

# FEEDING NINE BILLION: THE ROLE OF GOVERNMENT AND POLICY



[HTTP://WWW.FEEDINGNINEBILLION.COM/](http://www.feedingninebillion.com/)



HELLO, MY NAME IS EVAN FRASER  
AND I WORK AT THE UNIVERSITY OF GUELPH  
IN ONTARIO CANADA.

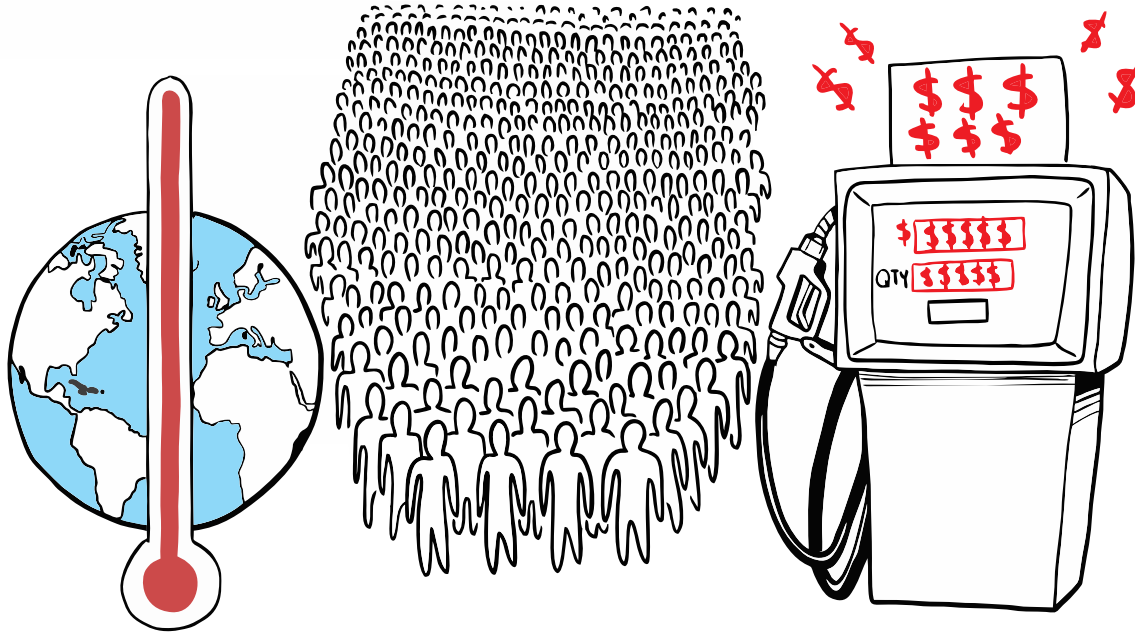
EVAN  
FRASER



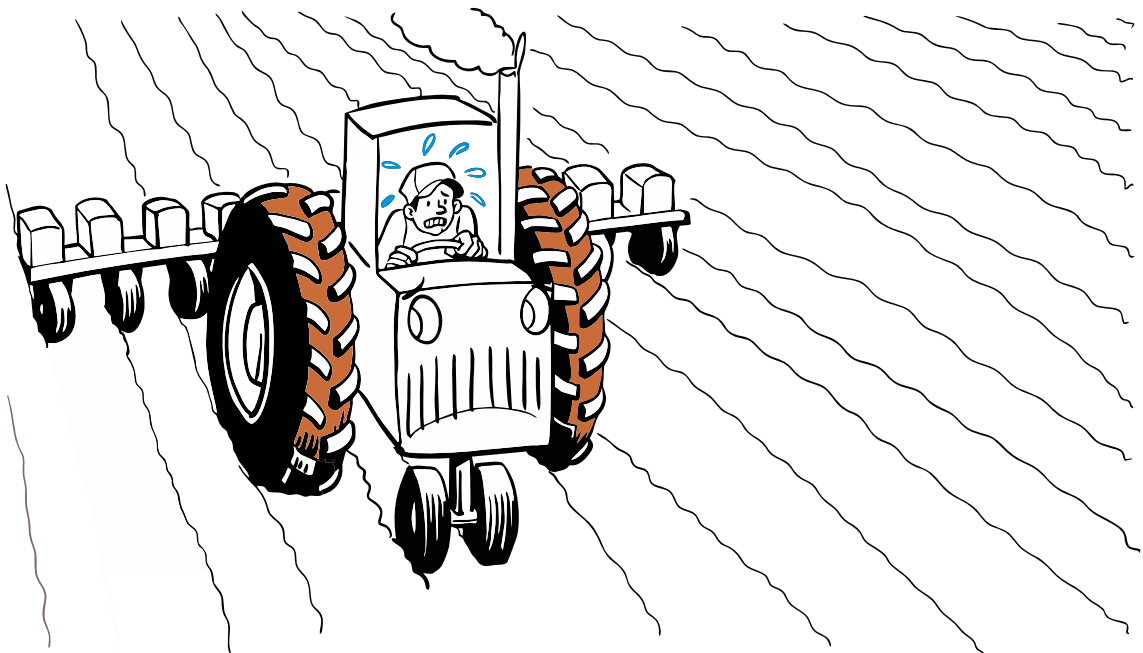
UNIVERSITY  
of GUELPH

CHANGING LIVES  
IMPROVING LIFE

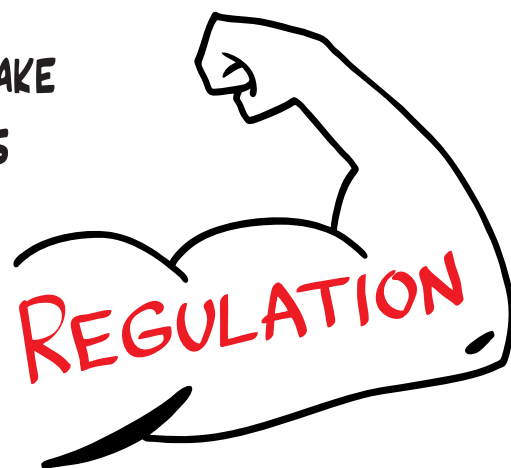
**AS ANYONE WHO HAS FOLLOWED THIS VIDEO SERIES KNOWS,  
CLIMATE CHANGE, POPULATION GROWTH, AND HIGH ENERGY PRICES**



**MEAN THAT MANY EXPERTS WORRY FARMERS WILL STRUGGLE OVER  
THE NEXT GENERATION TO PRODUCE ENOUGH FOOD FOR EVERYONE.**

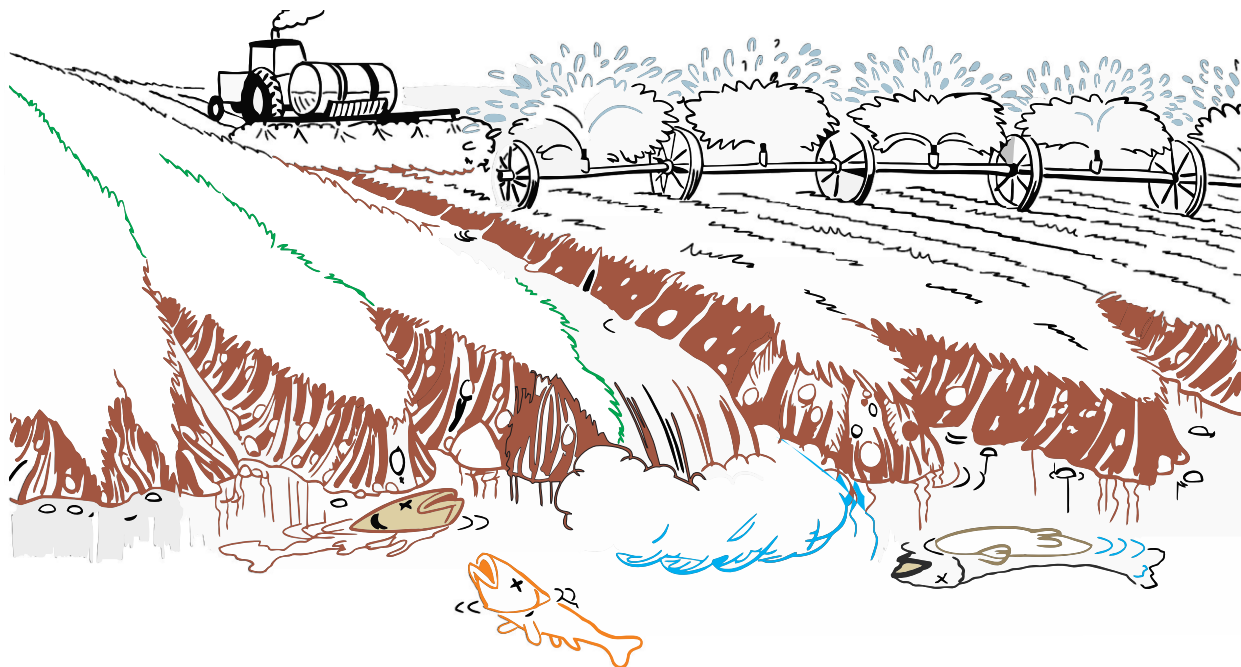


**THIS VIDEO LOOKS AT HOW POLICY CAN MAKE FARMING MORE SUSTAINABLE AND HELP US OVERCOME THIS PROBLEM.**



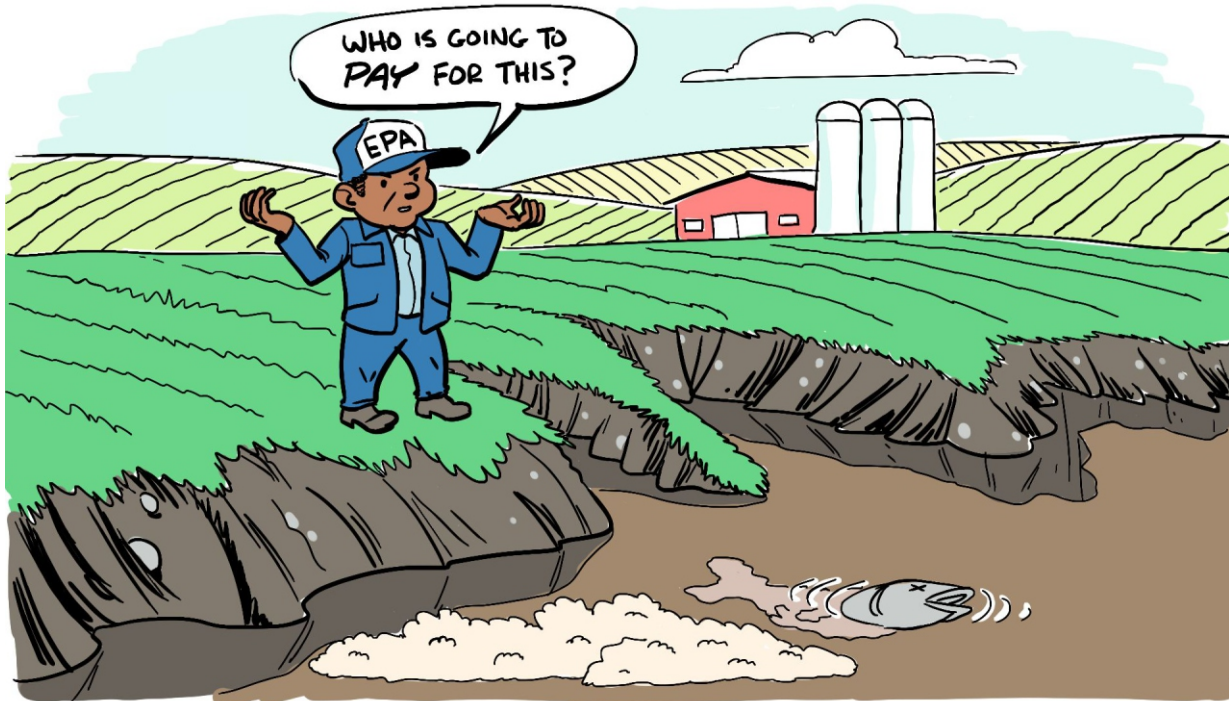
**FOR INSTANCE, HUGE AMOUNTS OF DATA SHOW THAT THE MODERN FOOD SYSTEM IS EXTREMELY WASTEFUL.**

**INEFFICIENT IRRIGATION MEANS THAT WE SQUANDER VAST AMOUNTS OF PRECIOUS WATER, WHILE MANY FARMERS APPLY MORE FERTILIZERS THAN PLANTS CAN USE.**



**THESE EXCESS NUTRIENTS RUNOFF FIELDS AND POLLUTE RIVERS AND LAKES.**

**WHAT'S WORSE, WESTERNERS WASTE BETWEEN 30 AND 50% OF THE FOOD THAT WE BUY.**

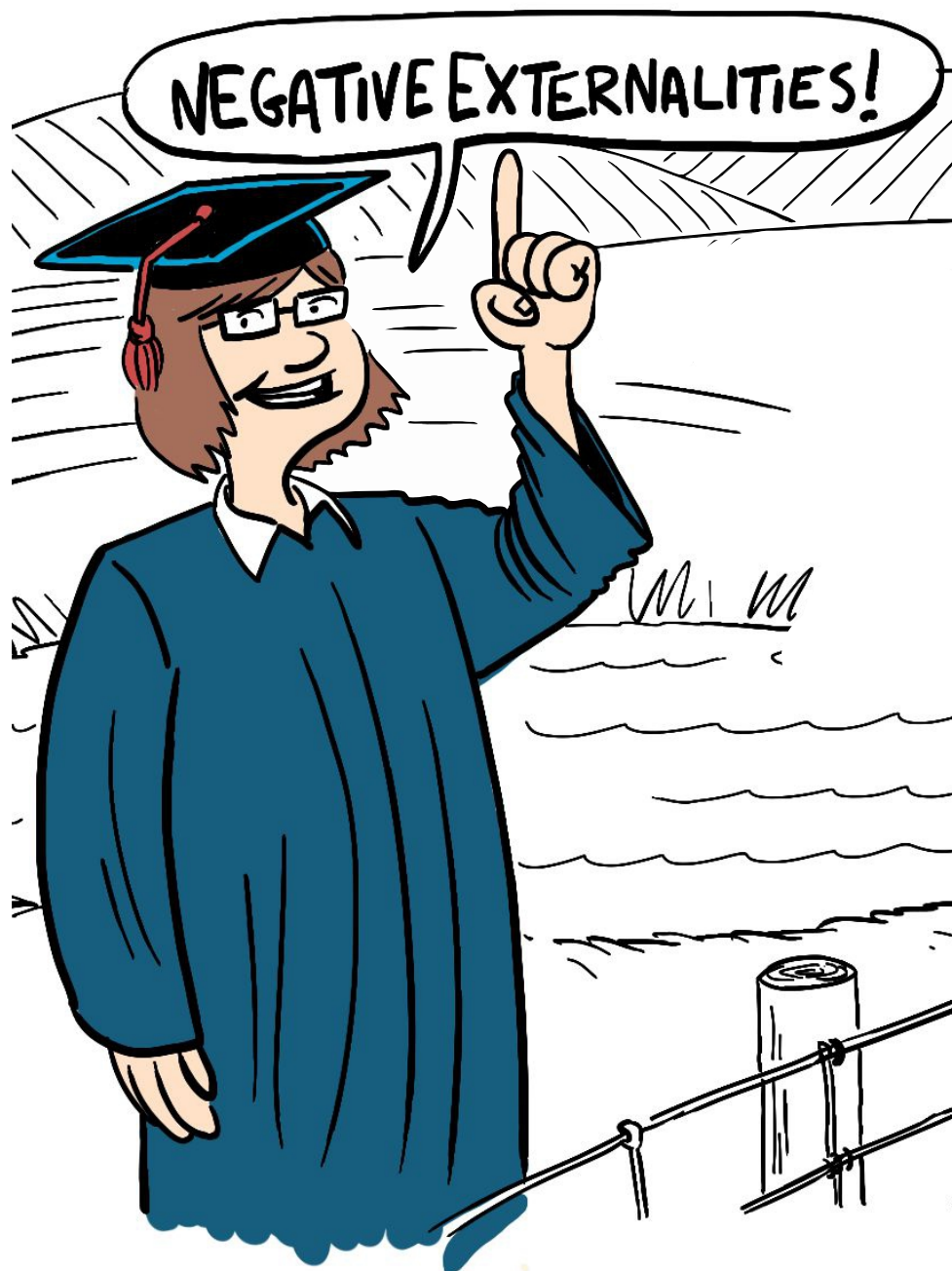


**SURELY IF WE SIMPLY CLEANED UP OUR ACT, WE WOULDN'T HAVE TO WORRY SO MUCH ABOUT THE FUTURE OF OUR FOOD SYSTEM, RIGHT?**



ECONOMISTS GIVE US A WAY TO THINK ABOUT THIS PROBLEM BY TALKING ABOUT "NEGATIVE EXTERNALITIES".

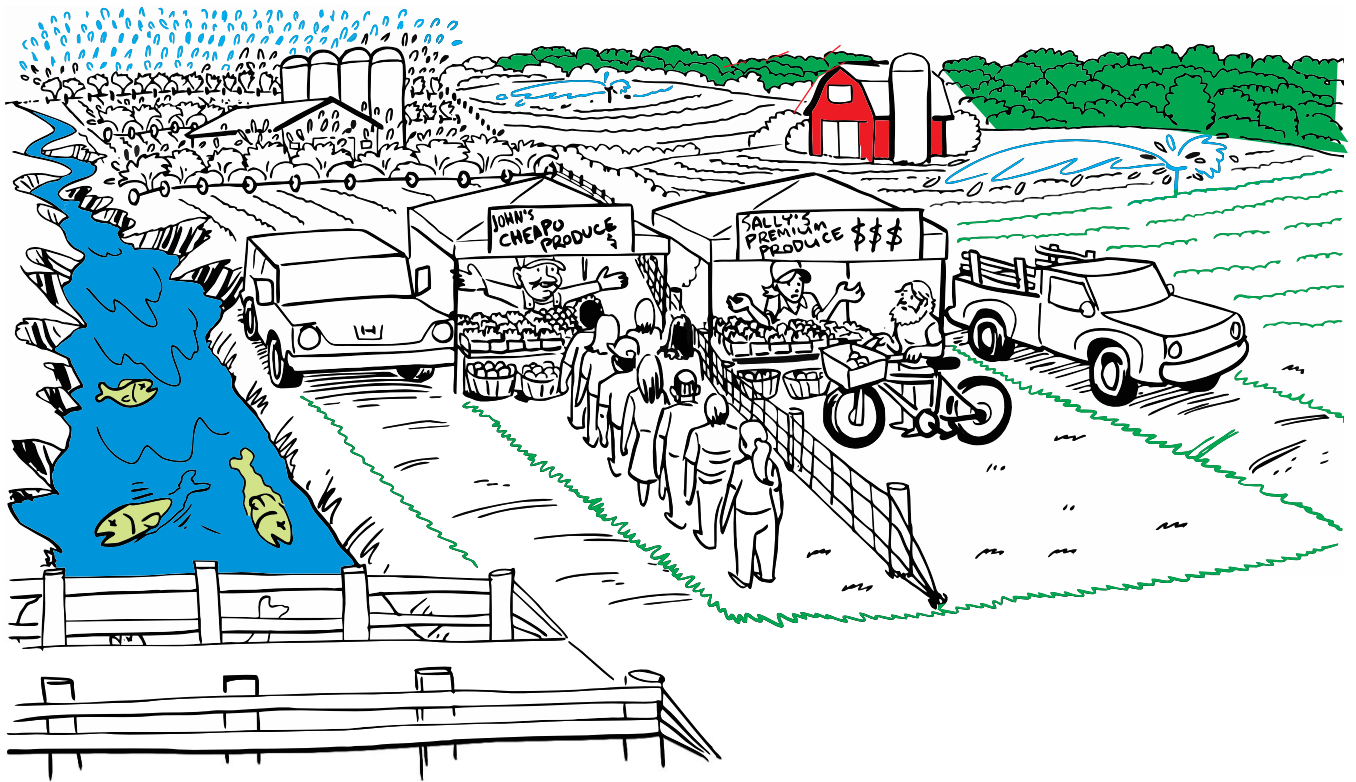
NEGATIVE EXTERNALITIES ARE COSTS OF PRODUCING FOOD THAT THE MARKET DOESN'T ACCOUNT FOR.



FOR INSTANCE, IF A FARMER DOESN'T PAY FOR THE WATER HE OR SHE USES, THEN THE VALUE OF THE WATER WOULD BE "EXTERNAL" TO THE PRICE THE CONSUMER PAYS FOR THE FOOD AND HENCE THERE WOULD BE NO INCENTIVE FOR THE FARMER TO CONSERVE THIS RESOURCE.



SIMILARLY, IF A FARMER POLLUTES A RIVER, AND THE PRICE OF THE FOOD FROM THAT FARM DOESN'T INCLUDE THE PRICE OF CLEANING UP THE RIVER, THEN THE COST OF POLLUTION IS ANOTHER NEGATIVE EXTERNALITY.

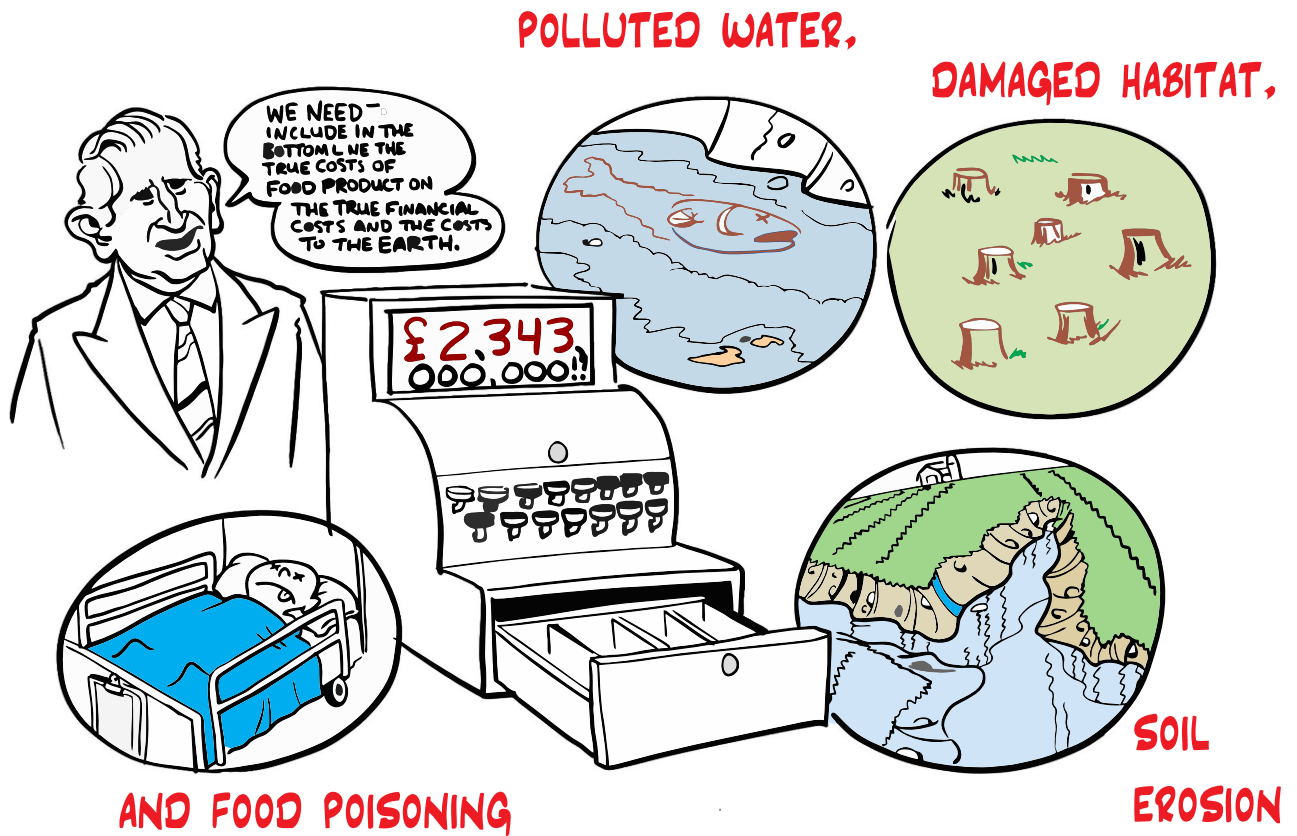


**THESE HIDDEN COSTS MEAN FARMERS WHO WASTE RESOURCES OR POLLUTE THE ENVIRONMENT ACTUALLY DO BETTER ECONOMICALLY THAN FARMERS WHO STEWARD THEIR LAND.**

**FOR INSTANCE, IF FARMERS DON'T PAY FOR THE WATER THEY USE, THEN A FARMER WHO USES INEFFICIENT IRRIGATION MAY BE ABLE TO OFFER CONSUMERS CHEAPER FOOD THAN A FARMER WHO SPENDS HER OR HIS MONEY INVESTING IN MORE EFFICIENT WATERING SYSTEMS.**



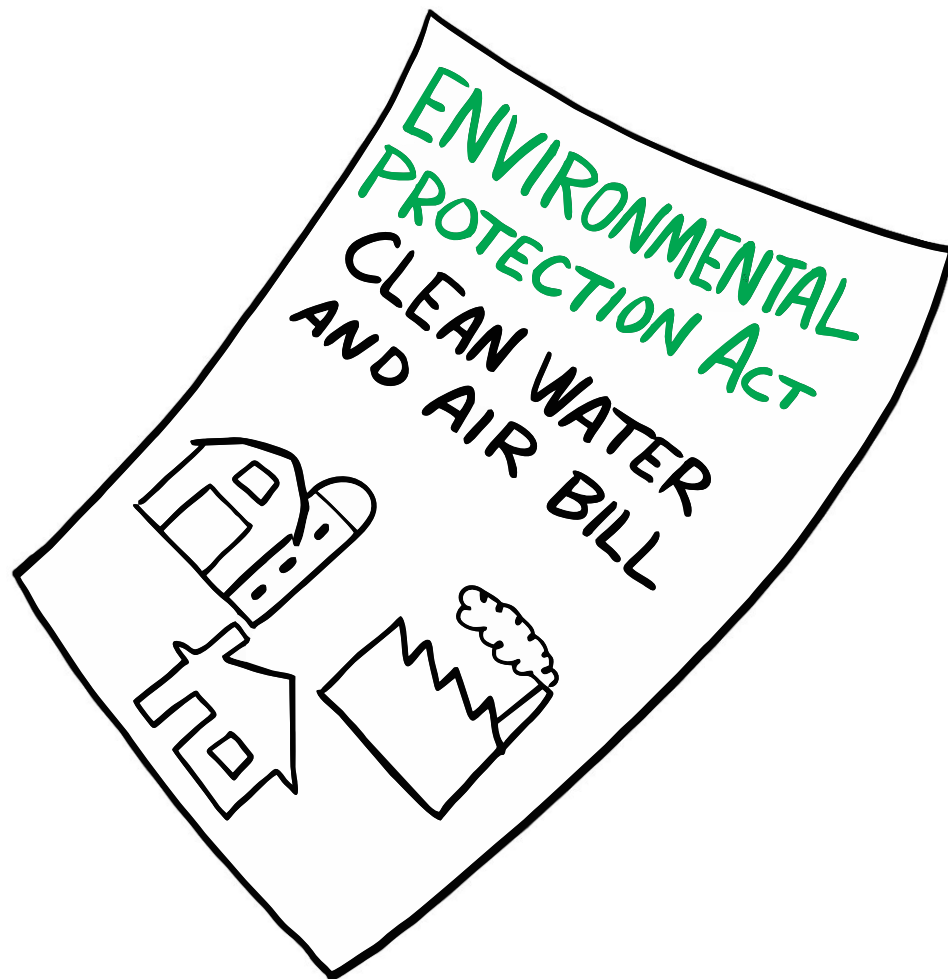
IN THE 1990S, A GROUP OF SCIENTISTS CALCULATED THAT, IN THE UNITED KINGDOM, EXTERNALITIES LIKE



... CAUSED £2.3 BILLION POUNDS WORTH OF DAMAGES IN 1996 ALONE.

THE BRITISH ROYAL FAMILY WAS NOT AMUSED: PRINCE CHARLES REGULARLY TALKS ABOUT THE FUTURE OF FARMING WHERE HE ARGUES THAT "...WE NEED TO INCLUDE IN THE BOTTOM LINE THE TRUE COSTS OF FOOD PRODUCTION – THE TRUE FINANCIAL COSTS AND THE TRUE COSTS TO THE EARTH".

MANY ARGUE THAT BECAUSE OF NEGATIVE EXTERNALITIES,  
POLICIES ARE NEEDED TO ENSURE THAT FARMERS, PROCESSORS,  
RETAILERS, AND CONSUMERS PAY THE FULL COST OF  
PRODUCING OUR FOOD.



THERE ARE A NUMBER OF WAYS OF DOING THIS.

**ONE WAY IS TO PASS LAWS THAT MAKE FARMERS PAY FOR THE THINGS THEY USE FROM THE ENVIRONMENT.**



**MOSTLY, THIS HAS BEEN TRIED IN IRRIGATED FARMING SYSTEMS WHERE COUNTRIES HAVE EXPERIMENTED WITH CHARGING FARMERS MORE FOR THE WATER THEY DRAW FROM AQUIFERS OR WELLS.**

**ANOTHER WAY IS BY PAYING FARMERS FOR "ECOSYSTEM SERVICES", WHICH IS A FANCY WAY OF SAYING "THE THINGS THAT THE ENVIRONMENT GIVES US."**



**FOR INSTANCE, THE EUROPEAN UNION HAS POLICIES THAT PAY FARMERS FOR MAINTAINING WILDLIFE HABITAT AND BIODIVERSITY.**

**THIS IS USEFUL BECAUSE IT CREATES AN INCENTIVE FOR FARMERS TO TOLERATE WILDLIFE THAT MIGHT OTHERWISE SIMPLY BE SEEN AS A PEST BECAUSE THEY DISTURB CROPS.**

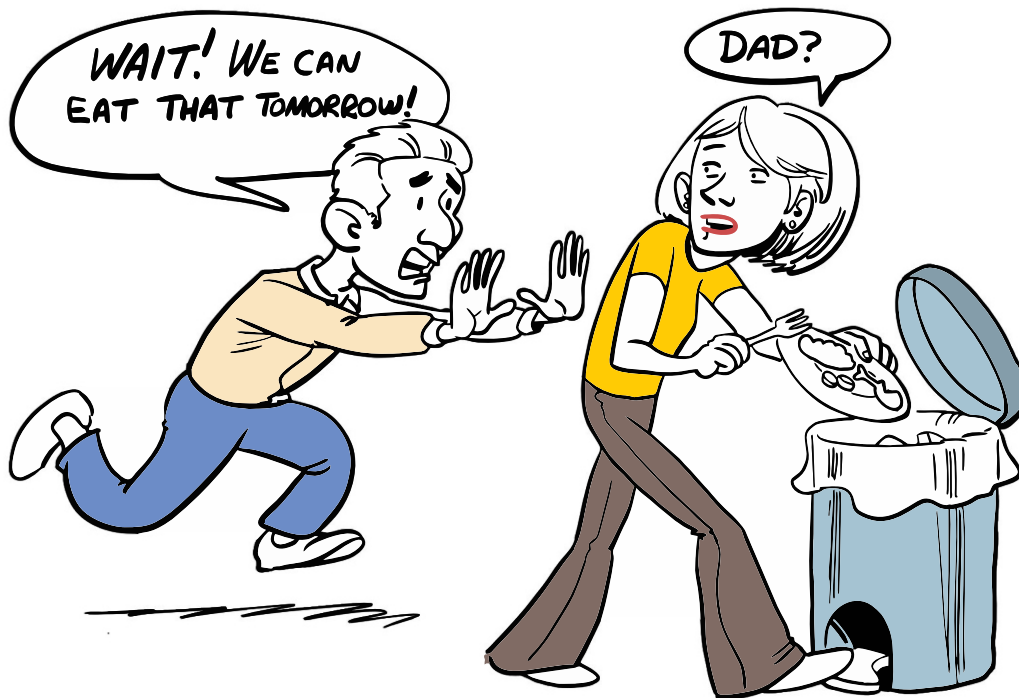




**A THIRD APPROACH IS TO TAX POLLUTION OR WASTE.**

**IF POLICIES ARE ENACTED THAT MAKE US BEAR THE FULL PRICE OF OUR FOOD, THEN IT STANDS TO REASON THAT FOOD PRICES WILL GO UP.**

**AND IF FOOD PRICES RISE IT ALSO STANDS TO REASON WE WILL THROW LESS OUT, MAKING THE WHOLE GLOBAL FOOD SYSTEM MORE EFFICIENT.**



**THIS MAY BE A PARTICULARLY USEFUL STRATEGY IN TERMS OF GETTING CONSUMERS IN THE WEST WHO THROW OUT A HUGE AMOUNT OF THE FOOD TO BECOME MORE EFFICIENT.**

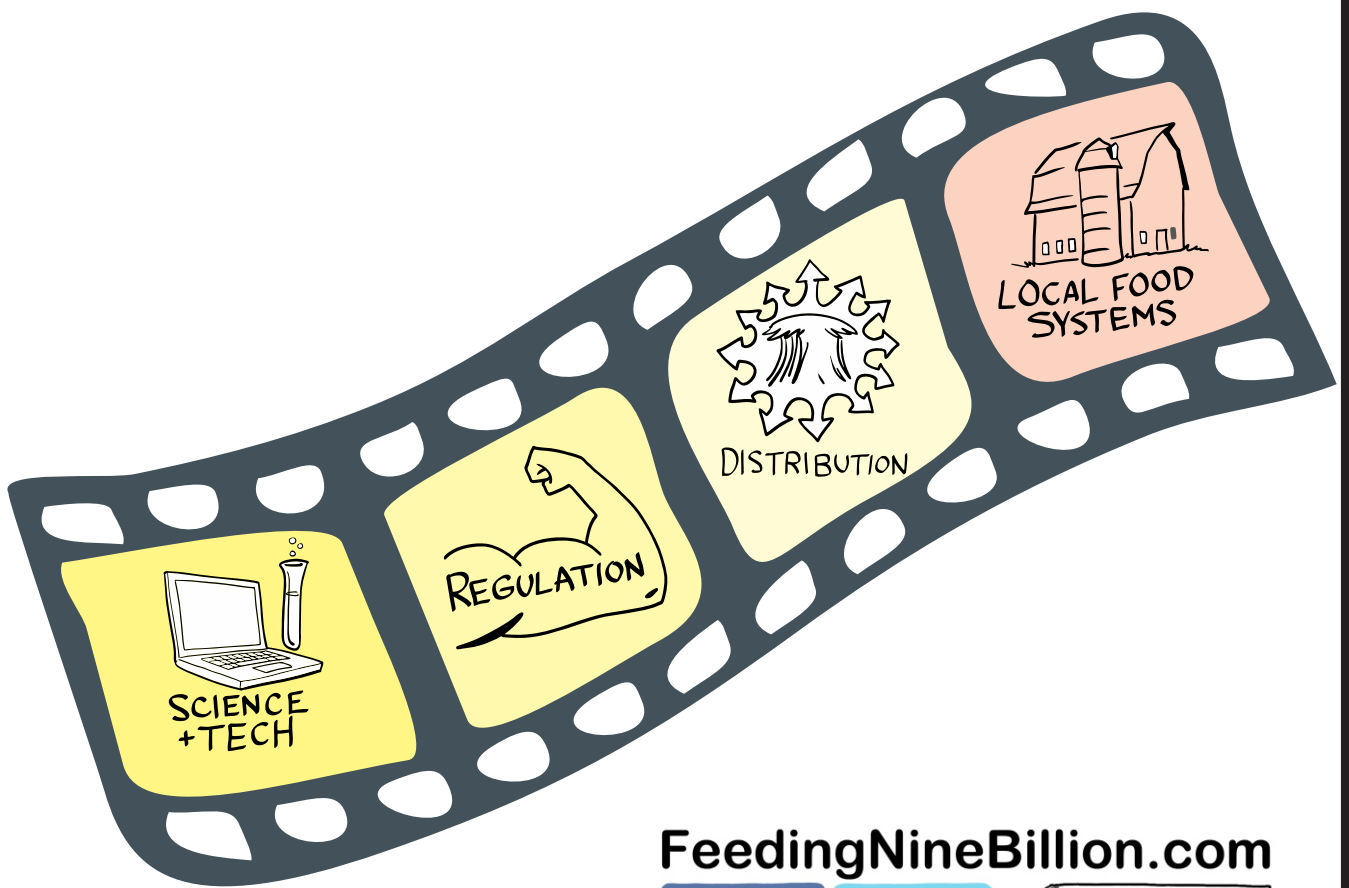
**BUT WHILE SUCH APPROACHES MAY SOUND IDEAL, THERE MIGHT BE UNINTENDED NEGATIVE CONSEQUENCES. IN PARTICULAR, POLICIES THAT FORCE CONSUMERS TO BEAR THE FULL COST THEIR FOOD MIGHT ALSO CAUSE A RISE IN FOOD INSECURITY AND MALNUTRITION FOR THOSE CONSUMERS WHO COULD NOT AFFORD TO PAY MORE FOR THEIR FOOD.**



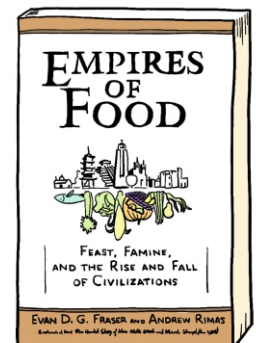
**SO WHILE IT IS VITALLY IMPORTANT FOR POLICY MAKERS TO DEVELOP STRATEGIES TO CORRECT NEGATIVE EXTERNALITIES, SUCH STRATEGIES MUST GO HAND IN HAND WITH OTHER POLICIES TO PROTECT THE POOR FROM THE NEGATIVE EFFECTS OF PRICE RISES.**

IF YOU ARE INTERESTED IN LEARNING MORE, YOU MIGHT BE KEEN TO CHECK OUT MY RECENT BOOK EMPIRES OF FOOD.

ALSO, YOU CAN FIND ME ON YOUTUBE, FACEBOOK AND TWITTER WHERE I REGULARLY POST ABOUT ISSUES RELATING TO GLOBAL FOOD SECURITY. AND THE WEBSITE [WWW.FEEDINGNINEBILLION.COM](http://WWW.FEEDINGNINEBILLION.COM) HAS ANNOTATED SCRIPTS ALONG WITH REFERENCES AND OUR BLOG.



FeedingNineBillion.com





## ENDNOTES:

This publication by the USDA outlines some of the major ways in which agriculture is inefficient in its water use. This publication also provides some suggestions for maximizing the efficiency of irrigation. "Inefficient Use of Irrigation Water." *Natural Resources Conservation Service*. United States Department of Agriculture, Mar. 2012. Web.

[ftp://ftp-fc.sc.egov.usda.gov/AR/drought/water\\_inefficient\\_irrigation.pdf](ftp://ftp-fc.sc.egov.usda.gov/AR/drought/water_inefficient_irrigation.pdf)

Nitrogen is an essential component of our modern food system. This National Geographic article demonstrates our reliance on the element, as well as the environmental problems that are arising due to over-application of nitrogen fertilizer on farmland.

Charles, Dan. "Fertilized World." *National Geographic Magazine* May 2013:

<http://ngm.nationalgeographic.com/2013/05/fertilized-world/charles-text>

Agriculture can have serious consequences for water systems; some of these threats, and the science behind them, are outlined in this FAO document. "Fertilizers as Water Pollutants." *Corporate Document Repository*. FAO, n.d. Web. 15 July 2013:

<http://www.fao.org/docrep/w2598e/w2598e06.htm>

Our global food system allows for billions of tonnes of food to be wasted, yet hundreds of millions of people go hungry. This report by the Institution of Mechanical Engineers identifies some of the major causes of this waste, as well as suggesting possible solutions to the problem. *Global Food - Waste Not, Want Not*. Rep. Institution of Mechanical Engineers, Jan. 2013. Web. 18 July 2013. [http://www.imeche.org/docs/default-source/reports/Global\\_Food\\_Report.pdf?sfvrsn=0](http://www.imeche.org/docs/default-source/reports/Global_Food_Report.pdf?sfvrsn=0)

For a longer description of externalities refer to:

GREGORY, D., JOHNSTON, R., PRATT, G., WATTS, M., WHATMORE, S. 2009. *Dictionary of Human Geography* (5th ed.). West Sussex: Wiley-Blackwell. Pp 235-6.

Manure spills from large scale hog operations have been a persistent problem all over the world. An example of this from around Ontario (where I'm from) is in the Chatham-Kent district, where 4 major problems occurred between 2006 and 2013. Spinoff economic and quality of life impacts are listed here: HENRY, TOM. (2013) Toxic algae could hit third of W. Lake Erie. *The Blade*. <https://www.toledoblade.com/local/2013/07/03/Toxic-algae-could-hit-third-of-W-Lake-Erie.html>

This academic journal article evaluates the impact of UK agriculture on the health of humans and the environment in the state. You can access the full text at the link provided below.

Pretty, J. N. et al. "An Assessment of the Total External Costs of UK Agriculture." *Agricultural Systems* 65.2 (2000): 113-36.

[http://www.researchgate.net/publication/222549141\\_An\\_assessment\\_of\\_the\\_total\\_external\\_costs\\_of\\_UK\\_agriculture](http://www.researchgate.net/publication/222549141_An_assessment_of_the_total_external_costs_of_UK_agriculture)

HRH The Prince of Wales is a well-known advocate for environmental protection, and a strong supporter for the development of a sustainable food system. Here, you can read the transcript of a speech he presented at Georgetown University on the subject of sustainable agriculture. Mountbatten-Windsor, Charles.

"A Speech by HRH The Prince of Wales to the Future for Food Conference, Georgetown University, Washington DC." Future for Food Conference. Georgetown University, Washington D.C. *Prince of Wales*. 4 May 2011. <https://www.princeofwales.gov.uk/media/speeches/speech-hrh-the-prince-of-wales-the-future-food-conference-georgetown-university>

In order to provide for both successful urban growth and a sustainable local food system, the European Union has enacted the a large suite of policies to encourage the preservation of the natural world, why still allowing for economic growth in the farming sector. *The Common Agricultural Policy a Partnership between Europe and Farmers*. Luxembourg: Publications Office of the European Union, 2012. European Commission, 2012. [http://ec.europa.eu/agriculture/cap-overview/2012\\_en.pdf](http://ec.europa.eu/agriculture/cap-overview/2012_en.pdf)

In Canada we can measure food waste as the difference from what we produce, and what we process, distribute and sell. This waste is estimated to be more than 27 billion CND or more than 2% of our GDP, more than what Canadians spent in restaurants (2009), slightly below Canadian agricultural exports (2007), more than Canadian agricultural imports (2007), and greater than the combined GDP of the world's 32 poorest countries (2009).

For a full discussion see GOOCH MARTIN, FELFEL ABDEL, MARENICK, NICOLE, 2010. Food Waste in Canada opportunities to increase the competitiveness of Canada's agri-food sector, while simultaneously improving the environment. Guelph Ont: Value Chain Management Centre, George Morris Centre.

<http://vcm-international.com/wp-content/uploads/2013/05/Cut-Waste-Grow-Profit-FINAL-DOCUMENT-Oct-3-121.pdf>

For a broader international discussion of food waste, refer to Segrè Andrea. 2012. Transforming food waste into a resource. Cambridge, UK: Royal Society of Chemistry.

<http://www.rsc.org/shop/books/2011/9781849732536.asp>

## CREDITS

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