ON THE COVER:

Rural Resilience
Addressing Community Health Outcomes with N.E.A.R Sciences
The Western Rural Development Center (WRDC) compiles this magazine with submissions from university faculty, researchers, agencies, and organizations from throughout the Western region and nation. We make every attempt to provide valuable and informative items of interest to our stakeholders. The views and opinions expressed by these agencies/organizations are not necessarily those of the WRDC. The WRDC is not responsible for the content of these submitted materials or their respective websites and their inclusion in the magazine does not imply WRDC endorsement of that agency/organization/program.

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ON THE COVER

**RURAL RESILIENCE**
Addressing Community Health Outcomes with N.E.A.R. Sciences

“The connection between an individual’s health and the place in which they live, work, and play is deeply rooted in how communities are built and the historical and current socio-economic conditions and policies influencing their daily lives. Environmental factors, such as ability to walk to work or school, or the ability to access culturally appropriate fresh food, can over time contribute to a lack of physical activity and poor nutrition. Eventually, these behaviors can lead to obesity and high blood pressure that can further lead to chronic diseases, such as heart disease and stroke.”
“Rural Connections is a vital tool in helping us accomplish our capacity-building goal by sharing exceptional outreach and research programs developed by talented professionals from throughout the region.”
Rural America is coping with significant problems including a shortage of high-quality jobs, severe health concerns, and a lack of affordable housing. The Western Rural Development Center (WRDC) seeks to address these issues by serving as a regional catalyst for building capacity in the West. *Rural Connections* is a vital tool in helping us accomplish our capacity-building goal by sharing exceptional outreach and research programs developed by talented professionals from throughout the region.

In this issue of *Rural Connections*, we are pleased to present six quality articles that present programs and ideas that will benefit the residents and communities of rural America.

Sue Lurie and Christy Anderson Brekken describe how the development of small sustainable businesses that contribute to local food production can be an important part of the New Natural Resource Economy (NNRE), and create needed jobs and economic activity.

Mark Apel and Gabrielle Sykes-Casavant explain how an externship program developed and operated by Cooperative Extension at the University of Arizona brings the skills and expertise of students to help communities accomplish important objectives.

Laura Ryser, Joy Lile, and Kody Russell maintain that health is strongly related to where people live, work, and play. The extent to which people can walk to work or school and have access to fresh food play a vital role in an individual’s health. Ideas to achieve these goals are described.

Ernie Watson of USDA Rural Development in New Mexico describes how RD programs can help individuals become homeowners and enjoy all of the subsequent benefits.

Noelle Hart, Catherine Gowan, and Kevin Zobrist discuss a program that seeks to make the benefits of bio-energy available to the general public, including Latino populations.

Finally, Roslynn Brain-McCann, Mark Apel, and Paul Lachapelle present results of their nationwide survey on the importance and relevance of sustainability in Extension education.

As always, I express my appreciation to Betsy Newman, editor of *Rural Connections*, for her professionalism and high-quality work. Because of her, the Western Rural Development Center is able to be much more effective and efficient in reaching our objectives. *
INTRODUCTION

Natural resources, including the soil and water needed for agricultural production, continue to be the dominant assets of many rural communities. Many natural resource dependent communities have faced significant socio-economic challenges for the past several decades due to structural shifts and social expectations regarding the management, production of, and markets for natural resources. This social and economic transformation has disrupted the ties between rural economies and primary production, and contributed to the ongoing decline of many communities, especially those lacking the infrastructure and markets of communities closer to urban centers and major transportation routes. Industrial recruitment has typically been used to replace exiting key employers; however, this economic development strategy does not protect communities from further economic shocks if those larger-scale replacement enterprises also leave the community.
The New Natural Resource Economy (NNRE) can be a complementary economic development approach to traditional natural resource uses and industrial recruitment strategies. The NNRE builds rural business diversity and, with it, economic resilience based on a healthy environment/healthy economy principle (Lurie and Hibbard, 2011). It includes three defining criteria: environmentally conscious use of natural resources to produce new products and/or reach new markets; multifunctional landscapes that include a mix of production, non-consumptive or amenity uses, and preservation/restoration; and support for very small businesses. Very small businesses employ ten or fewer workers, including the owner, and sole proprietors with no hired workers or only family labor.

CAN REGIONAL FOOD NETWORKS AND SMALL-SCALE AGRICULTURE CONTRIBUTE TO THE NNRE?

For over a century, farms adopted new technologies as part of the industrial production model, investing capital and replacing labor in a move toward specialization and commercialization (Welsh, 1997). Government also contributed through policy tools such as price supports, crop insurance, food safety regulation, food aid programs and others to make food cheap and plentiful (Dahlberg, 2008). In the 1990s, global trade agreements aligned government and private production standards across geographic and political boundaries (Campbell, 2009). These developments led to more commodity market-oriented production and marketing, increasing production output and farm size while the number of farms and ranches declined.

The industrial production model faces countervailing trends because of its perceived negative effects on human health, rural economies, and the environment. The emerging focus on local origin and sustainability provides opportunities for rural communities to support a diversity of very small local businesses around the agricultural use of natural resources, restoring greater capacity for self-direction and economic resilience.

The development of Regional Food Networks (RFNs) supports individual, small-scale producers who often choose sustainable production practices. RFNs include both community-level proximity and within-state regional food and producers, which aggregate to sales in RFNs comprising short food supply chains within a geographical region.

In 2016, an Oregon State University research team distributed both producer and consumer surveys in Oregon via convenience sampling. The team recorded and analyzed 193 responses from the producer survey, and 617 responses from the consumer survey, separating the respondents into two geographical regions. Seventy-four percent of producer responses were from the more highly populated Willamette Valley (WV) area, which includes the major urban centers. Twenty-three percent of producer respondents were from the non-Willamette Valley (NWV) region comprising the southwest, central, and eastern areas (Figure 1). The NWV counties are generally more sparsely populated with smaller population centers and lower overall per capita income than the WV counties. Many communities are located far from major transportation corridors. Approximately 16% of the consumer surveys were from the NWV areas (Brekken et al., in press).

Here, we focus on NWV data to understand the relationships among producers and consumers and their market channels in RFNs. While data for various characteristics may not be representative of the region as a whole, they nonetheless provide a window into the character of rural RFNs. Responses from producers and consumers suggest opportunities for very small scale agricultural production as part of the NNRE.

![Figure 1. The WV and NWV Producer Survey Regions.](image-url)
ARE OREGON’S RURAL SMALL-SCALE RFN PRODUCERS PARTICIPATING IN A NEW NATURAL RESOURCE ECONOMY?

To determine whether an NNRE development strategy is operative in rural Oregon, we analyzed the surveys to look for the characteristics of the NNRE: very small businesses that engage in environmentally conscious use of natural resources to produce new products or markets by managing for multifunctional landscapes.

Very Small Business

Very small businesses—those that have fewer than 10 employees—are common in rural Oregon. Half of the surveyed farms had no paid employees. Of the other half, only two employed more than 10 workers. Thus, all but two of the respondents in the survey are very small businesses. Sixty percent indicated that under half of their income was from the farm, making the farm an important source of supplementary household income.

Surveyed NWV farms ranged in acreage from under one acre to 60,000 acres; however, most farms fell into smaller acreage categories. About 40% of our sample farmed under 50 acres, 20% farmed between 50 and 219 acres, and the remainder operate over 220 acres. Thus, large acreages are not required for viable RFN businesses.

Environmentally Conscious Production to Create New Products or Markets

These RFN producers reported using environmentally conscious production practices. Roughly 53% utilized organic practices but were not certified, while 13% were certified organic. Of the 30% reporting conventional methods, many utilized conservation practices such as conservation tillage or no till, cover crops, integrated pest management, or nutrient management plans. Among NWV producers who raised animals, nearly 93% utilized grazing/free range practices, and 68% used antibiotic/hormone free feeding followed by slightly over 64% using grass/organic feeding methods.

The NWV farmers reported high use of RFN marketing: only one respondent reported marketing exclusively through national or international distributors; all of the others participated in RFN marketing channels, with an average of two marketing channels per farm. Direct marketing was the most common, with 79% of farms selling direct to consumers, followed by 64% selling to local restaurants and retailers. Approximately 29% utilized local/regional distributors who maintain the place of origin on the product through the supply chain. About 11% sold to local/regional institutions such as schools or hospitals. At least one farm obtained 90-100% of farm revenue from each type of marketing channel, showing robust commitment to RFN marketing among these farms.

Multifunctional Landscapes

By multifunctional landscapes, we mean a mix of production, non-consumptive or amenity uses, and preservation/restoration. By participating in RFNs with environmentally conscious production practices, respondents are using their lands for production and restoration. Furthermore, they use their land to fulfill their own values. Nearly 78% indicated that they chose production practices in “alignment with my environmental values.” That was followed by 35% each indicating profit incentives and having local or regional support and infrastructure for their production practices. Producers in the study also showed entrepreneurial attitudes: being optimistic, realistic, creative, innovative, and open minded. They likely find personal satisfaction from using their land for production and income.

When asked why they participate in RFN channels, community concerns came ahead of income concerns. “Promote locally made” was the highest motivator (80%), followed closely by “promote connection to community” along with “support local health/food security.” Given the loss of rural grocery stores and lack of access to fresh foods in many parts of Oregon, these producers seem to be responding to their local community’s needs.

“The emerging focus on local origin and sustainability provides opportunities for rural communities to support a diversity of very small local businesses around the agricultural use of natural resources, restoring greater capacity for self-direction and economic resilience.”
Only 28% of the farms indicated that they were responding to established markets, but the consumer survey indicates an appetite for RFN products in rural areas of Oregon. About two-thirds of NWV respondents were willing to pay some price premium for local food, with a majority defining “local” as “within my state” (33%) or “within 100 miles” (22%). Nearly 72% of NWV consumers were motivated to buy local foods to “support local farmers” followed by “promote local food” at about 53% and over 36% choosing “tastes better.” Environmental concerns and preserving agricultural landscapes were lower priorities.

SMALL-SCALE AGRICULTURE, RURAL RFNS, AND NNRE: THE ANSWER IS YES

The combination of producer and consumer responses from the NWV survey region paints an intriguing picture about rural RFNs, small-scale production, and their roles in the NNRE. Producer respondents were very small businesses involved in small-scale agriculture. In addition, small-scale production agriculture seems to be an important source of supplemental income in rural areas. Although consumer responses did not align with producer responses in valuing environmentally-conscious production, consumers are willing to pay a premium to support local producers. At the nexus of rural, small-scale agricultural production practices and motivations, and consumer willingness to support them, RFN participation in rural settings provides opportunities for very small agricultural enterprises and very small businesses to contribute to the NNRE principle of healthy environment-healthy economy. Programs and policies that help support these agricultural businesses add to the potential for rural producers and consumers to come together in ways that contribute to rural community resilience and vitality.

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HIGHLIGHTS FROM THE 2016 OREGON STATE UNIVERSITY PRODUCER SURVEY

- 50% of farms had no paid employees
- 60% of farms indicated that under half of their income was from the farm
- ~40% of farms farmed under 50 acres
- 20% of farms farmed between 50 and 219 acres
- 79% of farms are selling direct to consumers
- 64% of farms are selling to local restaurants/retailers
- ~29% of farms utilize local/regional distributors
- ~11% of farms sold to local/regional schools/hospitals
INTRODUCTION
The University of Arizona, like Land-Grant universities across the nation, has the mission of reaching out to the state’s communities and residents to bring solutions to bear on practical problems using research-based information. Since 2011, the Externships in Community Sustainability Program (ECSP) administered by Arizona Cooperative Extension provides creative, cost-effective, outreach and education, as well as providing service and learning opportunities for students through community-based sustainability projects. Externs are paid minimum wage and work for an entire semester rather than just a few weeks. The key distinction between typical internships and this program’s externships is that students are bringing particular skills and employing them in service to their communities through Extension, the outreach arm of the University.
THE PROGRAM

The ECSP is supported by the University of Arizona Green Fund, which is backed by a special “sustainability” fee of $24 per student per year, enacted by the Board of Regents in 2010. The Green Fund provides opportunities through an annual grant process and year-round mini-grants for students and employees to test innovative solutions to challenges in renewable energy, energy and water efficiency, waste reduction, and environmental sustainability education, research, and outreach. For a relatively small amount of funding to cover the wages of ten to twelve students for approximately ten weeks during the summer, this program has great impact on Arizona’s communities. Extension externs fulfill the outreach mission of the Green Fund by taking sustainability knowledge and practices from the campus and extending them to Arizona’s communities.

Community sustainability projects are developed through annual requests for proposals from county Extension personnel. The projects are typically multi-disciplinary activities involving community organizations, externs, Extension personnel, and campus resources. Externs working on specific projects over a summer semester often provide a much-needed boost in capacity for Extension’s variety of programs including community/school gardens, 4-H youth development, pest research, and local food systems. The projects foster the enhancement of social and natural resources, address community needs, and contribute to community resilience. The program aims to integrate multiple perspectives into Extension programs on sustainable living, including the ways that “choices, decisions, and behaviors affect natural resources, equity, and economic development at the local, regional, national, and global scales” (Elliott et al., 2008). Once the projects are approved, project managers recruit and give priority to students from the communities and counties in which the projects are being implemented. This helps defray housing costs and builds on the students’ familiarity with their home community. Moreover, local recruitment teaches students the importance of applying broad-based sustainability practices to the unique situations in their communities, i.e. thinking globally, but acting locally. Even though the students are paid minimum wage, they are given a substantial degree of responsibility to plan and implement the projects. This helps fulfill the University of Arizona’s larger goal of ‘student engagement.’

In 2016, the University of Arizona recognized the impact the students’ work has on their communities and their own personal development by designating the program as an official 100% Engagement experience. With that designation, students who complete their summer externship earn an Engaged Learning experience notation on their academic transcript. This is an innovative concept for a non-credit, out-of-classroom activity.

THE PROJECTS AND EXTERNS’ ROLE

The array of proposed and implemented projects spans the range of Extension sustainability programming in the areas of local food systems, farmers’ markets, community and school gardens, water conservation, integrated pest management, youth development, water conservation, and nutrition education. Student externs, since 2011, have taken on a variety of roles in helping to implement these projects, but most are given a coordinating role that affords them decision-making into a project’s implementation as well as a degree of leadership as they interact with community partners. Students have worked on developing rainwater harvesting demonstration sites; assisted with the management of start-up farmers’ markets

“The key distinction between typical internships and this program’s externships is that students are bringing particular skills and employing them in service to their communities through Extension, the outreach arm of the University.”
and community gardens; organized lessons for summer youth programs around gardening and urban farming; organized and presented nutrition workshops; assisted researchers with integrated pest management trials; developed educational materials around drought-tolerant landscapes; written manuals on school gardens certification and starting community gardens; and many more.

**IMPACTS**

To ensure that tangible impacts can be measured, project managers are required to develop evaluation criteria with their externs at the beginning of their projects. Evaluations of outputs and impacts are employed for each project, such as workshops conducted; number of adults and youth reached; number of volunteers supervised by externs; materials (videos, manuals) produced; number of gallons of water saved; structures constructed such as hoop houses; vegetables harvested, etc.

Since 2011, the program has hosted 69 externs, with a few returning for more than one summer. After the first year, the program’s impact on the students themselves was evaluated through exit interviews with the externs and their Extension supervisors. An evaluation of these interviews yielded three broad categories of impact:

1. Personal impact on the student (e.g., increased self-reliance, critical thinking, leadership);
2. Extension and community impact (e.g., building community capacity; strengthening Extension ties to communities); and
3. Sustainability impact (e.g., increased awareness of sustainability issues; evidence of new behaviors).

One extern summed up his experience as follows: “My community has given me a lot of tools to succeed in life and this was an opportunity to give a small piece back that will hopefully continue to get the community involved in sustainability.”

These brief results illustrate the value of an externship program as a means of integrating Extension’s strategic goals, with the development of sustainability practices in rural communities, the expansion of Extension capacity, and the development of leadership skills to promote sustainable community capacity (Apel et al., 2013).

In their 2013 article, “The Accidental Sustainability Agent,” the authors noted that even though the concept of ‘sustainability’ may seem vague to some it is easier to translate its meaning through common principles, such as conserving natural resources, recycling, growing food, or promoting healthier diets and nutrition to reduce health care costs. “Extension gives people the knowledge to connect the dots between their day-to-day choices and the consequences related to climate variability and dwindling resources – both economic and natural” (Apel, Jones, and McDonald, 2013).

The enthusiasm, skills, and education of each of the student externs contributes not only to the success of each of the projects they are assigned, but also to the longer-term relationship that the University and Extension have with each of these communities. The University’s Green Fund Committee, comprised.
of undergraduate students, is keenly interested in education, research, and outreach initiatives that directly relate to the environmental sustainability of the University of Arizona. The experiences and knowledge gained by students that participate in the externship program will most certainly have an impact on the University through their continued interest and pursuit of sustainability-related curricula and activities on campus. This program provides a two-way exchange of sustainability activities between the University and the communities it serves.

Lastly, the program actively recruits students who are from the communities where the projects are to be implemented. As mentioned earlier, this helps to defray the costs associated with housing as well as utilize a student already familiar with their own community. More importantly, however, local recruitment has the potential to teach students the importance of working with their own community, i.e. thinking globally, but acting locally. Since many of Arizona’s rural communities are suffering economically from the loss of their educated population (brain drain), the externship program may incentivize students to return and contribute to their home communities after graduating from the University of Arizona.

CONCLUSIONS
With just a small amount of financial support and the dedication of Extension personnel to sustainability goals, Externships in Community Sustainability Program methods can be applied in most parts of the country. Many rural communities are suffering economically from the loss of their educated population, through ‘brain-drain.’ Programs like Externships in Community Sustainability can provide students with incentives to contribute to their communities after graduating. At the same time, Extension increases its capacity to deliver and implement sustainability projects and reinforce its relationship with the communities in which they work. Lastly, the program provides a hands-on approach for students to enrich their knowledge and communication skills around the complex issue of sustainability that will only benefit them in the pursuit of their respective careers after college. ※

PICTURED: UA Extern and White Mountain Apache Tribal Member Cameron Smith in a school garden that he assisted with in Cibecue, Arizona/M. Apel.
As the Extension arm of a poplar-based biofuels research project, our task seemed clear – connect with landowners interested in growing poplar for biofuels. Changing circumstances and new information caused us to adapt and expand our role. Currently, we are engaging with stakeholders interested in poplar’s various ecosystem services, increasing general bioenergy awareness, and reaching Latino audiences.

With the potential to stimulate rural development, reduce greenhouse gas emissions, and decrease importation of foreign oil, bioenergy is projected to continue to be an important research and policy arena, and therefore an important topic for Extension. When it comes to generating biomass in the West, trees are a particularly abundant natural resource. Therefore, it should come as no surprise that trees are being investigated as a source of biomass for biofuels. However, where the woody material could come from may surprise you. Promising options include forestry residues, beetle-killed trees, and poplar trees grown as an agricultural crop.
The USDA National Institute of Food and Agriculture (NIFA) funded three multi-institutional consortiums (a.k.a Coordinated Agricultural Projects, or CAPs) in the western United States with the intent to enhance rural prosperity and national energy security through sustainable biofuels made from dedicated, regionally-appropriate, non-food bioenergy crops. The Northwest Advanced Renewables Alliance (nararenewables.org) researched the industry potential of converting forestry residues into jet fuel. They demonstrated the feasibility by powering a flight from Seattle, Washington, to Washington, D.C., in fall of 2016 (Alaska Airlines, 2016). The Bioenergy Alliance Network of the Rockies (banr.nrel.colostate.edu) is investigating the use of beetle-killed trees for fuel. Advanced Hardwood Biofuels Northwest (hardwoodbiofuels.org), the primary subject of this article, is exploring a poplar-based biofuel and chemical industry in Washington, Oregon, Idaho, and northern California.

POPLAR FOR BIOFUELS AND CHEMICALS
Advanced Hardwood Biofuels Northwest (AHB) envisions a regional system in which hybrid poplar trees are grown as perennial agricultural crops, chipped on three-year coppice rotations, and sent to biorefineries to make gasoline, diesel, and jet fuel, as well as high-value chemicals (Figure 1). This system would generate jobs, support agriculture, reduce greenhouse gas emissions, foster local environmental benefits, and produce drop-in biofuels fully compatible with current engines and fuel infrastructure. The project is led by the University of Washington and includes industry (GreenWood Resources and ZeaChem) and academic (Oregon State University, Walla Walla Community College, UC-Davis, and University of Idaho) partners, with Washington State University providing Extension services (hereafter AHB Extension).

BUILDING EXTENSION
AHB Extension is providing a model for how Extension professionals can facilitate interdisciplinary, applied research programs and be creative about expanding their audience base. We use typical outreach methods, like fact sheets, webinars, workshops, and field tours to teach about poplar biofuels. But we also utilize creative programming to reach beyond poplar biofuels and beyond traditional audiences. For example: playing a game about the carbon cycle with Latino families; making biodiesel with high school students in a “zombie apocalypse” scenario; and bringing wastewater, aviation, and forestry professionals together for a summit.

INCORPORATING ENVIRONMENTAL APPLICATIONS OF POPLAR
A large-scale poplar-based biofuels industry is unrealistic at this time, as biofuel production costs cannot compete with low fossil fuel prices. This is partly the result of a sudden increase in domestic petroleum and natural gas production in recent years. Given that a biofuels market for poplar is unlikely in the near-term, other incentives will be necessary for poplar to represent an opportunity for growers.

In addition to generating biomass for bioenergy, poplar plantings are a tool for a variety of environmental applications (Isebrands et al., 2014). Extension started developing relationships with wastewater treatment experts and other environmental professionals who use poplars for ecosystem services, like processing re-use water and restoring contaminated sites. Through these connections, Extension helped AHB move forward...
by pursuing creative win-win strategies based on combining poplar's multiple ecosystem services.

**INCREASING ENERGY LITERACY**
Understanding bioenergy’s potential value requires energy literacy – awareness of how we use energy in our lives, where energy comes from, and the impacts of our energy decisions. The opportunity to make bioenergy more accessible for the general public and Extension educators, combined with a lack of immediate market potential for poplar biofuels, drove us to develop broader bioenergy outreach materials and design an Extension-led training course for energy literacy volunteers.

In collaboration with WSU Snohomish County Extension, AHB Extension ran two energy literacy outreach programs: Energy Stewards and Promotores de Energía (Energy Ambassadors). The Energy Stewards program was made up of volunteers interested in outreach about energy in the context of sustainable living. The Promotores de Energía program served Latino audiences and was conducted in Spanish. Using the train-the-trainer model, sixteen volunteers were taught basic energy concepts, alternative energy topics, and energy conservation tips that they in turn shared with their communities. The volunteers and their families also visited an AHB poplar farm to learn more about how poplars can be used for biofuels.

**ENGAGING LATINO AUDIENCES**
Latino stakeholders are often missed by Extension programming because of language, cultural, and other barriers (Herndon et al., 2013). The success of the Promotores de Energía program prompted AHB to expand its Latino outreach efforts. With the aid of a Latino engagement specialist, AHB has:

1. Interviewed the Promotores to learn from their experiences;
2. Held family-friendly field tours in Spanish at an AHB poplar farm;
3. Discussed AHB and energy topics in Spanish at community events; and
4. Designed a section of the AHB website specifically for Spanish-speakers.

Perhaps the most innovative Latino engagement project is conducting group interviews with Latino agricultural workers who have worked on poplar farms. These interviews are being used to assess the knowledge and informational needs of these workers. For instance, workers shared that they often don’t know why the trees are being planted, but they appreciate working on the poplar farms, enjoying the shade, clean air, and relative lack of chemical inputs. Many workers were eager to learn more about the trees and bioenergy. In addition, AHB Extension is learning how poplar farms are managed from a different perspective, adding to information gathered directly from industry partners.

**COLLABORATING WITHIN-PROJECT**
Driven by a need to understand and communicate about all aspects of the project, AHB Extension found itself central to the AHB network. With a practical, service-oriented perspective and an ability to present various research topics (from growing the trees to conversion technology) in straightforward language, we were able to build relationships across the project, sustain lines of communication, and
maintain a real-world focus that extended beyond academia.

**CONCLUSIONS AND RECOMMENDATIONS**

So far, AHB Extension has investigated stakeholder knowledge and values, reached hundreds of community members and students, developed an extensive collection of outreach materials, hosted field tours, national conferences and workshops, and trained volunteers and interns.

Going forward, the focus is on ensuring that AHB makes decision-relevant, integrated information available into the future, and maintains important networks so that the Pacific Northwest is prepared for a poplar biofuels industry, when the opportunity arises.

AHB recommends that the larger Extension network consider how bioenergy might be a useful topic within their communities. Bioenergy touches everyone, whether they’re fuel consumers, growers looking for options to diversify, environmental stewards interested in energy alternatives, or students curious about job opportunities in science or facility operations. Bioenergy links diverse subjects like biology, chemistry, policy, and natural resources. As a complex and sometimes politicized topic, objective bioenergy information is hard to come by, and Extension can meet that need. Extension can use bioenergy as tool for:

1. STEM education;
2. Connecting with a variety of stakeholders; and
3. Raising awareness about how energy impacts our lives and the environment.

We also recommend that researchers and government agencies consider how Extension could aid interdisciplinary research and development projects. Extension’s service-oriented, science-driven mandate makes Extension approachable to researchers, industry professionals, policy makers, and community members alike. Visiting with project members, conducting frequent phone calls, and working together on outreach materials from scientific research are three examples of how Extension can help facilitate these projects. Extension’s effectiveness in networking can also increase the adaptability of ambitious, complicated projects to changing circumstances. AHB Extension and other regional bioenergy Extension programs have demonstrated that Extension can provide valuable internal communication and maintain practical, stakeholder-driven goals.

For more information, visit hardwoodbiofuels.org.

“The opportunity to make bioenergy more accessible for the general public and Extension educators, combined with a lack of immediate market potential for poplar biofuels, drove us to develop broader bioenergy outreach materials and design an Extension-led training course for energy literacy volunteers.”

PICTURED: Latino families learn about carbon cycling, fossil fuels, and biofuels by playing a game during a Spanish-speaking field day at an AHB poplar farm/AHB Extension.
The connection between an individual’s health and the place in which they live, work, and play is deeply rooted in how communities are built and the historical and current socio-economic conditions and policies influencing their daily lives. Environmental factors, such as ability to walk to work or school, or the ability to access culturally appropriate fresh food, can over time contribute to a lack of physical activity and poor nutrition. Eventually, these behaviors can lead to obesity and high blood pressure that can further lead to chronic diseases, such as heart disease and stroke. With increased geographic isolation and a disconnection to services and transportation options, rural residents are at risk for negative health outcomes and health disparities (Downey, 2013).
“Weaving together an approach to address community health and equity was the driving force to develop an initiative called Kitsap Strong, serving a population of 260,000 in Kitsap County, Washington.”

The National Institutes of Health (2002) includes rural Americans as a population group with high health disparities, represented as higher prevalence of obesity, diabetes, heart disease, cancer, physical inactivity, and poor diets. Efforts to address these disparities are “typically focused on the health care system and access-to-care barriers among individuals. Little attention has been directed to rural public health, which includes population-based, preventive approaches to improving the physical, mental, and social well-being of rural residents” (Downey, 2013).

Weaving together an approach to address community health and equity was the driving force to develop an initiative called Kitsap Strong, serving a population of 260,000 in Kitsap County, Washington. Made up of over 40 organizations and agencies organized into five networks and four committees, Kitsap Strong was developed through a “collective impact” process to address the interconnected public health and social challenges impacting Kitsap County residents (Kania et al., 2017). Many of the agencies that had been partnering since the early 2000s to address some of these challenges recognized the opportunity to create a network of partners working to improve health outcomes through the application of the NEAR sciences.

The integration of neuroscience, epigenetics, adverse childhood experiences, and resiliency into what is known as the “NEAR sciences” bundle, represents cutting-edge research and a framework for developing innovative approaches to address social, educational, and equity issues within any community. In order to understand what the Kitsap Strong initiative is trying to do, it’s important to understand the science it is built upon.

**Neuroscience** is a quickly developing field, and recent research in neurosciences has revealed hidden truths about the nature of the brain and what humans need to thrive (Languis et al., 2012). For example, neuroscience has increased the understanding of how humans respond to immediate threats and prolonged stress through the release and use of cortisol in the stress-response system (Nestler et al., 2008). While prolonged exposure to stress can be “toxic,” social relationships help to moderate the stress response and calm the nervous system (Coan et al., 2006). Trusting relationships serve to reduce stress and create a brain that is ready and able to learn and grow (Zak, 2017). Healthy activities like exercise and mindfulness can help reduce toxic stress hormones (Hoffman-Goetz et al., 1994). Diet and nutrition also play an important role in cognition (Bellisle, 2004), and specific nutrients like omega-3 fats contribute to healthy brain development in children and adults (Innis, 2008). Community factors like poverty, educational attainment, job availability, and social connectedness all have an effect on the amount of “toxic stress” impacting parents and their children, influencing brain development and health, educational, and career outcomes across the lifespan.

**Epigenetics** has received much attention since the breakthrough mapping of the human genome (Allis et al., 2015) because it has disrupted the “nature vs. nurture” debate, providing scientific evidence that social contexts can actually impact gene expression. For example, in laboratories, mother rats who lick their young help to release a gene for social interaction and caring, which is expressed when their offspring go on to care for their own young (Champagne, 2008). Similarly, holocaust survivors passed memories of their experiences on to their children through epigenetic markers (Yehuda et al.,
2016), influencing the physical health outcomes of future generations. Diet and exercise may also impact how genes are expressed; for example, a multi-generational study in Sweden showed that, for women who experienced famine during their adolescence, their paternal grandchildren (sons or daughters) had higher risk of cardio-vascular disease (Bygren et al., 2014). Epigenetics shows that the effects of “historical trauma” are not confined to ancient history, and some catastrophic events like slavery, colonization, or the Great Depression continue to influence the lifelong health outcomes for future generations.

**Adverse Childhood Experiences.** or ACEs, are early experiences in the lives of children and youth, that are linked to life-long vulnerability to chronic disease, negative social outcomes, and even early death (Felitti et al., 1998). The original ACEs study examined over 17,000 adult Americans and uncovered ten disruptive childhood experiences including abuse and neglect, parental substance abuse, mental illness, and divorce. Almost two thirds of the study respondents experienced at least one of these ACEs. As the number of ACEs increased in respondents, so too did the likelihood of long-term negative social and health outcomes like decreased educational attainment, increased poverty, cardiovascular disease, liver disease, mental health disorders, substance abuse, incarceration, and death. The annual Behavioral Risk Factor Surveillance System surveys have found similar trends in a nationally representative sample of over 53,000 Americans between 2009 and 2014 (Centers for Disease Control and Prevention, 2017). Researchers are now suggesting “many adult diseases should be viewed as developmental disorders that begin early in life and that persistent health disparities associated with poverty, discrimination, or maltreatment could be reduced by the alleviation of toxic stress in childhood” (Shonkoff, J. et al., 2012).

**Resilience** is a growing body of research studying how processes in the lives of individuals help them to recover from difficult events or stressful situations (Masten, 2015). Resilience is developed both through an individual’s internal psychological capacities like grit or stick-to-it-ness (Duckworth et al., 2007) and through external social relationships and networks that can provide material and emotional support (Armstrong et al., 2005). The study of resilience also translates to systems, including community and ecological resilience after natural and human-made disasters like war or hurricanes (Adger, 2000). Supporting resilient individuals and systems can lead to a thriving community.

Knowing that every community has risks from violence, drugs, hatred, and environmental contamination, every community also has the strength and capacity to support individuals and families, considered the building blocks of community resilience. Kitsap Strong has found a way to contribute to building of resilience through the work of five networks and four committees providing support and infrastructure to all activities.

**FIVE NETWORKS OF KITSAP STRONG**

1. Graduate Kitsap and Mason: A multi-county project to reduce educational inequalities and improve access to and completion of post-secondary education and career success. Emphasis is to ensure all students in the community obtain the education necessary to obtain a living wage.

2. NEAR Training and Education: A network providing training and education on the NEAR sciences in schools, social service agencies, and faith-based and community groups.

3. Trauma Informed Community: A project to translate NEAR sciences for daily use in clinical and community settings in order to create community services, programs, and policies which are more responsive to trauma.

4. HEAL (Healthy Eating Active Living): A coalition developing policy tools and strategies to increase access to healthy food and physical activity opportunities.

5. Thriving Neighborhoods: A grass-roots initiative focused on helping neighbors form strong connections and intervene to offer help when children or elders are in danger or need.
“Developing a resilient and thriving community ecosystem is critical to addressing the lifelong effects of adversity for those who have experienced high levels of toxic stress in childhood and adulthood.”

FOUR COMMITTEES SUPPORT EACH NETWORK

1. Leadership: Responsible for guiding collective efforts, developing a common agenda, shared goals, and ensuring that networks and committees are resourced and supported.

2. Funding: Organizations that are financially contributing to the initiative provides support and actively seeks out additional funding.

3. Data: Group of experts analyzing ACEs data in the community.

4. Policy: Group of leaders collaborating with Washington Nonprofits to inform state and local policy.

The NEAR sciences bundle encourages a shift in perspective and practice, forcing local agencies and organizations to reconsider policies, systems, and practices that place shame, blame, and fault on adults for a childhood that they “never asked for” and that was compounded by the community’s particular response to their survival behaviors.

Developing a resilient and thriving community ecosystem is critical to addressing the lifelong effects of adversity for those who have experienced high levels of toxic stress in childhood and adulthood. Agencies and organizations within this initiative realize that ACEs and other sources of “toxic stress” disproportionately affect impoverished and minority individuals, so a focus on equity in social services and education is central to the work.

Kitsap County leaders and funders are recognizing this science and the interconnectedness of the social challenges facing families in the community and are working with Kitsap Strong to support this initiative. Diverse agencies and organizations are coming together to explore possibilities, recognize shared challenges, create shared measurement, and emphasize prevention and systemic approaches toward collective goals to increase the health and well-being for all residents. ✡
The morning of January 20, 2017, in Cimarron, New Mexico, was a cold one. The temperature dipped to a chilly 26 degrees, and even though it was cold outside it was nice, warm, and cozy in Rosemary Goodman’s home – just the way she likes it.

At 70 years old, Ms. Goodman will tell you she’s lived a full life, complete with ups and downs. She owned a home in California. Then years ago, she suffered a brain injury after being exposed to carbon monoxide poisoning. Although she had a high functioning brain injury she is classified as disabled. Eventually, she moved to Taos, New Mexico, where she opened an art business. Her life was changed once again in a major way when the business failed and she became homeless. She struggled and eventually ended up living in substandard housing that at times didn’t have good heating or no heating at all.
“This community is a place when someone is in need everyone helps them and I want to keep that tradition going by helping anyone looking to buy a home. I know what it’s like to be poor, homeless, disabled, and hungry. But I also know how to overcome these obstacles and attain the ‘American Dream of Homeownership’ with the help of the federal government and others.” -- Homeowner, Rosemary Goodman

But through it all, she never gave up and remained determined that her dream to once again become a homeowner would one day become a reality. She’ll tell you she stayed focused and never lost faith. She says, “I was in need of a home and the government responded.”

Ms. Goodman is talking about USDA Rural Development and how the agency helped her buy a house. She found out about Rural Development’s housing program through brochures that were left at a Taos community center after a housing fair that was held at the facility.

Soon she met with Emily Gonzales from Rural Development’s Las Vegas, New Mexico, office. During this meeting, Ms. Goodman was encouraged to apply for a 502 Direct Home loan administered by Rural Development’s housing program. After working on some credit issues, Ms. Goodman was eventually approved for a USDA Rural Development 502 Direct Home Loan to buy a house she found in Cimarron, New Mexico.

After making an offer and completing the paperwork, she moved into her four-bedroom, two-bath house on October 5, 2015. Her dream to once again own a home became a reality.

But, as it turned out her dream home had issues. Right after moving in she smelled that familiar foul odor of natural gas. Something was wrong with her heating system! She had to do something quickly because she knew she was in danger. Finding a contractor was proving to be challenging and getting the money to fix the problem was another major issue. “What to do? What to do?” She thought.

Once again, she called Emily Gonzales and found out she was eligible to apply for a 504 Rehabilitation Grant for her home. This is another housing program offered by USDA Rural Development’s Rural Housing Service (RHS). This program can provide qualified senior citizens 62-years old or older a once in a lifetime $7,500 grant to rehabilitate their house, including the replacement of a heating system. After qualifying for the program, Ms. Goodman hired a local contractor and he installed two new gas heaters and a wood burning heater in her home.

“I never want to be without heat ever again, and that’s why I had the wood burning stove installed,” said Goodman. Also, at the same time she found out she qualified for financial support through her HMO and her contractor was able to upgrade one of her bathrooms with those funds.

Ms. Goodman says, now that the issues with the heaters and the gas lines in her home are fixed she can concentrate on living her life without any worries in her new home along with her two dogs Bella and Tiny Dancer.

And, of course Rosemary says the peace and solitude of her home allows her to focus on her art work which is her first love. She says her creativity is therapeutic and will ultimately help her become a more active member of her community especially with other artisans living in Cimarron.

“I plan on hanging some of my art work in the local galleries,” said Goodman as she proudly showed some of her art work hanging in her living room walls. She added, “My home is so peaceful it allows me to concentrate on my writing. Currently, I’m working on three different books.”
Goodman added being a homeowner in Cimarron makes her very happy, “This is a great place to live because the residents of this community have welcomed me.” She added, “This community is a place when someone is in need everyone helps them and I want to keep that tradition going by helping anyone looking to buy a home. I know what it’s like to be poor, homeless, disabled, and hungry. But I also know how to overcome these obstacles and attain the ‘American Dream of Homeownership’ with the help of the federal government and others.”

When hearing about Rosemary Goodman’s determination to become a homeowner and how USDA Rural Development helped her to realize her dream of homeownership, Acting State Director Eric Vigil commented, “I can tell you helping citizens like Rosemary Goodman is why all of us at Rural Development work here. It’s satisfying to make dreams come true for someone by providing the financial support that they may not be able to get from another lender.”

Ms. Goodman agrees, now that she’s happily living in her own home with a reliable heating system, a remodeled bathroom, and a large backyard for her dogs to roam, she’ll proudly tell you, “This is a charming and attractive home, in fact as far as I’m concerned I have one of the nicest homes in Cimarron.” Then she adds, “And, I’m very happy with everything and how it all turned out. Thank you.”

PICTURED: Rosemary Goodman (right) looks out the window of one of her bedrooms with USDA RD housing technician Emily Gonzales/E. Watson.
USDA RURAL DEVELOPMENT HOUSING PROGRAM FACTS

502 Direct Home Loan Program
Assists low- and very-low-income families purchase a home in the rural areas of the country by providing payment assistance to increase an applicant's repayment ability. Payment assistance is a type of subsidy that reduces the mortgage payment for a short time. The amount of assistance is determined by the adjusted family income. Borrowers are required to repay all or a portion of the payment subsidy received over the life of the loan when the title to the property transfers or the borrower is no longer living in the dwelling.

At a minimum, applicants must have an adjusted income that is at or below the applicable low-income limit for the area where they wish to buy a house and they must demonstrate a willingness and ability to repay debt.

Loan funds may be used to help low-income individuals or households purchase homes in rural areas. Funds can be used to build, repair, renovate, or relocate a home, or to purchase and prepare sites, including providing water and sewage facilities.

Properties financed with direct loan funds must:
- Generally be 2,000 square feet or less
- Not have market value in excess of the applicable area loan limit
- Not have in-ground swimming pools
- Not be designed for income producing activities

504 Single Family Housing Repair Loans and Grants
This program provides loans to very-low-income homeowners to repair, improve or modernize their homes. A once-in-a-lifetime grant in the amount of $7,000 can be made to elderly, very-low-income homeowners to remove health and safety hazards.

To qualify for this program you must:
- Be the homeowner and occupy the house
- Be unable to obtain affordable credit elsewhere
- Have a family income below 50% of the area median income
- To qualify for a once-in-a-lifetime $7,500 grant, you must be 62 or older and not be able to repay a repair loan

How may funds be used?
- Loans may be used to repair, improve or modernize homes, or remove health and safety hazards.
- Grants must be used to remove health and safety hazards

For more information go to the USDA Rural Development’s website at https://www.rd.usda.gov. In New Mexico call 505-761-4950 for more information on both housing programs.
BACKGROUND
How important is sustainability outreach to Extension educators in the West? How supportive are state Extension leaders in sustainability education? In January 2017, the National Network for Sustainable Living Education (NNSLE), an initiative of the Association of Natural Resource Extension Professionals (ANREP), administered a national survey seeking answers to these and related questions. Extension directors in every state along with four national Extension associations received a request to send all Extension educators a pre-notice, first survey link, second survey link, and thank you/final contact, following Dillman’s Tailored Design Method (2007) for online surveys. Over 1,600 responses were received on the national level, with 1,395 usable responses. When asked to list the top five emerging sustainability issues for their state’s respective Extension programs to address, water quality, climate change impacts, and water quantity were ranked highest nationally. This article will take the reader through the results and analysis of the survey for the Western region and show the broad spectrum of responses, and compare them to the rest of the nation.

INTRODUCTION
Sustainability education and outreach have been a hallmark of the National Network for Sustainable Living Education (NNSLE) and its Extension-based members since its inception in 2004. At the beginning, many members were the only Extension professionals in their state working in sustainability programs; but since then, many states have developed excellent programs that focus on multiple aspects of sustainability, as well as climate science and climate change. NNSLE wanted to gauge the importance of, support for, and emerging issues in sustainability outreach to Extension educators throughout the nation. To understand the extent of and support for these programs, NNSLE administered a national survey seeking answers to these types of questions in January of 2017.

METHODOLOGY
The Sustainability Outreach in Extension: National Survey was developed with input from colleagues attending the 2016 National Extension Sustainability Summit in Portland, Oregon, the Community Development Extension Institute in Jackson Hole, Wyoming, and the National Association of Community Development Extension Professionals conference in Burlington, Vermont. The survey was sent to Extension directors in every state, and also the chairs of the Association of Natural Resources Extension Professionals, National Extension Association of Family and Consumer Sciences, National Association of County Agricultural Agents, and the National Network for Sustainable Living Education. All contacts were made during the month of January, 2017. To ensure that Extension colleagues were all working from the same understanding of sustainability and its attendant principles, the survey included this preface:

“For the purpose of this survey, sustainability is defined in accordance with the National Network for Sustainable Living Education (NNSLE): ‘an ethic of stewardship in which
our desire for fulfilling and productive lives is thoughtfully and consciously balanced with the social, economic, and environmental security of life on Earth, now and for future generations.’

Sustainability may have subtle differences in meaning to different people, but it boils down to some very basic concepts:

- Activities or practices in any given discipline are undertaken with the objective of continuing that activity indefinitely in a way that doesn’t deplete the resource(s) the activity depends upon.
- Sustainability takes into equal account the social, environmental, and economic consequences of every practice, so that a positive, win-win-win result is most closely approximated.
- Nearly every activity or practice, regardless of how small, is related in some degree to a larger issue – such as ground-water depletion or the loss of agricultural lands.”

Of the 1,693 responses received, 1,395 agreed to participate and completed at least 75% of the survey. Almost all respondents were either county/regional educators, state specialists, county directors, or regional specialists. A complete report on the national results including the survey questions asked can be found at https://issuu.com/usuextension/docs/national_needs_complete_report. Of the national respondents who identified their state, 21.12% (n = 252) were from the Western region. This includes Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

RESULTS – WEST VS. NATION
While the questions in the survey and responses attempted to capture as much information on sustainability outreach in Extension as possible, this article will focus on a few key lines of inquiry.

What Are We Doing Well?
When asked what topic areas their state Cooperative Extension system is currently doing a good job at addressing, while taking into account dedicated staff time, programs, curriculum development, fact sheets, etc., Western states have much in common with the national results. Seven topics were in the top 10 of both the West and nation as a whole. Those included: Nutrition Education, Water Quality, Soil Health, Local Food Systems, Environmental Education, Increasing Youth's Interaction with Nature, and Consumer Education. The top three selected topics were the same for both the West and the nation (Nutrition Education, Water Quality, Soil Health). Nutrition Education was the top selected topic and received almost an identical overall percentage (74.73%, n = 890 and 74%, n = 185 respectively). Three topic areas were different; Western results included Grasslands Stewardship and Management (fourth-most selected), Urban Agriculture (eighth-most selected), and Forest Stewardship and Management (ninth-most selected) whereas, national results contained Health Education (seventh-most selected), Food Access (ninth-most selected), and Economic Development (tenth-most selected).

What Are the Emerging Issues that Should be Addressed?
In listing the top five emerging sustainability issues for their state’s respective Extension programs to address, the Western and national results contained four of the same top five topics: Water Quality, Climate Change Impacts, Environmental Education, and Economic Development. The top emerging sustainability issue in the national results was Water Quality (38.70%, n = 442) which was number three for Western states (28.81%, n = 70). The top emerging issue in the Western results was Water Quantity (38.68%, n = 94) which was not in the top five of the national results. The national results included Nutrition Education at number five (24.17%, n = 276).

What Are the Biggest Challenges to Educating About Sustainability in Extension?
Given a pre-set list of possible challenges facing Extension educators throughout the country regarding the topic of sustainability, respondents from the West and the nation ranked the challenges virtually identically. The top five challenges Extension educators felt they faced around the topic of sustainability were:

1. Communication - this included maintaining a clientele base while talking about politically charged issues, how to tie in sustainability with
various clientele values, etc.;
2. Lack of community interest/competing priorities;
3. Community collaboration - this included having time to engage and find what is important to communities, a two-way feedback loop between an Extension office and the community;
4. Lack of staff professional development;
5. Overcoming institutional barriers - this includes needing upper administrative support and the need to expand Extension's traditional role.

Is It Important to Educate Clientele About Sustainability?
Respondents were then asked, “Why do you think it is or isn’t important to educate your clientele about sustainability?” There was a wide variety of open-ended responses provided by Extension educators from around the West largely supporting the idea of sustainability education. The 194 open-ended responses were coded via Python and four major themes were identified. These included:

1. Sustainability in terms of using resources.
   • “Resources are increasingly becoming limited and negative externalities are increasingly far-reaching.”
   • “We do not have an unlimited supply of resources so sustainability is important for reducing waste and preserving the resources we have while meeting our needs.”
   • “We are running out of resources.”
2. Sustainability for the future.
   • “Because we need to be sustainable so we have enough resources in the future.”
   • “It is important because resources are limited and we must make a conscious and concerted effort to approach sustainability to the extent possible for the future generations to come.”
   • “It is important for the environment and future generations.”
3. Sustainability to help clientele.
   • “I feel that educating clientele about sustainability supports them in their pursuit of a high quality of life, and protects us all.”
4. Sustainability for economical and profitability purposes.
   • “Resource conservation and economic sustainability are critical to the success of farms and ranches in the West.”
   • “In agricultural enterprises, sustainability is intertwined with future economic viability.”
   • “I think it is important but that being said, I work with farmers and I stress the economics as the highest priority of sustainability. If your farm isn’t profitable you are not sustainable.”

Only a select few opined that sustainability outreach was not a job for Extension. For example, one respondent stated, “I am assuming the definition of sustainability used in this survey is the trendy green living programs. Most of my clientele is not motivated by this type of programming therefore I do not present much of it.”

Sustainability was seen by many as connected to our programming and Extension foundation as a whole. “Because as land usage is converting primarily to urban expansion, sustainability is more essential. Whether it’s food production or energy, it’s an important aspect that needs to be the basis of educational programs.”

“It is important that principles and practices that lead to more sustainable and higher quality lifestyles be taught. This content has been the centerpiece of Extension education since Extension’s beginnings. However, it is important that the effort be specific issue focused so as not to become politicized and polarizing in our communities.”
Conclusions – Where Next?

Overall, educating the public on the concept of sustainability and its attendant principles as a discrete topic may be an elusive objective. However, as noted in the article, “The Accidental Sustainability Agent,” the principles of sustainability are already embedded in many of the education programs that Extension implements throughout the land grant university system (Apel et al., 2013). The results of the survey bear this out since Extension respondents both in the West and nationally indicated a wide range of programs and topics they felt they were currently addressing through their efforts—ranging from nutrition and health to consumer education. But, as could be expected, Extension programs in the West are also addressing grasslands stewardship (range management) as well as forest stewardship, since these are regionally-important natural resources to sustain.

When noting emerging issues that Extension should be addressing, respondents from the West chose water quantity over water quality. As climate change is impacting the West’s water supplies, it isn’t surprising that this issue would be one that Extension educators feel they should be addressing. In fact, the University of Arizona’s Water Resources Research Center (https://wrrc.arizona.edu/) is dedicated to providing research-based information to stakeholders throughout the state in the face of decreased snowmelt and declining groundwater and surface water supplies. They accomplish this through symposiums, supply and demand studies, community facilitation, watershed scenario planning, modeling, and a myriad of other activities around water resources.

Relatedly, Utah State University (USU) offers the Center for Water Efficient Landscaping with the mission, “To promote water conservation through environmentally, socially, and economically sound landscape management practices.” (https://cwel.usu.edu/) Also offered is the Utah Climate Center, which has collaborated with USU Extension to design and launch an Extension Climate Change Science Essentials online training, with an emphasis on projected droughts and water scarcity. (Details available at https://extension.learn.usu.edu/browse/climate-essentials/courses/climate.)

As Western Extension professionals, many of us are focused on a specific program or discipline, such as nutrition, range management, water conservation, or climate change. All of these programs embody the fundamental tenets of sustainability, i.e. consideration for the economic, social, and environmental impacts that may occur as a result of our efforts. But, regardless of our individual programs, in the end the common thread that binds all of us is the objective of improving the lives of the West’s communities through research-based information, including through the survey work presented here. In doing so, we are helping to build a more sustainable future for our clientele and their successors.*

Report Links

National Summary

National Results (Complete)
https://issuu.com/usuextension/docs/national_needs_complete_report

State-by-State Summaries
https://usu.box.com/s/7otqfjipod9mtfsrlc56soxx1ddaxe3o

National Network for Sustainable Living Education
http://www.anrep.org/people/initiatives/nnsle/
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“The opportunity to make bioenergy more accessible for the general public and Extension educators, combined with a lack of immediate market potential for poplar biofuels, drove us to develop broader bioenergy outreach materials and design an Extension-led training course for energy literacy volunteers.”


PICTURED: Latino families learn about carbon cycling, fossil fuels, and biofuels by playing a game during a Spanish-speaking field day at an AHB poplar farm/AHB Extension.
REFERENCES

SMALL-SCALE AGRICULTURE AND THE NEW NATURAL RESOURCE ECONOMY


EXTERNSHIPS IN COMMUNITY SUSTAINABILITY THROUGH COOPERATIVE EXTENSION


BUILDING EXTENSION THROUGH COLLABORATIVE BIOENERGY RESEARCH


RURAL RESILIENCE


WESTERN EXTENSION AND SUSTAINABILITY OUTREACH


RURAL CONNECTIONS - PAST ISSUES

CLICK ON AN ISSUE TO VIEW IT OR GO TO WRDC.USU.EDU/RURAL-CONNECTIONS

Spring 2017
Disaster Preparedness, Climate Change, Rural Healthcare, Rural Transportation, Uses for Beetle-Killed Timber, Farmworker Demographics

November 2013
Western Demographics, Immigration and Policy, Rural Lations Contributions, Latino Entrepreneurs, California Agriculture, Life in Hawaii

Fall 2016

June 2013

Spring 2016
Tribal Health & Food Sovereignty, Illicit Drug Abuse in Rural Areas, Preparing Youth for Today’s Economy, Irrigation Technology, Aging in Place

January 2013
Drought in the West, Drought Impacts Reporting, Ranching During Drought, Economics of Large Wildfires, EDEN Drought and Wildfire Work

Fall 2015
Economic Recovery in the West, Forest Communities, Disaster Preparedness, Climate Data, Sustainable Water Use

May 2012
Food Hubs, Farm to School in Colorado, Rural Nevada Food Hub, Alaska Foodsheds, Local Food Policy Council

June 2015
Rural Pathways to Prosperity, Samoan Food Security, Agriculture Water Conservation, Living with Fire, Renewable Energy

September 2011
New Natural Resource Economy, Value-Added Farm and Ranch Resources, Rural Transportation in Montana, Digital Economy in the Western U.S., Rural Telecomm

May 2014
Extension Sustainability Outreach, Land Use, Climate Risk, Water Resource, Food Systems

June 2011
Climate Science in Rural West, Climate Change Legislation, Rangeland Carbon Sequestration, Forest Landowners, Oregon Ag Systems Strategies, and more!
September 2010
Benefits of Nature, Mental Health Outdoors, Ecological Approach to the Study of Obesity, Poverty Reduction, Biodiversity and Human Health

May 2010
Future of Western Water Law, Western Households’ Water Values, Hydrological Impacts of Traditional Irrigation in NM, Wetlands for Wastewater Treatment, Water Policy

November 2009
Food Insecurity in the West, Farm Worker (in)Security, Healthy Foods and Rural Convenience Stores, Farm to School, Real Food Cookbook, Local Solutions to Food Production

April 2009
NACDEP Issue: eXtension, Workforce Housing, Economic Growth vs. Economic Development, Sustainability, Tourism, Rural Farmers’ Markets, Bioenergy

November 2008
Freeways to Fuels, Wind Energy Development in Colorado, California Woody Biomass, Ocean Wave Energy, Distributed Biodeisel