These and many other questions complicate the decision to produce and market agroforestry (specialty) products. Applying standard market research approaches and the Porter Five Forces Model to specialty products provides answers to these questions and enables development of sound marketing strategies.

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Outline

✓ The “Black Box” of Agroforestry Enterprises
✓ Promising Trends - Buy Local

➢ Conduct a National Market Survey on Pawpaw
  • Market Background
  • Aim and Objectives
  • Specialty Crops - UMCA Market Research
  • Research Methods
  • Outcomes
Specialty Product Market Strategies

The “Black Box” of Agroforestry Enterprises

✓ Agroforestry enterprises often produce specialty products for markets about which little is known

✓ All that may be known about the market is that someone is growing the product and consumers are buying the product

✓ What happens to the product between producer and consumer is unknown, i.e., a “black box”.

➤ Challenge: How to overcome the lack of market information
Black Box

Questions to Explore ???

✓ How do I get into the market?
✓ What are my costs?
✓ Wholesale and retail prices
✓ Where can I buy what I need for my business and for what price?
✓ Is the supply I need readily available?
✓ Who are my customers? What do they want?
✓ For how much can I sell my products?
✓ Who are my competitors? What are they doing?
✓ What can I do differently?
These and many other questions complicate the decision to produce and market agroforestry (specialty) products.

Applying standard market research approaches and the Porter Five Forces Model to specialty products provides answers to these questions and enables development of sound marketing strategies.
Horticulture and Agroforestry Research Center
Ongoing Research Studies

- Cold hardy Loblolly pine germplasm
- Restored prairie
- Chestnut repository
- Apples
- Biomass plots
- Black walnut F1 and F2 plantings
- Chestnut cultivar trial
- Elderberry cultivar/flower trial
- Pawpaw cultivar trial
- Silvopasture Trial
- Forest farming research
- Warm season grass alley crop shade study
- Pitch x loblolly pine straw study
- Chestnut fertilization rate study
- Paired watershed buffer study
- Commercial chestnut production study
- Chestnut pollination study
- Pecan germplasm repository
- Flood Tolerance Lab
- Pecan Cultivar Trial
Top 20 Trends Include:

#3 Locally grown produce  
#4 Hyper-local sourcing  
#5 Natural ingredients  
#6 Environmental sustainability  
#13 Farm/estate branded items

“Buy Local”
Background - Pawpaw

✓ An Emerging Market
  • Main outlets: farmers markets & online retailers

✓ Information Needed
  • Participants in the value chain
  • Market potentials
  • Supply and demand trends
  • Profitability
  • Consumer preferences
Aim and Objectives - National Market Survey

✓ To better understand current and potential pawpaw markets, specifically to:
  • Identify **market participants** along the value chain.
  • Find out the **strength, weakness, opportunities and threats** for pawpaw market participants. **SWOT Analysis**
  • Evaluate the industry **competition**. **Porter Five Forces Model - PFFM**
  • Elicit consumer **preferences** (locally produced, pesticide free, etc.) to pawpaw. **Conjoint Analysis**.
  • Generate a **financial decision support tool** to estimate **profitability** of growing pawpaw.
Example -- Chinese Chestnuts (*Castanea mollissima*):

- Competitive market analysis (Gold et al. 2006)
- Consumer preference surveys
  - Gold et al. 2004, 2005
  - Cernusca et al. 2008
  - Aguilar et al. 2009, ...
- Excel-based financial decision tool
Specialty Crops - UMCA Market Research

- Elderberry (*Sambucus canadensis*)
  - Competitive market analysis (Cernusca et al. 2012)
  - Consumer preferences (Mohebalian et al. 2011)
  - Excel-based financial decision tool
- Shiitake mushroom (Gold et al. 2008)
Pawpaw - Past UMCA Market Research

✓ Consumer preferences (farmers market and local grocer)
✓ Pawpaw buyers in Columbia, Missouri

Past Consumption

Outlet Preferences

N=40
Pawpaw - UMCA Market Research

Quality (Appearance)
- 24% very good
- 59% good
- 17% satisfactory

Quality (Taste)
- 48% very good
- 45% good
- 3% satisfactory
- 3% bad

Price
- 24% as expected
- 21% higher than expected
- 21% lower than expected
- 35% don't know

N=40
S.W.O.T. Analysis

Internal

Strengths
Weaknesses

External

Opportunities
Threats
Choice Preference Model (CPM)
Conjoint Analysis

\[ U = V(i,n) + e \]
\[ V = \beta'X(i,n) \]

Utility from choosing a pawpaw is a function of different product attributes (e.g., pesticide free).

For consumer \( i \), if \( U_{i1} > U_{i0} \), the given pawpaw is selected.
\( U_{i1} \): Utility from choosing the given pawpaw
\( U_{i0} \): Utility from not choosing the given pawpaw

In Plain English – Method to Tease Out Unbiased Consumer Preferences for Product Attributes
## Methods - Market and Consumers

**Survey Instruments**

<table>
<thead>
<tr>
<th></th>
<th>Current and Potential Market (National)</th>
<th>Consumer Preferences (Regional)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sample</strong></td>
<td>Participants involved in the value chain</td>
<td>Consumers at farmers markets &amp; grocery stores</td>
</tr>
<tr>
<td><strong>Questionnaire Design</strong></td>
<td>S.W.O.T and PFFM</td>
<td>CPM - Conjoint Analysis</td>
</tr>
<tr>
<td><strong>Data Collection</strong></td>
<td>Mixed survey (mail and telephone survey)</td>
<td>Online survey</td>
</tr>
<tr>
<td><strong>Analysis</strong></td>
<td>Qualitative analysis</td>
<td>Descriptive statistics</td>
</tr>
<tr>
<td></td>
<td>Descriptive statistical analysis</td>
<td>Regression model</td>
</tr>
</tbody>
</table>
Questionnaire - Current and Potential Markets

✓ Mail Survey

- Position in the value chain
- Products sold
- Annual gross sales from pawpaw
- Supply and demand trends
- Percentage of pawpaw sales in overall business
- Length of time in pawpaw business
- Willingness to participate in follow up detailed phone interview
Follow-up Detailed Phone Survey

✓ Motivations, expectations, future visions, challenges.

- **Motivations** (health benefits, native plant, can be grown organically, productivity, etc)
- **Expectations** (create a profitable business, grow the business, diversify existing product line, etc)
- **Future visions** (diversify the pawpaw value added products, grow more pawpaw trees)
- **Challenges** encountered to establish a pawpaw business (Finances, supply, production/growing, processing, sale)
Follow-up Detailed Phone Survey

✓ Motivations, expectations, future visions, challenges.
✓ **S.W.O.T. Analysis** (example responses below)

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide quality pawpaw &amp; pawpaw products; Competitive prices</td>
<td>Lack of experience; Insufficient finances; Other potential problems</td>
<td>New farmers market nearby; Increasing interest in specialty crops; Strong “buy local’ trends</td>
<td>High levels of competition; Federal and/or state regulations; Fluctuations of market prices</td>
</tr>
</tbody>
</table>
S.W.O.T. ANALYSIS

**Strengths**
- Previous farming experience
- Available land
- Children returning to the farm
- Location - close to a big city

**Weaknesses**
- Moderate finances
- Seasonal and perishable product
- Lack of marketing skills

**Opportunities**
- New cultivars made available
- Elderberry co-op
- Increased interest in locally produced products

**Threats**
- Competition from imports
- Increased federal and state regulations
- Extreme climate events

***Example - farmer who would like to start growing elderberry***
### PFFM

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential Entrants</td>
<td>Level of difficulty to enter market; Capital needed</td>
</tr>
<tr>
<td>Suppliers</td>
<td>Key suppliers; Suppliers - who has control; Competitive prices for inputs;</td>
</tr>
<tr>
<td></td>
<td>Substitutes for inputs</td>
</tr>
<tr>
<td>Buyers</td>
<td>Potential buyers; Deliver directly to consumers or use intermediaries; Buyers - who has control</td>
</tr>
<tr>
<td>Substitute Products</td>
<td>Product uniqueness; Substitutes</td>
</tr>
<tr>
<td>Industry Competitors</td>
<td>Pawpaw industry competitors and their competitive advantages</td>
</tr>
</tbody>
</table>
PFFM Example
Shiitake Mushroom Industry

**THREAT OF NEW ENTRANTS**
- The cost to establish a business is not high
- Production and marketing knowledge need to be acquired through experience
- Incumbent firms create reputation through quality, customer service, consistent supply

**SUPPLIERS**
- Limited number of spawn suppliers
- Good relationship between suppliers and producers

**COMPETITION**
- From shiitake produced on sawdust and imports

**SUBSTITUTES**
- White button mushrooms and portabella mushrooms for lower price and higher availability
- Oyster mushrooms – same price and availability
- Chanterelle, maitake, morels, porcini – higher price, lower availability

**BUYERS**
- Local market
- Gourmet restaurants, farmers markets, on farm
- High prices
Questionnaire – Consumers

✓ Demographic information
✓ Knowledge, Familiarity & Attitudes
✓ CPM

Price:
• $3.5/lb
• $4.5/lb
• $5.5/lb

Production Process:
• Conventional
• Pesticide free

Origin:
• Locally grown
• Unknown
## CPM Example

<table>
<thead>
<tr>
<th></th>
<th>Pawpaw A</th>
<th>Pawpaw B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Price</strong></td>
<td>$3.5/lb</td>
<td>$5.5/lb</td>
</tr>
<tr>
<td><strong>Production Process</strong></td>
<td>Conventional</td>
<td>Pesticide free</td>
</tr>
<tr>
<td><strong>Origin</strong></td>
<td>Locally grown</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

**Your Choice**

A

B
Missouri consumers are 20 times more likely to choose Missouri chestnuts, and 4 times more likely to select U.S. chestnuts compared to imported nuts (Aguilar et al. 2010)

Method- Financial Decision Tool

✓ Data: Pawpaw orchards at MU Horticulture and Agroforestry Research Center and Southwest Research Center. Other long-term data... KSU??

✓ Benefit and cost analysis

<table>
<thead>
<tr>
<th>Economic Costs</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Establishment</td>
<td>• Market Price</td>
</tr>
<tr>
<td>• Management</td>
<td></td>
</tr>
<tr>
<td>• Harvest and Marketing</td>
<td></td>
</tr>
</tbody>
</table>

✓ Profitability indicators

NPV, IRR, Payback period, Net revenue, etc.
Financial Decision Support Tool - Elderberry

http://www.centerforagroforestry.org/profit/elderberryfinance.php

Elderberry Financial Decision Support Tool

Version 1.0

Establishment Decisions:
- Site Prep: Herbicide with Discing
- Spacing (ft): 4 x 12
- Bed Preparation: Plastic Mulch/Irrigation
- Planting Stock: Cuttings (Selected Varieties - per 1000)
- Planting Cost: Hand
- Fertilization: 100 lbs N Organic
- Permanent Cover: Grass mix

Management Decisions:
- Mulch/Compost: Compost (premade)
- Pruning: Manual
- Weed Control: Mowing
- Deer Control: User Defined

Harvesting and Marketing Decisions:
- Harvest Method: Hand Harvest
- Expected Rate of Return: 3%
- Expected Price/lb: $1.00 Farmgate

Financial Results

Based on the information that was entered in the model, this Elderberry Orchard will have the following financial performance over a 25 year period:

- Initial Number of Trees/ac: 907.5
- Expected Price/lb: $1.00
- PV of Revenues/ac @ 3%: $81,111.45
- PV of Costs/ac @ 3%: $26,671.20
- NPV/ac @ 3%: $54,440.28
- Rate of Return (MIRR): 18%
- Internal Rate of Return (IRR): 65%
- Years to Break Even: 3
- AEV/ac @ 3%: $1,967.09
Outcomes

- Database of participants involved in the pawpaw value chain.
- Market Report emphasizing forces that shape competition in pawpaw industry.
- Pawpaw Marketing Guide providing strategies associated with production, price, distribution and promotion.
- Financial Decision Support Tool.
Selected Specialty Crop Market Studies


Selected Specialty Crop Market Studies


We Need Your Help!

To obtain our desired outcomes:

✓ We are seeking to develop a thorough database of participants involved in the pawpaw value chain.

✓ The individuals at this conference are the core group involved with the US pawpaw industry.

➢ Help us identify pawpaw market participants throughout the US.
Thank you! Questions?

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UMCA