**EXECUTIVE SUMMARY**

Include a summary of 250 words or less, suitable for dissemination to the public. This summary should include a concise outline of the project’s purpose; activities to be performed, including subawards (when applicable); deliverables and expected outcomes; intended beneficiaries; and any other pertinent information.

Response: Late blight of potato has caused socioeconomic damages worldwide since the 1840s. Management of the causal pathogen, *Phytophthora infestans*, is dependent on fungicides. These fungicides are costly, toxic, and select for fungicide-resistant pathogens. Alternative management strategies are needed to mitigate crop losses and reduce fungicide applications. The goal of this research is to develop and deploy site-specific late blight forecasting models for producers in Washington state. We propose to develop forecasts and outreach with late blight incidence data from producers (**Figure 1A**), severity data from field surveillance and satellite imagery (**Figure 1A** & **C**), phenology data (**Figure 1B**), and weather data from AgWeatherNet (**Figure 1D**). To accomplish this goal, late blight intensity (incidence and severity) data will be collected from cooperating producers and ground-truthed by the PIs during the growing seasons. Late blight intensity data will then be modeled as a function of satellite imagery, phenology, and weather data with machine learning models (**Figure 1E**). Models that generate accurate predictions will be used for future forecasts (**Figure 1F**). Expected outcomes of this research include (i) site-specific forecasts that integrate data on late blight intensity, phenology, and weather, (ii) weekly management recommendations during the growing season (**Figure 1G**), and (iii) control of late blight with fewer fungicide applications. The effectiveness of the outcomes will be measured with surveys. Site-specific forecasts will be distributed to producers and researchers via listservs, field days, conferences, extension bulletins (**Figure 1I**), and peer-reviewed journal articles (**Figure 1H**). Late blight forecasts and digital outreach will help minimize fungicide applications without compromising yields by providing weekly site-specific disease management recommendations. Thus, this project will directly contribute to the sustainability of potato production and natural resource conservation in Washington. Ultimately, accurate late blight forecasting systems will enable producers to apply less fungicides without increasing the risk of crop failure.

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**ALIGNMENT AND INTENT**

**Project Purpose**

Clearly state the purpose of the project and the Project Type: food safety, plant pests and disease, research, crop-specific projects addressing common issues, and marketing and promotion. Describe the specific issue, problem, or need that the project will address. Include data and/or estimates that describe the extent of the issue, problem, or need.

Response: Enter text here.

**Objectives**

List the objectives of the project and their relation to the issues, problems, or needs.

* Response: Develop site-specific late blight forecasts for potato producers in Washington state. This objective can be measured qualitatively after the completion of each field season. Completion of this objective will be constituted by identification of model(s) that accurately predict late blight intensity.
* Issue weekly late blight disease management recommendations to producers in Washington. Starting in 2023, these recommendations will be deployed weekly with stakeholder listservs and less frequently with field days, extension bulletins, conferences, and peer-reviewed articles. Measurement of this objective can be completed by counting (i) weekly management recommendations and (ii) the number of producers who use the recommendations. If the machine learning models used for the forecasts are more accurate than existing models before 2023, then the weekly management recommendations can be issued earlier.

After completion of this project, subsequent proposals will be submitted to generate a website for producers to interface with the data and recommendations.

* Control late blight with fewer fungicide applications than used without the forecasts. This objective will be difficult to accurately measure, however; the number of fungicide applications used before and after the site-specific forecasts can be estimated with surveys, as described below.

**Project Beneficiaries**

Provide the number of affected producers and processors as well as a description of the benefits you intend to achieve as a result of the project.

Response: Enter text here.

**TECHNICAL MERIT**

**Work Plan**

Complete the below narrative and table for each objective of the project listed in the Alignment and Intent section.

**Objective 1:** Identify the objective that will be accomplished. This should match the objective identified in the Project Narrative Alignment and Intent.

**Timeline:** Start Date: Enter the overall objective start date using the format MM/YYYY. End Date: Enter the overall objective end date using the format MM/YYYY.

**How/Where:** Describe how and where this objective will take place.

**Resources:** Describe the required resources for this objective.

**Milestone(s):** Describe the milestones for assessing progress and success for this objective.

**Training & Technical Assistance (if applicable):** Describe how participants will be recruited and how the project will guide program development and delivery.

| **Objective 1 Activities** | **Performed by** | **Timeline** |
| --- | --- | --- |
| Describe the activity that will help to accomplish this objective. | Enter the Person(s) responsible (including collaborators and contractors) to accomplish this activity. | Enter the timeline associated with this activity using the format: MM/YYYY – MM/YYYY |
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*Insert rows if needed for additional activities.*

**Objective 2:** Identify the objective that will be accomplished. This should match the objective identified in the Project Narrative Alignment and Intent.

**Timeline:** Start Date: Enter the overall objective start date using the format MM/YYYY. End Date: Enter the overall objective end date using the format MM/YYYY.

**How/Where:** Describe how and where this objective will take place.

**Resources:** Describe the required resources for this objective.

**Milestone(s):** Describe the milestones for assessing progress and success for this objective.

**Training & Technical Assistance (if applicable):** Describe how participants will be recruited and how the project will guide program development and delivery.

| **Objective 2 Activities** | **Performed by** | **Timeline** |
| --- | --- | --- |
| Describe the activity that will help to accomplish this objective. | Enter the Person(s) responsible (including collaborators and contractors) to accomplish this activity. | Enter the timeline associated with this activity using the format: MM/YYYY – MM/YYYY |
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*Insert rows if needed for additional activities.*

Copy tables as needed for each project objective.

**Support from Other Federal or State Grant Programs**

If the proposed project has been or will be submitted to another federal or state program for funding, provide the grant program name. If not, please state “This project has not and will not be submitted to another federal or state program for funding.”

Response: Enter text here.

**How the SCMP Project Differs or Supplements the Other Grant Program’s Efforts**

If the proposed project builds on work previously funded by a federal or state grant program, including AMS grant programs, provide the year and grant program name and describe how the proposed project, if funded, would not duplicate work previously funded by the federal or state government. If not, please state “This project does not build upon a project previously funded by a federal or state program.”

Response: Enter text here.

**ACHIEVABILITY**

**Expected Measurable Outcomes**

Please refer to Form 1.7.2. Outcome Measures. Applicants must select at least one Outcome and one Indicator (sub-indicator, if applicable). Copy and paste the selected Outcome(s) and Indicator(s) here, along with the description of how the numbers were derived, how they will be measured, etc.

Response: Copy selected Outcome Measure table(s) here.

**Project Dissemination**

Provide a clear description of the plan to disseminate the project results (positive and negative) to similar organizations, stakeholders, and others that may be interested in the project results or in implementing a similar project.

Response: Enter text here.

**Risk Management Plan**

Provide a detailed and clear risk management plan.

Response: Enter text here.

**EXPERTISE AND PARTNERS**

**Key Personnel**

List key staff, including personnel and external project partners and collaborators that comprise the Project Team, their roles, and their relevant experience and past successes in developing and operating projects similar to this project. Ensure that you have included Letters of Commitment from Multi-State partner and collaborator organizations to support the information. Disclose of any potential concerns of conflicts of interest. For example, if you recruit your spouse, relatives, and/or business partner, provide solid evidence and clear explanation of your decisions, including a detailed monitoring and risk management plan.

Response: Enter text here.

**Management Plan, Data Sharing, and Public Access**

Describe your management plan for coordinating, communicating, and sharing data and reports among members of the Project Team and stakeholder groups, both internally to personnel and externally to partners and collaborators.

Response: Enter text here.

**Project Sustainability**

Describe how the project, and its partnerships and collaborations, will be sustained beyond the project’s period of performance (without grant funds).

Response: Enter text here.