



Seed Starting & Planning for Spring Planting

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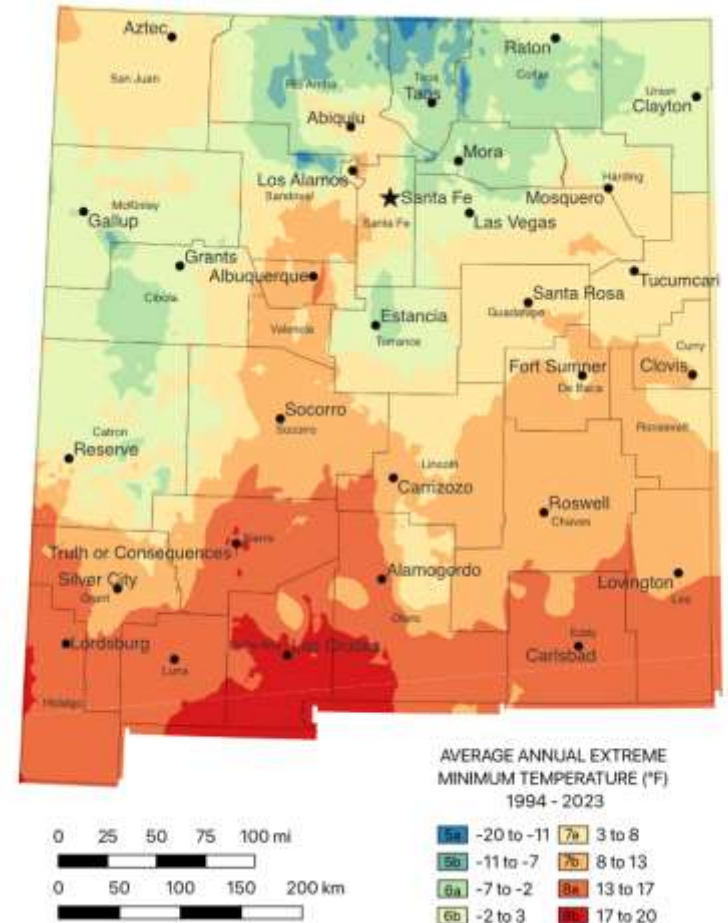
Benefits of Local Vegetables

- Know where your food comes from, and what goes into it
- Vegetables can be enjoyed at peak freshness, nutritional value
- Grow the varieties of vegetables you want



Know Your Climate

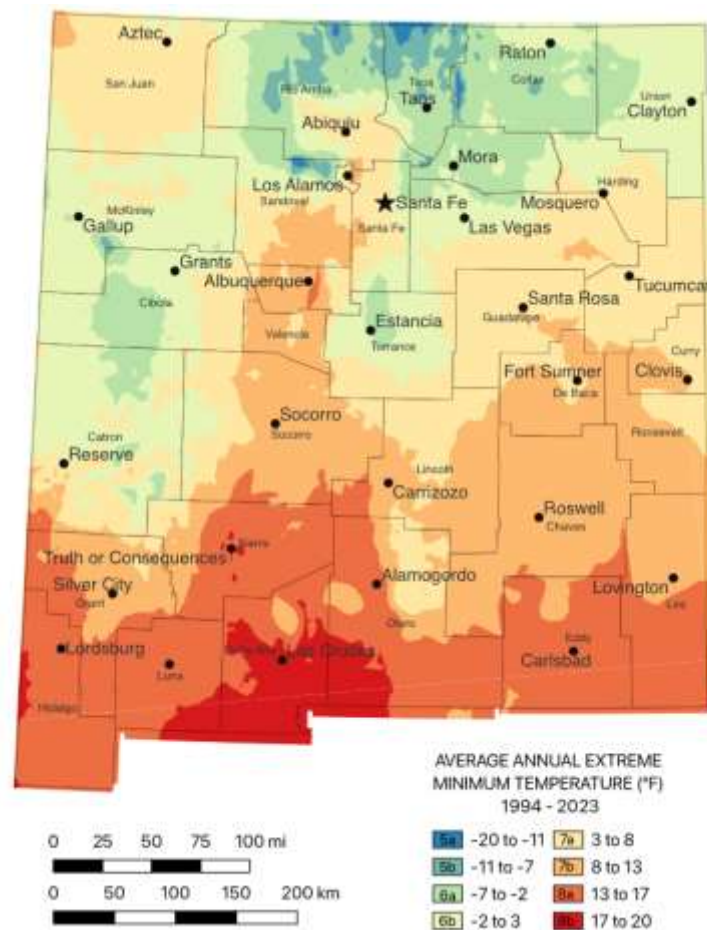
- Length of the growing season
- Last frost / first frost dates
- Night vs. day temp.
- Locations of microenvironments



https://pubs.nmsu.edu/_circulars/CR457B/

Farmington, NM

- **USDA Hardiness Zone 7a**
- Average Last Spring Frost approx. May 11-21
- Average First Fall Frost approx. September 30
- Growing Season approx. 196-220 days

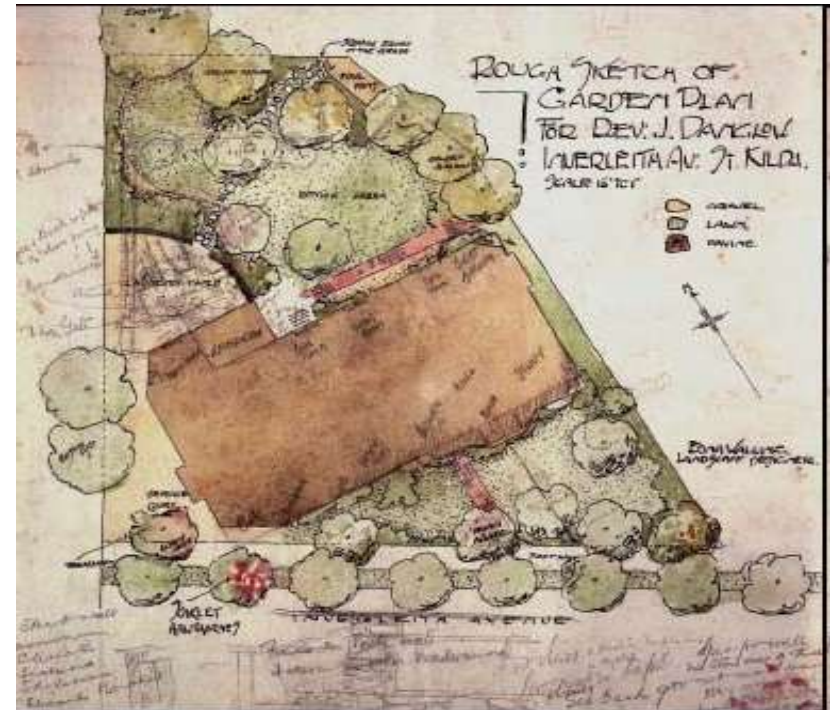


Farmington, NM Best Planting Windows

New Mexico AREA 3		Vegetable Planting Chart											
Crop		Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Asparagus													
Beans (bush, wax)													
Beans (pole)													
Beans (pinto)													
Beans (lima)													
Beans (fava, garbanzo)													
Beets													
Broccoli													
Cabbage													
Cabbage, Chinese													
Carrots													
Cauliflower													
Chard, Swiss													
Collards													
Corn, Sweet													
Cowpeas													
Cucumber													
Eggplant													
Garlic													
Kale													
Kohlrabi													
Lettuce (leaf)													
Melons (cantaloupe, musk)													
Okra													
Onions													
Peas													
Peppers (chile, bell)													
Potato													
Potato, sweet													
Pumpkin													
Radish													
Spinach													
Squash, summer													
Squash, winter													
Tomatoes													
Turnips													

Planning & Recordkeeping

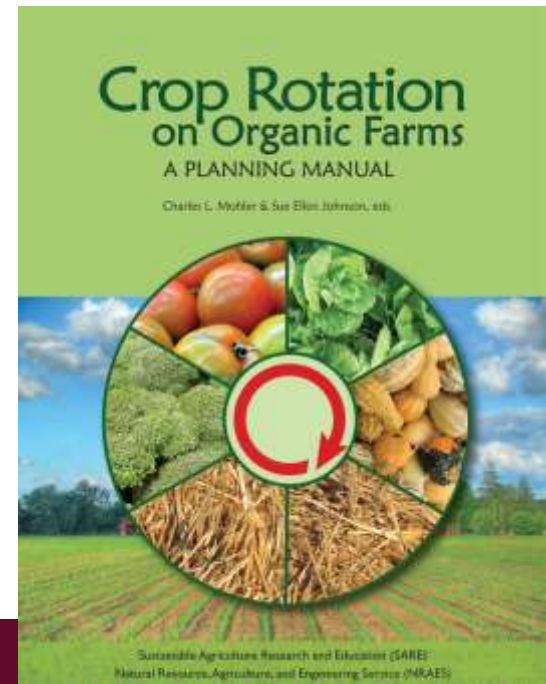
- Placement
- Proximity to water
- Types of vegetables (what do you like? What do your customers want?)
- Keep a log book
 - Crop placement
 - Varietal results
 - General activities



Crop Rotation

- Process of planting non-related crops in a planned, sequential order in the same area over multiple seasons
- Minimum of three-year rotation preferred
- Benefits include:
 - Reduces disease pressure
 - Breaks pest cycles
 - Improves soil health and structure
 - Manages nutrient demands

<https://www.sare.org/resources/crop-rotation-on-organic-farms/>



Getting ready to plant

- Starting off:
 - Organize, order, and prepare seeds
 - Start transplants
- Research
 - Sun loving
 - Shade dwellers
 - Drought tolerant
 - Timing



Spacing

- Know the size potential of every plant in order to give it enough space
- Example: Carrots need approximately 4 in. between plants, broccoli needs about 1 foot between plants



Harvest at the Right Time

Know your vegetables



- Premature harvest reduces amount of nutrient and flavor compounds

- Late harvest may result in a fibrous, less tender, bland or bitter crop



When to Harvest Vegetables

https://aces.nmsu.edu/pubs/_h/H216.pdf

Water

- Essential for growing a garden in the desert --All you need is a little **WATER!!!**
- Best times
 - evening
 - early morning
- How often?
- Scout and feel

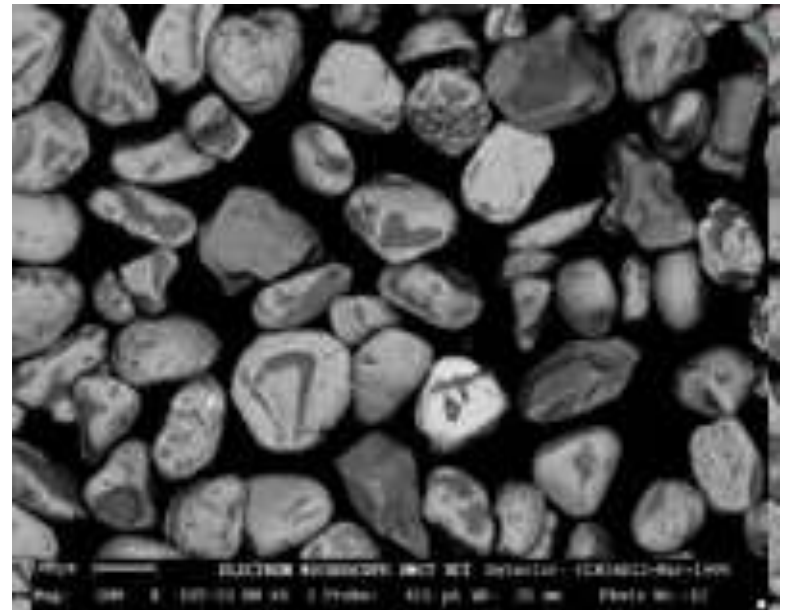


Water Properly to Improve Yields

- After planting irrigate lightly every 2-3 days until germination
- Once plants are established do not over or under water
 - Root Rot vs. Blossom End Rot

Soil Texture

- Coarse textured soils (high % sand)
 - Good drainage and tilth
 - Hold very little water
 - Minerals readily leached



Soil Texture

- Fine textured soils (high in silt and/or clay)
 - Poor drainage, hard to manage
 - Hold soil water tightly
 - Bind more nutrients



Prepare Soil

- Best soil is deep, well drained, fertile soil that contains plenty of organic matter
- Soil can be improved with compost and manure
- Raised beds, with soil brought in, can be used short-term (or long-term)



Determining soil moisture using the wet ball method
Courtesy NRCS

Compost

- Benefits of compost
 - Organic matter
 - Aeration
 - Soil moisture
- Make your own compost following scientifically validated method



http://www.aggregatepros.com/images/Compost_Heap_lg.jpg

Compost

- Ingredients
 - Leaves
 - Manure
 - Clippings
 - Food scraps
- Turn often
- Keep moist, not wet
- Don't add meat, dairy, processed foods



Compost

- When to add
 - Pre planting
 - Post planting
- How to add
 - Till in
 - Mulch



http://www2.grist.org/images/advice/how/2008/08/19/shovel-o-compost_h528.jpg

Manure

- Improves nutrient content of the soil
- Compost manure to kill undesirable microbes, weed seed
- Be wary of salt content and herbicide residues (Clopyralid, aminopyralid)



Fertilization

- Essential elements derived from the soil

N: Nitrogen

P: Phosphorus

K: Potassium

20-10-5

- But also,
Calcium, Chlorine, Iron, Sodium, Zinc, Nickel, Silicon
Magnesium, Sulfur, Manganese, Boron, Copper,
Molybdenum

Fertilizer Deficiency

- N = Nitrogen
 - Yellowing of older leaves, other leaves turn pale green. Stem becomes spindly, growth slows
- P = Phosphorus
 - Older leaves look scorched or wilted around margins. Yellowing of the leave veins
- K = Potassium
 - Small leaves look tinted reddish-purple. Leaf tips can look burnt and older leaves become almost black. Reduced fruit or seed production

Often caused by soil texture or pH (alkaline vs. acidic)

How to add it back?

- Synthetic fertilizers
- Organic fertilizers
- Compost
- Composted manure
- Green manure



<http://klru.org/ctg/blog/wp-content/uploads/2008/07/harvey-mow-web.jpg>

Pests

- Pests are any animal or plant that interfere with optimum growing conditions for your crop
- Disease, insects, weeds
 - Many harmful insect pests are attracted to weeds
 - Insects can transfer disease across large areas



Pest / Disease Interactions

- Example: Curly top virus
- Only spread by Beet Leafhoppers
- Large number of winter weeds result in higher leafhopper population



Beet leafhopper
[Picture by J. Appleby]



Preventing Pest Problems

- Scout
 - At least twice a week
 - Good to get down to plant level
- Beneficials
 - Insects that help keep pest insect populations down
 - Attract with flowers and habitat



Weeds

- “Plants growing where you don’t want them to grow”
- Don’t allow weeds to go to seed!
- Control by:
 - Mechanical removal
 - Mulch
 - Herbicides
 - Targeted water application



Mulch

- Pros
 - Keeps weeds at bay
 - Conserves soil moisture
 - Keeps fruit off ground
 - Increases soil temp
- Cons
 - Could harbor pests
 - Labor and cost investment
 - Reduces or increases soil temp out of optimum range



Mulch

- How to apply
 - Once plants are established, cover ground 2 – 4 inches
 - Water to help settle
 - Don't cover vegetable plants
- Types
 - Straw, leaves, wood chips, newspaper, plastic, pecan shells, compost

Row Covers

- Frost protection vs. insect excluding
- Hoop supported vs. floating
- Depending on weight & material:
 - Provides a 2 to 4°F temperature boost
 - May provide protection **from** insect pests
 - May provide protection **to** insect pests





SEEDS & TRANSPLANTS



Know Your Plants

- **Hybrid** vs. **open-pollinated** seed

Hybrid: The first-generation seed obtained from crossing two different inbred lines/plants under controlled conditions

-Seed is often expensive

Open-pollinated: Seed produced through field pollination

Know Your Plants

- **Hybrids:** Produce plants better than either parent
- **Open-pollinated:** Produce plants like the parent
- All heirloom plants are open-pollinated

Plant Your Garden

- **Direct seeding** is the easiest way to plant your garden
- **Transplants** are used to obtain earlier maturity, or if seed is expensive
 - May be harder to purchase in fall
- ***Make sure seed is treated to minimize disease transmission***



Transplants

- When to start
 - 4 - 6 weeks before first frost free day
 - Start in clean potting soil or peat pots
 - Start by warm, sunny window
- Sterilize soil / use clean containers
 - Prevents damping off
 - Oven or pressure cooker (160°F), or use commercial potting mix



HARDEN off your seedlings

- About one week before transplanting:
 - Put your seedlings outside in a shady place
 - protected from wind - for approx. 2-4 hours
 - Then bring them back inside
 - Each day increase the time
 - Slowly begin dividing the time between the shade and the sun
 - After a week of adjustment, the seedlings should be ready for the garden plot

Seed Saving

- Seed saved from hybrids & plants cross-pollinated with a different variety will not be true-to-type
- Clean
- Treat
 - 10% bleach solution
 - 10 minutes
 - Rinse
 - Air dry thoroughly (don't 'cook' seed!)



<http://www.srgc.org.uk/bulblog/log2004/080604/Cleaning%20seed.jpg>

Seed Storage

- Optimum Storage
 - Dry, cool, dark place
 - Refrigerate if possible
 - Temps below 50°F
 - Humidity below 50%
- Life expectancy depends on the type & storage conditions
- ***High temperatures kill seed!***

Seed Viability

- Maximum storage time for minimum 50% germination under optimum conditions
 - Broccoli seed: 5 years
 - Chile seed: 4 years
 - Onion seed: 2 years (70% required)
 - Spinach seed: 4 years
 - Squash seed: 7 years
 - Tomato seed: 5 years

Perennial Vegetable Crops

- Asparagus
 - Productive for 10 to 15 years
- Artichokes (southern NM)
- Rhubarb (northern NM)
- Take extra care in placement



<http://www.lifesci.ucsb.edu/~wallenstein/photos/pages/artichoke%20flower.htm>

Asparagus (*Asparagus officinalis*)

- Family Asparagaceae
- Tolerant of heat, drought and salinity
- Perennial; productive for many years
- Dioecious - male and female plants
- Modern varieties all male, so more spear production



<http://en.wikipedia.org/wiki/Asparagus>

Warm vs. Cool Season Crops

- Warm season crops include:
 - Squash, tomatoes, eggplant, okra, cucumber, beans, chile, bell peppers
- Cool season crops include:
 - Broccoli, carrots, spinach, lettuce, chard, kale, onions, beets, radishes

Warm Season Vegetables: Family Ties

Grass Family (*Poaceae*): Corn

Nightshade Family (*Solanaceae*): Tomatoes, Eggplant, Peppers, Potatoes

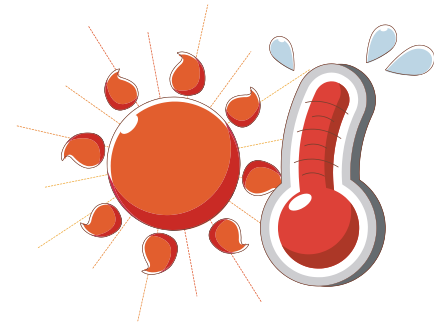
Mallow Family (*Malvaceae*): Okra

Bean Family (*Leguminosae*): Green Beans, Kidney Beans, Pinto Beans

Cucurbit Family (*Cucurbitaceae*): Cucumbers, Squash, Melons

Morning Glory Family (*Convolvulaceae*): Sweet Potatoes

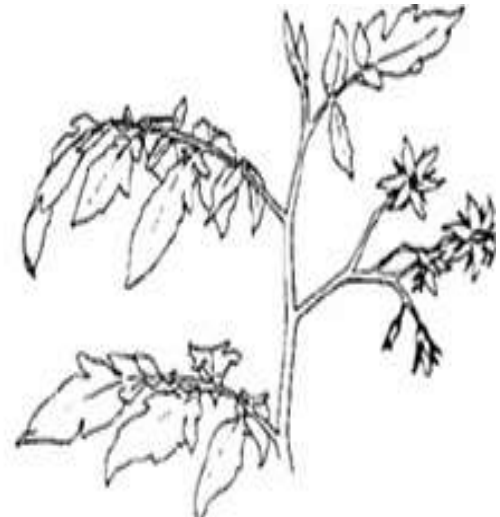
Warm-Season Vegetables



- Damaged by frost and killed by freezing temperatures
- Seeds germinate at warmer soil temperatures
- Thrive in warm temperatures, although growth slows at very high temperatures ($>90^{\circ}\text{F}$)
- Fruiting warm season vegetables may be indeterminate or determinate

Know Your Plants

- **Determinate:** Bush-type. Tend to set fruit at same time and exhibit earlier maturity
- **Indeterminate:** Vining, pole-type. Tend to set fruit over prolonged period and have higher overall yields



Cool Season Vegetables: Family Ties

Allium Family (*Allioideae*): Onions, Garlic, Leeks

Sunflower Family (*Asteraceae*): Lettuce

Parsley Family (*Umbelliferae*): Carrots, Celery

Goosefoot Family (*Chenopodiaceae*): Spinach, Beets, Chard

Mustard Family (*Cruciferae*): Broccoli, Cauliflower, Cabbage, Turnips, Collards, Kale

Cool-Season Vegetables



- Highly or somewhat frost tolerant
- Seeds germinate at cool soil temperatures
- Tend to have shallow root systems
- Greater response to N and P application
- Most provide poor quality if maturing in high temperatures
- Bolting (seed stalk development) may be a concern

Bolting

- Development of a seed stalk, or premature production of seed in a vegetable crop
- Most vegetable crops become unusable after bolting
- Triggered by:
 - a cold spell (vernalization) or
 - changes in day length (photoperiod)



Future Challenges for New Mexico Production

- Climate change will continue to create production challenges:
 - Irrigation availability
 - Erratic weather
 - Increased seasonal heat
 - Increased pest and disease pressure

Thank You!

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