



# MSU Agriculture Innovation Day

# Focus on Fruit and Vegetable Technologies

Create Your Own Climate Change with High Tunnels

## High Tunnels Can Change the Production Climate

**Air temperature** - reduce frost risk, increase growing degree days, avoid excessive summer heat

**Precipitation** - protect plants from rain and hail, optimize soil moisture with irrigation, manage nutrients and soil salts,

**Light quantity and quality** - reduced quantity, some plastics differentially affect wavelengths - PAR, UV, IR

**Humidity** - can be lower or higher than outside, depending on management)

**Wind** - lower or minimal windspeed.

## High Tunnels Can Change Plant Growth

**Plant development** - earlier germination or budbreak and bloom, increased shoot growth, and earlier harvests

**Plant processes** - reduce environmental stress which promotes more optimal photosynthesis and plant water relations

**Risks** - protect plants from frost, rain, hail, or wind Extend reproduction phase - flowering and fruiting periods for crops such as primocane raspberries and tomatoes

**Better products** - achieve higher yields, larger fruits, brighter flower colors, better fruit appearance (blemish-free)

## Pest pressure

Suppress - some insect pests and diseases, reducing pesticide applications, facilitating organic production

Enhance - some insects (e.g., mites, aphids) thrive under tunnels and must be managed accordingly



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**Plant health** - better plant health improves cold hardiness and winter survival

## **High Tunnels Can Change Market Windows and Values**

**Higher market values** - due to earlier, later, and/or extended ripening

**Sustain markets** - protected production provides more consistent crop supply

**Create new markets** - production of novel crops/varieties typically not grown in Michigan due to climatic limitations



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## High Tunnel Strengths/Weaknesses Vary by Type

	<b>Multi-Bay Tunnels</b>	<b>Single Bay Tunnels</b>
<b>Seasons</b>	Generally 3-season use, most common for perennial fruit crops	Can be used all year, most common for annual vegetables and cut flowers
<b>Capital Investment</b>	Less expensive per acre	More expensive per acre
<b>Management Costs</b>	More expensive due to seasonal plastic coverage/removal	Less annual labor cost for plastic management
<b>Land Use Efficiency</b>	Greater coverage of potential production area	Land between single bays unavailable for protected production
<b>Weather Risks</b>	Domed design cannot support snow loads, more susceptible to wind (without additional bracing)	Gothic peak design is generally strong enough for snow loads and typical winds
<b>Plastic Management</b>	Seasonal plastic installation/removal/ hibernation increases plastic wear and tear; plastic disposal/recycling can be a challenge (cost, labor, sources)	Plastic disposal/recycling can be a challenge (cost, labor, sources)

