



# Decision Support Systems for Insect Pest Management: Survey of Washington Potato Growers

---

Summary Report of 2025 Survey of Washington Potato Growers

**September 2025**

Dr. Edem Avemegah and Dr. Jessica Goldberger  
Department of Crop and Soil Sciences  
Washington State University  
Pullman, WA 99164

For more information, please contact Dr. Edem Avemegah at  
[edem.avemegah@wsu.edu](mailto:edem.avemegah@wsu.edu)

# Introduction

In 2023, a team of researchers and Extension specialists at Washington State University, Iowa State University, Michigan State University, University of Wisconsin, Cornell University, University of Maine, and USDA-Agricultural Research Service received funding from the U.S. Department of Agriculture’s National Institute of Food and Agriculture (USDA-NIFA) for a project titled “Enhancing Integrated Insect Pest Management Strategies for U.S. Potato Production Systems” (Grant #2023-51181-41160). The primary objective of this transdisciplinary effort is to develop and test sustainable alternatives to neonicotinoid insecticides, while also addressing social and economic impacts to facilitate the adoption of novel tactics. The project team is divided into four working groups. The Socioeconomic Working Group—drawing on insights from surveys, focus groups, and in-depth interviews—seeks to evaluate the socioeconomic influences and impacts associated with the transition from neonicotinoids to new pest management strategies. The purpose of this summary report is to share the results of a 2025 survey titled “Decision Support Systems for Insect Pest Management: Survey of Washington Potato Growers.”

## Survey Methods

From April to July 2025, we conducted an online and mail survey of commercial potato growers in Washington State. The survey focused on growers’ insect pest management decision-making practices, their familiarity and use of decision support tools, and their opinions about such tools to manage insect pests. We also gathered demographic data and farm characteristics and included six open-ended questions so respondents could share more detailed insights.

We compiled our mailing list of Washington potato growers using the following sources: Washington State Potato Commission (n=179) (list received in October 2024), USDA GAP-Certified Company online database (n=15) (<https://www.ams.usda.gov/services/auditing/gap-ghp>), Organic Integrity Database (n=8) (<https://organic.ams.usda.gov/integrity/>), Washington & Oregon Potato Conference (n=7) (attended in January 2025), and miscellaneous online sources (n=5). Our final list consisted of 214 potato growers, including 165 for whom we had both mailing and email addresses and 49 with mailing addresses only.

We employed a modified Tailored Design Method (TDM) to implement the survey. TDM is a survey design approach that emphasizes customizing survey procedures—such as multiple contacts, personalization, and clear design—to the target population in an effort to maximize response rates and data quality (Dillman et al. 2014). We offered both web and paper response options, mentioned trusted names associated with the Washington potato industry in our communications with potato growers, and provided clear instructions to make participation easy and appealing.

Respondents with email addresses received up to ten email messages with unique links to the Qualtrics version of the survey, two full postal mailings (cover letter, questionnaire, and postage-paid reply envelope), and three reminder postcards. The final postcard included a QR code that linked to the online survey. Respondents without email addresses received the full postal mailings and reminder postcards.

In our communications with potential respondents, we explained that the survey's purpose was to understand Washington potato growers' views on decision support systems for insect pest management. We also mentioned that their feedback would provide valuable insights and help researchers improve Washington State University's Potato Decision Aid System (WSU-Potato DAS) to meet growers' needs. We stated that the survey was a collaborative effort involving social scientists, entomologists, and Extension educators from WSU. We also provided information about our funding source (USDA-NIFA). Growers were informed that participation was voluntary and that no identifying information would be shared in any presentations or publications. We also noted that the study had been certified as Exempt (IRB #20871-001) by WSU's Human Research Protection Program.

Respondents were asked to specify whether they were a farm operator, a hired farm manager, or another decision-maker for an operation in Washington that grows and sells potatoes. Individuals who were not currently farming, retired, deceased, as well as those we were unable to reach (because of bad postal or email addresses) were considered "ineligible" for tracking purposes. Forty (40) potato growers completed the survey (online = 25 and mail = 15) and 10 were considered ineligible, resulting in a response rate of 20%. Our survey procedures and response rate are consistent with previous research showing that multiple contacts increase response rates among agricultural producers (Avemegah et al. 2021).



# Findings

## Eligibility Question

---

**Q1. Are you a farm operator, hired farm manager, or other decision-maker for an operation in Washington that grows and sells potatoes?**

Yes	No
100.0% (40)	0.0% (0)

## Initial Questions

---

**Q2. How would you describe your role in the potato operation with which you are associated?**

Farm owner, partner, or lessee	Hired farm manager	Other decision maker
70.00% (28)	25.00% (10)	5.00% (2)

**Q3. For how many years have you been involved in potato production as a farm operator, hired farm manager, or other decision-maker? (N = 39)**

Average years = 21; range = 1– 45

---

**Q4. How many total acres of potatoes do you typically grow? (N = 37)**

Average acres = 2,760; range = 135 – 13,500

---

**Q5. How many acres of certified organic potatoes do you typically grow? (N = 40)**

One grower indicated they operate 30 acres of certified organic potatoes, and the rest stated 0 acres.

---

---

**Q6. Approximately what percentages of your potatoes are typically sold through the following types of markets? (Your answers should total 100%.) (N = 39)**

Table-stock	Chip-stock	Frozen	Dehydrated	Seed	Other (Processed)
20.0	9.6	60.0	2.7	5.1	2.5

---

**Q7. In which county (or counties) do you grow potatoes?**

County /Counties	Percentage	States
Grant	23.0% (9)	Washington
Franklin	12.8% (5)	Washington
Adams and Grant	10.2% (4)	Washington
Adams, Franklin, and Grant	10.2% (4)	Washington
Skagit	10.2% (4)	Washington
Adams, Grant, and Lincoln	7.7% (3)	Washington
Benton	7.7% (3)	Washington
Benton and Walla Walla	2.6% (1)	Washington
Benton, Franklin, Morrow, and Umatilla	2.6% (1)	Washington and Oregon
Franklin and Walla Walla	2.6% (1)	Washington
Kittitas	2.6% (1)	Washington
Franklin and Skagit	2.6% (1)	Washington
Lincoln, Spokane, and Stevens	2.6% (1)	Washington
Whatcom	2.6% (1)	Washington

---

## **Insect Pest Management Practices**

---

**Q8. How important is each of the following factors when making decisions about insect pest management strategies for the potatoes you grow? (N's range from 37 to 40)**

<b>Factor</b>	<b>Not Important</b>	<b>Somewhat Important</b>	<b>Very Important</b>
Overall effectiveness	0.0%	2.6%	97.4%
Crop quality impact	2.5%	7.5%	90.0%
Potential yield impact	0.0%	10.3%	89.7%
Processor requirements	13.2%	5.3%	81.6%
Human health impacts	7.7%	15.4%	76.9%
Reducing development of pest resistance	2.6%	23.1%	74.3%
Cost to purchase or implement	0.0%	38.5%	61.5%
Long-term economic sustainability	0.0%	49.0%	51.0%
Land use regulations	2.6%	48.7%	48.7%
Consumer preferences	17.9%	41.0%	41.0%
Long-term environmental sustainability	12.8%	51.3%	35.9%
Impacts on pollinators	10.3%	53.8%	35.9%

**Q9. Do you consult with any agronomists, crop consultants, or agricultural chemical company representatives when making decisions about insect pest management for the potatoes you grow?**

<b>Yes</b>	<b>No</b>
97.5% (39)	2.5% (1)

**Q10. How much of the insect pest management advice you receive from agronomists, crop consultants, or agricultural chemical company representatives do you typically follow?**

<b>None</b>	<b>Some</b>	<b>About half</b>	<b>Most</b>	<b>All</b>
0.0% (0)	17.9% (7)	20.5% (8)	56.4% (22)	5.1% (2)

**Q11. What is your most critical need with respect to insect pest management for the potatoes you grow? (N = 34)**

Efficacy while keeping resistance in mind • Information about what is present, and how to attack it without breaking the budget • Information on when to apply • Nematodes are not insects, but RKN management with low Telone availability is number 1 • For seed, it is critical that we manage aphid populations as they are the vector for viruses • Pesticide resistance • A Product

that gets multiple pests, and lasts • Finding an alternative to Telone for Nematode control in the basin • Colorado potato beetle • Cost effective nematicide and fumigant • Efficacy data on new products being introduced to the market, especially alternative or biological products • Actionable and good information • Scab • Help understanding the proper timing on control • Nematode control • Control green peach aphids, Colorado potato Beetles and loopers • Long term sustainable product effectiveness • Colorado potato Beatle • Effective and targeted control • Control Psyllids and Tuber Moth most important • Finding cost effective solutions for nematodes • Quality • That the chemicals are effective • Avoid metro chemical pest management and use more natural control in a cost effective way • The right chemicals • That the chemical works • Control • Overall effectiveness, Not to lose any more AI's (Active Ingredients) • Wide spectrum control and tank mix friendly with fungicide • Scouting • Nematode, Beetle, Aphids – Damage • Aphid and Mites • Effectiveness, resistance strategy and overall integrated pest management.

## Decision Support Systems

**Q12. How familiar are you with decision support systems in general?**

Not familiar	Somewhat familiar	Very familiar
25.0% (10)	55.0% (22)	20.0% (8)

**Q13. How familiar are you with decision support systems specifically for insect pest management?**

Not familiar	Somewhat familiar	Very familiar
30.0% (12)	52.5% (21)	17.5% (7)

## Washington State University's Potato Decision Aid Systems

**Q14. Listed below are statements about decision support systems for insect pest management. Please indicate the extent to which you disagree or agree with each statement.**  
(N = 40)

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither Disagree nor Agree</b>	<b>Agree</b>	<b>Strongly Agree</b>
Agricultural advisors (Extension specialists, agronomists, crop consultants, etc.) encourage the use of decision support systems for insect pest management	0.0%	2.5%	35.0%	45.0%	17.5%
Using decision support systems to manage insect pests will lead to cost savings through more efficient insecticide applications	0.0%	0.0%	30.0%	57.5%	12.5%
I am confident I have the necessary skills and knowledge to use decision support systems for managing insect pests	0.0%	0.0%	30.0%	55.0%	15.0%
The agricultural industry is moving toward more data-driven insect pest management	0.0%	2.5%	27.5%	52.5%	17.5%
Using decision support systems for insect pest management is becoming increasingly important to remain competitive	0.0%	2.5%	30.0%	52.5%	15.0%
If I need help using decision support systems for managing insect pests, I can easily find support from Extension/university personnel	0.0%	2.5%	42.5%	40.0%	15.0%
Using decision support systems can help reduce insecticide use while still effectively protecting my crops from insect pests	0.0%	0.0%	27.5%	65.0%	7.5%
I can easily integrate decision support systems for managing insect pests into my existing farm management practices	0.0%	5.0%	27.5%	57.5%	10.0%
Using decision support systems improves the timing of insect pest control	0.0%	0.0%	28.2%	61.5%	10.3%
Other farmers successfully using decision support systems for insect pest management is important in my decision to adopt them	2.5%	5.0%	47.5%	40.0%	5.0%
The potential benefits of implementing decision support systems outweigh the challenges	0.0%	2.5%	52.5%	32.5%	12.5%

---

**Q15. Have you ever used WSU-Potato DAS in any capacity?**

Yes	No
45.0% (18)	55.0% (22)

---

**Q16. How would you describe your current engagement with WSU-Potato DAS?**

	Percentage
I use WSU-Potato DAS regularly and have no plans to stop using it	52.6% (10)
I am using WSU-Potato DAS on a trial basis to see if I like it	26.3% (5)
Other	15.8% (3)
I tried WSU-Potato DAS in the past but then stopped using it	5.3% (1)

---

**Q17. Which features or aspects of WSU-Potato DAS do you find most helpful when making insect pest management decisions? (N = 18)**

The wide options of products offered • Predictive features • GDD models for CPB and RKN • Timing of applications information • Threshold • Degree-day models of insect life cycles and region-wide sampling and mapping data • Chemical Information • Which pests were out • Pest forecasting • Product recommendation for pest type • Insecticide timing • Understanding when different insect pressure starts increasing • Insect traps help identify if the pest is in the area – sometimes insects come in quickly where the trap didn't show anything before • Need to review the system further • Updates • Timing of potato beetle applications • Local weather station data and customizable alerts/thresholds • Up-to-date pest information.

---

**Q18. Which features or aspects of WSU-Potato DAS do you find least effective or think could be improved? (N = 8)**

More insects • More data I'm not sure how to do this, but more data is always better • I think it's all pretty good • Need to review further • None • None • Haven't used other parts of it • Mobile phone app would be nice.

---

**Q19. What additional features, tools, or types of information would enhance your experience with WSU-Potato DAS or make it more valuable for your needs? (N = 9)**

Growers in other areas (Michigan) are working together with extension agents to coordinate and rotate chemistries to manage resistance in Colorado Potato Beetle might have value here • Not applicable, I like the tool • I just need more time to familiarize myself with it • Perhaps a text

and link to new and interesting information would be helpful • More historical data • Add more models for other insects • Growing degree days specific to region • Up to date • Chemical recommendations based on time of year/insect.

**Q20. Listed below are statements about WSU-Potato DAS. Please indicate the extent to which you disagree or agree with each statement. (N = 18)**

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither Disagree nor Agree</b>	<b>Agree</b>	<b>Strongly Agree</b>
WSU-Potato DAS allows me to apply pesticides more efficiently reducing costs	0.0%	0.0%	22.2%	61.1%	16.7%
I find WSU-Potato DAS user-friendly	0.0%	0.0%	33.3%	44.4%	22.2%
Demonstrations helped me see how WSU-Potato DAS could be used for my operation	0.0%	5.6%	16.7%	50.0%	27.8%
Using WSU-Potato DAS reduces resources spent on manual pest scouting	0.0%	0.0%	27.8%	61.1%	11.1%
I was able to experiment with WSU-Potato DAS before fully adopting it	0.0%	5.6%	12.2%	61.1%	11.1%
I feel confident in my ability to use the WSU-Potato DAS effectively	0.0%	5.6%	11.1%	66.7%	16.7%
I was able to start with some WSU-Potato DAS features before exploring other features	0.0%	0.0%	27.8%	55.6%	16.7%
Using WSU-Potato DAS increases my ability to prevent pest outbreaks	0.0%	0.0%	11.1%	77.8%	11.1%
I have seen other farmers successfully use WSU-Potato DAS to improve their pest management	0.0%	0.0%	66.7%	27.8%	5.6%
WSU-Potato DAS aligns well with my current farming practices	0.0%	0.0%	16.7%	66.7%	16.7%
I can easily track improvements in my pest management decisions using WSU-Potato DAS	0.0%	0.0%	33.3%	61.1%	5.6%
WSU-Potato DAS fits with my goal of reducing pesticide use while still maintaining crop protection	0.0%	0.0%	11.1%	77.8%	11.1%
The recommendations from WSU-Potato DAS are easy to understand	0.0%	0.0%	11.1%	72.2%	16.7%

I can clearly observe the reduction in pesticide use after implementing WSU-Potato DAS	0.0%	11.1%	50.0%	33.3%	5.6%
Using WSU-Potato DAS aligns with the best practices recommended by my agricultural advisors (Extension specialists, agronomists, crop consultants, etc.)	0.0%	0.0%	11.1%	66.7%	22.2%

---

**Q21. To what extent do you trust the information provided by WSU-Potato DAS?**

Do not trust	Somewhat trust	Mostly trust	Completely trust
0.0%	11.1% (2)	66.7% (12)	22.2% (4)

---

**Q22. How important is each of the following WSU-Potato DAS features for your insect pest management decisions? (N = 18)**

	Not Important	Somewhat Important	Very Important
Pathogen maps	0.0%	27.8%	72.2%
Phenology models in degree days	11.11%	27.8%	61.1%
Spray selection tool	0.0%	50.0%	50.0%
Text alerts	0.0%	50.0%	50.0%
Extension articles	0.0%	55.6%	44.4%
Phenology models in calendar days	5.6%	50.0%	44.4%
Contour maps	11.1%	55.6%	33.3%

---

**Q23. How useful is each of the following types of information provided by WSU-Potato DAS for your insect pest management decisions? (N = 18)**

	Not Useful	Somewhat Useful	Very Useful
Pathogen incidence near your farm location as shown in pathogen maps	0.0%	16.7%	83.3%
Current or predicted pest development based on calendar days or degree days	0.0%	27.8%	72.2%

Color-coded contour maps highlighting pest risk around your farm location	0.0%	33.3%	66.7%
Conditions from phenology models and related management options	5.6%	38.9%	55.6%

---

**Q24. Would you be willing to pay an annual subscription fee of \$250 per weather station to be able to continue using the WSU-Potato DAS in the future?**

	Percentage
Yes – I would be willing to pay \$250 per weather station (annually)	50.0% (6)
No – But I would be willing to pay less than \$250 per weather station (annually)	25.0% (3)
No – I would not be willing to pay an annual subscription fee	25.0% (3)
Don't know	0.0% (0)

---

**Q25. Where do you currently stand with respect to WSU-Potato DAS?**

	Percentage
I had not heard of WSU-Potato DAS prior to this survey	50.0% (11)
I have heard of WSU-Potato DAS but have not considered trying it	31.8% (7)
I am planning to try WSU-Potato DAS but have not started using it yet	9.1% (2)
I am evaluating the pros and cons of WSU-Potato DAS but have not tried it	4.5% (1)
Other	4.5% (1)

---

**Q26. What is your primary reason for not using WSU-Potato DAS? (N = 16)**

Not specific to my fields • I have not heard of it • I am not needing to change programs at this time • Good questions don't have an answer • Have not had training on how it works • Where do I find it to be available for use • I don't have time to research it and figure it out • Never heard of it • I usually do not have the insect pressure • Old school, 40 plus year experience • Never heard of it • I had not heard of WSU-Potato DAS prior to this survey • Not aware • Lack of information regarding the program • Not aware of it • Didn't know about it or didn't remember about it • Have not been informed.

---

**Q27. Do any of your employees or hired consultants (agronomists, crop advisors, etc.) currently use WSU-Potato DAS for the potatoes you grow?**

<b>Yes</b>	<b>No</b>	<b>Don't know</b>
41.7% (10)	50.0% (12)	8.3% (2)

---

**Q28. How likely are you to use WSU-Potato DAS during the 2026 growing season?**

<b>Not likely</b>	<b>Somewhat likely</b>	<b>Very likely</b>	<b>Don't know</b>
9.4% (3)	37.5% (12)	43.7% (14)	9.4% (3)

---

**Q29. Do you subscribe to the weekly WSU Potato Alerts e-newsletter?**

<b>Yes</b>	<b>No</b>	<b>Don't know</b>
62.9% (22)	34.3% (12)	2.9% (1)

---

## **Final Questions**

---

**Q30. How many total acres of farm/ranch land do you operate? (Please include both conventionally and organically managed farm/ranch land in your answer.) (N = 35)**

Average acres = 7,587; range = 445–40,000

---

**Q31. Which of the following best represents the total annual gross farm income (sales before expenses) for your entire farm business?**

<b>Level of Income</b>	<b>Percentage</b>
Less than \$50,000	0.0% (0)
\$50,000 - \$99,999	0.0% (0)
\$100,000 - \$249,999	2.9% (1)
\$250,000 - \$499,999	0.0% (0)
\$500,000 - \$999,999	5.7% (2)
\$1,000,000 - \$2,499,999	5.7% (2)
\$2,500,000 - \$4,999,999	8.6% (3)
\$5,000,000 - \$10,000,000	25.7% (9)
More than \$10 million	51.4% (18)

---

**Q32. Approximately what percentage of your total annual gross farm income (sales before expenses) is derived from the sale of potatoes? (N = 35)**

Average percentage of income = 62; range = 15–100

---

**Q33. What is your age? (N = 38)**

Average years = 50.1; range = 28–72

---

**Q34. For how many years have you been involved in agriculture as a farm operator, hired farm manager, or other decision-maker? (N = 38)**

Average years = 26.5; range = 1–55

---

**Q35. What is the highest level of formal education that you have completed?**

<b>Level of Education</b>	<b>Percentage</b>
Some high school or less	2.6% (1)
High school diploma or equivalent	28.9% (11)
Associate's degree	7.9% (3)
Some college but no degree	7.9% (3)
Bachelor's degree	39.5% (15)
Some graduate school but no degree	2.6% (1)
Graduate degree	10.5% (4)

---

**Q36. What is your gender?**

<b>Man</b>	<b>Woman</b>	<b>Prefer not to answer</b>
94.7% (36)	2.6% (1)	2.6% (1)

---

**Q37. Please feel free to share any additional comments or feedback you have on insect pest management, decision support systems in general, or WSU-Potato DAS specifically. (N = 7)**

I find the WSU/OSU professors and extension specialists approachable and knowledgeable I appreciate their work and use it whenever I can • A decision aid system could help a little, maybe until a DAS becomes specific to my fields (say, based on pivot-mounted cameras or something similar) I would be cautious about using it • Enjoy using it • The DAS system is a rare situation

where a project was promised and then met or exceeded every benchmark and expectation that we had for it • It is every bit as valuable as Ag Weather Net and deserves permanent support, many of the pest decision programs are geared towards Eastern Washington growers and are not applicable to Western Washington growers • Where is the tool available • I think we are on top of things that are important.

---

## References

- Avemegah, E., W. Gu, A. Abulbasher, K. Koci, A. Ogunyiola, J. Eduful, S. Li, K. Barington, T. Wang, D. Kolady, L. Perkins, A.J. Leffler, P. Kovács, J.D. Clark, D.E. Clay, and J.D. Ulrich-Schad. 2021. An examination of best practices for survey research with agricultural producers. *Society & Natural Resources*, 34(4): 538-549.
- Dillman, D.A., J.D. Smyth, and L.M. Christian. 2014. *Internet, Mail, and Mixed-Mode Surveys: The Tailored Design Method*. 3<sup>rd</sup> Edition. Hoboken, NJ: John Wiley & Sons.