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# *Chestnut Market Analysis* *Producers' perspective*

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## EXECUTIVE SUMMARY

The University of Missouri Center for Agroforestry (UMCA) is conducting research to identify and describe the chestnut (*Castanea spp.*) product market value chain. Through detailed market research and by organizing events that increase consumer awareness towards chestnuts, UMCA's goal is to broaden market opportunities for all individuals and businesses in the chestnut marketplace.

In 2004, UMCA conducted a nationwide survey of individuals and businesses active in the U.S. chestnut market (nurseries, producers and sellers).

The focus of this report is to describe the market from the producers' perspective. Out of 250 surveys mailed nationwide, 90 surveys were returned and analyzed (36% response rate). Responses came from 15 states. The highest representation came from Michigan (21%), followed by states on the West Coast (OR – 16%, CA – 12% and WA – 8%).

### **General information about the respondents and the industry**

Results indicate that the U.S. chestnut industry is in its infancy. The majority of chestnut producers have been in business less than 10 years and are just beginning to produce

commercially. Volume of production is low (a majority of producers obtain less than \$5,000 annually from the chestnut business and 35% have yet to realize their first sale). U.S. chestnut producers are mainly part timers or hobbyists (only 20% of respondents are full time farmers and only two are 100% involved in the chestnut business). The size of production operations are small (50% plant 3 to 10 acres of chestnuts), harvested manually. Trees are young (46% have trees younger than 10 years), barely entering commercial production. The majority of respondents sell fresh chestnuts in bulk or packaged, demand exceeds supply, and prices often exceed \$3.50 a pound.

To enter the chestnut business, one can self finance start-up costs without requiring loans or partnerships and establish at least a small scale operation. Chestnut production has many positive aspects. Chestnut cultivation can be a source of profit due to high demand, good prices, high volume of imports compared to domestic production and relatively low initial investment requirements. Producing chestnuts can be a way to diversify an existing agricultural business. Chestnuts can be grown organically, have many nutritional

and health benefits (e.g., gluten free flour) and are associated with positive feelings such as tradition, holiday, and family that helps advertise the product.

Barriers to success in the chestnut business include the lack of information for producers, retailers and consumers, 5 to 10 year time lag to get a return on investment, and shortage of available chestnut cultivars for commercial production. There are also concerns related to pest and disease control and the market is undeveloped.

### **Information about the market**

#### **Suppliers**

There are few major suppliers of grafted chestnuts in the industry. In the face of limited availability of chestnut seedlings and cultivars, chestnut producers grow and graft their own trees.

#### **Market outlets**

The majority of respondents sell their chestnuts locally, 38% sell regionally and 21% sell nationally.

No major buyers were mentioned and no contractual arrangements seem to exist between producers and their buyers. Many respondents (38%) sell chestnuts on-farm. Thirty four percent of respondents sell to farmers

markets. Twenty three percent sell fresh chestnuts to restaurants. Less than 20% sell to retail locations; e.g., ethnic stores (19%), upscale grocery stores (18%), health and natural food stores (17%), national chain grocery stores (11%), or wholesalers (12%). The highest prices for fresh chestnuts are paid by restaurants, followed by customers that buy on-line, health and natural food stores, farmers markets, and on-farm. The lowest prices are offered by discount grocery stores, distributors, and wholesalers. A premium price is obtained for organic production. A large number of respondents (49%) believe that demand is in excess of supply. Demand for fresh chestnuts is expected to continue to increase by 10% - 25% in the next 5 years.

#### **Substitutes**

Chestnuts may be substituted by nuts, grains and even potatoes but they have also unique characteristics. Chestnuts are almost fat free. High fiber content makes chestnuts a good snack food and the high percentage of complex carbohydrates are a source of energy. Chestnuts are also cholesterol free and contain a high amount of vitamin C. Chestnut flour is gluten free and useful for individuals that are affected by celiac disease.

### **Competitors**

The U.S. chestnut industry is too small to thoroughly evaluate domestic competition. Most respondents (69%) declared that there are between 1 and 10 other chestnut producers in their area and 19% are the only chestnut producers in their area. For new or existing producers, competition arises not only from local producers, but also from imports. Only 8% of respondents felt that the import of fresh chestnuts would become a threat in the next five years.

### **Policies that influence the industry**

Policies such as subsidizing cheap imports, lengthy quarantines for cultivars from other countries and lack of chemicals registered for use with chestnuts were mentioned by respondents as barriers to entry into the chestnut market. There were no policies identified as helpful to enter into the chestnut market. There are grants that may assist producers but none is specific for chestnuts.

### **Recommendations**

Chestnut is still a minor crop in the US and because of that not much attention is provided by Federal or State agencies, universities, or other organizations. As volume of production and sales increase, chestnut grower associations must join their efforts to fund and support industry research and development. Both production and consumption of chestnuts should be stimulated. The focus should be on generating demand by increasing consumers' awareness about chestnuts and providing information and support to actual and future producers in order to generate enough domestic production to meet the created demand. Imports can be out competed by providing high quality, fresh and timely chestnut based products.

## INTRODUCTION

Edible chestnuts (*Castanea spp*) are an ancient tree crop undergoing a global renaissance. Until the near extinction of the American chestnut forest from chestnut blight (1900-1950), American chestnuts were sold by the railroad car in the cities of the eastern USA. With the death of the American chestnut forests this food was essentially lost from the American diet for a couple of generations. Today, chestnuts are experiencing a surge in consumer popularity in many European countries, Australia, New Zealand and the U.S. and an increase in production in Asia. World chestnut exports in 2003 were 106,000 metric tons. The U.S. imported 4,500 metric tons in 2003 and 5,400 metric tons in 2004 (FAOSTAT, 2005). In response to this trend, and to the fact that the U.S. consumer has an increased interest in both new and healthy foods, efforts are in progress to revitalize chestnut production and consumption throughout the U.S. Over the past 20 years, little research has been conducted concerning chestnut production and marketing (Gold et al. 2004).

Commercial chestnut production in the U.S is based more on trial and error than coordinated research and scientific experimentation. To date, edible chestnut research initiated

throughout U.S. lacks effective collaboration, discussion and exchange of current results and ideas. The nascent chestnut industry includes producers who are developing orchards in the midst of a paucity of solid scientific information regarding chestnut species and their long term adaptability to specific sites in terms of climate or pests. Chestnut plantings contain a large amount of genetic diversity and / or interspecific hybrids but few cultivars are available for purchase in commercial numbers.

Scattered efforts exist throughout the U.S.A. to develop domestic chestnut production based on chestnut species and cultivars from Europe or Asia. Fulbright (n.d.) and Hunt et al. (2002) reported on research and grower feedback on germplasm, horticultural aspects of growing trees for good nut production and harvest, post-harvest treatment and marketing of chestnuts. Both provided guidelines for commercial chestnut cultivation in Midwestern states to new or potential chestnut orchardists. Southeast Iowa Nut Growers Association published the Chestnut Growers' Primer to provide chestnut producers with basic background information for successful chestnut production (Wahl, 2002).

Research efforts are currently underway at the University of Missouri Center of Agroforestry (UMCA) to develop improved varieties of Chinese chestnut (*Castanea mollissima*) and to provide guidance to growers in Missouri (Hunt et al., 2002). Along with production research, it is necessary to redevelop the domestic market by reintroducing the chestnut as a food crop to a new generation of U.S. consumers. Consumer preference marketing studies were conducted in 2003 and 2004. A 2003 study assessing consumer preferences for chestnuts (*Castanea spp.*) (along with pecans (*Carya illinoensis*) and eastern black walnuts (*Juglans nigra*)) was continued in 2004 focused solely on chestnuts. As in 2003 (Gold et al., 2004), consumers surveyed in 2004 were unfamiliar with chestnuts; they were unaware of their healthful properties, in what form and where to buy them, or how to prepare them. Survey participants preferred to buy roasted or fresh chestnuts from grocery stores or farmers markets. Quality and nutrition-diet-health were perceived as the most important attributes that influence the

decision to purchase chestnuts in both the 2003 and 2004 studies (Gold et al, In press.).

Following initial research into the consumer perspective, UMCA researchers are seeking to gain an in-depth understanding of the chestnut marketplace. The objective of this study is to look at the U.S. chestnut industry from the producer's perspective and take into consideration all the forces that influence competition based on Porter's Five Forces Model (Porter, 1980). By understanding the forces, the chestnut producers already in the market can find ways to react to these forces in their own interest and maintain or develop competitive advantages that will help them succeed in the industry. The study also provides valuable information to individuals looking to enter the marketplace, with chestnut production being either a potential alternative farm crop or an opportunity for people already in the orchard business to diversify into different markets.

## RESEARCH METHODOLOGY

To analyze the chestnut market, a multiple-step research methodology was employed. First, chestnut producers, nurseries and sellers all over U.S. were identified using secondary information from the Internet, chestnut grower associations, and university colleagues. A database of individuals and businesses participating in the chestnut market was developed.

Second, three questionnaire-based surveys were developed. Each questionnaire contained specific questions for chestnut producers, nurseries and retailers of chestnuts and chestnut products. The questions were designed to collect general information about the market participants and information specific to each of Porter's five forces (Porter, 1980).

The Five Forces Model looks at five areas of competition that market participants face. These areas include: barriers to entry, bargaining power of suppliers, bargaining power of buyers, threat of substitute products and rivalry among existing firms. The influence

of governmental policies on the market was added to the Porter model. By understanding the competitive forces within the chestnut industry, market opportunities and threats can be identified and successful strategies can be developed.

Questionnaires were mailed to all individuals identified in step one. Using a snow ball approach, a question in each survey asked for names and contact information of other participants in the market. The newly identified individuals and businesses were added to the database and questionnaires were mailed to them.

Using SPSS, descriptive analysis was performed to analyze the data.



# CHESTNUT PRODUCERS REPORT

For chestnut producers, out of 250 surveys mailed nationwide, 90 surveys were returned and analyzed (36% response rate). Responses came from 15 states.

The highest representation came from Michigan (21%), followed by states on the West Coast (OR – 16%, CA – 12% and WA – 8%).

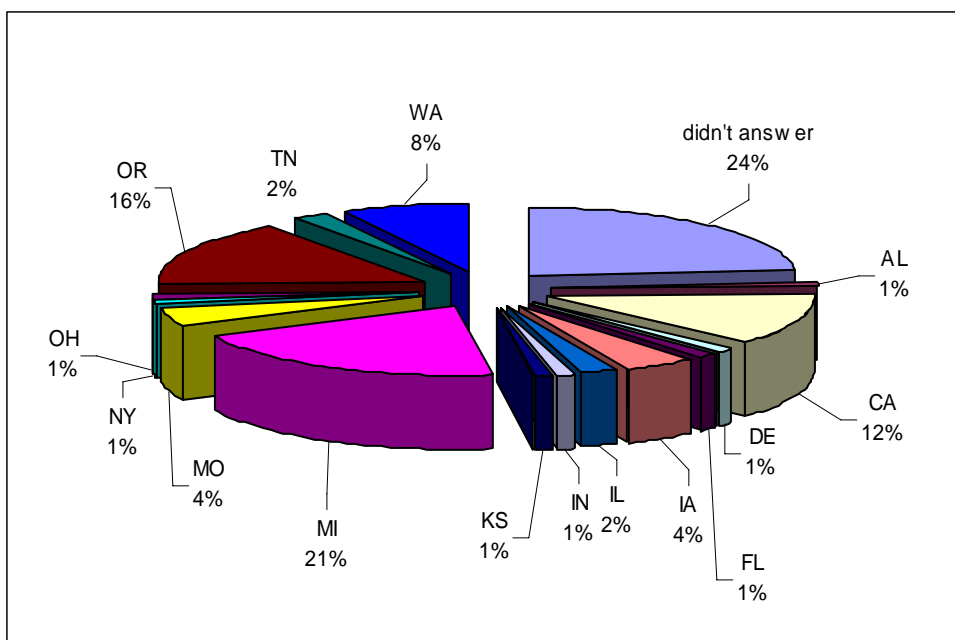


Fig.1 Distribution of respondents for the producer survey

## GENERAL INFORMATION ABOUT RESPONDENTS AND THE INDUSTRY

### Involvement in the chestnut business

Based on survey responses, the industry is dominated by small-scale producers with minor commercial involvement in the chestnut business (Fig. 2). Out of all respondents, only 20% are full time farmers and only a quarter (24%) of the full time farmers consider chestnuts more than 50% of their farming operation. The majority (53%) are part time farmers and over half of this group deal with other crops or activities more than with

chestnuts. Twenty seven percent are hobbyists. As hobbyists, there is little focus on commercial production and profit and more interest in tinkering, experimentation and pleasure.

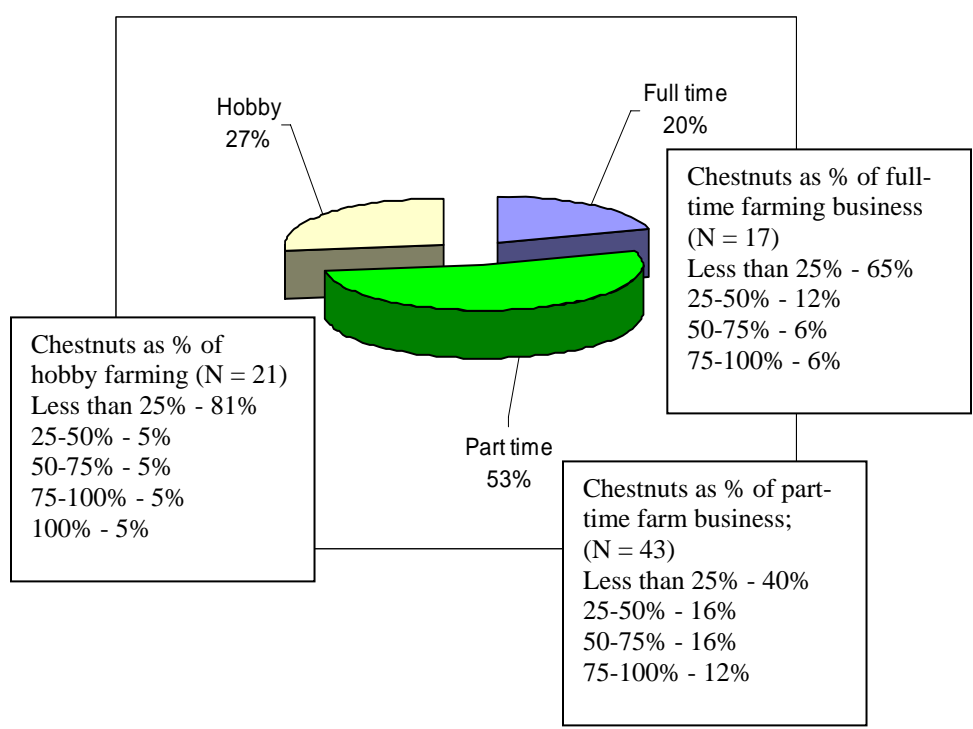


Fig.2 Degree of involvement by surveyed farmers in relation to chestnut production (N=90)

## Longevity in business

The U.S. chestnut industry is young. The vast majority of producers (96%) have been in the market less than 20 years and 64% less than 10 years (Fig. 3). Therefore, orchards are new, most of them just entering commercial production (92% of respondents have trees under age 20 and more than half under age 10). Commercial chestnut production begins sometime between 5 and 10 years after establishment, depending on location, management and other factors (Fulbright, n.d and Hunt et al., 2002).

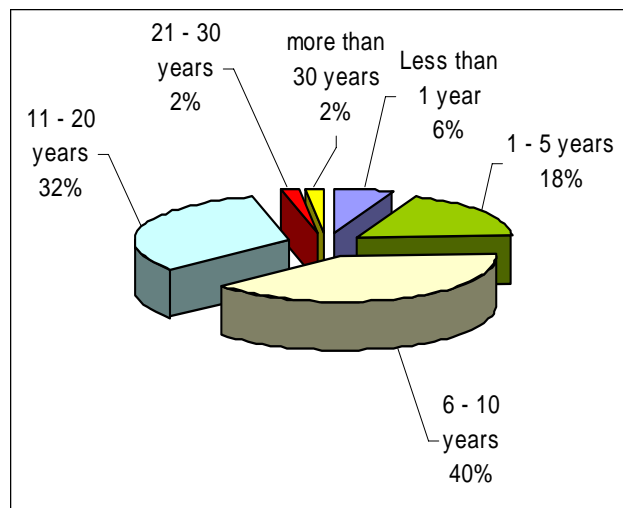


Fig.3 Number of years survey participants have been growing and producing chestnuts (N=90)

## Income generated by chestnuts

Both the part-time and young orchard characteristics of the businesses influence the revenue generated by chestnuts in the industry, currently very low. An overwhelming majority of producers who responded to the survey (96%) earn less than \$25,000 annually from chestnut sales (Fig. 4).

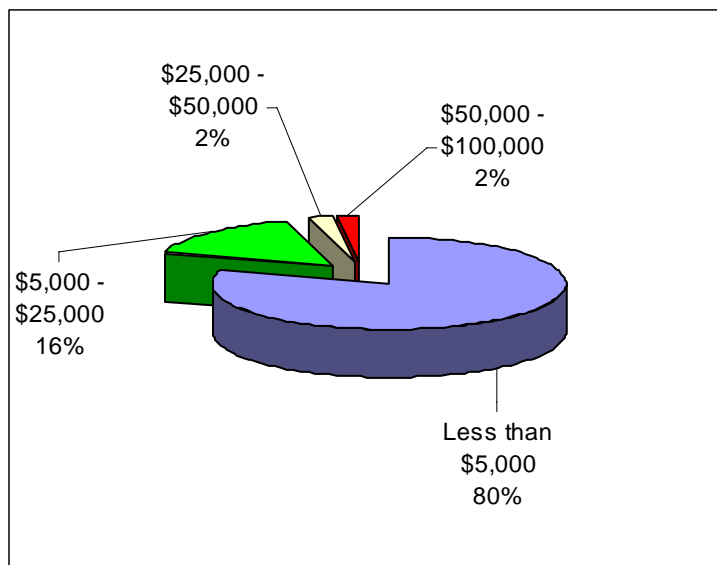


Fig.4 Income generated by chestnuts (N=90)

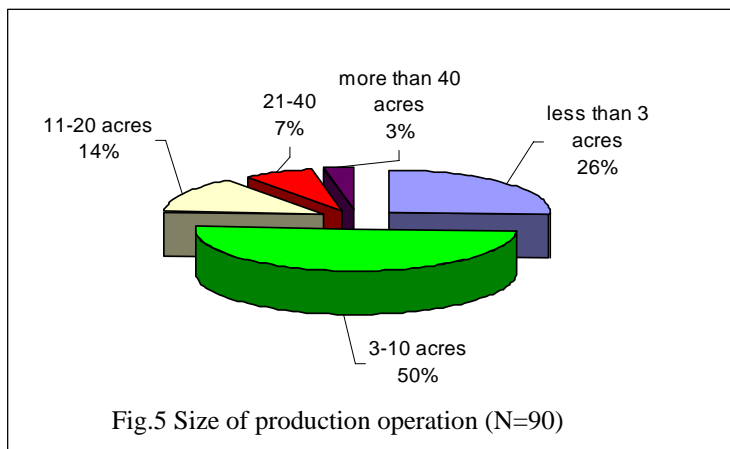
## The production operation

The size of production operation mentioned most often was between 3 and 10 acres (50%) followed by less than 3 acres (26%) (Fig. 5). The most common density of trees is 51-100 trees/acre (52% of respondents). This is another sign that the orchards are relatively new. Research indicates that a maximum of 50 trees/

acre is the optimal density for mature trees (Hunt et al., 2002).

There is interest in ecologically oriented production among the respondents. Forty six percent of respondents produce chestnuts using conventional practices, 42% don't use pesticides and 12% certified their production as organic.

Respondents indicated that they grow chestnuts from both seedlings (Appendix - Table I) and grafted cultivars (Appendix - Table II). Seedlings derived from Colossal (a European / Japanese hybrid – *Castanea sativa* X *Castanea crenata*), Nevada and unspecified Chinese cultivars are the most common type grown by respondents. Out of all cultivars that can be purchased in U.S., Colossal is by far the favorite due to its large sized nuts (+20 grams each) and high yields per acre. The preference for Colossal, espe-



cially in the eastern U.S.A., indicates a lack of testing, familiarity with and limited supply of other cultivars. The large number of producers that grow seedlings (26% only seedlings and 49% seedlings and cultivars) demonstrate that much of the current chestnut industry is not at a commercial stage. According to Fulbright (n.d.), a commercial industry cannot be established on seedlings. Uniformity and predictability, required in a commercial orchard, can only be provided by grafted cultivars.

Chestnut production is harvested manually by the majority of respondents (89%) while 16% use machines to harvest chestnuts. Most respondents didn't consider the investment in a harvesting machine as imperative because their chestnut production is not large enough to require mechanization.

The most common management practices used by respondents are mowing (90%), pruning (87%) and fertilization (73%). Other practices mentioned include irrigation, use of herbicides, thinning, mulching, pesticides and use of beneficial insects (Fig.6).

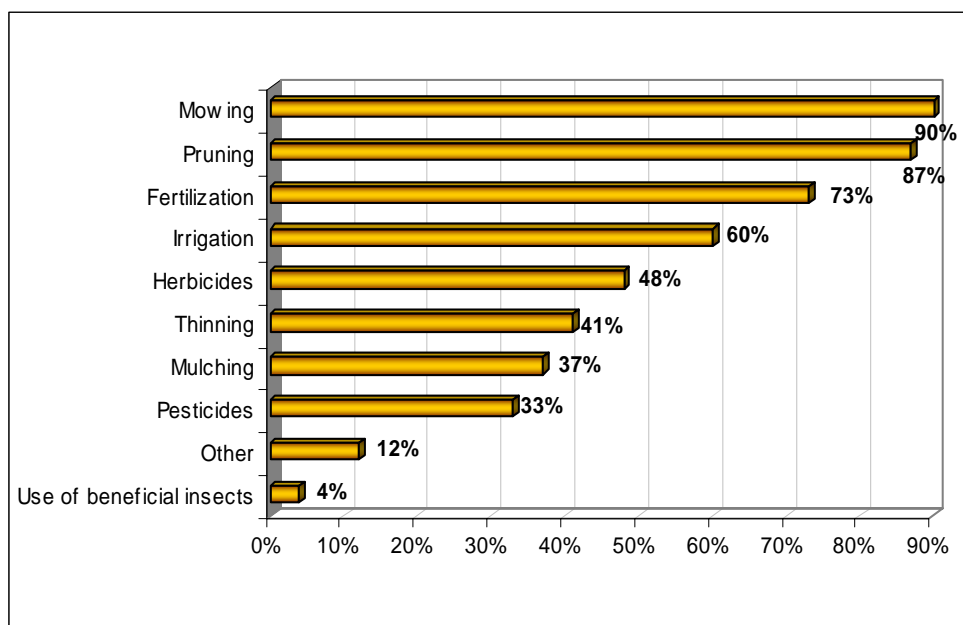


Fig.6 Management practices used by respondents (N=90)

The majority of respondents (81%) refrigerate the chestnuts after harvest. Refrigerated chestnuts can be kept fresh up to a full year. Forty nine percent of respondents indicated that their refrigerated chestnuts were fresh for up to four months (Fig. 7).

How long can you keep chestnuts fresh	Percentage of respondents
Less than 1 month	3 %
1-2 months	12%
2-4 months	38%
5-8 months	9%
10-12 months	2%

Fig.7 Length of time chestnuts can be kept fresh by respondents (N=90)

The majority of respondents (93%) don't treat chestnuts for weevil after harvest. Of the 93%, 35% declared that treatment is not necessary. The few that treat for weevil, use hot water or ozone/hot water/anaerobic soak.

## Products sold

Most respondents produce and sell fresh chestnuts in bulk (77%) or packaged (41%). Some producers act as small nurseries and produce seedlings (21%), grafted cultivars (10%) or chestnuts for seed (20%). Nineteen percent of respondents sell value added products like chestnut flour, dried chestnut kernels, frozen chestnuts, chestnut honey, soup mix and jam, jellies or preserves while 13% sell chestnut related products (e.g., roaster, mug, cap, knife) (Fig.8).

Survey results indicate that the value-added dimension of the chestnut business is at an early stage. In Asia and Europe, chestnuts are peeled and sold roasted, ready to eat as a snack or candied and sold as marron glacé. Chestnuts are frozen, dried and canned for later consumption, or sold as soup mix, jam, jellies, preserves, puree and flour. Based on research into products produced and sold in Europe and Asia many types of value-added products were described in the survey.

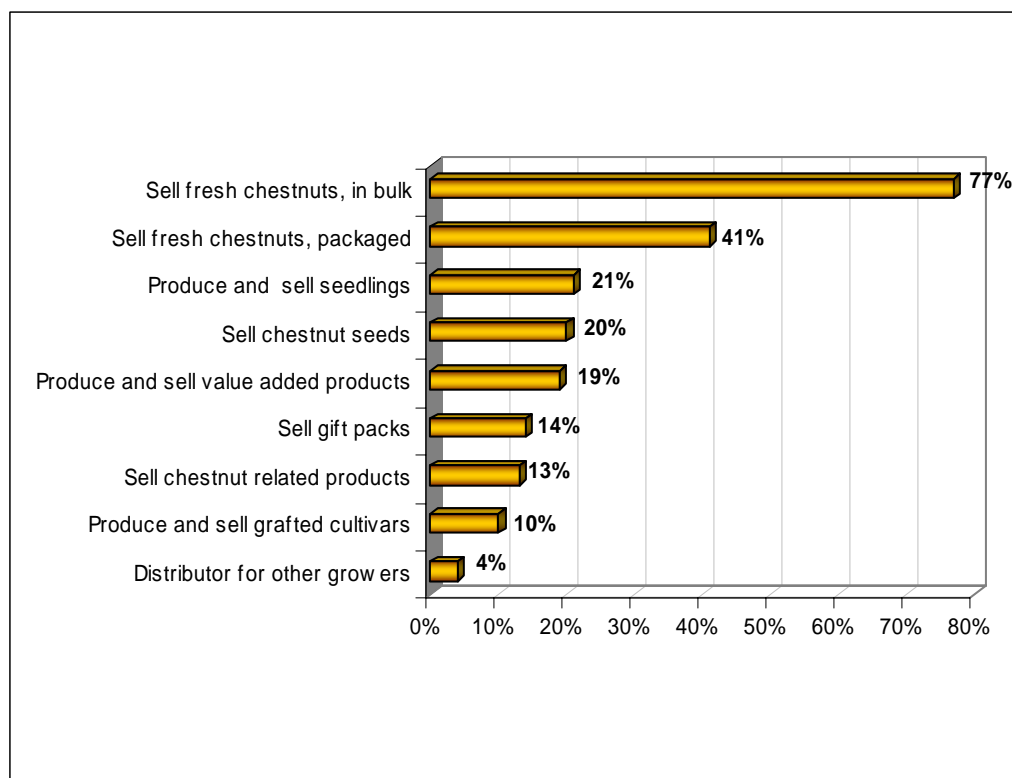


Fig.8 Activities performed by chestnut producers participants in the survey (N=90)

Few respondents were selling the value-added options presented (Fig. 9)

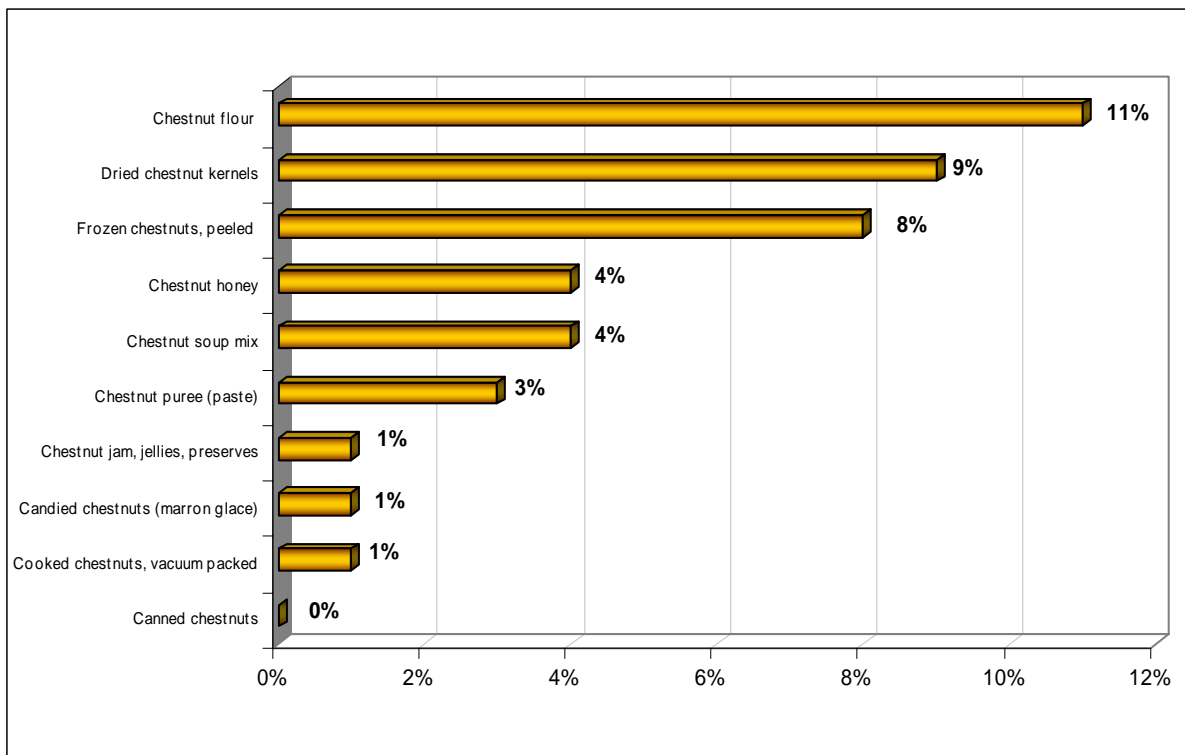


Fig.9 Value-added activities performed by chestnut producers participants in the survey (N=90)

Results show that value-added production is low and that producers had no difficulties selling all production of fresh chestnuts after harvest. For this reason, growers do not feel pushed to diversify into new products. As consumer demand for convenient, easy to prepare and ready to eat chestnuts increase, some producers may develop supplementary activities in addition to selling fresh chestnuts. For example, in Australia, peeled, frozen chestnuts are growing rapidly in popular-

ity (J. Casey, Pers. comm., 2004).

Additional processors may surface in the value chain as the diversity of products find their way to the market. Wider adoption of value-added products would complement the value of fresh chestnuts and prolong shelf life. Together with an increase in consumer awareness towards chestnuts, value-added products would help increase chestnut consumption beyond winter holidays to a healthy, year-round food.

## Brand name; Advertising; Publicity

One third of respondents (33%) recognize the advantage of developing a brand name. Respondents believe that a brand name would help the chestnut producer build trust and relationships with customers (29%), encourage repeated purchase (23%), increase awareness (22%), and stimulate word of mouth advertising (18%) (Fig. 10).

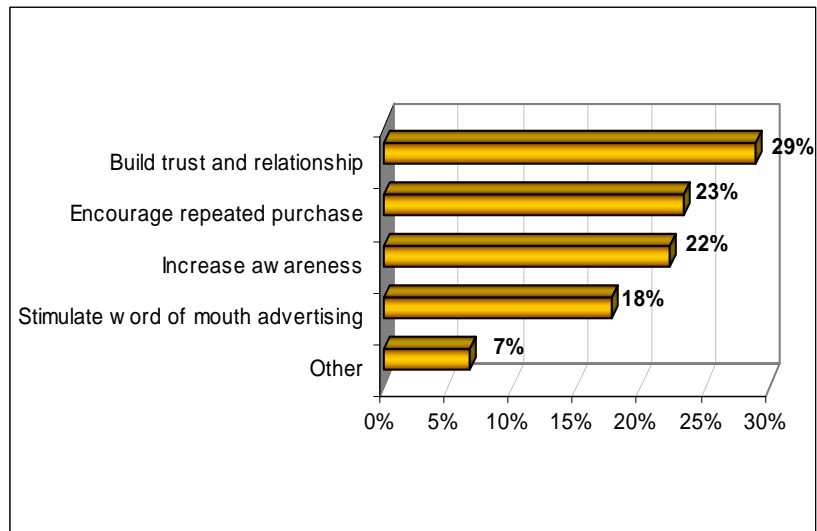


Fig.10 Reasons to develop a brand name (N=90)

The remaining 67% of respondents don't consider it necessary to develop a brand name because they either are in a pre-production stage, sell low volumes, sell through a cooperative, or sell only in bulk. Out of the producers that don't use a brand name yet (60 respondents), 33% plan to create one in the future.

U.S. chestnut production and marketing are just beginning. As more consumers become aware of chestnuts and chestnut products and demand increases, chestnut producers will need to focus on finding ways to deliver value to consumers on dimensions other than price. Consumers' needs should be identified and the product offering should meet with

those needs. Branding can help to introduce and remind the consumer the unique value the product offers, build trust and increase commitment and demand. This will enable the business to price higher resulting in increased profitability (Brereton and Company Inc., 2002).

Based on survey results, a correlation between the prices obtained for chestnuts and branding was found (prices tend to be higher for businesses or individuals that sell chestnuts under a brand name).



Only 38% of respondents use advertising to increase awareness toward their chestnut products. Out of 38%, the majority of respondents advertise on websites, in newspapers, flyers, magazines or billboards (Fig. 11). Reasons mentioned most often for not advertising are low volume of production, the shift of responsibility for advertising toward the grower cooperative, and lack of time or resources.

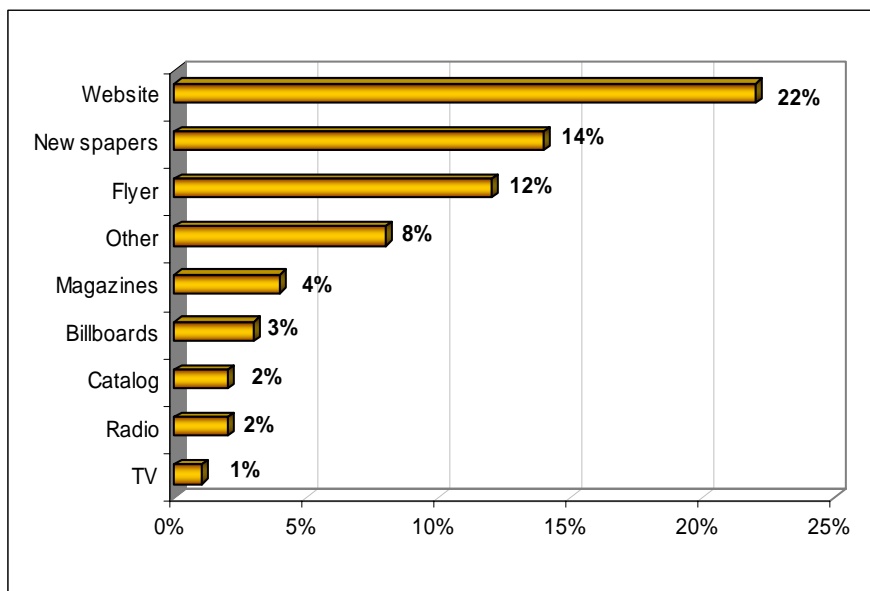


Fig. 11 Types of advertising used by respondents (N=90)

Publicity is used more often than advertising to increase awareness towards their chestnuts and chestnut products. Methods respondents used to generate publicity include free sample offerings (36%), news releases (20%), participation in festivals and fairs (20%), sponsoring community events (12%) and collabo-

ration with charities (11%). Demonstrations and tours offered to customers, talks offered to clubs, colleges, and schools, expositions, and publication of chestnut recipes and referrals are other ways respondents educate consumers.

## INFORMATION ABOUT THE MARKET

What we have learned about the industry, i.e., that it is small, young, and predominantly focused on the fresh produce market, will be reflected in all answers to questions related to the market. Current responses show that in the newly developing stage of the industry, the emphasis is more on production with less focus on the long-term future of the industry.

### Industry attractiveness

In Australia, the average cost to establish a 25 acres chestnut grove is \$38,900 (Trapnell et al., 1999). Estimates from the U.S. West coast range from \$2,275 to \$5,143 per acre (Allen Creek Farm, 2004). To enter the chestnut business, one can self finance start-up costs without requiring loans or partnerships and establish at least a small scale operation. All respondents (with only one exception) were self financed to start their chestnut production business. Additional investments are needed when production requires outside labor costs (46% of respondents hire people for help, most of them seasonal or part time for hand harvest, pruning, mowing, planting and nursery help), refrigeration facilities (81% of respondents refrigerate chestnuts after harvest), transportation (63% of respondents use

their own vehicle to transport chestnuts to the market) and marketing costs.

One negative aspect of starting a chestnut business is the time lag from initial investment to first return or profit. Out of our respondents, 41% obtained a return (had a first sale) in less than five years and 21% of respondents obtained the first return in 6 to 10 years, while 35% have yet to obtain a return. A large majority of respondents (76%) are not yet profitable. Ten percent of respondents became profitable (revenues exceeded expenses) in 6 to 10 years, 7% in less than 5 years and another 7% in 11 to 18 years. The factor that most influences the lack of profit is the size of the business (83% of the respondents that are still unprofitable have less than \$5,000 in annual sales from the chestnut business) (Fig.12).

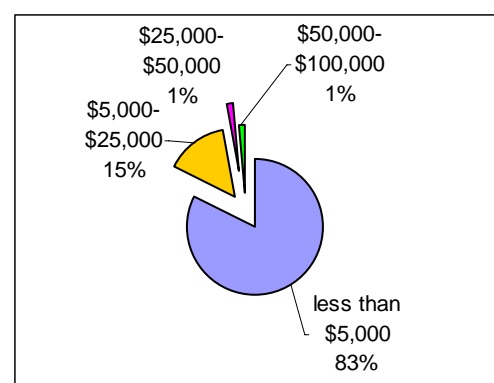
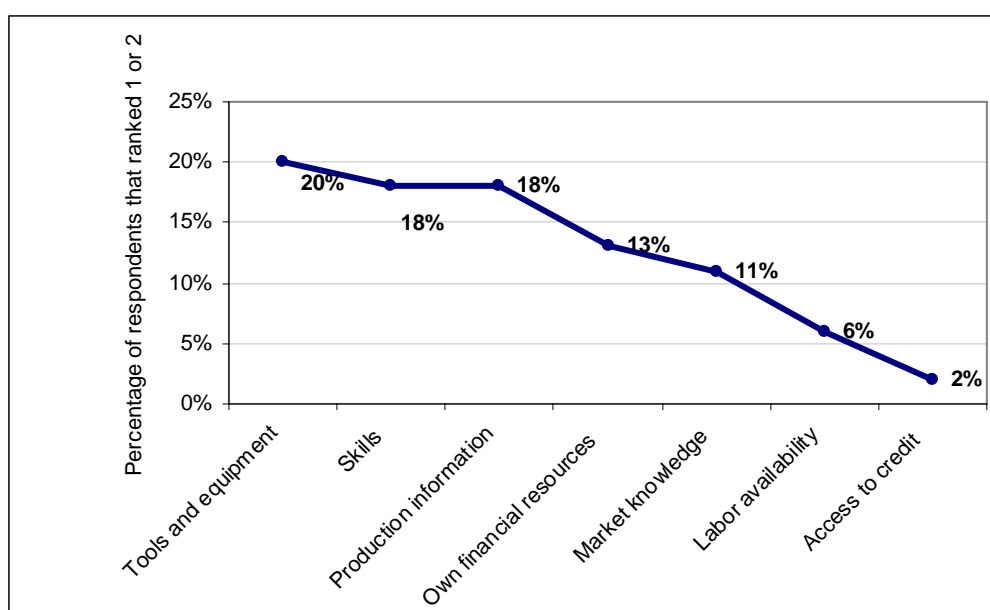


Fig. 12 Annual gross chestnut sales from surveyed respondents who are not yet profitable (N=90)

Production and marketing information and skills are critical resources to enter the market. However, responses to the survey confirmed the respondents focus on production more than marketing and the short-term rather than long-term. Tools and equipment, production skills and production information

were valued higher than financial resources, market knowledge and marketing skills while labor availability and access to credit were valued least (fig.13).



Additional details within categories\*:

*Skills:*

- Production: 14%
- Business: 2%

*Market knowledge:*

- How to market: 10%
- Potential buyers: 4%
- Market outlets: 4%
- Suppliers: 1%
- Distributors: 1%

*Production information:*

- Cultivar selection: 18%
- Orchard management: 10%
- Pest control: 4%
- Irrigation: 4%
- Weed control: 2%
- Grafting: 1%

\* Percentage of respondents that ranked the importance of critical resources with 1 or 2 out of 5—1 being the most important and 5 the least important):

Fig. 13: Critical resources identified by survey respondents needed for a chestnut production business (N=90)

Based on survey responses, individuals are attracted to the chestnut business by the potential for profit due to low initial invest-

ment and perceived market potential, or by interest in chestnuts and chestnut trees (Fig. 14).

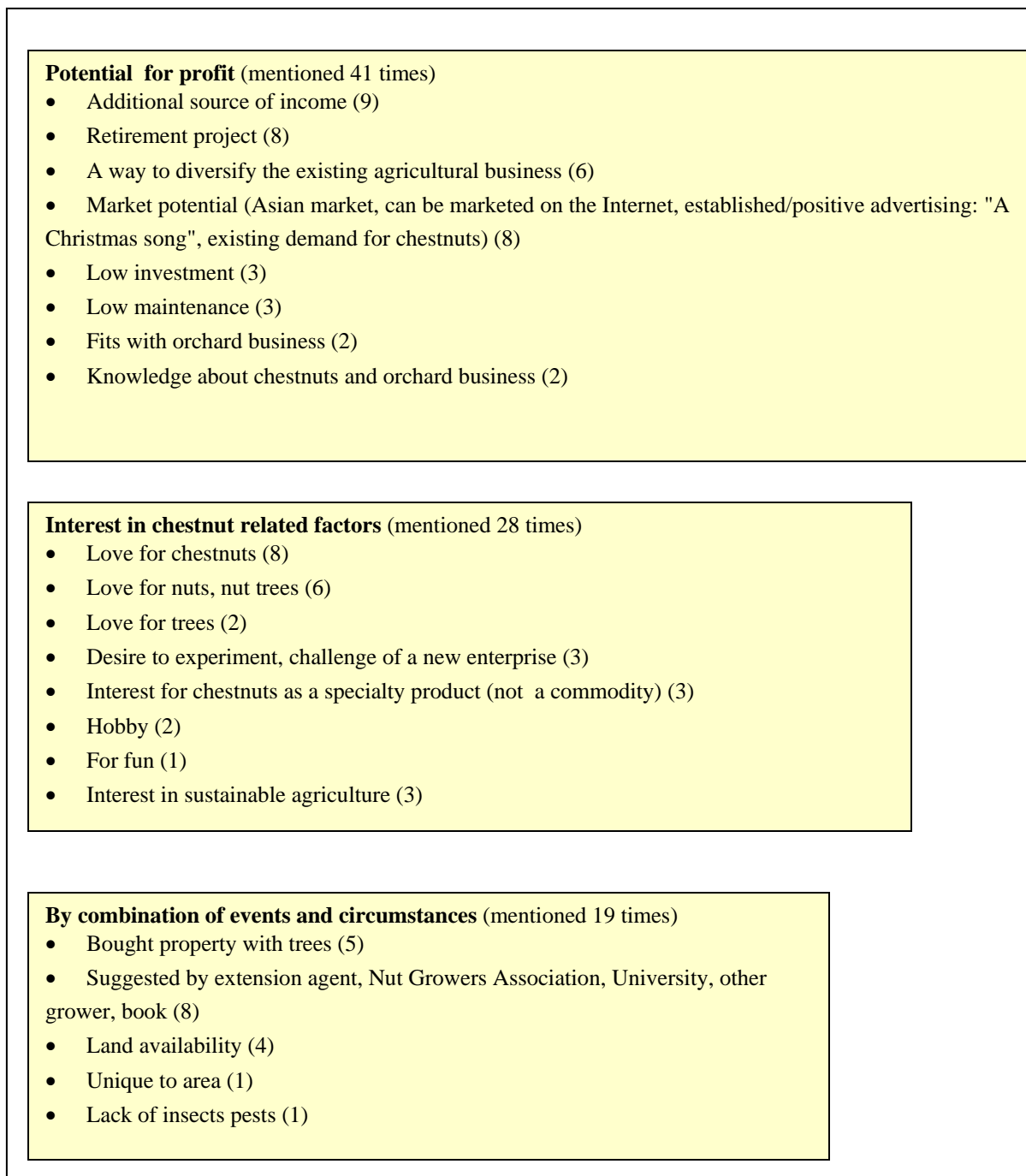


Fig. 14 Factors of attraction to start a chestnut production business (in parenthesis—the number of times the factor was mentioned by participants)

Lack of knowledge, information, available cultivars, equipment, and support, uncertainty of markets and demand, and long time to obtain a return on investment are factors that deter people from starting a chestnut production business (Fig.15). Because commercial chestnut production is only begin-

ning and faces so many uncertainties, the risk of failure in the market is high. Little research has been done on the specific cultivars for each region, resistance to pests and orchard management. Actual producers are learning as they go and continually experimenting.

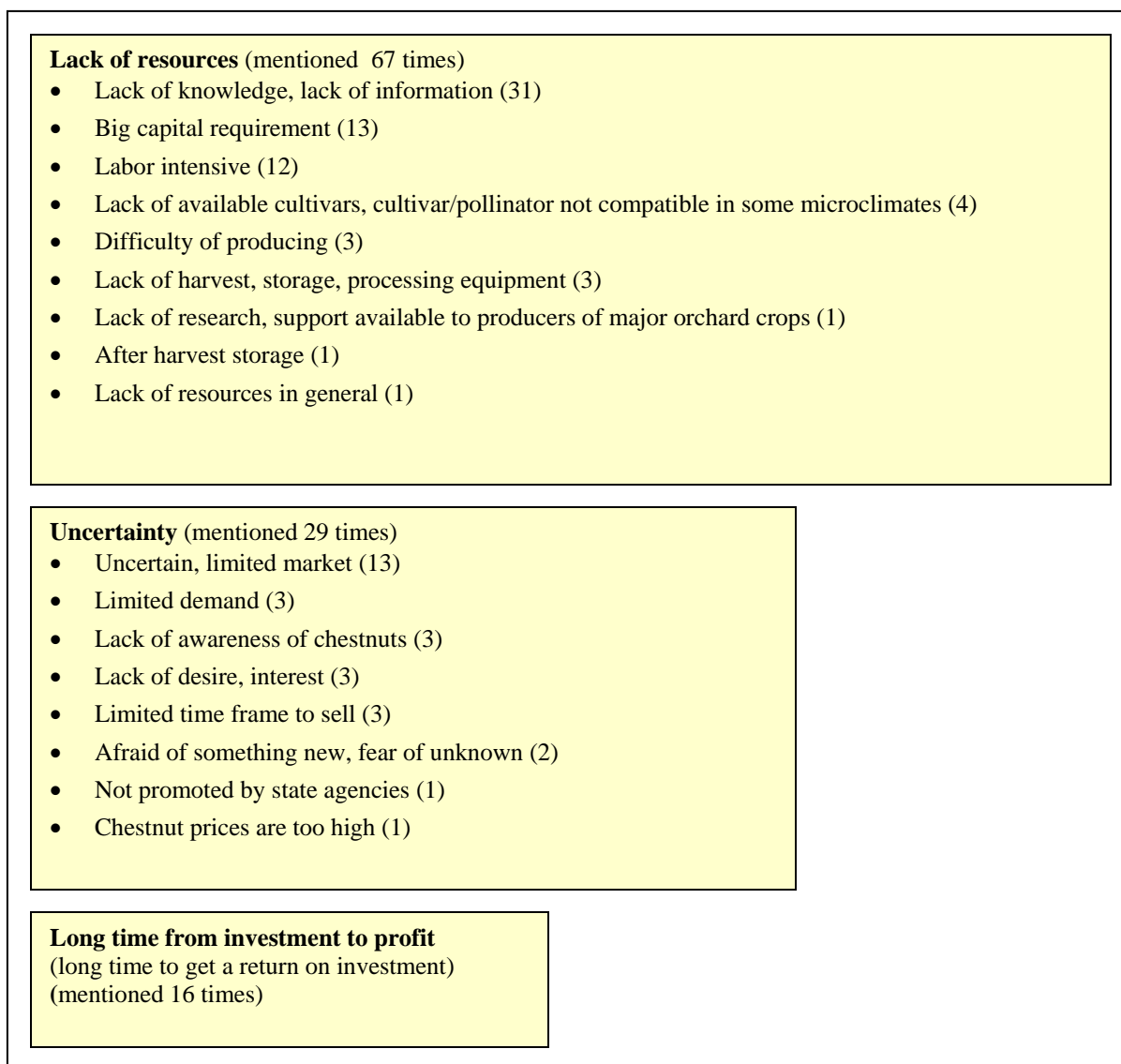


Fig. 15 Factors that retain people from starting a chestnut production business (in parenthesis—the number of times the factor was mentioned by participants)

## Suppliers

There are few major suppliers of grafted chestnuts in the industry. One particular nursery was mentioned as primary supplier by 31% of respondents and two other nurseries were mentioned by 7% and 6% respectively. The rest of the respondents mentioned other sources of supply. An alternative to buying seedlings and cultivars is to produce them. Fifty four percent of respondents produce their own seedlings and cultivars, 64% purchase grafted cultivars, 41% purchase seed-

lings and 18% purchase seedlings and do their own grafting. Results indicate that the supply of chestnuts is limited but chestnut producers can grow and graft their own trees. A niche opportunity exists for a few highly motivated chestnut producers to transform a cost center into a profit center by developing a nursery and selling seedlings and cultivars to other growers.

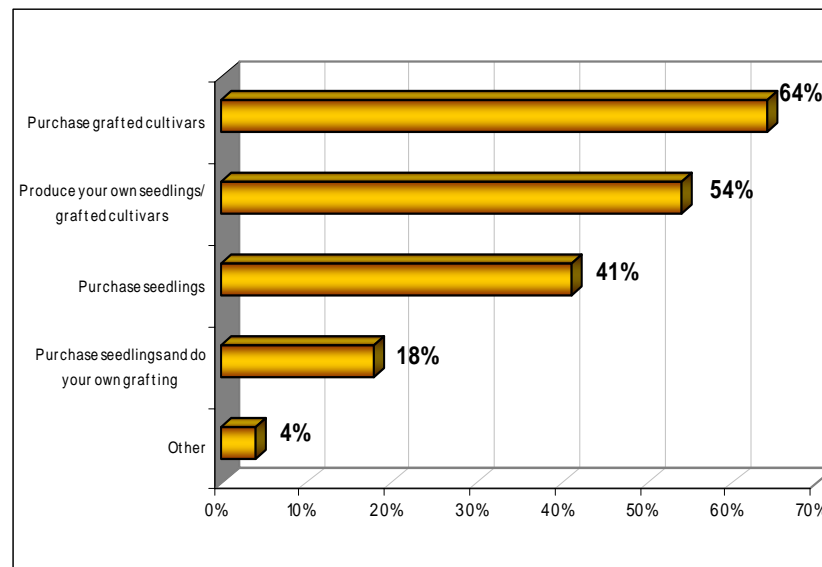


Fig. 16 Source of seedlings / cultivars (N = 90)

## Market outlets

The majority of respondents (63%) sell their chestnuts locally (within 75 miles radius), 38% sell regionally (between 75 and 200 miles radius) and 21% sell nationally.

No major buyer was mentioned and no contractual arrangements exist between producers and their buyers. Many respondents

(38%) sell chestnuts on-farm. Thirty four percent of respondents sell to farmers markets. Twenty three percent sell fresh chestnuts to restaurants. Less than 20% sell to retail locations; e.g., ethnic stores (19%), up-scale grocery stores (18%), health and natural food stores (17%), national chain grocery stores (11%), or wholesalers (12%) (Fig. 17).

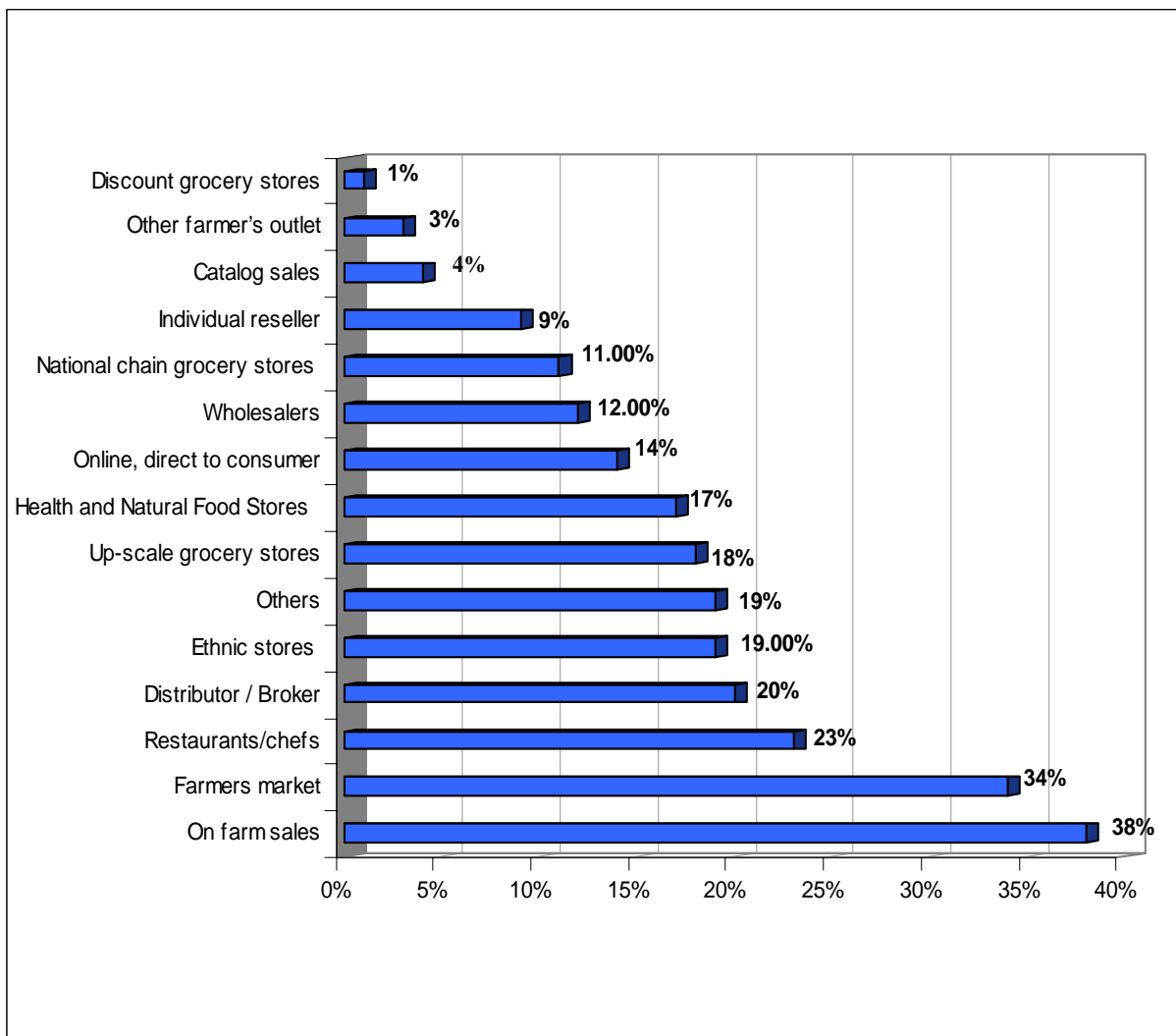


Fig. 17 Outlets for fresh chestnut sales as identified by surveyed producers (N=90)

The small number of producer sales to grocery stores is expected considering the nature of the industry. There is not enough production to satisfy the demands of quantity and continuity required by major grocery chains. Small-scale producers sell their products on-farm and online while larger-scale producers have started to sell to other outlets.

Looking at the average prices (Fig. 18), the highest prices are paid by restaurants, followed by customers that buy on-line, health and natural food stores, farmers markets, and on-farm. The lowest prices are offered by discount grocery stores, distributors, and wholesalers.

For most of the outlets, the range of prices is very large. Producers sell per pound from \$0.75 to \$6 at farmers markets, \$1.50 to \$6 on-farm, or from \$2 to \$7 at restaurants (Fig. 18). In most cases, the higher the involvement (full-time versus part-time and high percentage of chestnuts in the farming operation versus low), the more effort to obtain better prices. Producers that grow chestnuts from cultivars, grow organic chestnuts and sell under a brand name obtained higher prices than producers who sell generic seedling chestnuts grown conventionally.

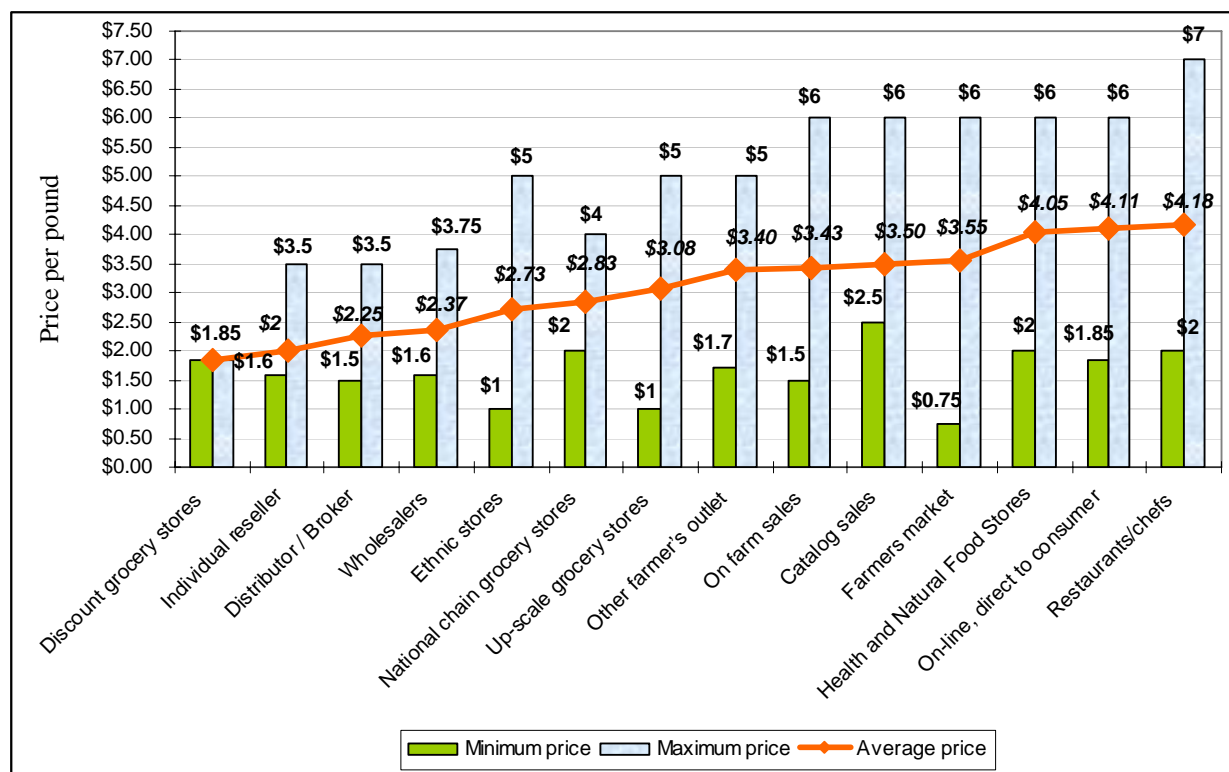


Fig. 18 Prices paid by different buyers as identified by surveyed producers (N=90)



According to the survey data, a premium price was obtained for organic production. The average prices for almost all of the market outlets are higher for producers that sell only organic compared with the prices obtained by producers that sell pesticide free and conventionally grown chestnuts (Fig. 19). Additionally, those that produce organic chestnuts sell more to up-scale grocery stores

stores, health and natural food stores, national chain grocery stores and online, direct-to-consumer.

Due to the large range of prices received, it is possible that the price can be increased by most producers without decreasing demand. To obtain higher prices, producers can switch to organic production and/or use branding, advertising and publicity.

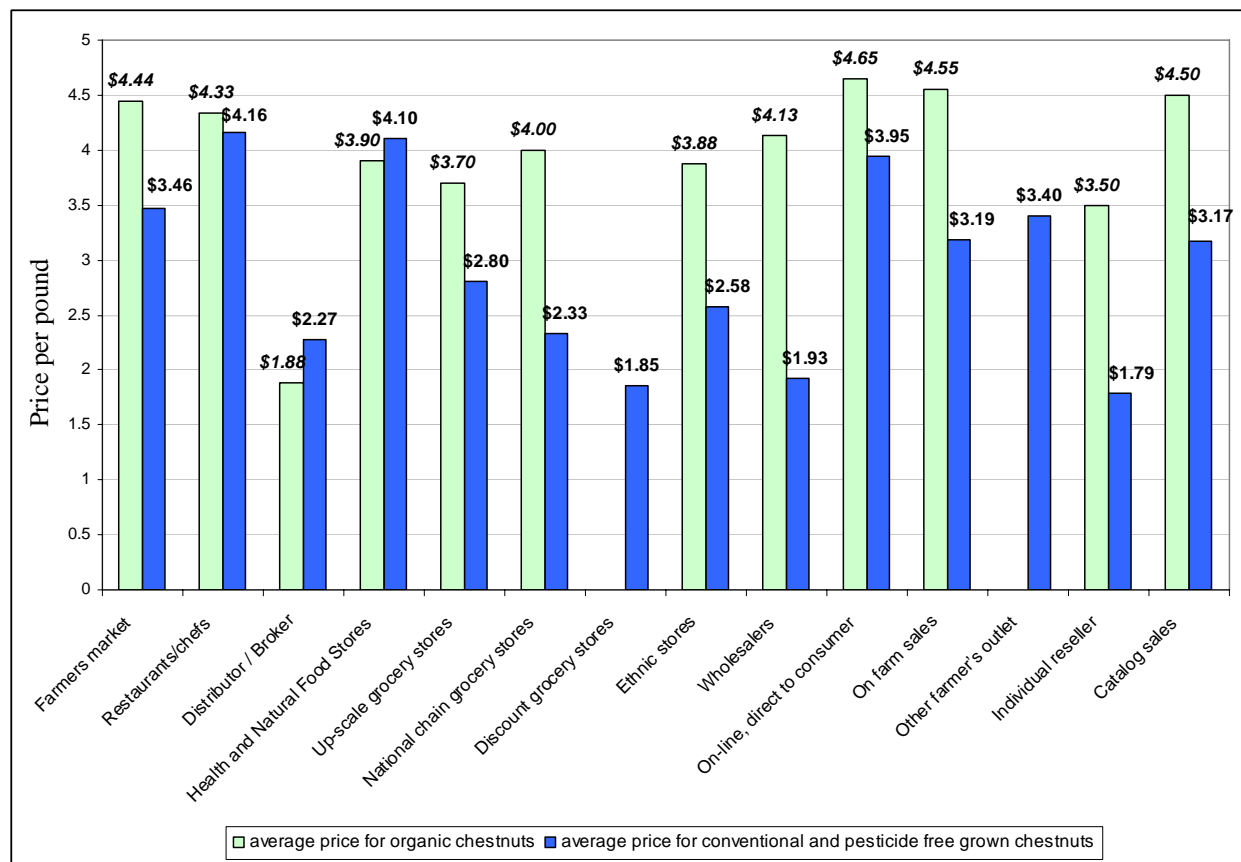


Fig. 19 Price premium obtained by surveyed chestnut producers for organic production (N=90)

Respondents prefer to sell on farm (28%), followed by up-scale grocery store (21%), farmers markets (17%) and distributors (16%) (Fig. 20).

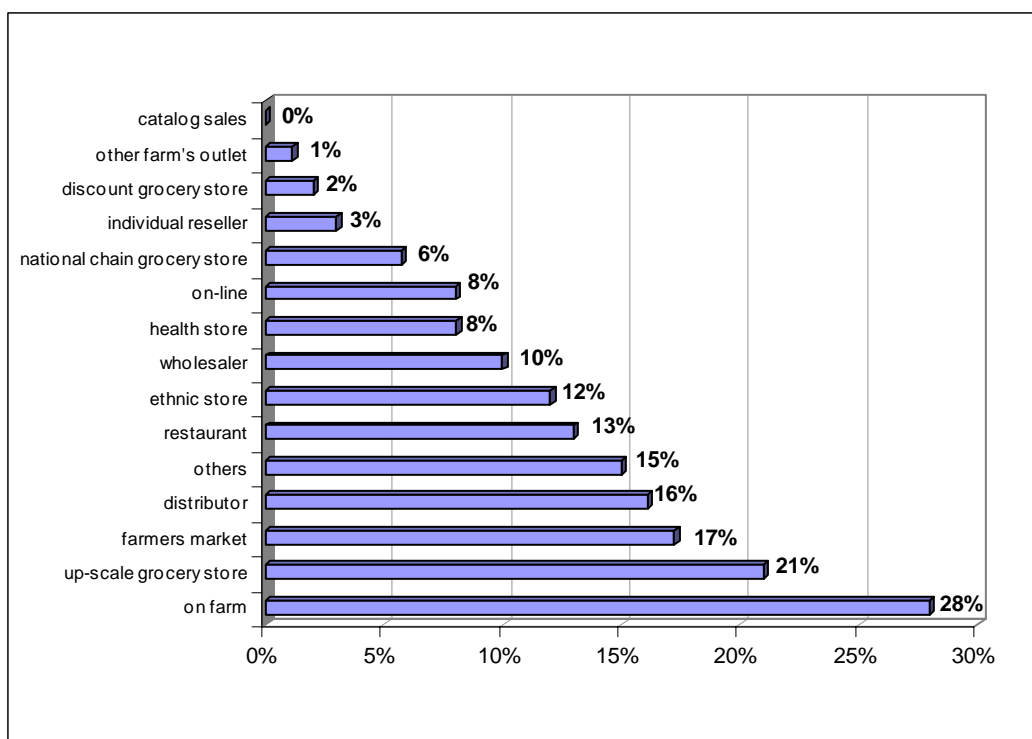


Fig. 20 Preferred buyers (ranked 1 or 2 out of 5) identified by survey respondents (N=90)

## Trends in demand

The majority of respondents (56%) indicated that demand for fresh chestnuts increased by 10% - 25% in the past 5 years. At the present time, respondents stated that demand for fresh chestnuts is steady (37%) or strong (32%). A large number of respondents (49%) believe that demand is in excess of supply, 21% that demand is equal to supply while 13% that demand is below supply. Demand for fresh chestnuts is expected to continue to increase by 10% - 25% in the next 5 years (62% of respondents). Sixteen percent indicated demand will be stable, while only 1% felt that demand will decrease (Fig. 21).

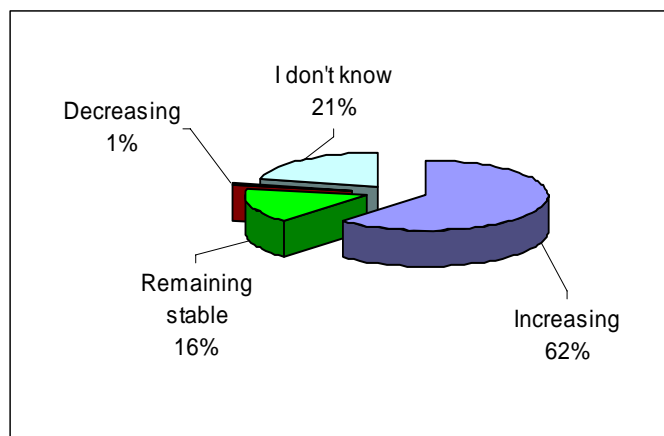


Fig. 21 Demand trends for fresh chestnuts in the next five years (N=90)

Due to the nature of the industry with its current focus on production of fresh chestnuts, few respondents expressed an opinion regarding demand for value added products.

There is little knowledge among buyers on how to handle chestnuts. Due to their high moisture content chestnuts need to be cooled soon after harvest and kept refrigerated (to minimize water loss and decay incidence). To insure that chestnut quality remains high 42% of respondents ship with information about perishability, 31% suggest the use of signs at the point of purchase and the others hand out flyers or verbally communicate to the customer. In this way, producers insure that chestnut quality remains high and consumers will have a positive experience with chestnuts.

## Substitutes

Chestnuts may be substituted by nuts, grains and even potatoes but they have also unique characteristics. Chestnuts are almost fat free. High fiber content makes chestnuts a good snack food and the high percentage of complex carbohydrates are a source of energy. Chestnuts are also cholesterol free and contain a high amount of vitamin C. Chestnut flour is gluten free and useful for individuals that are affected by celiac disease (UMCA, 2004).

## Competitors

Given the size of the domestic market, the industry is too small to thoroughly evaluate domestic competition. Most respondents (69%) declared that there are between 1 and 10 other chestnut producers in their area and

19% are the only chestnut producers in their area (Fig. 22)

Forty percent of respondents felt that the number of chestnut farms remained stable in the past five years while 31% noted an increase. Over the next five years, 54% think that the number of chestnut farms will remain stable and 34% that they will increase. Since most producers are able to sell all of their production in a short amount of time they feel unthreatened by competition in the short-run.

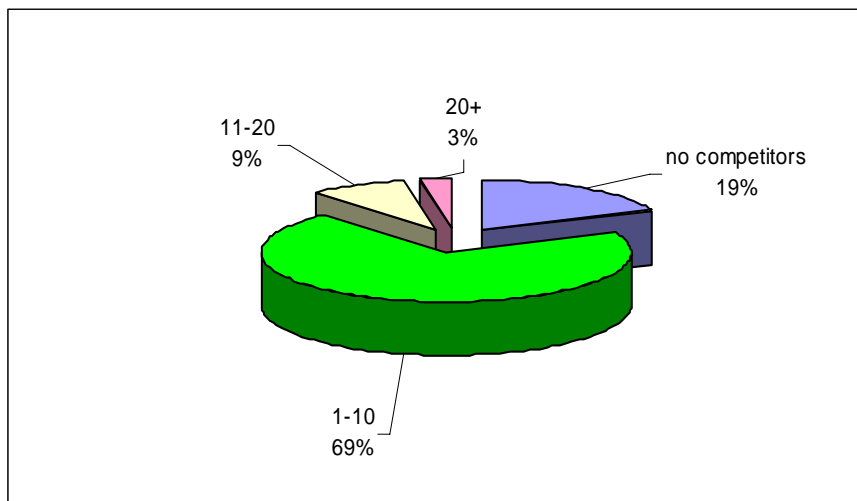


Fig. 22 Number of competitors in area (N=90)

For new or existing producers, competition can arise not only from local producers, but from imports. According to United States Department of Agriculture statistics (2005), starting with 2001, total value of imports was almost constant (\$11million) but imports from China increased strongly (about 400%). Only 8% of respondents consider that the import of fresh chestnuts would become a threat in the next five years. The attitude towards imports is probably based on the perception that domestic supply will be of better quality and can reach the market earlier. This creates an opportunity for local producers to increase production and replace imports.

### Competitive advantages

Producers already in the market try to provide value to their customers to maintain or increase their market share. To do this, producers build competitive advantages that help them differentiate their product from the competition. For our respondents, the most often declared competitive advantage was quality (68%), followed by customer service (37%) and market knowledge (20%) (Fig. 23).

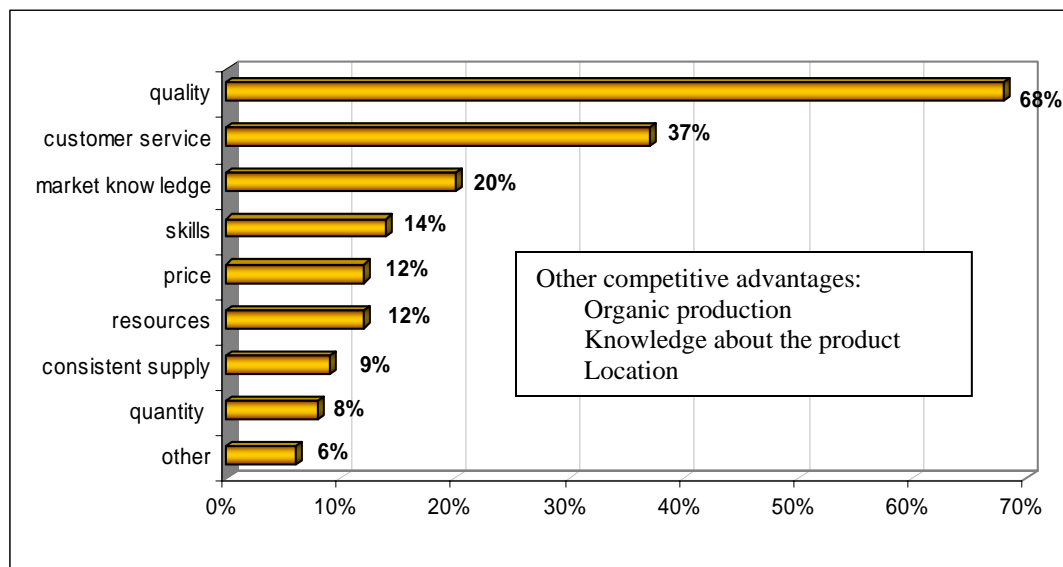


Fig. 23 Competitive advantages for successful domestic chestnut production business as identified by survey respondents (N=90)

## Trends in price

Based on survey data, thirty seven percent of respondents indicated that the price of fresh chestnuts increased an average of 10 to 25% in the last five years or remained stable (33%) (Fig. 24).

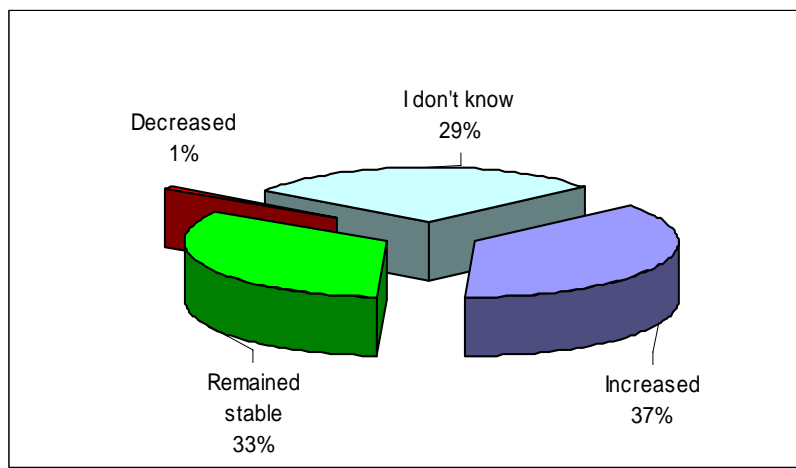


Fig. 24 Change in price for fresh chestnuts in the past five years (N=90)

In the next five years, 38% of respondents predicted that the price of fresh chestnuts will increase while 24% of respondents believed that prices will remain stable (Fig. 25).

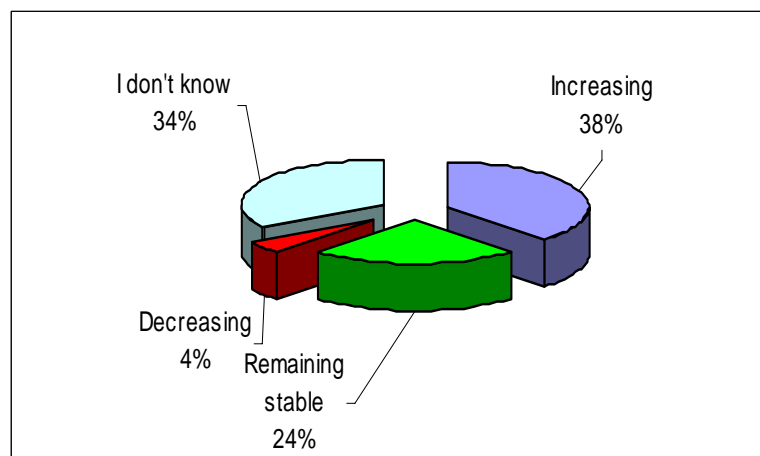


Fig. 25 Price trends for fresh chestnuts in the next five years (N=90)

## Policies that influence the industry

One federal policy that threatens profitability in the US chestnut market is the existence of free trade agreements that allow subsidized chestnuts to enter into the United States. The US government is trying to assist food producers from less developed countries to compete in international food markets (USAID, 2003). Subsidizing the entry of low cost chestnuts impacts the domestic chestnut producer who is struggling to overcome many barriers related to a minor crop. Another policy mentioned was the quarantine restriction on importing potentially promising cultivars that are not available domestically. The shortage in domestic supply for certain cultivars coupled with the delay in testing and releasing new cultivars due to quarantine will adversely influence chestnut production. Respondents mentioned an increase in regulations for agriculture which makes it more difficult to grow chestnuts. An important aspect mentioned by some of the respondents in this respect was the lack of chemicals approved for minor crops such as chestnuts. Growers

can only experiment with different pesticides used for other nut species but don't have the assurance that they are using a registered product.

There were no policies identified as helpful to enter into the chestnut market. There are grants that may assist producers as the USDA Sustainable Agriculture Research and Education (SARE) grant or the USDA Integrated Organic Program but none is specific for chestnuts.

## CONCLUSIONS AND RECOMMENDATIONS

The U.S. chestnut industry is in its formative stages. The majority of the chestnut producers have been in business less than 10 years. The volume of production is low. The size of production operations are small and chestnuts are harvested manually. Trees are very young barely entering commercial production. The majority of respondents sell only fresh chestnuts in bulk or packaged while a few of respondents sell value added products.

Chestnut production has many positive aspects. Chestnut cultivation can be a source of profit due to high demand and good prices for high quality chestnuts, high volume of imports compared to domestic production and relatively low initial investment requirements. Producing chestnuts can be a way to diversify an existing agricultural business. Chestnuts can be grown organically, have many nutritional and health benefits (e.g., gluten free flour) and are associated with positive feelings such as tradition, holiday, and family that can help advertise the product.

One of the biggest barriers to success in the chestnut business is the lack of information for producers, retailers and consumers. For producers, there is a serious lack of expertise and experience about cultivars, orchard management, prices, markets, and distribution channels.

There is little knowledge among buyers on how to handle the chestnuts and increase shelf life. There is limited consumer awareness of the product. Another barrier is the 5 to 10 year time lag to get a return on investment. There is a serious shortage of available chestnut cultivars for commercial production, the crop is perishable, there are problems related to pest and disease control and the market is uncertain. Specific policies such as subsidizing cheap imports, existent quarantines for cultivars from other countries and lack of chemicals registered for use with chestnuts can also be considered barriers to success.

Chestnut is still a minor crop in the US and because of that not much attention is provided by Federal or State agencies, universities, or other organizations. Chestnut growers associations must join their efforts to fund and support chestnut research and development of the industry. Both production and consumption of chestnuts should be stimulated. The focus should be on generating demand by increasing consumers' awareness about chestnuts and providing information and support to actual and future producers in order to generate enough domestic production to meet the created demand. Imports can be out competed by provid-



## LITERATURE CITED

- Allen Creek Farm, 2004 - ChestnutsOnLine.com - establishing the orchard. <<http://www.chestnutsonline.com/estaborchard.htm>>.
- Brereton and Company Inc. 2002. The changing landscape of the food industry: Harvesting profit or pain? Food Industry Reporter. Vol.1. <[www.brereton.net/pdf/Food\\_Industry\\_Report.pdf](http://www.brereton.net/pdf/Food_Industry_Report.pdf)>.
- FAOSTAT. 2005. Global chestnut export. <<http://faostat.fao.org/faostat/form?collection=Trade.CropsLivestockProducts&Domain=Trade&servlet=1&hasbulk=0&version=ext&language=EN>>.
- Fulbright, D. n.d. Growing chestnuts for commercial markets in Michigan and other Midwest states: a pioneer industry. <<http://www.plantpathology.msu.edu/fulbright/Pages/MNPCpages/growingchestnuts.html>>.
- Gold, M.A., M.M. Cernusca and L.D. Godsey. Update on consumers' preferences for chestnuts. HortTechnology (In press.)
- Gold M.A., M.M. Cernusca , and L.D. Godsey 2004. Consumer preferences for chestnuts, eastern black walnuts, and pecans. HortTechnology14(4):583-589.
- Hunt K., M. Gold and W. Reid 2002. Growing Chinese chestnuts in Missouri. Agroforestry in Action. University of Missouri Center for Agroforestry. <<http://agebb.missouri.edu/umca/pubs/chestnut.pdf>>.
- Porter M. E. 1980. Competitive strategy: Techniques for analyzing industries and competitors. New York: The Free Press.
- Trapnell L., S. Carmichael and D. Ridley 1999. Chestnut economics. Profitability and cash flow from chestnuts. In: Ridley D and Beaumont J. (eds.) The Australian chestnut growers' resource manual. DNRE Agriculture Victoria – Institute for Horticultural Development Knoxfield, Australia.
- UMCA. 2004. Why chestnuts? Nutrition and your health. <<http://agebb.missouri.edu/umca/whatnew/chestnut.pdf>>.
- USAID. 2003. Georgian chestnuts crack elite European market. Front lines. 11. 16 May 2005. <[http://www.usaid.gov/our\\_work/global\\_partnerships/gda/showcase/Nov03\\_FrontLines.pdf](http://www.usaid.gov/our_work/global_partnerships/gda/showcase/Nov03_FrontLines.pdf)>
- United States Department of Agriculture. Foreign Agricultural Service. 2005. U.S. Trade Imports, Fatus Commodity Aggregations, Chestnuts. <<http://www.fas.usda.gov/ustrade/USTImFatus.asp?QI=>>.
- Wahl T. 2002. The Chestnut Grower's Primer. Southeast Iowa Nut Growers. 1<sup>st</sup> Edition. 16 May 2005. <[http://www.pfi.iastate.edu/ofr/The\\_Chestnut\\_Primer\\_2002.pdf](http://www.pfi.iastate.edu/ofr/The_Chestnut_Primer_2002.pdf)>.

## APPENDIX

Seedlings	Origin	Frequency
American		5
Amy	Chinese	1
Bisalta	European * Japanese	1
Campbell	Chinese * European	1
Carr	Chinese	1
Chinese		18
Chinese * American		1
Chinese * Korean		1
Colossal	Japanese * European	19
Crane	Chinese	1
Davis		1
Dunstan		7
Eaton	Chinese * Japanese * American	3
European		4
European X American		1
Gideon		1
Japanese		1
Korean		1
Layeroka	Chinese * European	4
Maraval	Japanese * European	1
Miller	Chinese	3
Nevada	Japanese * European	10
Okei	Japanese * American	3
Orrin	Chinese	1
Paragon	European	2
Peach	Chinese	2
Qing	Chinese	5
Silverleaf	Japanese * American Chincapin	1
Skioka	Japanese * European	3
Skookum		3
Sleeping Giant	Chinese	2

Appendix—Table I

<b>Cultivars</b>	<b>Origin</b>	<b>Frequency</b>
142Q-Grimo	Chinese * European	1
Amy	Chinese	1
Bouche de Betizac	European * Japanese	2
Carolina	Chinese * American	1
Colossal	Japanese * European	37
Dunstan		2
Eaton	Chinese * Japanese * American	4
Fowler	European	1
Gideon	Chinese	2
Layeroka	Chinese * European	2
Marrisard		2
Marrone di Luscerna	European	1
Marsol	Japanese * European	2
Nevada	Japanese * European	2
Okei	Japanese * American Chinkapin	1
Peach	Chinese	3
Precoce Migoule	European	3
Qing	Chinese	7
Sleeping giant	Chinese * Japanese * American	1
Skioka	Japanese * European	1
Skookum		2
Willamette	Chinese * American	1

Appendix—Table II