

UNIVERSITY OF MINNESOTA
EXTENSION
MAKING A DIFFERENCE IN MINNESOTA

Climate Resilient Garden

Understanding & Adapting to Climate Change in Minnesota

MAKING A DIFFERENCE IN MINNESOTA: ENVIRONMENT • FOOD & AGRICULTURE • COMMUNITIES • FAMILIES • YOUTH

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Class Goals

In this class you will learn

- Understand how Minnesota is changing
- Have strategies for responding to sudden & severe weather
- Know what to do long-term to make your garden more resilient



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Understanding Climate Change

Setting the stage


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Weather vs Climate

- **Weather**
 - What happens
 - Based on daily & local variables (wind, rain, sun, season)
- **Climate**
 - What you expect to happen
 - Based on long-term weather trends
- **Climate change** happens when the weather patterns change

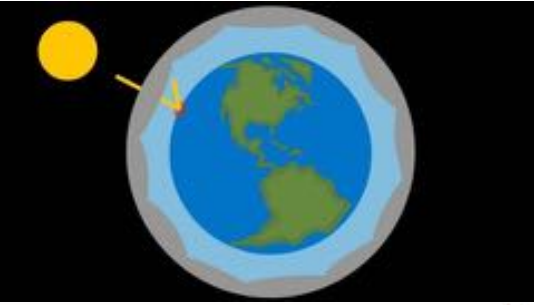


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What is Climate Change




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Causes of Climate Change

- **Natural Variations**
(seasons, jet streams & volcanos)
- **Landscape Changes**
(urbanization & deforestation)
- **Chemical Emission**
(greenhouse gas emissions)



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Climate Change in Minnesota

- Changing faster than predicted
- Most apparent in the north half of the state
- Notable changes
 - Temperature
 - Precipitation

Temperature change, 1895-2019
0.9 1.8 2.7 3.6 4.5°F

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Temperature Changes

- General changes
 - Warmer winter days
 - Warmer evenings overall
- Looks like
 - Fewer extremely cold days
 - More freeze-thaw cycles
 - Less snow cover
 - Shallow soil & lake freeze
 - Longer growing season
 - More heat waves

Average Temperature Changes
(winter daytimes & evenings)

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Temperature Change in the Garden

- Ecosystem misalignment
 - Changes to plant, insect & wildlife populations
- Plant damage
 - Branch break (ice)
 - Root die-back (lack of snow-cover)
 - Lower food yields (heat waves)
- Longer growing season
 - Earlier last frost & later first frost dates
 - Earlier, longer (& new) pest activity

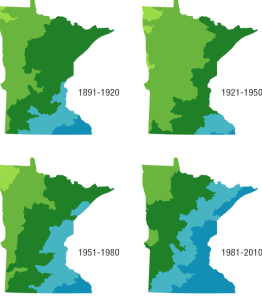
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Precipitation Changes

- General change
 - More precipitation in general
 - Unpredictable rain/snowfall
- Looks like
 - Higher rainfall totals
 - Heavier snow loads
 - Localized flooding
 - Dry, drought-like summers
 - More frequent severe weather




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Precipitation Change in the Garden

- Soil problems
 - Ecosystem die-back
 - Structure collapse
- Plant damage
 - Branch break (heavy snow)
 - Root damage (lack of snow-cover; flooding)
 - Plant die-back or death
- Condition Risk
 - Fire
 - Flooding
 - Drought



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Reacting to Change


Short-Term Strategies

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Garden Health Strategies Learn more in our **Pest Detective** class

- **Keep plants healthy**
 - Choose the right plants
 - Put plants in the right place
 - Provide enough sun & water
- **Use good gardening practices**
 - Check often & catch problems early
 - Remove plant debris & weeds
 - Decide if what you see is a problem
 - Use Integrated Pest Management (IPM) to fix problems




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Temperature Change Strategies

- **Keep plants well-watered**
 - During heat waves
 - In the fall until the ground freezes
- **Protect plants**
 - Mulch cold-sensitive plants in late fall
 - Shade evergreens & early-flowering trees
 - Cover cold-sensitive plants in spring & fall
 - Remove excess de-icing salt from soil
- **Watch for new & increased pest activity**
 - Report new-to-MN pests




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Heat Wave Strategies

- **Reduce outdoor activity during peak heat** (Heat + Humidity \geq 160°)
- **Add more water**
 - Water more often
 - Keep soil hydrated & covered
 - Set out bird- & bee-baths
- **Protect heat-sensitive plants with shade cloth**
- **Watch for fungal/bacteria outbreaks**
 - Remove diseased plants
 - Increase spacing between plants




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Precipitation Change Strategies

- Monitor precipitation
 - Add more or less as needed
 - Keep soil covered
- Transplant plants if needed
- Bind multi-stem tree trunks to distribute snow weight




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Severe Weather Strategies

- Protect Plants
 - Windbreaks (winds)
 - Stakes reduce (ice/snow)
 - Row covers & low tunnels (hail & cold temperatures)
 - Mulch (erosion)
- Group plants together
- Remove damaged plants



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Preparing for Change

Long-Term Adaptations

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Grow Healthy Soil

- Minimize disruption
 - Reduce tilling
 - Avoid compaction
- Keep it covered
 - Use mulch or groundcover plants
- Reduce chemical use
 - Synthetic fertilizer & pesticide
 - Keep lawn & leaf litter in-place
 - Practice Integrated Pest Management (IPM) for pest problems




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Manage Water

- Use smart timers & sensors
- Prevent evaporation with mulch
- Redirect water (flood-risk areas)
 - Berms, swales, French drains
 - Use plants to help excess water filter into the soil (ex. rain garden)
- Store water (drought-prone areas)
 - Rain barrels, dry wells, cisterns
 - Use permeable materials in paved areas



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See "Microclimate Evaluation Form" on class resource webpage

Know Your Yard & Garden

- Identify microclimates
 - Dips & hills
 - Wind-swept areas
 - North & south-west facing
 - Full-sun & deep shade
 - Boggy & sandy soils



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Redesign Your Landscape

- Embrace existing microclimates
 - Low- or no-mow plants for hills
 - Rain gardens for flood-prone areas
 - Xeriscaping for drought-prone areas
 - Prairie for heat-prone areas
- Install trees to block wind & sun
- Install raised beds or use large containers



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See class resource webpage for "Best Plants For Tough Sites" & "Best Yard Trees For Climate Change"

Change Plant Selection

- Consider new plants
 - Consider change to hardiness zones
 - More disease resistance
 - Flood- & drought-tolerant
- Diversify existing plants
 - Grass (lawn) species
 - Perennial & deep-rooted plants
 - Cover crops & ground covers
 - Trees & shrubs
 - 'Nearby native' plants to support wildlife




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Change Garden Practices

- Garden early or late in the day
- Stop annual tilling
- Let grass get 3-4 inches long
 - Keep non-invasive "weeds"
 - Save lawn clippings & leaves
- Prune woody plants regularly



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See class resource webpage for online resources for good information

Stay Informed

- Watch for changes
 - Replace struggling plants
 - Identify new pests
- Find reliable sources
 - Departments of Natural Resources, Agriculture & Climatology
 - University Extensions programs



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Reversing Change

Strategies for Combating Climate Change

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Compost

- Decreases greenhouse gas emissions
- Improves soil
 - Supports soil ecosystem
 - Improves plant health
 - Absorbs & stores carbon

Learn more in our Home Composting class



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Use People-Power

- Decreases greenhouse gas emissions
- Encourages physical activity
 - Yard & garden tools (lawnmowers, leaf-blowers, chainsaws)
 - Transportation (biking, walking, public transit)



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See class resource webpage for "Plants Do That"

Grow (Long-Lived) Plants

- Absorbs greenhouse gases
 - Stores carbon
 - Decreases soil disruption
- Improves living conditions
 - Provide shade & windbreaks
 - Supports local wildlife



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Support Local Food

Learn more in our Vegetable Gardening classes

- Decreases greenhouse gas emissions
 - Reduces waste by-products
 - Fewer energy requirements
- Increases number of local growers
 - Restores landscape biodiversity
 - Stores carbon
- Absorbs greenhouse gases
 - Decreases soil disruption



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See class resource webpage for online resources ways to get involved

Get Involved

- Become a citizen scientist
 - Measure temperature & precipitation changes
 - Track plant & wildlife movements
- Join a volunteer organization
 - Local parks & rec teams
 - State & local organizations
 - Get involved in local politics



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Thank you

University of Minnesota Extension
Ramsey County Master Gardener Volunteer Program
RamseyMasterGardeners.org

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