About BC At The Table

BC At The Table is intended to show how food is produced, processed, distributed and accessed in BC and inspire students to buy BC foods and support local farmers. It consists of four video segments that can be watched separately in shorter classroom sessions or together in one longer session. The videos highlight the main steps in the food system that four foods go through to make it to our plates:

- Produce (with a focus on greenhouse tomatoes and vegetables)
- Grains (with a focus on wheat)
- Dairy (with a focus on milk and cheese)
- Salmon (both wild and farmed)

The foods featured were selected because of the major role they play in BC’s economy. They are also representative of the four food groups in Canada's Food Guide.

The videos address some of the issues related to each food and give a glimpse of the career opportunities in the Agrifood industry. Students are encouraged to conduct further inquiry into specific issues of interest to them.

While watching the videos, students can use the food system worksheet provided at the end of this discussion guide to list the steps involved in the production, processing, distribution, access to and consumption of the foods introduced in the video. A teacher discussion guide is provided for each video segment to facilitate a general discussion about the food after watching the video.

BC At The Table links to many curriculum areas:

- Sustainable Resources 11 and 12
- Food and Nutrition 8 to 12
- Science and Technology 11
- Social Justice 12
- Graduation Transitions
Did you know?

- Farmed salmon is the second largest food commodity in terms of sales in BC. In 2010, 78,701 tonnes of farmed salmon were harvested in BC. That represents 71.7% of the national share (Fast Stats 2011).
- BC is the world’s 4th largest farmed salmon producer (Seafood Sector Snapshot, 2012).
- Farmed salmon products totaled $432.9 million in wholesale value and accounted for 75% of the total salmon wholesale value, while capture salmon products totaled $146.2 million and accounted for the remaining 25% (BC Seafood Industry Year in Review 2012).
- 23,600 tons of wild salmon were caught in 2010 (BC Seafood Industry Year in Review 2012).
Questions for discussion

1. Trace the journey of wild salmon from ocean to plate. How does it compare to the journey of farmed salmon?

2. What are some of the challenges faced by commercial fishermen? *(uncertainty related to openings, fish stocks, getting a fair price)*

3. What are some of the challenges faced by salmon farms? *(public perception, keeping fish healthy, cost of feed, reliance on technology)*

4. Can we only rely on wild capture to meet our demand for fish and to follow dietary recommendations to eat two servings of fish per week?

5. What are aquaculture's social and economic contributions to the local community? *(sustain local communities, generates thousands of jobs)*

6. What is aquaculture's contribution to BC's economy? *(generates millions of dollars in income)*

7. What is BC aquaculture's contribution to Canada's economy? *(export sales, supply of salmon to other provinces)*

8. What are the ecological problems associated with farmed salmon? How can these be addressed? Can aquaculture be sustainable?

9. What are the benefits of operating a land-based salmon farm? What are the challenges (both operational and environmental)?

10. What types of jobs are created by the salmon industry?

11. What kind of skills and training are needed in various fishery jobs?

12. Shaun and Sonia Strobel talk about Community Supported Fishery (CSF), a take-off on the idea of Community Supported Agriculture (CSA), in which a person buys a share for the food that will be produced in a season. When Shaun says, “It makes it a lot more sustainable, year in, year out,” what do you think he means?

13. Reflect on the quote from one of Shaun's CSF customers: “You’re putting food on their table while they’re putting food on yours.”

14. The video portrayed a fish farm that was unique in several ways. What made it different?

15. How can we, as consumers, make ocean-friendly decisions? *(educate ourselves and look for a third party certification that indicates sustainability and/or best practices are used to produce the fish we purchase)*

16. What are some of the practices used to ensure a safe fish supply?
Wild Salmon Food System—Examples of inputs and outputs

<table>
<thead>
<tr>
<th>Food System Component</th>
<th>Inputs</th>
<th>Outputs</th>
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</thead>
<tbody>
<tr>
<td><strong>Production</strong></td>
<td>• fishing license&lt;br&gt;• labour&lt;br&gt;• fuel&lt;br&gt;• equipment (nets, boat)&lt;br&gt;• ice</td>
<td>• fish&lt;br&gt;• greenhouse gases</td>
</tr>
<tr>
<td>Fishermen have to wait for the Department of Fisheries to open the fisheries before they can start catching wild salmon.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Processing</strong></td>
<td>• energy&lt;br&gt;• labour (to gut, wash, clean, grade, and pack fish with wet ice)&lt;br&gt;• gas&lt;br&gt;• water&lt;br&gt;• ice</td>
<td>• fresh whole fish or fish fillets&lt;br&gt;• fish waste (gut, bones, heads)&lt;br&gt;• greenhouse gases</td>
</tr>
<tr>
<td>Fish is transported back to the shore for minimal processing (cleaning).</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Distribution</strong></td>
<td>• refrigerated trucks&lt;br&gt;• refrigerators or freezers&lt;br&gt;• labour (driver, receivers)&lt;br&gt;• fuel</td>
<td>• packaged whole fish or fish fillets&lt;br&gt;• greenhouse gases&lt;br&gt;• waste&lt;br&gt;• businesses (distributors, wholesalers)</td>
</tr>
<tr>
<td>Within 24-36 hours, salmon is delivered to customers (such as wholesalers, retailers, restaurants and Community Supported Fishery customers).</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Access</strong></td>
<td>• fuel (from mode of transportation used to go buy the fish)&lt;br&gt;• electricity</td>
<td>• fish&lt;br&gt;• businesses (such as restaurants and grocery stores)&lt;br&gt;• greenhouse gases&lt;br&gt;• food waste</td>
</tr>
<tr>
<td>Fish can be bought directly from the local fishmonger, the grocery store, public markets, or the restaurant and other food service distributors.</td>
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<td></td>
</tr>
<tr>
<td><strong>Consumption</strong></td>
<td>• home preparation&lt;br&gt;• purchase from stores or restaurants&lt;br&gt;• electricity or gas&lt;br&gt;• water&lt;br&gt;• labour</td>
<td>• food from the Meat &amp; Alternatives food group&lt;br&gt;• food waste/ garbage</td>
</tr>
<tr>
<td>Consumers may cook, can or smoke salmon. Or they can eat it at a restaurant.</td>
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Teacher Backgrounder

WILD SALMON

Commercial fisheries
Operations that catch wild salmon are often referred to as capture or commercial fisheries.

There are three methods of fishing:

- Gillnetting: 25% of wild salmon (mainly sockeye and chum) are caught using this method. This is the method portrayed in the video.
- Seining: 50% of wild salmon (mainly sockeye, pink and chum) are caught using this method.
- Trolling: 25% of wild salmon (mainly chinook and coho) are caught using this method. Many trollers have a capacity for freezing at sea (FAS), which provides high quality fish during times when fresh salmon (other than farmed) is not available.

Types of salmon caught off the BC coast

- Chinook: rich in flavour with a flesh that ranges from white to deep red in colour
- Chum: mild and delicate taste
- Coho: delicate texture, but similar flavour to chinook
- Sockeye: strong and flavourful with a deep red flesh
- Pink: light in colour and flavour, lower in fat than other salmon species

Challenges of catching wild salmon
Commercial fisheries are dependent on openings regulated by the Department of Fisheries and Oceans (DFO). DFO is responsible for the management of fish and fish habitat, as well as fisheries derived from them. It carries out an extensive stock assessment to determine how many fish can be caught in any one given year without impacting the propagation of fish in subsequent years (often referred to as a catch allocation). Once a catch allocation has been estimated, the fishery is opened for a limited time or until the catch allocation is reached. Subsequent monitoring ensures that all fish caught are accounted for as best as possible, which is then factored into the allocation for subsequent years when combined with on-going stock assessment information and research. When wild stocks are low, openings are limited to maintain the ecological sustainability of the fishery. This may limit the amount of wild fish available in the marketplace.

Fun Fact
Fishing generally takes place away from the spawning grounds and intercepts the fish on their spawning migration routes in the open ocean. Given that Pacific salmon migrates throughout the Pacific, one only really knows where they are at the time of capture. So in reality, there is quite a bit of mystery in the wild caught fish with respect to where the fish has been.

The taste of salmon will vary depending on the species in question (due to prey preferences), where and when it was caught, and the time of year.
# Farmed Salmon Food System—Examples of inputs and outputs

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<th>Outputs</th>
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</thead>
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<tr>
<td><strong>Production</strong></td>
<td>• Salmon farms have to get a site license in order to run their operation.</td>
<td>• Land-based hatchery: eggs, fry, parr and smolt&lt;br&gt;• Grow out: fish of marketable size, fish manure, pollution&lt;br&gt;• Harvesting: fish&lt;br&gt;• fish organic waste&lt;br&gt;• greenhouse gases</td>
</tr>
<tr>
<td></td>
<td>• Land-based hatchery: feed, utilities, labour, technology, freshwater, equipment, time&lt;br&gt;• Grow out: saltwater, cages, nets, labour, feed, technology&lt;br&gt;• Harvesting: harvest vessels, labour</td>
<td></td>
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<td>• fresh or frozen fish (whole, deboned, filleted)&lt;br&gt;• fish waste (guts, bones, heads)&lt;br&gt;• greenhouse gases</td>
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<td><strong>Processing</strong></td>
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FARMED SALMON

While the video features Creative Salmon, a farm that raises chinook salmon, it is important to note that Atlantic salmon forms the bulk (>90%) of the salmon farmed in BC. Both species are well adapted to farming on the BC coast. Both provide the same level of nutrition. The farmer decides which species to grow based on the business model used and personal preferences.

Salmon farms are located in many areas: the Sunshine Coast, the west coast of Vancouver Island, the Discovery Islands, the Broughton Archipelago and the central coast around Klemtu.

The farm sites used by Creative Salmon are in the Tofino Inlet, which is shared with other farmers that grow Atlantic salmon. All farms follow well-established best practices (such as fallowing, single year class sites, careful site selection, monitored feeding to minimize waste, harvesting and husbandry practices that reduce stress) regardless of the type of salmon they raise.

While the typical salmon farm uses open net pens in the ocean to raise the fish, advances in technology have allowed some farmers to raise salmon in land-based pens. Both types of farming use the same feeding and monitoring systems. They also both produce the same amount of waste. With land-based pens, however, farmers can better control the impact of their operations on local aquatic habitat. One fairly new inland operation is run by the Namgis band on Vancouver Island. Despite being a promising practice for sustainable aquaculture, inland pens come with higher start-up, energy and maintenance costs. These can, however, be offset through better fish health and survival, and reduced need for pesticides and antibiotics. It will take time before inland-based operations are widely adopted as a viable business model providing salmon economically on a commercial scale.

Challenges of farming salmon:

- site productivity: some sites are less productive than others
- keeping fish healthy
- predators such as herons, cormorants, seals, sea lions
- fish can escape from nets
- managing fish health/disease (such as the issue of sea lice)
- competitors in the international market (such as Norway and Chile)
Hot issues

*Why farm salmon if we have a sustainable and productive fish supply?*

Capture fisheries are very seasonal and have limited supplies that fluctuate with a high degree of uncertainty from year to year. As a result, there is a limited amount of fresh fish for the consumer. When fishing is good, the balance of the catch is frozen to meet demand throughout the year. Even so, the demand is so high that capture fisheries cannot meet it. In comparison, farmed salmon provides a continuous supply of fresh fish year round, and in volumes that are able to sustainably meet the demand for fresh fish. In this way, both sectors complement one another by meeting the demand for a variety of salmon products year round, both fresh and frozen. Both products supply local and international markets, which are important for British Columbians who wish to buy local produce, but also for BC’s economy through export sales.

*Are fish stocks declining?*

Yes and no – this is a complex issue. Many stocks are below historic levels, while others remain relatively stable, despite fluctuating from year to year. The reasons for this are uncertain, but include natural variations, climate and habitat change, and fishing pressures. These fluctuations are often coast-wide, but can occur within specific stocks and regions. This is why commercial fishing for some stocks in some regions is not allowed at all, as has happened for sockeye in the Fraser River.

The value of the commercial salmon fishery goes up and down significantly depending on the year, the cycles being largely driven by abundance of sockeye and chum stocks. The landed value of the wild salmon fishery was $48M in 2011. However, in 2010 the landed value was $71M whereas in 2012 it was $26M. In comparison, farmed salmon production is much more consistent and predictable, with little change from year to year. The landed value of farmed salmon in 2010, 2011 and 2012 was $500M, $436M and $345M respectively.

While climate change and protecting salmon habitat remain global and regional issues, fishing practices have improved in recent years to ensure conservation is the first priority and impacts on weak stocks are minimized.

*What is the impact of aquaculture on First Nations communities?*

First Nations communities are benefiting from aquaculture, which generates the equivalent of 4,550 full-time jobs in the Comox-Strathcona area and just over $150 million in labour income. Protocol agreements can also be signed to allow the use of First Nations lands as new high productivity sites for salmon farming operations. This can bring in economic growth to the community. One example is the agreement with the Kitasoo First Nation in Klemtu, which operates a salmon farm and processing plant employing some 45 members of the band and generating about $1.5 million in income annually.

More about the socio-economic impact of aquaculture can be found in this study:  
Benefits of eating fish

Salmon is a great source of protein, omega-3 fatty acids and vitamin D.

Canada’s Food Guide recommends eating at least two Food Guide Servings of fish every week (such as char, herring, mackerel, salmon, sardines and trout) as it can help reduce the risk of heart disease.

One Food Guide Serving of fish is 75 grams (2 ½ oz) or 125 mL (½ cup).

Recommended number of Food Guide Servings per day

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<tr>
<th></th>
<th>Children</th>
<th>Teens</th>
<th>Adults</th>
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<tbody>
<tr>
<td></td>
<td>9—13 years</td>
<td>14—18 years</td>
<td>19—50 years</td>
</tr>
<tr>
<td>Girls and boys</td>
<td></td>
<td>females</td>
<td>males</td>
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<tr>
<td>1—2</td>
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<td>3</td>
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Cooking with salmon

Check BCSeafood.ca for salmon recipes to try at home. It is easier than you think!

Challenge: In the video, we see customers enjoying a “fish tacone” on the wharf. Make your own fish tacone!

Links

Aquaculture in Canada: Facts and Figures

BC Salmon Marketing Council
www.bcsalmon.ca/

BCSeafood.ca
www.bcseafood.ca/

Fisheries and Oceans Canada
www.pac.dfo-mpo.gc.ca/index-eng.html

Acknowledgement

We would like to thank Dr. Myron Roth, Ph.D., P. Ag., Industry Specialist – Aquaculture & Seafood Sector Development Branch BC Ministry of Agriculture, for reviewing the Salmon video and teacher discussion guide and providing us with the background information for this resource.
General questions

1. What is the average age of farmers in BC? What percent of the population in BC are farmers?

2. What is the cost of eating in BC? (According to the Cost of Eating in BC 2011, in 2011, the provincial average cost of the nutritious food basket for a family of four was $868.43 per month.)

3. What measures need be taken to increase food security? (According to the Cost of Eating in BC 2011, those earning minimum wage, receiving income assistance, or facing other challenges such as high rent, child care, or transportation costs struggle to find ways to purchase food as well as meet their other basic needs. The report recommends the following measures to increase food security: implementing a poverty reduction strategy, building affordable housing, increasing food assistance to reflect the cost of living, improving wages and working towards sustainable food systems that no longer require food banks.)

4. Have you heard of the term “food justice”? What does it mean? How can it be achieved? (advocating for improved access to healthy and affordable food in poorer areas, fair pay to farmworkers and food industry employees)

5. There is an increase in the local food movement. What does “local” mean to you?

6. Many people from BC travel across the border to shop for some of their groceries. What is the effect on BC’s economy and jobs if you were to mostly shop in the US?

7. What is being done in Canada to reduce hunger? Are food banks or programs like Quest Food Exchange the solution? What else can be done to address the issue at its root?

Additional Resources

Grow BC: A Guide to BC’s Agriculture Resources

2012 British Columbia Agrifood Industry Year in Review

BC’s Food Self-Reliance: Can BC’s Farmers Feed Our Growing Population?
Extension activities

- Have students interview a farmer or plan a balanced lunch using BC foods.

- We often think about the impact that food production exerts on the environment. But as consumers, we can also play a role by minimizing the food waste we generate. A recent UN report shows that a third of all food is wasted. In North America, this occurs mostly at two stages of the food system: harvest and consumption.
  - How much food waste is generated in your school? Your home?
  - What can you do to reduce the waste?
  - What are the consequences of having food waste end up in land fill? (methane, use up space in landfill, waste the resources used to produce the food, hungry people go without food that could be donated/redistributed)
  - What's involved in recovering and redistributing food that might end up as waste? What laws govern the donation of food?
  - How are food scraps handled in the waste stream in your community?

- In some countries there is a culture of gleaning. People are legally allowed to gather the food that remains in the field after it has been commercially harvested. Learn more about historical and modern day gleaners. Explore how gleaners have been represented in the arts.

- Ask students to find out what foods are produced in their area. Check the Buy BC website (www.buybcfood.ca) or the We ♥ Local site (weheartlocalbc.ca).

- Explore the taste of BC foods. For example, BC produces many varieties of pears, apples and potatoes. How many have you tried?

- How often do you use BC foods? Think about your meals, snacks and recipes. Consider choosing BC foods more often than imported.

- Survey the foods served at your cafeteria and ask about where they come from. How many are BC foods? How many are imported?

- Choose one food trend and research how this trend can influence the supply and demand of a related agricultural product. Examples of current food trends include deciding to go on a gluten-free diet, eating only organic foods, or adopting a 100-mile diet.

- Choose one of the foods highlighted in BC At The Table and identify the range of consumer products derived from it. Select one specific product and prepare a presentation on how it is made. Make sure to include the food system components involved in the process.

- How can climate change affect the different crops produced in BC? Give a specific example.

- What are genetically modified organisms (GMOs)? What are genetically engineered (GE) foods? What are the advantages and disadvantages of using GE seeds?
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Notes: