Pleasant Valley Farm
Argyle, New York
February 2019
Paul & Sandy Arnold

TOPIC LINE-UP FOR HIGH TUNNEL PRODUCTION
- **BASIC CONSTRUCTION OF OUR HIGH TUNNELS**
- **SOILS, BED PREPARATION, SEEDING & TRANSPLANTING**
- **CROP SPECIFICS**
- **PRINCIPLES OF WINTER PRODUCTION**
- **INSECTS AND DISEASES**
- **HARVEST, WASH, PACK**
- **TECHNOLOGY**

Season Extension and High Tunnel Construction Basics

SEASON EXTENSION HAS INCREASED OUR PROFITS SINCE 1992
- **STAY ON THE FARM**
- **LEVEL OUT THE INCOME**
- **CUSTOMER IMPACTS**
- **YEAR-ROUND WORKERS**

SEASON EXTENSION
- Row Covers
- Field Houses
- High Tunnels

PROS & CONS

<table>
<thead>
<tr>
<th>HIGH TUNNELS</th>
<th>LOW TUNNELS</th>
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<tr>
<td>Expensive</td>
<td>Inexpensive</td>
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<tr>
<td>1-2 year payback</td>
<td>Fast Payback $$</td>
</tr>
<tr>
<td>Diverse crops</td>
<td>Limited crops in Winter</td>
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<tr>
<td>Long-lived</td>
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<tr>
<td>Tractor accessible</td>
<td>Work by hand</td>
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<td>Not as sturdy</td>
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<tr>
<td>Hard to Rotate</td>
<td>Easy Rotations</td>
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<td></td>
<td>Yearly labor high</td>
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APRIL 10TH

Pros & Cons

Pros:
- Expensive
- 1-2 year payback
- Diverse crops
- Long-lived
- Tractor accessible
- Sturdy in weather
- Hard to Rotate

Cons:
- Inexpensive
- Fast Payback $\$
- Limited crops in Winter
- Short-lived
- Work by hand
- Not as sturdy
- Easy Rotations
- Yearly labor high
SITE SELECTION

- SOILS
- SLOPE
  - ORIENTATION-Winter/Summer
  - DISTANCE BETWEEN-Solar Mapping
  - WATER INFILTRATION
  - SHADING-PROTECTION
  - WIND
- SERVICES-Water, Electricity, Access

PRECISION WITH A TRANSIT

TUNNEL ONE 30’ X 144’
LAYOUT OF PIPES-INSULATION 2”X12”

HAVE SITE WORK DONE EARLY
HIRE THE PROFESSIONALS!

Polycarbonate knee wall-24” w 6” in ground

Water lines-- 4” drainage--fabric
RIMOL GREENHOUSES BUILT FOR SNOW

TUNNEL #2  34’x144’
NO WOOD!

POLYCARBONATE & SLIDER DOORS

• Aluminum Double Track
• Roll Curtain & Wiggle Wire

3 TUNNELS 1-30’X144’ 2- 34’X144’

RAT RUN FOR SNOW!

Large end vents—One layer of plastic

POWER & PROPANE & 2 WATER SOURCES

AUTOMATIC ROLL-UP SIDES $1200
PAY FOR THEMSELVES WITHIN A YEAR
Automatically raises and lowers every 5 minutes in 5 increments

Benefits of production
Efficiency

12 VOLT DC MOTORS

MOSTLY SUN DRIVEN SYSTEM
LIMITED HEAT THERMOSTAT 21 DEGREES UNDER COVER EMERGENCY HEAT FOR HARVESTING

Soil Management, Bed Prep, and Seeding

SOIL HEALTH

Soil Tests
- Take Annually to track progress
- Pick a lab and stay with them — Waypoint Analytics has great a great reference book
- Take sample same time every year
- Be accurate in sampling — Soil probe is a good tool to own

SOIL HEALTH

Soil Tests
- Amend as needed or get custom fertilizers (2 opinions)
- Know how to calculate what is needed
- Know crop needs (Knott’s Handbook)
- Soil Test as Soil Media maybe for high tunnels

Soil Tests
- Each Lab is individual
- Logan-extra micronutrients
- Extension-Resource
**SOIL HEALTH**

**Soil Tests**
- Micronutrients important
- Ask for full soil analysis
- Bargain at any price!
- No longer 3 major nutrients
- Spread evenly to get all nutrients up to proper levels
- Side-dressing of Nitrogen is common
- pH must be in proper range (6.5+); Adjust with lime or sulfur per recommendations

**APPLYING NUTRIENTS**
- Large spreaders
- Hand spreading
- Spray on fields
- Small spreader
- Through irrigation

**LIQUID MICRONUTRIENT APPLICATIONS**
- Even distribution
- Tank Mix
- Spring or Fall

**50 GAL 3 PT HITCH HYDRAULIC SPRAYER W 100’ HOSE**

**LOTS OF ORGANIC FERTILIZERS OUT THERE**
- Know the numbers
- OMRI-approved & listed
- Multiple nutrients
- What’s needed in your soil

**CUSTOM BLEND FERTILIZERS**
- 20# Solubor (20% B)
- 16# Copper Sulfate (25% Copper)
- 400# Feather Meal
- 200# Humates
- 1214# Peanut Meal
- 100# Elemental Sulfur (90% S)
- 50# Zinc Sulfate (20% ZN)

**GIVE SPECIFICS-POUNDS/ACRE & CUSTOM MADE BASED ON SOIL TEST**

**CUSTOM BLEND FERTILIZERS**
- Consider cost at $800 per ton
- Spread at rate of 500# per acre to add 60# of N per acre
- Covers 4 acres and cost is $200 per acre
- One acre on our farm grosses approximately $30-65,000 per acre
- GREAT VALUE & Deals with all Nutrients
OUR FERTILIZER IN TUNNELS

• NO ANIMAL PRODUCTS
• THEREFORE NO SALTS
• Use plant-based for tunnels
• Nitrogen: Peanut Meal, Soybean Meal, Cottonseed Meal, Peanut Meal

- Leaf Compost or Peat Moss

COMPOST

• Can be good
• Can be bad
• Critical to be weed-free
• Good if need nutrients and organic matter
• Can be expensive
• Must be properly finished

• Use caution for soil mixes
• 1 to 2 year old compost best

SOIL HEALTH

COMPOST

• Know your rates
• Use manure spreader designed for compost, like H&S
• Adding other types of organic matter are an option, like peat moss

SOIL HEALTH

PEAT MOSS VS COMPOST

CROPS ARE PACKED IN AND NEED EXTRA FERTILITY

BENEFITS

• Smother Weeds
• Hold Nutrients
• Maintain Organic Matter
• Source of Pollen for Bees
• Food for Beneficials
• Break up hardpan

COVER CROPS & ROTATIONS
PLASTIC OFF

COVER CROP-COW PEAS
- 90#/ACRE RATE
- BROADCAST
- DROUGHT & HEAT TOLERANT
- 100-150# N/ACRE

COVER CROP-BUCKWHEAT
- 90-100#/ACRE RATE
- BROADCAST
- SMOTHERS WEEDS
- ATTRACTS BENEFICIALS
- ATTRACTS POLLINATORS
- FAST: 70-90 DAYS
- PHOSPHORUS SCAVENGER
- CAN MOW

PREPARE SOILS

SUBSOILER
- Deep
- Hard Pan
- Results of Growth

Peat Moss
30 bales per tunnel

BED PREP

BED PREP
BED PREP

SPREAD PEAT MOSS AND FERTILIZER

 PRIMARY TILLAGE

Chisel Plows
- Fast
- Better for soil
- 2 foot
- Every year
- Different points

SECONDARY TILLAGE

Kuhn 5 ft Rototiller
- One pass-fine seed bed
- Quality brand
- Commercial
- Extended sides of tunnel
BED FORMING

Rotary Plow

BED FORMING

Raking out

BED FORMING

PREPARE TUNNEL MID-LATE SEPTEMBER

Rake tops of bed level
Direct seed using Jang seeder or Earth-way seeder

PREPARE TRANSPLANT BEDS

- 7 BEDS IN 30' WIDE TUNNEL
- 8 BEDS IN 34' WIDE TUNNEL
- ROTOTILL AND FORM BEDS (BY HAND WITH A SHOVEL...TAKES APPROX 5 HOURS)
- BEDS ABOUT 3 FT WIDE
- LAY BIOTELLO BY HAND TO SAVE SPACE

ROCK DOWN BIOTELLO
Waterwheel axle for marking

MUST PLANT BY OCT 5th

PLANT TRANSPLANTS
- 5 Rows per bed
- 3 Rows of Kale or Swiss Chard with 2 rows of Asian Greens in-between

PLANTING DATES – MATURITY – OCT 26
- Guessing game
- Critical to yield

ADD STRAW TO PATHS
- Paths weed-free
- Cushion on knees
- Clean & neat
- Organic matter
- Row-cover stays cleaner
- Install via buckets or plastic
- Note-tape measure

TRANSPLANTING OCT 1, 2018

GREENHOUSE SEEDINGS

SEEDS
- Good seeds are critical to success
- Quality seeds
- Disease free

GREENHOUSE
SEEDS
CONSIDER HOT WATER TREATING

GREENHOUSE

Organic Soil Mix-Cornell:
2 bales horticultural grade peat moss (3.8 cu ft)
1 bag of perlite (21# bag course)
6# organic fertilizer 5-3-4 (not animal based)
2# lime

*Test soil mix for pH and salts and nutrients
*Test greenhouse water for pH
*Work with professionals if issues

GREENHOUSE CARE

• Diseases - Root Shield and Root Shield Plus
• Actinovate - Fusarium
• Biological Stimulants
• Humic Acids

TRANSPLANT SOLUTIONS
Water in

KALE & SWISS CHARD
SEEDED JULY 15TH

GREENHOUSE SEEDING DATES

• Asian Greens - Aug 25th to Sept 1st
• Spinach - Sept 20th to Oct 1st

TRANSPLANT UP

• TRANSPLANTS ALLOW SUMMER PRODUCE TO CONTINUE PRODUCING IN TUNNELS
• CAN POT UP IF NECESSARY DEPENDING ON VALUE OF TUNNEL CROPS LIKE TOMATOES

HAVE READY TO PLANT IN TUNNEL ABOUT OCTOBER 5TH
Utilize all winter radiant heated benches.

Winter production in high tunnels.

How we grow them:

- Crops we grow:
  - Kale
  - Swiss chard
  - Spinach
  - Asian greens
  - Lettuce mix
  - Arugula
  - Broccoli raab

- Varieties:
  - Kale: Red Russian, White Russian, Winterbor
  - Swiss chard: Bright Lights
  - Spinach: TRAIL
  - Disease Resistant Lettuce, Mustards
  - Arugula: Astro, Regular
  - Asian Greens: Tokyo Bekana, Yukina Savoy, Vitamin Green, Tatsoi, Red Choi, Black Summer, Mei Qing Choi, Joi Choi

America
Bahamas
Corvair
Crocodile
Donkey
Emilia
Emu
Erste Ernte
Giant Winter
Lazio
Lombardia
Menorca
Tyee
Queen
Raccoon
Red Kitten
Reflect
Regiment
Samish
Seven GRN
Space
Spargo
St Helens
Tarpy

Spinach—Always doing trials! Changing!
24 varieties for 2011-12
### Summary

Yields can vary! Operating from Mar 8.

**Not a simple list!!**
- Some early
- Some late
- Upright
- Flat
- Spacing
- Direct seed
- Transplant
- Disease resistance

### Plant Transplants

- 5 rows per bed
- 3 rows of Kale or Swiss Chard with 2 rows of Asian Greens in between

### French Intensive Method

- **Swiss Chard and Asian Greens**
  - Asian Greens for Braising Mix
    - Tokyo Bekana
    - Yukina Savoy
    - Vitamin Green
  - Kale and Asian Greens
- Asian Greens also named “Large leaf mesclun mix”!
- Start harvesting December/January...love cold
- Kale & Swiss Chard dormant till late Feb unless warm!
FRENCH INTENSIVE METHOD

Asian Greens love the cold weather and flourish in Dec and January

Kale and Chard take off in February and produce like crazy all Spring

SPACING

8 x 12 for
- Kale
- Swiss chard
- Asian Greens
- Happy Rich Broccoli

4 x 14 for
- Broccoli Raab

Herbs: Parsley - Cilantro - Rosemary++

DIRECT SEEDING DATES

OCTOBER 1st
OPTIMUM FOR US (some years!)
SUCCESSIVE
- Salad Mix LETTUCE
- MUSTARDS-Reds, Greens
- SPINACH
- ASIAN GREENS - Mizuna, Tatsoi, etc

OTHER TRIALS

- Scallions
- Escarole
- Onions
- Turnips

WINDOW OF OPPORTUNITY
SEPTEMBER 20th TO OCT 5th
SPACING

- Spinach - Transplant 3-4 per cell: 5”x8”
- Spinach - Seeded 8”

FIND YOUR DATE!

THE WINTER HARVEST HANDBOOK BY ELIOT COLEMAN

Time of seedings are critical... Successive seedings gives consistency

Weather is a changing factor

SPACING

Lettuce, Asian Greens & Mustards for Salad Mix and Arugula

- 2 ½ inches
- Separate varieties
- Earthway or Jang

SPACING

Mustards are seeded in small blocks

Arugula to the right in successive plantings

ARUGULA

- Successive seedings
- Oct 1st & Nov 15th
- Astro & Regular

LETTUCE ALL WINTER
❖ DISEASE RESISTANCE
❖ NOW SEED SEPARATELY
❖ HAPPY CUSTOMERS
**SALANOVA LETTUCE**

- New 2012
- Trialed Winter 2012-13
- Seeded 9/30
- Not ready until March
- Small plants cold tolerant
- Few disease issues

- Makes a great quality mix
- Same length leaves
- Can recut
- Slower to grow

**PERCENT USE & VALUE**

Map for efficiency
Value per square foot high:
Usually about $4-$5 gross income

**JANUARY SEEDINGS**

- Broccoli Raab
- Happy Rich
- Asian Greens
- Salad Mix Greens

**LATE WINTER/EARLY SPRING PRODUCTION**

- Fantastic efficiency for harvest
- Cut 8 pounds in 5 minutes

**IN THE GREENHOUSE**
Seeded in January, transplanted into the tunnel in February, will produce in spring/summer

**BROCCOLI RAAB**

- GH Seeded in early January, transplanted to tunnel in March
- Produces all year till October+

**HAPPY RICH BROCCOLI**

- GH Seeded in early January, transplanted to tunnel in March
- Produces for April & May

**ASIAN GREENS**

**NEW SYSTEM**

- STRIP TRAYS
- DIRECT PLANT

**IN THE GREENHOUSE**

**LETTUCE**

- GH SEEDED FEB 15+
- SPEEDLING VS WINSTRIP
- TRANSPLANT IN MARCH into TUNNEL

- FULL SIZE HEADS
  - New Red Fire, Green Star, Carmona, Nancy and Romaine++
  - MINI HEADS–Many from Johnny's
  - HARVEST IN MAY
  - Mini Heads make the salad mix or are $1

**LETTUCE**
Principles of Winter Production

Transition to Summer

Principles Outline

- Venting
- Temperature Acclimation
- Row covers & Hoops
- Weeding
- Watering

VENTS OPEN 24/7 TO KEEP HUMIDITY DOWN

HAF FANS CRITICAL
KEEP ROW-COVERS DRY

PROTECTION

ROWCOVER
- 1, 2, 3
- Height
- Hoops
- Fold into center
HAND WEEDING

- Lots of tools out there
- Everyone has a favorite

HAND WEEDING

- Stand-up Wire Weeder work great
- Two Bad Cats

WINTER MAINTENANCE

Our Favorite:
Dutch Push Hoe
Walking pace
Incorporate fertilizer
www.Earthtoolsbcs.com

BED STEAMING

NEW SYSTEM FOR WEED CONTROL

- Uses 4-5 gallons per hour of diesel
- Hand weed vs steaming
- Pros and Cons
HAND WATERING
- In winter—spot water when needed
- Even watering
- Seed starting & Transplant watering in
- Row covers can be left in place

WINTER MAINTENANCE

DRIP TAPE WATERING
- Great for BioTelo beds
- Can use on all beds year-round
- Don’t get row covers wet

WINTER MAINTENANCE

WATERING OVERHEAD
- Good for seed starting
- Use nozzles that empty water out so don’t freeze
- Out of way

WINTER MAINTENANCE

TEMPORARY HEATING
GREAT RESULTS!
- LB White
- Johnson A421
- Nema 4
- Crop Value

LEARNING NEW TRICKS EVERY YEAR
- Harvest time
- Emergency night time
- Thermostat
- Value of crops
- Forever learning
Pests, Insects, and Diseases in the Winter High Tunnels

WINTER PESTS
- Downy Mildew
- White Mold
- Fusarium
- Powdery Mildew
- Cladosporium
- +++++
- Aphids
- Crown Mites
- Cabbage Looper
- Army Worm
- Voles
- Rabbits

WINTER INSECTS
- Aphids
  - Ladybugs:  
    - Buy Early
    - Spread weekly
  - Aphidoletes
    - Predaceous mite
  - Safer Soap

- Mites
  - Ragged edges on leaves/irregular leaves
  - Microscopic
  - Predatory Mites
  - Aza-direct

SPINACH CROWN MITE
- Monitor to catch early!
CABBAGE LOOPER & ARMY WORM
• Monitor to catch early!
• BT Effective

PESTS

Voles and Rabbits
• Traps
• Cats
• Dogs
• Feet
• Lead

Secure perimeter

PESTS

MANAGE FOR DISEASES..
OR IS IT DISEASE?

Voles and Rabbits
• Traps
• Cats
• Dogs
• Feet
• Lead

Secure perimeter

PESTS

Actinovate
• Regalia
• Cease
• Double Nickel
• LOTS OF TRIALS!

WINTER DISEASES

Downy Mildew in Lettuce and Greens

Actinovate
• Regalia
• Cease
• Double Nickel
• LOTS OF TRIALS!

WINTER DISEASES

Lettuce - Downy Mildew

Spinach Downy Mildew

The ‘late blight’ of spinach re-emerging in NE.
Found in high tunnel crops.
See it? Report it! Manage it!!

Images cf. Teresa Rusinek, Cornell

Lettuce - Downy Mildew

Spinach Downy Mildew

The ‘late blight’ of spinach re-emerging in NE.
Found in high tunnel crops.
See it? Report it! Manage it!!

Images cf. Teresa Rusinek, Cornell
WINTER DISEASES

• Maybe in seed
• Hot water treat?
• Variety selection for resistance
• Eliminate by spring plantings
• Major concern
• 16 Races

POWDERY MILDEW on Lettuce

• CONTROL: Milstop & Stylet Oil (JSS)

WHITE MOLD
Sclerotinia Drop
Lettuce Drop

• Causal Agent: Sclerotinia sclerotiorum
• 3 year rotation
• Sclerotia
• Ascospores
• CONTROL: Contans$$$

Fusarium & Mildews

• Root Shield Plus
• Actinovate
• Soil Serenade

WINTER DISEASES

VENTING most important!
• Temperature fluctuations
• +/- 20 degrees
• 65% or less RH

HAF FANS CRITICAL HUMIDITY & DISEASE DOWN

Cladosporium leaf spot

Downy Mildew in Spinach-NEW IN EAST
DISEASE PREVENTION

- Venting
- Sides Up
- Fans
- Variety
- Spacing
- Biologicals

Harvest, Wash & Pack

1990 EARLY YEARS: PUTTING $10,000 EACH YEAR BACK INTO THE FARM – SPEND $ TO MAKE $

MORE WINTER WORK – LOOK AHEAD

1995 REVISION 2:
Heated Washing Station
Insulated Overhead Doors

THINK AHEAD & PLAN FOR THE FUTURE! GAPS – FSMA
Floor Mats  
Smooth and washable walls  
Roll Carts  
Stainless Steel

FINAL REVISION!! 2015

12x14 cooler-Insulation-Radiant Heat

Dains-Cooler Insulation

American-Slider Doors

ACCESS DOORS-Auto keypad openers
HARVEST CRATE STORAGE

LOADING FOR MARKETS MADE EFFICIENT

Barrel Roots Washer-Winch

Switches-Water, On/Off both ends, Lights

Setup for Efficiency-Drain

Compact but user-friendly
Lights-Platform (Soon!)-Golf Cart storage
POWER WASHER for root crops

Can wash over 400 pounds of root crops in an hour with 3 workers!
• $1000 AND 2 WEEK PAYBACK
Get more done in less time...can keep price down.

• Buckhorn crates
• Window of opportunity for harvest

WINTER HARVESTING

BARREL WASHER-CRATES-OLD SYSTEM

Air heat-Reznor-2 Days

• Tools
• Specialty Knives

WINTER HARVESTING
WINTER HARVESTING

• Keep area clean and neat—no debris
• Clean up bed after cutting
• Many re-cuts

WINTER HARVESTING

• Weigh as we go
• Keep records!

USE SEPARATE CONTAINERS FOR HARVESTING VS MARKETS

Custom Harvest Wheelbarrows
Goes direct from field or tunnel to wash station

ONE OF OUR FAVORITE THINGS!

GOLF CARTS
• We now have 3
• Easy to drive
• Inexpensive
• Great for kids

GOLF CARTS
• Move lots quickly from field to wash area to maintain produce quality
SYSTEMS—READY TO GO FOR WASH/PACK DAY!

HOSE RETRACTOR—NEAT & TIDY

BUBBLER
- 200 gallon Milk bulk tank
- Jacuzzi Motor
- Efficient
- 400 bags spinach in 90 minutes = $1200
- OR $800/hour with 4 workers

3” PVC PIPE WITH ¼” HOLES FACING UP
SPECIAL BARS WELDED IN

BUBBLER GREENS WASHER

Motor in attic—Warm water
SANITIZE? STORAGE LIFE

Liz.Cashman@ecolab.com
$97 for 5 gal pail shipped
Test Strips

BUDDLER GREENS WASHER

Efficient assembly line

Load vented baskets...
Then netted bags

- Washing machine
- Spin cycle on switch 8 Sec
- Arugula, Salad Mix & baby spinach

- Washer on wheels
- Retractable cord
• Everything at hand
• Vented bags
• Standard count per crate
• Market crates never on floor

EFFICIENT SYSTEMS IN THE WASHING STATION

• Crates on wheels
• Floor Drains
• Knife racks
• Auto front door
• Cement to cooler

• Wash Greens first
• Cleanest to start

• Use test Strips to retest if more sanitizer needed

• Rubber bands pre-bunched
• Backup Scales
• Two per market

WARM WASH WATER

Hand-washing Sink-Instant Hot Water-Stiebel

• WHITEWASH BOARD
• LABOR POSTERS

Scale for weighing central for records
• New shelves for organization

Slide-out shelves for scales-charging

CLEAN UP EACH DAY!

• BUBBLER PIPES BRUSHED OUT AFTER EACH USE & PIPES DRY

WASHING CRATES

• High Pressure Washer
• Clean weekly or bi-weekly
• All harvest & market crates

Reduce risk of contamination with washable walls, floors, equipment, etc.

EMPLOYEE HANDBOOK-MARKET & FARM
• SAFETY REQUIREMENTS
• BATHROOM & HANDWASHING RULES
• SICKNESS
• WASH STATION PROTOCOL
• ATTIRE REQUIREMENTS
• SHOE/BOOT RULES
• FIRST AID/CUTS
• POSTERS & REGULATIONS POSTED
• NEW HIRE SAFETY TRAINING
• ANNUAL REVIEWS
• ++++++++ FSMA+++GAPS
• http://producesafetyalliance.cornell.edu

HAVE A FARM SAFETY PLAN

Feel good about serving customers clean, safe, healthy produce!
**TECHNOLOGY on PVF**

Increases Efficiency - Prevents Disasters

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**Why Technology on PVF?**

- Avoid Disasters
- Peace of Mind
- Notifications when away
- Training
- Improvement of systems
- Efficiency of time
- Checking on status
- Improves communication
- Increases accuracy of growing data

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**WHAT Technology on PVF?**

- Monnit Monitoring system
- Cameras
- Davis Weather System
- Farm Truck Monitoring - “Automatic”
- iPad usage - Market
- iPad usage - Washing Station
- CC reader
- WiFi

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**CAMERAS**

- Security
- Monitoring
- Safety
- Travel check
- Record
- Training
- Camera $150
- 1 Controller ~$400

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**SEVEN CAMERAS—LIVE FEED 24/7 CAN RECORD WITH MOVEMENT**

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**MONNIT SYSTEM**

- Wireless ~1,000ft
- Alarms to text or email (calling extra)
- Records all data
- Batteries last 2+ years
- Easy to move around

$80-$375 per sensor (most common Temp sensor $185), $200 sensor manager, $150 per year subscription
• 25+ sensors
• Temperature
• Water pressure,
• Humidity (limited)
• Voltage
• CO
• Wetness (flooding)

WEATHER STATION
Davis Vantage Pro II
Remote sensors
Repeaters
Computer Data Backup
Scientific Sales, Inc

SOLAR—
TEMP
HUMIDITY
WIND RAIN

$650 Main, $250 Repeater, Extra Station $180

Every year—Something new to learn to increase profits

10 degree temp difference during 15 degree night-hoops vs no hoops

iPad + Google Sheets for Record Keeping

Columns:
• What you want to harvest
• What you harvested last week
• What was Leftover

Custom Google sheet that creates each week from template and populates data week to week

USE IPAD AT MARKETS (Square)

Benefit: Tells sales during/right after, ave sales, # cust
AUTOMATIC Vehicle Tracking
• Gadget that Monitors & tracks vehicles
• Location, Mileage, Engine Codes
• Business $150

Internet & WiFi
• WiFi on 80% of main farm
• Allows all tech to function, it’s the backbone
• iPads can function anywhere
  • Only need cell plan for markets
• Makes installing new tech easy (ex: WiFi thermostat in high tunnel? Easy)
• Better communication between workers
• Can view cameras without internet from most of farm (saves mobile internet)

MORE INFORMATION CONTACT:
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QUESTIONS/DISCUSSION?