

The Public Value of Deep Winter Greenhouse Research and Extension



UNIVERSITY OF MINNESOTA | EXTENSION

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Presenting Issue

The University of Minnesota Extension [Regional Sustainable Development Partnerships](#) (RSDP) work on Deep Winter Greenhouses (DWGs) addresses the need for Minnesota small- and mid-scale farmers to:

- Maintain year-round production
- Find energy-efficient production methods that mitigate climate change

What is a DWG?

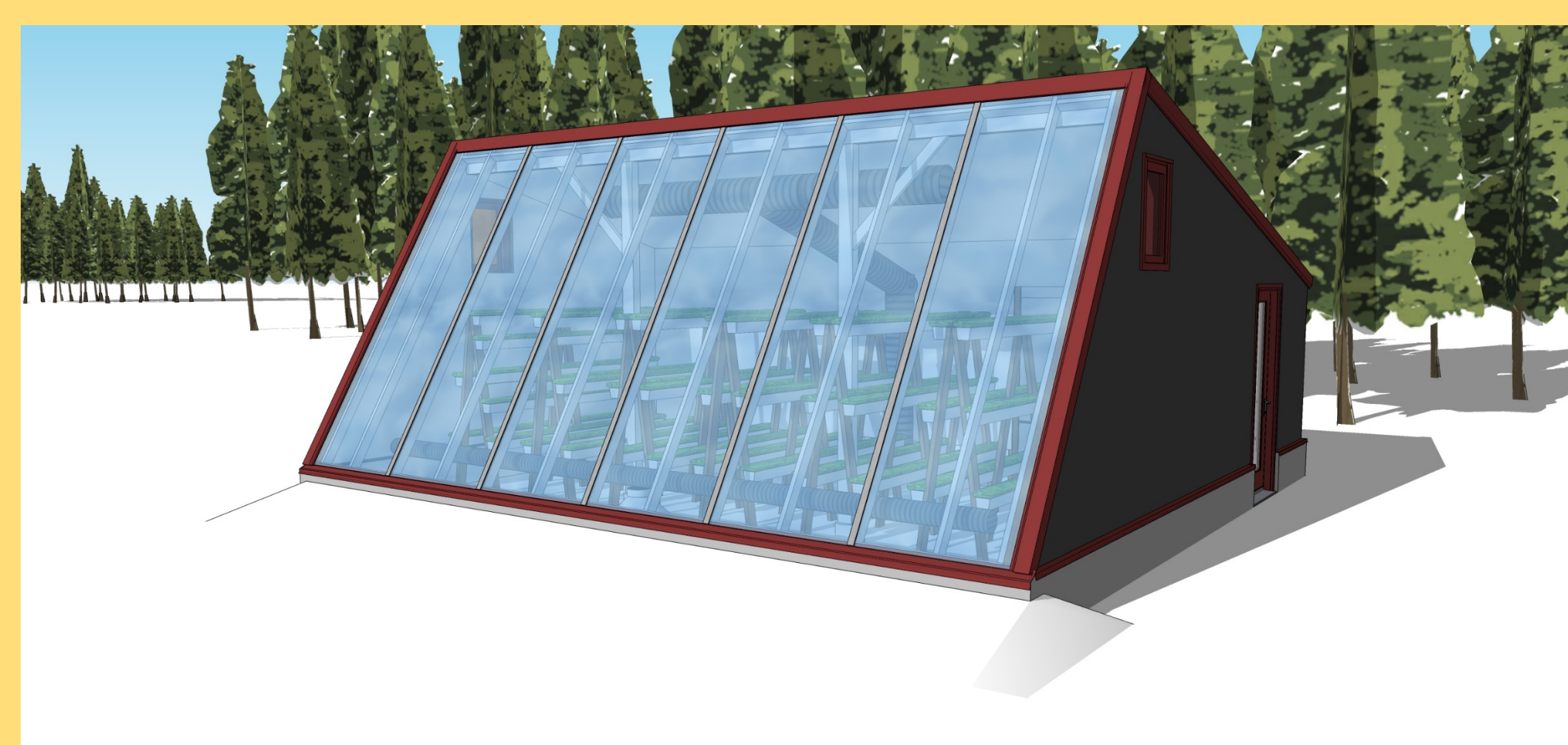


Photo by Carol Ford.

A DWG is a passive solar greenhouse designed to dramatically limit the fossil fuel required to grow crops in northern latitudes. DWGs store solar energy in a thermal mass (underground rock bed).

Extension's Programmatic Response

In 2016 RSDP launched a statewide campaign to build five DWGs based on a prototype design by the [Center for Sustainable Building Research](#) (CSBR). From 2016-19, research conducted on these DWGs will investigate how the technology can be maximized to support wider-spread adoption (behavior change).



Prototype DWG designed by Daniel Handeen, University of Minnesota College of Design Center for Sustainable Building Research.

The campaign builds on DWG research and outreach supported by RSDP since 2009, including:

- Trainings, workshops, and greenhouse open houses
- DWG [resource manual](#) and [web page](#)
- University research on design performance
- University research on [DWG costs and benefits](#)
- Greenhouse production trials (Poster [A](#), [B](#), and [C](#))
- DWG [producer case studies](#)
- Development of a [Deep Winter Producers Association](#)

The CSBR prototype builds on designs from Carol Ford and Chuck Waibel in their 2009 book [The Northland Winter Greenhouse Manual](#), published with support from RSDP.

Target Audience

The DWG campaign helps traditional small- and mid-scale farmers remain economically viable through an innovative way generate cash flow in the off-season.

In August-September 2016, a survey was conducted of participants in RSDP's DWG programming. Seventy of 180 eligible respondents (39%) completed the online survey.

Why Extension?

University of Minnesota Extension RSDP is uniquely positioned to connect University experts to community platforms to test and scale emerging DWG technology.

"Information provided by RSDP would not have been available to the public otherwise. People can now make the connections and get all the info needed to make winter production a reality." –Survey respondent

Behavior or Action Outcomes

Participants in RSDP's DWG outreach reported taking a variety of actions. 46% built or planned to build a DWG as a result of the programming (Fig. 1). Nearly all (93%) agreed that RSDP's DWG work positively impacted their knowledge, attitudes, or understanding of local food issues (Fig. 2).

Fig. 1. As a result of RSDP's research and outreach into DWGs, which of the following actions have you taken? (N=63)

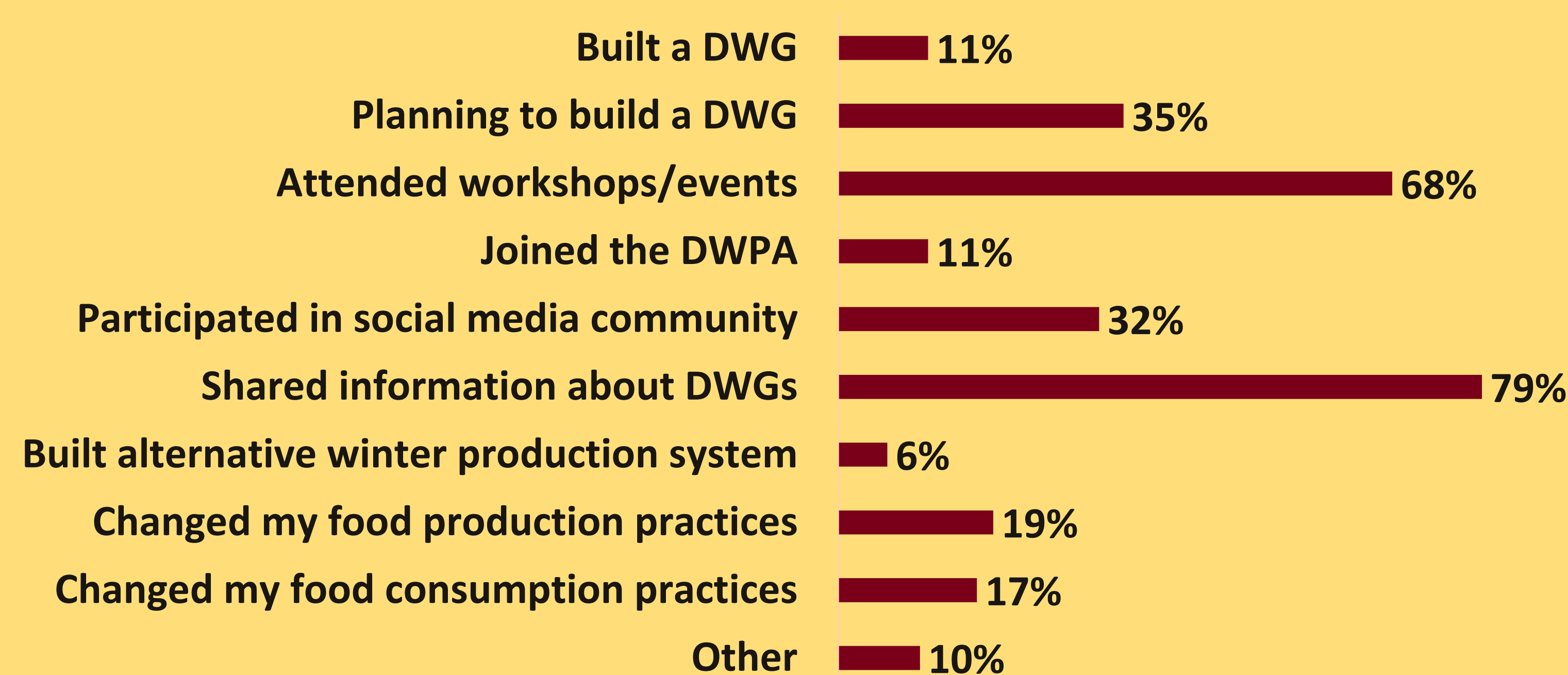
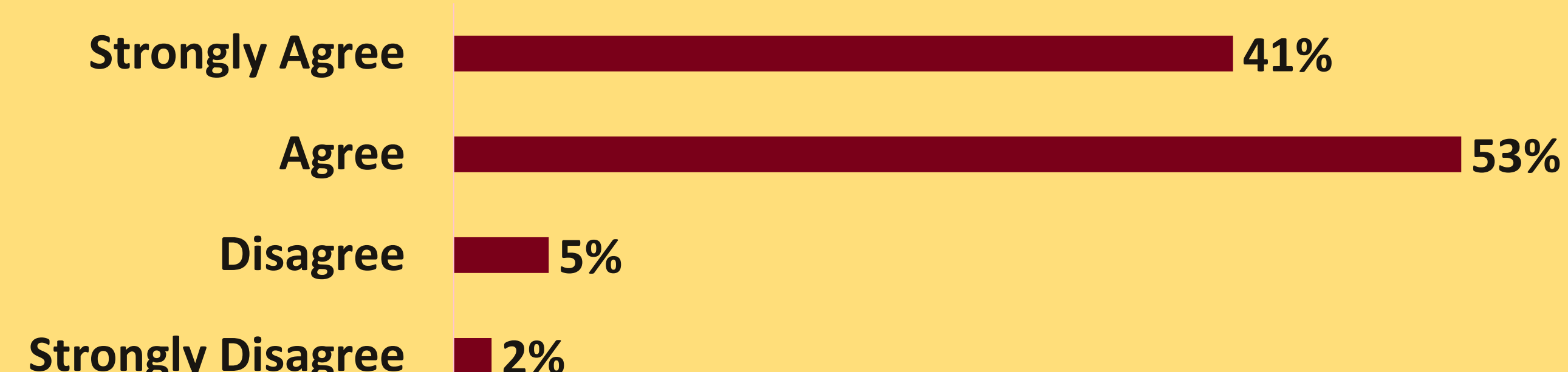


Fig. 2. To what extent do you agree that RSDP's work on DWGs has positively impacted your knowledge, attitudes, or understanding of local food issues? (N=59)



Survey Respondent Comments

"As a DWG producer who engaged in the program, I received direct assistance in production [trials] and energy audits where I learned about how to improve my DWG. I also learned about how my greenhouse financials compared to others."

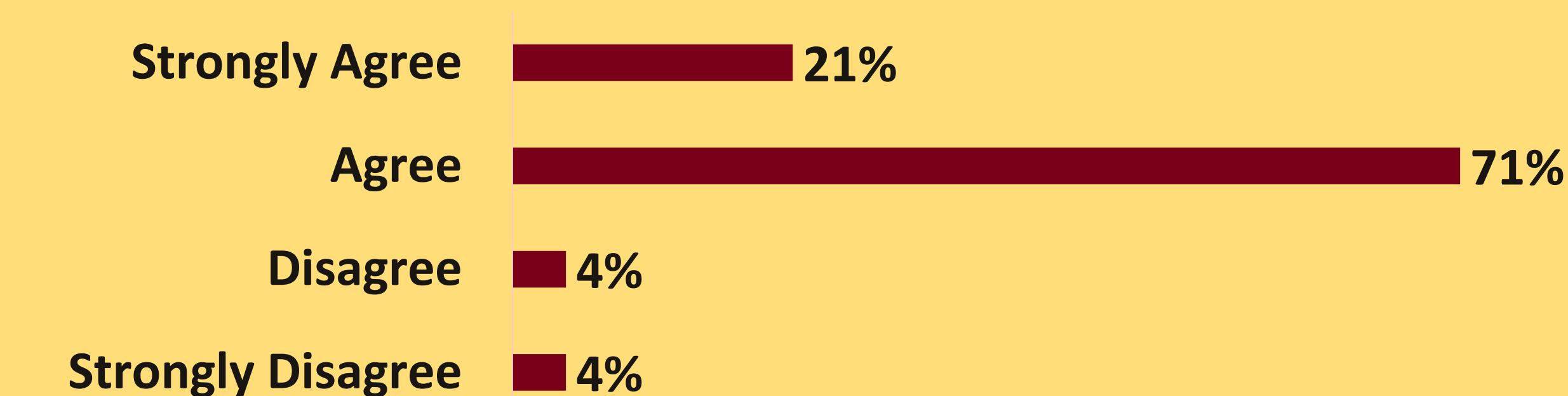
"I was completely unaware of this technology until connecting with RSDP staff providing these information sessions and resources."

"Created the community of like minded people where ideas flow."

Broader Impacts

To extend the reach of DWG programming, RSDP leveraged relationships with the Sustainable Farming Association and University/community partners, and support from a consortium of funders (see below). Nearly all (92%) survey respondents agreed that RSDP's work on DWGs has positively impacted knowledge, attitudes, or understanding of local food issues in their community (Fig. 3).

Fig. 3. To what extent do you agree that RSDP's work on DWGs has positively impacted knowledge, attitudes, or understanding of local food issues in your community? (N=48)



Learn More

- Learn more about DWGs and keep up with the latest developments on RSDP's DWG resource webpage: rsdp.umn.edu/statewide/deep-winter-greenhouse
- Watch Carol Ford's inspirational TEDxMinneapolis talk about her journey with DWGs: bit.ly/2cu4riX
- Greg Schweser discusses the DWG campaign on KSTP primetime news: bit.ly/2cxetkL

The statewide DWG campaign is made possible by support from the [University of Minnesota Institute on the Environment](#) (IonE) and a consortium of farm lending banks, including [AgCountry Farm Credit Services](#), [AgriBank](#), [AgStar Financial Services](#), and [United FCS](#). Support for RSDP's DWG work has also been provided by the [Bush Foundation](#), [Minnesota Department of Agriculture](#), [MnDRIVE](#), [University of Minnesota Extension](#) Block Grant, and [Southwest RSDP](#).