



# Eating for a Healthy Planet: A Conversation with Canadians

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## 2013 - Film Script and Research Citations

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Global understanding of climate change, as a crisis shared by all humanity, is growing. Our atmospheric, oceanic, and biological systems flow freely past international borders, therefore the impacts of climate change will be shared by all of earth's citizens, regardless of our countries of origin or our differing national emissions levels. As planetary citizens, we must “think globally, and act locally” – look beyond our borders to understand what factors most threaten the world's climate system, and then enact effective lifestyle changes at home.

Already the warming climate is having dramatic impacts. In September 2012, the summer melting of Arctic sea ice reached a new record, and since 1979 has declined by 13 percent per decade.<sup>1</sup> Without this ice cover, the pole no longer reflects sunlight, but absorbs increasing amounts of it, warming the climate and ocean. In addition to drastically affecting the ecosystems and beings who live here, this warming is also causing the world's glaciers to melt. In Greenland, extensive melting off the ice sheet cuts channels under the glaciers, hastening their progress into the sea where they deposit fresh water both as meltwater and icebergs. This changes the proportion of saltwater to freshwater, which in turn threatens to shut down the Atlantic thermohaline circulation, part of the ocean's global conveyor belt which brings warm currents up from the equator and moderates the climate.

The retreat of glaciers around the planet – such as Mount Kilimanjaro in Africa, in Bolivia, in

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<sup>1</sup> “Arctic Sea Ice Shatters Previous Low Records; Antarctic Sea Ice Edges to Record High,” *Science Daily*, Oct. 3, 2012. <<http://www.sciencedaily.com/releases/2012/10/121003103719.htm>>

the Himalayas – is already impacting the indigenous populations who live below them, who are losing one of their only sources of fresh water.<sup>2</sup> Elsewhere, rising temperatures are creating serious droughts such as here in Australia. According to the UN Food & Agriculture Organization, the FAO, by 2025, 64 percent of the world's population are expected to live in water-stressed areas.<sup>3</sup>

The growing range of impacts from climate change, such as the increase of wildfires burning around the world and the extreme storm surges causing loss of life and property, is well documented in scientific studies and increasingly to the public through films such as Al Gore's *An Inconvenient Truth*. Yann Arthus-Bertrand's 2009 film, *Home*, not only catalogues the growing list of environmental and social impacts, but also examines the root causes of human-induced climate change. A significant generator of greenhouse gas emissions is livestock agriculture, exceeding other more publicized sectors such as global transportation. Humanity's addiction to meat is changing the face of our planet, seen most dramatically in the conversion of the Amazon rainforest to livestock ranches and soybean crops for cattle feed.

[Sequence: Yann Arthus-Bertrand's film *Of Forests and Men*]

Global initiatives to reduce meat consumption, such as the Meatless Monday movement now active in 24 countries, is the focus of this film. It is not only one of many effective ways we can significantly mitigate greenhouse gas emissions and slow global warming, but also adapt to the coming changes in agricultural productivity by eating lower on the food chain. Concerns about global food security in a world increasingly stressed by climate change has many leading scientists predicting that the world must shift to a plant-based diet by 2050.<sup>4</sup> It represents one of the largest gains to be made, not only in mitigating and adapting to climate change, but also in improving environmental and human health. We'll hear from several Canadians who are already implementing these changes in their daily lives, either through Meatless Mondays, or through commitments to a vegetarian or vegan diet.

How can one single change, what you choose to put on your plate each day, have such widespread effects? In 2006, the United Nations released a landmark study which exposed animal agriculture as contributing nearly one-fifth of all human-induced greenhouse gases. That's more than the emissions from all the world's transportation including trains, planes, automobiles, and shipping, *combined*.<sup>5</sup> The UN Intergovernmental Panel on Climate Change – the IPCC – released similar figures

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2 HDCC400 lecture Mar. 4: Roxana Castellón. See also Elisabeth Rosenthal, "In Bolivia, Water and Ice Tell of Climate Change," *The New York Times*, December 14, 2009.

3 H. Steinfeld, P. Gerber, T. Wassenaar, V. Castel, M. Rosales, C. de Haan (2006), "Livestock's long shadow— Environmental issues and options," *UN FAO*, xxii.

4 John Vidal, Environment Editor, "Food Shortages Could Force World into Vegetarianism, Warn Scientists," *The Guardian*, Aug. 26, 2012. <<http://www.guardian.co.uk/global-development/2012/aug/26/food-shortages-world-vegetarianism>> Accessed Sept. 15, 2012.

5 *Ibid.*, xxi.

in their 2007 report, with agriculture reported at 13.5 percent of emissions, still higher than transportation.<sup>6</sup> Emissions from deforestation due to livestock agriculture, which the FAO estimates as the better part of 9 percent, was reported separately under the Forestry sector which grossed 17 percent.

Carbon dioxide is one of the key greenhouse gases, and among its emissions caused by humans, the livestock sector accounts for 9 percent, or 3 billion tonnes per year.<sup>7</sup> These come from not only the fossil fuels used to run farming equipment and grow crops – one-third of which are fed to livestock – but also deforestation. The expansion of livestock production is a key factor in deforestation, especially in Latin America. In the Amazon region alone, 60 million square hectares of forest have been cleared, 70 percent of which is now occupied by livestock pastures.<sup>8</sup> Much of the remaining 30 percent grows soya – not for humans, but for animal feed.<sup>9</sup> According to the IPCC AR4, the loss of biomass and burning results in 17.5% of greenhouse gas emissions<sup>10</sup> and in turn destroys crucial “carbon sinks,” extensive forests and vegetation that absorb CO<sub>2</sub>.

Methane is one of the most harmful greenhouse gases, with 23 times the warming power of carbon dioxide. The digestive emissions from the billions of ruminant livestock worldwide, each responsible for 250 to 400 litres of methane per day,<sup>11</sup> generate between 37<sup>12</sup> and 60 percent<sup>13</sup> of the world's anthropogenic methane.

The massive global population of livestock reared annually for slaughter – 56 billion animals,<sup>14</sup> that's eight times the human population – produces a tremendous amount of manure, both solid and liquid. In addition to being implicated in the pollution of groundwater and waterways, this waste generates 65 percent of one of the most powerful greenhouse gases – nitrous oxide – packed with 310 times the Global Warming Potential of carbon dioxide.<sup>15</sup> Livestock are also responsible for almost two-thirds [64 percent] of anthropogenic ammonia emissions, which contribute significantly to acid rain and acidification of ecosystems.<sup>16</sup> Nitrogen oxide and ammonia is transported downwind, where its deposition can lead to soil acidification, eutrophication of natural ecosystems and shifts in species diversity.

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6 IPCC, “Climate Change 2007: Synthesis Report,” *IPCC AR4*, 36.

7 Steinfeld et al, “Livestock’s Long Shadow,” 96.

8 *Ibid.*, 91.

9 Christopher Matthews, “Livestock a major threat to environment,” *FAO Newsroom*, Nov. 29, 2006. <<http://www.fao.org/newsroom/en/news/2006/1000448/index.html>>

10 IPCC, “Climate Change 2007: Synthesis Report,” *IPCC AR4*, 36.

11 Guy Dauncey, *The Climate Challenge: 101 Solutions to Global Warming*, (New Society Publishers, 2009), 163.

12 Steinfeld et al, “Livestock’s Long Shadow,” xxi.

13 J. Bellarby, B. Foereid, A. Hastings, P. Smith, “Cool Farming: Climate Impacts of Agriculture and Mitigation Potential,” University of Aberdeen, 2008, 8.

14 FAO (Food and Agriculture Organization of the United Nations) FAOSTAT. 2008. Accessed 20 Dec., 2012. <<http://faostat.fao.org/>>

15 Steinfeld et al, “Livestock’s Long Shadow,” 72.

16 *Ibid.*, xxi.

In 2008, the Chair of the IPCC Dr. Rajendra Pachauri, a climate scientist shown here receiving the Nobel-peace prize beside Al Gore, raised public awareness of livestock emissions in press releases. He encouraged the world's nations to consider reducing meat consumption as one of the most effective ways to combat climate change. Dr. Pachauri was one of several leaders raising awareness at the EU Parliament in Brussels in 2009, "Less Meat Less Heat."

[Sequence: European Union]

It appears the world has taken their message to heart. The Meatless Monday initiative has spread to twenty-four countries, from Belgium to Indonesia to Brazil. In the U.S., Meatless Monday is a non-profit initiative associated with the Johns Hopkins School of Public Health. Since its inception in 2003, hundreds of restaurants and organizations have added their pledge, including Sodexo, who serves over 9 million meals daily to health care, corporate and government institutions such as Toyota. Hundreds of universities and grade school districts in the U.S. have pledged to Meatless Monday. Seeing a win/win solution to promote healthy meal choices at school, the most recent is the southern California school system – one of the largest in the U.S. – who on Mondays will now be serving "nutritious, meat-free items" to their 650,000 students. The web site documents the growing number of initiatives including several cities such as Los Angeles and San Francisco whose city councils legislated Meatless Monday. Cutting our meat consumption is also healthier, reducing obesity, diabetes, some cancers and heart disease.<sup>17</sup>

International studies continued to mount, warning of the significance of livestock agriculture to climate change. A 2005 study at the University of Chicago analyzed the greenhouse gas emissions inherent in the average American diet, and found that "it requires the production of an extra ton and a half of carbon dioxide-equivalent compared to a strictly vegetarian diet."<sup>18</sup> For Canadians, this equals 1.36 metric tonnes.

But don't food miles matter? They do, but not as much as *what* we eat. Although most foods are transported over long distances, when emissions from different types of food are measured it is the *production* phase of those items which dominate greenhouse gas emissions, with the transportation leg from producer to retailer comprising only four percent. The start-to-end process of raising, slaughtering and distributing meat, fish, eggs and dairy comprise almost 60 percent of GHG emissions inherent in household food.<sup>19</sup> The authors of this study also found that shifting just one day per week's worth of

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17 The international Meatless Mondays program is spearheaded in the U.S. by the Johns Hopkins' Bloomberg School of Public Health (Baltimore, MD), and promotes the reduction of meat consumption by 15% to improve personal health and the health of the planet. Their comprehensive web site catalogues hundreds of K-12 schools, entire school districts, colleges and universities who have pledged to the Meatless Monday campaign to date.  
<<http://www.meatlessmonday.com/meatless-monday-school-programs/>>

18 G. Eshel and P. Martin, "Diet, Energy and Global Warming," *Earth Interactions* 10:1-17; 2006.

19 Christopher L. Weber and H. Scott Matthews, "Food-Miles and the Relative Climate Impacts of Food Choices in the

calories from red meat and dairy products to a vegetable-based diet achieves more GHG reduction than eating all locally sourced food, seven days per week.<sup>20</sup> In the end, buying local is important, just not as important as *what* you eat.

What does that mean to Canadians? Well, if every one of us went meatless on Mondays, the equivalent reduction in greenhouse gas emissions would be the same as taking over one and a half million passenger vehicles off the road,<sup>21</sup> or eight percent of all vehicles in Canada under 4.5 tonnes.<sup>22</sup> It also equals the carbon-sequestering impact of planting 189 million tree seedlings.

Canada's emissions reduction goals under the Kyoto Protocol were to reduce our greenhouse gas emissions to 17 percent below the 2005 level by the year 2020.<sup>23</sup> What does that mean to the average Canadian? In 2005, GHG emissions had risen to 22.9 tonnes per capita (t/c), therefore a 17% reduction aimed at a goal of 19 t/c per year for each one of us. By 2010 our emissions had dropped to 20.3 t/c, leaving a remaining balance to 'lose' of 1.3 tonnes. We have already identified that replacing animal products with plant-based foods achieves annually a net loss of 1.36 tonnes, more than meeting our goal.

Now, not everyone will be willing to give up meat entirely. And, ideally, reductions will be made across all sectors. But in a country where our government has abandoned the Kyoto Protocol,<sup>24</sup> Canadians have the power to make significant and achievable emissions reductions by what we choose to put on our plate each day.

And this all can be achieved simply by choosing a meatless spin on old favourites whenever we sit down to a meal, with the added benefit of leaving all forms of cholesterol, found only in animal foods, off our plate. Our health care system would thank us, already plagued by national obesity rates nearing 23 percent, with a full 60 percent of us eating ourselves overweight.<sup>25</sup> The strength of a plant-based diet to lower body mass index, type II diabetes, heart disease and several types of cancers, and extend life expectancy in long-term vegetarians by up to ten years is well documented in peer-reviewed

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United States," *Environmental Science & Technology*, 2008:42, (3508–3513), 3513.

20 *Ibid.*, 3512-3513.

21 The population of Canada, as at April 1, 2011 was 34,349,200. This, multiplied by the .214 metric tonnes per person, per annum CO<sub>2</sub> equivalent reductions in eating plant-based diet one day a week (see G. Eshel and P. Martin, "Diet, Energy and Global Warming," *Earth Interactions* 10:1-17; 2006) equals 7.4 million metric tonnes per annum, or one-tenth of emissions from all household vehicles. See Berouk Terefe, "Greenhouse Gas Emissions from Private Vehicles in Canada, 1990 to 2007," Statistics Canada, 2010, ISSN 1917-9693, 5.

22 Statistics Canada: Canadian Vehicle Survey: Annual (2009), 2010, Statistics Canada Catalogue no. 53-223-X, 12.

23 Government of Canada, "A Climate Change Plan for the Purposes of the Kyoto Protocol Implementation Act - May 2010," *Canada's Action on Climate Change* web site. <<http://www.climatechange.gc.ca/default.asp?lang=En&n=4D57AF05-1>>

24 News Editor, "Canada Leaves Kyoto Protocol," *Environmental News*, Dec. 17, 2012. <<http://ens-newswire.com/2012/12/17/canada-leaves-kyoto-protocol-lets-china-buy-into-oil-sands/>> Accessed Dec. 18, 2012.

25 Margot Shields and Michael Tjepkema, "Regional Differences in Obesity," *Health Reports*, Statistics Canada, Catalogue 82-003, 17:3, Aug. 2006, 1.

medical journals<sup>26</sup> and in long term studies such as the twenty-year Cornell Oxford China study, described by the New York Times as “the Grand Prix of epidemiology.” The dietitians of Canada fully endorse well-planned plant-based diets, which have ample forms of protein and are nutritionally complete without any need for pairing up groups of foods.

How can it be, that for so many decades, private enterprise such as the Dairy Council, has dictated our nutritional education?

[Sequences: 1950s Dairy Council “Whenever You Eat” and Interviews]

Why don't we hear more about this in Canada? Public awareness is limited by a government not only reversing climate-change commitments, but also publishing misleading data. For example, “Canada's Action on Climate Change” web site,<sup>27</sup> focuses primarily on energy and transportation emissions, with no mention of the dietary initiatives being enacted by other countries. British Columbia's *Livesmart BC* web site, and their “52 Ways to Reduce Your Emissions” makes not a single reference to diet.<sup>28</sup>

Part of the problem lies in Environment Canada's greenhouse gas reporting structure. It reports national Agriculture emissions at 8 percent, or 10 percent by economic sector, including methane and nitrous oxide emissions from livestock. However, all energy emissions used in agriculture, such as the fossil fuels to run farm equipment, create fertilizers, transport livestock and produce, are not reported under Agriculture at all, but instead transferred to the Stationary energy and Transportation sectors. This reporting structure is consistent at both the provincial and federal levels. Thus agriculture's significant role in climate change is not recognized, and these other sectors' emissions levels are artificially inflated to garner attention and initiatives.

[Sequence: Interviews]

Meatless Monday initiatives are growing in Canada, in major cities and universities such as at McGill and Queens. This eye-catching demonstration in front of Victoria's parliament buildings sported a banner that read, “Clean Your Conscience: Go Vegan! One kg. of Meat Equals One Year of Showers.”<sup>29</sup> Many Canadians are modifying their consumption of animal products in different ways: as so-called 'flexitarians,' reducing and sourcing meat products locally, to full-time vegetarians and vegans.

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26 Gary E. Fraser, MB, ChB, PhD; David J. Shavlik, MSPH, “Ten Years of Life: Is It a Matter of Choice?” *Archives of Internal Medicine*, Vol. 161, 2001, (1645-52), 1645.

27 Government of Canada, *Canada's Action on Climate Change* web site. <<http://www.climatechange.gc.ca/default.asp?lang=en&n=E18C8F2D-1>>

28 Government of British Columbia, “52 Ways to Reduce Your Emissions,” LiveSmart BC. <[www.livesmartbc.ca/homes/reduce.html](http://www.livesmartbc.ca/homes/reduce.html)>

29 Jack Knox, “The naked truth on the culture of food, cleansed and otherwise,” *Times Colonist*, Mar. 23, 2013. <<http://www.timescolonist.com/news/local/jack-knox-the-naked-truth-on-the-culture-of-food-cleansed-and-otherwise-1.97190>>

[Sequence: Interviews]

Although consumption is slowing in North America, a growing taste for meat in developing countries is expected to double current demand by 2050.<sup>30</sup> Already, China is the world's largest source of methane from manure, emitting more than one-fifth of the global total. Much of this comes from Chinese pig operations, and increasingly industrialized meat and milk production. In 2000, farmed animals in China raised in confined conditions, such as factory farms, generated roughly 1.4 billion tons of manure, an amount expected to increase by 2030 to almost 2 billion tons.<sup>31</sup> The environmental costs are many. In March 2013 over three thousand dead pigs were found in the Huangpu River that flows through Shanghai, having been dumped upriver from the city.

Intensive livestock production also raises worries about zoonotic diseases, and transmission to humans of virulent strains incubated in such close confinement. Toxic strains of E-coli bacteria originate in livestock feces, and contaminate food products either at the slaughterhouse or through improper waste treatment contaminating adjacent cropland. The 2012 outbreak at the Canadian XL processing plant resulted in the destruction of over 6 and a half million kilograms of beef at risk from contamination.<sup>32</sup>

[Sequence: Interviews]

Mitigating greenhouse gases is essential. But we must also adapt to environmental changes already occurring due to climate change. Greater precipitation and temperature extremes, leading to droughts, flooding and reduced crop productivity in many areas, threaten global food security. In a world where one billion people are already undernourished, scientists are asking us to re-think our agricultural priorities, in which one third of global grain harvests are cycled through livestock. Ten to thirty percent drops in grain productivity are anticipated by 2050 in a world of increasingly elevated atmospheric carbon dioxide levels.<sup>33</sup>

Adapting to an overpopulated world stressed by climate change has many leading scientists predicting that by 2050 we will have to limit the proportion of animal based foods to 5 per cent of total calories to avoid catastrophic shortages," and "increase the amount of water available to grow food in an increasingly climate-erratic world."<sup>34</sup> Fresh water is becoming so precious that the UN Environment Program projects that in just 14 years, two thirds of the world's population will be living in countries

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30 Steinfeld et al, "Livestock's Long Shadow," 1.

31 Mia MacDonald and Sangamithra Iyerey Hoot, "Skillful Means: The Challenges with China's Encounter with Factory Farming," *Brighter Green Policy Paper*, 2011, 4.

32 CBC News, "XL foods to destroy all meat from E.coli recall," *The Canadian Press*, Oct 20, 2012.

<<http://www.cbc.ca/news/canada/story/2012/10/20/xl-foods-destroy.html>>

33 Håkan Pleijel, Johan Uddling, "Yield vs. Quality trade-offs for wheat in response to carbon dioxide and ozone," *Global Change Biology*, 18:2 Feb. 2012, (596–605), 596.

34 Vidal, "Food Shortages Could Force World into Vegetarianism, Warn Scientists," *The Guardian*, 2012.

facing water scarcity.<sup>35</sup>

A 1991 report by Brown University estimated that global agriculture can support only 3 billion people on a meat-based diet, but up to 6 billion on a vegan diet.<sup>36</sup> What will that mean to a world in 2050 with 9 billion people? As much as family farms are an ethical improvement on industrialized livestock production, there is simply not enough land to feed 9 billion people on the happy farms of yesteryear, without a significant reduction in dietary animal products. By eating lower on the food chain, we could achieve food security for global nations, with the potential to return the food sovereignty co-opted by globalized food multinationals. We could also free up extensive cropland for reforestation, returning vast tracts of land to the fragmented wildlife habitats we have compromised, to act as carbon sinks and enhance ecological diversity. This would return health to our oceans, not only by allowing fish stocks to recover, but also by reducing our demands on a region increasingly affected by climate change, with rises in temperature and acidification levels affecting many of its species. It would also reduce the vast wash of fertilizers and other agricultural runoff which make their way downriver to the sea, creating massive 'dead zones.'

These hypoxic (low-oxygen) areas in the world's oceans and large lakes occur near inhabited coastlines where aquatic life is most concentrated, becoming depleted of the oxygen required to support most marine life. By 2008, over 400 dead zones were documented in the world's oceans, the largest covering 70,000 square kilometres. Their number has roughly doubled each decade since the 1960s.<sup>37</sup> The Mississippi River, which drains 41 percent of the continental United States, dumps high-nutrient agricultural runoff into the sea. The resulting Gulf of Mexico 'Dead Zone' off the coast of Louisiana and Texas, is the most notorious hypoxic zone in the United States, currently 18,000 square kilometres in area. By 1990, the hypoxic zone on the northwestern continental shelf of the Black Sea had expanded to 40,000 square kilometres. However the good news is that the removal of fertilizer subsidies in this part of the former Soviet Union “reduced nutrient loading by a factor of 2 to 4, with the result that, by 1995, the hypoxic zone had gone. As oxygen levels normalized, ecosystem function improved.”<sup>38</sup>

The intensive costs of producing animal products are not fully revealed in their final price point, but kept artificially low through excessive government subsidies, totalling \$8 billion annually in

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35 “By 2025, 1.8 billion people will be living in countries or regions with absolute water scarcity, and two-thirds of the world's population could be living under water stressed conditions.... Almost half the world's population will be living in areas of high water stress by 2030.” See United Nations International Decade for Action: Water for Life, “Water Scarcity.” <<http://www.un.org/waterforlifedecade/scarcity.shtml>>

36 Robert S. Chen et al, *The Hunger Report: 1990*, The Alan Shawn Feinstein World Hunger Program, Brown University, June, 1990, 2.

37 Diaz, R. J.; Rosenberg, R. (2008-08-15). “Spreading Dead Zones and Consequences for Marine Ecosystems,” *Science* 321 (5891): (926–9), 296.

38 *Ibid.*, 928.



Canada.<sup>39</sup> Although these industries' lobbying power is no doubt strong, and old habits entrenched, Canadians deserve these inequities to be resolved by no longer subsidizing industries which cost so much to human health and the environment. Subsidy removals in the 1980s in New Zealand, where cows and sheep together produce 43% of the country's emissions,<sup>40</sup> resulted in "significant reductions of environmental damage caused by agriculture in general, in the form of increasing forest land, less erosion, and less nutrient runoff."<sup>41</sup>

The reduction of livestock agriculture is one of the significant ways we can reduce our greenhouse gas emissions, and prepare for a world increasingly stressed by climate change. The win/win benefits to the environment, to human health, and to animals are profound. This change lies in the hands of ordinary people like you and me, which we can implement starting today. It's already happening. The USDA reports that in 2012, 17 percent of the US population already eats vegetarian meals at more than half of their weekly meals.<sup>42</sup> In the Netherlands, 40 percent of citizens now have at least 3 meat-free days per week, in an effort to reduce climate change.<sup>43</sup> This growing population of "flexitarians" is assisted by positive global campaigns, in spite of a lack of national legislation.

Changing food habits can feel challenging, putting long-held habits and traditions up for review. But it can also be fun, with friends, families and communities reclaiming the central role of food in a culture of well-being and sustainability. With so much at stake, making changes towards more healthful and cruelty-free foods can become part of our culture. The only side effects, are good ones.



*"Nothing will benefit human health and increase the chances for survival of life on Earth as much as the evolution to a vegetarian diet."*

— Albert Einstein

*"The single action that a person can take ... to reduce carbon emissions is vegetarianism."*

— Dr. James Hansen, NASA Climatologist

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39 Paul Waldie, "The growing problem: Canada slips from agricultural superpower status," *The Globe and Mail*, Nov. 23, 2010. <<http://www.theglobeandmail.com/news/national/time-to-lead/the-growing-problem-canada-slips-from-agricultural-superpower-status/article1316188/>>

40 Dauncey, *The Climate Challenge*, 163.

41 Steinfeld et al, "Livestock's Long Shadow," 232.

42 Harris Interactive Poll, April, 2011. <<http://www.vrg.org/blog/2012/05/18/>>

43 De Bakker E and Dagevos H (2012). "Reducing Meat Consumption in Today's Consumer Society: Questioning the Citizen-Consumer Gap." *J Agric Environ Ethics* 25:877–894

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### **Written and Produced by:**

Holly Cecil, Human Dimensions of Climate Change, University of Victoria, Canada.

### **Participants:**

Wokje Abrahamse	Jordan Reichert
Kayla Amaladas	Victoria Sztanek
Beth Doman	Susan Hawkins
Professor Robert Gifford	Professor Angus Taylor
Elizabeth May, OC MP	Professor Scott Woodcock
Trevor Murdock	