CAPI
THE CANADIAN AGRI-FOOD POLICY INSTITUTE

March 2025

Food: The undervalued asset in Canada's Indo-Pacific Strategy

A *Perspective* Report prepared for CAPI
by Ted Bilyea

Perspective
Report

The Canadian Agri-Food Policy Institute
960 Carling Avenue, CEF Building 60
Ottawa, ON K1A 0C6
capi-icpa.ca

The Canadian Agri-Food Policy Institute's mission is to lead policy development, collaborate with partners and advance policy solutions within agriculture and food.

This report was funded in part by *Agriculture and Agri-Food Canada under the Sustainable Canadian Agricultural Partnership's AgriMarketing Program*

To ensure the validity and quality of its work, CAPI requires all *Research* Reports to go through a peer review process. CAPI thanks the peer reviewers for their comments on an earlier draft of this report.

Table of Contents

Introduction: The strategic value of food in Canada's Indo-Pacific Strategy

Food security is a top priority in most countries in the Indo-Pacific region of the world, a vast land area that includes the Indian and western Pacific Ocean and the countries and islands that border them.

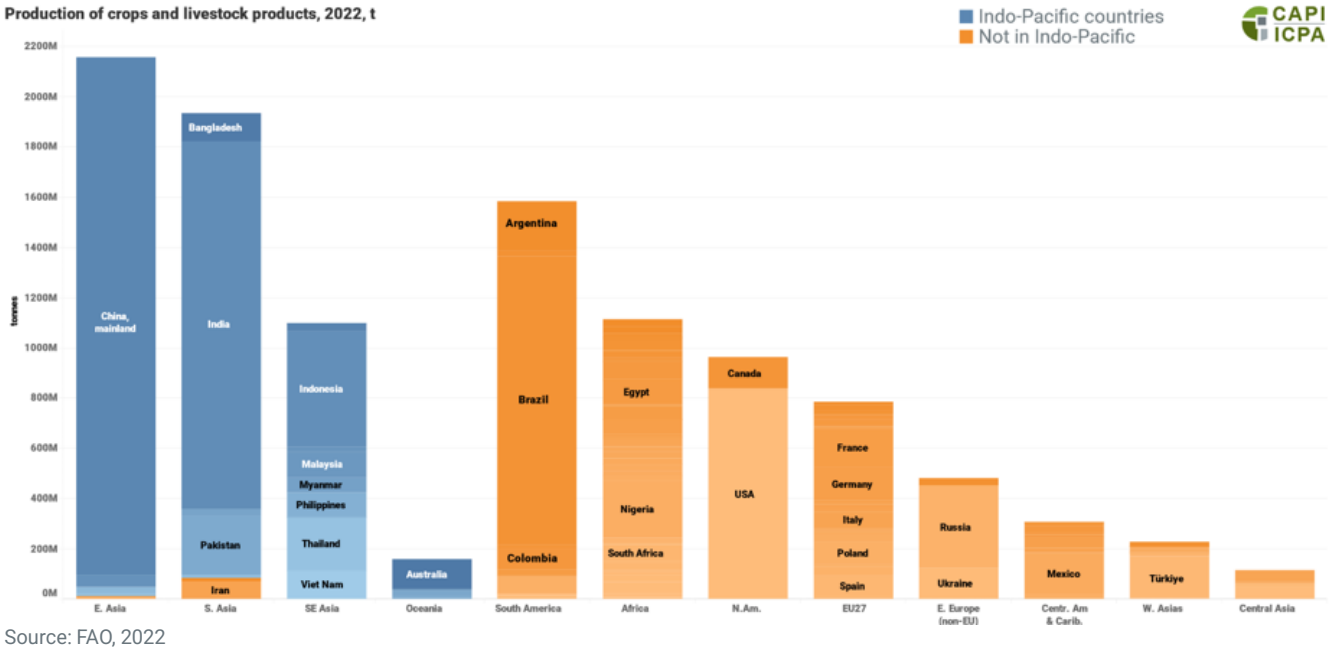
This region is significant not only because it is home to about half of the world's population and some of the largest economies, but also because it's the world's fastest growing region and home to many of Canada's most important trading partners.

Given this, it seems strange that Canada, which has an enormous food trade surplus, has not recognized the strategic value of its food production asset as it engages with largely food-deficit countries or countries that are in transformation from food surplus to deficit.

This paper outlines the strategic value of food in Canada's Indo-Pacific Strategy (IPS), referencing CAPI's previous report on Linking Global Food Security with China's Food Security.

Importance of the Indo-Pacific

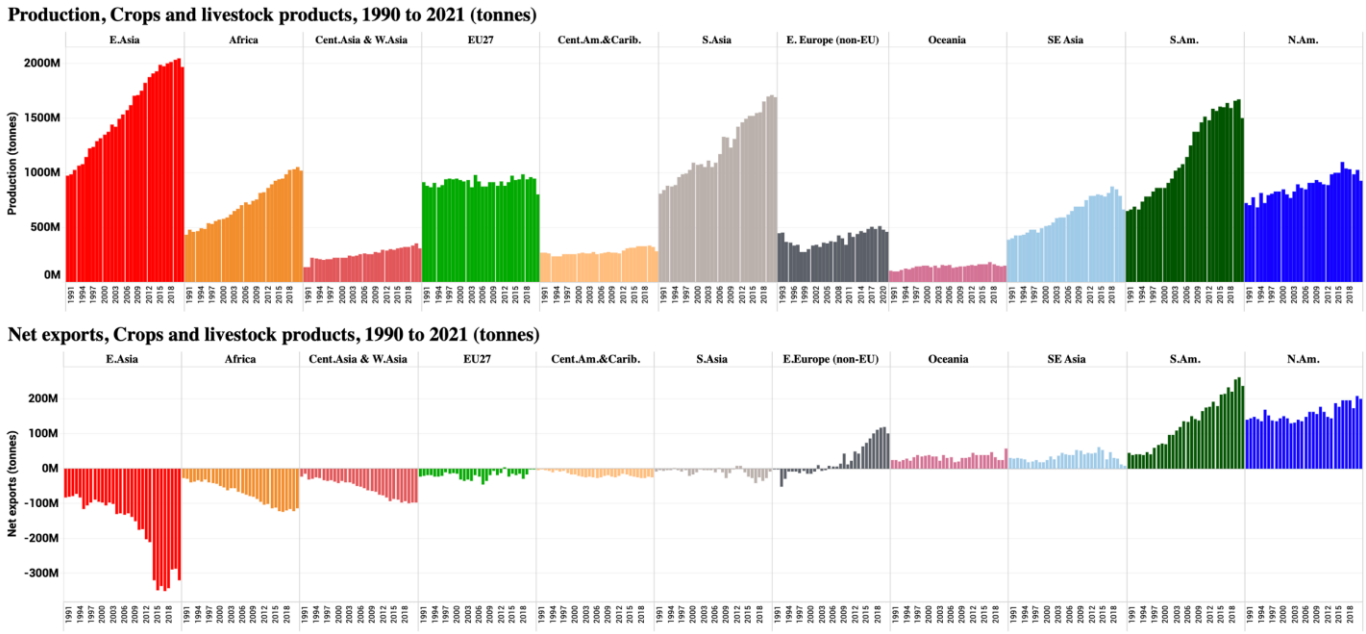
Figure 1



Source: FAO, 2022

As per Figure 1, a global view of crop and livestock production reminds us that the Indo-Pacific countries make up by far the largest food production region in the world.

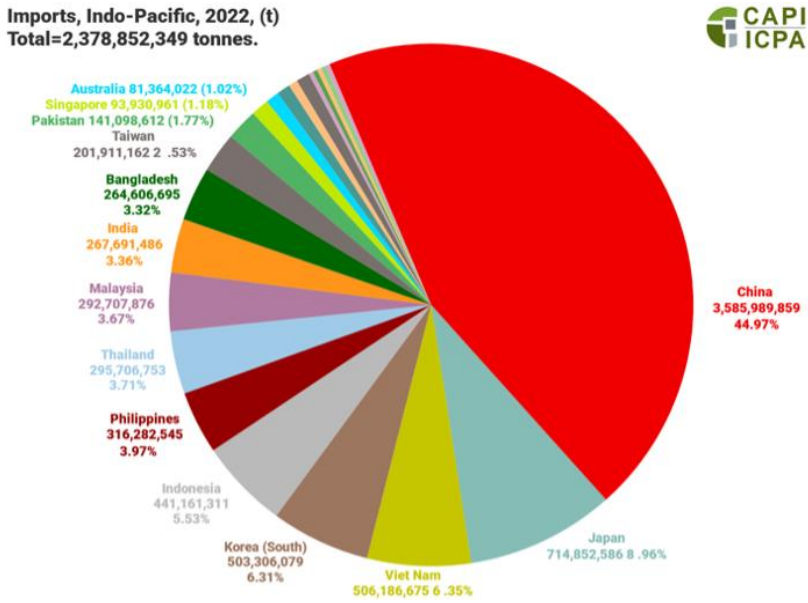
Figure 2



Source: CAPI, 2024

Despite being the largest crop and livestock producing region, it is also by far the largest food-deficit region, measured by net food trade in volume. This is apparent as we break the world down into more discreet regions, subdividing the Indo-Pacific into East Asia, Southeast Asia, Oceania, and South Asia (see Figure 2).

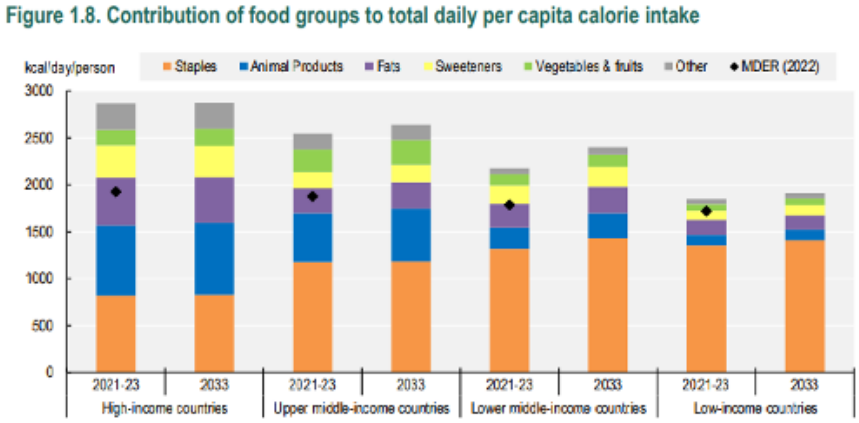
Figure 3



Looking at the total crop and livestock product imports of Indo-Pacific countries, it's noteworthy that China currently accounts for nearly half of the imports (see Figure 3).

Source: CAPI, 2024

Figure 4



Crop and livestock consumption, especially protein and fats including vegetable oil, are directly related to population and particularly income growth, as demonstrated in Figure 4.

Source: FAO, 2024

Figure 5

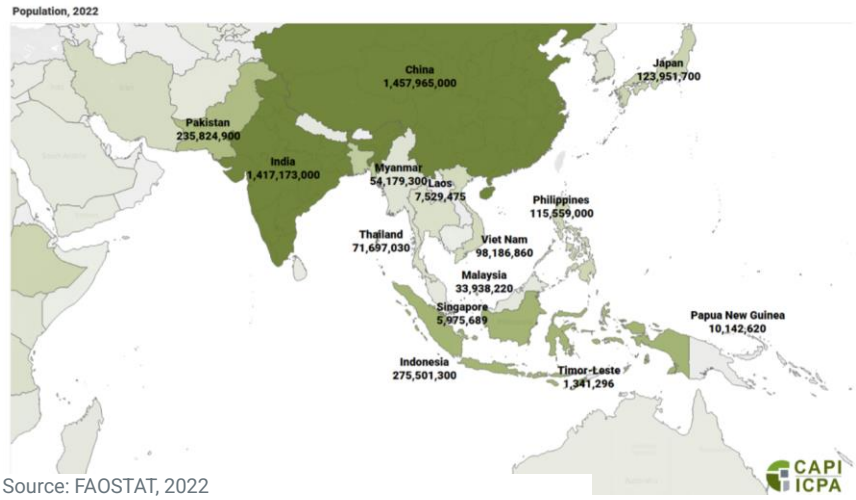
Given that the Indo-Pacific is increasingly food deficit, as seen in Figure 5, it is useful to consider population and income growth separately and their implications for global food trade.

Before doing so, however, it is important to note that a number of the Indo-Pacific countries are starting from quite low levels of per-capita protein consumption, which is income related. Any income improvement will have a significant consumption effect, as these countries have high income elasticities for food consumption.

Source: FAO, 2022

The global food system and the population challenge

Figure 6



Source: FAOSTAT, 2022

The Indo-Pacific is home to half of the world's people and its population is forecasted to continue to grow for at least the next 20 years. At the same time, population growth is also projected to continue in Africa until near the end of the century, assuming no wars or pandemics.

Despite slowing global population growth, world population is projected to increase by over 700 million, reaching 8.7 billion by 2033. This reflects an average growth rate of 0.8%, signaling a deceleration compared to the 1% growth observed in the past decade (see Figure 7).

Sub-Saharan Africa is anticipated to witness the most rapid population growth at 2.4%, whereas China's population is expected to decline gradually. India is projected to cement its position as the most populous country, having surpassed China in 2023, with an average growth rate of 0.8% over the next decade.

Figure 7

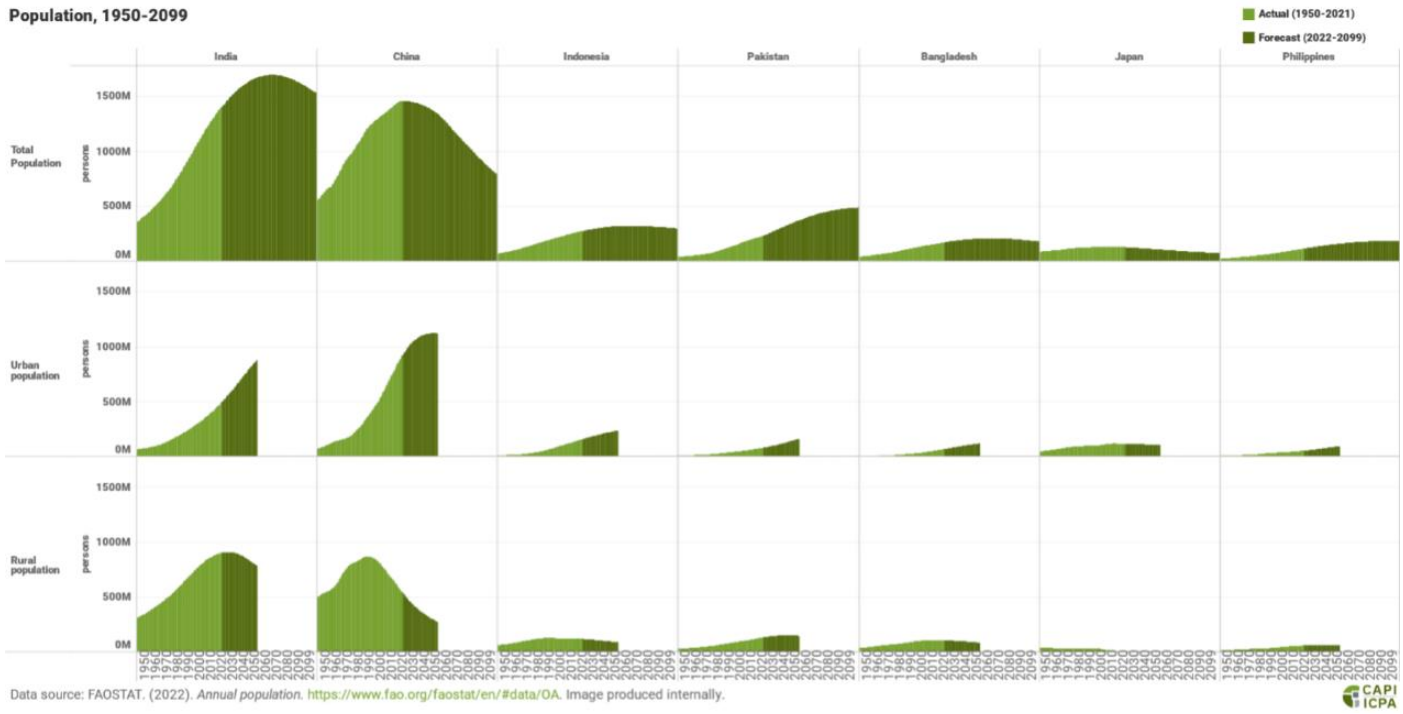
Source: CIA World Factbook, 2022

The overall slowdown in global population growth is anticipated to lead to a slower growth in global food demand compared to the previous ten years.

However, globally the population will continue to rise for at least the next 25-30 years and then flattens toward the end of the century. The Indo-Pacific and Africa will be major drivers of that expansion.

As can be seen in Figure 7, over half the world's babies are currently born in Asia.

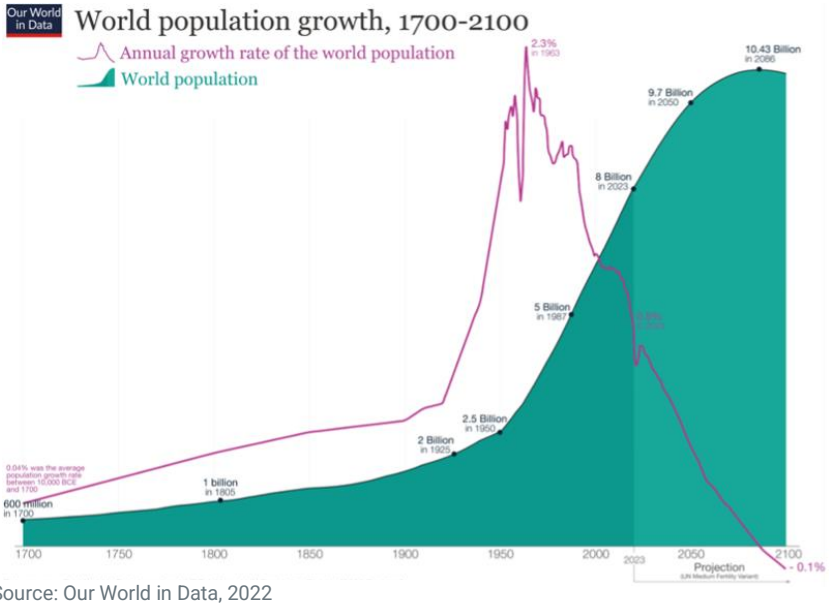
Figure 8



Source: FAOSTAT, 2022

Figure 8 indicates historical population growth from 1950-2022 and projections for the future. China and Japan have already reached their maximum populations while India and several other Indo-Pacific countries continue to grow. Also of note is the increase in urban dwellers across the Indo-Pacific. A significant portion of the Indo-Pacific population will continue to migrate from rural to urban settings, which tends to align with increasing income and food consumption.

Figure 9



Source: Our World in Data, 2022

Overall, what this information tells us is that even if birth rates remain below the replacement rate of 2.1 for most of the developed world, population growth will continue to challenge food security in the Indo-Pacific until the latter part of the century, unless agricultural productivity rises substantially.

The latest United Nations (UN) global population estimates indicate population growth will remain a challenge for the food system (see Figure 9).

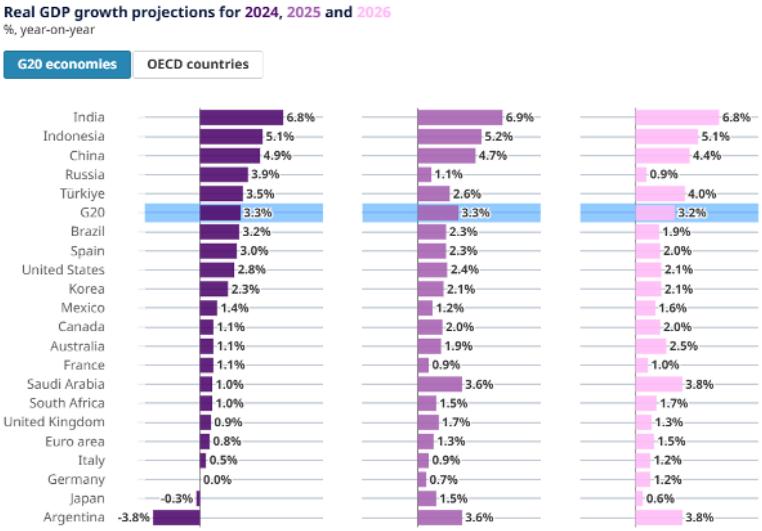
The global food system and economic drivers

Current economic outlook[1] indicates that global food consumption will continue to grow, although at a slower rate than pre-pandemic levels, despite increased geopolitical challenges.

The key food driver is gross domestic product (GDP) per capita, which relates to household disposable income.

Most recent projections also show global recovery continuing in four out of the top 10 Group of 20 (G20) economies, with the best growth performance projected in the Indo-Pacific. All four countries (India, Indonesia, China and South Korea) are large food importers.

Figure 10

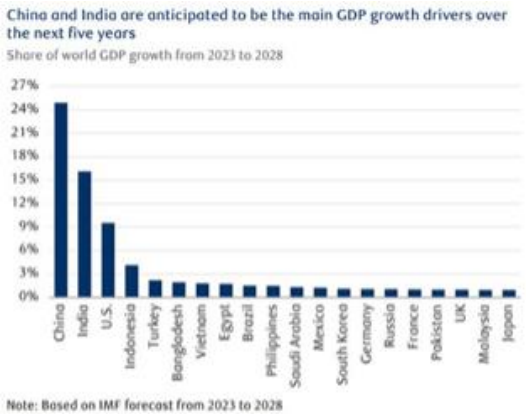


Source: OECD Economic Outlook, 2024

Most recent projections[2] also show global recovery continuing in four out of the top 10 Group of 20 (G20) economies, with the best growth performance projected in the Indo-Pacific. All four countries (India, Indonesia, China and South Korea) are large food importers.

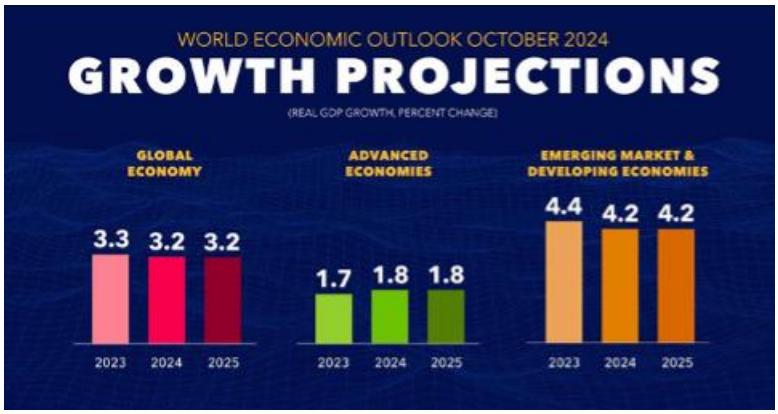
In addition, the growth outlook for the full Organization for Economic Co-operation and Development (OECD) membership is 3.3% for 2025 and 2026, which means increasing consumption of foods, particularly protein, fats, fruit and vegetables. (See Figure 10).

Figure 11



Source: IMF, 2023

Figure 12



Source: IMF, 2024

[1] Based on recent publications by the OECD, IMF and Peterson Institute for International Economics
[2] OECD. (December, 2024), Economic Outlook.

Figure 13

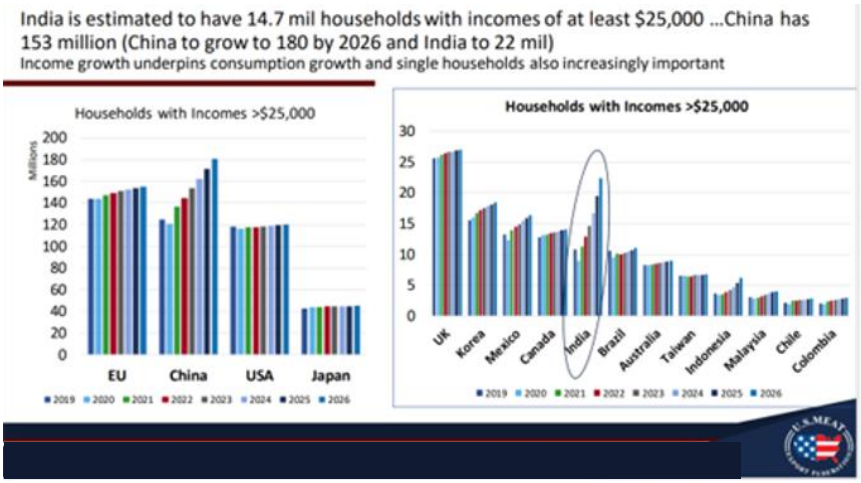
Source: Oxford Economics Global Cities, 2022

According to Figures 12 and 13, Asian cities will lead global GDP growth, which again has strong implications for the global food system.

GDP growth impacts how much and what type of food is consumed at the household income level. It is well understood that once household incomes rise beyond $25,000 per year, more protein is consumed, particularly meat protein, fats and produce.

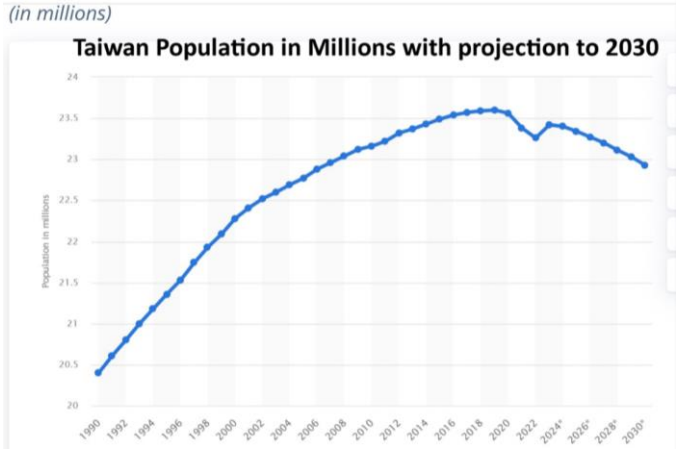
This household income elasticity, and related enhanced diet, is driving the need for increased food production. The chart below shows the dramatic growth in the number of households with income in excess of $25,000 annually. China has overtaken the United States (U.S.) and the European Union (EU) while India and multiple developing countries — particularly in the Indo-Pacific — are now entering that category.

Figure 14



Source: USMEF, 2022

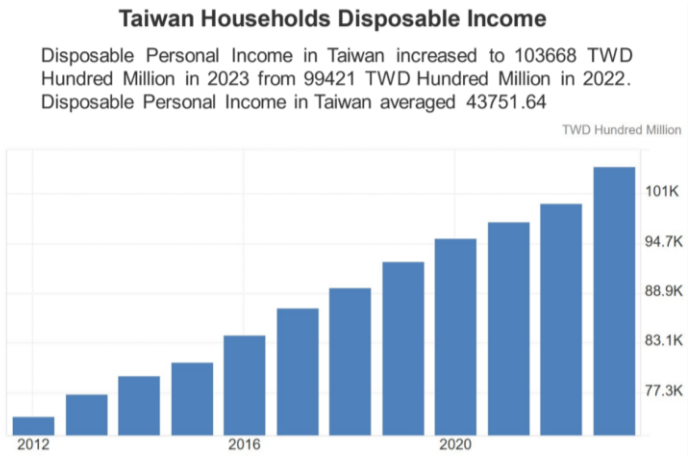
Figure 15



Source: Statistica, 2024

There is evidence from Taiwan that as population decreased, household income and disposable income per person increased, which likely accounts for Taiwan's strong meat demand.

Figure 16

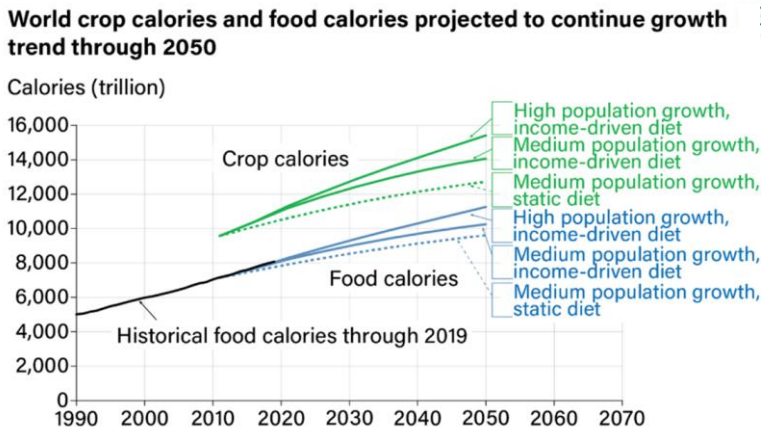


Source: Trading Economics, 2021

There is also evidence from Japan that declining and aging populations lead to an increase in protein consumption, particularly of meat.

Will global food production meet future demands of population and income growth?

Figure 17



Source: USDA, 2024 Chart created by J.P. Gervais, Farm Credit Canada

There is an enormous body of literature opining on the production challenge presented by population and income growth. One of the simplest visuals of the challenge (see Figure 17) indicates that a combination of high or medium population and income growth would translate into global consumption needs that would outpace our production capacity, barring any major productivity jumps.

A recent study out of China[3] aimed to project meat and cereal demand for the country to 2030, based on income elasticities. The study concluded that income elasticities for all meat products and most cereals tend to decline as per capita income increases. It also found that, for wheat, income elasticity of demand increases as per capita income increases.

[3] De Zhou. (2024). Projecting meat and cereals demand for China based on a meta-analysis of income elasticities. Science Direct. https://www.sciencedirect.com/science/article/abs/pii/S1043951X17301888

"These changes in income elasticities are large enough that models used to make long-term projections of Chinese food consumption should incorporate time-varying income elasticities of demand. Given the tight domestic supply of food products in China, incorrect projections could lead to inappropriate agricultural and trade policies that could distort world food markets.

– Science Direct, 2020

The increased consumption for general cereals, rice, wheat, general meat and pork required to fill the gap between 2025 and 2030, as seen in Figure 18 below, would have clearly challenged the global food system had economic growth not slowed in China post pandemic.

Even with the weaker elasticities, as incomes have risen the increasing consumption will demand greater productivity, particularly for wheat and meat.

Figure 18

Table 7
Alternative food consumption levels for 2030 (million tons).
Source: authors' calculations based on meta-regression results and assumptions described in text.

Year	Based on Constant 2010 Elasticities					Based on Time-Varying Elasticities				
	General cereals	Rice	Wheat	General meat	Pork	General cereals	Rice	Wheat	General meat	Pork
2012	310.2	144.0	125.0	71.9	52.7	310.2	144.0	125.0	71.9	52.7
2015	332.2	158.8	140.3	79.4	57.7	329.3	158.3	140.8	79.1	57.3
2020	369.6	185.6	168.8	93.0	66.7	357.9	183.1	171.2	91.8	65.1
2025	407.0	214.8	201.1	107.8	76.3	381.1	208.7	207.1	105.0	72.5
2030	445.3	246.9	238.1	124.1	86.7	399.5	235.3	250.3	118.8	79.8

Source: De Zhou. (2024)

The global food system will clearly have more challenges ahead. Income elasticities are significantly higher across a wide range of developing countries and growth rates are picking up in a number of the Indo-Pacific countries following the pandemic, with increased consumption, reduced food exports and increased food imports.

Figure 19

Source: USDA, 2024

Many animal-product-deficit countries, particularly in the Indo-Pacific, are increasing animal production and integrating biofuels, despite the fact that this is creating feed grain/oilseed deficits. In turn, this is reducing food exports in some cases and increasing agricultural imports. For example, recent projections suggest this is also transforming India from a net food exporter to a net food importer (see Figures 18 and 19).

Figure 20

INDIAN INCOME PYRAMID

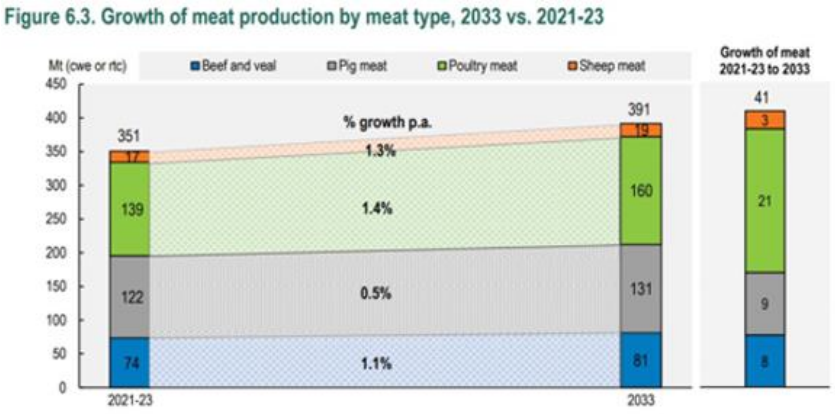
Consuming class	Income class (Rs. '000 at 2020-21 prices)	Population (million)			Population (%)			Annual growth (%)	
		2020 -21	2030 -31(P)	2046 -47(P)	2020 -21	2030 -31	2046 -47	2021 -31	2031 -47
Destitutes	<125	196	79	25	14	5	2	-8.6	-6.9
Aspirers	125– 500	732	568	184	52	37	11	-2.5	-6.8
Middle Class	500-3,000	432	715	1,015	31	47	61	5.2	2.2
Rich	>3,000	56	169	437	4	11	26	11.7	6.1
	Total	1,416	1,532	1,661	100	100	100	0.8	0.5

Source: The Economic Times, 2023

If Figure 20 is correct, India is about to follow China in slowly moving from grains self-sufficiency to becoming a more substantial importer. The increases in income among relativiely young people will lead to increased demand, diminishing exportable surplus.

When the income elasticity and population driver is applied globally, it produces an increase of 41 million tonnes of meat produced from 2021/2023 to 2033 (see Figure 21).

Figure 21



Source: OECD/FAO, 2024

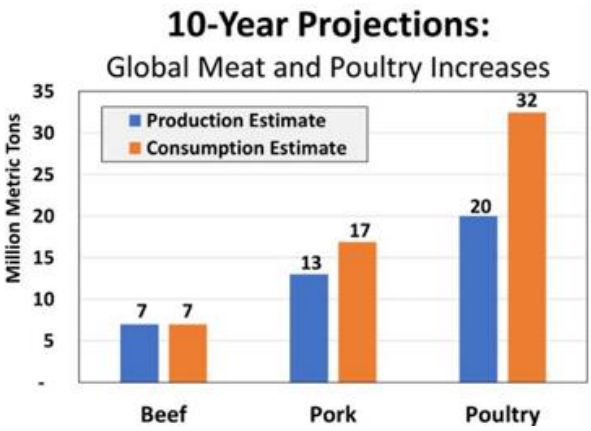
According to recent data from the OECD and FAO, the meat production increases needed to meet demand will require additional pasture and cropland as well as improved yields. For example, using North American conversion rates for the growth of chickens and hogs, we would require at least 63 million additional tonnes of feed. However, the actual amount required would be considerably higher as genetics and disease issues in developing countries slow weight gain and require longer feeding. Similarly, the additional 8 million tonnes of beef and 3 million tonnes of sheep meat will require considerable additional pastureland, assuming they are largely grassfed.

One expert recently suggested[4] that with beef cattle being in a virtual global liquidation cycle, there is no possibility of reaching an additional 8 million tonnes within the decade mentioned. He sees beef capping out at 7 million additional tonnes over the approximate same time frame.

Moreover, when applying a similar income elasticity equation, he sees demand for meat exceeding increased supply by approximately 15 million tonnes. With beef unable to expand within the set timeframe, potential unfilled demand will be price rationed as pork and particularly poultry production attempt to fill the gap.

[4] Stuart, B. (2024, April). *Global Agri Trends*.

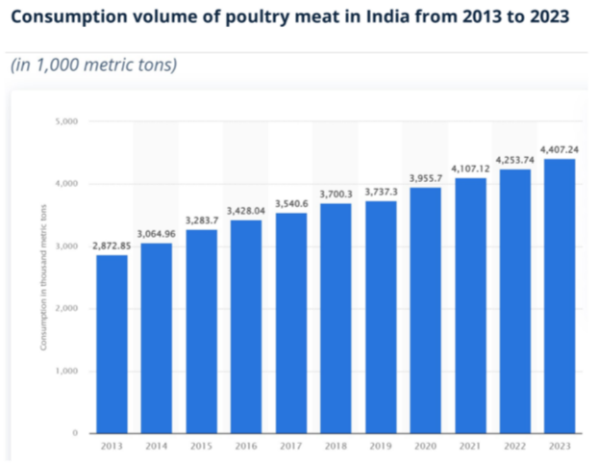
Figure 22



Source: Brett Stuart Global Agri Trends, 2024

It is possible the meat gap may be delayed due to the current slowing of the Chinese economy, but with other economies undergoing renewed growth it is likely the projections from the OECD and the Food and Agriculture Organization of the United Nations (FAO) will prove true, perhaps with a bit of a lag due, as illustrated in Figure 23 by the rapidly rising poultry consumption in India.

Figure 23

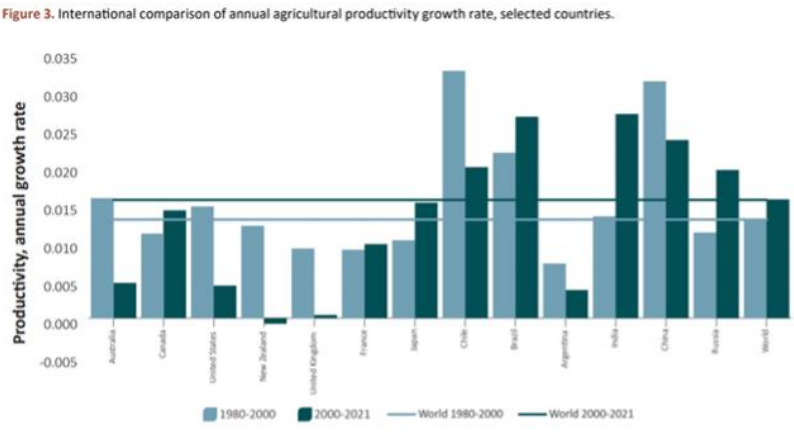


Source: Statista, 2024

It's important to remember that the Indo-Pacific is home to half of the global population and is the fastest-growing economic region in the world, with 60% of global GDP. According to the Government of Canada's IPS, the top 5 Indo-Pacific countries alone have a combined GDP of $37.9 trillion, compared to EU's combined GDP of $21.7 trillion.

Clearly if growth continues, even at the current slower pace, this part of the world will be prioritizing food security in the not-so-distant future.

Figure 24

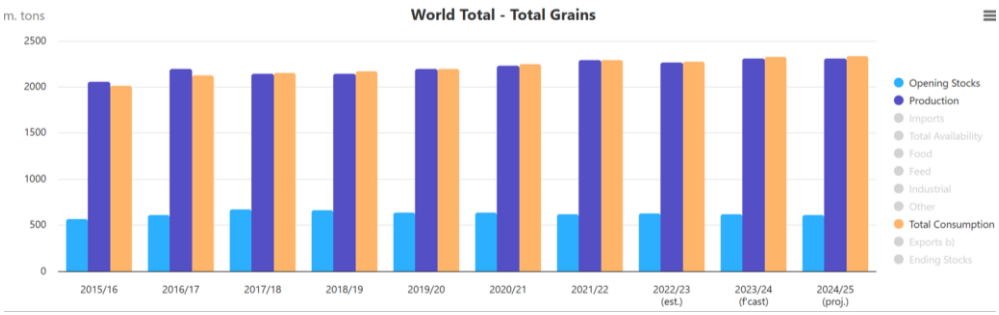


Source: Australian Government, 2024

The complex question is: can we feed increasing consumption without irreversible damage to the global food system and the planet?

One of the key assumptions is that increased productivity gains can help countries meet growing demand. However, despite agricultural productivity improvements in some countries, on a global basis, agricultural productivity is slowing. (See Figure 24).

Figure 25

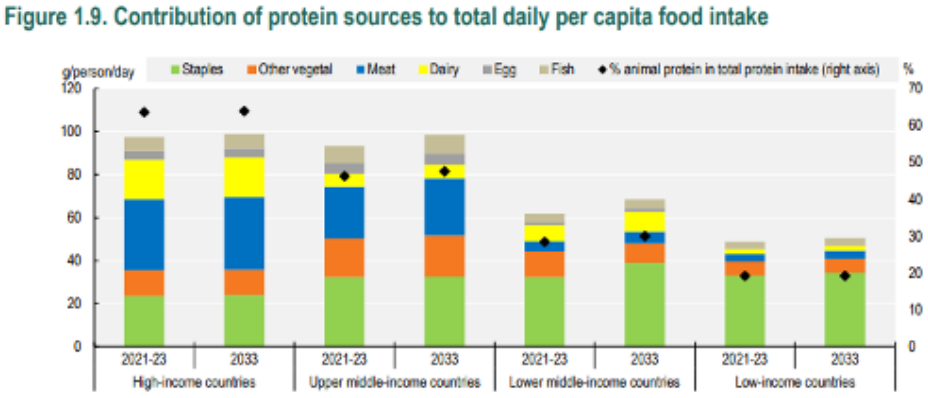


One indicator that productivity is not fully keeping pace with demand is that we've been unable to build stocks of global grain since 2015, despite the fact that globally more land has been brought into agricultural production.
(See Figure 25).

Source: International Grains Council, 2025

Slowing growth in China, combined with a good 2024/2025 crop in the U.S., may result in the first steadying in global stocks in a long time but given global headwinds this is likely to be temporary. Consumption has increased about 1.4% annually, while production has risen by about 1% with the difference showing in stocks drawn down.

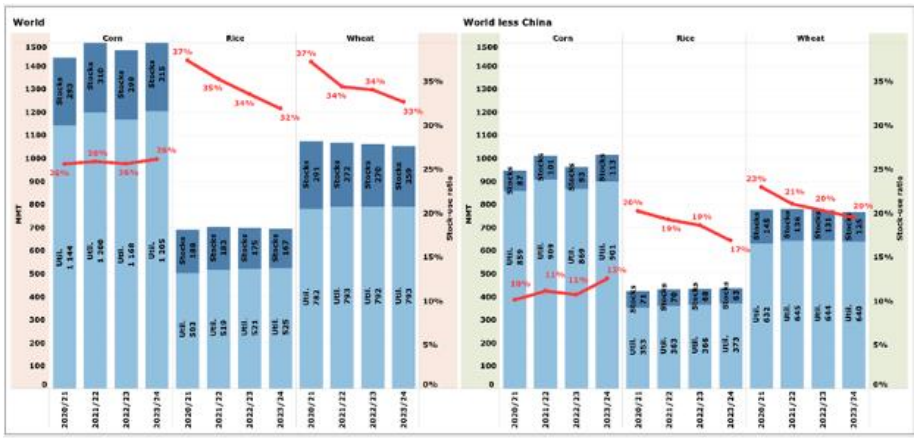
Figure 26



As the grain supply increases, more will be used to produce animal proteins, assuming more people continue to move into the middle class, particularly the Indo-Pacific.

Source: OECD/FAO, 2024

Figure 27



At this point one might ask: why have we not paid more attention to the fact that global grain stocks are not growing? The answer to that is twofold. First, the majority of grain stocks are held in China (see Figure 27) and second, there are more people with nutrient deficiencies and more going hungry, particularly in the growing number of conflict areas.

Source: CAPI, 2023

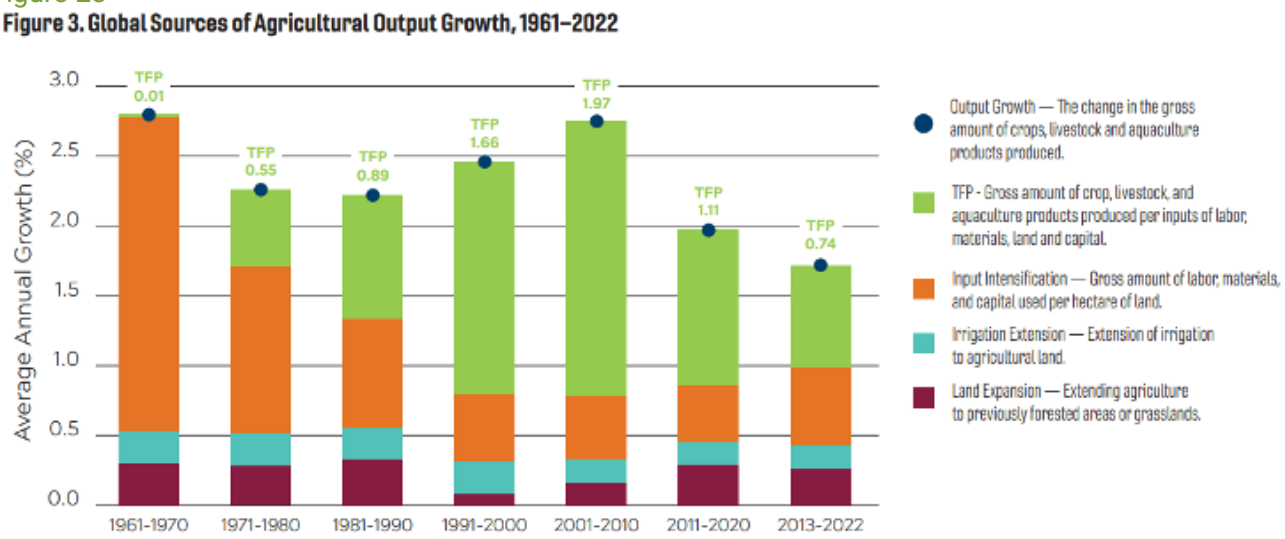
In assessing the importance of Canada's agri-food trade surplus to its IPS, a critical question is: How likely is it that productivity will improve to sufficiently meet increased demand from population growth and rising numbers entering the middle class?

The OECD projects that global agricultural production will increase by 1.1% annually over the next 10 years, with 80% of the increase coming from yield and the balance from the transformation of pasture- and natural-lands into cropland. Cropland expansion is projected to occur predominantly in Asia and the Pacific, Latin America and Sub-Saharan Africa.

One of the largest transformation is planned for Brazil's Cerrado where the government is targeting 70 million acres of degraded pasture to be upgraded to cropland. If that is successful it would represent nearly a 35% increase in Brazil's total planted area compared with the 2023/2024 but ultimate success will depend on the headwinds discussed later in this paper but most concerning is the markedly drier conditions affecting this area thought to be due to changes in atmospheric circulation and evapotranspiration[5].

At the same time, pastureland is projected to transition in Asia and the Pacific (excluding China and India) to accommodate more intensive systems for pigs and poultry. Ruminant production is also expected to shift towards more feed-intensive systems[6], which require less pastureland but more feed grains and protein meals.

Figure 28



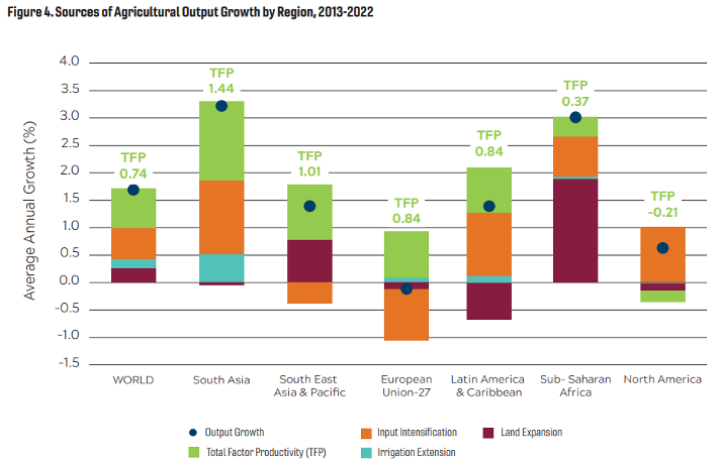
Source: USDA, 2024

The next key question is: What is the likelihood that there will be sufficient productivity gains to prevent a global food security crisis, especially when recent data[7] shows that the annual productivity growth of agriculture output has declined for the last couple of decades. To be clear, output is still rising but it is slower than in the past.

There are currently a number of unsustainable trends. Figure 28 indicates the global output growth rate has fallen, led by an output growth rate slowing in the EU countries and North America. Figure 29 raises concern as to whether South Asia, with the highest average annual growth rate of crop and livestock, can maintain output growth when it is so dependent on irrigation which is already known to be drawing down groundwater, particularly in Northwest India.

[5] Source Nature July 11, 2023 https://www.nature.com/articles/s41598-023-38174-x
[6] Organisation for Economic Co-operation and Development (OECD). OECD iLibrary. https://www.oecd-ilibrary.org
[7] Virginia Tech. (2024). Global Agricultural Productivity Report.

Figure 29



Source: USDA, 2024

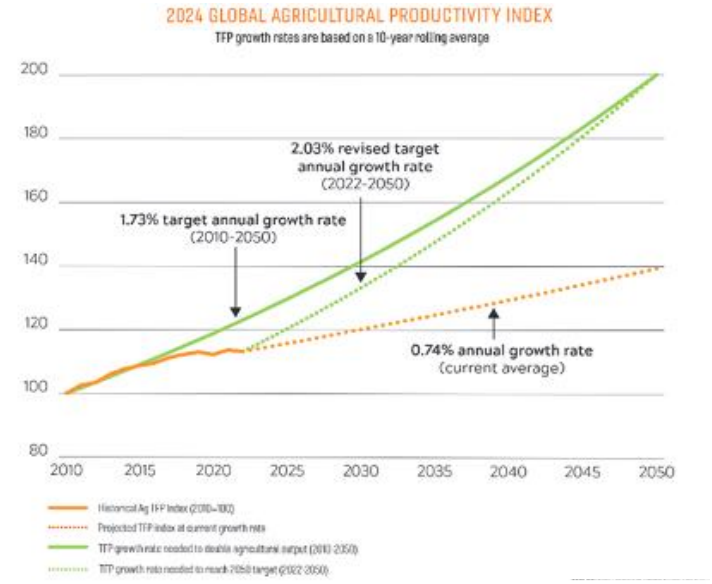
As wells run dry or require such deepening that the water becomes salty, some proportion of double crop agriculture may revert to one crop a year, supported by the monsoon.

The same may be true for Sub-Saharan Africa[8], the region with the second highest annual output growth, two thirds of which is supported by a questionably sustainable conversion of forest and grassland to crop.

Similarly, a large portion of Southeast Asia's annual growth is directly related to conversion of tropical forest to cropland, which may prove an increasingly unsustainable growth factor.

All three of these areas are adopting productivity enhancements that North America and the EU employed to boost productivity a couple of decades ago. As these enhancements continue, we will inevitably see further productivity growth begin to slow as it did in the EU and North America.

Figure 30



Source: GAP Report, 2024

With total factor productivity (TFP) growth dropping for the last two decades, it is unlikely that we can continue to produce more food than we will consume, even assuming some slowing of current population and income projections. A recent study[9] projected that, to meet sustainable food production goals and successfully feed a growing global population, TFP growth must average 2% annually from 2024 to 2050.

[8] Virginia Tech. (2024). Global Agricultural Productivity Report.
[9] Virginia Tech. (2024). Global Agricultural Productivity Report.

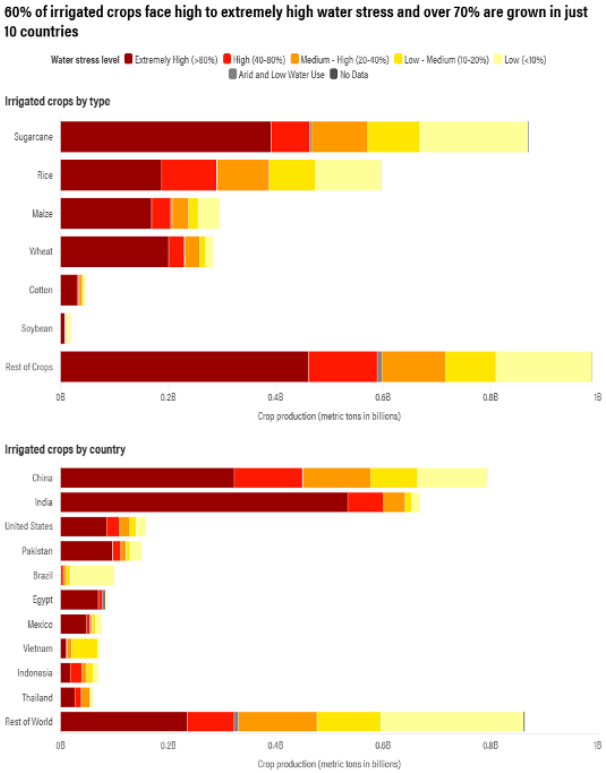
The challenges for continued growth in output productivity

Water accessibility

One of the most potentially significant challenges to agricultural output growth right now is water.

A recent report[10] shows that 31% of the population, or 51 countries or territories, are expected to suffer from high to extremely high water stress by 2050. Another recent report [11] outlines how just a handful of countries globally produce most of the world's irrigated crops – and their water sources are rapidly depleting.

Figure 31



Source: Aqueduct Food, 2024

Figure 32

Source: OilPrice.com, 2024

[10] https://www.wri.org/applications/aqueduct/country-rankings/?indicator=bws
[11] https://www.wri.org/insights/growing-water-risks-food-crops?apcid=0065832f2f41868dfb65d100&utm_campaign=wridigest&utm_medium=email&utm_source=wridigest-2024-12-19

Another recent study[12] found that nearly 3 billion people live in areas of the world experiencing a worsening water shortage.

Further evidence shows that droughts and floods are becoming more serious threats to agriculture and will require significant mitigation and adaptation efforts to even maintain current agriculture productivity growth.

One of the major drivers of productivity growth in South Asia and other parts of the world is irrigation accessed from groundwater. However, global groundwater is being drawn down in many major agricultural producing areas significantly faster than recharge rates. A recent study[13] sets out the timetable for these challenges:

"Global non-renewable groundwater withdrawals exhibit a distinct peak-and-decline signature, comparable to historical observations of other depletable resources (for example, minerals), in nearly all (98%) scenarios, peaking on average at 625 km^3 yr^{-1} around mid-century, followed by a decline through 2100. The peak and decline occur in about one-third (82) of basins, including 21 that may have already peaked, exposing about half (44%) of the global population to groundwater stress. Most of these basins are in countries with the highest current extraction rates, including the United States, Mexico, Pakistan, India, China, Saudi Arabia and Iran. These groundwater-dependent basins will probably face increasing costs of groundwater and food production, suggesting important implications for global agricultural trade and a diminished role for groundwater in meeting global water demands during the twenty-first century."

– Nature Sustainability, 2024

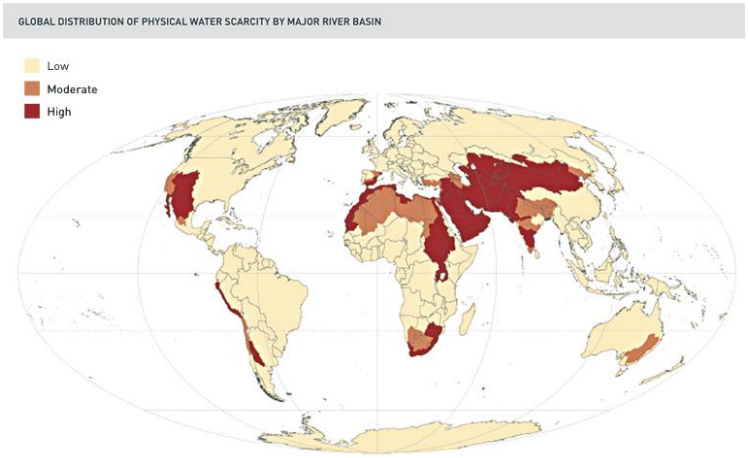
Another recent report re-iterates the issue:

"Because of the dependence of many key food production systems on groundwater, declining aquifer levels and continued abstraction of non-renewable groundwater present a growing risk to local and global food production. In some regions, particularly in the Middle East, Northern Africa and Central Asia, countries are already withdrawing in excess of critical thresholds. Western, Central and South Asia currently use half or more of their water resources in irrigation, and in Northern Africa withdrawals for irrigation exceed renewable resources due to groundwater overdraft and recycling."

– FAO, 2011

[12] Global Commission on the Economics of Water (GCEW). (2024, October)
[13] https://www.nature.com/articles/s41893-024-01306-w?fromPaywallRec=false

Figure 33



Source: FAO, 2021

The decline not only affects the country using the groundwater for irrigation but will curtail international food trade, as pointed out in the following:

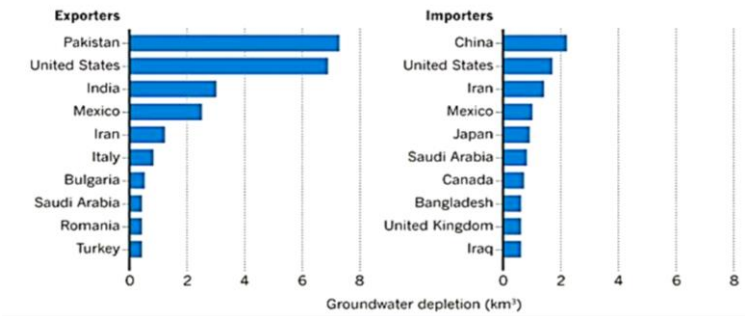
"Recent hydrological modelling and Earth observations have located and quantified alarming rates of groundwater depletion worldwide. This depletion is primarily due to water withdrawals for irrigation but its connection with the main driver of irrigation, global food consumption, has not yet been explored. Here we show that approximately 11% of non-renewable groundwater use for irrigation is embedded in international food trade.

A vast majority of the world's population lives in countries sourcing nearly all their staple crop imports from partners who deplete groundwater to produce these crops, highlighting risks for global food and water security. Some countries, such as the USA, Mexico, Iran and China, are particularly exposed to these risks because they both produce and import food irrigated from rapidly depleting aquifers."

– Nature Science Letter, 2017

The major exporters of groundwater depletion and the major importers of crops from depleted groundwater are shown in Figure 34 below. Despite Canada being a large surplus food exporter, it is not one of the major groundwater depletion exporters, but it is a major importer of agriculture dependent on depleted ground water.

Figure 34



The increasing use of irrigation despite water scarcity has accelerated soil salination, which the FAO has pointed out to be another serious threat to maintaining, let alone increasing, agricultural productivity.

Recent research has found that the amount of land globally affected by excess salt is set to increase rapidly, which could have potentially devastating effects on food production.

Source: Environmental Science, 2017

In fact, recent statistics[14] have suggested that about 1.4 billion hectares (3.4 billion acres), or about 10% of global land is affected by salinity, with a further 1 billion hectares (2.5 billion acres) considered to be "at risk."

"This is already having a serious impact on agriculture, as globally about a tenth of irrigated cropland and a similar proportion of rain-fed cropland is afflicted by excess salt. The potential losses to crop yields are as high as 70% in some cases.

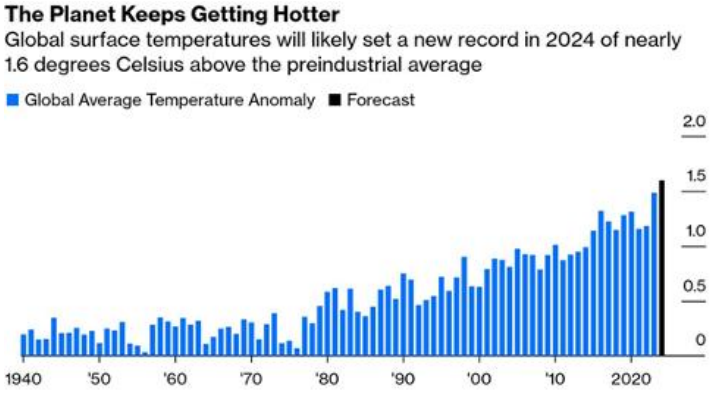
Some of the world's largest and most populous countries are particularly badly hit, including China and the U.S., Russia, Australia and Argentina. The central Asian region is also a hotspot, with Afghanistan, Kazakhstan, and Uzbekistan badly affected, while Iran and Sudan also rank among the countries suffering the worst effects. These 10 countries account for 70% of salt-affected soils globally."

– The Guardian, 2024

Of course, both groundwater depletion and soil salination are significantly impacted by the fact the world is getting warmer. The rise in temperature itself will play a major role in slowing, and eventually reducing agricultural productivity growth globally, with the exception of high latitude countries such as Canada, Russia, Scandinavia and more.

Climate change

Figure 35

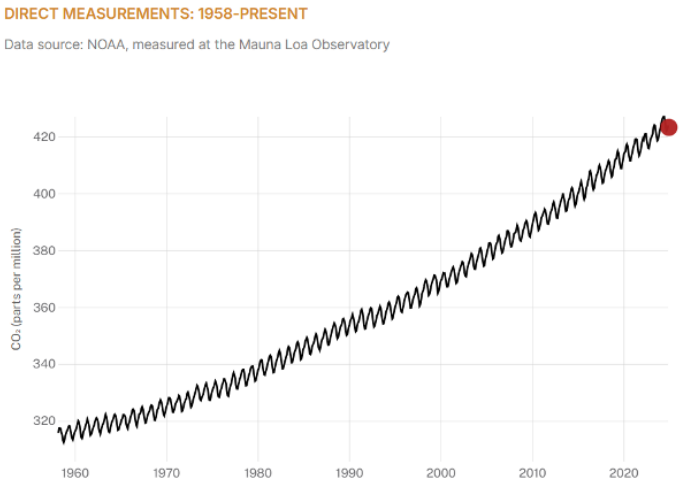


Source: Copernicus Climate Change Service, 2024

There has been a lot written on global warming, but as Figure 35 below indicates, it is generally conceded that we are currently experiencing warmer temperatures globally.

[14] FAO. (2024). https://www.fao.org/newsroom/detail/fao-launches-first-major-global-assessment-of-salt-affected-soils-in-50-years/en

Figure 36

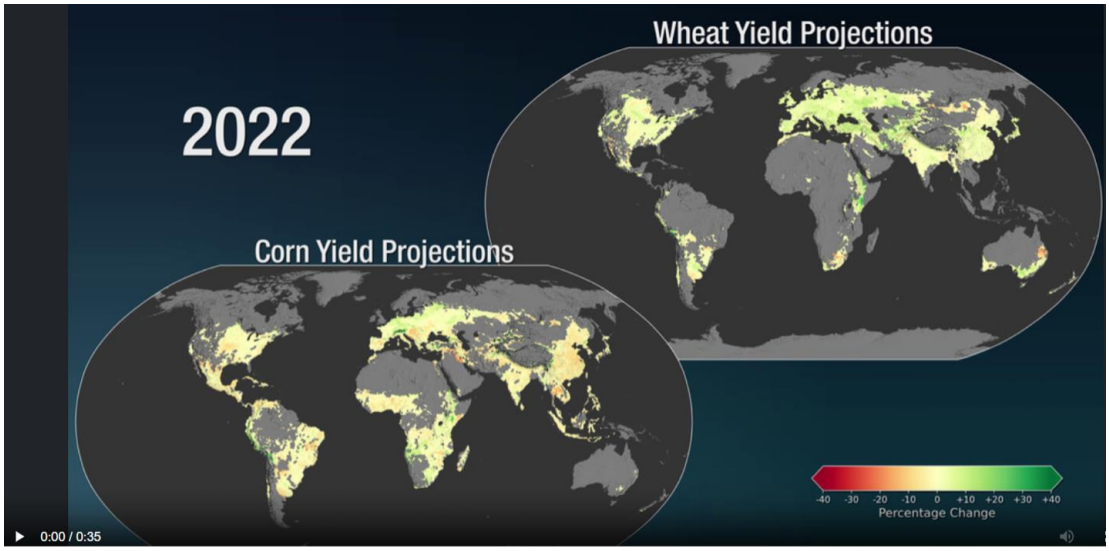


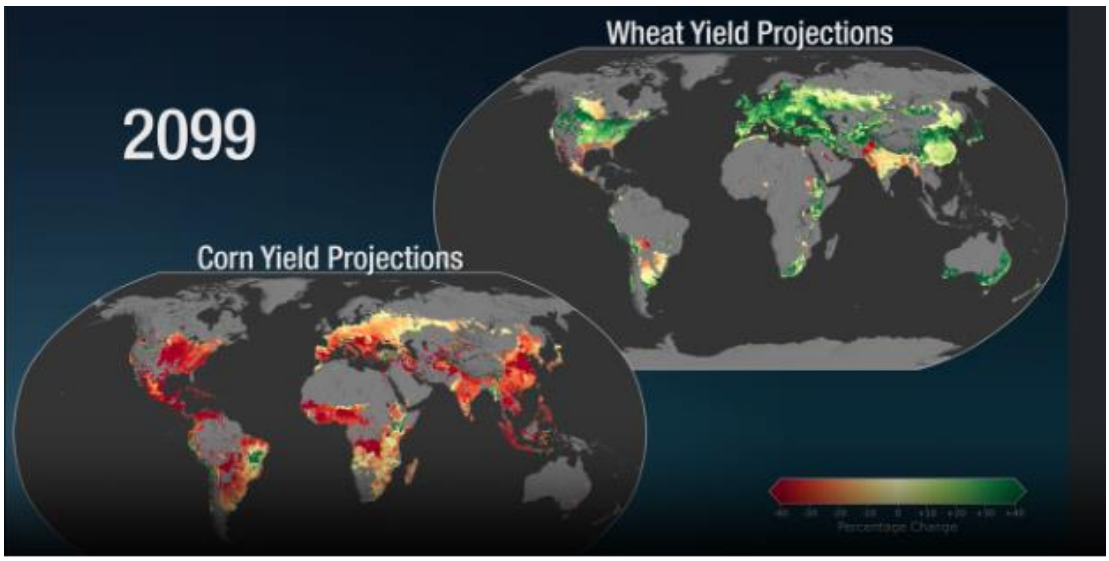
Source: NASA, 2024

Having a definitive view on the effect of warming and increasing CO2 levels on various crops is well beyond the scope of this report. However, without some currently unforeseen game-changing intervention (China's increasing use of genetically modified crops and animals not withstanding), it is safe to say productivity will be increasingly handicapped as we move toward 2050 and later.

Figure 37 below attempts to visualize the temperature and CO2 effect on crops.

Figure 37





Source: NASA, 2022

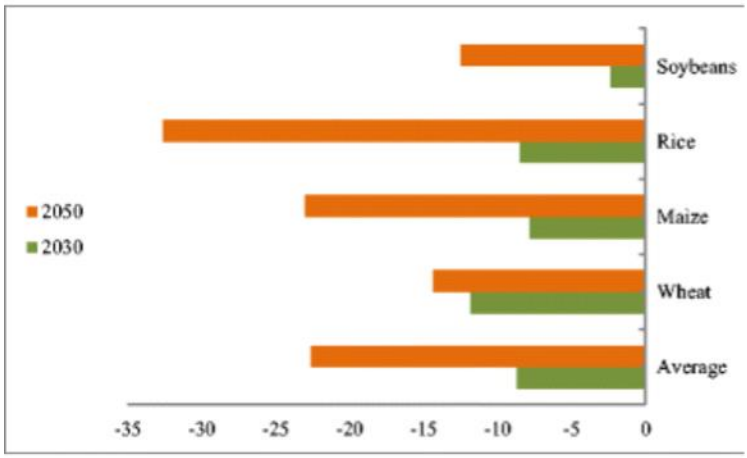
As per the modelling in Figure 37, the conclusion is that:

> **"Average global crop yields for maize, or corn, may see a decrease of 24% by late century, with the declines becoming apparent by 2030, with high greenhouse gas emissions, according to a new NASA study. Wheat, in contrast, may see an uptick in crop yields by about 17%. The change in yields is due to the projected increases in temperature, shifts in rainfall patterns and elevated surface carbon dioxide concentrations … making it more difficult to grow maize in the tropics but elsewhere expanding wheat's growing range."**
>
> – NASA, 2022

Another recent study[15] foresees significant crop and price volatility in the major grains, projecting that climate change could reduce global crop production by 9% in the next decade and by 23% in the 2050s. It also projects that climate change volatility will lead to increases in annual fluctuations of global crop production of 1-3% over the next four decades, which would have significantly adverse effects on the production of global staple crops. It would also exacerbate fluctuations of food availability, therefore potentially increasing price volatility and food security, particular in poorer areas.

If Figure 38, below, is even partially accurate it suggests a food security disaster later in the century.

Figure 38



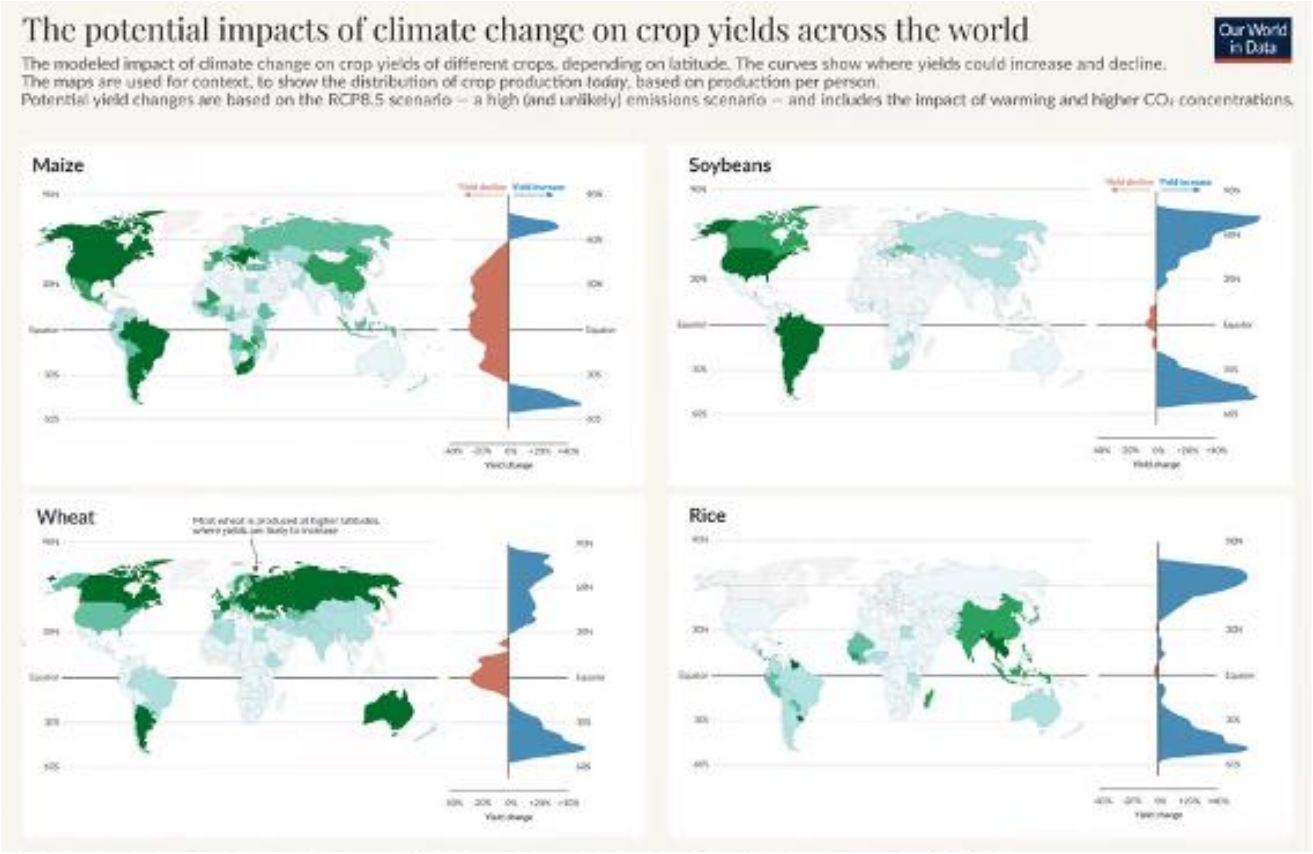
Projected effect of climate change on food production (%)

Source: ResearchGate, 2017

Another study[16] looking at the dual issue of warming and increasing CO2 makes it clear that the most serious adverse crop effects will occur in lower latitude countries while Canada may actually benefit. As we consider what this means for Canadian strategy, it is worth remembering the majority of countries in the Indo-Pacific are all in the lower latitude range most affected, at least partially.

[15] Ritchie, H. (2024). *How will climate change affect crop yields in the future?*
[16] Ritchie, H. (2024). *How will climate change affect crop yields in the future?*

Figure 39



Source: Our World in Data, 2024

Bringing this a little closer to home, another recent study showed a productivity gap in U.S. agriculture due to warmer temperatures and slightly drier conditions:

> **"Researchers modeled a future climate-change scenario with an average temperature increase of 2 degrees Celsius (3.6 degrees Fahrenheit) and a 1-inch decrease in average annual precipitation. Projections showed that the difference of the total factor productivity levels between the projected period (2030-40) and the reference period (2000-10) varied across regions. Some states would experience larger effects than others."**
>
> – USDA, 2019

As the U.S. is a large net exporter of a variety of agri-food products by volume, the productivity gap that the USDA foresees in a number of states will make it difficult to overcome productivity declines elsewhere, as discussed above.

The FAO sums this situation up by focusing on the global trading system.

> **"The global trading system is a public good which will only become more valuable in the future. Free and unfettered access to global food supplies must be ensured in the face of the great uncertainty around future climate change and its impacts on agricultural production."**
>
> – FAO, 2018

A Canadian Indo-Pacific Strategy

Our first move on the global chess board might be to raise the understanding that global food security is seriously under threat, which has been highlighted by experts in recent years.

Canada needs to be a leader in keeping global attention on the threat to global food security, which will reduce resistance to the subsequent strategies proposed. As a reminder of the strength of our agriculture asset:

- Canada has structurally larger agricultural capacity than it has domestic population to feed
- Relatively abundant fresh water with low reliance on groundwater irrigation
- Generally efficient agricultural production systems
- The Canadian agricultural systems is generally expected to be a beneficiary of climate change
- Significant a stable exportable surpluses, with few peers

Given the likelihood of rising food deficits and the economic growth in the increasingly food deficit Indo-Pacific, how might Canada's relatively sustainable agri-food asset feature in our IPS?

From the Government of Canada's perspective, the Indo-Pacific represents an enormous area of opportunity.

> **"The Indo-Pacific is rapidly becoming the global centre of economic dynamism and strategic challenge. Every issue that matters to Canadians — including our national security, economic prosperity … depend in part on what happens over the next several decades in the Indo-Pacific. By 2040 the region will account for more than half of the global economy, or more than twice the share of the United States. By 2030, it will be home to two-thirds of the global middle class, having lifted millions out of poverty through economic growth."**
>
> – Government of Canada, 2024

However, along with this opportunity comes enormous strategic challenges. The Indo-Pacific is home to four nations that have nuclear weapons and our relationship with these nations runs from cool to hostile. Interestingly, there is no recognition in the Canadian strategy that food security is critical to many of the larger Indo-Pacific nations who fear increasing vulnerability. For example, China's "No. 1" policy document focuses on food security. In early 2024, the Chinese Communist Party unveiled its policy guidelines for agriculture and rural development for the year, reflecting that food security and improving crop yields are currently top priorities. Similarly, Japan has become highly focused on food security, particularly after having faced shortages of rice, palm oil etc. in the last few years[17].

[17] Foreign Agricultural Service, U.S. Department of Agriculture (USDA). (2024). Japan announces measures to strengthen food security. https://www.fas.usda.gov/data/japan-japan-announces-measures-strengthen-food-security

In the case of India, food security is deeply woven into the country's politics, as evidenced by the government's stockpiling of, and subsidies for cereals. But unlike China and Japan, India has a much greater challenge with its growing population and particularly its increasing middle class, discussed above. A recent report showcased how India's food security challenges are in a class of their own:

> **"The problem is already palpable today. Although cereal production has greatly increased, the quantity of "foodgrains" available per capita is already decreasing, going from 510.1 grams per day per person in 1991 to 507.9 grams in 2021."**
>
> – The Wire, 2024

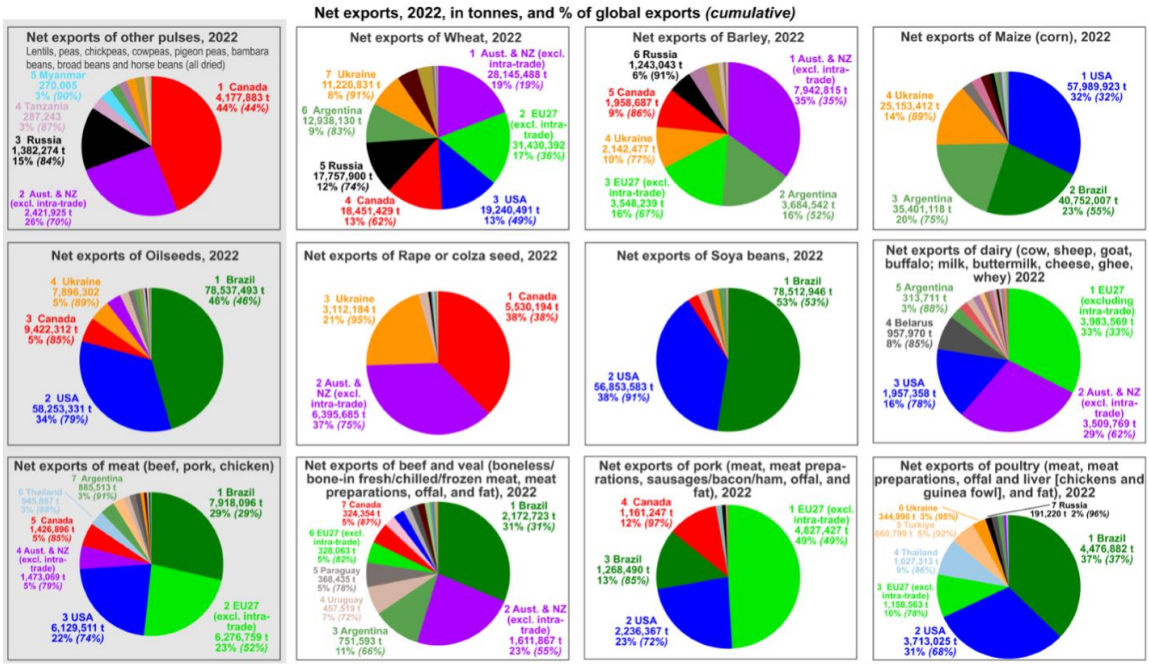
Lest there be any doubt of the seriousness of food security concerns for the Indo-Pacific, a recent article made the situation clear.

> **"A nation's power is contingent upon the happiness of its populace and its capacity to positively impact its economy and security. Indicators such as food availability, levels of malnutrition and hunger, and food accessibility gauge the health of a population. Food security significantly impacts the readiness of a nation's Armed Forces. Effective military operations rely on the availability of adequate food supplies for personnel. Consequently, it is imperative for nations to prioritize food security as a national security imperative. Regardless of a nation's power, effective functioning across all domains necessitates a steady and uninterrupted food supply to its citizens. Governments worldwide are addressing these concerns. Treating food security as a core national security concern ensures resilience against the indirect impacts of climate change. Furthermore, ensuring food security is not only essential for maintaining citizen satisfaction and productivity but also for quelling discontent within a nation."**
>
> – Journal of Indo-Pacific Affairs, 2024

Therefore, it will be critical for Canada to recognize food as a strategic asset by first highlighting that the global food system is moving from the era of abundance to a future of increasing scarcity. This is causing many countries to begin prioritizing food security, but the supply of all major traded food commodities is highly concentrated. It takes at most seven net export countries to make up over 70% of the trade in most major food commodities and in no case is Russian production required in order to reach 70%. In fact, in many cases, it takes four or fewer countries to reach well above 80% of the net exports. The opposite is the case when we look at the increasing list of net food importers, as shown in Figure 41 on the following page.

Canada features in the handful of large net exporters of temperate crops and animal products measured by volume, along with U.S., Brazil, EU, Australia, New Zealand, Ukraine and Argentina. These countries are also all net exporters of crop and livestock product measured by value, except for the U.S., which has become a net importer measured in value terms. This is significant, as there may be more alignment between some of the other net exporters in forming a coalition to shift some power back to the net exporters, which has tended to accumulate with the net importers during the era of abundance.

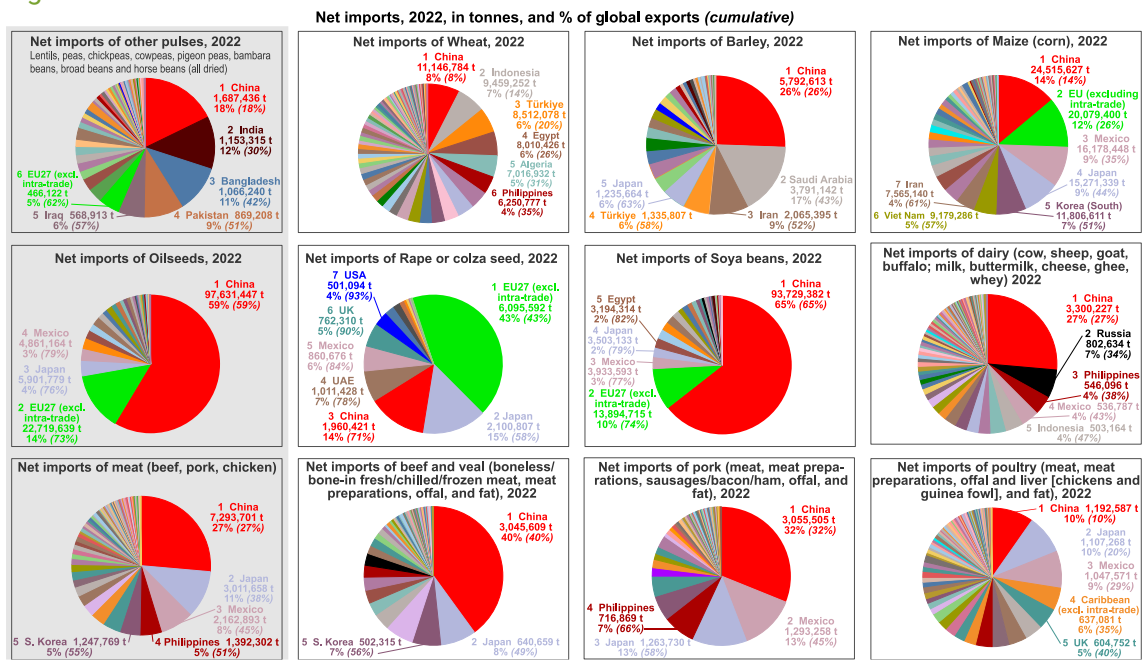
Figure 40



Source: CAPI, 2024

Contrast the concentration of net food exporters with the greater number of net importers and note the one exceptionally large importer and the Indo-Pacific share of net imports.

Figure 41



Source: CAPI, 2024

Food has become the weapon of choice as retaliation in trade disputes. Increasingly, countries employ food trade as a tool to intimidate and punish as diplomatic tensions arise, and to opportunistically expand their own domestic agri-food industries at the expense of their import suppliers. For example the political tensions between Australia and China were oddly coincident with dumping disputes on barley, wine, and restrictions on beef and lobster restrictions initiated by China against Australia- despite the fact that China is a large net importer of each of these products. Similarly a diplomatic row between Canada and China in 2018-21 involving detention of each other's citizens was coincident with Chinese action against imports of Canadian canola.

In other cases, countries employ public stockholding programs that secure domestic food supplies with high internal producer prices and lower internal consumer prices for staple goods, backed by import controls. Examples include India's rice stockholding program and wheat stockholding in Egypt.

The rebalancing of power between importers and exporters is intended to curb the weaponization of food, which has tended to use tactics such as denial of market, which is highly disruptive to the global trading system.

The lack of predictability raises the risk premium for food trade surplus countries and subsequently curtails investment in productivity, while often inducing expansion elsewhere of unsustainable or high-carbon-intensive replacement supply.

Building such a net exporter club will require coalition countries to rebalance exporter/importer power in their interest, which may depend on support from farmers and agri-food companies in these countries.

Today farmers feel they are in competition with their global counterparts. They are largely subject to global arbitrage layered on top of tariffs, non-tariff barriers and outright denial of market which in the era of abundance required their government to offer various degrees of support or protection. In the past, temporary support has often been insufficient in preventing longer term damage to the sector when access to key markets was denied. However, as farmers understand that we are shifting to an era of less abundance or longer-term scarcity, their expectations of government may shift from defense to offense.

As exports of crop and livestock were concentrating in fewer countries, they were also concentrating in fewer multinational companies, which developed global sourcing or origination in some or all of the handful of net export countries listed. Therefore, success of a coalition of the willing will also require that these multinationals headquartered in coalition countries rebalance the terms of trade. This would allow them to continue to benefit from their global arbitrage while enjoying a tidal shift that lifts all boats as opposed to the arbitrage induced by an importer excluding certain sources but not others.

Clearly the foundation of the coalition of the willing strategy would need to start with a dialogue in each net exporting country between farmers, agri-food companies and government, and would need to examine the advantages of more strategic cooperation to alter the balance in the terms of trade.

There is no reason to exclude some of the smaller net exporters shown in Figure 40, as they will want to be part of the new system. There are also several countries with relatively small shares that could help in the transition to new rules of the road.

Food exporters may take time to fully develop a coalition strategy. In the meantime, Canada should explore an additional strategy with a close net-import ally, for example Japan, that might entail offering to a special form of "export assurance."

An "export assurance" would guarantee the buyer in the partner country or company a prorated portion of the crop or livestock product in the event of a crop reversal calculated against their historical performance, in exchange for a food trade deficit customer/country undertaking for a minimal annual purchase. This type of partnership would de-risk investment in productivity for Canada while strengthening food security for the partner, in this example Japan.

This type of partnership would still allow for marketing advantages of high-quality Canadian product and even potentially Internationally Transferred Mitigation Outcomes (ITMOs) which may be available as parts of Canadian agriculture move toward carbon neutrality. (ITMOs are a type of unit that, like carbon credits, represent a ton of GHG reduced or removed from the atmosphere)[18]. In the example of a Japan/Canada partnership, this ITMO would theoretically be available to the extent that a qualified low carbon intensive product would be replacing higher carbon intensive domestic production or potentially imports from higher carbon intensive agricultural exporters.

[18] https://allcottrading.com/uncategorized-en/difference-carbon-credits-itmos/

Making value-added a priority in a Canadian strategy

Having set the stage for food becoming a strategic asset, with Canada taking more leadership in various organizations such as FAO and prioritizing building consensus for rebalancing the importer/exporter power and terms of trade, we can consider the perhaps most difficult strategic element to our IPS -- securing more value added.

Potential U.S. tariffs threaten our agri-food trade surplus with the U.S. on bulk, intermediate and even consumer-oriented food products. Therefore, diversifying beyond the U.S., particularly for our value-added consumer products, has become critical. The prime target market for diversification is the Indo-Pacific.

As of 2022, about 60% of our agri-food exports went to the U.S. and 24% to the Indo-Pacific. To lower our dependence on the U.S. and make Canada's crop and livestock trade a strategic asset, we will need to grow our share destined to the Indo-Pacific to at least one-third of overall agri-food exports over the next 10 years, with a priority focus on intermediate and consumer products.

Not to let a crisis go to waste, this is the time to introduce some elements of industrial strategy to take advantage of the coming growth in demand for processed agri-food products. A successful strategy will shift Canadian processors from focusing on defense in the face of U.S. tariff threats and Canadian retaliation to offense in the form of growth. The winners will be those that, in marketing terms, can migrate from the "Red Ocean" (the known market space of goods and services competing today) to the "Blue Ocean" (the unknown market space of products and services not available today) by focusing on what is often called "white space" of unmet customer needs.

When the "white space" strategy is working at its best it creates uncontested market space, which at least for a time makes competition irrelevant while generating maximum returns for the value chain and incenting investment to rapidly scale up.

The vast majority of food processors in Canada are small to medium size enterprises (SMEs). For the most part they survive, as they have found a niche or a sliver of white space in the Canadian marketplace. Government-fueled funding organizations help SMEs bring new agri-food products or services to market but most often the risk versus reward and capital required to scale even to the national level seems undoable.

One way to shift the risk/reward dynamic and attract capital for these SMEs to grow their niche would be to adjust the tax treatment to allow for maximum "accelerated investment incentives" for companies producing products that qualify for "Made in Canada" or "Product of Canada" labels.

Such a strategy would likely produce a good return to government. Many of these SMEs with positive differentiated products would be well positioned to initially execute some portion of at least import replacement, no doubt helped by campaigns by industry and government to promote "Made in Canada" and "Product of Canada" labelling. However, there is another significant positive benefit of such a strategy for the entire value chain, from the consumer products and intermediate processors all the way back to farm level. Adding value in Canada is one of the best business risk management strategies available.

If successful, some SMEs will become national and/or continental size players or alternatively be acquired by larger players. Whatever can be done should be, to assist with the former. However, in the case of the latter making sure our systems are not unconsciously or consciously favouring acquisition of SMEs or even national players by foreign companies as opposed to Canadian entities is critical. That is increasingly concerning as we move into a world of less abundance where a foreign entity may have mercantilist intent not aligned with Canadian interests. As well the idea of export coalitions at a minimum will require a type of alignment among some Canadian companies that compete domestically but may need to work together on export to reach the scale required to be meaningful. A complete rethinking of the mandate of the Competition Bureau would be an obvious place to start, given it has overseen the hollowing out of the Canadian food industry.

Moving to the next layer of companies, what can be done to grow the national/continental size Canadian processors, some of which already export beyond the U.S? In order for these companies to become true multinationals, they will need to deeply penetrate the fast growing Indo-Pacific.

These processing companies will play a critical role in not only import replacement but more importantly in shifting the whole Canadian agri-food system away from overdependence on the U.S. market by growing export and production in the Indo-Pacific.

These companies also have a need for the "accelerated investment incentives" afforded to the SMEs. However, to make this concept really work, we need to rethink the agri-food innovation system in Canada. To lift this group to the global level we need to refocus Canadian innovation on "moonshots" critical to segments of food processing and building on natural advantages that would allow us to own uncontested white space globally. The white space that is the most difficult for a non-Canadian food processor to copy is one where the differentiation innovation is built into the raw product and the processing technology.

An example of this is how Maple Leaf Foods International was the first in the world to develop a system to export chilled pork from North America to Japan. Once that processing technology was developed, it became critical to protect the white space from others by adjusting genetics and feeding programs to give the Japanese consumer a table meat similar to their domestic pork.

The chilled technology eliminated European competition for chilled pork due to their transit times and the fact that the vast majority of genetics used in Europe are to deliver meat for further processing not tasty table meat. The U.S. eventually mastered the technology but have been ambivalent on the genetics, as they tend vacillate between the cost of producing a hog and the quality of the meat, which leaves Canada as the preferred premium table meat supplier.

While looking at refocusing innovation on the "Blue Ocean" opportunities, it is also critical to protect our food asset by prioritizing the existential risks for our plant and animal-based industries. If we remain on the current growth path, sooner or later the world will enter a food crisis. Therefore, risk mitigation "moonshots," particularly around health and disease, will not only fortify premiumization but increasingly be seen as a secure supply in an insecure world. It would go a long way to guaranteeing uptake on the "Export Assurance" strategy mentioned above.

An example of this would be the elimination of invasive wild boar from Canada. Wild boars represent an existential threat to the pork value chain. There is little doubt innovation could eliminate this threat, but the industry has been thus far unable to prioritize what is existential versus important.

Any successful strategy would also need to address the need for government to not only successfully negotiate new FTAs, such as they have done recently with Indonesia and Ecuador, but to put more focus on making sure existing FTAs are actually working well for Canada.

If indeed some of these national/continental players were to graduate to the global level, what might that look like? We have two somewhat different examples to consider. The first is Saputo. Because of the export restrictions that come with Canadian dairy supply management, Saputo had to develop its global supply chain beyond Canada largely in net dairy exporting countries in order to serve world markets. Besides producing in Canada for the domestic market they are also producing in Argentina, Australia, the United Kingdom, and the U.S. Saputo operates 65 manufacturing facilities and sells to more than 60 countries, including China.

Perhaps the most successful Canadian food processor at the global level is McCain Foods. McCain is an example of a company that found the 'French fry white space' when the American fast-food industry was beginning to grow and rode that expansion in North America and Europe and is now doing so in the rest of the world, as global diets have westernized. McCain Foods has developed an unheard-of global market share, around 14% of French fries consumed globally. It has two significant competitors in the U.S. and one in Europe, in addition to a large number of smaller competitors in numerous countries[19].

McCain Foods, which sells products in 160 countries including throughout the Indo-Pacific, is a good reminder to companies seeking to enter the global ranks that once the white space is found, it's critical to scale up rapidly and build redundancy well beyond core Canadian production.

Global companies that have achieved success in the Indo-Pacific have generally invested heavily in marketing and production in the larger countries in the region. Most have built supply chain redundancy in one or more of the handful of the surplus exporters of their key raw materials, to mitigate crop failures or geopolitical events that could temporarily disrupt supply from their home country.

A successful industrial strategy would prioritize the growth of Canadian controlled agri-food companies while being open to foreign partners or companies that would prioritize Canada as their choice for producing value added products for export. An industrial strategy must: ensure a continuous flow of process and product innovation, from raw materials through to the final product; prioritize highly trained people with relevant language competency; designate capital to support in-country marketing and to scale and build redundancy; include efficient infrastructure to move and store product; include a refocusing of government efforts on our economic interests in the Indo-Pacific.

[19] Fortune Business Insights. (2024). *French fries market report*. https://www.fortunebusinessinsights.com/french-fries-market-107372

Conclusion: How Canada can capitalize on its agri-food asset at this critical time, with a focus on the Indo-Pacific

There are growing opportunities for Canada's agri-food sector globally right now, particularly in the Indo-Pacific. It is critical that we capitalize on these opportunities by understanding what they are and how we are uniquely positioned to fill the gaps. It is also critical that we develop a strong,
and actionable strategy to do so. Here are some elements that should be captured in such a strategy:

Keep the world focused on the coming food security crisis

- Take leadership of the FAO group, with a focus on disseminating and updating the organization's work on climate change, agricultural trade and global food security

Employ a 'soft power' strategy

- Build consensus for a coalition of the willing
- End the weaponizing of food and rebalance the terms of trade

Enhance trading relations with food-deficit allies such as Japan

- Introduce an "Export Assurance" strategy for guaranteed purchases

Rethink a Competition Bureau strategy

- Rethink the Competition Bureau strategy, taking global context into account.

Introduce industrial policy to build our agri-food strategic asset

- Establish plans to grow Canada's agri-food sector, manage risk, exploit opportunities in the Indo-Pacific and lessen our reliance on the U.S
- Establish strategic initiatives to shift the risk/reward dynamic for SMEs and larger Canadian processors
- Rethink the Canadian innovation system, with a focus on creating opportunities and mitigating existential threats

Use and create FTAs as a strong tool to support the growth of the Canadian agri-food industry

- Ensure existing FTAs are working to the industry's favour and being enforced (Canada currently has FTAs in all other G7 countries)
- Strategically negotiate new FTAs in other regions of the world (i.e. the Indo-Pacific) to establish long-term regulations for mutually beneficial trade for the future