



Growing Vegetables in a Raised Bed



Patrick Byers
Regional Horticulture Specialist
University of Missouri Extension



Outline

- Introduction to raised bed gardens
- Types of raised beds
- Construction materials
- Design
- Soil mix
- Growing vegetables in a raised bed
- The KOLR10 Raised Bed Vegetable Project

Growing Vegetables in a Raised Bed

Advantages of Raised Beds

- Better drainage
- Higher yields
- Expanded growing season
- Easier maintenance
- Using difficult sites
- Useful for children and people with disabilities

Growing Vegetables in a Raised Bed

Locating the Raised Bed

- Full sun
- Protection from wind
- Close to water
- Close to the house
- Away from trees with invasive roots
- Access

Growing Vegetables in a Raised Bed

Types of Raised Beds

- Temporary raised beds
- Permanent raised beds



Growing Vegetables in a Raised Bed

Construction materials

- Treated landscape timbers (?)
- Used railroad ties (?)



Growing Vegetables in a Raised Bed
Construction materials

- Treated lumber
- Rot resistant lumber
- Synthetic lumber



Growing Vegetables in a Raised Bed
Construction materials

- Concrete blocks
- Brick, stone



Growing Vegetables in a Raised Bed
Construction materials

- Concrete blocks
- Brick, stone



Growing Vegetables in a Raised Bed
Construction materials

- Concrete blocks
- Brick, stone



Growing Vegetables in a Raised Bed
Construction materials

- Concrete blocks
- Brick, stone



Growing Vegetables in a Raised Bed
Design

- **Shape**
 - Often determined by site limitations
 - Rounded or curved beds are easier with concrete blocks or masonry

Growing Vegetables in a Raised Bed
Design

- Shape
- **Width**
 - 4 feet width is best for beds accessed from both sides
 - 3 feet width is best for beds accessed from one side, or beds for people in wheelchairs or with walkers

Growing Vegetables in a Raised Bed
Design

- Shape
- Width
- **Length**
 - Usually determined by the site
 - Break up long lengths

Growing Vegetables in a Raised Bed
Design

- Shape
- Width
- Length
- **Depth**
 - Most plants do best with at least 6-12 inches of rooting depth
 - Beds higher than 24 inches require retaining walls and foundations
 - Beds for disabled gardeners are often 18-24 inches high
 - Seating can be accommodated on the sides of the bed

Growing Vegetables in a Raised Bed
Design

- Shape
- Width
- Length
- **Depth**



Growing Vegetables in a Raised Bed
Design

- Shape
- Width
- Length
- Depth
- **Pathways**
 - Foot traffic only – 1-3 feet wide
 - Wheelchair – 4 feet wide
 - 2 wheelchairs – 7 feet wide
 - Hard surface is best

Growing Vegetables in a Raised Bed
Design

- Shape
- Width
- Length
- Depth
- Pathways
- **Special features – cold frames**

Growing Vegetables in a Raised Bed
Design

- **Cold frames**



Growing Vegetables in a Raised Bed
Design

- Shape
- Width
- Length
- Depth
- Pathways
- **Special features – row covers, netting**

Growing Vegetables in a Raised Bed
Design

- **Row covers, netting**



Growing Vegetables in a Raised Bed
Soil Mix

- Good quality topsoil
- Added organic matter
- Work the base soil
- Mix the added soil with the base soil
- Can also use mixtures that do not contain soil – peat moss, vermiculite, rice hulls, compost, other materials

Growing Vegetables in a Raised Bed
Special Techniques

- Vertical gardening



Growing Vegetables in a Raised Bed
Special Techniques

- Vertical gardening



Growing Vegetables in a Raised Bed
Special Techniques

- Vertical gardening



Growing Vegetables in a Raised Bed
Special Techniques

- Vertical gardening



Growing Vegetables in a Raised Bed
Special Techniques

- Mulching



Growing Vegetables in a Raised Bed
Special Techniques

- Irrigation



Growing Vegetables in a Raised Bed
Special Techniques

- Companion planting




Growing Vegetables in a Raised Bed
Special Techniques

- Succession planting
 - Beans!
 - Beans!!
 - Beans!!!
 - Beans!!!!



Any Questions?



Growing Vegetables in a Raised Bed The Project

- Cooperators
 - Jill Gilardi, KOLR10
 - Patrick Byers, MU Extension



Growing Vegetables in a Raised Bed The Project

- Goals
 - Demonstrate raised bed vegetable gardening
 - Demonstrate potential for home vegetable production



Growing Vegetables in a Raised Bed Construction materials - 2008

- Treated lumber
- Metal stake supports
- Lined

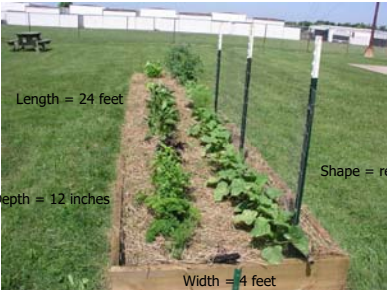


Growing Vegetables in a Raised Bed Construction materials - 2009

- Solid landscape blocks



Growing Vegetables in a Raised Bed Design



Length = 24 feet

Depth = 12 inches

Width = 4 feet

Shape = rectangle

Growing Vegetables in a Raised Bed The Soil Test

Growing Vegetables in a Raised Bed Soil Mix

- Topsoil
- Compost – 2 inches
- Tilled together

Growing Vegetables in a Raised Bed The Budget

MOU 10 Garden Project Proposal – Budget
24 foot x 4 foot raised beds, 12 inches deep

Item	Description	Cost per bed
Bed sides	2x12 treated lumber, cost per linear foot \$1.50, need 60 feet per bed, suggest 12 foot sections	\$90.00
Bed supports	2" metal supports, need 12 per bed, suggest steel egg post material, which is \$2.50/4 foot piece, cut in half	\$13.14
Lining for bed sides	6 mil plastic sheathing, need double layer, need 2' roll per bed	\$9.74
Topsoil	Delivered cost is \$23.75/cu yd, need 3.75 cu yd per bed, minimum delivered is 24 cu yd	\$88.00
Compost	MOU compost from CU is \$25/cu yd, price is raised for cost delivered (actual need 4 truck to haul), need 3 cu yd per bed for 2 inch layer	\$15.00
Soaker hose	Price is \$3 per 75 feet, need 50 feet per bed, need fittings for end pieces	\$10.00
Straw mulch	Need 2 bags per bed, cost per bag is \$4.79, 4 bags	\$4.79
Soil amendments	This is estimated pending results of soil test (see below)	\$10.00
Seeds and transplants	This is estimated pending final planting plan	\$50.00
Misc	Supports for plants, ties, stakes, twines, screws for bed construction, twine for construction to water supply, irrigation supplies, post cutting charge	\$100.00
Rental items	Soil mixer to move soil from delivered pile into beds, cost is \$150/hour	\$160.00
Rental items	Heavy duty tiller to work the base soil in advance of soil construction and to incorporate compost and soil amendments into bed soil, cost is \$15/hour	\$50.00 (estimated)
Total (with rentals)		\$570.67
Total (without rentals)		\$360.67

Growing Vegetables in a Raised Bed The Planting Plan - 2008

MOU 10 Vegetable Garden Project
Bed size: 24 feet x 4 feet

1. Tomatoes (16, planted 24" apart, and trained on cages, 3 dishing cutters and 3 cherry salad cutters)
2. 500 Bush Beans – bush beans, 16 rows, 16 plants
3. Cucumbers (12, planted 24" apart and trained on a parrot, using cutters)
4. 4' row of green beans, followed by lettuce
5. 4' row of lettuce, followed by green beans
6. 4' row of green beans, followed by cabbage
7. Eggplant
8. Eggplant
9. Sweet pepper
10. Sweet pepper
11. Sweet pepper
12. Sweet pepper
13. Sweet pepper
14. Sweet pepper
15. Sweet pepper
16. Peas (16 rows)
17. Peas (16 rows)
18. Peas (16 rows)
19. Peas (16 rows)
20. Peas (16 rows)
21. Peas (16 rows)
22. Peas (16 rows)
23. Peas (16 rows)
24. Peas (16 rows)
25. Peas (16 rows)
26. Peas (16 rows)
27. Peas (16 rows)
28. Peas (16 rows)
29. Peas (16 rows)
30. Peas (16 rows)
31. Peas (16 rows)
32. Peas (16 rows)
33. Peas (16 rows)
34. Peas (16 rows)
35. Peas (16 rows)
36. Peas (16 rows)
37. Peas (16 rows)
38. Peas (16 rows)
39. Peas (16 rows)
40. Peas (16 rows)
41. Peas (16 rows)
42. Peas (16 rows)
43. Peas (16 rows)
44. Peas (16 rows)
45. Peas (16 rows)
46. Peas (16 rows)
47. Peas (16 rows)
48. Peas (16 rows)
49. Peas (16 rows)
50. Peas (16 rows)

Growing Vegetables in a Raised Bed The Timeline - 2008


- April 23 – planning meeting
- May 9 – construct raised bed
- May 21 – planting the raised bed
- July 3 – first harvest
- July-October
 - Harvest is in full swing
 - Succession planting
 - Warm season crops
 - Cool season crops

Growing Vegetables in a Raised Bed The Timeline - 2009

- March 25 - Construct the new raised bed
- March 25 - Install cold frame
- April 8 - Planting the cold frame
- April 15 - Planting the cool season garden
- May-November
 - Harvest is in full swing
 - Succession planting
 - Cool season crops: May-June
 - Warm season crops: June-frost
 - Cool season crops: September-frost


Growing Vegetables in a Raised Bed
The Challenges

- Pest management - insects
 - Japanese beetle
 - Tomato fruitworm
 - Cabbage looper
 - Tomato hornworm
 - Dill worm
 - Flea beetle
 - Aphids



Growing Vegetables in a Raised Bed
The Challenges

- Pest management - diseases
 - Tomato early blight
 - Cucumber anthracnose




Growing Vegetables in a Raised Bed
The Challenges

- The Weather
 - Wind and hail damage
 - Wet conditions
 - Hot conditions

Growing Vegetables in a Raised Bed
The Challenges

- Other challenges
 - Weeds in the mulch
 - What to do with the harvest?
 - Thieves



Growing Vegetables in a Raised Bed
The 2008 Harvest

- Lettuce - 3 spring salads, 8 fall salads
- Cucumbers - 118
- Green beans - 8.5 lbs
- Tomatoes - 218
- Bell peppers - 30
- Onions - 12 green + 13 small bulb
- Eggplant - 40
- Broccoli - 8
- Cabbage - 3
- Cauliflower - 5
- Radish - 5 bunches
- Herbs -
 - Basil - 8 bunches
 - Parsley - 11 bunches
 - Sage - 2 bunches
 - Rosemary - 1 bunch
- Flowers - zinnias (7 bouquets); sunflower (38)

Growing Vegetables in a Raised Bed
The 2008 Harvest - Value

■ Lettuce - 3 spring salads, 8 fall salads	\$20.06
■ Cucumbers - 118	\$85.00
■ Green beans - 8.5 lbs	\$14.36
■ Tomatoes - 218	\$109.00
■ Bell peppers - 30	\$20.70
■ Onions - 12 green + 13 small bulb	\$3.38
■ Eggplant - 40	\$15.92
■ Broccoli - 8	\$7.16
■ Cabbage - 3	\$4.14
■ Cauliflower - 5	\$14.95
■ Radish - 5 bunches	\$5.59
■ Herbs -	\$24.85
■ Basil - 8 bunches	\$19.92
■ Parsley - 11 bunches	\$8.69
■ Sage - 2 bunches	\$4.98
■ Rosemary - 1 bunch	\$2.49
■ Flowers - zinnias (7 bouquets); sunflower (38)	\$59.00

Growing Vegetables in a Raised Bed
The 2008 Harvest

Total value of harvest:
\$384.11



Growing Vegetables in a Raised Bed
Developments in 2009

- More vegetables
 - Spring cool season garden
 - Warm season garden
 - Fall cool season garden
- Cold frame gardening
- A new raised bed
 - Concrete block walls
 - Soilless growing media

Growing Vegetables in a Raised Bed
Developments in 2009

- More vegetables



Growing Vegetables in a Raised Bed
Developments in 2009

- Cold frame gardening



Growing Vegetables in a Raised Bed
Developments in 2009

- The new raised bed



Growing Vegetables in a Raised Bed
Developments in 2009

- The new raised bed



Growing Vegetables in a Raised Bed
Developments in 2009

- The new raised bed – challenges
 - Nutrition was an issue
 - Watering was a challenge
 - Voles!!!
 - Plants needed staking or support



Resources

- MU Extension publications:
<http://extension.missouri.edu/main/DisplayCategory.aspx?C=41>
 - Raised bed gardening
 - Vegetable planting calendar
- Patrick Byers: ByersPL@missouri.edu
417-859-2044

Any Questions?

