WASHINGTON
POLICY CENTER
Improving lives through market solutions

POLICY BRIEF

How Agriculture Speaks Environmental

Madilynne Clark
WPC Agriculture Policy Research Director

June 2017

Key Findings

1. *A farm's survival depends not only on financial factors, like crop prices, but also on the quality of the land, water, and natural habitat that are essential to the future sustainability of the operation.*
2. *Over 58 years - about the average age of a farm family operator - agriculture has increased production by 156 percent, reduced soil erosion by 85 percent, reduced dust six-fold, and reduced stubble burning 22 times.*
3. *In 2007, the U.S. achieved $281.5 billion in agricultural output. Without productivity growth, it would take 78 percent more resources now to achieve the same level of production output as in 1949.*
4. *Through the 1990s, investment in agricultural extension grew as percentage of agricultural GDP to 1.35 percent. Extensive investments allowed farmers to work closely with experts to improve agricultural practices with the newest research and knowledge.*
5. *The combination of pesticides and biotech crops makes possible the adoption of environmentally friendly production methods.*
6. *No-till practices reduce fuel consumption and help store carbon in the soil. In 2014, the benefit of this farm practice was equivalent to removing 10 million cars from the road.*

WASHINGTON
POLICY CENTER
Improving lives through market solutions

POLICY BRIEF

How Agriculture Speaks Environmental

Madilynne Clark
WPC Agriculture Policy Research Director

June 2017

How Agriculture Speaks Environmental

Madilynne Clark
WPC Agriculture Policy Research Director June 2017

Introduction

Fighting fires in Eastern Oregon, I learned quickly that cattle outnumber people, dirt roads sprawl across the countryside, and most of the land is rangeland. Many farm families depend on the range for feeding cattle through the late spring and summer, and fires endanger this livelihood. You only need to experience one rangeland fire to realize that farmers are the most passionate, dedicated, and motivated firefighters on the line. They care for their cows and their livelihood, but farmers also care for the land. They fight longer, harder, and quicker, hoping to minimize damage to the open range.

Yet farmers who care for the land so passionately are often accused of environmental degradation and regarded as the foe of the earth by urban foodies and activists. It is possibly due to the general public's distance from the farm and misunderstanding of its intricacies. A form of inflammatory propaganda attacking agriculture has taken hold of mainstream media and college campuses, indoctrinating audiences with misinformed and anti-science claims. Those claiming to be "green" are frequently surrounded by jungles of concrete, while those truly caring for the environment live and work on the land every day.

Anti-farming arguments often defy common sense. In claiming that farmers disregard water, land, and wildlife, anti-farming activists ignore two simple truths. First, farm families live on and often own the very land they are accused of damaging. Second, many of these family farms have lived on the land for generations and intend for their farm to continue for many years into the future.

A farm's survival doesn't depend on monetary factors alone. The quality of the land, water, and natural habitat are also intricately connected with the future sustainability of the operation. To combat the claims of anti-farming arguments, one must realize that a farm family has no motivation to destroy their livelihood and the place where they live. Instead, farmers have every motivation to preserve, protect, and improve the quality of the environment on which their farm and their livelihood depend.

This Policy Brief discusses how farmers are the best environmentalists and stewards of the land. Beginning with an overview of the progress agriculture has already made, this study focuses on the care farmers have for natural resources including: water, land, and air. A brief section of the report highlights the environmental benefits of biotechnology. Finally, the report looks at Washington's Voluntary Stewardship Program and how it enhances the positive interaction between farmers and the environment.

Progress

Washington agriculture advocate, farmer, and businessman Alex McGregor notes, "In a little more than the average age of the farm family operator (58 years), agriculture has increased production 156 percent, reduced water borne soil erosion by 85 percent, reduced dust six-fold, and reduced stubble burning 22 times."[1]

That is an impressive feat for any industry, and it is a testament against the misplaced accusations unfairly targeted at agriculture.

Fueled by the innovation of the industrial revolution, the heartbreak of the 1930s Dust Bowl, and the scientific fervor of World War II, farmers now have access to many new technologies.[2] From 1889 to 1950, public investment in food and agricultural research and development grew by 3.9 percent annually in real terms.[3] Over the last 40 years, private sector investment has grown more rapidly than public sector investments but the rate of growth has been more variable.[4] Research investments are a critical part of the productivity improvements that the United States and the world have realized in the post-WWII era, widely known as the Green Revolution.[5]

The post-WWII era within the United States saw amazing improvements in production as farmers were asked to industrialize.[6] As agricultural productivity increased, farmers used less land, water, crop inputs, and labor to produce more food. In 2007, the U.S. produced $281.5 billion in agricultural output. Without the productivity growth that has been achieved since 1949, it would take 78 percent more resource inputs today to achieve the same level of output.[7]

As environmental awareness grew in the late 1960s and early 1970s, farmers began to confront some of the negative effects of fertilizer and pesticide use. Concerned about land, water, wildlife, air, and neighbors, farmers worked closely

---

1 Alex McGregor, personal communication with the author, April 5, 2017, copy available on request.

2 "Postwar Technology, Farming in the 1940s," by Bill Ganzel, Wessels Living History Farm, at http://www.livinghistoryfarm.org/farminginthe40s/machines_08.html.

3 "Public Food and Agricultural Research in the United States: The Rise and Decline of Public Investments, and Policies for Renewal," by Philip Pardey, Julian Alston, and Connie Chan-Kang, AGree, April 2013, at http://www.foodandagpolicy.org/sites/default/files/AGree-Public%20Food%20and%20Ag%20Research%20in%20US-Apr%202013.pdf.

4 "Agricultural Productivity Growth in the United States: Measurement, Trends, and Drivers," by Sun Ling Wang, Paul Heisey, David Schimmelpfennig, and Eldon Ball, Economic Research Report No. ERR-189, United States Department of Agriculture Economic Research Service, July 2015, at https://www.ers.usda.gov/publications/pub-details/?pubid=45390.

5 Ibid.

6 "Corporatization of American Agriculture," by John Ikerd, Small Farm Today Magazine [put magazine name in italics], 2010, at http://web.missouri.edu/~ikerdj/papers/SFT-Corporatization%20of%20Am%20Ag%20(7-10).htm.

7 "Public Food and Agricultural Research in the United States: The Rise and Decline of Public Investments, and Policies for Renewal," by Philip Pardey, Julian Alston, and Connie Chan-Kang, AGree, April 2013, at http://www.foodandagpolicy.org/sites/default/files/AGree-Public%20Food%20and%20Ag%20Research%20in%20US-Apr%202013.pdf.

with researchers, extension agents, and agronomists to become more efficient and use fewer resources. Agricultural extension is administered by land grant universities, such as Washington State University, to provide information about new technologies and research to farmers in the local area.

Through the 1990s, investment in agricultural extension grew as a percentage of agricultural GDP to 1.35 percent. Though the rate of growth has slowed, these relationships continue today, as the investment in extension was equal to 1.38 percent of agricultural GDP in 2008, allowing farmers to adopt new technologies and better production practices.[8]

Farmers work daily to conserve natural resources

Farmers are environmentalists because they work with real-life environmental events that happen every day. They are committed to preserving the water, land, air, and wildlife for the next generation, because without these resources their farms would cease to exist.

Water

In the Yakima Valley, an orchard grower works to perfect water applications. Using three different forms of irrigation, including overhead sprinklers, low sprinklers, and drip irrigation, the grower conserves water and protects blossoms from frost. Previous production practices for frost prevention in apples included burning diesel and even tires to warm the air around the trees. A few decades ago, accounts of blackened skies in fruit production regions were common.[9]

Farmers have reduced burning by using water to protect the fruit from frost and have reduced water consumption as well. Through drip irrigation, consolidated planting, and new apple varieties, orchards have been able to reduce water consumption and improve production. Previous practices required higher water volumes to reach a tree's entire root zone.[10]

In 2008, agriculture invested $2.15 billion into improving and expanding irrigation systems, a 92 percent increase compared to the previous five years. From 1984 through 2008, agriculture adopted more efficient pressure irrigation and moved away from gravity irrigation systems. Gravity irrigation systems use gravity to deliver water to the field versus a pump. Furrow and flood irrigation are the

8 Ibid.

9 "A is for apple – Frost Control," National Apple Museum, at http://www.nationalapplemuseum.com/book15.html.

10 Harold Austin, personal communication with the author, April 26, 2017, copy available on request.

most common methods of gravity irrigation seen in the United States.[11] In 1984, 71 percent of land was gravity irrigated, and the more efficient pressure irrigation systems were used on only 28.5 percent of land. By 2008, only 48 percent of land was gravity irrigated, while pressure irrigation had grown to 51.5 percent of land, an increase of 23 percentage points over 24 years.

To put the water savings into perspective, over that 24-year period, irrigated acres throughout the west grew by 2.1 million acres, but the total agricultural water applied declined by nearly 100,000 acre feet. Reduced water use per acre is not the only benefit of adopting better irrigation technologies. Improved crop yield and quality, reduced energy costs, reduced labor costs, reduced fertilizer and pesticide loss, reduced soil erosion, and reduced water runoff are all benefits for both the farmer and the environment.[12]

Land

Dairy farmers are frequently accused of degrading the environment. A few hours visiting with a Washington dairy farmer quickly shows that dairy farmers carefully guard their natural resources. Land is just one resource they protect very seriously.

A dairy farm, east of Sunnyside, Washington is home to over 2,500 Holstein cows. Surrounded by lush fields in the spring, this farm carefully monitors every inch used to grow the cows' feed. By using precision agriculture equipment, the farmer is able to map soil conditions, moisture levels, and yield data. As planting occurs, the tractor's precision equipment is able to adjust the seed rate to increase or decrease seeding dependent on the collected data.

Seeding applications are not the only precision technology helping the farmer. GPS-guided steering adjusts a tractor's location within inches, minimizing wasteful overlap application of seed, fertilizer, and other inputs. Precision technology is used again during the growing season to spot-treat areas of the field that need fertilizer, compost, or pesticides. Precision technology allows the farm to minimize inputs that might runoff into streams.[13]

Precision agriculture technology use has grown significantly since the late 1990s. Yield monitors that measure production throughout the field are the most

11 "Irrigation in U.S. Agriculture: On-Farm Technologies and Best Management Practices," by Megan Stubbs, CRS Report, Congressional Research Service, October 17, 2016, at https://fas.org/sgp/crs/misc/R44158.pdf.

12 "Water Conservation in Irrigated Agriculture: Trends and Challenges in the Face of Emerging Demands," by Glenn Schaible and Marcel Aillery, Economic Information Bulletin EIB-99, United States Department of Agriculture Economic Research Service, September 2012, at https://www.ers.usda.gov/publications/pub-details/?pubid=44699.

13 Jason Sheehan, personal communication with the author, April 26, 2017, copy available on request.

commonly used form of precision technology, and are used on almost half of farms. More advanced technologies include tracker guidance/auto-steer systems (34 percent), GPS based yield mapping (21 percent), soil mapping, and variable rate applications (16-26 percent).[14]

As machinery and inputs are made more efficient through the use of precision agriculture technologies, farmers are able to reduce environmental impacts, improve productivity, and increase profits for the farm.[15] Precision technology provides a number of environmental benefits, including reducing the overlap by harvesters which decreases fuel consumption and applications of other inputs. Additionally, specialized application of fertilizer and pesticides reduces harmful runoff into waterways.[16]

Not only does precision agriculture allow farmers to preserve the soil, but the cost savings incentivize adoption. The improved efficiency during planting and fertilizing can save a farmer 2.4, 2.2, and 10.4 percent for seed, fertilizer, and tractor fuel, respectively.[17] Variable rate applications create a cost savings of about 10.5 percent for pesticide applications.[18] These savings are not only reflected in the farmer's profits but also in the environment, as run-off is decreased and production is maintained or improved.

Cost savings, increased food production, and environmental benefits all contribute to this booming investment. Currently, the precision agriculture industry is expected to experience 14 percent compounded growth into 2019.[19]

---

14 "Farm Profits and Adoption of Precision Agriculture," by David Schimmelpfennig, Economic Research Report ERR-217, United States Department of Agriculture Economic Research Service, October 2016, at https://www.ers.usda.gov/publications/pub-details/?pubid=80325.

15 "The economic and environmental impacts of precision agriculture and interactions with agro-environmental policy," by J. Schieffer and C. Dillon Precision Agriculture (2015) 16:46-61 on October 7, 2014.

16 Ibid.

17 "A Whole Farm Analysis of the Influence of Auto-Steer Navigation on Net Returns, Risk, and Production Practices," by Jordan Shockley, Carl Dillon, and Timothy Stombaugh, Article, Journal of Agricultural and Applied Economics, 43, 1, February 2011, at http://ageconsearch.umn.edu/bitstream/100640/2/jaae321.pdf.

18 "Whole farm analysis of automatic section control for agricultural machinery," by Jordan Shockley, Carl Dillon, Tim Stombaugh, and Scott Shearer, Article, Precision Agriculture (2012) 13, January 14, 2012, at http://www.academia.edu/29759401/Whole_farm_analysis_of_automatic_section_control_for_agricultural_machinery.

19 "Global Precision Agriculture Market Will Boom Following the Need to Maximize Food Production Through 2019, says Technavio," BusinessWire, February 29, 2016, at http://www.businesswire.com/news/home/20160229006011/en/Global-Precision-Agriculture-Market-Boom-Maximize-Food.

Air

Blessed with one of the highest yielding dryland wheat areas in the world, farmers in the Palouse region of Washington manage a unique problem – too much stubble. After harvest, fields are covered with thick, shiny, and slick wheat stubble that makes it difficult to plant for the next year. The next year's wheat crop must be planted into the recently-harvested field and wheat stubble makes it difficult for the seed to root and emerge. Wheat stubble reflects the sun and keeps soil temperatures lower than needed for seed germination. The result is often a thin, poor stand of wheat the following spring.

In the past, farmers used field burning to eliminate thick stubble. Reducing stubble and improving the ability of the soil to absorb heat creates thicker, more profitable wheat fields. There was a significant problem, however: the smoke.

Wheat growers worked with the Department of Ecology and reduced field burning by half over nine years.

New technologies and research allowed drier areas of Eastern Washington to adjust production systems from a summer fallow rotation (that only had a crop harvested every other year) to no-till drills. No-till drills minimized soil disturbance, cut through heavy stubble, decreased the number of passes a farmer takes over his field every year, and reduced field burning. The effort to improve air quality was successful, and in the process, farmers were able to change to a production system that offered soil conservation benefits and water quality improvement.[20]

Washington wheat growers still work to protect air quality. Washington state's Agricultural Burning Taskforce meets three times a year to develop and update management practices, adjust burn permit fees, and identify research.[21] In 2016, Washington state issued permits for just over 100,000 acres for burning, a slight increase over 2015, but well below the long-term average of 150,000-160,000 acres per year. Additionally, public complaints about agricultural burning decreased to 18 in 2016, down from 29 in the previous year.[22]

---

20 Jay Penner, personal communication with the author, May 3, 2017, copy available on request.

21 "Agricultural Burning Task Force," State of Washington Department of Ecology, 2016, at http://www.ecy.wa.gov/programs/air/aginfo/Task_force.htm.

22 "Agricultural Burning Practices and Research Task Force #99 Meeting Summary," State of Washington Department of Ecology, November 9, 2016, at http://www.ecy.wa.gov/programs/air/aginfo/research_pdf_files/Meeting_99_summary11092016.pdf.

Biotechnology development has aided agriculture's ability to speak environmentally

Too often, fear is associated with agricultural terminology.[23] GMOs, pesticides, Confined Animal Feeding Operation (CAFO), hormones, cage-free, nitrates, biotechnology, and similar terms are used out of context, ignoring the relevant science. Biotechnology including genetically modified organisms (GMOs) and pesticides are important tools to help farmers care for the environment. From 1996 to 2007, $20 billion in U.S. farm income resulted from the productivity and efficiency gains provided by agricultural biotechnology, but strong profits are not the only benefit of biotechnology.[24]

Through improved plant breeding, scientists were able to reduce the unpredictability of traditional methods, reducing the time needed to breed in new traits into various crops. This technology advancement, known as GMOs, allows farmers to produce more with with fewer natural resources.

Plants are bred for a variety of benefits, including resistance to drought, disease, and insects. The genetic resistance allows farmers to spray pesticides less frequently, use less water, and still maintain production. For example, the adoption of biotech crops reduced pesticide applications by 1.28 billion pounds from 1997 to 2014, an 8.2 percent reduction. The environmental effects associated with herbicide and insecticide use on these crops decreased by 18.5 percent, according to the Environmental Impact Quotient estimation.[25]

Contrary to popular belief, pesticides allow farmers to be more environmentally friendly. Research and development in both the private and public sectors created multiple chemistries that target a particular pest (disease, insect, weeds), but are gentle on the environment. With improved chemistries, farmers can spray smaller amounts, less frequently.

Attacks made against pesticides fail to mention that these advanced technologies actually promote biodiversity. By improving yields, farmers are able to meet people's need for food with their current land base allowing natural areas to remain in place,

---

23 "Why we're so scared of GMOs, according to someone who has studied them since the start," by Roberto Ferdman, Wonkblog, *The Washington Post,* July 6, 2015, at https://www.washingtonpost.com/news/wonk/wp/2015/07/06/why-people-are-so-scared-of-gmos-according-to-someone-who-has-studied-the-fear-since-the-start/?utm_term=.84000015e778.

24 "Agricultural Biotechnology Benefits Farmers and the Environment – In Response to Report Criticizing Herbicide and Pesticide Use and Biotech Seed Prices," Biotechnology Industry Organization (BIO), Issue in Brief, November 17, 2009, at https://www.bio.org/sites/default/files/files/Benbrook_Report_PUBLIC_111709.pdf.

25 "Environmental impacts of genetically modified (GM) crop use 1996-2014: Impacts on pesticide use and carbon emissions," by Graham Brookes and Peter Barfoot, Research Paper, GM Crops and Food – Biotechnology in Agriculture and the Food Chain, Volume 7, 2016, Issue 2, June 2, 2016, at http://www.tandfonline.com/doi/full/10.1080/21645698.2016.1192754.

preserving native biodiversity.[26] Additionally, pesticides allow farmers to adopt new practices like no-till farming. No-till practices leave more residue in place which impedes run-off of soil, water, and agricultural chemicals.[27]

The combination of pesticides and biotech crops makes possible the adoption of environmentally friendly production methods. No-till practices reduce fuel consumption and help store carbon in the soil. In 2014, the benefit of this farm practice was equivalent to removing 10 million cars from the road.[28]

Agriculture and critical areas are intertwined

In Washington state, the intersection of agriculture and environmental policy can be contentious; as decisions are made, it is important to remember that farmers are effective advocates for natural resources. Washington's Growth Management Act (GMA) designates environmental areas of concern as "critical areas" which "include the following areas and ecosystems: (a) wetlands; (b) areas with a critical recharging effect on aquifers used for potable water; (c) fish and wildlife habitat conservation areas; (d) frequently flooded areas; and (e) geologically hazardous areas."[29] GMA requires counties to use the best available science to protect and maintain critical areas.[30]

Unable to withdraw once enrolled in the Growth Management Act, GMA counties have been faced with burdensome regulations and costly lawsuits. One example of GMA's counterproductivity is in the case of agricultural lands and critical areas. One of the four key purposes of the act is "protecting environmentally critical areas from harm and conserving agricultural, forest, and mineral lands by directing development elsewhere."[31]

Evidence attests that efforts under GMA to protect critical areas hinders the preservation of agricultural lands. Mandates to protect critical areas have frequently

---

26 "The Contribution of Crop Protection Products to the United States Economy," by Mark Goodwin Consulting Ltd, CropLife America, at http://191hmt1pr08amfq62276etw2.wpengine.netdna-cdn.com/wp-content/uploads/2015/08/CLA-Socio-Economic-Report.pdf.

27 "The benefits of Pesticides. A story worth telling," by Fred Whitford, et.al. Purdue Extension PPP-70, Purdue University, January 2006, at https://www.extension.purdue.edu/extmedia/ppp/ppp-70.pdf.
https://www.extension.purdue.edu/extmedia/ppp/ppp-70.pdf

28 "Environmental impacts of genetically modified (GM) crop use 1996-2014: Impacts on pesticide use and carbon emissions," by Graham Brookes and Peter Barfoot, Research Paper, GM Crops and Food – Biotechnology in Agriculture and the Food Chain, Volume 7, 2016, Issue 2, June 2, 2016, at http://www.tandfonline.com/doi/full/10.1080/21645698.2016.1192754.

29 "Revised Code of Washington 36.70A.030, Definitions, Effective date July 1, 1994, at http://app.leg.wa.gov/rcw/default.aspx?cite=36.70a.030.

30 "Wetlands in Washington State Chapter 2 – The Growth Management Act and Protection of Critical Areas," State of Washington Department of Ecology, Volume 2 – Protecting and Managing Wetlands, April 2005, at http://www.ecy.wa.gov/programs/sea/wetlands/bas/vol2final/Chapter%202_Volume%202_.pdf.

31 Settle and Gavigan, supra note 5, at 904-05.

removed land from agricultural production for the benefit of critical areas.[32] Case law is filled with multiple conflicts between critical areas and agricultural lands, costing Washington counties and its residents millions of dollars.[33]

In response to this reoccurring conflict, the Washington state legislature passed the Voluntary Stewardship Program (VSP) in 2012, giving counties a chance to balance the demands of critical areas and agriculture. Creating local, incentive-based solutions, VSP will "protect critical areas while maintaining and enhancing the viability of agriculture…"[34]

Currently, 28 of Washington's 39 counties are participating in a Voluntary Stewardship Program, created in 2011. The program moves away from the command and control nature of the GMA and incorporates incentives into the protection of critical areas and the maintenance and improvement of a county's agricultural viability.[35]

By bringing together key stakeholders within the county, representing a diversity of interests in critical areas and agriculture, each county can design a unique plan best suited for their local area. The plan is based on voluntary, incentive-based tools to encourage both the protection and support of critical areas.[36]

As the initial plans for the first two counties, Chelan and Thurston, are implemented, and the 26 other plans are prepared, the contribution agriculture makes to protecting the environment becomes increasingly important. New research and technology enables farmers to provide better care for the environment through water conservation and protection, efficient land and input utilization, and air quality preservation.

Remembering that agriculture is already a great contributor to water quality and conservation, land use conservation, air quality improvements, and habitat preservation should be an important part of the VSP discussion. One final example of how farmers work with the environment illustrates how farmers are instrumental and valuable in improving critical areas.

---

32 "WEAN wins critical areas lawsuit," by Janis Read, *Whidbey News-Times*, March 26, 2014, at http://www.whidbeynewstimes.com/news/wean-wins-critical-areas-lawsuit/.

33 "A Resolution Initiating County Participation in the State Voluntary Stewardship Program to Protect and Enhance Critical Areas Where Agricultural Activities are Conducted," by Ron Wesen, Kenneth Dahlstedt, Sharon Dillon of the Board of Skagit County Commissioners, Skagit County, 2014, at https://www.skagitcounty.net/PublicWorksNaturalResourcesManagement/Documents/Resolution%20Initiating%20VSP.pdf.

34 RCW 36.70A.625

35 "Impact Report: Voluntary Stewardship Program," by Amanda Murphy, William D. Richelshaus Center, Washington State University, 2016, at http://extension.wsu.edu/wp-content/uploads/2014/07/voluntary-stewardship-program-2016.pdf.

36 "Voluntary Stewardship Program (VSP) – Background," by Bill Eller, Washington State Conservation Commission, 2014, at http://scc.wa.gov/vsp-background/.

A Washington cattle rancher uses rotational grazing to manage his rangeland and provide an affordable feed source to his cattle. Utilizing best management practices and rangeland management research, the rancher's grazing practices have improved biodiversity on his ranch, including within the streams.

The rancher will graze his cattle for short, infrequent periods along riparian areas. The managed movement of cows within riparian areas is a reflection of centuries of grazing by bison, elk, and other hooved mammals that improved the ecological diversity of the streams.

A fish biologist came to study the streams along the grazed areas and found that because of the cows' presence along the riparian areas, the size and diversity of the fish within the stream was well above the average of non-grazed areas. The rancher described his farm's benefit to the environment best by saying, "Cows are the best all-terrain range management vehicles available."[37]

Viewing critical area protection and agriculture as competing interests is detrimental to Washington state. VSP has the potential to improve collaboration among agriculture and critical area interests, while improving both, especially considering that agriculture is vital to the success of the environment and farms benefit critical areas in many ways.

Conclusion

Real life examples and well-established statistics illustrate that farmers are the best environmentalists, because they combine their close knowledge of the land with a natural incentive to use fewer resources. Farmers provide careful stewardship of water, land, and air, providing benefits for all Washington's citizens. As the clamor against agriculture builds and is sustained by urban activists and some government bureaucrats,[38] it is important to remember that agriculture is a vital component of protecting many critical natural resources across our state.

37 Dick Coon, panel member comments during Washington Policy Center's Solution Summit, May 16, 2017, copy available on request.

38 "What's Upstream Cleared Pt.2," by Bob Larson, Radio Interview, AgInfo, May 8, 2017, at http://www.aginfo.net/index.cfm/event/report/id/Washington-State-Farm-Bureau-Report-37053.

Published by Washington Policy Center

Washington Policy Center is an independent research organization in Washington state. Nothing here should be construed as an attempt to aid or hinder the passage of any legislation before any legislative body.

Chairman	**Craig Williamson**
President	**Daniel Mead Smith**
Vice President for Research	**Paul Guppy**
Communications Director	**Molly Sheerer**

If you have any comments or questions about this study, please contact us at:

Washington Policy Center
PO Box 3643
Seattle, WA 98124-3643

Online: www.washingtonpolicy.org
E-mail: wpc@washingtonpolicy.org
Phone: (206) 937-9691

About the Author

Madilynne Clark is the Agriculture Policy Research Director at Washington Policy Center, based in the Tri-Cities office.

An Oregon native, Madilynne brings a lifetime of experience in Agriculture to WPC. Her passion for agriculture grew as she helped her dad on veterinary calls and then became active in FFA.

Before joining WPC, she worked for Ag Association Management in Kennewick as an Account Manager and field rep for the Far West Spearmint Marketing Order. She worked with growers and industry across Washington, Oregon, and Idaho. She also spent two years as an associate of The Context Network. Her time involved working as a business analyst on various agriculture projects in production, wholesale, retail, and policy Ag sectors.

Madilynne holds a Master's Degree in Agricultural and Resource Economics from Colorado State University as well as a B.S. in Environmental Economics, Policy and Management from Oregon State University. When not working for WPC, she enjoys knitting, running, and every minute with her husband, newborn son, and their dog, Parli.