

## Generalized Assessment of the Impact of Climate Change on Washington Agriculture

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A generalized assessment of the impact of climate change on key facets of Washington state's agricultural sector is being conducted by an interdisciplinary team of WSU and USDA scientists. These key facets include climate change effects on *tree fruits, potatoes, grapes, dryland cropping systems, weeds, diseases, insect pests and production economics*.

Computer simulation, expert opinions, and experience from areas of the world with similar conditions to those predicted for climate change in the state are being utilized to assess cropping system impacts from projected changes in a) temperature, b) growing season length, c) precipitation patterns, d) water supply and demand, e) atmospheric carbon dioxide concentration, f) potential growth rate, and g) incidence of weeds, pests, and diseases. Based on this information, climate change impacts on agriculture at the enterprise budget level will be developed and preparation / adaptation strategies will be recommended. These impacts include changes in pesticide use, expected yields, variability of yields, and entire shifts in crop production. Early research results from predictive models indicate:

- The increased temperatures in 2020 and 2040 on codling moth biology as predicted by a degree-day model would result in earlier emergence (5 to 10 days) of adults in the spring, an increase in the percent of third generation that growers would have to control, an increase in control costs of \$50 to \$100 per acre, and the potential that codling moth would develop resistance faster to newly registered, reduced-risk insecticides.
- A 1°C rise in temperature over the April-October growing season will add 214 heat units (GDD) to the season. Even such a modest increase will shift several of Washington's AVAs (American Viticulture Areas) into the next higher Winkler region, which will influence fruit composition and grape juice and wine quality. The projected increase in the frequency of hot (>35°C) summer days might compromise wine grape production in much of eastern Washington.
- Fire blight of pome fruits is projected to *increase* under all increased early-season temperature scenarios and *remain static* under all late season scenarios. The incidence and severity of powdery mildews on cherries and grapes would *increase* under the increased early-season temperature and increased precipitation scenario. The hop powdery mildew model indicated *no change* under the various early season temperature scenarios and a *decrease* in disease severity under increased late-season temperature scenarios.

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