


# Agroforestry Enterprise Planning


## Agroforestry and Perennial Crops

- Meeting human needs while improving ecosystem health
  - Food and other yields
  - Carbon sequestration
  - Soil building



## Polycultures

- 2 or more species
- Minimal competition
- Maximum cooperation
- Optimize management and harvest
- Livestock integration




## Focus

- US
- Direct market
- Specialty products




## Challenges: Time Lag

- Waiting for perennial crops to bear
- Waiting for system establishment
- Waiting for positive cash flow



## Challenges: Extra Costs

- Establishing livestock management systems for mowing etc.
- Establishing support crops
  - Nitrogen fixers
  - Windbreaks
  - Living fences
  - Shade trees
  - Living trellis trees
  - Shade legume groundcovers
  - Etc.



### Challenges: Experimentation

- Unfamiliar new crops
- Unfamiliar new production systems



### Challenges: Marketing

- New and unusual products
- No customer familiarity
- Lack of established marketing channels







### FARM PLANNING PROCESS

- Goal setting
- Balance drivers
  - Land location and capability
  - Market research
  - Enterprise selection
  - Financial capability
- Budgeting
- Whole farm plan – site, economics, QOL



### CASE STUDIES

### Sample Commercial Systems

|  |  |   |   |                             |
|--|--|---|---|-----------------------------|
| Macadamia nut<br>( <i>Macadamia integrifolia</i> ) | Coffee (Coffea species)  | Macadamia nut trees with coffee understorey   |  | Hawaii                      |
| Sesban (Sesbania sesban)                           | Passion fruit ( <i>Passiflora</i> species)                                     | A nitrogen fixing tree (for firewood, mulch, or animal fodder) supporting and shading passion fruit vines |  | Africa                      |
| Coconut ( <i>Cocos nucifera</i> )                  | Pasture  | Coconut with pasture and livestock underneath   |  | Polynesia (Dalla Rosa 1993) |
| Peach palm ( <i>Bactris gasipaes</i> )             | Black pepper vine ( <i>Piper nigrum</i> ) and cocoa ( <i>Theobroma cacao</i> ) | Peach palm over cocoa and supporting black pepper vines   |  | Brazil (Nair 1993)          |

Source: Elevich, Agroforestry Guides for Pacific Islands

### Walnut Meadows – West Virginia

- 300 acres of managed forest land
- 10 acre walnut timber plantation
- On-site sawmill, drying kiln, cabinet shop
- 50 year plan laid out



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### Walnut Meadows - Ginseng

- 30+ acres
- Grown in forest after thinning
- Grows to 8-13 years old
- Ex: 1,000 lbs from 3000 sq ft @\$50/lb
- Also national seller of ginseng seed
- High disease pressure in wet years



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### Walnut Meadows - Mushrooms

- Inoculate branches from felled timber
- Multiple species produced
- Grow in shade of timber trees



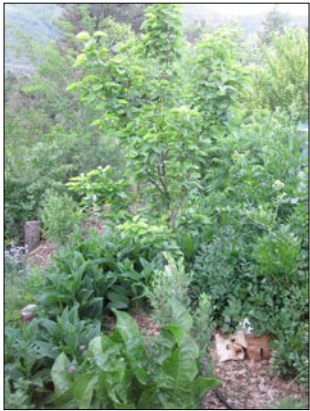
### Jerome's Organics Basalt Colorado



Products: produce, nursery stock, consulting Markets: restaurants, health food stores, courses

### An Edible Ecosystem

- Mostly perennial
- Low maintenance
- Soil building
- Weed suppressing
- Pest controlling
- Habitat providing
- Carbon-friendly
- Food producing



### Roberto Muj – Chimaltenango, Guatemala Perennial Market Garden



Products: cut flowers, medicinal herbs, fruits & nuts, more Markets: farmers' markets, stores, family use

### ENTERPRISE SELECTION

### Enterprise Selection Guidelines

- What can you PRODUCE
  - Main crops: suited to your site, low-maintenance
  - Support species with marketable products
  - Integrated livestock to assist management
- What can you SELL
- What products FIT your marketing plan
  - Complementary products



### Direct Market vs. Wholesale

- Direct Marketing
  - keep higher %
  - work more
  - limited quantities
  - Set your own price
  - Can sell new & unusual products
- Wholesaling
  - lower profit per unit
  - Less work → can focus more on production
  - Can accept large quantities
  - Prices set by external businesses



### Value-Added Products

- Increase price and profitability
- Improve shelf life
- Diversify product line
- Some legal/processing issues



### The Smoothie Stand



### Artist's Charcoal



\$12.38/box

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### Native Wasabi



\$110/lb real wasabi

### Woody Cut Flowers



\$1000/yr single coppice stump in D.C.

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### Roast Pork



12 x 100lb pigs @ \$10/lb meat = \$6000 in one day

### Biochar



5 gallon bucket \$36.50

### Native Useful Plant Seed

**Ceanothus americanus (New Jersey Tea)**

| Seeds     |          | Bare Root Plants |          | Potted Plants |          |
|-----------|----------|------------------|----------|---------------|----------|
| Quantity: | Pricing: | Quantity:        | Pricing: | Quantity:     | Pricing: |
| Packet    | \$2.00   | 1 - 2            | \$7.00   | Tray of 36    | \$98.00  |
| 3/8 oz.   | \$10.00  | 3 - 11           | \$6.00   |               |          |
| 1/4 oz.   | \$15.00  | 12 - 35          | \$4.20   |               |          |
| 1/2 oz.   | \$25.00  | 36 - 99          | \$3.60   |               |          |
| 1 oz.     | \$40.00  |                  |          |               |          |
| 1 lb.     | \$900.00 |                  |          |               |          |

A deciduous shrub that grows just 3' tall, the dried leaves of New Jersey Tea make a flavorful tea that was popular during the Revolutionary War.

Source: Prairie Moon Nursery Catalog

### Power Line Contracts



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### AGROFORESTRY BUDGETING



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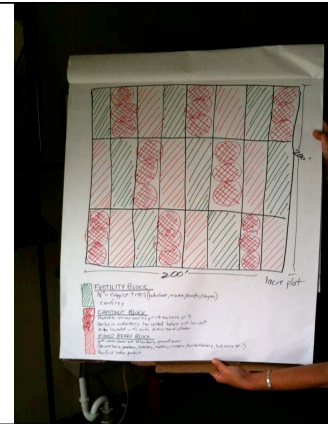
### Step One: Create Working Polycultures

- Minimize competition
- Maximize cooperation
- Optimize harvest and management logistics
- Integrate livestock to reduce labor and inputs
- Establish, observe, refine



### CASE STUDY

- Young plant geek rural area low-cost land
- One acre
- Shared deer fence and swales
- CHESTNUT BLOCK
  - Chestnut for flour
  - Strawberries Y 1-3
  - Nectary tea herb understory
- MIXED BERRY BLOCKS
  - Berries for fruit leather
  - Strawberries Y 1-3
  - White clover
- FERTILITY BLOCKS
  - Chop & drop
  - Mimosa & Amorpha
  - Comfrey



### Step Two: Project Yields and Shade Impacts

- For 10-100 year planning window
- Generally overstory yields go up with time
- Pasture yields generally go down
- Sunny understory and alley crop yields go down
- Shade crops can be established and then yields begin
- This can cause polyculture to be redesigned

### Shade and Yield Impacts

| SHADE    | Y1  | Y2  | Y3  | Y4   | Y5   | Y6   | Y7   | Y8    | Y9    | Y10   |
|----------|-----|-----|-----|------|------|------|------|-------|-------|-------|
| chestnut | Sun | Sun | Sun | Part | Part | Part | Part | Shade | Shade | Shade |

| YIELD (lbs/acre) | Y1 | Y2   | Y3   | Y4  | Y5  | Y6  | Y7  | Y8  | Y9  | Y10 |
|------------------|----|------|------|-----|-----|-----|-----|-----|-----|-----|
| chestnut         | 0  | 0    | 0    | 0   | 160 | 330 | 500 | 600 | 700 | 700 |
| strawberry       | 0  | 2600 | 2000 | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| tea herbs        | 0  | 0    | 0    | 200 | 500 | 500 | 500 | 500 | 500 | 500 |

### Step Three: Marketing and Processing

- Aim for shared marketing channels to minimize labor and expenses
- Aim for shared processing equipment for same reason
- This can also cause polycultures to be refined

### Shared Resources

- Shelf-stable products for shipping
- Shared direct market website
- Shared drier processing equipment
- Need for grain grinder

### Step Four: Run the Numbers

- Collect and review enterprise budgets
- Multi-year cash flow: revenues and expenses
- Project savings from livestock integration and support plants
- Fill gaps in cash flow
- This can also refine polycultures

| ITEM                                    | YEAR  |          |         |         |         | Through Life of Vineyard | YOUR BUDGET |
|---|-------|----------|---------|---------|---------|--------------------------|-------------|
|   | 0     | 1        | 2       | 3       | 4-20    |                          |             |
| <b>INCOME</b>                           |       |          |         |         |         |                          |             |
| Grapes                                  | 0     | 0        | 0       | 0       | 3       | 5                        |             |
| Price                                   | \$0   | \$0      | \$0     | \$2,375 | \$4,750 | \$53,125                 |             |
| <b>VARIABLE COSTS</b>                   |       |          |         |         |         |                          |             |
| Cover Crop Seed                         | 15    |          |         |         |         | 15                       |             |
| Vines                                   | 2,316 |          |         |         |         | 2,316                    |             |
| Fertilizer                              | 20    | 50       | 50      | 50      | 50      | 1,820                    |             |
| Lime                                    | 45    | 0        | 0       | 0       | 0       | 45                       |             |
| Pesticides                              | 30    | 196      | 294     | 411     | 411     | 7,918                    |             |
| Hand Labor                              | 0     | 1,710    | 513     | 702     | 567     | 12,564                   |             |
| Harvesting Costs                        | 0     | 0        | 0       | 1,560   | 500     | 9,550                    |             |
| Machinery Operating Expense             | 38    | 432      | 167     | 179     | 193     | 4,959                    |             |
| Custom Machine Hire                     | 75    | 75       | 75      | 75      | 75      | 1,575                    |             |
| Miscellaneous                           | 10    | 215      | 49      | 111     | 81      | 1,761                    |             |
| Interest on Oper. Cap.                  |       |          |         |         |         |                          |             |
| <b>TOTAL VARIABLE COSTS</b>             | 233   | 4,994    | 1,148   | 2,578   | 1,877   | 40,860                   |             |
| <b>FIXED COSTS</b>                      |       |          |         |         |         |                          |             |
| Operator Labor Charge                   | 50    | 50       | 50      | 50      | 50      | 1,800                    |             |
| Mach. And Equip. Charge                 | 6,000 |          |         |         |         | 6,000                    |             |
| Land Charge                             | 100   | 100      | 100     | 100     | 100     | 2,100                    |             |
| Taxes                                   | 2,624 |          |         |         |         | 2,624                    |             |
| Liability Insurance                     | 50    | 50       | 50      | 50      | 50      | 1,600                    |             |
| Management Charge                       | 100   | 100      | 100     | 100     | 238     | 4,438                    |             |
| <b>TOTAL FIXED COSTS</b>                | 250   | 7,344    | 300     | 300     | 438     | 16,232                   |             |
| <b>TOTAL COSTS</b>                      | 483   | 12,338   | 1,448   | 2,878   | 2,314   | 57,092                   |             |
| <b>RETURN OVER VAR. COSTS</b>           | (233) | (4,994)  | (1,148) | (2,578) | (2,873) | (42,265)                 |             |
| <b>RETURN OVER TOTAL COSTS</b>          | (483) | (12,338) | (1,448) | (3,028) | (2,436) | (26,834)                 |             |
| <b>PERCENT VALUE RETURN<sup>3</sup></b> | (483) | (11,762) | (1,192) | (276)   | 1,664   | 859                      |             |

| COMP.                  | YEAR ONE | YEAR TWO | YEAR THREE | YEAR FOUR | YEAR FIVE | YEAR SIX | YEAR SEVEN | YEAR EIGHT | YEAR NINE | YEAR TEN |
|------------------------|----------|----------|------------|-----------|-----------|----------|------------|------------|-----------|----------|
| <b>Deer fence</b>      | \$1,000  | \$0      | \$0        | \$0       | \$0       | \$0      | \$0        | \$0        | \$0       | \$0      |
| <b>Swales</b>          | \$450    |          |            |           |           |          |            |            |           |          |
| <b>Amendments</b>      | \$500    |          |            |           |           |          |            |            |           |          |
| <b>Grain Grinder</b>   |          |          |            |           | \$500     |          |            |            |           |          |
| <b>Packaging</b>       | \$500    | \$500    | \$500      | \$700     | \$700     | \$1,000  | \$1,000    | \$1,000    | \$1,000   | \$1,000  |
| <b>Marketing</b>       | \$1,500  | \$500    | \$500      | \$500     | \$500     | \$500    | \$500      | \$500      | \$500     | \$500    |
| <b>Dryer (6-house)</b> | \$1,300  |          |            |           |           |          |            |            |           |          |
| <b>Total</b>           | \$5,250  | \$1,000  | \$1,000    | \$1,200   | \$1,700   | \$1,500  | \$1,500    | \$1,500    | \$1,500   | \$1,500  |
| <b>Chestnut</b>        |          |          |            |           |           |          |            |            |           |          |
| Yields                 | 0        | 0        | 0          | 0         | 160       | 330      | 500        | 600        | 700       | 700      |
| Price/lb               | \$15     | \$15     | \$15       | \$15      | \$15      | \$15     | \$15       | \$15       | \$15      | \$15     |
| Income                 | \$0      | \$0      | \$0        | \$0       | \$2,400   | \$4,950  | \$7,500    | \$9,000    | \$10,500  | \$10,500 |
| Costs                  | \$200    | \$0      | \$50       | \$0       | \$0       | \$0      | \$0        | \$0        | \$0       | \$0      |
| <b>Shrub Berries</b>   |          |          |            |           |           |          |            |            |           |          |
| Yields                 | 0        | 0        | 1300       | 2200      | 3300      | 3300     | 3300       | 3300       | 3300      | 3300     |
| Price/lb               | \$5      | \$5      | \$5        | \$5       | \$5       | \$5      | \$5        | \$5        | \$5       | \$5      |
| Income                 | \$0      | \$0      | \$6,500    | \$11,000  | \$16,500  | \$16,500 | \$16,500   | \$16,500   | \$16,500  | \$16,500 |
| Costs                  | \$330    | \$0      | \$0        | \$0       | \$0       | \$0      | \$0        | \$0        | \$0       | \$0      |
| <b>Coppice Legume</b>  |          |          |            |           |           |          |            |            |           |          |
| Costs                  | \$150    | \$0      | \$0        | \$0       | \$0       | \$0      | \$0        | \$0        | \$0       | \$0      |
| <b>Cumfrey</b>         |          |          |            |           |           |          |            |            |           |          |
| Costs                  | \$300    | \$0      | \$0        | \$0       | \$0       | \$0      | \$0        | \$0        | \$0       | \$0      |
| <b>Herbs</b>           |          |          |            |           |           |          |            |            |           |          |
| Yields (dry)           | 0        | 0        | 0          | 200       | 500       | 500      | 500        | 500        | 500       | 500      |
| Price/lb               | \$10     | \$10     | \$10       | \$10      | \$10      | \$10     | \$10       | \$10       | \$10      | \$10     |
| Income                 | \$0      | \$0      | \$0        | \$2,000   | \$5,000   | \$5,000  | \$5,000    | \$5,000    | \$5,000   | \$5,000  |
| Costs                  | \$0      | \$0      | \$0        | \$0       | \$0       | \$0      | \$0        | \$0        | \$0       | \$0      |
| <b>Strawberry</b>      |          |          |            |           |           |          |            |            |           |          |
| Yields                 | 0        | 2600     | 2000       | 0         | 0         | 0        | 0          | 0          | 0         | 0        |
| Price/lb               | \$5      | \$5      | \$5        | \$0       | \$0       | \$0      | \$0        | \$0        | \$0       | \$0      |
| Income                 | \$0      | \$13,000 | \$10,000   | \$0       | \$0       | \$0      | \$0        | \$0        | \$0       | \$0      |
| Costs                  | \$3,000  | \$0      | \$0        | \$0       | \$0       | \$0      | \$0        | \$0        | \$0       | \$0      |
| <b>TOTAL INCOME</b>    | \$0      | \$13,000 | \$16,500   | \$13,000  | \$23,900  | \$26,450 | \$29,000   | \$30,500   | \$32,000  | \$32,000 |
| <b>TOTAL COSTS</b>     | \$9,180  | \$1,000  | \$1,050    | \$1,200   | \$1,700   | \$1,500  | \$1,500    | \$1,500    | \$1,500   | \$1,500  |
| <b>PROFIT</b>          | -\$9,180 | \$12,000 | \$15,450   | \$11,800  | \$22,200  | \$24,950 | \$27,500   | \$29,000   | \$30,500  | \$30,500 |

### Financing

- CSA model
- Crowdfunding
- Peer to Peer Lending
  - Prosper.com, lendingclub.com
- Community and Microfinance Lenders
- Traditional Business and Ag Lenders
- Investors Circle, Slow Money
- Program-Related Investment



### Challenge!

- In absence of policy changes
  - Requires innovation at every level
  - Some very good opportunities
  - Many new operations in last 3-5 years

