

Foundation Farm/ Tunnel Costs & Returns



Midwest Winter Vegetable Production Conference
January 21, 2016

Foundation Farm/ Tunnel Costs & Returns



FARM BY THE NUMBERS:

- 24,000 square feet in cultivation (1/2 acre), set over 5 acres.
- \$80,000 yearly sales, 25+ crop types, 4 seasons.
- 4 high tunnels: 3 (100X17), 1 (100X30).
- 3 weekly farmers' markets (65%), small CSA (5%), 1 large store & 4 restaurants (30%).
- Labor: 3 mornings (Mo/We/Fr), crew of 3 to 6 for a total of 60 hours man-hours weekly.



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FARM PHILOSOPHY: ORGANIC, NO-TILL

- **Optimal microbial life:** natural soil texture and structure plus micro-biological "glue" form "aggregates" which creates an ideal ecosystem. Tilling destroys soil's natural texture, structure and micro-biome!
- **Optimal water and air content:** soil in its un-tilled, natural state optimizes water and air availability to plants and micro-organisms. Tilling cuts moisture and air capacity in half leading to heavier irrigation and repeated tilling.
- **Optimal nutrient availability:** undisturbed soil structure and biology optimizes nutrient accumulation/release, hence can reduce, and even eliminate the need for any fertilizer.

Plants are capable of producing "exudates" which attract specific micro-organisms (bacteria) which in turn can feed the plants throughout the extensive rhizosphere (root area). Rhizosphere can be vastly extended by fungal networks.

Tilling leads to more fertilizing, organic or conventional.



Foundation Farm/ Tunnel Costs & Returns



1-Lowest Cost Options: mini-tunnels and row-covers:

- ❖ best for season-extension and winter tunnels and, more marginally, for outdoor over-wintering.
- ❖ Freeze-safe to 25 degrees or 20 degrees if doubled. Use medium grade covers.
- ❖ Increase quality and marketability of early spring, late fall and winter crops (no freeze burn).
- ❖ Easy to set up (covers) and use for harvest (covers).
- ❖ Cost-efficient; mini-tunnels can be build for less than 50 cents/square-foot
- ❖ Reduce the impact of predators like crows and deer.



Foundation Farm/ Tunnel Costs & Returns



2- Low Cost Option: low tunnels/specs

- ❖ 17 wide, 8' tall (highest) and 100' long (flexible); low profile against winds, no internal support or cross-beams, good cross ventilation.
- ❖ Full access from the outside and inside paths with 6' foot clearance
- ❖ Standard 24' long arches which can be transported on a 18' trailer.
- ❖ Allows 3 beds (3.5 to 4 feet) with path (2.5 feet)



Foundation Farm/ Tunnel Costs & Returns



2- Low Cost Option: low tunnels/specs

- ❖ individual components gathered from cost-competitive sources, for a 50% savings over kits of similar size.
- ❖ Total cost: 1\$/square foot (see breakdown) .
- ❖ High quality materials, designed to sustain high winds (70mph so far), and to last over 10 years:
 - Arches: 1" square-tubing, micro-galvanized steel
 - Plastic cover: Tufflite IV, 6mil, UV-treated
 - Structure anchors
 - Plastic Attachment: U-channels and Wiggle Wire
 - All hardware rust-proof (SS, galvanized, zinc-plated)



LOW-TUNNEL PARTS & SUPPLIES
SIZE: 100X17 (Rev. / Nov. 2010)



qty	description	price	supplier	phone/website	total
1	100'x25' TuFiller IV Plastic, Clear +\$8&11	175.50	Imperial Hardware & Supply, Inc.	www.imperialhardware.com 800-442-4147	175.50
1	20'x10' TuFiller IV Plastic, Clear +\$8&11	70.20	Imperial Business & Supply, Inc.	www.imperialhardware.com 800-442-4147	14.40
18	1/2" Square X 16 galvanized X 24' +\$8&11	21.90	C&R Wholesale Pipe & Tube	Dave Phillips 800-708 8823	394.20
3	5/8" rebar	10.00	C&R Wholesale Hardware Store	870-425 2463	30.00
8	Eye Bolts 1/4X1.5 3/4 in.	1.00	Hardware Store		8.00
100+	28 Oz self-drilling metal screws	.12	Hardware Store		12.00
20	7/8" EMT conduit	3.70	Hardware Store		74.00
18	1/2" EMT coupler	.70	Hardware Store		12.60
	Misc. PVC parts for 2 cranks				3.00
100+	Nylon 3/8" rope		Hardware Store		13.00
200+	1" x 3" cedar planks	25	Local wood-mill		25.00
36	Carbs 3/4 x 2.5" carriage bolts/nuts	1.00	Hardware Store		36.00
31	Aluminum Poly Patch Single Channel +\$8&11	7.84	Farmtek Morgan County	www.farmtek.com 800-327 4835	243.04
23	38 Soving Whiggle Wire +\$10.18	1.85	Farmtek Morgan County	www.farmtek.com 800-327 4835 www.morgancountystore.com	79.00
34	Auger Style Earth Anchor	4.89	Farmtek Morgan County	www.farmtek.com 800-327 4835	61.05
18	1" EMT conduit	6.00	Hardware Store		108.00
16	1" EMT conduit couplers	1.60	Hardware Store		25.60
32	1" x 1/2" 2-hole metal straps	.70	Hardware Store		22.40
TOTAL					\$1,525

Foundation Farm/ Tunnel Costs & Returns



2- Low Cost Option: low tunnels/set up

Factors: sun exposure, drainage, heat/cold management, ventilation, bed surface optimization.

- ❖ Tunnels are lined East-West with prevailing winds from the West
- ❖ Tunnels are left open on the off-wind (East) side
- ❖ Beds are 3.5' or 4' wide with 2.5' paths
- ❖ 6" drainage ditches on fan sides
- ❖ Beds are covered individually with covers floating on metal wire hoops
- ❖ Ventilation is from East end (always open) and both sides (rollable).



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2- Low Cost Option: low tunnels/techniques

- ❖ No tiller/tractor, all work is manual; only machine is mower
- ❖ Mulch: used against weeding
- ❖ Fertility: organic matter (rabbit manure, mulch, plant residues), feather meal (nitrogen)
- ❖ Heat protection/ventilation: roll-up sides, permanent opened end
- ❖ Plant winter positioning: hardiest plants are set on outside beds



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2- Low Cost Option: low tunnels/benefits

- ❖ Increased production time: 6 months added (Dec.-May.)
- ❖ Increased yields and quality (improved weather, low soil compaction)
- ❖ Increased crop protection (crow, deer)
- ❖ Bottom line: \$12,000 winter income and triple tomato income (summer-fall)



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3- High Cost Option: high tunnels

- ❖ Maximized tunnel benefits: weather, space/access, durability
- ❖ 5 degree extra hedge against killing freezes!
- ❖ Kit from Morgan County Seed: 2 3/8" diam. 14 gauge galvanized steel arches, 6mil. UV-treated plastic, 3 lines of purlins, corner braces and drop curtains.



100' by 30' by 15' Cost = \$8,000

Cost/Square foot: \$2.65

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3- High Cost Option: high tunnels/weakness

- ❖ Increased wind sensitivity: tunnel height (15 feet versus 8 feet for low tunnels) makes it prone to destruction under catastrophic winds (70mph and higher).
- ❖ Recommendation: heavy-duty square-metal frame on the wind side; generous concrete footings on all poles.



Foundation Farm/ Tunnel Costs & Returns



4- Low & High Tunnels/ returns

Both types of tunnels easily justify their costs by providing large incremental returns, in the form of increased yields in summer (tomatoes, peppers, etc.) and additional crop production in winter.

	LT 1			LT 2			LT 3			HT				total sq. feet
End	200	300	200	200	300	200	200	400	400	400	200	400	200	4250
1st week 8-15	planting	planting	planting	planting	planting	planting	planting	planting	planting	planting	planting	planting	planting	
9/Week	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
months	3	3	4	3	3	3	3	3	4	5	3	4	5	
invested	\$400	\$400	\$400	\$400	\$400	\$400	\$400	\$400	\$400	\$400	\$400	\$400	\$400	\$6,400
1st week 12-01	harvest	harvest	harvest	harvest	harvest	harvest	harvest	harvest	harvest	harvest	harvest	harvest	harvest	
9/Week	0.4	0.35	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
months	4	4	5	3	3	3	3	4	5	3	5	4	5	
invested	\$400	\$400	\$300	\$300	\$700	\$0	\$300	\$475	\$300	\$0	\$0	\$500	\$500	\$283
total/week	\$800	\$1,100	\$700	\$700	\$1,645	\$363	\$750	\$963	\$736	\$300	\$500	\$500	\$500	\$613
total/season	\$2,400	\$2,400	\$2,400	\$2,400	\$2,400	\$2,400	\$2,400	\$2,400	\$2,400	\$2,400	\$2,400	\$2,400	\$2,400	\$11,110
additional summer income assuming all tomatoes between June 1st and November 1st (6 months):														
4250 square feet X 500lb/acre/square foot X 6 months = 12,750														
Summer Total:	\$12,750													
Year Total:	\$29,860													
total cost:	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$12,000

Foundation Farm organic/no-till system



My gardening/farming books are available for \$10 each or \$25 for all 3...

