

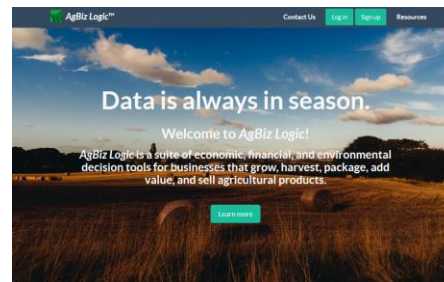
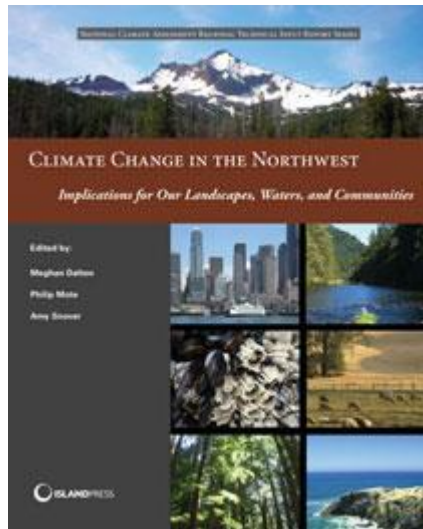


Climate Change projects in the Applied Economics Department

**Climate Change and Ocean Acidification:
A Workshop for Oregon Educators
Wednesday - Thursday,
June 29-30, 2016
Oregon State University Corvallis campus**

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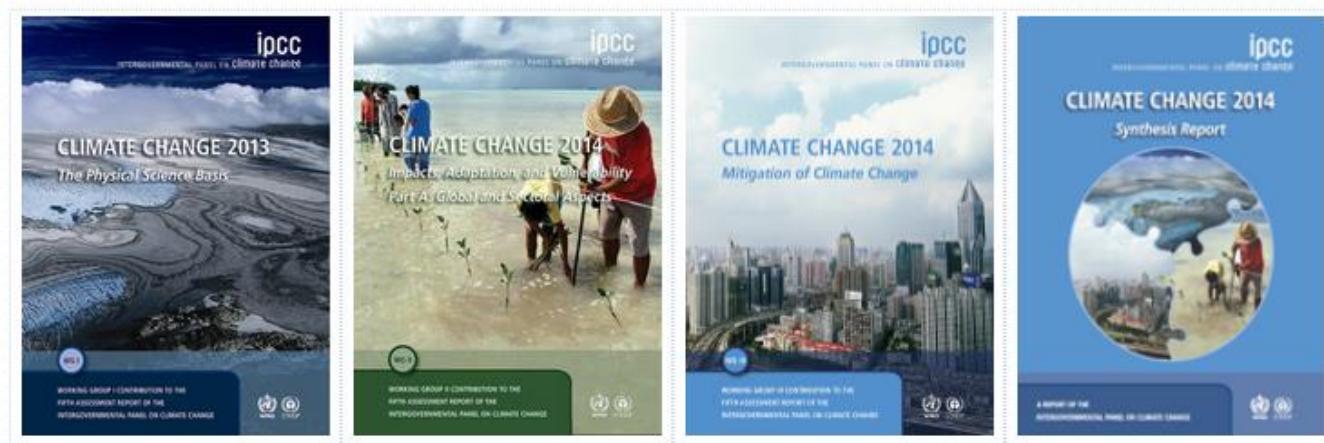
June 30, 2016



Submitted by Laurie Houston Susan Capalbo and John Antle on Tue, 2015-03-10 12:43

Assessment Reports:
IPPC Fifth Assessment Report
National Climate Assessment
PNW Climate Assessment

Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5)



The good news:

“...it would be ***possible***, using ***a wide array*** of **technological measures** and **changes in behavior**, to limit the increase in global mean temperature to two degrees Celsius above pre-industrial levels.”

The bad news:

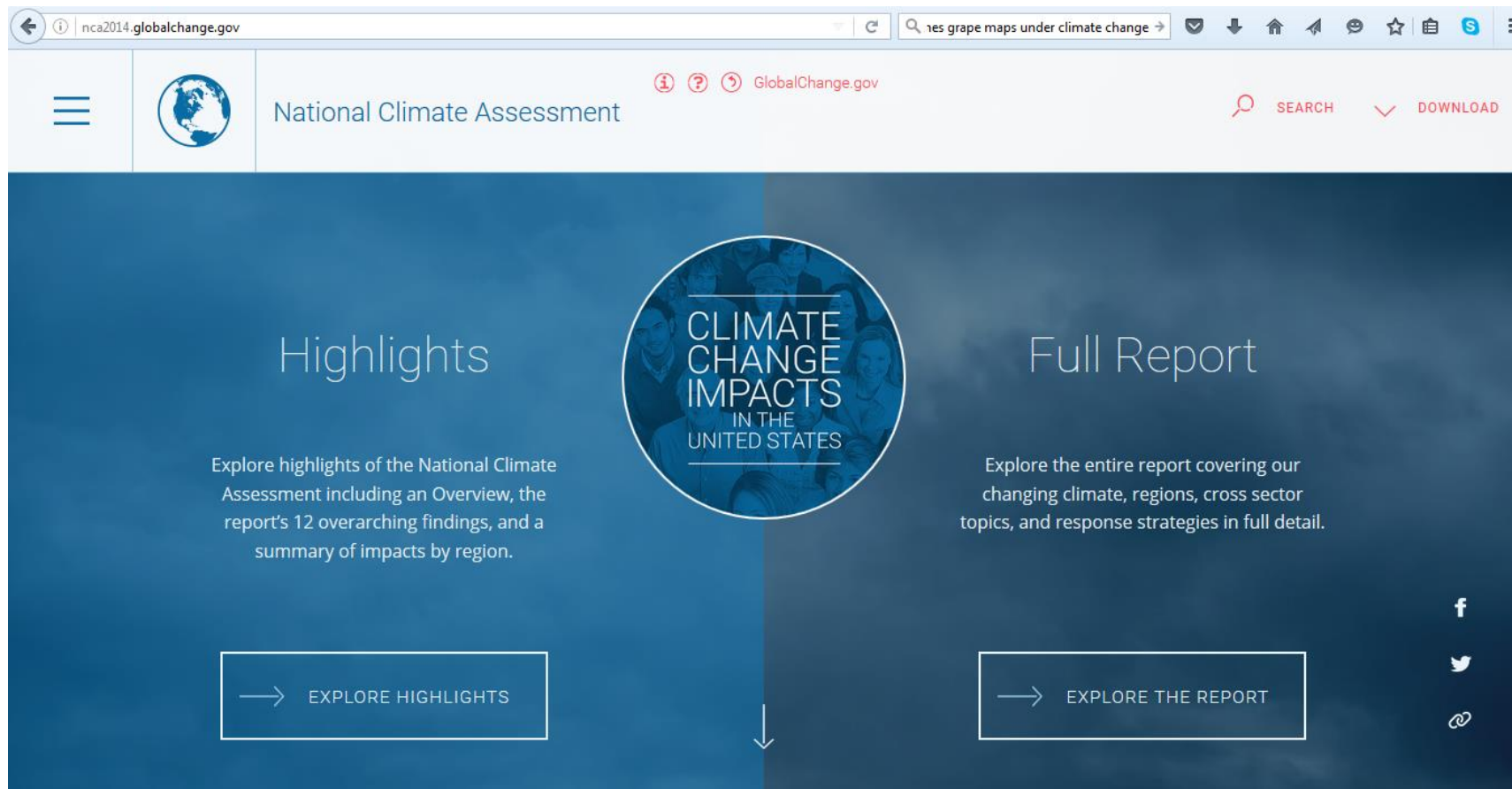
“...only ***major*** **institutional and technological change** will give a better than even chance that global warming will not exceed this threshold.”

<http://www.ipcc.ch/report/ar5/#.UugBCbTTmUk>

5 Major Takeaways from the most recent IPCC report

1. **Humans are largely responsible for rising global temperatures** (The *IPCC* is 95 percent *confident* that *humans* are the main *cause*).
2. **Many observed impacts are happening more quickly than previously predicted.**
3. **Climate change is creating more frequent and more intense extreme weather events.**
4. **Business-as-usual will lead us far beyond 2 degrees Celsius of warming (the estimated safe level of global warming).**
5. **Cutting carbon dioxide (CO₂) emissions is the most urgent imperative for global climate action.**

The National Climate Assessment



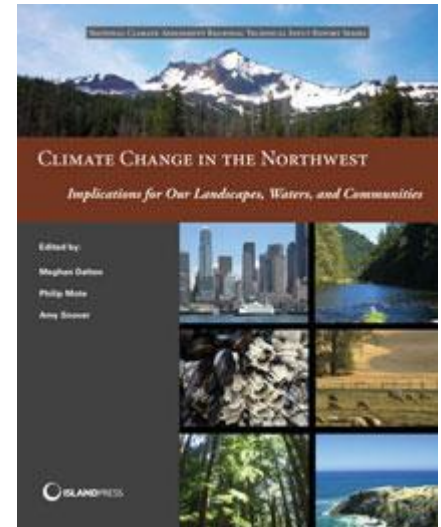
<http://nca2014.globalchange.gov/>

Key Messages

- Global climate is changing, will continue to change over this century and beyond, and the global warming of the past 50 years is primarily due to human activities.
- U.S. average temperature has increased by 1.3° F to 1.9° F since record keeping began in 1895; most of this increase has occurred since about 1970.
- The frost-free season is lengthening
- Average U.S. precipitation has increased. More winter and spring precipitation is projected for the northern United States, and less for the Southwest, over this century.
- Extreme weather events have increased.
- Sea Level is rising and oceans are becoming more acidic
- The magnitude of climate change beyond the next few decades depends how much we continue to emit greenhouse gasses.

The Northwest Climate Assessment

- Water - Winter stream flows are increasing, spring peak flows are occurring earlier and late-summer flow decreases.
- Coasts - Increased frequency of coastal flooding, and increased ocean acidification.
- Forests - Increase in droughts and high temperatures have increased disease and insect infestations and increased wildfires.
- Agriculture - is relatively unaffected currently and may benefit from CO2 effects in the short run, but as temperatures increase, water supplies and insect and disease issues will have negative impacts on agriculture.



What does this all mean in economic terms?

Economists often refer to climate change as a negative externality.

Externalities result when the actions of one person (or firm) have a **DIRECT, UNINTENTIONAL, AND UNCOMPENSATED** effect on the well-being of another individual (or the profits of other firms).

Human activities such as the burning of fossil fuels, are creating greenhouse gases and affecting the global population. The true costs are not being accounted for - thus creating a market failure.

How do we fix market failures?

We get the government to intervene:

1. Set a standard
2. Establish a cap and trade system for carbon emissions
3. Implement a carbon tax

What do you do when government intervention doesn't happen?

You have to rely on a variety of individual efforts that together will begin to change the momentum hopefully have a positive influence on change.

A good way to start is through academic research, extension, and outreach efforts.



REACCH

Regional Approaches to Climate Change - Pacific Northwest Agriculture

REACCH is an interdisciplinary project with a variety of scientists and professionals from OSU UI and WSU and the Agricultural Research Service, designed to ensure sustainable cereal production in the inland Pacific Northwest under the risks of regional climate change.

If you are interested in learning more about this project you can go to our website.

<https://www.reacchpna.org/>

REACCH Climate Change lesson plans

Unit Topic	Teaching Time
Climate & Pacific Northwest Agriculture	Five 50-minute class periods
Cropping Systems & Sustainability	Three 50-minute class periods
Soils	Minimum of three 50-minute class periods, could take as much as three weeks
Water & Erosion	Minimum of four 50-minute class periods.
Carbon, Photosynthesis, & Respiration	Minimum of five 50-minute class periods.
Nitrogen Cycling	Minimum of three 50-minute class periods.
Climate Science & Society	Minimum of five 50-minute class periods.
Precision Agriculture	Minimum of five 50-minute class periods.
Crop Pests	minimum of five 50-minute class periods.
Careers in Agriculture & Natural Resources	minimum of five 50-minute class

Open OSU Climate Change Learning Modules

The goal of these modules is to provide a basic understanding of climate change and how it relates to economics.

These modules present materials about:

- the physical facts of climate change,
- the potential impacts,
- and potential adaptation and mitigation strategies from an economic and policy perspective.

Interactive Learning Modules for Climate Change Education

OSU Oregon State University

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Introduction to Climate Change and Economics


Jianhong Mu & Laurie Houston Department of Applied Economics

Course Objectives:

1. Obtain a basic understanding of economic theory and principles that pertain to climate change.
2. Gain an understanding of how economic and legal approaches can be used to facilitate climate change adaptation and mitigation efforts.
3. Become familiar with global, national, state, and local organizations related to climate change.
4. Gain an understanding of how economists use models to make climate change projections, and address related problems (changes in social welfare, water use, yields, and livestock & crop mixes, etc.)
5. Become familiar with recent and projected climate changes in in the US and the PNW, and how these changes will impact society and the economy.

**Check out the IPCC 5th assessment reports
or the 2014 National Climate Assessment**

*This course consists of 10 classes that introduce climate change related issues. Click on a picture to preview what will be discussed in each class, or click on the links (bottom left) to learn more about international and national climate change assessments. Look around, explore, learn, and **have fun!***



<http://osupachyderm.org/pachyassets/presos/ClimateChangeCourse299/index.html#screen/00-128-638510300555-12810016112710563579347-17-13>

Open OSU - Learning Modules for Climate Change

Climate Change Awareness

Module 1: The Science

Module 2: Impacts, Adaptation and Mitigation

Module 3: The Role of Economics

Currently in Adobe Captivate but converting to Articulate Storyline.

<https://courses.ecampus.oregonstate.edu/oer/climatechange1test/>

<https://courses.ecampus.oregonstate.edu/oer/climatechange1test/>



What is climate change?

Click the buttons below to explore some of the climatic conditions which contribute to climate change.

OPEN OREGON STATE

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Climate Change Awareness Modules – learning outcomes

Module 1. The Science -

<https://courses.ecampus.oregonstate.edu/oer/climatechange1test/>

- Define climate change
- Identify the cause of climate change and sources of greenhouse gases
- Describe how the climate has changed and what to expect in the future

Module 2. Adaptation and Mitigation

- Recognize a range of climate change impacts and adaptation possibilities
- Identify several mitigation actions that individuals can do to reduce their carbon footprint

Climate Change Awareness Modules

Module 3. The Role of Economics

- Identify policies that can reduce greenhouse gas emissions
- Explain how economics is being used in current climate change policies
- Recognize advantages and disadvantages of climate change policy options

AgBiz Logic™ - <http://www.agbizlogic.com/>

A web-based decision support tool for assessing management decisions. It consists of web-based modules, and climate information for farmers to better understand the financial and environmental trade-offs associated with alternative management decisions.

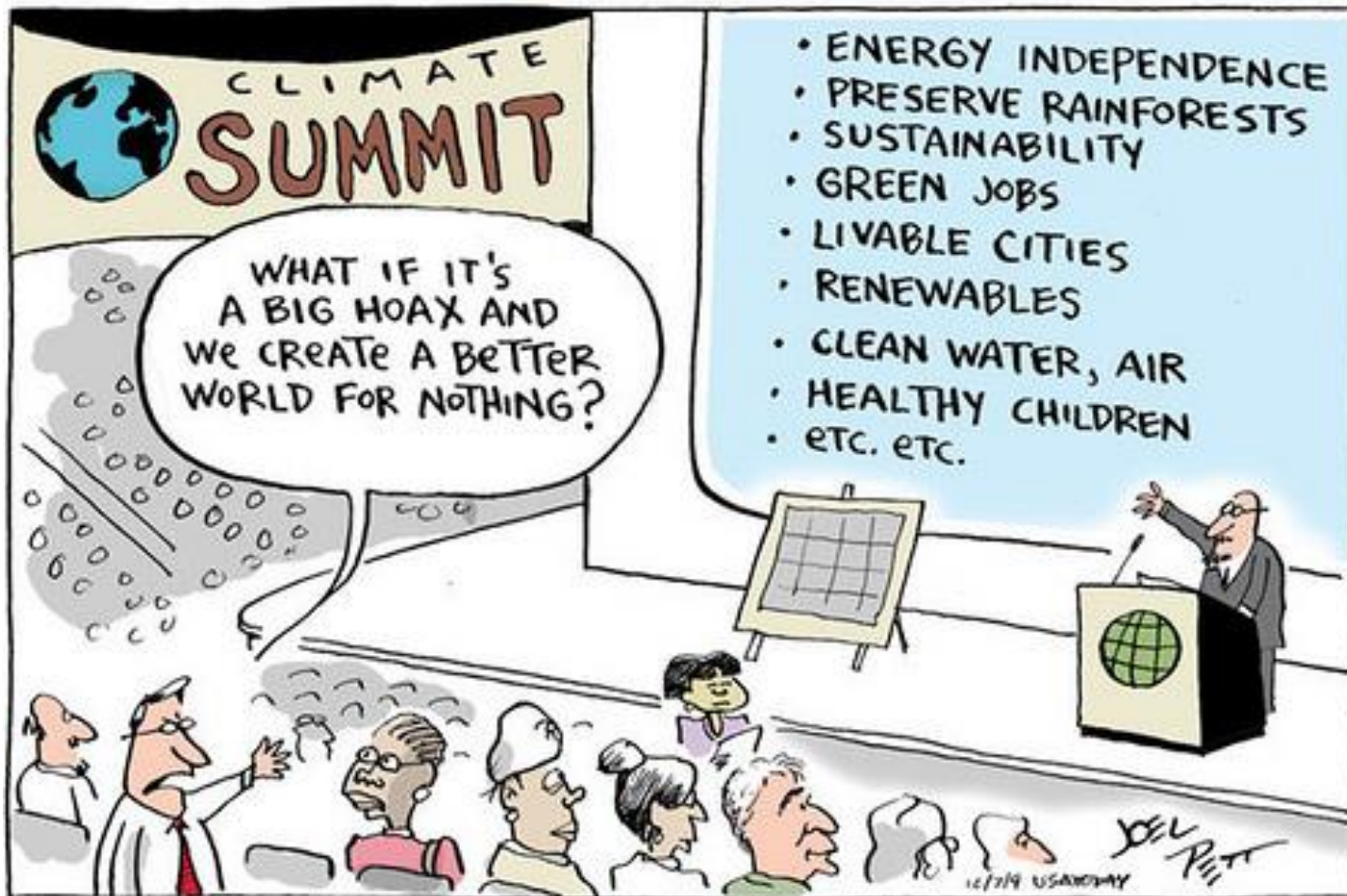
AgBiz Logic™ will be available for use on PC's smart phones, and tablets



Regional climate variables projections (out to 2030) for Wenatchee, WA, and Pendleton and Corvallis, OR.

- Number of nights below freezing per year
- Accumulated chilling hours
- Seasonal min temp
- Seasonal max temp
- Accumulated growing degree days
- Number of warm nights/yr
- Number of heat wave events/yr
- Number of cold snap events/yr
- Diurnal temperature range
- Growing season length
- Accumulated water year precip
- Max number of consecutive wet days/yr
- Max number of consecutive dry days/yr
- Number of very heavy precip days

My Response to Climate Deniers



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- Oregon Agricultural Experiment Station (OAES)
- AGree – Meridian Institute
- Oregon Agricultural Experiment Station
- Center of Agricultural and Environmental Policy at OSU