



A Transition Toward Plant-Based Diets:

A study amongst BC residents in the
Lower Mainland

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Executive Summary

With dramatically rising food costs, mounting concerns over food and agricultural impacts on climate change and growing demands on intense animal farming practices, the window of opportunity to evaluate current dietary trends appears to be ripe.

In 2020 the [Vancouver Humane Society \(VHS\)](#) produced a report evaluating the City of Vancouver's institutional procurement activities. The report included recommendations on a plant-based procurement policy that could improve the City's carbon footprint and reduce animal suffering, all while proving economically efficient. A motion acknowledging the multiple co-benefits of shifting toward increased plant-based procurement and to explore policy recommendations outlined in the VHS's report was approved unanimously by Vancouver's City Council in 2021.

The Vancouver Humane Society is now applying a similar lens in researching *individual consumer habits* across BC residents – specifically in the Lower Mainland – and presenting the learnings and recommendations in this report.

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... the window of opportunity to evaluate current dietary trends appears to be ripe.

The VHS is looking to understand BC (Lower Mainland specifically) residents' dietary behaviours and attitudes as they pertain to animal-based and plant-based foods, and make recommendations on how individuals can reduce emissions, save animal lives, and save on their grocery bills with small or significant changes in their diets.

The Research

The VHS designed and distributed a survey pertaining to food consumption habits, attitudes toward plant-based diets, and perspectives on rising food costs to BC residents. With data obtained from the survey, calculations were conducted to understand financial costs and greenhouse gas emissions associated with typical respondent diets. Models replacing 25%, 50%, or 100% of animal-based products with common plant-based alternatives were then run to understand potential savings across emissions, costs, and animal lives.

Results

Attitudes and Behaviours:

The majority of surveyed British Columbians feel the impact of rising prices on their finances and are looking for ways to save on groceries. Most respondents agreed they would consider buying more plant-based alternatives to reduce grocery bills. Two-thirds of respondents acknowledged that they have already reduced their animal product consumption, though primarily for personal health reasons. The top ranked reason for hesitation in consuming plant-based items was concerns for taste and enjoyability of the product or meal.

Emissions, Cost and Animal Lives Savings Potential

A reduction in emissions was experienced when substituting plant-based alternatives for *each* animal-based food type. These savings were most significantly experienced with reductions in beef and seafood products.

Cost savings were seen when replacing *most* (56%) of animal-based food types with plant-based alternatives. Cost savings were also seen most significantly with reductions in beef and seafood products.

Emissions and cost savings were typically greater when plant-based alternatives were whole food options (e.g. lentils), rather than processed items (e.g. nut-based cheeses).

Individual animal life savings were unable to be reliably calculated based on survey results. However, based on Statistics Canada consumption data, it is likely that millions of animal lives could be saved with even small changes in the diets of residents across the province.

Recommendations

The VHS recommends that consumers subscribe to the 3 R's of animal product consumption: Replacement, Reduction and Refinement, with a particular focus on the *Replacement* principle as it provides the greatest potential for ensuring animal

welfare, reducing consumer emissions, and saving costs. Across a diet consisting of equally consumed animal-based products, the VHS would recommend reductions in beef and seafood products to achieve optimal emissions and cost savings. In reducing animal suffering, the VHS recommends that consumers consider the number of animal lives used to supply consumption habits as well as the amount of hardship a particular animal will face in their short lifetime. The VHS recommends that readers evaluate their own dietary habits and utilize the information provided in this report to make informed decisions on how to achieve maximal impacts from any dietary changes.

Considerations

The plant-based alternatives suggested in this report are only meant as examples for potential substitutions for commonly consumed animal-based products. There are many other suitable plant-based options that may achieve varying results across emissions and cost saving potential. Readers are encouraged to select alternatives that appeal most to their preferences, cultures, and budgets, as well as calculate the potential for cost and emissions savings using calculators and documents listed in the *Resources* section of this report.



Background

Environmental Considerations

Global diets are becoming increasingly unsustainable. Agriculture is responsible for approximately 30% of all global emissions¹, and takes up half of the world's habitable land². The most significant contributor to agriculture's ecological impact is the raising of livestock. Livestock raising has affected both human and non-human systems at alarming rates. It has displaced millions of Indigenous peoples from their lands while destroying *billions* of hectares of wildlife habitat³. Much of the land and other resources are required to provide livestock nutrition through grazing lands or in producing animal feed (such as corn and soybeans)^{4 5}. The reality is that, globally, the vast majority of farmed animals (70%) are raised and slaughtered within industrialized systems⁷.

Furthermore, we can expect to see a continuous rise in demand for animal products due in part to a growing global population and a corresponding increase in food needs but mostly due to global dietary shifts toward more meat and dairy consumption^{8 9 10}. Meat consumption has historically been linked to income, and as global wealth continues to grow, meat consumption rates are following^{11 12 13}. If these trends progress as predicted, agriculture will take up an additional 10 million square kilometres of natural land by 2050 – this is the same size as Canada¹⁴.



Agriculture is responsible for approximately 30% of all global emissions¹, and takes up half of the world's habitable land².



Animal Welfare

In addition to the excessive consumption and destruction of natural resources, the most common method of livestock raising – industrial factory farms – imposes heartbreaking, inhumane conditions on the animals involved.

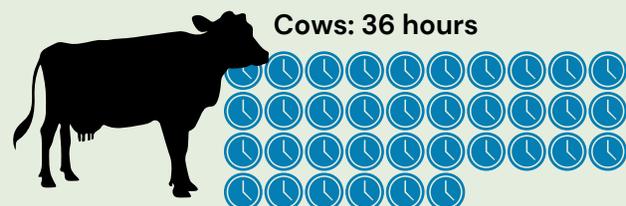
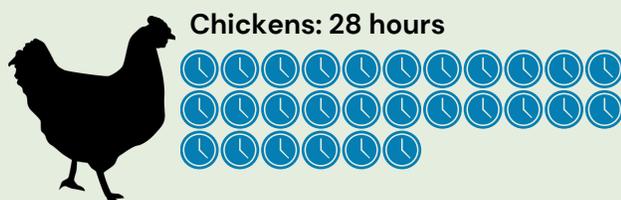
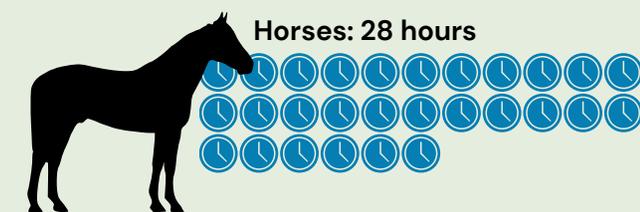
Intensive farming typically involves large numbers of animals packed into cramped, barren and unnatural conditions¹⁵. Their enclosures are often so small that the animals' ability to behave naturally or socially is severely restricted, and some develop painful sores on their hooves and feet from standing their entire lifetime on concrete¹⁶ ¹⁷. Other on-farm practices pose serious welfare concerns, including painful procedures without providing pain control; rough handling; untimely or no treatment of injuries and disease; and inhumane forms of on-farm euthanasia (e.g. blunt force trauma).

Animals raised in intensive farming environments are often fed unnatural diets to rapidly increase weight, which sometimes includes the use of antibiotics and hormones causing the animals physical and digestive discomfort¹⁸.

Transport and slaughter processes are often equally distressing to the animals. Transport journeys involve rough handling of animals, overcrowding, prolonged standing, and exposure to extreme weather conditions¹⁹. Legally, many species of farmed animals may not receive food, water or rest for up to seventy-two hours during transport²⁰. Every year in Canada, approximately 14 million farmed animals suffer injuries during transport journeys and up to 1.6 million die en-route to slaughter²¹.

Canadian animal welfare standards are known to be particularly weak when compared to regions like Australia, New Zealand, and the EU, which have continually worked with industry to heighten standards of animal care²². At slaughterhouses, thousands of animals are killed per day, resulting in a fast-paced, dangerous environment for both the animals and the workers²³

How long can animals be transported for without food, water, or rest in Canada?



Local Consumption of Animal Products

Canada is a major player in global livestock markets. Canada is one of the top beef and pork exporters in the world^{24 25} and sees over eight hundred million animals slaughtered on an annual basis, most of which were raised on factory farms or in “intensive farming” conditions^{26 27}.

Canada generally has seen continuous increases in meat consumption over the past decade²⁸. BC residents have shown increased household spending across meat, dairy, eggs, fish, and seafood in the past decade, though meat, seafood and fish spending is below the national average in Canada²⁹.

BC boasts the highest percentage of vegans and vegetarians amongst all provinces³⁰ and local residents have shown greater interest in reducing animal product consumption than residents of any other province³¹.

Inflation and Food Pricing

Canada experienced jarring inflation rates (6.8% annually) in 2022, at a rate that hasn’t been seen in four decades³². Food costs experienced one of the highest inflation rates over the past year, reaching nearly double the annual average inflation rate at 12%³³.

[Canada’s Food Price Report](#) (2023) predicts a further increase in food prices (from 5% to 7%), with the most substantial increases in vegetables, dairy, and meat products. The report also forecasts that an average family of four will spend an increase of up to \$1,065.60 from what was spent on groceries in 2022.



...[BC] residents have shown greater interest in reducing animal product consumption than residents of any other province.





Overview of Research

The Vancouver Humane Society (VHS) observed the daily headlines highlighting rising food costs³⁴ and recent reports indicating that Canadians (and British Columbians specifically) are interested in moving toward plant-based diets^{35 36}. In response, the VHS commissioned research efforts to determine the emissions, animal life, and cost-saving potential to local consumers in reducing animal-based product consumption.

The project aimed to understand current dietary trends and attitudes of the residents of BC's Lower Mainland* – specifically attitudes and behaviours around animal-based product consumption. The project then calculated typical financial costs and greenhouse gas emissions associated with common BC diets and looked to understand the potential impacts of replacing 25%, 50% or 100% of animal-based products with common plant-based alternatives.

To gain insights into the dietary choices and attitudes, a twenty-three-question digital survey was distributed among a representative sample of Lower Mainland residents from the Angus Reid Forum.

The survey inquired about the number of servings consumed on a monthly basis of various popular animal-based products (e.g., beef, pork, dairy, etc.). The survey also posed questions regarding attitudes toward animal and plant-based food and diets.

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[The project] looked to understand the potential impacts of replacing 25%, 50% or 100% of animal-based products with common plant-based alternatives.

Emissions and costs associated with consumption habits were calculated, as well as those for common plant-based alternatives. The potential for cost and emissions savings in various scenarios (replacement of 25-100% of animal products with plant-based alternatives) for the typical diet of a Lower Mainlander was determined.

*BC's Lower Mainland is the geographical area comprised of the regional districts of Metro Vancouver and the Fraser Valley with a population of just over three million.

Summary of Research Method

Survey

A survey was conducted by the Vancouver Humane Society from December 9 – 15th, 2022 among a representative sample of 803 Lower Mainland residents aged 18+ who are members of the Angus Reid Forum. For comparison purposes only, a probability sample of this size would carry a margin of error of +/- 3.5 percentage points, 19 times out of 20.

The survey was comprised of twenty-three questions across three categories:

- **Consumption habits:** *E.g. Which best describes the quantity of beef products you consume on a monthly basis?*
- **Attitudes and perceptions of plant-based diets:** *E.g. What factors, if any, have caused you to reduce your animal product consumption?*
- **Attitudes and changes in food purchasing behaviour:** *E.g. Have or will the rising food costs change your food consumption or purchasing behaviour? If so, how?*

Calculations

Greenhouse Emissions:

Emissions data (measured in grams of CO₂e) was calculated for all monthly serving(s) options of animal-based products presented in the survey (with the assumption that portions were equivalent to 100g as outlined in the survey).

Emissions data was then calculated for identical serving(s) options (and sizes) for common plant-based alternatives.

Emissions data was then calculated for three plant-based replacement scenarios:

- replacing 25% of animal-based products with plant-based alternatives
- replacing 50% of animal-based products with plant-based alternatives
- replacing 100% of animal-based products with plant-based alternatives

Emissions were calculated using [My Emissions Food Carbon Footprint Calculator](#).

Costs:

Typical costs associated with all monthly serving(s) options of animal-based products presented in the survey were calculated.

Typical costs were then calculated for identical serving(s) options (and sizes) for common plant-based alternatives.

Typical costs were then calculated for three plant-based replacement scenarios:

- replacing 25% of animal-based products with plant-based alternatives
- replacing 50% of animal-based products with plant-based alternatives
- replacing 100% of animal-based products with plant-based alternatives

Costs were calculated using [Save On Foods online pricing guide](#). Save On Foods was selected as it's a local BC grocery chain, which was considered to best reflect typical costs associated with BC residents' diets.

Where multiple costs were outlined for a specific product (varying due to brand name, product specifications, etc.), an average cost was determined and applied.



Determining Alternatives

Plant-based alternatives were selected based on the Humane Society International's [Guide to Plant-based Substitutions](#).

Where emissions data was unavailable for particular alternatives, an online search for recipes and popular substitutions was conducted, and a replacement plant-based substitution was selected.

Notes about some animal-based items and plant-based alternatives:

- **Fish** – the average cost and emissions data were calculated for salmon, tuna and cod – the most popularly consumed fish in Canada³⁷.
- **Seafood** – the average cost and emissions data were calculated for crab and shrimp – the most popularly consumed seafood in Canada³⁸.
- **Dairy** – the average cost and emissions data were calculated for yogurt and butter – the most popularly consumed dairy products in Canada³⁹ (for the animal-based product), while average cost and emissions data were calculated for plant-based yogurt and olive oil – the most popularly consumed oil in Canada⁴⁰ – as popular plant-based substitutions.
- **Cheese** – costs for dairy cheese were calculated using the average cost data for parmesan, cheddar, feta, gouda and mozzarella and for plant-based cheese using the average cost data for parmesan, gouda, blue and provolone.
- **Seafood** – mushrooms were deemed the most suitable substitution due to their likeness in texture to most seafood types. It was recognized that nutritional value (particularly protein content) is not comparable between these two food items, however as most recipes call for mushrooms as a typical replacement for seafood, it was determined this replacement would most accurately depict consumers' costs and emissions if they were to replace seafood in their diet.
- **Eggs** – the average cost and emissions data were calculated for bananas and chickpeas as these reflected the most common substitution in egg consumption as an ingredient in a meal and as an ingredient in baking. Note that flax seeds were considered the preferable choice for the baking egg substitution, but emissions data was not available, so an alternate replacement was selected.



Research Findings

Survey Findings

The twenty-three-question survey targeted food spending behaviours, attitudes toward plant and animal-based diets, and animal-based consumption habits.

The results were as follows:

Food Spending Behaviours

The overwhelming majority of surveyed British Columbians feel the impact of rising prices on their finances and are looking for ways to save on groceries, predominantly by reducing impulse buys and shifting to discount items or brands while shopping. Most respondents agreed they are open to exploring more plant-based alternatives to save money.

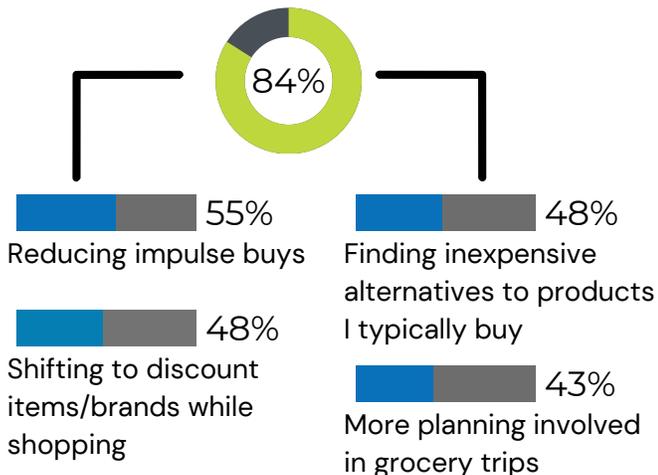
Respondents identified concerns over the rising food costs in BC:

92% are concerned about how the rising cost of living is impacting their finances

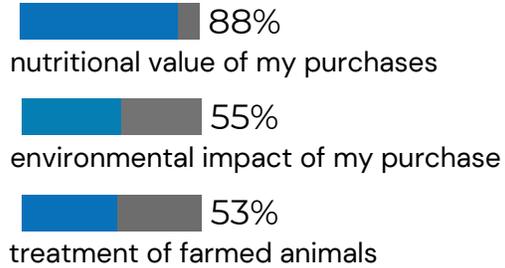
87% are looking for ways to cut back at the grocery store

75% are looking for ways to change their diet to eat more affordably

To manage rising costs, most consumers (84%) are adjusting their food purchasing behaviour in the following ways:



The top factors listed by respondents in considerations they make while choosing foods to purchase were:



66% of respondents

identified that they would be open to exploring more plant-based food options to save money.





Attitudes Towards Plant and Animal-based Diets

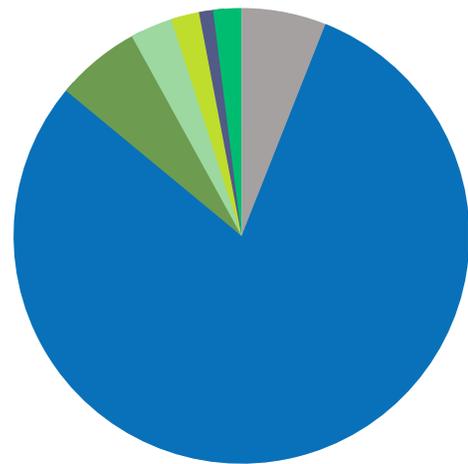
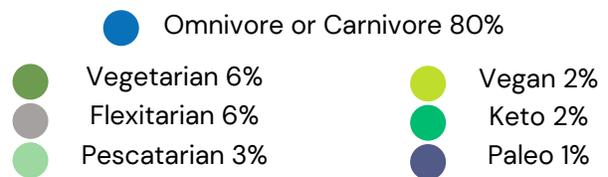
The majority of respondents described their diets as omnivorous or carnivorous. Vegetarians were the next most common diet type. **Two-thirds** of respondents acknowledged that they have reduced their animal products consumption, primarily for personal health reasons. **Three-quarters** of respondents identified taste as the most significant factor in influencing food purchases. This aligns with concerns over the enjoyability of plant-based meals being ranked as the top reason for hesitation in purchasing plant-based items. Survey respondents identified individual health, the impact on the environment and the impact on the overall cost of living as areas they understand the most when it comes to impacts of animal-based diets.



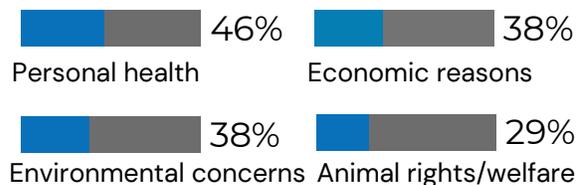
Three-quarters of respondents

identified taste as the most significant factor in influencing food purchases.

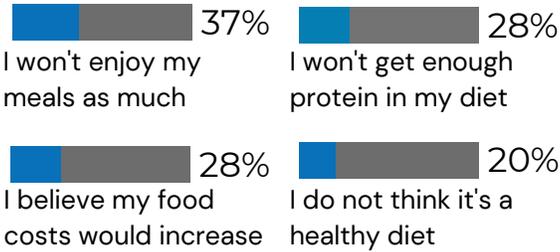
Respondents described their diets as:



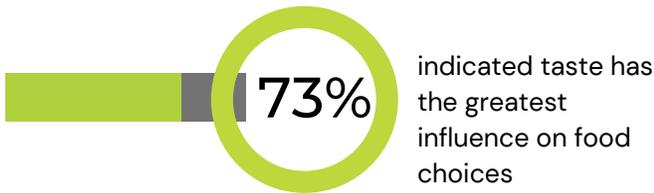
However, **Two-thirds (65%)** of surveyed British Columbians say they reduced their consumption of animal products, motivated primarily by the following four factors:



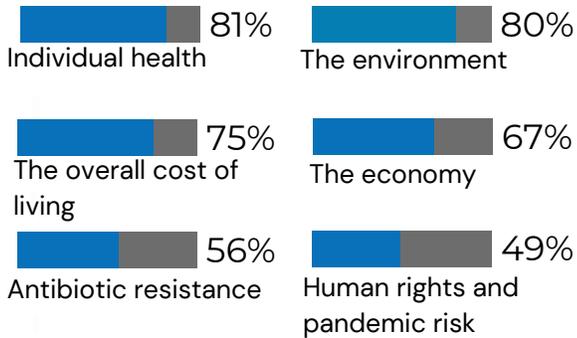
Respondents identified these factors as the most prevalent in preventing purchasing and consuming more plant-based options:



Which aligns with the overwhelming #1 driver of food consumption: taste



When it comes to awareness of the impact of animal products on other areas, surveyed consumers are most informed about the impact on:



Animal-Based Consumption

Of the five types of meat and seafood presented in the survey, chicken is consumed most frequently while fish and other seafood are consumed significantly less often than other animal-based products.

Table 1: The most commonly consumed quantities (on a monthly basis) amongst respondents

Product	Quantity Consumed Monthly
Beef	5-10 and <4 servings*
Pork	<4 servings
Chicken	5-10 servings
Fish	<4 servings
Seafood	<4 servings
Eggs	7-17 servings
Cow's Milk	<1L
Cheese	5-8oz
All Other Dairy	500ml-1L

*Serving portions are 100g



Data Results

A diet based on the most common survey responses (listed in Table 1) could save up to:

100% transition to plant-based alternatives

68kg of CO₂e/month



equivalent of about a hybrid vehicle tank of gas

816kg of CO₂e/year



half the emissions used to power an entire home for a year

\$50/month or \$600/year



50% transition to plant-based alternatives

33kg of CO₂e/month



equivalent of 1.5 bags of waste recycled rather than sent to landfill

396kg of CO₂e/year



nearly 1600km by gas powered vehicle - about the distance of driving Vancouver to Regina, about an 18H drive

\$25/month or \$300/year



25% transition to plant-based alternatives

17kg of CO₂e/month



equivalent of 2068 cell phone charges

204kg of CO₂e/year



about the amount of carbon sequestered by ¼ acre of forested land

\$13/month or \$156/year



Greatest potential for impact:

Cost

Swapping all beef to lentils creates a savings of up to \$60/month (100% transition), \$30/month (50% transition) and \$15/month (25% transition) and a maximum of \$720/year.

Switching all general seafood to mushrooms could save between \$64/month (100% transition), \$32/month (50% transition) and \$16/month (25% transition). This is a maximum savings of \$768/year depending on how the amount of seafood consumed.

Greenhouse Gas Emissions (GHGs)

Any transition of beef to lentils carried the greatest impact on emissions by a very significant amount. When looking at ten servings/month (one of the most common monthly beef serving amongst consumers), swapping only **25%** of those beef servings would create nearly **double** the emission savings seen by swapping **100%** of ten monthly servings of pork, chicken, and fish to plant-based alternatives.

Reducing your beef by as little as **25%** has the same impact as cutting out all chicken and pork from your diet (when compared at identical servings – e.g. 10 per month).

If consumers of the most common diet (see servings/product listed in *Survey Findings*) swapped 100%, 50% or 25% of their beef for lentils, the emissions savings would be nearly double those seen with swapping the same percentage of *all* other listed animal-based products.



Any transition of beef to lentils carried the greatest impact on emissions by a very significant amount.

If consumers swapped **100%** of their beef consumption (sticking again with the ten servings/month), the amount of carbon saved (**1075kg**) over the course of a year is equivalent to the carbon that would be sequestered by 18 tree seedlings grown over ten years.

Seafood carries the next most significant emission rates with consumption. When looking at 0–4 servings/month (the most common monthly seafood serving amongst respondents), if consumers swapped **100%** of these servings to mushrooms, they stand to reduce their emissions by **412kg/year** – **about 1600km driven by a gas-powered vehicle.**



Summary of Impacts (Per Product Type)

*Ranges indicate the 4-21 monthly serving options presented in the survey.
 *All equivalencies are from the US Environmental Protection Agency GHG Equivalencies Calculator.

Lentils Swapped for Beef



Consumers could save up to \$720/year and over 1 tonne of CO₂e on an annual basis which is the equivalent of the emissions produced by nearly 500 litres of gasoline, or equivalent to about one third of emissions created by the average BC driver on an annual basis⁴¹.

Swap Rate	Monthly GHG Savings	Monthly Cost Savings
25%	4 - 22kg	\$3 - 15
50%	9 - 45kg	\$6 - 30
100%	17 - 90kg	\$11 - 60

Tempeh Swapped for Pork



Consumers may spend up to an additional \$240 annually for this particular alternative choice, but would save 144kg of CO₂e annually which is equivalent to the amount of emissions saved by 45kg of waste recycled instead of landfilled.

Swap Rate	Monthly GHG Savings	Monthly Cost Savings
25%	0.5 - 3kg	+ \$1 - \$5
50%	1 - 6kg	+ \$2 - \$10
100%	2 - 12kg	+ \$4 - 20

Tofu Swapped for Chicken



Consumers could save up to \$180 per year while reducing emissions by 18kg annually which is equivalent to the emissions used to power a smartphone over 2000 times.

Swap Rate	Monthly GHG Savings	Monthly Cost Savings
25%	4 - 22kg	\$0.75 - 4
50%	0.6 - 3kg	\$1.50 - 8
100%	0.3 - 1.5kg	\$3 - 15

Chickpeas Swapped for Fish



Consumers could save up to \$540 per year while reducing CO₂e emissions by 132kg annually which is equivalent to the carbon sequestered by 2 seedlings grown for 10 years.

Swap Rate	Monthly GHG Savings	Monthly Cost Savings
25%	0.5 - 3kg	\$2 - 11
50%	1 - 6kg	\$4 - 22
100%	2 - 11kg	\$9 - 45

Mushrooms Swapped for Seafood



Consumers could save up to \$756 per year while reducing CO2e emissions by 408kg annually which is equivalent to the carbon sequestered by nearly half an acre of forested land.

Swap Rate	Monthly GHG Savings	Monthly Cost Savings
25%	2 - 9kg	\$3 - 16
50%	3 - 17kg	\$6 - 32
100%	7 - 34kg	\$12 - 63

Oat Milk for Cow's Milk



Consumers may spend up to \$120 annually additionally for this (and most other popular) milk alternatives, however, consumers could cut their emissions by up to 108kg annually which is the equivalent amount of emissions used to charge over 13,000 smartphones.

Swap Rate	Monthly GHG Savings	Monthly Cost Savings
25%	0.5 - 2kg	+ \$0.50 - 2
50%	1 - 4kg	+ \$1 - 5
100%	2 - 9kg	+ \$2 - 10

Chickpeas and Bananas Swapped for Eggs



Consumers could save up to \$60 per year while reducing CO2e emissions by 84kg annually which is equivalent to the emissions produced by driving 336 km in a gas powered vehicle (about the distance of driving Vancouver to Kelowna).

Swap Rate	Monthly GHG Savings	Monthly Cost Savings
25%	0.5 - 2kg	\$0.25 - 1.50
50%	1 - 4kg	\$0.5 - 3
100%	1 - 7kg	\$1 - 5



Plant-based Cheese Swapped for Dairy Cheese



Consumers may spend up to \$36 annually additionally for this particular alternative, however, consumers could cut their emissions by up to 24kg annually which is the equivalent amount of emissions produced by driving 96km by a gas powered vehicle.

Swap Rate	Monthly GHG Savings	Monthly Cost Savings
25%	0.25 - 1kg	+ \$0.25 - 0.50
50%	0.5 - 1kg	+ \$0.50 - 1.50
100%	1 - 2kg	+ \$1 - 3

In keeping with this estimate, if the 5.1 million BC residents cut their animal-production consumption down by only one quarter, more than 28 million animal lives could be spared. If the entire province were to transition completely to plant-based, around 112 million animals could be saved.

Of course these numbers are somewhat of a crude calculation; there are many factors to be considered such as the exact number of animals consumed by BC residents, the percentages of animals slaughtered that never make it to consumers plates, the reliability of Statistics Canada data, and the consumption rate of non-farmed animals, amongst many others. However, it is no exaggeration to estimate that millions of animal lives could be spared with widespread adoption of even minimal transitions to plant-based alternatives across the province.

Plant-based Yogurt and Olive Oil Swapped for Other Dairy



Consumers may spend up to \$108 annually additionally for these particular alternatives, however, consumers could also cut their emissions by up to 252kg annually which is the equivalent amount of emissions saved by nearly 80kg of waste recycled instead of landfilled.

Swap Rate	Monthly GHG Savings	Monthly Cost Savings
25%	0.5 - 5kg	+ \$0.25 - 2
50%	1 - 11kg	+ \$0.50 - 4
100%	2 - 21kg	+ \$1 - 9



Credit: Victoria de Martigny / We Animals Media

Animal Lives

The exact numbers of animal lives potentially saved with the proposed transitions of a typical BC diet were unable to be reliably calculated and reported. Instead, data from 2019 reveals that approximately twenty-two farmed animals are slaughtered per capita annually – a conservative estimation that does not include any aquatic animals or animals that die on the farm or in transport⁴².

Recommendations

This report presents varied scenarios. Most notably, it highlights that an individual does not have to completely upend their diet or lifestyle to participate in a more sustainable, humane food system.

There are gradual steps available that can make an impact. The overarching goal with this report is to highlight that animal-product replacement, of any amount, can carry great impacts on the environment, on animal lives, and on your grocery bill.

Connecting these findings with the “Three Rs” ethical principles of animal consumption⁴³.

- **Replacement:** replacing animal-based products with plant-based alternatives
- **Reduction:** if consuming animal-based products, selecting ones that have a *lesser* impact on the environment and use *less* animal lives
- **Refinement:** only eating animal-based products that involve methods that minimize animal pain and distress

A framework originally developed to improve the welfare of laboratory animals, the 3 R’s are also applicable in protecting farm animals and the environment.

This report focuses primarily on the first principle of *Replacement*, however, some information provided in the report can help consumers make informed decisions across all principles.

Additionally, these three principles are not only considered “different parts of the same process to meet human health and animal welfare challenges, but also powerful options to combat climate, biodiversity and—last but not least—food security challenges”⁴⁴.



...animal-product replacement, of any amount, can carry great impacts on the environment, on animal lives, and on your grocery bill.

Image 2: 3 R Principles Explained

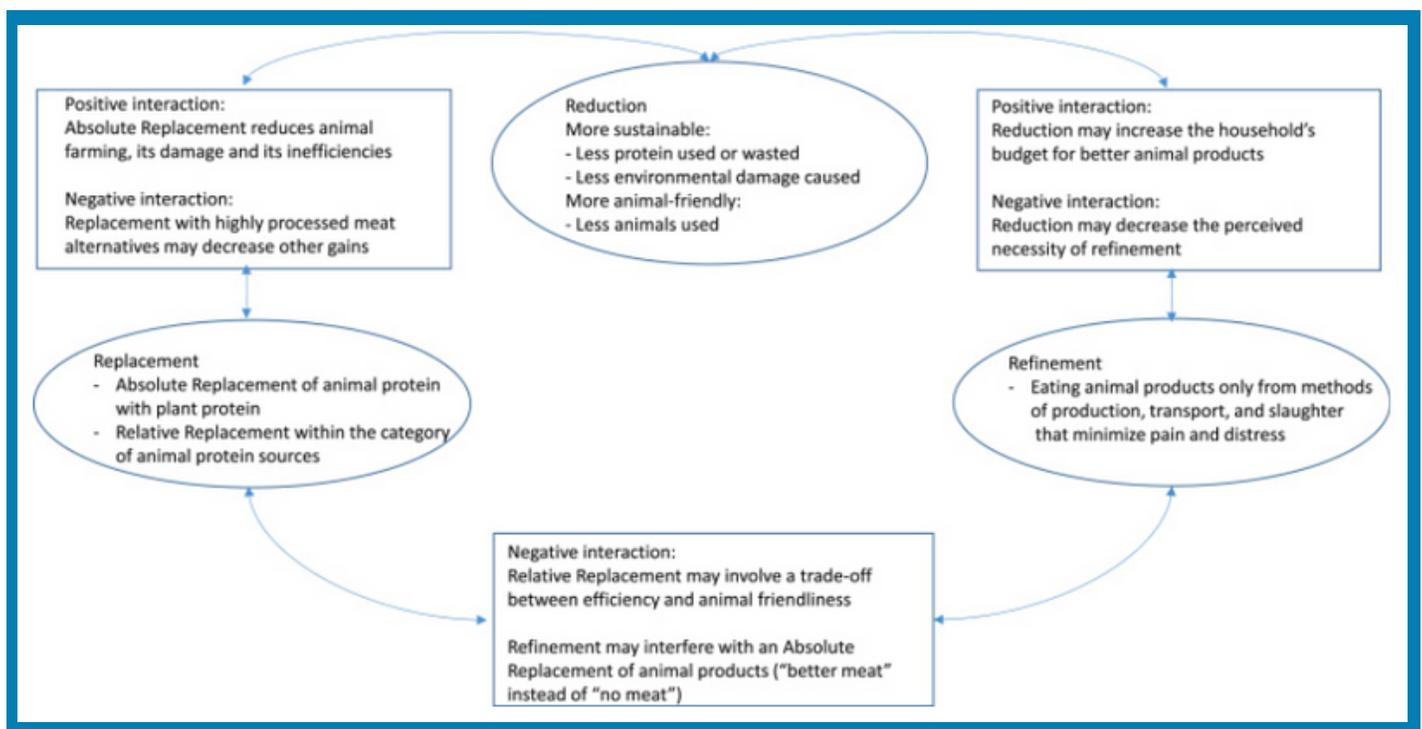


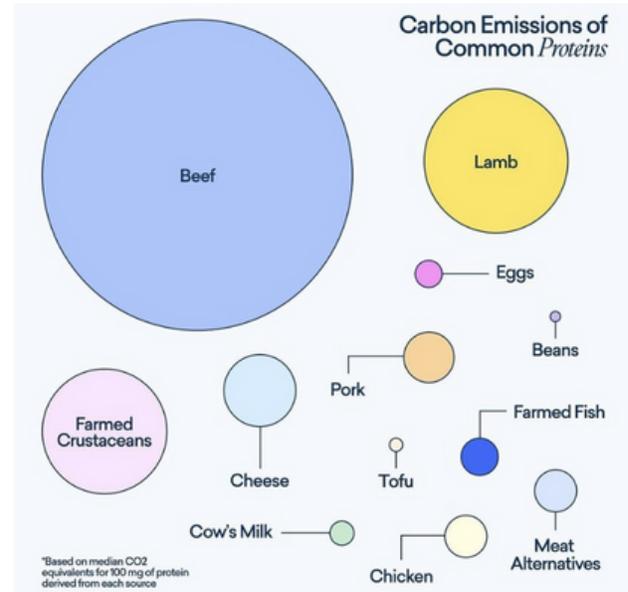
Image sourced from de Boer, Joop, and Harry Aiking. “Considering how farm animal welfare concerns may contribute to more sustainable diets.” *Appetite* 168 (2022): 105786.

Emissions

To most significantly reduce diet related emissions, any transition from **beef or seafood** to plant-based alternatives will carry the greatest impact from a replacement perspective. Not only are these products the most carbon intensive products of those listed in the survey, but common plant-based alternatives are typically whole foods or ones that involve little processing, therefore enhancing total emissions savings.

However, looking at our own diets and **understanding where the majority of our emissions outputs are generated, and making small to substantial changes in those categories will likely maximize our efforts to reduce our collective carbon footprint.** Emissions associated with certain food types are outlined in the *Impact Summaries Per Product Type* charts found in the Potential for Savings section, or refer to *Image 2* for a general understanding of animal-based products associated with the greatest emission outputs.

Image 2: Carbon Emissions of Common Proteins



Graphic created by Bon Appetit based on data from Poore, Nemecek (2018). Retrieved from [Greenpeace Canada's Twitter](#).

Cost

Generally the greatest cost savings are seen with beef and seafood. However, as noted previously, the replacement items listed are just suggestions that work well with some dishes, but not all. Additional alternative suggestions for these products, which may not be as cost effective are listed in *Table 2*.

Table 2: Additional Beef and Seafood Alternatives

Beef



Mushrooms



Quinoa



Walnuts



Hemp hearts



Texturized vegetable protein



Seitan

Seafood



Hearts of palm



Banana blossoms



Jackfruit



Tofu



Chickpeas

For alternative suggestions where costs *increased* when compared to animal products, it is worth noting that these alternatives are typically more highly processed items, requiring more stops along the supply chain and therefore experiencing a heightened price point. The above suggestions were selected for their textural and nutritional (protein) likeness to the products they were meant to replace. **Selecting more natural, whole products (like legumes, beans and pulses) is more likely to create cost savings.**

Animal Lives

In a life to life comparison, reducing seafood, fish, poultry and eggs will ultimately save more animal lives than reducing pork or beef due to the lesser number of portions produced from one animal. For example, it takes about 134 chickens to produce the same amount of meat as one cow⁴⁵.

Another consideration is, in essence, the *amount* of suffering one animal endures in their lifetime. Dairy cows, beef cattle, and pigs are typically raised for longer periods of time before being brought to slaughter when compared to chickens, farmed fish, and seafood, and therefore experience longer periods of hardship in comparison. Some animals face particularly grueling hardships within their lifespan as livestock animals. For example, dairy cows are kept in a repeated cycle of pregnancy, birth, separation from their young, and milking until their milk production declines and they are sent to slaughter, usually at 5-6 years old⁴⁶.



Another consideration [when considering animal welfare and suffering] is, in essence, the *amount* of suffering one animal endures in its lifetime.



Resources

To better understand how to reduce emissions, animal suffering, and costs associated with *your* diet, consider tracking your dietary habits and utilizing the following resources to understand the types of changes that could carry the greatest impact for you.

Free food carbon footprint calculator

Our free food carbon footprint calculator tells you the climate impact of your food, meals, or a recipe. Find out your carbon footprint today!

Enter approximate number of servings: 1

Ingredients

Choose an ingredient

+ Add Ingredient

Weight

g

Calculate

My Emissions Food Emissions Calculator

Greenhouse Gas Equivalencies Calculator

Convert emissions or energy data into concrete terms you can understand — such as the annual CO₂ emissions of cars, households, and power plants.

The Greenhouse Gas Equivalencies calculator allows you to convert emissions or energy data to the equivalent amount of carbon dioxide (CO₂) emissions from using that amount. The calculator helps you translate abstract measurements into concrete terms you can understand, such as the annual emissions from cars, households, or power plants. This calculator may be useful in communicating your greenhouse gas reduction strategy, reduction targets, or other initiatives aimed at reducing greenhouse gas emissions.



Updated March 2022

These estimates are approximate and should not be used for emission inventories or formal carbon emissions analysis. See [Calculations & References](#) for equations and sources used.

Step 1 - Enter and convert data

Select data to convert:

- Energy data
- Emissions data

US Environmental Protection Agency's Greenhouse Gas Equivalencies Calculator

PLANT-BASED SUBSTITUTIONS

Use this handy substitution guide to feature plant-based ingredients in your favourite recipes. Remember: You can make anything plant-based!

Red meat

Replacements for red meat include:

- Lentils
- Mushrooms
- Quinoa
- Walnuts
- Hemp hearts
- Texturized vegetable protein
- Seitan
- Spices and herbs

Chef's Tip: Include a fat and appropriate plant-based protein to mimic mouth-feel and season your dish well, by utilizing not only salt and pepper, but other flavour enhancers like cumin, soy sauce or garlic.

In lieu of ground beef try:

In a medium heated pan sauté together 1 tbsp oil + 250g crumbled tempeh (or 1/2 cup lentils and 3/4 cup finely diced mushrooms) + 1 tbsp soy sauce + 1 tsp ground cumin + 1 tsp paprika + 1/4 tsp black pepper. Sauté until spices are fragrant and tempeh is darker brown, about 3 minutes

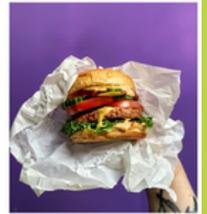


Photo: LikeMeat/Unsplash

Humane Society International's Plant Based Substitution List



Vancouver Humane Society's "Increasing Plant-based Purchasing at the Municipal Level" report

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Appendices

Calculations for Individual Consumers – Summary Sheet

100% Change of most common consumer servings		
Product	upper serving	Cost Savings
Beef	10	\$28.50
Pork	4	-\$3.84
Chicken	10	\$7.30
Fish	4	\$8.52
Seafood	4	\$12.12
Eggs	1020g	\$2.55
Milk	1L	-\$1.60
Cheese	227g	-\$1.82
Other Dairy	1L	-\$1.70
		\$50.03
50% Change of most common consumer servings		
Product	upper serving	Cost Savings
Beef	10	\$14.25
Pork	4	-\$1.92
Chicken	10	\$3.65
Fish	4	\$4.26
Seafood	4	\$6.06
Eggs	1020g	\$1.28
Milk	1L	-\$0.80
Cheese	227g	-\$0.99
Other Dairy	1L	-\$0.85
		\$24.94
25% Change of most common consumer servings		
Product	upper serving	Cost Savings
Beef	10	\$7.13
Pork	4	-\$0.96
Chicken	10	\$1.83
Fish	4	\$2.13
Seafood	4	\$3.03
Eggs	1020g	\$0.64
Milk	1L	-\$0.40
Cheese	227g	-\$0.49
Other Dairy	1L	-\$0.43
		\$12.47

Final Cost Results

COST									
100% Replacement									
Beef Servings 0%	Cost	Total Cost	Lentil Servings 100%	Cost	Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
0-4	\$3.26/100g	\$13.04	0-4	\$0.41/100g	\$1.64	\$11.84	\$11.40	13%	87%
5		\$18.30	5		\$2.05	\$2.05	\$14.25	13%	87%
10		\$32.80	10		\$4.10	\$4.10	\$28.50	13%	87%
11		\$35.86	11		\$4.51	\$4.51	\$31.35	13%	87%
20		\$65.20	20		\$8.20	\$8.20	\$57.00	13%	87%
21+		\$68.46	21+		\$8.61	\$8.61	\$59.85	13%	87%
Pork 0%	Cost	Total Cost	Tempeh Servings 100%	Cost	Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
0-4	\$1.97/100g	\$7.88	0-4	\$2.93/100g	\$11.72	\$11.72	-\$3.84	149%	
5		\$9.85	5		\$14.65	\$14.65	-\$4.80	149%	
10		\$19.70	10		\$29.30	\$29.30	-\$9.60	149%	
11		\$21.67	11		\$32.23	\$32.23	-\$10.56	149%	
20		\$39.40	20		\$58.60	\$58.60	-\$19.20	149%	
21+		\$41.37	21+		\$61.63	\$61.63	-\$20.26	149%	
Chicken 0%	Cost	Total Cost	Tofu Servings 100%	Cost	Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
0-4	\$1.60/100g	\$6.40	0-4	\$0.87/100g	\$3.48	\$3.48	\$2.92	54%	46%
5		\$8.00	5		\$4.35	\$4.35	\$3.65	54%	46%
10		\$16.00	10		\$8.70	\$8.70	\$7.30	54%	46%
11		\$17.60	11		\$9.57	\$9.57	\$8.03	54%	46%
20		\$32.00	20		\$17.40	\$17.40	\$14.60	54%	46%
21+		\$33.60	21+		\$18.27	\$18.27	\$15.33	54%	46%
Fish 0%	Cost	Total Cost	Chickpea Servings 100%	Cost	Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
0-4	\$3.01/100g	\$12.04	0-4	\$0.88/100g	\$3.52	\$3.52	\$8.52	29%	71%
5		\$15.05	5		\$4.40	\$4.40	\$10.65	29%	71%
10		\$30.10	10		\$8.80	\$8.80	\$21.30	29%	71%
11		\$33.11	11		\$9.68	\$9.68	\$23.43	29%	71%
20		\$60.20	20		\$17.60	\$17.60	\$42.60	29%	71%
21+		\$63.21	21+		\$18.48	\$18.48	\$44.73	29%	71%
General Seafood 0%	Cost	Total Cost	Mushrooms 100%	Cost	Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
0-4	\$4.24/100g	\$16.96	0-4	\$1.21/100g	\$4.84	\$4.84	\$12.12	29%	71%
5		\$21.20	5		\$6.05	\$6.05	\$15.15	29%	71%
10		\$42.40	10		\$12.10	\$12.10	\$30.30	29%	71%
11		\$46.64	11		\$13.31	\$13.31	\$33.33	29%	71%
20		\$84.80	20		\$24.20	\$24.20	\$60.60	29%	71%
21+		\$89.04	21+		\$25.41	\$25.41	\$63.63	29%	71%
Egg 0%	Cost	Total Cost	Banana/Chickpea 100%	Cost	Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
360g	\$0.51/egg(50g)	\$3.06	360g	\$0.006/g	\$2.16	\$2.16	\$0.90	71%	29%
420g		\$3.57	420g		\$2.52	\$2.52	\$1.05	71%	29%
1020g		\$8.67	1020g		\$6.12	\$6.12	\$2.55	71%	29%
1080g		\$9.18	1080g		\$6.48	\$6.48	\$2.70	71%	29%
2100g		\$17.85	2100g		\$12.60	\$12.60	\$5.25	71%	29%
2160g		\$18.36	2160g		\$12.96	\$12.96	\$5.40	71%	29%
Cows Milk 0%	Cost	Total Cost	Oat Milk 100%	Cost	Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
1L	\$1.50/L	\$1.50	1L	\$3.10/L	\$3.10	\$3.10	-\$1.60	207%	
2L		\$3.00	2L		\$6.20	\$6.20	-\$3.20	207%	
3L		\$4.50	3L		\$9.30	\$9.30	-\$4.80	207%	
5L		\$7.50	5L		\$15.50	\$15.50	-\$8.00	207%	
6L		\$9.00	6L		\$18.60	\$18.60	-\$9.60	207%	
Cheese 0%	Cost	Total Cost	Vegan Cheese 100%	Cost	Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
113g	\$0.04/g	\$4.87	113g	\$0.05/g	\$5.81	\$5.81	-\$0.94	119%	
142g		\$6.12	142g		\$7.30	\$7.30	-\$1.18	119%	
227g		\$9.78	227g		\$11.60	\$11.60	-\$1.82	119%	
255g		\$10.99	255g		\$13.12	\$13.12	-\$2.13	119%	
340g		\$14.65	340g		\$17.48	\$17.48	-\$2.83	119%	
389g		\$15.90	389g		\$18.97	\$18.97	-\$3.07	119%	
Other Dairy 0%	Cost	Total Cost	Plant Based Yogurt & Oil 100%	Cost	Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
0-500ml	\$1.15/100ml	\$5.75	0-500ml	\$1.32/100ml	\$6.60	\$6.60	-\$0.85	115%	
1L		\$11.50	1L		\$13.20	\$13.20	-\$1.70	115%	
1.5L		\$17.25	1.5L		\$19.80	\$19.80	-\$2.55	115%	
2L		\$23.00	2L		\$26.40	\$26.40	-\$3.40	115%	
3L		\$34.50	3L		\$39.60	\$39.60	-\$5.10	115%	
4L		\$46.00	4L		\$52.80	\$52.80	-\$6.80	115%	
5L +		\$57.50	5L +		\$66.00	\$66.00	-\$8.50	115%	

50% Replacement									
Beef Servings 50% Cost		Total Cost	Lentil Servings 50% Cost		Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
0-4	\$3.26/100g	\$6.52	0-4	\$0.41/100g	\$0.82	\$7.34	\$5.70	56%	44%
5		\$8.15	5		\$1.03	\$9.18	\$7.13	56%	44%
10		\$16.30	10		\$2.05	\$18.35	\$14.25	56%	44%
11		\$17.93	11		\$2.26	\$20.19	\$15.68	56%	44%
20		\$32.60	20		\$4.10	\$36.70	\$28.50	56%	44%
21+		\$34.23	21+		\$4.31	\$38.54	\$29.93	56%	44%
Pork 50% Cost		Total Cost	Tempeh Servings 50% Cost		Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
0-4	\$1.97/100g	\$3.94	0-4	\$2.93/100g	\$5.86	\$9.80	-\$1.92	124%	
5		\$4.93	5		\$7.33	\$12.25	-\$2.40	124%	
10		\$9.85	10		\$14.65	\$24.50	-\$4.80	124%	
11		\$10.84	11		\$16.12	\$26.95	-\$5.28	124%	
20		\$19.70	20		\$29.30	\$49.00	-\$9.60	124%	
21+		\$20.69	21+		\$30.82	\$51.50	-\$10.13	124%	
Chicken 50% Cost		Total Cost	Tofu Servings 50% Cost		Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
0-4	\$1.60/100g	\$3.20	0-4	\$0.87/100g	\$1.74	\$4.94	\$1.46	77%	13%
5		\$4.00	5		\$2.18	\$6.18	\$1.83	77%	13%
10		\$8.00	10		\$4.35	\$12.35	\$3.65	77%	13%
11		\$8.80	11		\$4.79	\$13.59	\$4.02	77%	13%
20		\$16.00	20		\$8.70	\$24.70	\$7.30	77%	13%
21+		\$16.80	21+		\$9.14	\$25.94	\$7.67	77%	13%
Fish 50% Cost		Total Cost	Chickpea Servings 50% Cost		Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
0-4	\$3.01/100g	\$6.02	0-4	\$0.88/100g	\$1.76	\$7.78	\$4.26	65%	35%
5		\$7.53	5		\$2.20	\$9.73	\$5.33	65%	35%
10		\$15.05	10		\$4.40	\$19.45	\$10.65	65%	35%
11		\$16.56	11		\$4.84	\$21.40	\$11.72	65%	35%
20		\$30.10	20		\$8.80	\$38.90	\$21.30	65%	35%
21+		\$31.61	21+		\$9.24	\$40.85	\$22.37	65%	35%
General Seafood 50% Cost		Total Cost	Mushrooms 50% Cost		Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
0-4	\$4.24/100g	\$8.48	0-4	\$1.21/100g	\$2.42	\$10.90	\$6.06	64%	36%
5		\$10.60	5		\$3.03	\$13.63	\$7.58	64%	36%
10		\$21.20	10		\$6.05	\$27.25	\$15.15	64%	36%
11		\$23.32	11		\$6.66	\$29.98	\$16.67	64%	36%
20		\$42.40	20		\$12.10	\$54.50	\$30.30	64%	36%
21+		\$44.52	21+		\$12.71	\$57.23	\$31.82	64%	36%
Egg 50% Cost		Total Cost	Banana/Chickpea 50% Cost		Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
360g	\$0.51/egg(60g)	\$1.53	360g	\$0.006/g	\$1.08	\$2.61	\$0.45	85%	15%
420g		\$1.79	420g		\$1.26	\$3.05	\$0.53	85%	15%
1020g		\$4.34	1020g		\$3.06	\$7.40	\$1.28	85%	15%
1080g		\$4.59	1080g		\$3.24	\$7.83	\$1.35	85%	15%
2100g		\$8.93	2100g		\$6.30	\$15.23	\$2.63	85%	15%
2160g		\$9.18	2160g		\$6.48	\$15.66	\$2.70	85%	15%
Cows Milk 50% Cost		Total Cost	Oat Milk 50% Cost		Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
1L	\$1.50L	\$0.75	1L	\$3.10L	\$1.55	\$2.30	-\$0.80	153%	
2L		\$1.50	2L		\$3.10	\$4.60	-\$1.60	153%	
3L		\$2.25	3L		\$4.65	\$6.90	-\$2.40	153%	
5L		\$3.75	5L		\$7.75	\$11.50	-\$4.00	153%	
6L		\$4.50	6L		\$9.30	\$13.80	-\$4.80	153%	
Cheese 50% Cost		Total Cost	Vegan Cheese 50% Cost		Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
113g	\$0.04/g	\$2.44	113g	\$0.05/g	\$2.91	\$5.34	-\$0.47	110%	
142g		\$3.06	142g		\$3.65	\$6.71	-\$0.59	110%	
227g		\$4.89	227g		\$5.88	\$10.77	-\$0.99	110%	
255g		\$5.50	255g		\$6.58	\$12.08	-\$1.07	110%	
340g		\$7.33	340g		\$8.74	\$16.07	-\$1.42	110%	
369g		\$7.95	369g		\$9.49	\$17.44	-\$1.54	110%	
Other Dairy 50% Cost		Total Cost	Plant Based Yogurt & Oil 50% Cost		Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
0-500ml	\$1.15/100ml	\$2.88	0-500ml	\$1.32/100ml	\$3.30	\$6.18	-\$0.43	107%	
1L		\$5.75	1L		\$6.60	\$12.35	-\$0.85	107%	
1.5L		\$8.63	1.5L		\$9.90	\$18.53	-\$1.28	107%	
2L		\$11.50	2L		\$13.20	\$24.70	-\$1.70	107%	
3L		\$17.25	3L		\$19.80	\$37.05	-\$2.55	107%	
4L		\$23.00	4L		\$26.40	\$49.40	-\$3.40	107%	
5L +		\$28.75	5L +		\$33.00	\$61.75	-\$4.25	107%	

25% Replacement											
Beef Servings 75% Cost			Total Cost	Lentil Servings 25% Cost			Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
0-4	\$3.28/100g		\$9.78	0-4	\$0.41/100g		\$0.40	\$10.18	\$2.86	78%	12%
5			\$12.23	5			\$0.51	\$12.74	\$3.56	78%	12%
10			\$24.45	10			\$1.03	\$25.48	\$7.13	78%	12%
11			\$28.90	11			\$1.13	\$28.02	\$7.84	78%	12%
20			\$48.90	20			\$2.05	\$50.95	\$14.25	78%	12%
21+			\$51.35	21+			\$2.15	\$53.50	\$14.96	78%	12%
Pork 75% Cost			Total Cost	Tempeh Servings 25% Cost			Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
0-4	\$1.97/100g		\$5.91	0-4	\$2.93/100g		\$2.93	\$8.84	-\$0.96	112%	
5			\$7.39	5			\$3.66	\$11.05	-\$1.20	112%	
10			\$14.78	10			\$7.33	\$22.10	-\$2.40	112%	
11			\$16.25	11			\$8.06	\$24.31	-\$2.64	112%	
20			\$29.55	20			\$14.65	\$44.20	-\$4.80	112%	
21+			\$31.03	21+			\$15.41	\$46.44	-\$5.07	112%	
Chicken 75% Cost			Total Cost	Tofu Servings 25% Cost			Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
0-4	\$1.60/100g		\$4.80	0-4	\$0.87/100g		\$0.87	\$5.67	\$0.73	89%	11%
5			\$6.00	5			\$1.09	\$7.09	\$0.91	89%	11%
10			\$12.00	10			\$2.18	\$14.18	\$1.83	89%	11%
11			\$13.20	11			\$2.39	\$15.59	\$2.01	89%	11%
20			\$24.00	20			\$4.35	\$28.35	\$3.65	89%	11%
21+			\$25.20	21+			\$4.57	\$29.77	\$3.83	89%	11%
Fish 75% Cost			Total Cost	Chickpea Servings 25% Cost			Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
0-4	\$3.01/100g		\$9.03	0-4	\$0.88/100g		\$0.88	\$9.91	\$2.13	82%	18%
5			\$11.29	5			\$1.10	\$12.39	\$2.66	82%	18%
10			\$22.58	10			\$2.20	\$24.78	\$5.33	82%	18%
11			\$24.83	11			\$2.42	\$27.25	\$5.86	82%	18%
20			\$45.15	20			\$4.40	\$49.55	\$10.65	82%	18%
21+			\$47.41	21+			\$4.62	\$52.03	\$11.18	82%	18%
General Seafood 75% Cost			Total Cost	Mushrooms 25% Cost			Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
0-4	\$4.24/100g		\$12.72	0-4	\$1.21/100g		\$1.21	\$13.93	\$3.03	82%	18%
5			\$15.90	5			\$1.51	\$17.41	\$3.79	82%	18%
10			\$31.80	10			\$3.03	\$34.83	\$7.58	82%	18%
11			\$34.98	11			\$3.33	\$38.31	\$8.33	82%	18%
20			\$63.80	20			\$6.05	\$69.85	\$15.15	82%	18%
21+			\$66.78	21+			\$6.35	\$73.13	\$15.91	82%	18%
Egg 75% Cost			Total Cost	Banana/Chickpea 25% Cost			Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
360g	\$0.51/egg(80g)		\$2.30	360g	\$0.006/g		\$0.54	\$2.84	\$0.23	93%	7%
420g			\$2.68	420g			\$0.63	\$3.31	\$0.26	93%	7%
1020g			\$6.50	1020g			\$1.53	\$8.03	\$0.64	93%	7%
1080g			\$6.89	1080g			\$1.62	\$8.51	\$0.68	93%	7%
2100g			\$13.39	2100g			\$3.15	\$16.54	\$1.31	93%	7%
2160g			\$13.77	2160g			\$3.24	\$17.01	\$1.35	93%	7%
Cows Milk 75% Cost			Total Cost	Oat Milk 25% Cost			Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
1L	\$1.50/L		\$1.13	1L	\$3.10/L		\$0.78	\$1.90	-\$0.40	127%	
2L			\$2.25	2L			\$1.55	\$3.80	-\$0.80	127%	
3L			\$3.38	3L			\$2.33	\$5.70	-\$1.20	127%	
5L			\$5.63	5L			\$3.88	\$9.50	-\$2.00	127%	
6L			\$6.75	6L			\$4.65	\$11.40	-\$2.40	127%	
Cheese 75% Cost			Total Cost	Vegan Cheese 25% Cost			Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
113g	\$0.04/g		\$3.65	113g	\$0.05/g		\$1.45	\$5.11	-\$0.23	105%	
142g			\$4.59	142g			\$1.83	\$6.42	-\$0.30	105%	
227g			\$7.34	227g			\$2.94	\$10.28	-\$0.49	105%	
255g			\$8.24	255g			\$3.28	\$11.52	-\$0.53	105%	
340g			\$10.99	340g			\$4.37	\$15.36	-\$0.71	105%	
369g			\$11.93	369g			\$4.74	\$16.67	-\$0.77	105%	
Other Dairy 75% Cost			Total Cost	Plant Based Yogurt & Oil 25% Cost			Total Cost	Total Cost in this Scenario	Cost Reduction in this Scenario	Spend %	Spend Reduction
0-500ml	\$1.15/100ml		\$4.31	0-500ml	\$1.32/100ml		\$1.65	\$5.96	-\$0.21	104%	
1L			\$8.63	1L			\$3.30	\$11.93	-\$0.43	104%	
1.5L			\$12.94	1.5L			\$4.95	\$17.89	-\$0.64	104%	
2L			\$17.25	2L			\$6.60	\$23.85	-\$0.85	104%	
3L			\$25.88	3L			\$9.90	\$35.78	-\$1.28	104%	
4L			\$34.50	4L			\$13.20	\$47.70	-\$1.70	104%	
5L +			\$43.13	5L +			\$16.50	\$59.63	-\$2.13	104%	

Final Greenhouse Gas (GHG) Results

GHG									
100% Replacement									
Beef Servings 0%	GHG	Lentil Servings 100%	GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %		
4	17332	4	268	268	17064	2%	98%		
5	21665	5	335	335	21330	2%	98%		
10	43330	10	670	670	42660	2%	98%		
11	47663	11	737	737	46926	2%	98%		
20	86661	20	1341	1341	85320	2%	98%		
21+	90994	21+	1408	1408	89586	2%	98%		
Pork Servings 0%	GHG	Tempeh Servings 100%	GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %		
4	2651	4	437	437	2214	17%	83%		
5	3314	5	547	547	2767	17%	83%		
10	6628	10	1093	1093	5535	17%	83%		
11	7291	11	1202	1202	6089	17%	83%		
20	13257	20	2186	2186	11071	17%	83%		
21+	13919	21+	2295	2295	11624	17%	83%		
Chicken Servings 0%	GHG	Tofu Servings 100%	GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %		
4	1882	4	742	742	1140	39%	61%		
5	2353	5	928	928	1425	39%	61%		
10	4706	10	1856	1856	2850	39%	61%		
11	5177	11	2042	2042	3135	39%	61%		
20	9412	20	3712	3712	5700	39%	61%		
21+	9883	21+	3898	3898	5985	39%	61%		
Fish Servings 0%	GHG	Chickpeas Servings 100%	GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %		
4	2422	4	341	341	2081	14%	86%		
5	3028	5	426	426	2602	14%	86%		
10	6056	10	852	852	5204	14%	86%		
11	6661	11	937	937	5724	14%	86%		
20	12111	20	1704	1704	10407	14%	86%		
21+	12716	21+	1789	1789	10927	14%	86%		
General Seafood 0%	GHG	Mushrooms 100%	GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %		
0-4	7048	4	562	562	6486	8%	92%		
5	8873	5	702	702	8171	8%	92%		
10	17746	10	1405	1405	16341	8%	92%		
11	19520	11	1545	1545	17975	8%	92%		
20	35491	20	2809	2809	32682	8%	92%		
21+	37266	21+	2950	2950	34316	8%	92%		
Eggs 0%	GHG	Chickpea/Banana 100%	GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %		
6	1622	6	397	397	1226	24%	76%		
7	1892	7	452	452	1440	24%	76%		
17	4596	17	1099	1099	3497	24%	76%		
18	4866	18	1162	1162	3704	24%	76%		
35	9462	35	2260	2260	7202	24%	76%		
36+	9732	36+	2324	2324	7408	24%	76%		
Cow's Milk 0%	GHG	Oat Milk 100%	GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %		
1L	1817	1L	368	368	1449	20%	80%		
2L	3634	2L	735	735	2899	20%	80%		
3L	5451	3L	1103	1103	4348	20%	80%		
5L	9084	5L	1839	1839	7245	20%	80%		
6L +	10901	6L +	2206	2206	8695	20%	80%		
Cheese 0%	GHG	Vegan Cheese 100%	GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %		
4oz	996	4oz	308	308	688	31%	69%		
5oz	1246	5oz	385	385	861	31%	69%		
8oz	1993	8oz	617	617	1376	31%	69%		
9oz	2242	9oz	694	694	1548	31%	69%		
12oz	2989	12oz	925	925	2064	31%	69%		
13oz +	3238	13oz +	1002	1002	2236	31%	69%		

Other Dairy 0%	GHG	Dairy Free Yogurt/Oil 100%	GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %
500ml	2879	500ml	788	788	2091	27%	73%
1L	5758	1L	1575	1575	4183	27%	73%
1.5L	8637	1.5L	2363	2363	6274	27%	73%
2L	11516	2L	3151	3151	8365	27%	73%
3L	17274	3L	4726	4726	12548	27%	73%
4L	23032	4L	6302	6302	16730	27%	73%
5L +	28790	5L +	7877	7877	20913	27%	73%
50% Replacement							
Beef Servings 50%	GHG	Lentil Servings 50%	GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %
4	8666	4	134	8800	8532	49%	51%
5	10833	5	168	11000	10665	49%	51%
10	21665	10	335	22000	21330	49%	51%
11	23832	11	369	24200	23463	49%	51%
20	43331	20	671	44001	42660	49%	51%
21+	45497	21	704	46201	44793	49%	51%
Pork Servings 50%	GHG	Tempeh Servings 50%	GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %
4	1326	4	219	1544	1107	58%	42%
5	1657	5	274	1931	1384	58%	42%
10	3314	10	547	3861	2768	58%	42%
11	3646	11	601	4247	3045	58%	42%
20	6629	20	1093	7722	5536	58%	42%
21+	6960	21+	1148	8107	5812	58%	42%
Chicken Servings 50%	GHG	Tofu Servings 50%	GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %
4	941	4	371	1312	570	70%	30%
5	1177	5	464	1641	713	70%	30%
10	2353	10	928	3281	1425	70%	30%
11	2589	11	1021	3610	1568	70%	30%
20	4706	20	1856	6562	2850	70%	30%
21+	4942	21+	1949	6891	2993	70%	30%
Fish Servings 50%	GHG	Chickpeas Servings 50%	GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %
4	1211	4	171	1382	1041	57%	43%
5	1514	5	213	1727	1301	57%	43%
10	3028	10	426	3454	2602	57%	43%
11	3331	11	469	3799	2862	57%	43%
20	6056	20	852	6908	5204	57%	43%
21+	6358	21+	895	7253	5464	57%	43%
General Seafood 50%	GHG	Mushrooms 50%	GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %
4	3524	4	281	3805	3243	54%	46%
5	4437	5	351	4788	4086	54%	46%
10	8873	10	703	9576	8171	54%	46%
11	9760	11	773	10533	8988	54%	46%
20	17746	20	1405	19150	16341	54%	46%
21+	18633	21+	1475	20108	17158	54%	46%
Eggs 50%	GHG	Chickpea/Banana 50%	GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %
6	811	6	198	1009	613	62%	38%
7	946	7	226	1172	720	62%	38%
17	2298	17	550	2848	1749	62%	38%
18	2433	18	581	3014	1852	62%	38%
35	4731	35	1130	5861	3601	62%	38%
36+	4866	36+	1162	6028	3704	62%	38%
Cow's Milk 50%	GHG	Oat Milk 50%	GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %
1L	909	1L	184	1093	725	60%	40%
2L	1817	2L	368	2185	1450	60%	40%
3L	2726	3L	552	3277	2174	60%	40%
5L	4542	5L	920	5462	3623	60%	40%
6L +	5451	6L +	1103	6554	4348	60%	40%

Cheese 50%		GHG	Vegan Cheese 50%		GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %
4oz		498	4oz		154	652	344	65%	35%
5oz		623	5oz		193	816	431	65%	35%
8oz		997	8oz		309	1305	688	65%	35%
9oz		1121	9oz		347	1468	774	65%	35%
12oz		1495	12oz		462.5	1957	1032	65%	35%
13oz +		1619	13oz +		501	2120	1118	65%	35%
Other Dairy 50%		GHG	Dairy Free Yogurt/Oil 50%		GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %
500ml		1439.5	500ml		394	1834	1046	64%	36%
1L		2879	1L		788	3667	2092	64%	36%
1.5L		4318.5	1.5L		1182	5500	3137	64%	36%
2L		5758	2L		1576	7334	4183	64%	36%
3L		8637	3L		2363	11000	6274	64%	36%
4L		11516	4L		3151	14667	8365	64%	36%
5L +		14395	5L +		3939	18334	10457	64%	36%
25% Replacement									
Beef Servings 75%		GHG	Lentil Servings 25%		GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %
4		12999	4		67	13066	4266	75%	25%
5		16249	5		84	16333	5333	75%	25%
10		32498	10		168	32665	10665	75%	25%
11		35747	11		184	35932	11732	75%	25%
20		64996	20		335	65331	21330	75%	25%
21+		68246	21		352	68598	22397	75%	25%
Pork Servings 75%		GHG	Tempeh Servings 25%		GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %
4		1988	4		109	2098	554	79%	11%
5		2486	5		137	2622	692	79%	11%
10		4971	10		273	5244	1384	79%	11%
11		5468	11		301	5769	1522	79%	11%
20		9943	20		547	10489	2768	79%	11%
21+		10439	21+		574	11013	2906	79%	11%
Chicken Servings 75%		GHG	Tofu Servings 25%		GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %
4		1412	4		186	1597	285	85%	15%
5		1765	5		232	1997	356	85%	15%
10		3530	10		464	3994	713	85%	15%
11		3883	11		511	4393	784	85%	15%
20		7059	20		928	7987	1425	85%	15%
21+		7412	21+		975	8387	1496	85%	15%
Fish Servings 75%		GHG	Chickpeas Servings 25%		GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %
4		1817	4		85	1902	520	79%	21%
5		2271	5		107	2378	651	79%	21%
10		4542	10		213	4755	1301	79%	21%
11		4996	11		234	5230	1431	79%	21%
20		9083	20		426	9509	2602	79%	21%
21+		9537	21+		447	9984	2732	79%	21%
General Seafood 75%		GHG	Mushrooms 25%		GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %
4		5286	4		141	5427	1622	77%	23%
5		6655	5		176	6830	2043	77%	23%
10		13310	10		351	13661	4085	77%	23%
11		14640	11		386	15026	4494	77%	23%
20		26618	20		702	27321	8171	77%	23%
21+		27950	21+		738	28687	8579	77%	23%
Eggs 75%		GHG	Chickpea/Banana 25%		GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %
6		1217	6		99	1316	306	81%	19%
7		1419	7		113	1532	360	81%	19%
17		3447	17		275	3722	874	81%	19%
18		3650	18		291	3940	926	81%	19%
35		7097	35		565	7662	1801	81%	19%
36+		7299	36+		581	7880	1852	81%	19%

Cow's Milk 75%	GHG	Oat Milk 25%	GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %
1L	1363	1L	92	1455	362	80%	20%
2L	2726	2L	184	2909	725	80%	20%
3L	4088	3L	276	4364	1087	80%	20%
5L	6813	5L	460	7273	1811	80%	20%
6L +	8176	6L +	552	8727	2174	80%	20%
Cheese 75%	GHG	Vegan Cheese 25%	GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %
4oz	747	4oz	77	824	172	83%	17%
5oz	935	5oz	96	1031	215	83%	17%
8oz	1495	8oz	154	1649	344	83%	17%
9oz	1682	9oz	174	1855	387	83%	17%
12oz	2242	12oz	231	2473	516	83%	17%
13oz +	2429	13oz +	251	2679	559	83%	17%
Other Dairy 75%	GHG	Dairy Free Yogurt/Oil 25%	GHG	GHG consumed in this scenario	GHG Reduction in this scenario	GHG used %	Reduction of %
500ml	2159	500ml	197	2356	523	82%	18%
1L	4319	1L	394	4712	1046	82%	18%
1.5L	6478	1.5L	591	7069	1569	82%	18%
2L	8637	2L	788	9425	2091	82%	18%
3L	12956	3L	1182	14137	3137	82%	18%
4L	17274	4L	1576	18850	4183	82%	18%
5L +	21593	5L +	1969	23562	5228	82%	18%