The Economic Feasibility of Forming A California Wheat Cooperative

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Executive Summary

Recent concerns relative to California farm gate prices for wheat and a lack of profitability in wheat production has been expressed by a group of California wheat growers. Their dissatisfaction has resulted in their consideration to form a California wheat grower cooperative. The cooperative would become the marketing agent for the growers and potentially allow growers to pool their production for greater market power as well as capture profits beyond the farm gate. Two feasibility issues are addressed by the study: 1) The organizational feasibility of forming the cooperative, and 2) The economic feasibility of a California wheat growers cooperative engaging in value-added marketing opportunities upstream from the farm gate that would result in increased the return to wheat grower production. The objective of the study was to evaluate those feasibilities.

A survey of California wheat growers was done to assess the organizational feasibility of starting a California wheat growers' cooperative. A list of 8,533 California wheat growers provided by the California Wheat Commission from which a stratified sample of 1,519 growers was send a mail survey. The first mail survey was followed up by a phone survey of eighty-six wheat growers and a second mail survey of 102 growers. Thirty useable surveys were returned from the first mailing. Two additional useable surveys were obtained from the follow-up phone and mail surveys for a total of 32 useable surveys. The growers who answered the survey accounted for approximately 12% or 72,583 acres of the 615,000 acres of wheat planted in 2001.

The low response rate of 2% was a cause for concern. It is not clear whether the low response rate was reflective of lack of interest in cooperative formation or due to other factors such a timing of the survey or lack of a monetary or other incentive for filling out the survey. The low response rate and consequent non-response bias did not allow for any statistical inference to be made concerning the results of the survey. Thus, the responses were viewed as anecdotal in nature.

The majority of growers that responded to the survey felt the wheat prices they received were unfair; that wheat was not a good alternative to other crops; and indicated it was unlikely they would be growing wheat in 3 to 5 years. Growers attitudes to cooperative formation varied widely, even with the small sample. The majority of growers who responded to the survey were generally supportive of cooperatives in general but were reluctant to declare a cooperative structure a sound idea for the California wheat industry. If these responses are any viable indication of the general sentiment of California wheat growers, then a wheat cooperative may have difficulty building the membership needed for physical or pecuniary economies-of-scale. This suggests that if a California wheat growers cooperative is to formed and be successful that an initial coalition of California wheat growers must educate and convince other growers concerning the possible benefits of such a cooperative.

The economic feasibility of a California wheat growers' cooperative engaging in value-added marketing activities was assessed for wheat merchandizing, flour milling, value-added processing and specialty wheat and flours.

California wheat merchandizing is the selling of wheat from the farm gate or from storage to three markets: California flourmills, feed markets, and export. The availability of price and cost information limited the economic analysis of these markets but indicators of market opportunity were developed. Thus while it was not possible to calculate merchandising profit several indicators suggest that wheat merchandizing could be viable value-added marketing opportunity for a California wheat cooperative. These indicators include the fact that California is a wheat deficit state, that there exist market intermediaries who are performing the merchandizing activity which suggests that some potential degree of profitability does exist in the merchandising activity, there are relatively low barriers-to-entry to this marketing activity, and that the margin indicators that were calculated suggest there are potential returns to the activity above marketing costs.

There are fourteen flourmills in the state ranging in milling capacity from 2,500 cwt/day to 18,500 cwt/day. Four firms own the majority of the milling capacity: General Mills, ConAgra, Archer Daniel Midlands, and Cargill. These are large agribusiness' that have developed extensive distribution channels. This combined with the large investment cost to enter the industry and the already over-capacity and low rate of return situation suggest that the risks and returns for entering this industry are not favorable. Thus, it was determined that engaging in flour milling would not be a viable economic activity.

Several value-added processing activities were investigated. Specifically, pasta, tortilla, and frozen dough processing was evaluated. Secondary data on the pasta and tortilla industries showed that each has a high degree of concentration and both are experiencing a reduction in profitability. They were dropped from further consideration. The frozen dough industry does seem to offer a potentially attractive value-added marketing opportunity. The financial analysis done on this industry showed a range of 15% rate on return to 25% based on different price and cost assumptions. The industry is experiencing attractive industry growth rates, and has relatively low entry barriers.

The last value-added activity evaluated was specialty wheat and flours. No formal economic analysis was done on this activity but a food processors survey was completed, as was an exploratory retail inventory of wheat-based products. The majority of the food processing firms (bakeries, pasta makers, tortilla, etc) contacted indicated significant increase in organic wheat flour used. The exploratory retail inventory found a cumulative total of 102 different California food processing firms making 956 wheat containing foods with 11% of those products being labeled as totally organic and 24% labeled as containing organic wheat ingredients.

The general conclusions that can be drawn from the study are that there are economically feasible value-added marketing activities in which a California wheat cooperative could be engaged. Each has its own risk and potential return situation and each has different equity and operating capital needs and management skills. The organization issue is whether California wheat growers can be convinced that it is in their best interest to form, finance, and support a such cooperative.

The Economic Feasibility of Forming a California Wheat Growers' Cooperative

I. INTRODUCTION

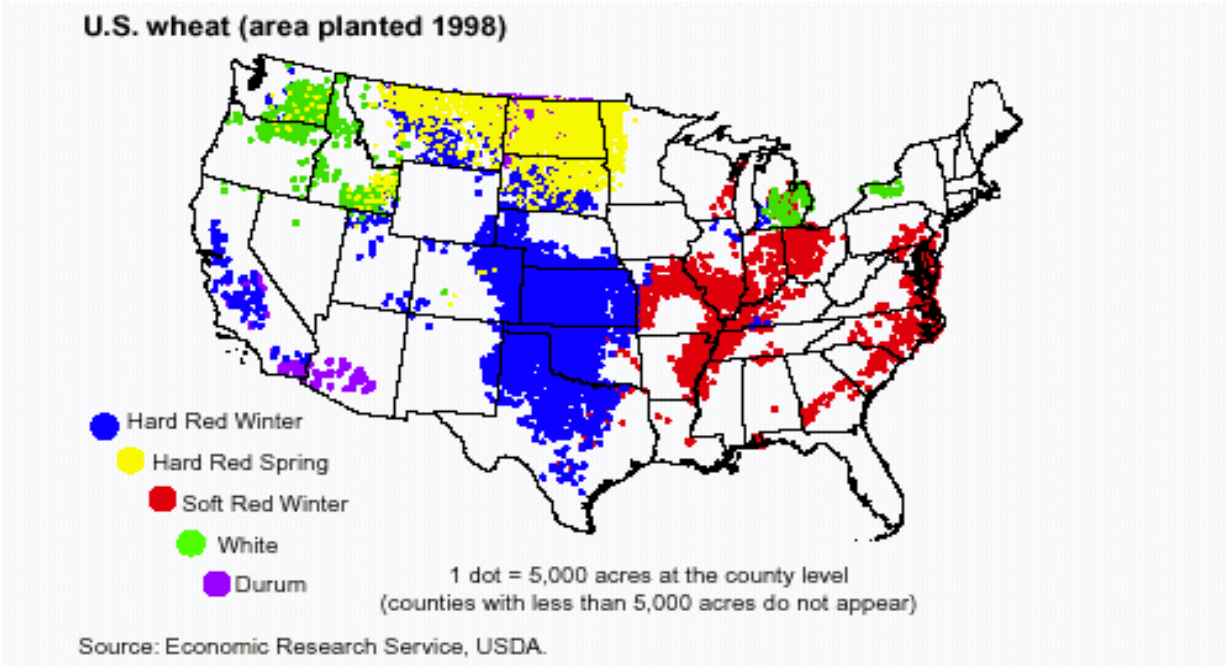
Recent concerns relative to California farm gate prices for wheat and a lack of profitability in wheat production has been expressed by a group of California wheat growers. Their dissatisfaction has resulted in their consideration to form a California wheat grower cooperative. The cooperative would become the marketing agent for the growers and potentially allow growers to pool their production for greater market power as well as capture profits beyond the farm gate. The economic feasibility of forming the cooperative has as necessary conditions: 1) interest on the part of California wheat growers in the formation of a cooperative, and 2) determining if there are wheat marketing opportunities upstream from the farm gate that will increase the return to wheat grower production. The objective of the study was to evaluate those necessary conditions.

This report is the culmination of that study. The first section of the report provides an overview of the California wheat situation, evaluates the cooperative structure as a business entity, and presents the results of a California wheat grower survey to assess interest in the formation of a California wheat growers' cooperative (Section II). The sections III to VI provide quantitative and qualitative economic analysis of differing marketing options available to the cooperative. The options assessed were: wheat merchandizing, flour milling, and value-added production and food processing. There were some data limitations to research, which are discussed in the specific area applicable. The final section provides the conclusions that can be drawn from the research.

Market and Industry Overview

Figure 1 shows that the majority of wheat grown in California is hard red winter, with smaller amounts of durum, and white being grown. Most recently winter wheat accounts for 75% of total wheat production in California (California Wheat Commission-CWC). California winter wheat production takes place in 32 counties. Five

Figure 1.



counties, Colusa, Fresno, Kern, Kings, San Joaquin, and Tulare, account for about 56% of the total California winter wheat production. The main varieties of red winter wheat grown in the state in 2001 were Brooks, Bonus, Express, and Yecora Rojo. Dirkin and Klasic varieties dominate white winter production.

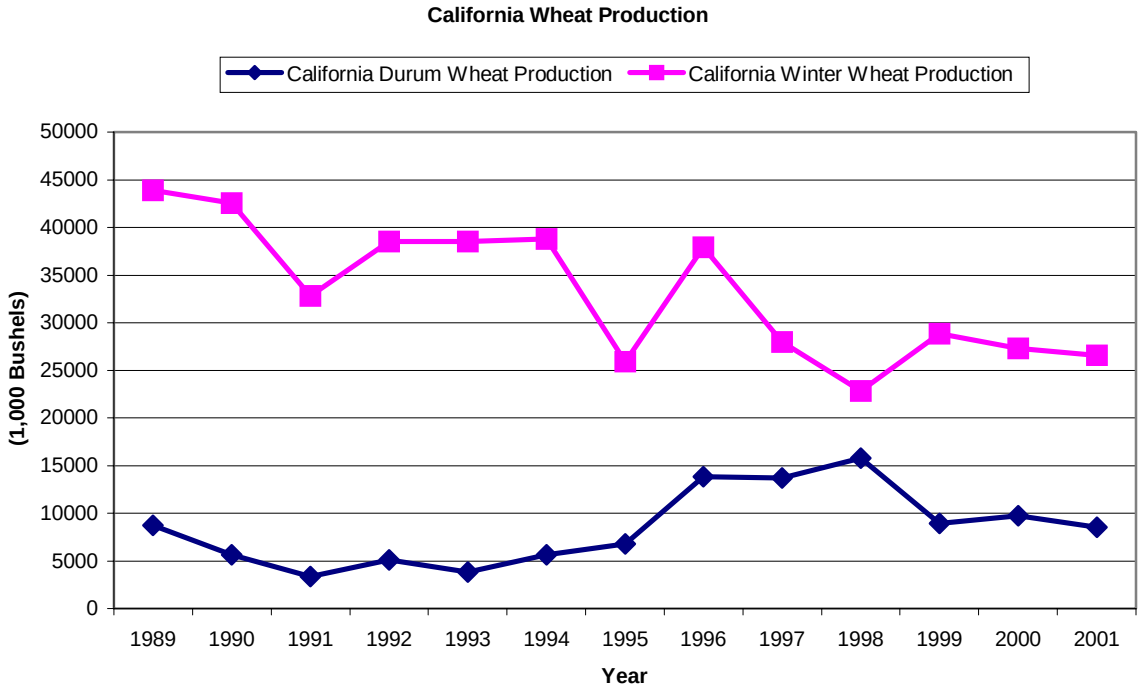
The majority of the durum wheat grown in California is Desert Durum®[1] with the predominate variety being Kronos. Durum wheat is produced in eight California counties

[1] The phrase "Desert Durum" has been trademarked with the US patent office under the ownership of the Arizona Grains Research and Promotion Council and the California Wheat Commission. Only durum produced in the states of Arizona and California can use the Desert Durum® trademark.

of which two, Fresno and Imperial account for 78% of the California Durum wheat production (see Appendix, Table 1 for greater detail) . Wheat grown in California is marketed to flour mills, used for feed, and goes into the export market. The use of the wheat is dictated primarily by its protein characteristics and price.

Production of wheat in California has declined from 1980 when it reached its high of 2,565 thousands of tons to 1,053 thousand of tons in 2001. Figure 2 shows a general downward trend of winter wheat production and slight up trend in durum wheat production from 1989 to 2001.

Figure 2.



Source: National Agricultural Statistical Service Published Estimated Database

California wheat prices are impacted by the same set of factors that affect US wheat prices in general. The fall in US wheat prices from 1996 through 2000 can be attributed to a number of factors including a strong US dollar, increased world stocks, and increased foreign production. Those factors lead to decreased export demand, which when coupled with high US production and stocks led to falling wheat prices. The

forecasted 2001-2002 US wheat price is $2.75 - $2.85 per bushel, which is above the average price of $2.62 received in 2000-2001.

This forecast is predicated on reduced US production, falling world stocks, and possible increases in export demand; however, prices are likely to remain sluggish (ERS-USDA). This suggests that California farm level wheat prices are likely to remain in the low three-dollar range for winter wheat and the high three to low four dollar range for durum wheat. The results of falling prices and generally increasing costs of production have lead to decreased profitability for California wheat producers.

Figure 4 illustrates the market value and total cost relationship for wheat production in the Pacific region of the United States. Figure 4 indicates that only in 1996, when wheat prices were at all time high levels, were total costs and market values for wheat approximately equal. An average of $74.64 per acre were lost over each of the last ten years (ERS-USDA).

Figure3

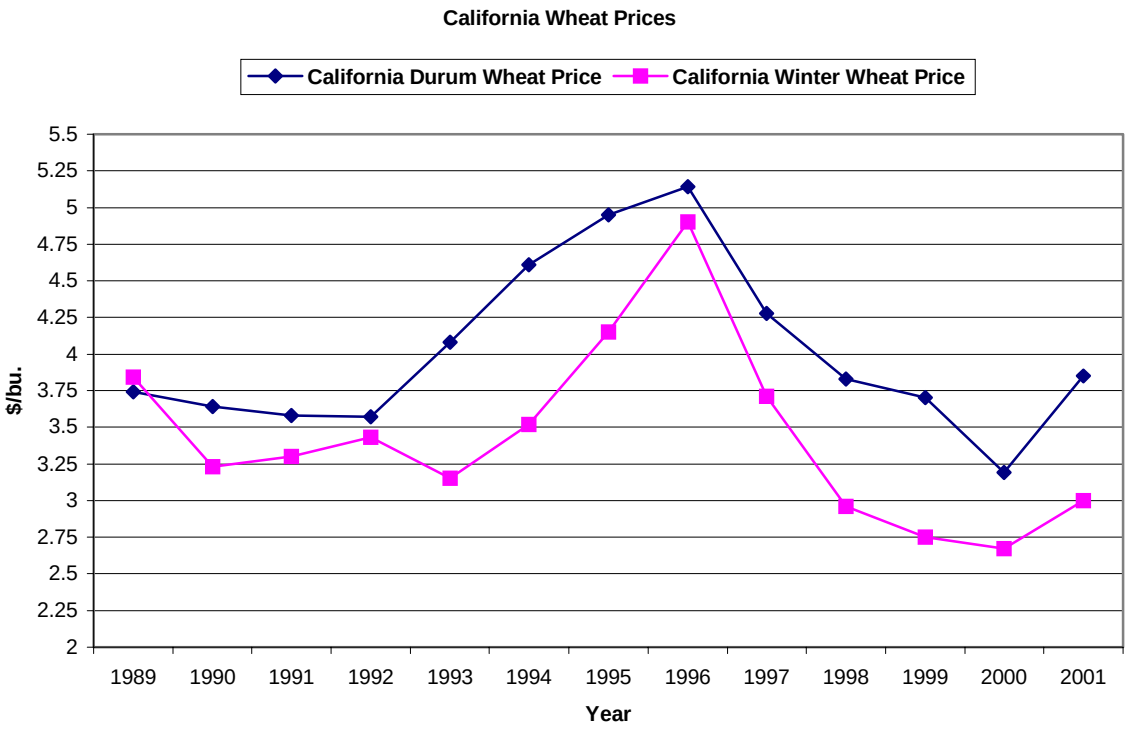
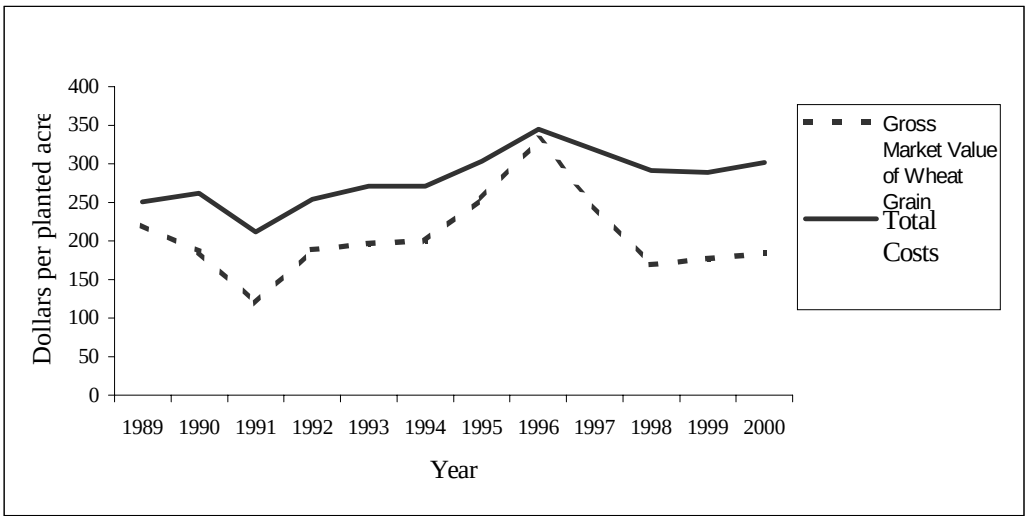


Figure 4. Pacific US Wheat Grain Market Value Versus Total Costs, 1989 – 2000.



Source: USDA Economic Research Service Wheat Cost and Return Data.

A number of industry organization and structure issues are also affecting wheat growers. The last 20 years have seen increasing concentration in industries involved in the handling and marketing of US grain products. Mergers, in particular, have changed the manufacturing structure. One difference is that companies now produce a broad line of consumer products where they didn't before (Manchester 1994). In the grain-merchandising sector the number of firms has decreased, while their market share and size have increased. In 1982, there were over 9,100 grain elevators in the United States, while in 1994 there were fewer than 8,000 (Cook 1994).

Consolidation in the grain and oilseed processing industries is occurring rapidly: in 1973 the four largest flour milling firms had about a 33.5 percent market share, which jumped to 50.7 percent in 1983 and again jumped in 1990 to 58.1 percent. During this period of consolidation, the 12 largest firms experienced increases from 67.7 percent market share in 1973 to 78 percent in 1983, and to 80.5 percent in 1990 (Cook 1994). In 1997 the four largest flour-milling firms had 48.4 percent, and the 20 largest firms had 80 percent market share (*1997 Census of Manufacturers*).

A number of factors are stimulating the concentration and vertical coordination of the grain associated industries. Securities price-earning strategies and greater economic rents are obvious motivations (see Manne), but beyond that new technologies are

increasing the variety of means by which grain-related industries can satisfy consumer needs. Today's consumers demand more sophisticated processed foods than they did 30 years ago. Examples of these technologies are genetically engineered crops, information delivery systems, and grain quality measuring devices. Increasingly, businesses must engage in market coordination activities to occupy consumer-driven market niches (Cook).

As companies work to meet the demands of their consumers, two grain and oilseed markets are rising, a product market and a commodity market. Seed companies, food manufacturers, and bulk commodity trading firms operate in these markets. The development of economies-of-scale and risk management will ultimately be these markets' comparative advantage (Cook 1994).

As consumer demands increase, industries strive to meet these demands. The baking industry has created up to 1,000 new products a year to fill this increasing demand, but only a few firms have the resources to compete in the newly developed niche markets. Since many of the new products fail, these firms must have the capital to back hundreds of trials and promotions each year (Manchester).

The Cooperative as a Business Entity

The principle historical reasons given for formation of a traditional cooperative have been to achieve some type of counterbalancing market power, to act as an industry yardstick, to allow growers to achieve greater control of the marketing of their production, and to share in the quantitative and qualitative benefits of being a user-owned organization.

Traditional cooperatives are built on a foundation of cooperative principles established over 150 years ago in England by the Rochdale Society. A retail cooperative, the Society followed ten fundamental rules: 1) open membership, 2) one member, one vote, 3) cash trading, 4) membership education, 5) political and religious neutrality, 6) no unusual risk assumptions, 7) limitation on the number of shares owned, 8) limited interest in stock, 9) goods sold at regular retail prices, and 10) net margins distributed according

to patronage (Frederick). These are known today as the Rochdale principles, and most have become vital factors in the development, legality and sustainability of cooperatives.

Three fundamental goals derived from the Rochdale principles guide many cooperatives. These three principles not only distinguish cooperatives from other forms of business, but also have been used in federal and state statues as criteria for a business to qualify as a cooperative. First, members unite to gain services, supplies, and access to markets they would not otherwise be able to utilize. Second, those who use the cooperative own it. Third, members control the cooperative's activities through the one-member, one-vote Rochdale principle (Frederick).

The three fundamental principles were the basis of the instrumental 1922 Capper-Volstead Act. Capper-Volstead enables farmers to collectively buy and sell products by granting limited anti-trust protection. In order to qualify, an association of producers must meet three conditions. First, the association must be operated for the mutual benefit of its members. Second, it cannot handle more nonmember products than member products. After satisfying these two conditions, associations have the option of meeting one or both of the following Rochdale principles: no member has more than one vote and the association does not pay more than an 8% annual return on stock or dividends (Volkin). However, if a cooperative engages in any predatory practices, it may be accountable to anti-trust lawsuits (McBride).

A different cooperative structure has recently emerged. It is referred to as the "New Generation Cooperative" (NGC) structure. NGC and traditional cooperatives are similar in that they both maintain three basic cooperative principles: first the one member-one vote, secondly net proceeds are returned to the grower-owners, and lastly a collective effort will reap greater benefits for growers that they could achieve individually. The NGC's do differ from traditional cooperatives in terms of marketing emphasis. NGC's attempt to capture profits above the farm gate through value-added processing and marketing activities rather than the traditional cooperative's focus on the storage, transport, and merchandizing of farm commodities.

Delivery rights are another of the distinguishing points of difference between a traditional cooperative and a NGC (Cropp). Growers buy shares in the NGC and each share is tied to an allocated volume of product the grower delivers. These rights act as a

two-way, agreement, or contract between members and the cooperative. Delivery rights assure producers a home for their product and provide the cooperative a reliable volume of product. Also, they act as a form of supply control, enhancing a cooperative's ability to react to market conditions.

Delivery rights lead to another difference between traditional cooperatives and NGC. Delivery rights lead to closed memberships in a NGC. A NGC establishes a set production volume with each unit of production tied to a delivery right. Growers buy delivery rights, establishing a contract. Once all delivery rights are sold, a NGC's membership is closed. New membership is available by purchasing existing delivery rights from another member. Transfer of delivery rights is subject to NGC board approval. If the NGC wants to expand its processing capacity, it may offer additional delivery rights to raise the needed construction capital. These occasions are opportunities for more growers to join or existing members to expand their allocation.

NGC's require higher initial grower investment than traditional cooperatives. By purchasing initial delivery rights, the members make larger initial investments. This process allows NGC's to typically raise 30-50% of their capital requirements (Harris, Stefanson, and Fulton). With a significant up-front capital investment, NGC's are able to return additional net earnings to members rather than using it as equity financing for the business, in turn lowering their total capital borrowing costs.

Another significant advantage of NGC's is the transferability and possible change in value of the delivery rights. With board approval, members can sell their delivery rights to existing or prospective members. The member who is selling the delivery right and the buyer negotiate the price. Moore and Noel (1995) have written on the conditions that lead to the valuation of delivery rights. They concluded that the value of the rights depends upon cooperative performance (returns to growers), market structure, and fixity of assets. A change in any of those factors can lead to an increase or decrease in the value of the delivery right.

Grain Cooperative Performance

The choice of whether to form a traditional or NGC needs to be viewed within the larger context of the type of business the cooperative plans to engage in and in light of market performance of similar cooperatives. Another alternative is the option of using an investor-owned-firm business form.

Assessing actual operational and financial performance statistics for wheat cooperatives is difficult. Much of the published data reported is aggregated data that either classifies wheat cooperatives[2] in the general classification of grain-oilseed cooperatives or marketing cooperatives. An additional complicating factor is that many cooperatives handle several different commodities including wheat and are categorized as diversified cooperatives.

Aggregate performance measures can be obtained for US grain cooperatives included in the list of top 100 (based on business volume) of US agricultural cooperatives (Chesnick). The following provides an overview of the recent performance of US grain cooperatives. This overview should be viewed as a snapshot not as an indicator of what future performance may or may not look like. Many agricultural companies, cooperative and IOF's have experienced downturns in the recent period. Rather it is intended to provide a performance benchmark against which the formation of a California wheat growers' cooperative could be viewed.

Table 1 shows a comparison of performance measures for 1999 and 2000. The current and quick ratios measure cooperative liquidity, while debt-to-asset ratio and long-term debt to equity measure how a cooperative is financed and financial risk. The "times interest earned" measures the extent to which operating income can decline before the cooperative is unable to meet its annual interest cost.

Gross profit margin and net operating margin are profitability ratios. Return on total assets reflects the efficiency in the use of cooperative assets in generating net

[2] A list of traditional grain cooperatives (those that perform storage, transportation and commodity merchandizing functions) and new generation wheat marketing cooperatives is provided in Appendix, Table 2 . The list was complied from the *Directory of Cooperatives* published by the Rural-Business Cooperative Service and from a list of new generation cooperatives complied by Merrett, Holmes, and Waner at the Illinois Institute of Rural Affairs (IIRA).

margins. Return-on-equity is a ratio that looks at the return on member investment after all expenses have been deducted. The 1999 and 2000 ratios for grain cooperative present a mixed picture of grain cooperative performance.

Table 1. US Grain Cooperative Aggregate Financial Performance Measures for 1999 – 2000.

Year	Current Ratio	Quick Ratio	Debt to Asset	Long-Term Debt to Equity	Times Interest Earned	Gross Profit Margin	Net Operating Margin	Return To Total Assets	Return On Members Equity
	----------Ratios----------			------Times-------		----------Percent----------			
1999	1.27	0.66	0.54	0.4	4.06	12.54	1.04	6.34	9.5
2000	1.27	0.67	0.58	0.46	1.88	13.25	1.25	3.41	8.7

Source:

Grain cooperatives' current ratio was 1.27 in 2000, the same as it was in 1999, while the 2000 quick ratio was 0.67 up slightly from 0.66 in 1999. These figures would indicate that inventory values remain about the same in grain cooperatives between 1999 and 2000. Inventory value remains a large component of current assets, which suggests that if inventory values were to decline that there could be some need for grain cooperatives to borrow to meet working capital needs.

The leverage ratios increased for grain cooperatives between 1999 and 2000. The debt-to-asset ratio increased from 0.54 to 0.58 indicating more capital was being financed by debt. The long-term debt-to-equity ratio increased from 0.40 to 0.46. The slightly higher liquidity indicated by the quick ratio increase combined with higher leverage ratios indicates that grain cooperatives used more debt financing for their working capital needs. Leveraging a cooperative is not necessarily a bad thing, but it does put more risk on the business. The biggest risk comes from cooperatives defaulting on their loans. These ratios, combined with the large decline in the times earned interest measure, suggest there is no current crisis. There is a situation where grain cooperatives are leveraging themselves to fund operations, while revenues from those operations continue to fall.

The profitability measures, while not an absolute indicator of fiscal health, do nevertheless provide a view of the financial strength of cooperatives. Grain cooperative gross margins increased from 12.54% to 13.25% and net operating margins increased from 1.04% to 1.25%. These would indicate an increased efficiency in handling a larger volume of sales. Return on total assets decreased by 46% between 1999 and 2000. This reflects lower efficiencies in the use of grain cooperative assets in generating net margins. The combination of all the above led to an 8.4% decrease in return on member's equity between 1999 and 2000.

The performance of grain cooperatives has had an impact on their share of the US farm commodity marketing. 43% of farm marketing of grains and oilseed were done by grain cooperatives in 1997, but dropped to 39% in 1998, and to 34% by 1999.

Grain cooperative performance has been reflective of the general agricultural situation from 1997 until the present time. Low commodity prices combined with higher operating costs have resulted in lower returns to grower-members. It is these lower prices and reduced cooperative return to growers that have lead rowers to pursue the idea of developing and marketing value-added products from their agricultural production.

Grain Cooperatives Adding Value

Schrader and Goldberg (p.52) found a significant proportion of cooperative members saw the cooperative as a way for farmers to become more involved in their commodity's marketing system. In their view farmers evaluated cooperatives from their financial impacts as well as their effects on market structure. The motivation and interest in forming NGC has been driven by many of the factors discussed above. These include:

1. Grower returns for raw commodities as a percent of the consumers' food dollar have been declining.
2. Access to markets for growers has become more difficult as concentration among food processors and retailers has accelerated.
3. Independent family farms feel threatened by the so-called "industrialization" of agriculture.
4. Technological advances continue to result in increased production.

Exports opportunities were curtailed by the downturn in Asian markets, by globalization of markets, and by the strong dollar.

Examples of grain processing NGC's include: The 21st Century Alliance-Kansas, Dakota Pasta Growers Cooperative (DPGC)-North Dakota, Spring Wheat Bakers (SWB)-North Dakota, Value-Added Products (VAP)-Oklahoma, and American White Wheat Producers Association (AWWPA)-Kansas.

The 21st Century Alliance

The 21st Century Alliance has started six value added agriculture businesses over the last five years. By raising over $25 million from producers and committed debt equity partners. Two of these companies are directly involved in wheat merchandizing and food processing. 21st Century Grain Merchandising, LLC was formed in June of 2000 to deliver Identity Preserved grain from its farmers to our customers. Farmers who have participated in the milling wheat IP program over the past two years have enjoyed an average premium for their protein and quality of $.25/bushel

The other 21st Century Alliance grain company is The 21st Century Grain Processing Cooperative, dba New Mexi-Kan Milling Company. 375 Kansas wheat farmers raised $3.2 million and purchased a flourmill located 30 miles north of Las Cruces, New Mexico. One year later they were selling wheat flour in many southwestern and west coast markets from a plant which had required a $2.5 million renovation

During the summer of 2001, the cooperative acquired Farmers Elevator of Dawn, Texas and its subsidiaries, Panhandle Milling and Panhandle Corn Products. The flourmill, food-grade corn cleaning and bagging operation is located just southwest of Amarillo. This acquisition allowed farmers to deliver identity-preserved wheat and corn from the Texas Panhandle to the origin mills and will expand the branded presence of the companies in the Southwest and Mexico. The cooperative's stated goal is to increase farmer's return through value-added processing and marketing.

Dakota Growers Pasta Cooperative

DGPC is known for finding success in a relatively competitive market. DGPC mills members' durum wheat into semolina flour, and produces specialty pastas for both retail and wholesale markets. Competitive advantage was realized in durum wheat, since its high level of protein and kernal hardness makes it ideal for pasta.

DGPC vertically integrated to include a grain elevator, mill, four pasta production lines, and a warehouse. The integration allowed the firm to achieve significant cost savings, allowing them to pass those savings onto their producer members (Boland and Barton). DGPC experienced a difficult year in 2001, sustaining a net loss of $3.9 million in the nine months prior to April 2001. This was difficult for a company who had had a net earning of $6.8 million in the previous year and since its inception in the mid 1990's has been touted as an example of a successful NGC.

The company stated that the loss could be attributed to competitive pricing and lower sales volumes in the industry. Increased costs associated with packaging, freight, utilities, and raw materials only increased the losses for the company. Consolidation within the company, along with other cost saving strategies, should return the company to a more profitable state (Schroeder 2001). DGPC expected to recover and begin to operate at a profit in the last quarter of 2001 (Boland and Barton).

DGPC is considering transitioning from a cooperative to a private corporation. While this would allow them to more easily raise capital by issuing additional debt or equity securities, this is not the major reason for the proposed change. DGPC states, "Recently, our members have experienced difficulty personally growing and delivering durum wheat to us on a consistent basis." The transition would allow DGPC growers flexibility in marketing their wheat, and at the same time they would enjoy the economic benefits of an equity investment in the enterprise (Milling & Baking News 2002). This last issue raises the question about an assured home for growers products the NGC creates.

Spring Wheat Bakers

Wheat farmers in South Dakota, North Dakota, Minnesota, and Montana founded Spring Wheat Bakers (SWB) in 1996. The SWB identified three crucial qualities that set

them apart from most other new cooperatives: 1) it raised $22 million in member funds before it chose a use for the growers wheat, 2) the processing plant was not located in the member's area, and 3) the first processing facility was opened without the use of debt.

A steering committee of knowledgeable agriculturalists and grain industry persons were chosen to volunteer their time to the early formation of the cooperative. The committee evaluated several components to find a market for their product. A major goal of the committee was to identify markets that would provide a 15% on investment for the cooperative's members. SWB targeted high quality European and artisan style crusty bread products, focusing on the $4 billion US wholesale market. The committee expected this market to grow 5% a year for five years, and also found a need for quality frozen dough products ("New Generation Cooperatives on the Northern Plains").

SWB became a co-manufacturer of frozen dough products in 1999. They produce a finished product for companies that previously processed their own frozen dough, turning their potential competition into customers. All products are made to the customer's specifications. Another unique quality of SWB that became a significant competitive advantage was the plant's location. Rather than locating near the production of hard red spring wheat, the plant was located outside Atlanta. The location was chosen because of the proximity to a large portion of the US population and anticipated population growth. Most importantly, it is cheaper to transport grain to Atlanta than to transport the finished product to the customers.

SWB experienced some difficulties in beginning its operations and returned to the growers for additional capital after the establishment and expansion of a new processing facility. The members were willing to put up extra capital to insure their initial investment succeeded.

Value Added Products-Oklahoma

VAP is a producer-owned cooperative in Alva, Oklahoma. A drastic drop in wheat prices had many in the wheat industry concerned about the future and wanting to find new options to revive the industry. Once it was determined that flour milling was not an attractive option due to high regional competition and proximity to large bakeries, the group decided to explore other processing opportunities.

A feasibility study indicated that frozen dough would be the best option for processing wheat, subsequently $7.5 million was raised in only three months. An abandoned Wal-Mart was bought in Alva, to be the new processing facility. After two years and $17 million, production began in September 2000 (Holcomb 2000). The vision of VAP is eventually to vertically integrate, capturing a larger portion of the price spread between farm and retail store, and to expand their product lines.

VAP produces various bakery products for supermarkets, restaurants, institutional establishments, and government agencies, which in turn provides a secure home for local wheat crops, generates incomes, tax revenue, and employment for Alva's rural community (Stotts 2001). From Oklahoma's hard red winter wheat, VAP creates artisan breads and rolls, sweet goods, laminated products, and pizza dough.

American White Wheat Producers Association

American White Wheat Producers Association (AWWPA) is a Kansas cooperative, located in Atchinson. It markets identity preserved wheat. It was developed by a task force that identified a cooperative as an opportunity for growers to maximize returns from white wheat, while controlling production and marketing of available white wheat varieties (Brester, Biere, and Armbrister). AWWPA experienced operating losses and filed for Chapter 11 bankruptcy protection in 1996 and has now emerged from bankruptcy and made its final payments to creditors.

AWWPA does not own any equipment, rather it relies on alliances with the industry for everything from trucking to wholesaling and retailing the final product. Since its inception, it has developed some new products for hard white winter wheat. Additionally, members have received a $0.30 per pound premium for their white wheat over hard red winter wheat (Brester, Biere, and Armbrister).

Although NGC's are a vehicle to potentially greater growers returns on their production they can experience problems. As noted above SWB underestimated their start-up capital requirements. DGPC may become a private corporation so that it can have additional flexibility in acquiring additional capital and procurement of durum wheat. Thus, NGC's are not without controversy, nor necessarily a static structure. Publications concerning the risks, benefits, and philosophical and practical differences in

organizational and financial structures between traditional cooperative structures and NGC can be found in Cotterill; Cropp; Harris, Stefanson, and Fulton; King; and Torgerson among others.

IOF Versus Cooperatives as a Business Form

Choosing a traditional or NGC cooperative structure needs to be addressed in light of whether they are appropriate business entities for the needs of the grower group. A cooperative may not be appropriate or desirable in every case. Kenkel lays out the differences between investor-owned-firms (IOF) and cooperatives in terms of objectives, sources of equity, control, transferability of ownership, and the legal issue of anti-trust. Kenkel includes a list (presented below) of the advantages and disadvantages of cooperatives versus IOF. A careful evaluation of those advantages and disadvantages should be undertaken prior to choosing the cooperative business structure.

IOF Advantages

1. There is a greater potential pool of equity capital since investors are not limited to the individuals who use the firm's services. Since the investor may be in another line of business, the investment in the agribusiness may be a diversification, limiting the effective risk.
2. There are greater incentives to provide equity capital since the rate of return on equity capital is not limited and the individuals who provide the bulk of the capital have voting privileges in proportion to their investment.
3. Stockholders who are dissatisfied with the firm due to their time horizon (short-term return versus long-term growth), risk preference, or opinion of management can sell their equity. This advantage may be limited in small agribusinesses since the value for the equity must be individually negotiated if no public market price exists.

IOF Disadvantages

1. A large producer or an outsider can obtain control of the firm by purchasing a majority of the equity.

2. Agricultural producers collectively marketing through an investor-owned firm do not have limited immunity from anti-trust regulations, which a cooperative provides.
3. Users do not share in the risk or profits. Organizers may end up supplying the capital and taking the risk, while the majority of users wait for the firm to be established. There is no automatic mechanism to require users of the firm to supply equity capital and share in the risk.

Advantage to Cooperatives

1. Benefits and investment are tied to use. There is an automatic mechanism for all users to share in the risk and profits.
2. One member-one vote policies eliminate takeover by outsiders or larger users.
3. There is limited immunity to anti-trust legislation.
4. Owner/members have a vested interest in delivering quality products.
5. Members may be more willing to continue to patronize the cooperative even if competitors offer better prices in the short-run.

Disadvantage to Cooperatives

1. The pool of equity capital is limited to producers. Investment usually deepens farmers' financial commitment to a particular commodity or industry.
2. Large producers who account for a large share of the business volume and who therefore contribute the bulk of the capital may not feel that their interests are adequately represented. If they choose not to participate in the cooperative, the firm may have difficulty in operating on an efficient scale.
3. Not all members use all services. Therefore, pricing policies, overhead cost allocation, and decisions to maintain particular lines of business become much more controversial than in investor-owned firms.

Ultimately, growers must express an interest in the formation of a cooperative. A survey of California wheat growers was conducted to determine the level of interest, as well as to gain information on California wheat production, pricing, and marketing. The survey methodology and results are discussed in the next section.

II. WHEAT GROWER COOPERATIVE INTEREST

A California wheat grower survey was conducted between July and November of 2001. The survey was a joint effort between members of the Agribusiness Department at California Polytechnic State University, San Luis Obispo (Cal Poly) and CWC.

A number of questionnaire designs were reviewed, questions were changed or modified, and a pre-test conducted on a random selection of 10 growers from a CWC grower database. A copy of the final questionnaire is included in Appendix, Figure 1. The survey was conducted through two mailings and telephone follow up (Muelrath).

Sampling Procedures

Based on a list of 8,533 wheat growers provided by the CWC a survey sample size of 1,519 wheat growers was chosen. A stratified sample design was used to divide the growers into 6 size strata, based on the number of acres of wheat grown. The first three strata consisted of growers of 1 to 999 acres. An ideal sample size with a 20% sampling error was calculated for each stratum. Each of the sub samples was multiplied by 6.67 to achieve the desired response rate to the survey due to the low response rate of the pretest (see Table 2).

A census of strata four through six was conducted assuming these growers were heavily involved in the industry and most likely to respond to a wheat survey. A 20% sampling error for the first three strata combined with a census survey of the final three strata generated 1,519 mailed surveys. The 20% sampling error was chosen based on the practicality (cost) of mailing 1519 surveys, compared to the 5,419 needed to meet a 10% sampling error. The CWC mailed the surveys along with a cover letter to the 1,519 growers.

Sixty-five surveys were returned stating “did not farm wheat in California”, or had never been involved in farming. Ninety-three were returned by the post office with an incorrect address. Thirty-one returned surveys were completed, and thirty were

Table 2. Cal Poly-CWC Grower Sampling Stratification of First Mailing (Summer 2001).

Stratum	Acreage	Number of Growers in Strata	Sample Size	Low Response Factor (x 6.67)
1	1-99	3,896	98	652
2	100-499	3,903	85	564
3	500-999	515	13	84
4	1000-2999	194	194	194
5	3000-4999	16	16	16
6	5000 and over	9	9	9
Totals		8533	415	1,519

useable, resulting in a low 2.5% response rate. One response was not used because the wheat grown only used for cattle silage, not marketed.

After updating the list to reflect the responses from the first mailing, deleting non-wheat growers and incorrect addresses, 400 grower names were randomly selected. Eighty-six of those growers' phone numbers were located via the Internet and each grower was called in October of 2001. The caller greeted each respondent and noted they were working with the CWC and USDA on a feasibility study to start a new cooperative to serve California wheat growers. Each respondent was asked if they were currently involved in growing wheat in California. If they responded yes, the caller asked if they had filled out a survey earlier in the year about the cooperative. If the respondent did not, the caller continued, asking if they had about 10 minutes to answer questions about their involvement in the wheat industry and their perspective on cooperatives. Respondents were assured their answers would be held in confidentiality and would only be released in a group as a part of the entire study.

Nineteen of 86 growers did not have wheat in California. Two growers already filled out the survey (respondents had not been asked to put their name on returned surveys). Six of the telephone numbers were either disconnected or the caller hung up on the surveyor. Three requested a survey be mailed to them, yet these were never returned, and three growers completed the survey over the phone. For the remaining 56 growers phone contact was attempted, but never made. When possible, messages were left, but none were returned.

In November, the survey was mailed to 102 growers who reported 500 or more acres of wheat (see Table 3). This strategy sought to identify growers of substantial size. Five were returned with the wrong address. Seven respondents did not raise wheat or farmed outside of California. Two completed surveys were returned; however, one was a duplicate of an earlier survey and the second farmed in Kansas, so neither was considered useable in the results.

Table 3. Cal Poly-CWC Grower Sampling Stratification of Second Mailing (Fall 2001).

Stratum	Acreage	Number of Growers in Strata	Sample Size Needed	Low Response Factor (x 6.67)
1	500-600	28	2.0	13
2	601-700	18	1.5	10
3	701-800	15	1.7	11
4	801-900	9	0.7	4
5	901-1000	5	0.2	1
6	1001-1100	28	0.6	4
7	1101-1200	37	0.5	3
8	1201-1300	22	0.4	3
9	1301-1400	16	0.3	2
10	1401-1500	14	0.3	2
11	1501-1700	20	1	7
12	1701-1900	16	0.7	4
13	1901-2100	6	0.6	4
14	2100-3000	16	16	16
15	3001-4000	12	12	12
16	4001 +	6	6	6
Totals		268	44.5	102

Grower Survey Results[3]

The two mail surveys and phone survey resulted in 33 useable questionnaires. Owing to the low response rate and likely non-response bias no statistical inference statements are made, the data are treated as purely descriptive. The 33 questionnaires

[3] The wheat growers' survey portion of this study is from K. Muelrath's thesis work part of the overall funded project.

accounted for 72,583 acres of wheat grown in California, representing 12% of the total 615,000 acres planted in 2001 (CASS). Varieties grown included:

- Express	- Anza	- Elder	- Yolo
- Sierra	- Kronos	- Bravador	- Kern
- Brooks	- Bonus	- Ramona	- Klassic
- "durum"	- Yecorra Rojo		

The most common varieties were Express, and Yecorra Rojo with eight growers reporting acreage planted in each variety. Brooks followed these with six growers, Anza with five growers reporting acreage and Klassic and Kronos each being planted by four growers.

Growers responded from sixteen different counties in California, with most growers coming from Kings with five, followed by Solano with four and San Joaquin with three growers. Counties reported included:

- Alameda	- Colusa	- Contra Costa	- Fresno
- Imperial	- Kern	- Kings	- Madera
- Merced	- Monterey	- Riverside	- San Joaquin
- Solano	- Sutter	- Tulare	- Yolo

The second and third survey questions (see Appendix, Figure 1) attempted to discover how California wheat growers stored their wheat. Sixteen (50%) of the respondents did not store wheat, followed by nine (27.3%) who stored wheat in a commercial facility. Six respondents stored wheat on-farm and one utilized both on-farm and commercial facilities. Six respondents used a silo, one used a bunker silo, two used a slab and eight used elevators for storage.

Growers were asked who transported their wheat and the amount charged per ton. Twenty-two transportation companies were cited in the surveys, and responses were very dispersed. The most frequently mentioned were Adams Grain used by three growers and Phillips Trucking by two growers. Four growers did not respond and five growers transported their own wheat to the first handler's facility. The average cost of hauling grain to the first handler's facility was $7.71 per ton. The highest transport price paid

was $16.50 per ton and the lowest reported was $5.00 per ton. The production weighted average cost of hauling grain to the first handler's facility was $6.80 per ton.

First Handlers and Grain Buyers

Nineteen different first handler facilities were reported, along with three respondents who did not answer the question. The most common first handler facility was Adams Grain with seven growers, followed by Phil O'Connell Grain with three growers, and two growers each reporting Cargill, Mezger Grain, and Penny Newman. One grower sold to an Arizona market.

Primary and secondary buyers of the grain were addressed in questions seven and eight. Eighteen different primary buyers were reported. Adams Grain with eight growers was used most often as a primary buyer. Phil O'Connell followed with four growers, while Cargill, Levine and Barkley Seed Company each had two growers. Four growers did not report a primary buyer. Fewer growers reported the use of a secondary buyer, with twenty growers not answering the question. Three growers used Adams Grain, two used Riverside with a total of ten secondary buyers reported.

Prices Received

The question on price, grade and quality (question 9) appeared to be the most sensitive for growers. Six growers did not respond to any parts of the question, and few completed the entire table. Responses included wheat prices from up to four years ago. Overall, the average price per ton received was $104.62, with a high of $125 and a low of $86. USDA grade averaged 1.3, indicating most growers produced USDA grade 1. Average dockage was 0.675%, and average protein was 11.6%.

Table 4 shows a breakdown of the use of price support services over the last five years. Several growers also listed additional programs they participated in. The most common was the Production Flexibility Program. Other programs listed included disaster loans, flex payment, FSA, rice and sugar loans, and USDA loans. Several growers listed LDP, loan deficiency program, as another program; however, part three (turn grain over to government in loan deficiency program) specifically addressed the program

Secondary Uses

Question 11 was requested by the CWC to determine what percentage of growers use a portion their crop for green chop. Ten growers did not put any of their crop into green-chop, 21 used it for less than 25% of their production, one used 25%-50% of their crop for green chop, and one reported 50%-75% for green chop use. It should be noted that one survey was returned that used 100% of the crop for green chop in their dairy operation. Again, this survey was not included in the results because none of the crop was marketed as wheat grain.

Current Coop/Group Involvement

Wheat grower cooperative involvement, question 12, indicated that most of the growers were not cooperative members. Twenty-three (69.7%) of the growers did not belong to cooperatives, while ten (30.3%) were cooperative members. Growers were members of several different cooperatives, including: Farmers Rice, San Joaquin Valley Hay Growers, Pacific Coast Producers, Sunsweet Growers, Stratford Growers, Stratford Grain, Cal-Cot, Rhodes Bean, and Cal Wool.

Table 4. Number of Growers Reporting Use of Government Price Support in the Last FiveYears.

Annual Frequency	Crop Insurance	Market Loan	Government Loan
0 of last 5 years	9	25	25
1 of last 5 years	2	3	3
2 of last 5 years	0	2	2
3 of last 5 years	4	0	0
4 of last 5 years	0	0	0
5 of last 5 years	18	3	3
Total	33	33	33

Along with cooperative involvement, growers were asked to note their membership in farm organizations. Thirty-one of the 33 respondents were members of

their local county Farm Bureau. Twenty (60.6%) respondents were members of the California Association of Wheat Growers. Three (9.1%) of the respondents were members of the Western Growers Association. Two (6.1%) respondents were members of the California Grain & Feed Association. In addition to those listed on the survey, growers volunteered six other farm organization affiliations, which included: California Tomato Growers, California Alfalfa and Forage Association, California Women in Agriculture, California Association of Winegrape Growers, California Wool Growers and Lodi District Grape Growers Association.

Table 5. Frequency of Grower Use in the Last Two Years of Marketing and Pricing Method (n=33).

Method	Didn't Use	< 25%	25-50%	50-75%	> 75%
Cash/spot price at harvest	12	8	5	2	6
Forward contract handler/processor	12	2	7	3	9
Hedge with futures market	24	5	1	2	1
Directly to the end user	23	4	3	1	2
Totals	71	19	16	8	18

Marketing and pricing methods used by growers varied, question 14 see Table 5. Most growers reported using cash/spot pricing or forward contracting with the handler and processor. Nine of the respondents forward contracted with the processor or handler 75% or more of the time. Twenty-four (72.7%) did not hedge with the futures market. Ten of the respondents marketed directly to the end user.

Cooperative Services Desired

Question 15, dealt with services a cooperative should offer and was difficult to administer over the phone (see Table 6). Also, several respondents did not rank each category; rather they indicated their most preferred service. Marketing of wheat was the highest-ranking service, followed by storage facilities, developing specialty markets, milling, and crop insurance. Marketing of wheat was also the most popular choice, with 25 growers selecting it as a prospective cooperative service. Custom harvesting and equipment rental were the lowest ranking and were chosen by the fewest number of

growers. Only five growers ranked all services as requested, with an average of 9.0 for rental and 9.8 for harvesting.

Table 6. Average of Grower Rankings, and Frequency Each Service Was Chosen by Growers (n=32).

Service	Average Ranking	Frequency
Marketing of wheat	1.2	25
Storage facilities	2.4	16
Develop & market specialty wheat products	3.1	15
Cooperative milling of wheat	3.5	13
Crop insurance	4.1	12
Cleaning facilities	3.2	10
Transportation facilities	5.6	8
Production and harvesting supplies	7.3	6
Custom harvesting	9.8	5
Drying facilities	4.6	5
Equipment rental	9.0	5

After ranking each service a cooperative should offer, growers were asked their opinions about the wheat industry in general. In that context, question 16 attempted to determine their agreement or disagreement with five statements, see Table 7. One grower did not respond.

Most growers, 70%, disagreed somewhat or completely with the first statement, that "growers receive a fair price given the world supply and demand situation." Fifty-eight percent, or 19 growers agreed completely or somewhat that they are not paid the premium prices they should be for quality differences. Thirteen growers agreed somewhat or were neutral that adequate market strategy is available to wheat growers. Sixty-seven percent disagreed somewhat or completely that wheat is a good alternative given costs and returns for all crops grown. Two agreed completely, but thirteen growers were ambivalent over the amount of wheat they would be growing wheat in the next three to five years.

The final survey question attempted to determine grower's interest in cooperatives, and their support of the cooperative business structure. Growers tended to

Table 7. California Wheat Grower Opinions of the Overall Wheat Market (n = 32).

Market Concepts	Agree Completely	Agree Somewhat	Neutral	Disagree Somewhat	Disagree Completely
Given the world supply-demand situation, prices are fair.	1	6	2	8	15
Not paid the premium prices for wheat quality differences.	10	9	7	5	1
Adequate market strategy information available to growers.	3	13	7	3	6
Given costs & returns for all crops grown, wheat is a good alternative.	2	3	5	11	11
I will most likely be growing more acres of wheat in 3-5 years.	2	0	13	7	10

agree or disagree somewhat, with few strong opinions in either direction. During the telephone surveys, the three growers were supportive of the fundamental ideas of a cooperative, yet hesitant to declare it a sound idea for the industry. One grower disagreed completely and two disagreed somewhat that farmer's vertical integration is sound strategy (see Table 8). Ten growers disagreed completely or somewhat that cooperative forms of business today are strong and viable, compared to thirteen who agreed completely or somewhat. Growers were evenly distributed on a cooperative's ability to provide greater market power, with nine neither agreeing nor disagreeing.

Willingness-to-invest in a start-up cooperative was nearly equally split, with 13 agreeing completely or somewhat, and 14 disagreeing completely or somewhat. The margins increased somewhat on the next question, "generally, I favor investing/developing cooperative marketing". Seventeen agreed somewhat or completely, and 10 disagreed somewhat or completely. Thirteen growers were neutral that cooperative business was acceptable in the 19th and 20th century, but not today, while fourteen disagreed completely or somewhat with the statement. Four growers agreed completely and one agreed somewhat that growers should focus on production, not lose focus by integrating forward. Twenty-five disagreed completely or somewhat to offset this. No one disagreed completely that managing price risk and market assurance are

Table 8. California Wheat Grower Responses to Cooperative Business Structure Questions (n = 32).

Cooperative Issue	Agree Completely	Agree Somewhat	Neutral	Disagree Somewhat	Disagree Completely
Farmer's vertical integration through cooperative ownership of processing or distribution facilities is sound strategy.	7	12	10	2	1
Today, cooperative forms of business are viable and strong (compared with proprietary firms, corporations, partnerships, LLC, sole proprietor)	2	11	9	6	4
Cooperatives provide California farmers with greater market power and returns to a commodity than if they did not exist.	7	9	9	5	2
I am willing to make a start-up cooperative investment given the many factors to evaluate are reasonable.	5	8	5	7	7
Generally, I favor investing/developing cooperative marketing.	5	12	5	7	3
Cooperative business was acceptable for the 19th and 20th century, but not today.	0	5	13	7	7
Farmers and ranchers should focus on production, not lose focus by integrating forward into processing, packaging or distribution.	4	1	2	14	11
Managing price risk & market access assurance (a home for my product) are the major long run success issues of my farm.	13	15	2	2	0

long run success issues. Twenty-eight of 32 growers, or 85%, agreed completely or somewhat with the importance of price risk and market assurance issues.. This last issue received the highest cumulative scores, which descriptively corroborates the Schrader-Goldberg position mentioned earlier.

After over ten years of financial losses on California wheat farms, growers are searching for alternatives to allow them to stay in production and reap a greater value from the crop. Growers are considering the formation of a NGC to capture additional value and establish marketing tools.

Statistical Limitations of Non-Response

This portion of the study reviewed several factors of cooperatives, NGC's and their unique qualities, along with successful cooperatives and grain milling operations. A supporting grower survey attempted to measure California wheat farmers' interest in the

cooperative idea, and their willingness to financially support the formation of a NGC. While the response rates were far too low to be evaluated statistically, they did lend some insight to growers' attitudes about cooperatives and the needs a NGC may be able to fill in the industry.

All three survey attempts had identified the required number of responses to reach a statistically valid result, and each fell far short of the mark. The first mailed survey needed 228 completed surveys. The phone survey had a goal of returning 60 completed surveys, to essentially double the response to the first survey. The second mailed survey required 15 completed surveys. With only 33 completed surveys returned from all three attempts, the results would not warrant further statistical evaluation.

A few key factors contributed to the low response rate. While attempts were made to ensure a sound mailing list was used, it was difficult to confirm the accuracy of the list until the surveys were mailed. After reading responses from individuals not involved in California farming and talking to respondents on the telephone, it was clear the list was an inaccurate representation of California wheat growers. At least three conversations over the telephone indicated they had registered for some form of tax advantage associated with farming wheat. The respondents suspected this was how their names ended up on a USDA list of California wheat growers.

Of the roughly 8,500 names in the grower database, nearly half (3,897) had less than 100 acres of wheat, and 20% (1,876) of those raised under 50 acres. Round three of the survey considered only those reporting over 500 acres of wheat, this modification should have been implemented in the first round. While it may not have garnered any more responses, efforts would have been concentrated on those growers the industry felt would be most likely to participate in a cooperative. In many cases wheat represents only a minor crop for California farmers and often only in crop rotation.

The timing of the surveys was another factor that might have affected the number of results. The first surveys were mailed in July, and the telephone surveys were done in late October. While talking to growers in October, a few mentioned that they were too busy in the summer to fill out surveys. By the time the third group of surveys were mailed, it was late November, and close to the holiday season. If the surveys were to be

attempted again, they might have a better chance of being filled out during a slower time of the year, possibly the winter or rainy season.

Insights From the Grower Survey

While the surveys did not provide statistically sufficient sample size, they did exhibit some interesting findings about wheat grower's attitudes towards the industry and cooperatives. Few of the respondents were members of a cooperative, but every one was a member of their local Farm Bureau. Since Farm Bureau is know as a grass-roots lobbying organization that derives its strength from collective efforts, membership may indicate the grower's interest in working as a group to achieve individual benefits. These same qualities of working together in a group for collective action apply to cooperatives, and may be strong points for organizers of the cooperative. Conversely the low response rate could be perceived as a negative response (lack of a broadly held interest) in the concept of a start up NGC.

Growers addressed the pricing of their commodity differently. Some used a mix of direct marketing and forward contracting, while a few hedged on the futures market or relied on the cash market. While each grower developed a system that works well individually, a cooperative may be able to provide an aggregate or uniform approach to the pricing and sale wheat. Also, selling to a cooperative could eliminate some of the risk, by knowing the allotted amount the cooperative would purchase and a more solid idea of the price range.

Each grower ranked the services they thought the cooperative should offer. Marketing was both the most important and frequently requested service. Also, growers were interested in wheat storage. Earlier in the survey, growers were asked about the types and location of storage used, and most did not store any wheat or had to use off-farm facilities. As the two highest ranked services, marketing and storage facilities are important factors the cooperative should address.

Some of the most important results might be the grower's attitudes about the future of wheat on their farm. The majority either disagreed somewhat or completely that wheat was a good alternative compared to other crops. Also, when asked if they would be growing more wheat in three to five years, only two agreed. If this is a true

representation of the industry, then a wheat cooperative may have difficulty finding members if few expect to produce wheat on the future. However, if the cooperative successfully improves prices and market access, it may encourage those who are undecided to stay in the industry.

Grower's attitudes towards cooperatives varied widely. As noted in the results during the telephone interviews, all three respondents were supportive of the cooperative idea, but reluctant to declare it a sound idea for the industry. These same sentiments were reflected in the results of all 33 surveys. Few growers strongly agreed or disagreed with any of the statements, leading to a large number of responses in the middle of the range. This does not indicate a compelling argument or driving force behind the development of a cooperative.

Overall, growers indicated the need for some changes in the industry for them to stay involved. A cooperative may be part of a solution, but such an organization or firm needs a strong group to organize it. Cooperatives profiled in the literature reviewed noted the necessity of a core group of growers and managers in the early stages. The wheat industry must gather those who are most interested in the cooperative, organize their key points, and start visiting with wheat farmers all over California. Farmer to farmer conversations appear to be an effective tool for organizing cooperatives.

A core group of committed growers and supporters were essential to the start up of several new generation cooperatives. If the California wheat industry is truly interested in developing a cooperative, a committed group of individuals must organize and start educating others about the possible benefits of a cooperative.

III. ECONOMIC FEASIBILITY of WHEAT MARKETING

This section provides quantitative and qualitative economic feasibility analysis for several wheat marketing options. Specifically, the economic feasibility of wheat merchandizing, flour milling, and value-added processing is evaluated. Any of these marketing options would require some type of investment by the cooperative.

Wheat Merchandizing

There are three primary markets for wheat harvested and marketed in California. Approximately 40% goes to California flourmills, 40% goes to California feed use, and 20% is exported (California Wheat Commission, 2002).

Table 9. Percent of California Farm Wheat Marketed by Month

Year	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	April
1994-1995	13	24	28	11	6	1	1	4	3	2	2	5
1995-1996	17	17	30	13	6	2	2	4	6	1	1	1
1996-1997	10	32	25	9	4	2	2	2	3	1	5	5
1997-1998	12	34	24	7	3	5	1	2	3	1	5	3
1998-1999	7	13	20	13	9	15	7	1	4	1	6	4
1999-2000	2	25	39	11	16	1	1	2	1	1	1	1

Source: National Agricultural Statistical Service, Annual Prices (1995 – 2000)

Table 9 shows the percentage of California wheat that is marketed by month over a six-year period. On average, 80% of California's wheat production is sold by growers to wheat merchants (first handlers), directly to flourmills, or feed wheat markets in the five-month period from May through September with an average of 52% being sold in June and July. Wheat merchants then either resell immediately or store and resell later to flourmills, export, and feed wheat buyers over the course of the marketing year.

The economic feasibility of a California wheat grower's cooperative becoming involved in merchandizing of growers' wheat starts with the estimation of commodity

assembly-marketing margins and contribution margins for flourmill, feed wheat, and export markets. The estimated assembly-marketing margins are then adjusted by storage and transportation costs to obtain contribution margins.

A cautionary note needs to be stated at this point. The estimated assembly-marketing margins and contribution margins were not developed in a mode that would create statistically valid estimates of the true assembly-marketing or contribution margins. The estimated margins need to be viewed as "indicators**"** of the true margins and it is probable that they would be biased for several reasons. First, they are based on averages that most likely will not be sufficiently representative of California market conditions. Second, it is likely that there would a large variance around those averages due to location of production, wheat quality, and local storage and transportation cost. Third, and related to the first two reasons is the data limitations associated with reported price and cost information. These limitations are discussed further in this section of the paper.

The reader should keep this caution in mind, for brevity the following will refer the margins estimates as assembly-marketing margins or contribution margins. These margin estimates should be viewed as **indicators** of the true margins **not** accurate measures of those true margins.

The assembly-marketing margin is defined as the difference between the farm gate price of wheat (price received by the wheat producer) and the flourmill, export, or feed wheat delivery point price. The assembly-marketing margin must be at a minimum large enough to cover storage, transportation, and marketing costs and to the extent that this margin is greater than those costs, profits result.

Price Data for Margins

The price and cost data limitations to the margin analysis follow. California wheat prices are reported by three government agencies. USDA's Agricultural Marketing Service (AMS) reports farm, flourmill, and feed wheat prices weekly in the *California Feed and Grain Report*; however, the prices reported every week are limited to the low-high price range for 13%, 13.5%, and 14% protein wheat delivered to Los Angeles flourmills. Delivery point feed wheat prices are occasionally reported for the

Petaluma-Santa Rosa, Stockton-Modesto-Oakdale-Turlock, Fresno-Tulare, and Los Angeles-Chino Valley areas. Farm gate prices (FOB, Ranch) are predominantly reported during the harvest periods of May through July.

Farm gate prices are reported for hard red winter wheat 13% protein, ordinary protein, durum wheat, and feed wheat. This report was the only source of farm gate feed wheat prices and provided most of the farm gate durum wheat price information. Neither durum nor feed wheat prices were reported on a regular basis. During the months of May through August farm gate prices were frequently reported, but for the remaining months frequently were not reported due to a lack of confirmed sales[4]. AMS also provided reports on the monthly average high-low average Los Angeles flourmill price for wheat and the high-low average Los Angeles Chino Valley feed wheat price.

USDA's National Agricultural Statistical Service (NASS) reports monthly and yearly price series for California farm gate wheat prices. The reported monthly winter wheat price is an average of the prices for all winter wheat marketed in a given month. There were relatively few missing observations in the NASS monthly price time series for California winter wheat. The reason most often given for not reporting a monthly price was that there were to few sales and to report the price would be a violation of buyer-seller confidentiality requirement. Monthly durum wheat prices were rarely reported for the same buyer-seller confidentiality reason.

The California Agricultural Statistic Service (CASS) reports wheat prices in its *California Field Crop Review*, which is published monthly. The price reported is a monthly average price for all wheat sold in the state. The prices are generally reported in the May through July issues. Prices are generally not reported in other months for reasons of buyer-seller confidentiality.

The following price data was chosen for flourmill market and feed wheat market analysis. The monthly price for California farm gate winter wheat was taken from the NASS monthly price reports. Delivered prices to Los Angeles flourmills and the Los Angeles Chino Valley feed market are the monthly AMS reported prices. The large gaps in weekly price reporting in both the CASS and AMS reports does not allow for a

[4]A dataset based on the AMS *California Food and Feed Grain weekly* reports from January 1999 through May 2002 is in Appendix, Table 3 to this report.

consistent analysis of weekly assembly-marketing margins for any of the wheat markets being analyzed. Thus, the monthly prices were chosen for analysis since there are fewer gaps in the price series for monthly prices than the weekly prices and it allows more months of the year to be analyzed than if the CASS or AMS weekly prices were used.

The use of average monthly prices will bias the estimated assembly-marketing margins to the extent that they understate or overstate the protein quality differences. For example, the flourmill price is 13% protein price. This is the lowest protein price reported by AMS. If the average monthly price is biased toward a lower protein level, then the assembly-marketing margin for the flourmill market would be overstated. This is quite likely the case since the feed wheat market takes 40% of the California wheat production. Wheat moving into this market is generally of 11.5% to 12% protein.

The export and feed market assembly-marketing margins are also likely to be biased. The export market for California winter wheat is relatively small. Winter wheat is exported through the Ports of Stockton and Sacramento. The most recent export shipments reported by AMS took place in 2001- 2002 (AMS-*California Food and Feed Grain Weekly Report*, June 28, 2002). All the shipments were US #2 hard red winter wheat. Value of shipment data was obtained from USDA's Farm Service Agency (Harding). To the extent that the average monthly winter wheat farm price reflects higher (lower) quality wheat than that exported, the export margin would understated (overstated).

Most of the durum wheat produced in California is exported. It is shipped from California via rail to the Gulf of Mexico. There are some 2001-2002-farm gate durum prices observations reported in the weekly AMS and there are reported durum export prices out of the Gulf. An export margin was calculated for the durum, but again only an indicator of the durum export margin.

The same general conclusion can be made relative to the feed wheat assembly-marketing margin. There is relatively few feed wheat prices reported by AMS. The use of the monthly average farm price for feed wheat will undoubtedly understate the margin.

Further complications include the differences between the prices received by growers in different wheat growing counties, and local specific supply and demand

conditions where lower protein wheat can have a higher price than higher protein wheat, if it is in short supply and needed for blending.

Two other limitations to this assembly-marketing margin analysis are the difficulties in determining wheat storage and transportation costs. There is relative little published information on California wheat transportation and storage costs. The location of the storage relative to wheat markets, and variability in storage and transportation costs can influence the results. The storage and transportation costs used in the marketing margin analysis were derived from number of sources including first handler interviews, and a report on California wheat prepared for CWC (Starbird). Thus, these costs should be viewed as estimated indicators of storage and transportation costs. [5]

Margin Evaluations

The first part of the merchandizing analysis is to determine the assembly-marketing margins for flourmill, feed and than export. Once the assembly-marketing margins have been determined contribution margins are estimated. The contribution margin is defined as the difference between the assembly-marketing margin and storage and transportation costs.[6] The contribution margin covers marketing costs with any residual being profit and returns to fixed assets. Determination of the economic feasibility of entering any of the three wheat merchandizing arenas will partly depend on the relative size of the contribution margins.

Figure 5 shows the relationship between the average monthly farm gate winter wheat price and the high-low flourmill price for wheat delivered to Los Angeles.[7] The figure shows that the assembly-marketing margin can be quite variable. The variability is influenced by a number of factors. These include the demand for wheat by the flourmills, the farm gate supply of wheat, and the size of the marketing costs associated with this merchandizing activity.

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[5] Caveat of page 31 is invoked here.

[6] (Avg P_{la} – Avg P) less Assembly Gross Margin and Contribution Margin = (Avg P_{la} – Avg P_{fg}) - (C_{stor}+C_{trans}).

[7] The flourmill assembly-marketing analysis is for winter wheat. There is some milling of durum wheat in California but there did not exist sufficient pricing information to allow determination of an assembly-marketing margin indicator.

Table 10 shows the low and high prices paid by Los Angeles flourmills and the assembly-margin indicators for those prices from 1998 through 2001. The assembly-marketing margin indicators follow the variability in Los Angeles flourmill prices for wheat and the farm gate price for wheat. The lowest low Los Angeles flourmill delivered price assembly-marketing margin indicator was $0.74/cwt in June of 2001 and the highest high Los Angeles flourmill delivered price assembly-margin indicator was $2.97/cwt in May of 2000. That is a range of $2.23/cwt. All but one of the 37 assembly-marketing margins indicators is above $1.00/cwt. The range of these assembly-marketing margins suggests large fluctuations that are directly associated with changing transportation and storage costs, and market profitability.

Figure 5. Comparison of Average Farm Winter Wheat Prices and Los Angeles Flourmill Delivered Prices (January 1997 – December 2001).

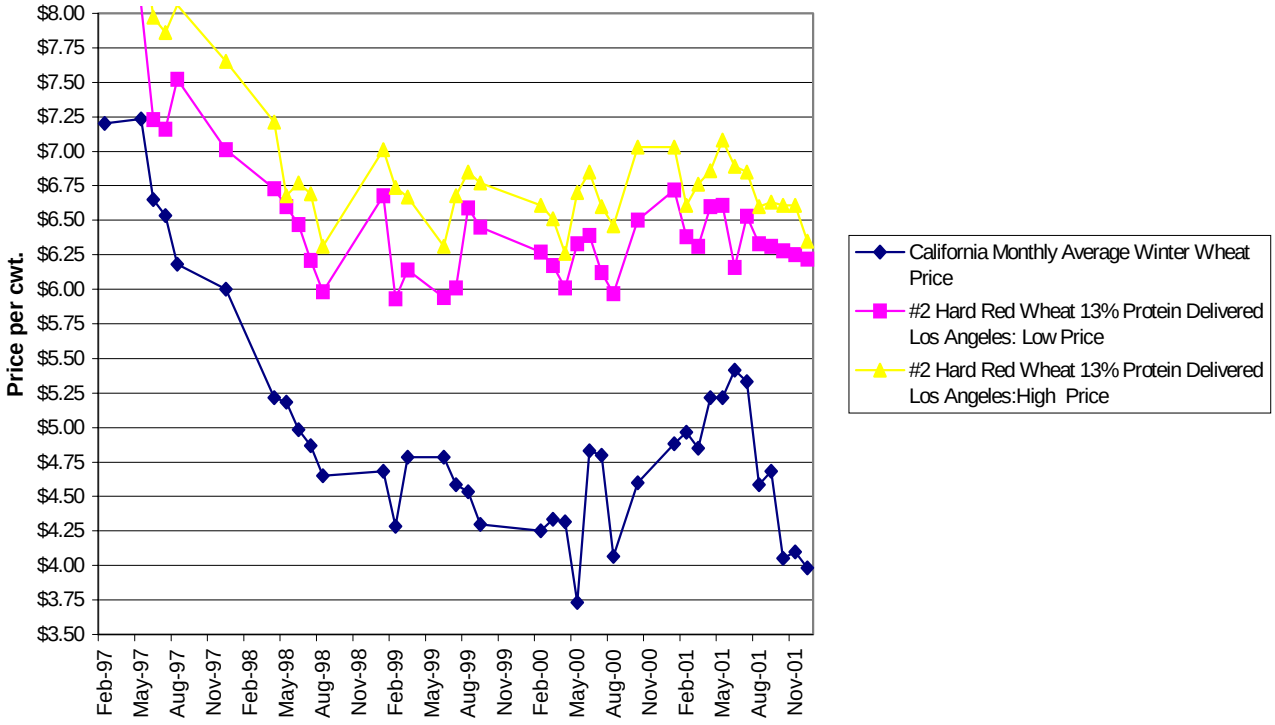


Table 10. Assembly-Marketing Margins for Los Angeles Flourmills ($ per cwt).

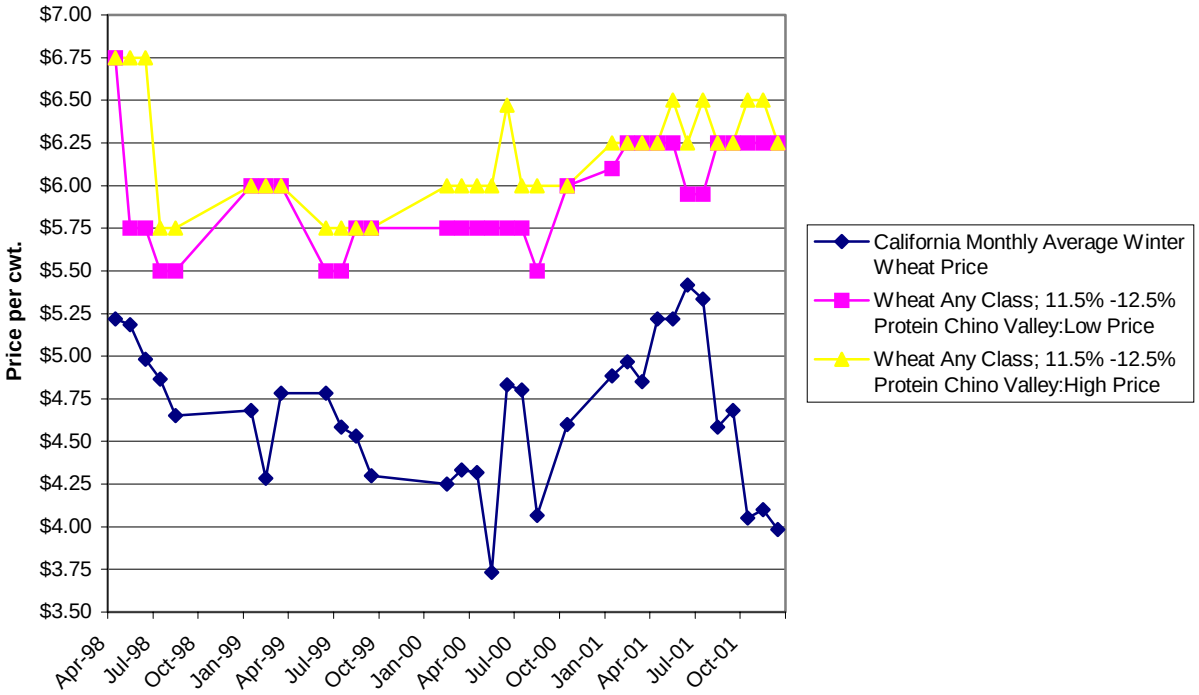
Month/Year	California Monthly Average Winter Wheat Price	#2 Hard Red Wheat 13% Protein Delivered Los Angeles: Low Price	#2 Hard Red Wheat 13% Protein Delivered Los Angeles: High Price	Flour Mill Assembly-Marketing Margin: Low Price	Flour Mill Assembly-Marketing Margin: High Price
Apr-98	$5.22	$6.73	$7.21	$1.51	$1.99
May-98	$5.18	$6.60	$6.68	$1.42	$1.50
Jun-98	$4.98	$6.47	$6.77	$1.49	$1.79
Jul-98	$4.87	$6.21	$6.69	$1.34	$1.82
Aug-98	$4.65	$5.98	$6.31	$1.33	$1.66
Average 1998	**$4.98**	**$6.40**	**$6.73**	**$1.42**	**$1.75**
Jan-99	$4.68	$6.68	$7.01	$2.00	$2.33
Feb-99	$4.28	$5.93	$6.74	$1.65	$2.46
Mar-99	$4.78	$6.14	$6.67	$1.36	$1.89
Jun-99	$4.78	$5.94	$6.31	$1.16	$1.53
Jul-99	$4.58	$6.01	$6.68	$1.43	$2.10
Aug-99	$4.53	$6.59	$6.85	$2.06	$2.32
Sep-99	$4.30	$6.45	$6.77	$2.15	$2.47
Average 1999	**$4.56**	**$6.25**	**$6.72**	**$1.68**	**$2.15**
Feb-00	$4.25	$6.27	$6.61	$2.02	$2.36
Mar-00	$4.33	$6.17	$6.51	$1.84	$2.18
Apr-00	$4.32	$6.01	$6.26	$1.69	$1.94
May-00	$3.73	$6.33	$6.70	$2.60	$2.97
Jun-00	$4.83	$6.39	$6.85	$1.56	$2.02
Jul-00	$4.80	$6.12	$6.60	$1.32	$1.80
Aug-00	$4.07	$5.97	$6.46	$1.90	$2.39
Oct-00	$4.60	$6.50	$7.03	$1.90	$2.43
Average 2000	**$4.37**	**$6.22**	**$6.63**	**$1.85**	**$2.26**
Jan-01	$4.88	$6.72	7.03	$1.84	$2.15
Feb-01	$4.97	$6.38	$6.61	$1.41	$1.64
Mar-01	$4.85	$6.31	$6.76	$1.46	$1.91
Apr-01	$5.22	$6.60	$6.86	$1.38	$1.64
May-01	$5.22	$6.61	$7.08	$1.39	$1.86
Jun-01	$5.42	$6.16	$6.89	$0.74	$1.47
Jul-01	$5.33	$6.53	$6.85	$1.20	$1.52
Aug-01	$4.58	$6.33	$6.60	$1.75	$2.02
Sep-01	$4.68	$6.31	$6.63	$1.63	$1.95
Oct-01	$4.05	$6.28	$6.61	$2.23	$2.56
Nov-01	$4.10	$6.25	$6.61	$2.15	$2.51
Dec-01	$3.98	$6.22	$6.35	$2.24	$2.37
Average 2001	**$4.77**	**$6.39**	**$6.74**	**$1.62**	**$1.97**
Average 1998-2001	**$4.67**	**$6.31**	**$6.70**	**$1.64**	**$2.03**

Source: NASS Month Agricultural Price Reports, 1998 - 2001

Figure 5 shows the relationship between the average monthly farm gate winter wheat price and the high-low flourmill price for wheat delivered to Los Angeles. The figure shows that the assembly-marketing margin can be quite variable. The variability is influenced by a number of factors. These include the demand for wheat by the flourmills, the supply of wheat at the farm gate and the size of the marketing costs associated with this merchandizing activity.

Table 10 shows the low and high prices paid by Los Angeles flourmills and the assembly-margins for those prices from 1998 through 2001. The assembly-marketing margin indicators follow the variability in Los Angeles flourmill prices for wheat and the

Figure 6. Comparison of California Average Winter Wheat Price and Chino Valley Feed Wheat Prices (1998 – 2001)



farm gate price for wheat. The lowest low Los Angeles flourmill delivered price assembly-marketing margin indicator was $0.74/cwt in June of 2001 and the highest high Los Angeles flourmill delivered price assembly-margin indicator was $2.97/cwt in May

Table 11. Assembly-Marketing Margins Chino Valley Feed Wheat Market ($ per cwt).

Month /Year	California Monthly Average Winter Wheat Price	Wheat Any Class; 11.5% - 12.5% Protein Chino Valley: Low Price	Wheat Any Class; 11.5% - 12.5% Protein Chino Valley: High Price	Chino Valley Feed Wheat Assembly-Marketing Margin: Low Price	Chino Valley Feed Wheat Assembly-Marketing Margin: High Price
Apr-98	$5.22	$6.75	$6.75	$1.53	$1.53
May-98	$5.18	$5.75	$6.75	$0.57	$1.57
Jun-98	$4.98	$5.75	$6.75	$0.77	$1.77
Jul-98	$4.87	$5.50	$5.75	$0.63	$0.88
Aug-98	$4.65	$5.50	$5.75	$0.85	$1.10
Average 1998	**$4.98**	**$5.85**	**$6.35**	**$0.87**	**$1.37**
Jan-99	$4.68	$6.00	$6.00	$1.32	$1.32
Feb-99	$4.28	$6.00	$6.00	$1.72	$1.72
Mar-99	$4.78	$6.00	$6.00	$1.22	$1.22
Jun-99	$4.78	$5.50	$5.75	$0.72	$0.97
Jul-99	$4.58	$5.50	$5.75	$0.92	$1.17
Aug-99	$4.53	$5.75	$5.75	$1.22	$1.22
Sep-99	$4.30	$5.75	$5.75	$1.45	$1.45
Average1999	**$4.56**	**$5.79**	**$5.86**	**$1.22**	**$1.29**
Feb-00	$4.25	$5.75	$6.00	$1.50	$1.75
Mar-00	$4.33	$5.75	$6.00	$1.42	$1.67
Apr-00	$4.32	$5.75	$6.00	$1.43	$1.68
May-00	$3.73	$5.75	$6.00	$2.02	$2.27
Jun-00	$4.83	$5.75	$6.47	$0.92	$1.64
Jul-00	$4.80	$5.75	$6.00	$0.95	$1.20
Aug-00	$4.07	$5.50	$6.00	$1.43	$1.93
Oct-00	$4.60	$6.00	$6.00	$1.40	$1.40
Average 2000	**$4.37**	**$5.75**	**$6.06**	**$1.38**	**$1.69**
Jan-01	$4.88	$6.10	$6.25	$1.22	$1.37
Feb-01	$4.97	$6.25	$6.25	$1.28	$1.28
Mar-01	$4.85	$6.25	$6.25	$1.40	$1.40
Apr-01	$5.22	$6.25	$6.25	$1.03	$1.03
May-01	$5.22	$6.25	$6.50	$1.03	$1.28
Jun-01	$5.42	$5.95	$6.25	$0.53	$0.83
Jul-01	$5.33	$5.95	$6.50	$0.62	$1.17
Aug-01	$4.58	$6.25	$6.25	$1.67	$1.67
Sep-01	$4.68	$6.25	$6.25	$1.57	$1.57
Oct-01	$4.05	$6.25	$6.50	$2.20	$2.45
Nov-01	$4.10	$6.25	$6.50	$2.15	$2.40
Dec-01	$3.98	$6.25	$6.25	$2.27	$2.27
Average 2001	**$4.77**	**$6.19**	**$6.33**	**$1.41**	**$1.56**
Average 1998 – 2001	**$4.67**	**$5.89**	**$6.15**	**$1.22**	**$1.48**

Sources: NASS Monthly Price reports; 1998-2001.

of 2000. That is a range of $2.23/cwt. All but one of the assembly-marketing margins indicators is above $1.00/cwt. The range of these assembly-marketing margins suggests large fluctuations that are directly associated with changing transportation and storage costs, and market profitability.

The Chino Valley feed wheat market prices (see Figure 6) much like the Los Angeles flourmill market shows much less price volatility than the farm gate winter wheat price. Prices paid for feed wheat in the Chino Valley are primarily driven by the cost and availability of substitute feeds. Thus, price variability in that market for feed wheat is not directly related to the supply of California wheat, but rather to costs of all substitute feeds. One should expect that if the costs of alternative feed increase relative to California feed wheat that demand and consequently price paid for California feed wheat should increase and if the costs of alternative feed decrease relative to California feed wheat prices that California feed wheat price should decrease.

Table 11 shows the same general trend in exists in the assembly-marketing margins for the Chino Valley wheat feed as that, which exists in the Los Angeles flourmill wheat market. The assembly-marketing margins widens as the farm gate price of wheat drops. The assembly-marketing margins for Chino Valley feed wheat are lower than those for the Los Angeles flourmill wheat market. These differences can be hypothesized to exist because of wheat quality and transportation cost differences and the realization that the feed market is the residual or last claimant user. Feed wheat use helps clear the market. The assembly-marketing margins, based on the four-year average, differ from $0.42/cwt for the low price margins to $0.55/cwt on the high price margins.

Although there are relative few feed wheat prices reported in the AMS' *Weekly Food and Feed Grain Reports* from which to make any definitive observation, it would appear that the spread between the price for 13% protein farm wheat moving to the flour market and the lower quality feed wheat moving into the feed markets would account for part of the difference in the assembly-marketing margins.

Export Margins

The export market is the last merchandizing activity to be evaluated. California is not a major exporter of winter wheat. California winter wheat exports accounted for less

than 2% of U.S. hard red winter wheat exports in 2001 – 2002. In a number of years no winter wheat has been exported from California. California durum wheat is exported primarily out of Gulf ports and in 2001 – 2002 accounted for approximately 12% of U.S.

Table 12. California Wheat Export 1992-02 by Country of Destination.

WHEAT EXPORTS FROM CALIFORNIA BY COUNTRY OF DESTINATION IN 1,000 BUSHELS 1992-2002
(Crop Year June through May)

	1992 1993	1993 1994	1994 1995	1995 1996	1996 1997	1997 1998	1998 1999	1999 2000	2000 2001	2001 2002	TOTALS
				HARD RED WINTER WHEAT							
Afghanistan	0	0	0	0	0	0	0	0	0	0	0
Algeria	0	965	0	827	0	0	0	0	0	0	1792
Bangladesh	3574	965	1853	923	0	0	0	0	1029	1102	9446
Bolivia	1331	0	0	0	1732	0	0	0	0	0	3063
Brazil	0	0	0	0	1135	0	0	0	0	0	1135
Chile	0	591	0	0	0	0	0	0	0	0	591
China (Main)	0	0	1157	0	0	0	0	0	0	0	1157
Colombia	0	0	0	0	0	0	0	0	0	0	0
Costa Rica	0	0	0	0	0	0	0	0	0	0	0
Djilboulti	0	383	0	0	0	0	0	0	0	0	383
Ecuador	0	951	0	2197	1157	0	0	0	0	0	4305
Egypt	0	0	0	0	0	0	0	0	0	0	0
Ethiopia	0	0	772	0	0	0	0	0	0	0	772
India	939	0	0	0	0	0	0	0	0	0	939
Indonesia	0	0	0	432	0	0	0	0	0	1212	1644
Iraq	0	0	0	0	0	4033	0	0	0	0	4033
Italy	0	0	0	0	0	0	0	0	0	0	0
Japan	0	0	0	0	0	0	0	0	0	0	0
Jordan	0	0	0	0	0	0	0	0	0	0	0
Kenya	0	1300	0	0	0	0	0	0	0	0	1300
Malaysia	0	0	0	0	0	0	0	0	0	0	0
Mexico	551	0	0	0	0	0	0	0	0	0	551
Mongolia	0	0	0	0	0	404	0	0	0	919	1323
Morocco	1087	2314	0	0	0	0	0	0	0	0	3401
North Korea	0	0	0	0	0	0	3505	0	0	1102	4607
Peru	0	0	0	0	2780	350	0	0	0	0	3130
Russia	1347	0	1215	0	0	0	0	0	0	0	2562
Sierra Leone	0	0	0	0	0	0	0	0	0	0	0
South America	0	0	0	0	0	0	0	0	0	0	0
Sri Lanka	2411	901	0	0	0	0	0	0	0	0	3312
Sudan	0	0	0	568	0	0	0	0	0	0	568
Tunisia	0	0	0	0	0	0	0	0	0	0	0
Yemen	0	0	5395	0	0	0	0	0	0	0	5395
All others	0	0	0	0	0	0	0	0	0	0	0
TOTALS	11240	8370	10392	4947	6804	4787	3505	0	1029	4335	55409

Source: Agricultural Marketing Service, Food and Feed Grain Report, June 2002.

Table 13. California US No.2 Hard Red Wheat (HRW) Exports 1992-3 to 2001-02.

Destination	Amount Metric Tons	Port of Debarkation	Value of Shipment (Metric ton)	Value of Shipment (per cwt)
Bangladesh	30,000	Stockton (71%) Sacramento (29%)	$130.00	$5.90
Indonesia	33,000	Sacramento	$130.00	$5.90
North Korea	30,000	Stockton	$130.00	$5.90
Mongolia	25,000	Stockton	$132.00	$5.99

Sources: AMS *Weekly Food and Feed Grain Reports* and A. Harding.

durum exports.

Table 12 shows the hard red winter wheat exports from California from 1992-1993 to 2001-2002. The five largest California hard red winter wheat importers over that period were Bangladesh, Ecuador, Iraq, and North Korea, and Yemen. Twenty-two different nations imported hard red winter wheat over the 10-year time period.

Table 13 shows the export shipment by destination, amount, port of debarkation, and the shipment value per hundredweight, and the export-assembly marketing margin. All the exports were PL-480 or Food for Peace sales. The value of shipments is defined as the value of the wheat purchased by Farm Services Agency. The assembly-marketing margin on these shipments, using the yearly average for 2001-2002 winter wheat farm price, was $1.23/cwt to $1.32/cwt. This assembly-margin was comparable to that for Chino Valley Feed Wheat market in the same time period.

Table 14 shows the export sales of durum wheat produced in California and Arizona from 1998-1999 through December 11, 2001. The three-year average for 1998-1999 through 2000-2001 was 261,438 metric tons. Table 15 shows the Gulf export average monthly price for durum wheat, the California farm gate average monthly durum price, and the gulf export assembly-marketing margins for California durum wheat.

Table 14. Export Sales of Desert Durum® Wheat Produced in California and Arizona for Marketing Years of 1998-99 to December 11, 2001.

	Marketing Years in Metric Tons			
Country	98-99	99-00	00-01	01-02
Algeria	48,771			
Dominican Republic		3,217	3,608	
Germany		17,299		
Italy	292,231	201,129	176,256	104,202
Netherlands				8,399
Nigeria	3,874	3,680	8,000	8,800
Spain		26,250		
Venezuela				5,094
Total	344,876	251,575	187,864	121,401

Source: California Wheat Commission

Table 15. Gulf Export Market Assembly-Margins for California-Arizona Durum Wheat (Price/Cwt).

Month	May-01	Jun-01	Jul-01	Aug-01	Sep-01	Average
Gulf Price	$8.69	$8.79	$8.70	$8.66	$8.85	$8.74
California Farm Gate Durum Price	$6.25	$6.38	nr	$7.02	nr	$6.55
Gulf Assembly-Marketing Margin	$2.44	$2.41	---	$1.64	---	$2.19

Sources: United States Wheat Associates Prices and Agricultural Marketing Service *Weekly Food and Feed Grains Reports*.
Note: nr – not recorded.

The average durum wheat export assembly-marketing margin was $2.19 per cwt. This is slightly higher the winter wheat high price assembly-marketing margin for Los Angeles.

The next section looks more closely at the issues of storage and transportation costs and how assembly-marketing margins were affected. The difference between the assembly-marketing margin and storage and transportation costs can be referred to as contribution margins. The contribution margin can be used to pay for operational cost and may contain a profit.

Storage Cost and Capacity

California wheat storage and transportation costs are important determinates of the economic feasibility of being involved in wheat merchandizing. There is little published information on California storage and transportation cost and availability and what is available tends to be aggregated and general in nature. An attempt was made to obtain more detailed information on storage and transportation costs and availability. Forty-four California wheat first handlers were contacted by telephone and one was interviewed in person.[8] Questions were asked concerning storage and transportation cost

[8] CWCmaintains a database of California wheat first handlers. The first handlers contacted were all on that list. A copy of the CWC first handler database is included in the Appendix, Table 4.

and availability, types of merchandizing activities that they engaged in, and types and amounts of wheat they handled[9].

Twenty first-handlers answered some of the questions posed to them, but none of these first handlers answered all of the questions. The information gathered from these

Table 16. Western United States Storage Capacity and Grain-Soybean Stocks in 1,000's Bushels.

	Storage Capacity		Grain and Soybean Stocks			
Date	Off Farm	Total	On-Farm	Off-Farm	Total	Percent
Dec-95	139,970	139,970	5,000	36,000	41,000	29%
Dec-96	138,600	138,600	9,000	37,000	46,000	33%
Dec-97	140,210	140,210	5,000	42,000	47,000	34%
Dec-98	137,000	137,000	3,000	47,000	50,000	36%
Dec-99	146,550	146,550	2,000	47,000	49,000	33%
Dec-00	157,614	157,614	2,000	40,000	42,000	27%
Dec-01	159,280	159,280	1,000	37,000	38,000	24%
Average		145,603	3,857	40,857	44,714	31%

Note: On farm storage capacity was Not Reported.
Source: USDA/NASS *Grain Stocks Report*

interviews, as with to the grower survey, cannot be considered to have statistical significance and should be viewed as anecdotal or at best descriptive industry information primarily because of low response rates[10]. The responses did provide some insight into first handlers' activities and were included in following discussion on storage, transportation, and wheat merchandizing activities.

Table 16 shows the storage capacity and grain-soybean stocks in the western US (California, Nevada, Arizona, and Utah). The average capacity utilization in the western US in December from 1995 thought 2001 was 31%. Capacity utilization does not, in general, appear to be an issue in the Western United States. California wheat is stored primarily in commercial (off-farm) facilities with relatively little on-farm storage being used. Table 17 illustrates that case.

[9] A copy of the questions asked of the first handlers is included in Appendix, Figure 2. The names of the first handlers that responded to questions are not included in this report for reasons of confidentiality.
[10] Insufficient data exists to execute non-parametric statistics.

The exact amount of wheat storage available in California cannot be determined since information about location and capacities of wheat storage warehouses can only be

Table 17. On-Farm and Off-Farm Grain Storage (tons) for Selected Months, 1996-01.

Date	Farm Storage	Off-Farm Storage	Percent Off-Farm Storage
Jun-96	3,000	146,010	97.9%
Jun-97	4,500	138,000	96.7%
Jun-98	6,000	223,650	97.3%
Jun-99	60,000	756,000	92.1%
Dec-00	57,000	545,790	89.6%
Sep-01	46,500	723,000	93.6%

California Agricultural Statistical Service, Field Crop Reports

Table 18. California Grain Elevators Location, Capacity, and Transport Service.

Company	Location	Bushel Capacity	Grain Elevator Directory
Adams Grain	Arbuckle	*	UPRR
Adams Grain	Famoso	300,000	UPRR
Barkley Seed	Grape	1,800,000	UPRR
Ceres Agricultural Products	El Centro	45,000	UPRR
Crisp Warehouse	LeMoore	*	UPRR
El Toro Export	Brawley	1,500,000	UPRR
El Toro Export	Heber	2,000,000	UPRR
Imperial Grain Growers	Brawley	1,000,000	UPRR
J.G. Boswell	Corcoran	527.256	BNSF
J.G. Boswell	Corcoran	983,956	BNSF
J.G. Boswell	Corcoran	3,551,000	BNSF
Miller Milling	Fresno	280,000	UPRR
Miller Milling	Fresno	3,300,000	BNSF
Newell Grain Growers	Tule Lake	80,000	UPRR
Newell Grain Growers	Hannchen	528,000	BNSF
NF Davis Drier and Warehouse	Firebaugh	300,000	UPRR
Peavey	Turlock	315,000	UPRR
Penney-Newman	Stockton	6,500,000	UPRR/BNSF
Sanchez Grain	Hanford	535,000	BNSF
Winema Elevator	Tule Lake	80,000	UPRR
Winema Elevator	Tule Lake	260,000	UPRR
Winema Elevator	Stronghold	315,000	BNSF

found for those warehouses that are Commodity Credit Corporation licensed warehouses[11] and warehouses that are grain elevators for the Union Pacific (UPRR) or the Burlington Northern-Santa Fe (BNSF) railroads.[12]

Table 18 lists the grain elevators served by the railroads. The total capacity of these California warehouses is 23,673,480 bushels of grains. The grain elevators combined capacities are 23,673,480 bushels. Given California wheat production in 2001 was 35,106,600 bushels (California Agricultural Statistical Service) and that these warehouses all store wheat they could provide storage for 67% of the state's total production.

Table 19 shows the first handler responses as they relate to the provision of storage services and storage availability. Ten first handlers responding indicated they provided storage services. Eight handlers felt that there was adequate storage available although two indicted that storage services could be slightly limited on a localized basis during harvest depending on crop size. These responses from the first handlers combined with the more aggregate storage information would seem to imply that there is adequate storage availability for California wheat although there may be some slightly limited availability at harvest in localized areas.

Table 19. California Wheat First Handler Responses on Storage, Frequencies in Parentheses.

Question Regarding	Response (Frequency)		
Provide Storage Services	yes (11)	no (9)	n.a. (0)
Availability of Storage	adequate (11)	slightly limited at harvest (2)	n.a. (7).
Provide Transportation Services	yes (12)	no (6)	n.a. (2)

[11] There are 89 California CCC licensed warehouses. Two-thirds appear to be rice driers and/or warehouses. The remainder seems to be other grain storage warehouses that could store seed, wheat, corn, and other small grains. A list of these warehouses can be found at:
www.fsa.usda.gov/daco/whactivities/whse_services.html

[12] Both the UPRR and BNSF railroads list California grain elevators that have rail service (www.uprr.com and www.bnsf.com)

Eight of eleven first handlers providing storage services provided storage rate data, which varied from $6.00/ton ($0.30/cwt) to $12.00/ton ($0.60/cwt). These rates typically included in and out charges and a monthly storage fee. In one in-depth interview a first handler provided more detailed information on storage, transportation rates, and confirmed the general conclusions drawn earlier.

Table 20. Estimated Monthly Storage Costs for California Wheat Short-term Storage Costs (2 months or less).

Months Storage	In Charge ($/cwt)	Storage Rate ($/cwt)	Out-Charge ($/cwt)	Total ($cwt)	Total ($/ton)
1	0.125	0.025	0.125	0.275	5.50
2	0.125	0.050	0.125	0.300	6.00

Long Term Storage (3 month or more)

Months Storage	In Charge ($/cwt)	Storage Rate ($/cwt)	Out-Charge ($/cwt)	Total ($cwt)	Total ($/ton)
3	0.165	0.114	0.165	0.444	8.88
4	0.165	0.152	0.165	0.482	9.64
5	0.165	0.190	0.165	0.520	10.40
6	0.165	0.228	0.165	0.558	11.16
7	0.165	0.266	0.165	0.596	11.92
8	0.165	0.304	0.165	0.634	12.68

Source: First handler interviews telephone interviews, 2002.

The storage costs shown in Table 20 are line with the range of storage costs indicated by the grower survey. There is almost certainly a degree of variability in the monthly storage cost figures as presented and those that would be offered by individual storage service providers. Supply conditions for individual firms can change due to differences in cost structure, available capacity, and storage demand.

An alternative to purchasing storage services is to construct them. Table 21 presents the estimated costs of construction for differing capacities and types of flat warehouse storage. Construction costs were not included for farm bins since most wheat storage was done off-farm, as shown in Tables 16, 17, and 18.

One first handler provided information concerning wheat storage construction costs, an estimated a range of $85/ton and $125/ton. The construction cost numbers for concrete storage shown in Table 21 correspond to that estimate. Table 22 was constructed based on the concrete storage construction cost numbers in Table 21.

Table 22 develops the yearly or amortized construction payment to the financing institution, and the average fixed cost of capital[13] for four sizes of storage facilities at three interest rates. It is assumed that 30% of the total construction cost is made as a down payment. The lowest fixed cost per ton is $8.55/ton for a 60,000-ton facility and $11.96/ton for a 12,000-ton facility. No variable costs (labor, energy, supplies, *etc*.) could be obtained. Thus, the average fixed costs presented should be viewed as just the cost of entry into the storage service industry and understate the average total costs of building and operating wheat storage.

Table 21. Wheat Storage Construction Cost Per Ton of Capacity.

Bushel Storage Capacity	Tons of Storage Capacity	Wood ($/ton)	Steel ($/ton)	Concrete ($/ton)
50,000	1,500	$127	$130	$145
75,000	2,250	$118	$122	$136
100000	3,000	$113	$117	$130
150000	4,500	$107	$110	$123
200000	6,000	$100	$105	$117
250000	7,500	$97	$102	$114
300000	9,000	$95	$100	$111
400000	12,000	$90	$95	$105
500000	15,000	$86	$91	$101
750000	22,500	$80	$86	$95
1000000	30,000	$77	$82	$91
2000000	60,000	$69	$74	$82

Source: Marshall Valuation Service, 2001.

The fixed costs presented in Table 22 are comparable to commercial storage rates presented in Table 20; however, these do not reflect the variable operation costs of

[13] These figures understate the true fixed costs of storage since it does not reflect the costs of licenses, permits, management, and other fixed costs.

operating a storage facility. There appears to be sufficient storage for wheat in existing facilities and that leasing storage space is a preferable option to construction and operating new storage space.

Table 22. Investment Cost per Ton for Wheat Storage Construction

Interest rates	Storage Capacity (tons)	Construction Cost ($M)	Amount Financed (30% down payment-$M)	10 Yearly Payments ($M)	Fixed Cost per Ton
8%	12,000	$1,260	$882	$131.4	$10.95
9%	12,000	$1,260	$882	$137.4	$11.45
10%	12,000	$1,260	$882	$143.5	$11.96
8%	15,000	$1,515	$1,060	$158.0	$10.54
9%	15,000	$1,515	$1,060	$165.2	$11.02
10%	15,000	$1,515	$1,060	$172.6	$11.51
8%	30,000	$2,730	$1,911	$284.8	$9.49
9%	30,000	$2,730	$1,911	$297.8	$9.93
10%	30,000	$2,730	$1,911	$311.0	$10.37
8%	60,000	$4,920	$3,444	$513.3	$8.55
9%	60,000	$4,920	$3,444	$536.6	$8.94
10%	60,000	$4,920	$3,444	$560.5	$9.34

Transportation Costs

Similar to California storage cost information there is relatively little California wheat transportation cost information available from public information sources. The *1997 Census of Manufacturing* indicates that there were 637 agricultural transportation establishments providing localized service in the state and 399 agricultural transportation service establishments providing long-distance (between metropolitan areas or interstate) transportation services.

Fourteen of the twenty first-handlers interviewed stated they provided transportation services. Eight responded that they did not perceive a transportation

service shortage, two indicated there may be slight shortages at the end of harvest, and the remainder did not respond to the question.

Eight first handlers provided the transportation rates. The rate structures used varied from flat rate structures based on point of destination to per mile rate structures. The per-mile rate structures were mileage tiered range structures. For example, two first handlers indicated they used the "old" Public Utility Commission rate structure that included four mileage range tiers. Each tier had a different rate per hundredweight of product and the rate per-mile increases as the mileage ranges increase.

Table 23 provides a transportation rate structure based on the first handler interviews. The transportation rate from farm to storage is based on the "old PUC" rate structure as provided by two of the first handlers and assumes that the average distance from farm to storage is more than 10 miles. The rates shown for transportation to Los Angeles flourmills, Chino Feed Wheat markets, and the Port of Stockton should be viewed as indicators of freight costs from the Southern San Joaquin Valley. The transportation cost for durum wheat to Gulf export terminals (Corpus Christi) is based on the Union Pacific Railroad rate calculation program (www.uprr.com).

Table 23. Estimated California WheatTransportation Costs ($ per cwt).

Storage Time (months)	Transport to Storage	Transport to Los Angeles Flourmill Market	Transport to Chino Feed Wheat Market	Transport to Port of Stockton	Transport to Gulf (Corpus Christi)
0	$0.00	$0.85	$0.75	$0.75	$1.33
1	$0.22	$0.85	$0.75	$0.75	$1.33
2	$0.22	$0.85	$0.75	$0.75	$1.33
3	$0.22	$0.85	$0.75	$0.75	$1.33
4	$0.22	$0.85	$0.75	$0.75	$1.33
5	$0.22	$0.85	$0.75	$0.75	$1.33
6	$0.22	$0.85	$0.75	$0.75	$1.33
7	$0.22	$0.85	$0.75	$0.75	$1.33
8	$0.22	$0.85	$0.75	$0.75	$1.33

The transportation costs shown in Table 23 should not be viewed as actual quoted rates. These costs are shown here are based on industry telephone survey information with limited responses. There is likely a large variance in transportation rates for reasons of farm proximity to storage facilities, and transportation services supply and demand conditions at any given time. Several of the first handlers interviewed said that

transportation rates were likely to be higher at harvest time than at other times of the year.

A cooperative could invest in and operate its own transportation services, but no investment analysis was done. There are a few reasons for not doing that investment analysis. First, transportation is relatively localized and wheat is grown in many parts of the state making transportation coordination a difficult task. Second, the investment costs vary considerably depending on the type and age of equipment purchased. Third, operational costs depend on wages/benefit, fuel, maintenance, insurance, and taxes. These costs can vary greatly from location to location. Fuel costs changes are critical factor in profitability of trucking and higher fuel costs are a major factor in transportation company bankruptcies (AMS-USDA, 2002). These factors along with the first handler interviews suggest a cooperative would probably be best served by contracting for transportation services and/or consider developing a grower-trucker program that allows individual growers to haul their production to specific locations under a specific rate structure.[14]

Transport Contribution Margin Analysis

This section estimates the contribution margin indicators for the Los Angeles flourmill market, the Chino Valley feed wheat market, and the California winter wheat and Gulf durum wheat export markets. Contribution margins can be viewed as average indicators of market viability. Contribution margins are estimated for the Los Angeles flourmill market; Chino Valley feed wheat market; Stockton wheat export market; and one for the durum wheat export market.

Contribution margins are estimated for a base case where transportation and storage costs are those shown in Tables 20 and 23; a case where transportation costs are increased by ten percent and a case where transportation costs are decreased by ten percent. These cases are presented to provide some sensitivity analysis to the presentation. The Los Angeles flourmill market is presented first, followed by the Chino

[14] Several cooperatives have developed this type of program, an example is Farmer Rice Cooperative's Green Rice Delivery Program.

Valley feed wheat market, and then the two export markets. Table 24 presents the transport and storage costs for up to eight months of storage.

Table 24. California Flourmill Transport Costs ($ per cwt).

Storage Time	Storage	Transport to Storage	Transport to Los Angeles Flourmill Market
0	$0.00	$0.00	$0.85
1	$0.28	$0.22	$0.85
2	$0.30	$0.22	$0.85
3	$0.44	$0.22	$0.85
4	$0.48	$0.22	$0.85
5	$0.52	$0.22	$0.85
6	$0.56	$0.22	$0.85
7	$0.60	$0.22	$0.85
8	$0.63	$0.22	$0.85

Table 25. California Flourmill Marketing and Transport Contribution Margins - Base Case ($ per cwt).

Storage Time	Low Assembly-Marketing Margin	High Assembly-Marketing Margin	Low Contribution Margin	High Contribution Margin
0	$1.64	$2.03	$0.79	$1.18
1	$1.64	$2.03	$0.30	$0.69
2	$1.64	$2.03	$0.27	$0.66
		0-2-month Average	**$0.45**	**$0.84**
3	$1.64	$2.03	$0.13	$0.52
4	$1.64	$2.03	$0.09	$0.48
5	$1.64	$2.03	$0.05	$0.44
		3-5-month Average	**$0.09**	**$0.48**
6	$1.64	$2.03	$0.01	$0.40
7	$1.64	$2.03	-$0.03	$0.36
8	$1.64	$2.03	-$0.06	$0.33
		6-8-Average	**-$0.03**	**$0.36**
		0-8-month Average	**$0.17**	**$0.56**
		Grand Mean	**$0.37**	

Notes: Averages are for 0-3, 3-5, 6-8, and 0-8 months of storage. The grand mean is an average of low and high contribution margins for the 0-8 months of storage.

Table 25 shows the low and high contribution margins for the base case. The contribution margins are for an eight-month period since most California wheat is marketed in that period of time (see Table 9, p.30).

Several observations were made from Table 25, first, all the average contribution margins are positive except for the 6-8 month low contribution margin average. The

contribution margins vary from a high of $1.18/cwt to a low of -$0.06/cwt with 16 of 18 contribution margin estimates being positive. Second, as storage costs increase over time the contribution margins decrease. This suggests that there is a degree of sensitivity to the size of the contribution margins and storage costs. Third, there is approximately a $0.39/cwt spread between the high and low contribution margins. Thus, the timing of the merchandizing transaction is also an important determinant of the size of the contribution margin.

Table 26 provides comparisons between the high and low contribution margins for the base case, a case where transportation costs are increased by ten percent and a case where transportation costs are decreased by ten percent.

Table 26 shows that Los Angeles flourmill average three-month contribution margins remain mostly positive even under increasing transportation costs. An important observation from this table is that management of transportation costs can have a significant impact on the contribution margins.

Table 26. Los Angeles Flourmill Contribution Margins Given Changes in Transportation Costs ($ per cwt).

Monthly Term Average	Base Case : Low	Base Case: High	10% Increase Transport Costs : Low	10% Increase Transport Costs:High	10% Decrease Transport Costs:Low	10% Decrease in Trans Costs:High
	Contribution Margins					
0-2-months	$0.45	$0.84	$0.36	$0.75	$0.56	$0.95
3-5-months	$0.09	$0.48	-$0.01	$0.38	$0.20	$0.59
6-8-months	-$0.03	$0.36	-$0.13	$0.26	$0.08	$0.47
0-8-months	$0.17	$0.56	$0.07	$0.46	$0.28	$0.67
Grand Mean ($/cwt)	$0.37		$0.27		$0.47	

Tables 25 and 26 indicate the Los Angeles flourmill market may be an economically feasible target market for a wheat cooperative in California. The next market to be evaluated is the Chino Valley feed wheat market. Table 27 provides estimates of the contribution margins for that market.

The three-month (0-2) average for the Chino feed wheat market is positive for both the low and high contribution margins. The 3-5 month average is positive for the high contribution margin, but negative for the low contribution margin. The 6-8 month average is negative for both the low and high contribution margins. The 0-8 monthly

Table 27. Chino Valley Feed Wheat Market Base Case Contribution Margin ($/cwt).

Storage Time	Storage	Transport To Storage	Transport Chino Feed Wheat Market	Chino Valley Feed Wheat Market: Low Assembly-	Chino Valley Feed Wheat Market: High Assembly	Chino Valley Feed Wheat Market: Low	Chino Valley Feed Wheat Market :High
				Marketing Margins		Contribution Margins	
0	$0.00	$0.00	$0.75	$1.22	$1.48	$0.47	$0.73
1	$0.28	$0.22	$0.75	$1.22	$1.48	-$0.03	$0.24
2	$0.30	$0.22	$0.75	$1.22	$1.48	-$0.05	$0.21
				0-2-month Average		**$0.13**	**$0.39**
3	$0.44	$0.22	$0.75	$1.22	$1.48	-$0.19	$0.07
4	$0.48	$0.22	$0.75	$1.22	$1.48	-$0.23	$0.03
5	$0.52	$0.22	$0.75	$1.22	$1.48	-$0.27	-$0.01
				3-5-month Average		**-$0.23**	**$0.03**
6	$0.56	$0.22	$0.75	$1.22	$1.48	-$0.31	-$0.05
7	$0.60	$0.22	$0.75	$1.22	$1.48	-$0.35	-$0.09
8	$0.63	$0.22	$0.75	$1.22	$1.48	-$0.38	-$0.12
			6-8-month Average			**-$0.35**	**-$0.09**
			0-8-month Average			**-$0.15**	**$0.11**
			Grand Mean			**-$0.02**	

Table 28. Chino Valley Feed Wheat Contribution Margins Given Changes in Transportation Costs ($ per cwt).

Monthly Term Averages	Base Case: Low	Base Case: High	10 % Increase in Trans Costs: Low	10 % Increase Trans Costs: High	10 % Decrease Trans Costs: Low	10 % Decrease Trans Costs: High
			Contribution Margins			
0-2-Month	$0.13	$0.39	$0.05	$0.31	$0.21	$0.47
3-5-Month	-$0.23	$0.03	-$0.32	-$0.06	-$0.15	$0.11
6-8-Month	-$0.35	-$0.09	-$0.44	-$0.18	-$0.27	-$0.01
0-8-Month	-$0.15	$0.11	-$0.24	$0.02	-$0.07	$0.19
Grand Mean	-$0.02		-$0.11		$0.06	

Table 28 presents a comparison of the base case, ten percent transportation cost increase case, and the ten percent decrease in transportation cost decrease. It is interesting to note that the Chino Valley feed wheat market has positive 0-2 month average contribution margins for all three transportation cases and that the grand average for the ten percent decrease in transportation costs is positive.

Although, the Chino Valley feed wheat contribution margins are not as large as the Los Angeles market and are sensitive to both storage and transportation costs it appears to be somewhat economically feasible for this market. Additionally, there are other feed wheat markets in the state that could allow for greater flexibility in wheat merchandizing and those markets could allow for more transportation and storage cost management discretion.

Table 29. Stockton Wheat Export Market Base Case Contribution Margins ($/cwt).

Storage Time in Months	Storage Cost	Transport to Storage	Transport to Port of Stockton	Stockton Export Market: Assembly Marketing Margin	Stockton Export Market: Contribution Margin
0	$0.00	$0.00	$0.75	$1.35	$0.60
1	$0.28	$0.22	$0.75	$1.35	$0.11
2	$0.30	$0.22	$0.75	$1.35	$0.08
				0-2 Month Average	**$0.26**
3	$0.44	$0.22	$0.75	$1.35	-$0.06
4	$0.48	$0.22	$0.75	$1.35	-$0.10
5	$0.52	$0.22	$0.75	$1.35	-$0.14
				3-5 Month Average	**-$0.10**
6	$0.56	$0.22	$0.75	$1.35	-$0.18
7	$0.60	$0.22	$0.75	$1.35	-$0.22
8	$0.63	$0.22	$0.75	$1.35	-$0.25
				6-8-Month Average	**-$0.22**
				0-8-Month Average	**-$0.02**

The export markets for winter wheat and durum wheat are the last to be evaluated. Table 29 shows the estimated Stockton export market contribution margins for winter wheat. A couple of areas of concern underlie the estimated contribution margins for this market. First, the farm level price used to estimate the assembly-marketing margins upon which the contribution margins are estimated is the average of two yearly prices and certainly may not be reflective of actual or typical farm gate prices received for the

exported wheat. Second, it is unlikely that a static one-year view of that market is representative of the true dynamic nature of the California winter wheat export market.

The resulting contribution margins are similar to those presented in for the Chino Valley feed wheat market. A key to being involved in this market is timing of the export sale and the export price. The export contribution margins are sensitive to storage costs[15]. A general rule of thumb used in determining whether to sell or store a commodity is that the expected future price must be at least as great as the current price plus storage costs. The dynamics of the export market make this a problematic issue since it requires some ability to forecast not only future export prices, but also forecast whether export demand will actually materialize. Table 12 (p. 31) underscores this point. There is a good deal of variability in the annual winter wheat exports from California and in 1999-2000 no wheat was exported.

Table 30. Comparison of Stockton Export Wheat Contribution Margin Given Changes in Transportation Costs ($/cwt).

Monthly Term Averages	Base Case	10% Increase Transport Costs:	10% Decrease Transport Costs:
	Contribution Margins		
0-2-months	$0.26	$0.19	$0.37
3-5-months	-$0.10	-$0.17	$0.01
6-8-Months	-$0.22	-$0.29	-$0.11
0-8-months	-$0.02	-$0.09	$0.09

Table 30 shows the variability in export contribution margins under differing transportation rates. The table illustrates the point that lower transportation and storage costs make the export market more economically feasible. The durum wheat export market is of greater importance to durum wheat producers, as historically the majority of it has been exported. Table 31 provides the estimated contribution margins for that market.

[15] The same issue is true for the flourmill and feed wheat markets. The difference is those markets appear to be quite liquid with selling opportunities being readily available while the export market is much less liquid with selling opportunities being more infrequent than the other two markets.

Table 31. California Durum Wheat Gulf Exports - Contribution Margins ($/cwt).

Storage Time Months	Storage	Transport to Storage	Transport to Corpus Christi	Export Assembly-Marketing Margin	Wheat Export: Contribution Margin
0	$0.00	$0.00	$1.33	$2.19	$0.86
1	$0.28	$0.22	$1.33	$2.19	$0.37
2	$0.30	$0.22	$1.33	$2.19	$0.34
3	$0.44	$0.22	$1.33	$2.19	$0.20
4	$0.48	$0.22	$1.33	$2.19	$0.16
5	$0.52	$0.22	$1.33	$2.19	$0.12
6	$0.56	$0.22	$1.33	$2.19	$0.08
7	$0.60	$0.22	$1.33	$2.19	$0.04
8	$0.63	$0.22	$1.33	$2.19	$0.01
				Average	**$0.24**

This market compares favorably to the Los Angeles flourmill market. The advantage this market seems to have is that all the contribution margins are positive, which suggests a degree in flexibility in storage management. That is, even if durum wheat is stored for longer than optimal period, a positive contribution margin is achieved.

No transportation sensitivity analysis was done for durum wheat. First, the rail rate is established through published tariffs. Second, even if truck transportation rates increased by ten percent all but the 8-month storage margin would still be positive.

Economic Feasibility of Wheat Merchandizing Markets

There are a number of indicators that would suggest that there is economic feasibility in merchandizing California wheat by a California wheat grower's cooperative. There are two general indicators of the economic or market feasibility. First, California is a wheat deficit state, which means there an excess demand for wheat in California. It is not a question of whether the wheat can be sold but rather at what price can the wheat be sold.

Second, there are over 70 first handlers in the first handler database supplied by the California Wheat Commission. Fifteen of those first handlers account for over 70% of total sales. Common sense suggests these first handlers are involved in California wheat merchandizing because some degree of profitability exists.

One should keep in mind that some proportion of the contribution margin goes to pay for the firm's marketing costs (defined to be all of the costs associated with the merchandizing activity) and what is left is profit. An empirical estimate of that profitability, large or small, requires firm level information; however, the likelihood of obtaining that type of information is quite small.

The estimated contribution margins suggest the most economically feasible winter wheat market is the Los Angeles flourmill market. The feed wheat market and export markets do not exhibit the size of contribution margins associated with the Los Angeles flour market, but may offer market opportunities. The durum wheat export market does offer potentially profitable export-marketing opportunities.

The contribution margins suggest that given differing storage and transportation costs there exists enough margin in the merchandizing activity to pay for marketing costs and perhaps achieve some profit. As was mentioned a number of times in this section all of the calculated margins are based on average prices and non-statistical cost information. There is no valid analytical method to draw firm conclusions concerning merchandizing profitability.

Some concluding comments are in order. The contribution margin analysis while not a precise measure of profitability does show the sensitivity of plausible margins to changes in storage costs and transportation costs. Two costs were not captured in the storage cost figures used in the margin analysis. The first was interest paid on operating costs to hold and maintain the in storage wheat, and the second is the opportunity cost of not converting the wheat inventory into cash. The opportunity cost is a measure of the foregone interest that cash could have earned had the wheat been sold rather than stored.

A second issue is the price risk associated with holding wheat in storage. Market demand and supply conditions can change dramatically over the course of any marketing year. Thus, if wheat is being held in storage in anticipation of increasing prices and then prices fall losses and possibly substantial losses would be incurred instead of profits. This suggests that successful merchandizing is in reality successful inventory management and requires knowledge of current and probable future market conditions.

A final issue is one of people. If a cooperative enters the California wheat merchandizing business, then operational costs would be incurred. These costs must be

paid out of the contribution margins. The degree to which the business will be profitable is strongly related to the individuals that will manage the merchandizing activities. Key abilities of these individuals should be knowledge of and ability to use price risk management tools, such as hedging, ability to assess current market conditions and develop realistic future market forecasts, have or quickly develop knowledge concerning the industry and its major players, and have the interpersonal skills to work with cooperative members, staff, and buyers.

IV. Milling Costs and Flour Mill Investment

California Flour Milling

The question of economic feasibility in flour milling consists of ownership on many different levels. The normal process by which wheat food manufacturers obtain their flour is either by contract with the flourmill or by a cash basis transaction, and this can be somewhat easily obtained through published cash price listings. Two different hypotheses for economic feasibility include the topic of toll milling (having wheat milled into flour by a flour mill while retaining ownership of the product) versus building or buying a flourmill for the cooperative itself.

Industry Structure

The competitive nature of wheat production is evident in the commodity product characteristics. The homogenous characteristics of wheat, the large number of producers, and the consolidation of flourmills over the past thirty years has led to the oligopolistic structure within the milling industry. This consolidation has decreased the number of wheat buyers creating bigger, more efficient, and powerful buyers (Dahl). This consolidation has sprung debate in 1998 over market power of the flourmills and whether this market power is harmful to the wheat farmer. Does the consolidation have beneficial market efficiency gains that out weigh the imbalance of market power over the farmer? A study by Stiegert and Carton of Kansas State University suggested that increasing concentration has more to do with increasing efficiency than in generating market power. The individual farmer cannot affect the price of the commodity nor can a single farmer have enough volume to influence price selling to oligopsonistic millers (*i.e.* concentrated buyers of raw wheat from grain merchants or farmers).

Structure in California

The geographic move of flourmills has had a big impact on the state of California. The evolution of wheat transport, introducing of covered and hopper boxcars lead to easier transportation methods of wheat compared to flour. Flour is more susceptible to loss and contamination than wheat grain; therefore, the costs of shipping wheat relative to flour have gone down over the years. With lower shipping costs over the years flourmills have relocated from the wheat intensive rural countryside to the more populated urban areas (Babcock, Cramer, and Nelson). This shift is evident in the location of the bigger mills in California. Consolidation of the flour milling industry in the past has also occurred in order to take advantage of the economies-of-scale and efficiencies, associated with them as seen in the table below.

Table 32. US Flour Milling Industry, 1975 Versus 1999 (Wheat, Rye, and Durum Mills).

Year	# of Mills	Daily Capacity (mil cwt)	Avg. Mill(cwt/day)
1975	296	1.039	210
1999	238	1.618	410

Source: *Baking Business.Com,* Sosland Publishing Company, Kansas City, Mo.

Flour Milling Capacities In California

In 1997 the US Census Bureau reported California as having more flour milling establishments than Kansas, but the latter produced much more flour than California. This reflects larger Kansas mills and the population differences between the two states. California population increased at a rate 50% faster than Kansas between 1990 and 2000. According to the NASS-USDA, Kansas produced 506 million bushels of wheat (ranking number 1), while California produced 94.7 million bushels of wheat in 1997, yet California had five more mills than Kansas (see Table 33).

There are about sixteen flour mills now located in California with a total milling capacity range of anywhere from 130,000 cwt/day to 155,000 cwt per day. The table below displays the location, company name, milling capacity, and storage capacity of

flour mills in the state of California. The totals are the summation of the information available so they are underestimated, because of the lack of data for various mills.

Table 33. Kansas and California Aggregate Wheat Milling Industry Data, 1997.

NAICS code	Description	Estab-lish-ments	Value of Shipments ($1,000)	Annual payroll ($1,000)	Paid employees
Kansas					
Flour milling		28	569,451	30,963	927
	Population, percent change, 1990 to 2000 8.5%				
California					
Flour milling		33	664,391	28,672	757
	Population, percent change, 1990 to 2000 13.6%				

Source: *1997 Census of Manufactures* and US Census Bureau; People, 1990 and 2000.

As one can see from Table 34 the majority of California mills are located in the Los Angeles/Colton area, the most populated region, again this emphasizes the geographic movement of flourmills closer to consuming areas. There are also various big mills in the San Francisco Bay Area and the San Joaquin and Sacramento Valleys.

Although these mills would theoretically like to run non-stop, according to Robinson of the Northern Crops Institute, the optimal level is around 90% of capacity for best returns (Robinson). There are also seasonal and cyclical patterns that do not always allow a mill to reach its optimal efficiency. The demand for flour changes throughout the year and from year to year, both domestically and globally, so the miller tries to maximize production through buying from various geographic supply locations.

Sources of Wheat for California Flour Mills

The majority of the wheat processed by these flourmills is sourced from outside the state. The big mills buy anywhere from 80 to 95% of their wheat outside the state, while the two smallest mills buy close to 90% of their wheat from inside the state and usually in the same region. The millers need to obtain the kind of wheat

Table 34. California Wheat Flour Milling Firms, Location, and Capacities, 2000.

Location	Company	Milling Capacity (cwt/day)	Storage Capacity (bu)
Los Angeles	ADM	10,700	750,000
	Cargill	15,000	1,220,000
	Cereal Food Processors, Inc.	12,900	645,000
	General Mills	9,300	597,000
	Capitol Milling Co.	2,500	NA
Colton	Capitol Milling Co.	10,000	NA
	ConAgra	7,000	
San Bernardino	Cargill	18,500	900,000
Stockton	Cargill	11,500	850,000
Oakland	ConAgra	11,000	1,000,000
Modesto	Pendelton	3,000	NA
Vallejo	General Mills	15,200	NA
Hanford	Lacey Milling Co.	2,000	66,000
Fresno	Miller Milling	6,000	NA
	Totals	141,600	6,028,000

demanded from the flour food processor at the lowest cost possible that still meets the specifications of grade and acceptability. The millers said California harvest time is when they buy California wheat, supplies are abundant and prices lower. The millers contend Californian wheat has somewhat less favorable qualities than wheat from the plains states, but the prime difference is price. Even though the wheat from the plains states must be transported much greater distances, they can still get it cheaper than California wheat most of the year. This price disadvantage is several factors including farming costs (related to input prices), quantity supplied, and greater opportunity costs associated with producing wheat in California (*i.e.* alternative crops of higher value).

The Great Plains region produces massive amounts of wheat, which allows that region large economies-of-scale in wheat handling. Large economies-of-scale have led to

efficiency and lower production costs (Mac Phee and Peterson). The price of wheat is then bid down to a level with which other regions cannot compete. If a farmer were to start growing a relatively low value crop such as wheat, in place of a high value crop, the lost revenue is an important opportunity cost. For example, in the central coast region of California wine grapes have taken the place of barley and wheat grown in the past. Thus higher value wine grapes may have depleted the wheat grown in the area.[1] Land prices or rents have been bid up by the opportunity costs (alternative crop values) of growing wheat. This means that the cost of growing wheat in California is high is some regions, therefore, the low prices received for wheat cannot makeup for the added land rents and opportunity costs. Farmers being price takers in a competitive wheat farming industry, have no control over what the price will be. In the long run this price depressing affect may drive some farmers out of business.

The big miller also is able to lower costs, once again through economies-of-scale, by buying in large quantities and taking advantage of bulk transportation rates. This allows the big miller to source wheat from greater distances, including the wheat rich Great Plains. The smaller mills cannot achieve these transport rate economies-of-scale and do not have enough capital to store large amounts of wheat for future milling, therefore, a majority of their wheat is bought inside the state at the time of harvest.

For the feasibility study toll milling costs were evaluated (getting wheat milled into flour for us while retaining ownership of the product) versus implementing a new flourmill plant in California.

Toll Milling Research

Toll milling is the milling of wheat into flour while the owner of the wheat retains ownership of the wheat and the resultant flour. The merchant mill of today buys their own wheat and sells flour to the food processors. Doing this allows for greater run times,

[1]In some Central Coast counties the grain production depletion coincides closely with the 1986 Farm Bill's Conservation Reserve Program.

a must in such a small profit margin business, and it also gives the flour mill leverage and flexibility in milling and managing risk through the crush.

The short run decision analysis of whether to take on extra milling (in this case toll milling) is highly correlated with capacity. Again, a lack of product differentiation and the competitive nature of the industry have resulted in very small profit margins. A high volume must be produced and processed in order to receive a sufficient return for farmers and millers. While the optimal economies-of-scale are very large for the wheat producer, the miller also faces a need size and the attendant economies-of-scale. Schneider and Usset contend there is usually an optimal capacity level depending on the geographic region and distribution logistics for flour mills.

In 2000 an average US flourmill ran approximately 280 days annually and many mills operated more than 300 days per year. Most mill managers would seek even higher levels of operation, but are limited by the seasonal flour demand and volatile or erratic flour export opportunities that make further enhanced use difficult (Schneider and Usset). This raises the capacity issue. Because of the small milling margins received a mill has to produce as much volume as possible, so constant run time is theoretically optimal. If the mill is not running at capacity then there is opportunity to gain revenues.

Now the decision turns to relevant or differential costs. The relevant costs associated with taking on toll milling include the variable costs associated with milling flour. Beyond the basic low cost capacity point, the more flour a mill processes the higher the variable costs, but fixed costs remain the same no matter the flour volume. These fixed costs will occur regardless of milling volume and, therefore, are irrelevant in making the decision.

Toll milling is the recognition that the volume and capital requirements are too high for a firm's needs. Our estimates of toll milling based on Appendix, Table 5 calculations is between $1.57 and $2.50, which represents a reasonable range over the 2000-2001 period. This incorporates two standard deviations above and below the means of those two years' data collected.

Extra Costs Associated with Preserving Identity

Attention must be given to the extra costs associated with the identity preservation (IP) for niche market and specialized products. The future of the flour milling industry seems to be evolving towards IP or a value added supply chain management emphasis. IP in the organic wheat niche market is mandatory in order to meet government regulations and requirements associated with the organic label. This market involves toll milling because of this very identity-preserve problem.

> Identity preserved supply chains forego efficiencies present in commodity chains and imply extra logistical costs. Accurate assessment of direct and hidden IP costs is complicated by inherent difficulties in generalizing across grain supply chains (Maltsbarger and Kalaitzandonakes).

The IP supply chain theory is one that involves commitment from the seed through retail, but we will focus on extra milling costs. Some of those costs come in the form of opportunity costs of foregone marketing benefits as in the case of spreads. The mill tries to buy wheat at very low prices and wants to sell flour at the highest price available. If the flour market is low the miller sometimes stores the flour waiting for the market to rise and selling when it does. This storage capability allows the miller take advantage of these spread differences, but if the miller never owns the wheat or flour then these opportunities are bypassed. The downtime related to identity preservation in milling also has adverse affects. Sorting wheat, keeping track of identification, and start/stop machinery costs add to the overall variable costs of milling.

Maltsbarger and Kalaitzandonakes studied direct and hidden costs from the grain elevators' perspective and included coordination costs, segregation costs, and opportunity costs. These total IP costs ranged from 0.164 to 0.274 cents per bushel, depending on the size of the elevator and contract specifications. If IP persists in the future then parts of these costs will be passed on to the miller and this may lead to opportunity for toll milling.

Table 35. Estimated California Flour Milling Plant Costs of Production, 2002. *fn/d:/WheatProj/MillingCost.xls*

	Kansas-1998		California-2002		
	Total Cost	Flour Cost	TotalCos	Flour Cost	Basis for Change '98 to '02
Cost Item	$	$/cwt	$	$/cwt	
Payroll & benefits	1,579,769	0.5096	1,719,264	0.5546	15.9% USA avg hrly prdn wage `98-`02 up 15.9%
Payroll taxes	126,382	0.0408	192,177	0.0620	0.939 Calif/Kansas mnfg wage differential
Total Payroll	1,706,151	0.5504	1,911,442	0.6166	31.2% Calif>Kansas WC rates+Infl incr
Maintenance, materials, spare parts	260,000	0.0839	274,820	0.0887	1.057 Ag Outlook Table8-98to02
Utilities	678,900	0.2190	773,267	0.2494	Sacto Valley rate diff '02
Auto/truck expenses	12,000	0.0039	11,364	0.0037	0.947 Ag Outlook Table9-TranspServ USAtotal
Computing	10,000	0.0032	11,390	0.0037	
Dues & subscriptions	500	0.0002	570	0.0002	
Travel & entertainment	15,000	0.0048	17,085	0.0055	
Insurance	13,000	0.0042	14,807	0.0048	
Legal & accounting	25,000	0.0081	27,075	0.0087	1.083 Ag Outlook Table9-BusServ
Office supplies & post	24,000	0.0077	24,480	0.0079	1.020 Ag Outlook Table9-Supplies
Telephone	15,000	0.0048	15,465	0.0050	1.031 Ag Outlook Table9-Commun/H2O/Sewage
Subtotal-Other operating costs	1,053,400	0.3398	1,170,323	0.3775	
Total Variable Costs	2,759,551	0.8902	3,081,764	0.9941	
Debt repayment	1,350,000	0.4355	1,406,700	0.4538	360% RealPropCost Differential-Ka:Ca
Equipment depreciation	1,230,667	0.3970	1,230,667	0.3970	BLS Machinery PPI Unchanged 117.9 to 117.7
Building depreciation	188,750	0.0609	188,750	0.0609	
Real property taxes	5,260	0.0017	300,960	0.0971	4.776x Real PropTxDiff 1.1%:1.75%*(Land Diff)
Total Annualized Fixed Costs	2,774,677	0.8951	3,127,077	1.0087	
Total Costs	5,534,228	1.7852	6,208,841	2.0029	112.19% Calif 02 cost to Kan98

Sources:

1) S.P. Schneider and E..C. Usset, "Flour Production Costs at New and Old Mills. . .," Assn of Operative Millers Bulletin, Sept 2000, 7527-32.

2) Energy Information Administration-DOE, "Electric Sales and Revenue Data Tables," May 17, 2000.

3) Agricultural Statistics 2001, NASS-USDA, Tables 9-9 and 9-12. 4) Calif. State Board of Equalization, Property Tax Rates 1/1/02, Sacramento

5) Agricultural Outlook, "Tables 8 & 9- Producer Price Indexes & Price Indexes of Food Market Costs," June-July 2000 and 2002.

Entry Into Flour Milling

An obvious option is to consider entry into flour milling either by construction of a plant or its equivalent the purchase of an older mill that could be remodeled. The cost of new flourmill in California is addressed, while the latter is essentially a partial budgeting or incremental investment exercise involving a proportion of the costs of a new mill. In order establishing the costs specific to California a prototype mill evaluation for Kansas was evaluated and then adjusted to the current time period (2002) and location (California - see Table 35).

Schneider and Usset developed a model mill development cost scenario published in September 2000 based on 1998 Kansas costs. This was used as the basic model and then adapted to California for important real estate, energy, taxes, and labor cost differentials. Further the 1998 adjusted data was inflated to 2002 figures using producer price indicies.

New Plant Implementation Option: A Model Plant Proforma

The construction of the prototype current technology mill is presented in Tables 35 and 36. The costs were made specific for establishing a new plant in Central California in or near the Sacramento area in order to be located logistically near production and port facilities.

Depending on one's assumptions such a California mill would appear to be at a disadvantage relative to Kansas, excluding wheat raw material costs. The model mill would appear to have 12% higher costs for milling wheat in California in 2002 versus Kansas in 1998, but even the Kansas mill site cost would have been up 1.3% by 2002. The California mill site could expect a 10¢ disadvantage relative to Kansas in variable cost of flour milling. The Kansas flourmill came in at $1.785 per hundred weight fully costed, whereas the California mill (2002) was estimated at $2.003 per hundred weight of flour (see Table 35). The largest areas of cost differential were: payroll, payroll taxes, utilities, real property costs (see Table 36), and utilities costs. Actual mill labor costs in Kansas were running higher than California, but between wage inflation and payroll taxes

(especially workmen's compensation rates) California in 2002 loses out to Kansas in 1998. Many cost categories had virtually nil change between 1998 and 2002 in real terms.

Land costs were found to be nearly five fold higher in California, but in either case that was a small proportion of the total capital cost necessary, which exceeded $26 million in both states. Land costs were 1.1% of total capital needs in Kansas, but 5% in California (see Table 36).

Table 36. 2002 California Model Mill Differentials from Kansas Model 2000.

Daily Capacity: 10,000 cwt or 1million lbs

Capital Costs	Kansas	California
Land	300,000	1,400,000
Processing equipment	17,936,000	17,936,000
Lab & Office equipment	523,000	523,000
Building costs	7,501,000	7,501,000
Total Assets	26,260,000	27,360,000

Notes: Real Prop Value based on Kansas/California farmland differential

300000	8 acres w Hwy access	$37,500
5,260	Real Property Tax-Kansas	
1.75%		
1432800	8 acres with Hwy access	$179,100
111,042	Real Property Tax -Sacramento Co.	
7.75%	Source: California BoE	
1.10%	% of assessed value-Noel, *et al.*.	

The next two sections look more closely at other wheat value added opportunities of pasta, frozen dough, tortillas, and niche market offerings.

V. MAJOR VALUE ADDED PROCESSING ARENAS

The U.S Pasta Industry

Table 37. US Pasta Sales, Volume (in billions of dollars and units) for 52-Weeks Ending July, All Retail Outlets.

Year	1996	1997	1998	1999	2000
$ Sales	1.35	1.38	1.35	1.32	1.28
Sales Units	1.47	1.46	1.42	1.40	1.36

Source: Bakingbusiness.com, "Pasta Facts."

The data above shows slightly declining pasta sales in dollar amounts as well as unit sales over the 1996-2000 period. The four largest dry pasta-manufacturing companies have 57.1% of the US market share, while the eight largest companies maintain 74.3% of the market. The 20 and 50 largest pasta companies had 88% and 92.8% market share respectively. The Herfindahl-Herschmann Index for the 50 largest companies in dry pasta manufacturing in 1997 was 1321.5 (BOC-USDOC). All of the above measures indicate that the industry, if not oligopolistic is moving in that direction and recent mergers and sales of brands described below substantiates the trend toward increasing market concentration in this industry.

Ward's Business Directory of US Private and Public Companies in 1996 lists the five largest pasta companies as Borden Pasta Inc., Golden Grain Co., Nissin Foods, Noodles By Leonardo Inc., and American Italian Pasta Company (AIPC) The top three are subsidiaries, and the last two are private companies. Along with the consolidation trend found in many grain-based industries, in 2001, AIPC and the New World Pasta Company (NWPC) acquired several of the 1996 market leader Borden's Pasta brands (Schroeder 2001).

AIPC, the number one producer of private label pasta in the US and the number two marketer in the branded segment, is building a plant in Tolleson, Arizona. In February of 2002, the AIPC board approved a $45 million investment to build a

production facility at the Arizona site. This new site will be the first of its kind west of the Rockies. The new plant will open up the West Coast market and will allow AIPC to take advantage of Arizona's desert durum supply (*Milling and Baking News,* April 9, 2002).

AIPC President-CEO Webster has stated (*Milling and Baking News*, April 9, 2002) the advantages of the new site as,

> by locating our next [plant] capacity addition in the West, instead of adding capacity at our existing manufacturing locations, we generate significant logistics savings and provide superior service to our West Coast customers, while creating available capacity to support the continued rapid growth of our business sourced from our existing plants. Adding this strategic location will further enhance our low-cost producer leadership in the industry.

In its first phase of development the facility will have a capacity of 100 million pounds with eventual annual capacity of 300 million pounds. The AIPC plant will provide California producers of quality durum a market that is close-by, minimizing transportation costs. As a relatively small player in the overall durum market, California producers should be able to sell at North Dakota fob prices plus transportation costs from North Dakota to Arizona. In 1997 Arizona produced 8.2 million bushels of durum wheat. That same year California produced 12.4 million bushels of durum wheat (*Census of Agriculture 1997*).

While AIPC and other large pasta manufacturers are making capital investments and creating branded products to meet consumer demands, the industry as a whole still has some problems to conquer. "We still need to rationalize [increase concentration] capacity on the supply and demand side of the equation," according to T. Dodd, president and general manager of DGPC. Consolidation will help reduce supply and demand variations (Schroeder 2000).

Pasta manufacturers are seeing promotion as the key to success in the pasta industry of today. In the past they were selling to consumers emphasizing price. Now more and more, producers are realizing that in order to increase sales volume they need to focus on research and integrated promotional programs. Promoting the pasta category as a whole, through industry associations, and has been the target of many large marketers (Schroeder 2001).

An interesting observation is that the real profit in this industry comes from the Italian pasta equipment manufacturers. This is the reason Nestle's CEO Peter Brabeck pulled out of dry pasta manufacturing (Wetlaufer 2001).

> I pushed this company into the dry pasta business. It seemed like a brilliant idea at the time-a big market opportunity. There's a market for the center of the plate, I said, and we should be there. So, we looked for acquisitions, and in 1988 we found Buitoni, which seemed to be a good company to establish us in this new business.

Unfortunately, things did not turn out as well as Brabeck anticipated. Their biggest mistake in the preliminary stages was that they did not do research and analyze the industry enough. Brabeck said they failed to realize the competitive advantage was with the pasta machinery producer's proprietary technology, not the pasta producer. Because of this, Nestle found no sustainable advantage in this industry and eventually pulled out all together (Wetlaufer 2001).

With AIPC moving into the West Coast markets, it could be very challenging for potential competitors. AIPC's move to Arizona will provide them close access to Arizona and California supplies of Desert Durum® wheat, supplemented by supplies from the major durum growing areas of North Dakota and Canada. At the same time, the AIPC facility is strategically located close to many large consumer market places.

The dry pasta industry had a four firm concentration ratio (CR_4) of 57.1% in 1997. Today, with the mergers that have occurred in this industry over 60% of the market is controlled by the four largest firms. For a new entrant to successfully compete in this market would be very challenging. Additionally, the industry environment is plagued with over capacity, as well as declining unit and dollar sales, not a good prognosis.

The US Tortilla Sector

Results from a 2000 survey by the Tortilla Industry Association indicate the tortilla industry is the fastest growing segment in US baking. In 2000, US sales at

wholesale prices totaled more than $4 billion, representing a growth rate of 57% over the past four years.

Tortillas are the second highest selling product in the packaged bread category, even above bagels. Much of tortillas success is because Mexican food is becoming mainstream for US consumers. In 2001 US consumers purchased 7 billion pounds of tortillas, the equivalent to one tortilla per person per day (Tortilla Industry Association 2002). Tortilla sales have increased from $300 million in 1972 to $4 billion in 2000. The

Table 38. US Tortilla Sales Volume in Millions of Dollars and Units of Product for 52 Week Periods Ending in July, All Retail Outlets Combined, 1996-2000.

	1996	1997	1998	1999	2000
Sales $	$614	$641	$665	$723	$757
Sales Units	507	493	500	517	517

Source: *Bakingbusiness.com*, "Tortilla Facts".

strength and growth in the industry has greatly been due to growth in the foodservice area, increasing consumption by non-Hispanic populations, and alternative tortilla products such as flavored wraps (*Snack Food Magazine*, 1996). In 1997, tortilla sales remained strong due to the popular 'wrap' (California cuisine) and home meal replacement. At this time the top tortilla manufacturers were Azteca, Mission, Pinata, Guerrero, and Tyson (*Milling & Baking News*, 1998-v76).

Along with home-consumption, foodservice is also a large marketplace for the tortilla industry, which adds up to $2 billion of tortillas total sales. Helping the foodservice tortilla sales are food chains. Fast food chains like KFC and Subway provide this market with tortilla wrap sandwiches that are fast and convenient (Juttelstad).

In North America and Europe, the tortilla industry has had strong sales. Since 2000, tortillas are taking more shelf space in retail grocery stores than ever before. Even though flour tortillas have the largest share of the market, corn tortillas are gaining growth every year. The fastest growth region for tortillas is in the midwestern states. Like in most other food categories, growth in the tortilla segment is largely due to its convenience and health benefits (Stockwell).

The CR_4 for the industry is 57.2%, and the top eight companies accounted for 64.2 % of the market (BOC-USDOC). Like a lot of food processing industries, technology has taken over the production of tortillas. According to the American Institute of Baking (AIB), small, family run tortillerias have traditionally manufactured tortillas. Now, large corporations that can produce over 6,000 tortillas per hour dominate the tortilla industry. In 2001, equipment manufacturers were reporting back orders for machinery, this indicates that the industry is not slowing down rather it is growing. Its growth rate is reported to be 10 percent a year (*Milling & Baking News*, January 22, 2002).

As with most grain-based food processing industries, the tortilla industry has seen a number of mergers and acquisitions. In 1997,

- Azteca acquired the Mariachi label (NY) and the Cachita brand (Puerto Rico)
- Authentic Specialty Foods, Inc. in Texas acquired La Victoria, La Monita Food Products, and Sauces Unlimited and the Tortilla King, Inc. (1998).
- Mission Foods acquired the El Ranchito brand name (Mission is a subsidiary of Gruma USA).
- In 2002, Harvest States Foods purchased Casa Christina.

Industry experts feel that consolidation is the solution for food service buyers who are searching for local or regional facilities that can produce and deliver the product to new locations where the buyer is currently not located (*Baking & Snack Magazine* 1998). Although there is growth in this industry, it is increasing becoming dominated by large players, such as Gruma and Bimbo, who in fighting for retail shelf space pay enormous sums in slotting fees to obtain distribution. The industry is increasingly becoming bifurcated between industry giants and the small "mom and pop" operators who scurry after the small operators in retail and food service. The big companies are able to make the sizable investments in slotting fees to obtain supermarket distribution. This is hurting the smaller competitor's ability to obtain distribution, and adversely affects the diversity and quality of the product offering (*Baking & Snack Magazine*, 1998). Thus large barriers to entry exist in the tortilla sector.

Frozen Dough Manufacture[2]

The total market for frozen dough products covers retail grocery sales, food service (including in-store bakeries), and industrial (for pizza manufacture and other food processes that use frozen dough). The US Department of Commerce census figures show that the value of non-bread frozen bakery product (SIC 2053) shipments, which include pizza dough and bulk dough, increased 51.7 percent, from $1.67 billion in 1992 to $2.54 billion in 1996 (Holcomb 2000). At the retail level, frozen bread, rolls, and biscuits recorded annual sales of $266.2 million in 2000, an 18 percent year-to-year increase. In 1999, US food service sales of frozen bakery products exceeded $3 billion. Sales in supermarkets in 2001 reached $446 million for baked goods and $158 million for dough (*Bakingbusiness.com*). Overall, the frozen dough sector has experienced tremendous market growth.

As California wheat growers search for alternatives to increase returns from their crop production efforts, the frozen dough industry, in either the food service or industrial market, may offer an attractive option. This industry deserves assessment for two main reasons: the previously discussed market growth and its market structure. The frozen dough sector is less entry resistant than other baking industries, and many firms, small and large, have decided to enter this highly attractive market (Lou and Wilson 1998). Even though it has low barriers to entry, this segment does have significant market-entry costs, due to technological advances and high costs of product handling (Holcomb 2000).

The frozen dough product segment is the third largest segment in the baking industry. The market includes only a few large firms, none of which dominate, with the top four firms controlling only about 24 percent of the total market. In 1998, the top players in this industry were Rich Products (Buffalo, NY), Country Home (Shelton, CT), and The Pillsbury Company (Minneapolis, MN). The frozen dough industry is not necessarily only for the big players-several smaller manufacturers have successfully entered the market; at the same time other large food manufacturers like Quaker Oats and H.J. Heinz Company have left the frozen dough business to return to markets with which they are more familiar (Schroeder 1999).

[2] This portion of the study comes from the thesis work of J.A. Johnson, whose work was funded by this project.

Because Americans are leading busier lives, they are demanding more quick and convenient food items. The frozen dough industry has reacted by developing fast and easy alternatives to traditional bakery products. As consumer demands increase, food manufacturing industries strive to capitalize on these demands by creating up to 1,000 new products a year (Cook).

Success in the frozen bakery business is owing largely to the convenience of its products for both the consumer and the retailer. Not too long ago, most retail grocers had fully staffed in-store bakeries to supply their customers with fresh breads and pastries. Today most large grocers use centralized manufacturers to supply these products. This shift to outside manufacturing can be attributed to increased consumer demands, the high costs of maintaining an in-store bakery staff and equipment, and the scarcity of skilled labor (Reynolds).

Today, for example, Rich Products Corporation supplies Albertsons' stores with fresh breads. In California, Albertson's stores use par-baked dough manufactured in Rich's plant in Fresno. At the store, the bakery staff finishes baking the bread and sells it warm, fresh, and smelling like it just came out of the oven (Reynolds). This approach has become the norm for many large retail grocers, who are able to make even larger margins from their bakery products by avoiding the costs of maintaining a fully staffed bakery. An executive of Dawn Food Products (Jackson, Michigan), stated, "The benefit of a frozen dough plant is that the manufacturer is able to create a consistent level of quality while still maintaining portion control, factors that are not as easily maintained by retailers or in-store bakeries" (Schroeder 1999).

Convenience to consumers is also a major reason for the frozen dough business's successful growth. Greater utilization of frozen dough is related to increased consumption of meals prepared outside of the home. The USDOC states that in 1998, food consumption in the away-from-home category increased 1.6 percent. This was the largest increase in this category since a 2.8 increase in 1994. Today, food away from home accounts for 48 percent of the $311 billion expended for food in the United States (Schroeder 1999).

There are three terms used in the refrigerated and frozen dough industry that describe the manufacturing processes bread products go through. "Baked-off" refers to

refrigerated and frozen dough that must be thawed, proofed, and baked. "Thaw-and-sell" refers to fully baked products that are frozen, thawed, and slightly heated or sold ready-to-eat. "Par-baked" refers to dough that is partially baked, frozen, thawed, and baked before sold (Kulp, Lorenz, and Brummer).

One key to success in a market like this is innovation. Important developments in the advancement of the frozen dough category have come from new technologies, such as improved dough make-up lines, freezing techniques, and freezer ovens that require no proofing. What separates the frozen dough sector from the fresh baked and bakery mix category is the capability of frozen dough manufacturers to adopt technological innovations that produce consistent and quality products. Another key to success in this industry is the ability to decrease labor costs. New technologies, such as the ones listed above, have allowed those in the industry to minimize labor costs. The future of the frozen dough industry is promising. As long as the trend for meals prepared outside of the home continues, this sector is likely to grow. As the frozen dough industry expands, capital investment and product quality, driven by new processing technologies, will become crucial (Schroeder 1999).

The method of research in this analysis comprises mainly gathering primary and secondary information on the frozen and refrigerated dough industry and the investments needed to form a cooperative processing plant. Primary data was collected from frozen dough manufacturers and cooperatives, industry consultants, business professionals, and government agencies. Secondary data was collected from various trade journals, and university and government publications.

To determine the necessary investment costs of creating a frozen dough manufacturing cooperative, information on the necessary land, building, and equipment costs will be collected. Along with the physical costs, information on start up costs, such as legal formation, fees and permits, and accounting will be obtained. Current workforce and managerial salary estimates, along with current market prices for product ingredients, and inputs, overhead, and the processed end product will be determined from available sources. All of the information collected on the investment and costs of running a frozen dough manufacturing facility came from the most current sources available. This data

was collected to determine the investment returns, discounted cash flow analysis, and potential profitability to arrive at an internal rate of return for this investment.

This analysis examined the investment costs associated with the creation of a new cooperative, including the facility and the operational costs associated with frozen dough manufacturing. Several industrial parcels were located as potential sites for the facility (Johnson). The proposed facility will be located near the Interstate 80 corridor between Fairfield and Sacramento, California, chosen due to its relative proximity to major consumer markets. Three major markets surround the proposed location: Sacramento/San Joaquin Counties, population: 1.7 million; Reno – Carson City, population: 436,000; and the San Francisco Bay area, population: 6.6 million (US Census, 2001). Due to the cost of shipping and the perishable qualities of the product, it is necessary to locate production where it is cost efficient to ship to major markets, while maintaining product quality. For example, Spring Wheat Bakers (SWB) from Fargo, North Dakota, located their production facility outside Atlanta, Georgia, to take advantage of the large populations and potential consumer markets there.

The chosen site will occupy a 30,000 square-foot facility, including 27,000 square feet of factory and 3,000 square feet of office space. The facility's construction cost was determined with reference to *Means Square Foot Costs* (2001). The construction costs include all necessary fixtures for the facility except for the equipment and supplies. The cost of outside improvements, such as landscaping and parking lots, has also been calculated. Equipment costs, including installation of all systems of production, are estimated at $11.7 million (Johnson).

The cooperative would produce pre-proofed frozen dough for roll bread products from the wheat of member-growers. A 15-person workforce would be needed for each eight-hour shift of production, plus the necessary production management (Holcomb 2001). Production for years one and two is estimated to be 8,415,000 pounds of dough, increasing to 22,440,000 pounds in years three through seven. To fill these production demands, 63,400 hundredweights of wheat would be needed in years one and two, and 169,068 hundredweights in years three through seven. The average cost of California wheat over the last five years has been $6.81 per hundredweight (USDA Market News).

This price will be used as a "fair market price" in calculating flour costs and establishing a transfer price for grower/members delivering wheat to the cooperative.

The considerable cooperative formation fees will be included in the total investment costs (see Table 39). Legal fees for forming the cooperative totaled $70,000, and cooperative organizational costs are estimated at $100,000. Operating capital, the cash needed to run the operation and pay bills and salaries, is calculated as one-sixth of the combined total of cost of goods sold, general and administrative expenses, and

Table 39. Legal Fees For Establishing a Cooperative in California.

Fees	Item Description
$3,000 to $15,000	*Articles of Incorporation and Bylaws.* This document determines the cooperative's structure and how it will be governed, including procedures for naming the board of directors and determining their authority, the dividend policy, and voting rights. The fees for this service range from $3,000 to $15,000 depending on the size of the cooperative and type and size of law firm used. A larger law firm will generally be more expensive and less cost conscious.
$20,000 to $50,000	*Prospectus and Exemptions*. The prospectus provides all material information about an offering of securities and is the primary sales tool of the company that issues the securities (called the issuer) and of broker-dealers who market the offering for the issuer (called underwriters). The prospectus is also a legal document that protects the issuer and underwriters because it serves as written proof that investors were given all of the material facts as they are set out in the prospectus. After a business plan is developed, a lawyer creates the prospectus based on two- or three-year financial projections. This prospectus is then delivered to all potential investors. Issuance of membership interests must meet federal and state regulations, and the cooperative must meet the requirements for exemptions.
$3,000 to $5,000	*Opinion Letter*. This is the attorney's assurance that the cooperative meets all exemptions and has disclosed all necessary information to the investor.
$26,000 to $70,000	Total Formation Legal Fees

Source: M. Holman.

marketing costs. For the proposed cooperative, two months of operating capital is estimated at $580,000 (Holman 2001).

In addition to the nominal state-filing fee of $100, the various legal fees involved in the formation of a new cooperative are explained below. Brokers handle most issues, but a land-use attorney is needed to deal with environmental issues and secure permits for water use, waste, occupancy, and building. The ability to obtain the needed permits should be a condition for the purchase of the property. Regional land-use attorneys are more expensive than business attorneys, charging fees of around $300-$350 per hour. In some cases an environmental consultant is also needed.

The land-use attorney would first perform a "land-use audit" to assess and determine the necessary government permits. Such an audit lists the previous use(s) of the property and the permits that have been granted there in the past. A "land-use audit" would cost $5,000 to $10,000 and property permits would cost about $10,000 to $20,000.

Table 40. Investment Costs for a Cooperative Frozen Dough Plant in Northern California.

Organization Costs	
Cooperative Organization (estimated)	$ 100,000
Legal Fees[a]	
Cooperative Formation	70,000
Land-Use Audit	5,000
Land/Building Permits	10,000
Physical Assets	
Land [b]	300,000
Building [b]	2,285,250
Outside Improvements [b]	170,000
Equipment [b]	11,770,000
Office Equipment (Estimated)	50,000
Capital	
Two Months Operating Capital	580,000
Total Investment	$ 15,340,250

Source Notes: [a] M. Holman; [b] Johnson.

Obtaining these permits in the Sacramento Valley should be easier than it would be in some areas, Napa County or San Luis Obispo County. For instance, if the property is in an industrial park, these cost estimates would tend to toward the lower end, since industrial parks usually have agreements set up with the government as to the types of uses allowed for the land, making the process of applying for permits much easier and less expensive (Holman 2001).

The building contractor would develop the construction contract that is included in the total cost of the building. A business attorney would review the contract for the client, for a legal fee of around $500-$1,000 (Holman 2001).

Given a production range of 3,000 to 7,000 pounds of dough per hour for a multi-product line (Naegele; Johnson), a line of the size proposed in this study is estimated to average 5,500-pounds-per-hour throughput. Full production for one eight-hour shift would generate 11,220,000 pounds of dough annually (see Table 40).

Basis For Revenue Calculations

A new frozen dough facility can take as long as 18 to 30 months to reach full commercial production capability (Sayler 2001). To maintain the conservative, low risk nature of this study, during the first two years the plant will be budgeted to run for one eight-hour shift per day at 75 percent production capacity, producing 4,125 pounds of dough per hour. This would allow the cooperative time to develop markets for the end product and also to address logistical and mechanical problems in the plant. Therefore, production for each of the first two years would yield approximately 8,415,000 pounds of dough. Due to the learning curve, it is assumed that the plant produces less than this at the start of the first year and eventually increases production to exceed this amount at the end of the second year.

The estimated revenue the plant will generate is determined by product prices. The average of eight FOB prices quoted by the Bridgford price list for an assortment of roll bread products, $0.63 per pound, is used to estimate the plant-generated revenue (Bridgford Price List- from Johnson). In the first two years of operation, assuming that

Table 41. Calculation of Revenue, Reduced Production First Two Years for a California Wheat Cooperative Frozen Dough Plant.

Percentage of Production	100 %	75 %
Eight-hour shifts per day	1	1
Hours per week	40	40
Hours per 51-week year	2,040	2,040
Pounds per hour	5,500	4,125
Pounds produced	11,220,000	8,415,000
Annual revenue at $0.63 per pound for roll dough	$ 7,068,600	$ 5,301,450

100% of production will be sold and there would be no leftover inventory, revenue would be $5,301,450. In the third year of production the plant would increase production to a full capacity rate of 5,500 pounds per hour for 16 hours a day (two shifts). During years three through seven the plant would produce 22,440,000 pounds of dough annually. The expected annual revenue generation for years three through seven is $14,137,200. These calculations are detailed in Table 42.

Table 42. Calculation of Revenue for Cooperative in Northern California.

	Years 1 & 2	Years 3 – 7
Eight-hour shifts per day	1	2
Hours per week	40	80
Hours per 51-week year	2,040	4,080
Pounds produced:		
Years 1 & 2 - 4,125 lbs/hour	8,415,000	
Years 3 to 7 - 5,500 lbs/hour		22,440,000
Annual revenue at $0.63 per pound for roll dough	$5,301,450	$ 14,137,200

In other organizations, such as SWB, because of the size and specific product focus, plant start-up took longer and cost more than expected. The average 18-to-30-month start-up time is needed for trial and error when working with a multi-variety production line (Sayler). For the purpose of this study, production has been limited to five days a week. In most cases, manufacturing facilities eventually increase production to six or seven days a week.

Dough is 55 percent flour; the remaining ingredients are mostly water, with a small percentage of added ingredients such as yeast (Holcomb 2001). The USDA/NASS estimates that when wheat is milled, the extraction rate of the flour is 73 percent, meaning that each pound of flour requires 1.37 pounds of wheat (USDA-ERS, *Wheat Yearbook 2001*).

If 8,415,000 pounds are produced in years one and two, then 55 percent of that amount, 4,628,250 pounds of flour (46,282 hundred-weights), will be needed. Given a 73 percent extraction rate, 46,282 hundredweights of flour will require 63,400 hundredweights of wheat. Based on the five-year average wheat price, the cost of wheat in years one and two is $431,754. Toll milling charges were calculated from industry gross milling margins (Johnson). At an average rate of $2.20 per hundredweight flour, toll milling for year one will be $101,820.

For the estimated 22,440,000 pounds of dough in years three through seven, 12,342,000 pounds (123,420 hundredweights) of flour per year will be needed. To produce this amount of flour requires the milling of 169,068 hundredweights of wheat. The annual cost of wheat for years three through seven is estimated at $1,151,353. At an average charge of $2.20 per hundredweight flour, toll milling will cost $271,524 for years three through seven (see Table 43). The cost of additional ingredients, such as yeast and preservatives, is estimated at ten percent of total raw material plus toll milling.

Value Added Products, Inc. of Alva, Oklahoma, provided the costs of packaging. For baguette-sized frozen dough, packaging includes box cases, plastic bag lining, inner case lining, shrink-wrap, and pallets (Blundell).

Production salaries include the 15-person labor force to produce the dough and the production management team. Production management includes the plant engineer, quality control manager, shift manager, and plant manager. When the plant increases

shifts from one to two a day, the salaries for production management and labor costs will double.

Energy costs will vary directly with the level of production. Although energy prices historically have fluctuated wildly, moving from one to two shifts in year three should at least double the amounts estimated in Johnson. Table 44 summarizes the total annual cost of goods sold for years one and two and for years three through seven.

Table 43. California Frozen Dough Plant Wheat Flour Use Calculations.

Assumptions:

- Dough is made up of 55% flour (Holcomb, 2001).
- The extraction rate of flour from wheat is 73% (USDA).
- Average toll milling charge is $2.20 per cwt flour (Johnson).
- Average California red winter wheat price is $6.81 per cwt (Johnson).

	Years 1 & 2	Years 3 – 7
Annual targeted dough production, in pounds	8,415,000	22,440,000
Flour component of dough (55 %):		
In pounds	4,628,250	12,342,000
In hundredweights (cwt)	46,282	123,420
Wheat needed, at 73 % extraction rate, in cwt	63,400	169,068
Wheat cost, at $6.81 per cwt	$ 431,754	$ 1,151,353
Toll milling charge, at $2.20 per cwt of flour	$ 101,820	$ 271,524

General and administrative costs are those that are not directly related to production. These costs include management, clerical, administrative, accounting, and marketing salaries. Office supplies, legal fees, property taxes, and maintenance also fit under this category. Table 45 summarizes the general and administrative costs.

No standard benchmark is available for budgeting of continuing legal fees, which would be dependent on a firm's legal activity and the likelihood of lawsuits against it. At least $2,000 should be budgeted annually for legal fees, to cover a business attorney's performance of an annual audit and attendance at annual board of directors' meetings. In

the annual corporate audit, the attorney reviews authorizations for the board's activities to make sure all activities were conducted under correct authority and ratifies the board's minutes.

These legal procedures provide protection for the board of directors. Usually, business attorneys that specialize in cooperatives are engaged for these tasks (Marks 2001).

Table 44. Cost of Goods Sold for Frozen Dough Manufacturing.

	Years 1 & 2	Years 3 – 7
Raw Material		
Wheat (Table 43)	$ 431,754	$1,151,353
Toll Milling Charges (Table 43)	101,820	271,524
Ingredients (10% of above costs)	53,357	142,288
Packaging – (VAPC, OWC)[a]	361,758	964,692
Direct Labor [a]		
Labor	643,365	1,286,730
Production Management:		
Plant Manager	159,500	319,000
Plant Engineer	130,500	261,000
Quality Control	116,000	232,000
Shift Manager	108,750	217,500
Energy [a]	45,040	90,080
Total Cost of Goods Sold	$2,151,844	$4,936,167

Notes: [a]J.A. Johnson.

Accounting fees pay for an outside certified public accountant to prepare annual audits, year-end statements, and tax reports for the cooperative. First year returns and audits generally take longer and require more time of the accountant. Budgeted accounting costs for the first year-end will be slightly higher. First year and continuing accounting fees were estimated to be $27,000 and $25,000 respectively (Marks).

Insurance costs remain the same for years one through seven. This insurance covers liability of the land, building, equipment, and cooperative (Capponi and Johnson). Total company and plant annual insurance costs are estimated at $102,000. The property tax rate for commercial property in the proposed plant locations averages 1.1 percent. The tax, which applies to the value of land, building, and improvements, would equal about $29,000, rounded to $30,000 to allow for annual 2 percent increases (Sacramento and Solano County Assessor's Offices 2001). Building maintenance costs are estimated to be around $50,000 per year.

Table 45. Frozen Dough Plant General, Admininstrative and Marketing Costs.

Cost Item	Years 1 & 2	Years 3 to 7
Salaries (Smith, Johnson):		
General Manager	$ 232,000	$ 232,000
Controller	94,250	94,250
Receptionist	44,370	44,370
Office Secretary	44,370	44,370
Administrative Assistant	50,750	50,750
Accounting/Payroll Manager	72,500	72,500
Office Supplies	3,000	3,000
Legal Fees (Holman)	2,000	2,000
Accounting Fees (Marks, Johnson)	27,000	25,000
Insurance – (Capponi, Johnson)	102,000	102,000
Property Taxes	30,000	30,000
Building Maintenance	50,000	50,000
Total General and Administrative Costs	752,240	750,240
Marketing Costs:		
Marketing & Sales Manager (Johnson)	174,000	174,000
Brokerage Fees (Margaroli)	159,043	424,116
Trade Allowances	159,043	424,116
Travel Expenses	50,000	50,000
Consulting Fees	25,000	25,000
Total Marketing Costs	567,086	1,097,232
Total General, Admin., & Marketing Costs	$ 1,319,326	$ 1,847,472

Notes: Sources in parentheses.

Marketing costs include the cooperative's in-house marketing manager's salary and travel expenses, trade allowances, brokerage fees paid to independent brokerage firms, and consulting fees. Brokerage fees, commissions that brokers receive on product sales, are estimated at three percent of the manufacturing facility's annual revenue (Margaroli).

Trade allowances, including advertising and trade shows, are also estimated at 3 percent of annual revenue. Travel Expenses are budgeted at an estimated $50,000 per year and consulting fees at $25,000 per year. The income statement consists of annual revenue, cost of goods sold, and general, administrative, and marketing costs. Gross profit is calculated by subtracting the costs of goods sold by the revenue. Gross profit is reduced by general, administrative, and marketing costs to yield net income. The income statement (Table 46) shows calculations for years one and two and for years three through seven. The annual net income for the two time periods is approximately $1.8 million and $7.4 million respectively.

Depreciation is not included in this study's financial analysis. In an investor owned firm depreciation provides a tax-shield at the rate of the entity's tax rate. That is, if a corporation's tax rate is 50 percent, each dollar of depreciation shields $0.50, thus increasing the cash flow; however, a farmer cooperative's net income is usually taxed according to the single-tax principal. This means that under federal tax law, the cooperative's income is taxed at either the cooperative level or at the patron level. Cooperatives are seen as nonprofit extensions of patrons-owner members. Because of this, cooperatives, as defined under subchapter T of the Internal Revenue Code 521 (Cobia), pass their net proceeds on to their patrons and do not pay federal income taxes.

Because of farmer cooperative tax laws, this study does not include depreciation in the cash flow analysis and discounted cash flow investment analysis; however, it does include the undepreciated original investment (see Table 47). It should be noted that in operational accounting, the cooperative would depreciate assets that are depreciable according to normal accounting standards. Depreciation would be included as an expense and subtracted from total sales to arrive at net income.

The present value method discounts future revenues of a proposed project in order to compare the present value of future benefits with the present value of capital outlays.

Table 46. Frozen Dough Plant Income Statement Proforma Annualized.

	Years 1 & 2	Years 3 – 7
Revenue (see Table 42)	$5,301,450	$14,137,200
Cost of Goods Sold (see Table 44)		
Raw Materials	431,754	1,151,353
Toll Milling Charges	101,820	271,524
Ingredients	53,357	142,288
Packaging	361,758	964,692
Labor	643,365	1,286,730
Production Management	514,750	1,029,500
Energy	45,040	90,080
Total Cost of Goods Sold	2,151,844	4,936,167
Gross Profit	3,149,606	9,201,033
General & Administrative (see Table 45)		
Salaries	538,240	538,240
Office Supplies	3,000	3,000
Accounting Fees	27,000	25,000
Legal Fees	2,000	2,000
Insurance	102,000	102,000
Property Taxes	30,000	30,000
Factory Maintenance	50,000	50,000
Total General & Administrative	752,240	750,240
Marketing Costs (see Table 45)		
Marketing/Sales Mgr.	174,000	174,000
Brokerage Fees	159,043	424,116
Trade Allowances	159,043	424,116
Travel Expenses	50,000	50,000
Consulting Fees	25,000	25,000
Total Marketing	567,086	1,097,232
Total Expense	1,319,326	1,847,472
Net Income	$1,830,280	$7,376,141

Table 47. Present Value Analysis of Northern California Cooperative Frozen Dough Plant.

	Net Income	PVF	Loan Rate 8.00% PVF Cash Flows	PVF	25% Earning Rate PVF Cash Flows
Investment	(15,300,000)				
Year 0		1.000		1.000	
Year 1	$1,830,280	0.926	$1,694,839	0.800	$1,464,224
Year 2	1,830,280	0.857	1,568,550	0.640	1,171,379
Year 3	7,353,561	0.794	5,838,727	0.512	3,765,023
Year 4	7,353,561	0.735	5,404,867	0.410	3,014,960
Year 5	7,353,561	0.681	5,007,775	0.328	2,411,968
Year 6	7,353,561	0.630	4,632,743	0.262	1,926,633
Year 7	7,353,561	0.583	4,287,126	0.210	1,544,248
			$28,434,629		$15,298,435
			($15,300,000)		($15,300,000)
Net Present Value			$13,134,629		($1,565)

An alternative to the present value method is the internal rate of return, yield, or earning power. The yield is the discount rate that equates the present value of expected cash flows with the expected value of the expected inflows.

This project's present value analysis has been computed using two return standards, 8 percent and 25 percent. The 8 percent discount rate is the fixed rate cost of credit suggested for an investment of this size and duration (Pearce). This 8 percent yields a net present value of $13.1 million. The 25 percent discount rate yields a negative $1,565 or essentially the investment's internal rate of return (Table 47).

Because this study only looks at current costs and price figures, a sensitivity analysis was done to see how sensitive this investment was to fluctuations in costs and prices. Given the study's revenue and cost of goods sold for years one through seven, the sensitivity analysis adjusts these figures by ten and fifteen percent in either direction. Table 48 outlines four different scenarios in the sensitivity analysis for years one and two, and three through seven. With this study's net income at $1,830,280 increasing costs by ten percent (scenario one) decreases net income to $1,615,096. Decreasing revenue by ten percent (scenario two) decreases net income to $1,300,135. With a combination of these two scenarios (scenario three) happening at the same time, net

income decreases to $1,084,951. When one decreases revenue and increase costs by fifteen percent (scenario four), net income decreases to a low point of $712,286.

The same scenarios apply in Table 49 for years three through seven. Increasing the costs of goods sold by ten percent (scenario one) would decrease net income by almost $500,000. Decreasing revenue by ten percent would decrease net income by $1.4 million. The most significant scenario is when costs of goods sold were increased and revenue was decreased by fifteen percent (scenario four), which resulted in a net income decrease of $2.8 million. This sensitivity analysis demonstrates that market fluctuations

Table 48. Sensitivity Analysis for Revenue and Costs of Goods Sold Affecting Net Income.

Scenario Years 1 & 2	Base Case	#1 Increase COGS 10%	#2 Decrease Revenue 10%	#3 Combination #1 & #2	#4 Increase COGS Decrease Revenue 15%
Revenue	$5,301,450	$5,301,450	$4,771,305	$4,771,305	$4,506,233
COGS	2,151,844	2,367,028	2,151,844	2,367,028	2,474,621
Gross Profit	3,149,606	2,934,422	2,619,461	2,404,277	2,031,612
General & Admin.	752,240	752,240	752,240	752,240	752,240
Marketing	567,086	567,086	567,086	567,086	567,086
Net Income	$1,830,280	$1,615,096	$1,300,135	$1,084,951	$712,286

Scenario Years 3 - 7	Base Case	#1 Increase COGS 10%	#2 Decrease Revenue 10%	#3 Combination #1 & #2	#4 Increase COGS Decrease Revenue 15%
Revenue	$14,137,200	$14,137,200	$12,723,480	$12,723,480	$12,016,620
COGS	4,936,176	5,429,794	4,936,176	5,429,794	5,676,602
Gross Profit	9,201,024	8,707,406	7,787,304	7,293,686	6,340,018
General & Admin.	750,240	750,240	750,240	750,240	750,240
Marketing	1,097,232	1,097,232	1,097,232	1,097,232	1,097,232
Net Income	$7,353,552	$6,859,934	$5,939,832	$5,446,214	$4,492,546

in product prices and raw materials can have a dramatic impact on the net income and financial feasibility of this cooperative. However, even with the “worst case” scenario of a decline in revenue of 15 percent and increasing costs of goods sold of 15 percent, the

Table 49. Frozen Dough Plant Present Value Sensitivity Analysis, 8% Cost of Money, All Income and Cash Flow Figures in Dollars

	Scenario 1		**Scenario 2**		**Scenario 3**		**Scenario 4**	
Net Income	PVF	PVF Cash Flows	Net Income	PVF Cash Flows	Net Income	PVF Cash Flows	Net Income	PVF Cash Flows
	1							
$1,615,096	0.926	$1,495,579	$1,300,135	$1,203,925	$1,084,951	$1,004,664	$1,035,063	$958,468
1,615,096	0.857	1,384,137	1,300,135	1,114,216	1,084,951	929,803	1,035,063	887,049
6,859,934	0.794	5,446,788	5,939,832	4,716,227	5,446,214	4,324,294	5,232,972	4,154,980
6,859,934	0.735	5,042,052	5,939,832	4,365,777	5,446,214	4,002,968	5,232,972	3,846,234
6,859,934	0.681	4,671,615	5,939,832	4,045,026	5,446,214	3,708,872	5,232,972	3,563,654
6,859,934	0.63	4,321,759	5,939,832	3,742,094	5,446,214	3,431,115	5,232,972	3,296,772
6,859,934	0.583	3,999,342	5,939,832	3,462,922	5,446,214	3,175,143	5,232,972	3,050,823
		26,361,272		$22,650,187		$20,576,859		$19,757,980
Less Investment		($15,300,000)		($15,300,000)		($15,300,000)		($15,300,000)
Net Present Value		$11,061,272		$7,350,187		$5,276,859		$4,457,980

investment returns almost 4.5 million in discounted cash flow using an 8 percent cost of funds (Table 49).

Table 49 presents the net present values of the investment given the four different sensitivity analysis scenarios and using the cost of credit discount rate of eight percent. Each scenario yields a different net present value, ranging from 11 million to 4.49 million. This shows what the net present value of the 15.3 million investment would be for each possible scenario, given the 8 percent cost of credit.

All projections such as costs, revenues, production capability, start-up time, and investments are conservative, realistic, and based on the best information available at this time.[3] This study uses the lower end of possible throughput for production projections, and for investment and operational costs, reports the higher end. When years three through seven approach, it is likely that most of the major variables, such as energy, raw material, and labor costs, will have changed. The frozen dough industry also has the potential for overcapacity, which may result in downward pressure on prices and a squeeze on profit margins.

For this analysis, a one-pound bread loaf is used to calculate revenues and costs of goods sold. In reality, the proposed frozen dough manufacturing facility will be capable of producing a variety of value-added end products. Revenues and costs of goods sold will vary as other product categories, such as croissants and cinnamon buns, are added to the production line. It is most likely that these other bread categories will have higher costs of goods sold due to the added ingredients needed for them. Croissants require butter or vegetable shortening and cinnamon buns require sugar, raisins, and spices, which will significantly increase their costs of production. In return, the prices received for these products will also be higher.

The purpose of evaluating the financials of a frozen-dough manufacturing facility was to determine if it would be an economically favorable investment. The best indicators of profitability are in the income statement and the present value analysis. It

[3] SWB had difficulties since their 1997 beginning, although they claim the situation will improve. Because they were not able to predict all problems in their operation, they were short in operating capital before they reached full capacity. In 2001, SWB started an equity drive to raise operating capital for the company's cash flow, going to its members and asking for between $1.5 and $4 million in new capital. For the first few years, the company was spending money to get production up to par. They are ready to start turning profits in 2002, with production at full capacity and a list of new customers. Projected profits are $1.7 million for 2002 and $3.45 million for 2003 (Sayler – see Appendix 13).

should also be recognized that this analysis is neutral as to the method of financing the required investment. That is, the amount of debt financing, which will impact costs and cash flow, is not considered.

The results of this research show that it is feasible and profitable for wheat growers to increase profit margins by investing in frozen dough manufacturing. If California wheat growers were to invest in a frozen dough-manufacturing cooperative, they would benefit from the experiences of other previously established cooperatives. The annual growth rate of 15 percent in par-baked and frozen dough products, along with ease of entry and the observation that the industry is not suffering from over capacity, make this sector attractive. Annual cash flow analyses show that the facility would have a positive cash flow. Present value analysis indicates this investment with its stated and implicit assumptions has an internal rate of return of almost 25 percent. The higher the internal rate of return makes the investment more attractive for investors. On the other hand, this rate may appear to be unrealistically high. Industries with high rates of return often attract many investors and participants to the industry, which in turn may cause the rate of return to decrease. Also, note that transportation and storage costs of the wheat, flour, and end product are not included in this analysis.

With this type of investment, California wheat growers would increase their profit margins by forming a cooperative to add value to their crops, through the manufacturing and marketing of frozen dough products.

Issue of Market Access

Gaining market access is an important objective to take into consideration before production begins. Also, having a confident and patient customer base during the facility's start-up phase can be an important asset. SWB credit their success to obtaining customers like Rich Products Company and Quizno's, a nationwide submarine sandwich retailer. SWB made it a priority to find customers whose needs match their production capabilities. SWB chairman stated, "Our plant is particularly suited to making their [Quizno's] product, which is a long French loaf, or baguette." SWB are under a

manufacturing contract with Quizno's, as well as with the 227-member Mountain View Harvest Cooperative, which operates Gerard's Bakery in Colorado (Sayler).

The Value Added Products Center (VAP), a farmer owned closed cooperative with a state-of-the-art frozen dough-manufacturing facility in Alva, Oklahoma, markets their pre-proofed pizza crusts nationally using manufacturing contracts and broker/customer relationships. VAP is aware of the need to be flexible and is planning on eventually carrying a more varied product line (Blundell, Gorton). Going beyond manufacturing contracts is also in the plans for SWB, who will soon look for national chain accounts. This will allow SWB to supply customers with higher volumes and limited product needs through direct wholesale marketing. These products will be marketed to grocery chains and to regional distributors for resale.

Although the investment for a value-adding cooperative is high, it appears to be feasible in terms of returns. Knowing about the problems that similar cooperatives have faced in the past can benefit a future cooperative in terms of what to expect in the process of creating and running such an investment. Keys to success appear to be finding and maintaining a knowledgeable management team, conservative financial and production forecasts, and obtaining strong buyer alliances prior to the development of a production line. Since it is hard to differentiate frozen dough from other manufacturer's frozen dough, focusing on service or niche markets may be the way to set the cooperative apart from other manufacturers.

VI. Market Niche Opportunities and Food Processor Flour Use

Table 50. Exploratory Study of California Firm's Wheat Containing Food Products, Excluding Frozen Foods, from Three Central Coast Retail Stores.

Scolari's 294 (30%) Albertson's 401 (40%) New Frontiers 261 (30%) = Total 956 Items
Net Food Items = 842 (w/o replicates)

				Wheat Food Categories (Items/% by Category)								
Avg Wt(oz)	Avg Price	Organic	Organic Flour	Snack	Ingred	Meal Cmpon't	Whole Food	Sweet	Bagels Bread	Crackers Cookie	Cereal	Pasta
13.1	2.71	93	198	31	48	53	82	87	246	174	39	82
		11%	24%	4%	6%	6%	10%	10%	29%	21%	5%	10%

Source: Cal Poly State University, 2002; see Appendix Table 8 for a full listing by firm and share of products.

Wheat Containing Processed Food Products

An exploratory[4] retail inventory survey was conducted of "California made" (*i.e.* California labeled) wheat containing food products, excluding frozen foods, at three Central Coast retail stores. The study found a cumulative 956 wheat containing food items from 102 firms with only 114 overlapping items. Thus 842 total wheat containing food products were processed, or made in California. The largest count of products was in the leading national/multi-regional chain, which had nearly 400 California made wheat containing food products. These were identified by in-store inventory, of three central coast retailers, which included a leading national chain store, a regional chain, and a regional organic retailer. Of all products found 11% were labeled as totally organic and 24% contained organic wheat ingredients (see Appendix, Table 6 for product list).

[4] No attempt was made at random selection of the area or retail stores, this was exploratory in the broadest sense. All three are established retailers from well-established sub-markets (national chains, regional chains, and organic health food regional firms). This assumes that product availability is uniform across the same retailer's stores in other areas of California.

The products were categorized by type, with the leading product area being bread, or bread equivalent products. These included bread, tortillas, bagels, muffins, or other bread like products, which constituted 246 items or 29% of all offerings found (see Table 50). There were 174 cookie and cracker offerings accounting for 21% of products were found, and 87 sweet roll type items or other wheat containing confections, accounting for 10% of the products. The categories of pastas and whole foods (*e.g.* energy bars or meal substitutes) each had 10% of the wheat containing foods from California firms. Wheat in food ingredients, items used in making some other food preparation, and food components categories numbered 48 and 53 products respectively, each 6% of the total. Ready-to-eat or cooked-type cereals tallied 39 items, 5% of the total. Snack items, at 32 products (4%[5]), were the smallest product categories. No attempt was made to establish the product shelf space area commanded by each of the products.

From this very limited exploratory retail store sample, the four largest manufacturing firms in terms of product offerings were 1) Mother's/Archway Cookies (78 products), Health Valley (51 products), Golden Grain (44 products), and Sara Lee Bakery (38 products). Appendix Table 6 has a complete listing of the firms and their product offerings. These four firms produced 211 (25%) of the 846 total wheat containing "California made" products found. All of the top four firms were on the *Milling and Baking News* processor list, as were 6 of the top 10 firms in terms of products or items found. The top 8 firms had 321 (38%) of the product count, the top 12 firms 409 (49%), and the top 20 firms had 541 (nearly 65%) of the 846 total product count.

California (labeled) food processors of wheat containing food products would not appear to be a highly concentrated market, although those measures are usually based on sales dollars by firm within a product category. No attempt was made to record retail store shelf space accorded the products, nor measure shopper traffic at any of the three stores.

What these results suggest is that there could be well over 240 California firms or food processing plants supplying, perhaps, over 1000 individual wheat containing food product items. The opportunity for establishing a niche` of flour or wheat products

[5] One of these products fit the cereal category as well.

offerings would seem to be very good. The firm/product lists and food processor lists appear in the appendices.

Product Opportunity Areas

The exploratory inventory[6] study gave the analysts the perception that there were relatively more innovative or new food concepts at the smallest of the retail stores, the organic store. Two possibly important areas for innovative entry seem to be present, specialty diet foods for those persons with disabling diseases, and innovative convenience luncheon or quick meals of higher quality in preparation and taste. An increasing number of products will possibly be offered to Americans with disabling diseases where diet is a factor, such as: heart disease, hypertension, diabetes, kidney problems, and digestive problems. Many products are implicitly filling those product areas. These seem apparent after the recent reporting of the increasing incidence of overweight conditions in Americans of all ages. More products seem to be available with lower refined sugars content, higher dietary fiber, and lower in food additive content.

The prepared quick foods or lunch type foods that are innovative, that are out of the ordinary sandwich mold and of higher quality would appear to offer opportunity for new product entry. Quality here implies there will be a better eating experience and higher quality ingredients.

Food Processor Survey Results

Lastly, a wheat containing food product processor telephone survey of California firms (with mail follow up) was conducted. The original survey population source was food processors from the *Milling and Baking News* (Sosland Publishing Co, Kansas City, Mo.) list, which enumerated 162 such firms in California. The telephone survey (see Appendix Figure 3) was conducted on a randomly drawn sample of 50 firms (nearly 31%) from the *Milling and Baking News* list. All firms were contacted with 16 firms

[6] These are qualitative summary observations not made with any statistical model or subject to statistical test.

providing usable responses, out of a final viable sample list of 48 firms,[7] for a response rate of 33%. In contrast to the above mentioned "Food Processor" survey, the in-store inventory found 77 of its 102 firms were not included on the processor list from *Milling and Baking News*. From this we conclude that the number of wheat using food processors easily could be nearly half again larger than the industry list might suggest.

The food processor survey sought to identify what food processors were looking for in terms of wheat and wheat flour input quality. The surveys were administered to the "person" who did the flour purchasing within the firm. The respondent firms covered the state from Sacramento, in the north, to the Mexican border counties, in the south(see Appendix, Table 7 for the food survey compilation).

Initially flour purchasers responded overwhelmingly that they used quality specifications on their purchases; however, their responses as to specific quality characteristics were highly variable, as was their extemporaneous knowledge or definition of technical qualities of wheat flour. It is likely that recall was reflected in their responses on purchase arrangements, which were also overwhelmingly at "contract prices." With contracted quality and prices, flour procurement people may feel less concern for rigorously supervising flour quality upon receipt. Protein level/quality was the most widely mentioned quality characteristic. The range of protein levels sought was from 11 to 13.2%, and half those responding wanted 12.5%+ protein, while a handful reported taking "average" or "standard" protein levels. Absorption characteristics and ash content of flour were suggested by a few firms as quality concerns or measures used. A small proportion of those interviewed identified the flour characteristics of "baking consistency" and "moisture content." Other flour characteristic descriptors, but not widely mentioned, included: stability, sieve size, Kosher, bleached, unbleached, non-bromided, color, ascorbic acid content, gluten content, farinograph tests, *etc*.

Pricing, as previously mentioned, appeared to be generally by contract, but several flour users reported some spot market purchases to make up for shortfalls, specialty flour purchases, or market price advantage opportunities. One minor flour user reported buying all his firm's flour on the cash market. The prices reported as being paid

[7] One firm was listed at two locations, but was found to work together and a second firm claimed it used no wheat or wheat flour in its products.

were from $5.50 to $6.10 per 50 lb bag equivalent. Specialty flours brought substantially more, with the range covering $10.00 to $23.00 per 50 lb bag equivalent. For many respondents prices were considered proprietary information and were not revealed. Half of the respondents reported on flour prices paid, while all but one firm was willing to report on flour use per unit time (see Table 51 below).

Table 51. California Food Processor Survey of Flour Use in 1000s lbs by Flour Type (n-15), 2002.

Flour Type:	Plain	WholeWheat	Blended	Specialty
Totals:	584.3	44.025	10.575	135.15
Cumulative	774.05	- 1000s lbs/ week all flour types		
Flour Use:	40250.6	- 1000s lbs/ year all four types		

Cumulative flour, use across the 15 California firms reporting volume use, was equivalent of over 40 million pounds per year, or more than three-quarters of a million pounds per week. 75% of that demand was for plain white flour. Specialty flours constituted roughly 17% of all flour used by the sample firms.

Packaging (or flour delivery form) mostly was either in bulk or in bagged bulk form. Only a handful of firms reported receiving flour in a packaged form (not bagged bulk) and only one reported receiving all of its flour in the packaged form. The sample firms were evenly divided between receiving their flour in bulk shipments and bulk bag shipments. Several firms reported receiving all their flour in a bagged bulk shipment form. The suppliers or brands used included ABS Puratos, Archer Daniels Midland, Bake Mark, California Milling, Caneura, Capital Distributing, Cargill, General Mills, Guistos, Harvest King, Horizon Milling, Honeyville Grain, King Kissar Wheat, Lacey's, Millec Milling, and Pendleton Flour Mills.

Data Problems: Survey Research in the Communications Age

Collecting data by telephone was rendered with much greater difficulty now than even five years ago. There are several factors, which affect these methods of collecting

primary data. First, one thing that has influenced both firms and individuals response to telephone calls is the huge intrusion into daily life of aggressive telemarketing. This now pervasive sales technique with its computer assisted dialing and recalling has seemingly increased the defensive use of voice mail call screening and technology has also allowed most firms to elude the direct caller with systems of touch-tone menus. The former allows the caller to avoid the interview and the later substantially increases the time, frustration of making final connections, and completing interviews. Further, the latter were often found to be dysfunctional, incomplete, or offer no option for direct personal contact, heretofore, one of the advantages of telephone survey research. At best one is left with a very complicated call back process or merely avoided. Few voice mail messages requesting call back were returned.

A second problem lies in California's multi-ethnic food processing sector. Language barriers were often nearly insurmountable, which included both Asian and European language speakers. Due to the ethnic nature of food product demand the employment of persons with English, as a second language is fairly widespread.

Lastly, the current lack of interaction between local and long distance telephone carriers creates technical barriers (such as line noise) that telephone companies are often not willing to work out or will not acknowledge.

In all cases when only voice mail contact was made, but no final contact a survey was forwarded to the contact or the *Milling and Baking News* list contact.

VIII. SUMMARY and CONCLUSIONS

The basic objective of the study was to determine if there was economic feasibility of forming a wheat cooperative in California. The answer to this question is a qualified "yes." There are two basic questions that needed to be addressed. The first, "Are California wheat growers interested in the formation of the cooperative"? Secondly, "Are there viable market opportunities for the formation of the cooperative"?

Grower Interest Survey

The lack of grower response to the wheat grower survey is a matter of concern. A mail survey to over 1,500 growers with a follow-up phone survey and a second mail survey resulted in 33 useable questionnaires. It can be argued that there were reasons for the low response rate: time of year in which the survey was taken, lack of monetary or other award for filling out the survey, individual resistance to mail clutter, concerns relating to confidentiality of information, and probably several others. However, the survey did contain a cover letter signed by officials from the both California Wheat Commission and Cal Poly State University stating the importance of the survey as a tool in assisting the development of a cooperative whose objective is to increase California wheat growers' returns. Thus, a 2% response is a cause for concern that most California wheat growers may not be interested in forming or joining a wheat cooperative.

This observation is borne out somewhat by the responses given to survey questions concerning cooperatives. Several growers (10) *disagreed completely* or *somewhat* that cooperative forms of business today were strong and viable, compared to a similar number (13) who *agreed completely* or *somewhat*. Growers were evenly distributed on a cooperative's ability to provide greater market power, with a minority (9) expressing indifference, neither *agreeing* nor *disagreeing*. Willingness-to-invest in a start-up cooperative was nearly evenly divided, a fair number (13) *agreed completely* or

somewhat, while a similar number (14) *disagreed completely* or *somewhat*. The relative frequencies increased somewhat on the question, "generally, I favor investing/developing cooperative marketing." Roughly half (17) *agreed somewhat* or *completely*, and while a minority (10) *disagreed somewhat* or *completely*. A fair number (13) of growers were *neutral* responding that a cooperative business was acceptable in the 19th and 20th centuries-but not today, while a similar number (14) *disagreed completely* or *somewhat* with the statement.

These responses provide a mixed picture as to whether the California wheat growers perceive the need for a wheat growers cooperative and should be viewed as a signal that if a California wheat cooperative is formed that time and effort will be needed to educate California wheat growers about the benefits such a cooperative could have for them.

Wheat Merchandizing Opportunities

The second question is whether there are viable wheat markets for the cooperative to enter. The first market is to be assessed was the wheat merchandizing market. This market would appear to be economically feasible for the cooperative to enter. As noted in the section on wheat merchandizing even without doing any margin analysis the market characteristics suggest its economic viability. First, California is a wheat deficit state and it is not a matter of whether there is a market for California grown wheat, but rather what price would be received. Second, it is unlikely the first handlers who are currently supplying the flourmill, feed wheat, and export markets would continue to do so year after year if there were not some long-run profitability associated with their merchandizing activities.

The contribution margin analysis, given the previously stated caveats, also indicates the economic viability of this market. However, as noted the actual profitability of merchandizing markets cannot be determined with the available data. This is an important point since wheat prices in this market can vary significantly year-to-year depending on supply and demand conditions. Thus while the cooperative's merchandizing activities may be able to capture some merchandizing profit and increase

growers returns it is possible and probable that there will be years when even those increased grower returns will not cover wheat production costs. Albeit wheat production losses will perhaps be less than if the merchandizing activity is engaged in by the cooperative

A cooperative that enters into the wheat merchandizing market would probably be similar a traditional grain cooperative. A cooperative of this type would need to have a significant marketing pool (size) for at least two reasons. The first is that a larger market pool would allow the operational costs to be spread over greater volume, which would reduce operational cost per unit. This is very important for a marketing activity where the cost per unit is directly related to the competitiveness of the firm. The second reason is to obtain some market power. The larger the pool, depending on supply and demand conditions, the greater the cooperative's bargaining power with potential wheat buyers and sellers of storage and transportation services will be. Finally, there are low barriers-to-entry and exit and the potential investment cost is relatively low.

A key determinant of the success of the merchandizing or marketing aspects is strongly related to the individuals managing these merchandizing activities. Key abilities of these individuals should be knowledge of and ability to use price risk management tools, such as hedging, ability to assess current market conditions and develop realistic future market forecasts, have or quickly develop knowledge concerning the industry and its major players, and have the interpersonal skills to work with cooperative members, staff, and buyers.

Manufacturing Opportunities

Two other markets look to have economic feasibility. The first is the frozen dough industry. The annual growth rate of 15 percent in par-baked and frozen dough products, along with ease of entry and the observation that the industry is not suffering from over capacity, make this sector attractive. Annual cash flow analyses show that the facility would have a positive cash flow over an eight year project horizon. The financial analysis presented in the report indicates that entry into this market would require an investment of slightly over $15 million, which includes cooperative formation costs. It

should be noted that transportation and storage costs of the wheat, flour, and end product were not specifically included in the analysis of frozen dough. Flour prices used were Southern California delivery points; however, the plant was assumed to be located in the East Bay-west Sacramento region.

The net present value of the investment is $13 million , yielding an approximate 25 percent return on investment over an eight year horizon. The high internal rate of return makes the investment more attractive for investors. On the downside, this rate may appear to be unrealistically high. Industries with high rates of return often attract many investors and participants to the industry, which in turn may cause the rate of return to decrease.

The upside is that while there is more inherent investment, operational and marketing risk in this type of market entry than wheat merchandizing there exists significant profit potential that could greatly enhance grower return on their wheat production and at least initially would not require nearly the size of marketing pool that would be required for successful wheat merchandizing. The cooperative could be formed as a new generation cooperative that could benefit from knowing about the problems that similar cooperatives have faced in the past and what to expect in the process of creating and running such an investment. Keys to success appear to be finding and maintaining a knowledgeable management team, conservative financial and production forecasts, and obtaining strong buyer alliances prior to the development of a production line. Since it is hard to differentiate frozen dough from other manufacturer's frozen dough, focusing on service or niche markets may be the way to set the cooperative apart from other manufacturers.

Flour Milling and Market Niche` Products

Consideration was given to investing in a cooperative flourmill, but at this time it is not a prudent investment decision. Thus, a flour toll milling agreement will have to be entered into. The cost of the toll milling used in the financial analysis of the frozen dough market was $2.20 per hundredweight flour. If toll milling costs were to rise above that figure they would have a downward impact on the net present value and internal rate

of return of the frozen dough plant. Cost disadvantages exist in favor of the Midwest flour milling.

The food processor survey identifies cumulative flour use over 40 million pounds per year across the 15 California firms reported. This volume use is equivalent to more than three-quarters of a million pounds per week, of which 75% was for plain white flour. Specialty flours constituted roughly 17% of all flour used by the sample firms and this number would appear to be growing larger over time.

The final market opportunity appears to be a sizeable and growing market for specialty flours. There appears to be well over 240 California firms or food processing plants supplying, perhaps over 1000 individual wheat containing food product items. A quantitative analysis of this marketing opportunity was not undertaken; however, an exploratory inventory study gave the analysts the perception that there was a growing market for relatively more innovative or new wheat food concepts at smaller retail stores, especially organic food stores. Two possibly important areas for innovative entry seem to be present, specialty diet foods for those persons with disabiling diseases, and innovative convenience luncheon or quick meals of higher quality in preparation and taste. An increasing number of products will possibly be directed at Americans with disabiling diseases where diet is a factor, such as: heart disease, hypertension, diabetes, kidney problems, and digestive problems. Many products are implicitly filling those product areas. These seem apparent after the recent reporting of the increasing incidence of overweight conditions in Americans of all ages. More products seem to be available with lower refined sugars content, higher dietary fiber, and lower in food additive content.

The prepared quick foods or lunch type foods that are innovative, that is out of the ordinary sandwich element and of higher quality would appear to offer opportunity for new product entry. Quality here implies better eating experience and higher quality ingredients.

The conclusion drawn is that there are market opportunities available to a California wheat cooperative. The question is, “Can California wheat growers be convinced that it is in their best interest to form, finance, and support such a cooperative?”

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Appendix Table 1. California Wheat, All Varieties, Acreage, Yield and Production, 2001 Preliminary.

County	Planted	Harvested	Yield/Acre	Production
	Acres		Tons	
Alameda	2,000	500	2.22	1,110
Butte	4,000	4,000	1.96	7,830
Colusa	24,500	23,500	2.21	51,990
Contra Costa	4,000	2,500	1.90	4,740
Fresno	62,500	59,000	2.40	141,360
Glenn	11,500	9,500	2.32	22,050
Imperial	41,500	38,500	3.16	121,830
Kern	65,000	37,000	2.14	79,110
Kings	79,000	70,500	2.09	147,060
Lassen	4,500	1,500	2.02	3,030
Madera	29,000	13,500	2.16	29,130
Merced	21,500	8,000	2.28	18,210
Modoc	5,500	1,500	1.90	2,850
Monterey	3,500	1,500	1.10	1,650
Placer	4,500	2,000	2.24	4,470
Riverside	34,000	25,500	1.82	46,500
Sacramento	17,000	13,500	2.23	30,105
San Benito	3,000	1,500	1.52	2,280
San Diego	1,500	1,500	2.00	3,000
San Joaquin	38,000	32,000	2.24	71,700
San Luis Obispo	3,500	1,500	1.18	1,770
Santa Barbara	500	500	1.14	570
Shasta	1,500	1,000	1.71	1,710
Siskiyou	4,500	3,000	2.14	6,420
Solano	24,000	24,000	2.18	52,200
Sonoma	1,000	500	1.80	900
Stanislaus	4,000	1,500	2.46	3,690
Sutter	13,000	11,000	2.10	23,100
Tehama	3,000	1,000	1.62	1,620
Tulare	61,000	29,500	2.37	69,840
Yolo	42,500	40,000	2.51	69,840
Yuba	500	500	1.68	840
STATE	615,000	461,000	2.28	1,053,150

Source: California Agricultural Statistics Service. 2001 Wheat Estimates. Sacramento.

Appendix Table 2. Traditional U.S. Wheat and New Generation Wheat Cooperatives

Colorado

Amherst Cooperative Elevator, Inc.
P.O. Box 115, 34661 County Road 53 Amherst, CO 80721-0115
Gary Peintner, General Manager
Telephone: (970) 854-3141 FAX: (970) 854 3764 E-Mail Address:
amhcoop@ria.net Type: Marketing, Service
Products: Wheat, Feed Grains, Soybeans, Dry Edible Beans, Petroleum Products

Holyoke Cooperative Association
P.O. Box 118
Holyoke, CO 80734-0118
Harlan E. Stern, General Manager
Telephone: (970) 854-2254 FAX: (970) 854-2259 Home Page: www.hca.net E-Mail
Address: hca@hca.net Type: Marketing Products: Fertilizer, Feed, Fuel, Grain,
Convenience Store

Roggen Farmers Elevator Association
P.O. Box 8
Roggen, CO 80652-0008
Terry Seelhoff, General Manager
Telephone: (303) 849-5506 FAX: (303) 849-5508 Type: Marketing Products: Grain,
Corn, Wheat, Milo, Millet, Pinto Beans

Illinois

Alliance Grain
P.O. Box 546
Gibson City, IL 60936-0546 Steve P. Kelly, General Manager
Telephone: (217) 784-4284 FAX: (217) 784-8949 Home Page: www.alliance-
grain.com Type: Marketing
Products: Grain, Corn, Beans, Wheat, Feed, Fertilizer, Chemicals, Lime

Assumption Cooperative Grain Company
104 West North Street Assumption, IL 62510-1002 Tom
Bressner, General Manager
Telephone: (217) 226-3213 FAX: (217) 226-3244 Home Page: www.acoop.com
Type: Marketing Products: Grain, Petroleum, Seed, Farm Supplies

GROWMARK, Inc.
1701 Towanda Avenue Bloomington, IL 61702-2500 Bill
Davisson, CEO
Telephone: (309) 557-6000 FAX: (309) 829-8532 Home Page:
www.growmark.com E-Mail Address: cmrelate@growmark.com
Type: Farm Supply, Manufacturing, Distribution, Grain Marketing

Gateway Co-op
P.O. Box 125
Galva, IL 61434-0125
Wayne Kreig, General Manager
Telephone: (309) 932-2081 FAX: (309) 932-3136 E-Mail Address:
gateway@inw.net Type: Marketing Products: Grain, Feed, Fertilizer, Petroleum

Appendix Table 2 (cont). Traditional U.S. Wheat and New Generation Wheat Cooperatives

Gateway FS Inc
P.O. Box 100 (221 East Pine) Red Bud, IL 62278 Mike
Kuhn, General Manager
Telephone: (618) 282-4000 FAX: (618) 282-4012 Home
Page:www.gatewayfs.com E-Mail Address: gatefs@gatewayfs.com Type:
Marketing and Supply
Products: Grain, Fertilizer, Feed, Seed, Fuel, Buildings, Chemicals

Grand Prairie Cooperative
P.O. Box E
Tolono, IL 61880-1105
Dennis Montavon, General Manager
Telephone: (217) 485-6630 FAX: (217) 485-5143 Type: Storage Products:
Corn, Soybeans, Wheat

Ludlow Cooperative Elevator Company
Box 155
Ludlow, IL 60949-0155
David L. Hastings, General Manager
Telephone: (217) 396-4111 FAX: (217) 396-7309 Type: Marketing

Prairie Central Cooperative
Rural Route 1, Box 230 Chenoa, IL 61726-9756
Michael Sulzberger, General Manager/CEO Telephone: (815) 945-7866
E-Mail Address: pccoop@dave-world.net Type: Marketing

Topflight Grain
400 E. Bodman
Bement, IL 61813-1299
Richard Thomas, General Manager
Telephone: (217) 678-2261 FAX: (217) 678-8113 E-Mail Address:
bementgr@net66.com Type: Marketing Products: Grain

Ursa Farmers Cooperative Company
P.O. Box 8
Ursa, IL 62376-0008
Gerald Jenkins, General Manager
Telephone: (217) 964-2111 FAX: (217) 964-2660
Home Page: www.ursacoop.com
Type: Marketing Products: Grain, Feed, Seed

Indiana

Fulton-Marshall Co-op
P.O. Box H (510 W. Adams St.) Rochester, IN 46563-1508
Barry Day, General Manager
Telephone: (219) 936-3107 FAX: (219) 935-4667 E-Mail Address:
fmcoopplyoffice@hoosierlink.net Type: Supply, Marketing
Products: Fertilizer, Feed, Seed, Crop Chemicals, Petroleum, Grain Marketing

Appendix Table 2 (cont). Traditional U.S. Wheat and New Generation Wheat Cooperatives

Gibson County Farm Bureau Co-op Association, Inc.
Box 1310
Princeton, IN 47670-1310
James O. Elliott, General Manager Telephone: (812) 385-4867
Type: Farm Supply, Marketing
Products: Fertilizer, Agricultural Chemicals, Liquid Fuels, Petroleum, Feed, Seed, Farm Supplies, Corn, Soybeans, Wheat, Grain Sorghum

Growers Cooperative, Inc.
P.O. Box 2196, 2600 13th Street Terre Haute, IN 47802-0196 Dan Weber, Executive Vice President Telephone: (812) 235-8123
Home Page: www.growerscoop.com Type: Marketing Products: Grain and Farm Supplies

Jasper County Farm Bureau Co-operative Association
P.O. Box 238
Rensselaer, IN 47978-0238
Donald L. Misch, General Manager
Telephone: (219) 866-7131 FAX: (219) 866-7490 Type: Farm Supply, Marketing
Products: Grain, Fertilizer, Chemicals, Petroleum Products, Feed, Seed, Tires, Batteries, Accessories, Grower Services

Westland Co-op, Inc.
P.O. Box 432
Crawfordsville, IN 47933-3137 Jeffrey T. Troika, President/CEO Telephone: (765) 362-6700 Type: Farm Supply, Marketing
Products: Fertilizer, Chemicals, Feed, Grain, Petroleum Products

Iowa

Ag Vantage FS, Inc.
P.O. Box 409 (1930 McCloud Ave) New Hampton, IA 50659-0409
Gaylan Brunssen, General Manager Telephone: (515) 394-3031 Fax: (515) 394-5849 Home Page: www.agvantagefs.com E-Mail Address: mailus@agvantagefs.com Type: Grain Marketing, Farm Supply

Alceco-Albert City Elevator, A Cooperative
P.O. Box 428
Albert City, IA 50510-0038 Bruce G. Anderson
Telephone: (712) 843-5803
Type: Marketing, Farm Supply, Service
Products: Grain, Fertilizer, Agronomy Services, Feed

American Grain and Related Industries (AGRI Industries)
2829 Westown Parkway, Suite 100 W. Des Moines, IA 50266-1394
Jerry Van Der Kamp, Executive Vice President and CEO Telephone: (515) 223-3738
FAX: (515) 223-7770 Home Page: www.agri-industries.com Type: Marketing Service
Products: Grain, Member Services

Central Counties Cooperative
107 North Pioneer Road Reinbeck, IA 50669
Marc Melhus, General Manager Telephone: (319) 345-6831
Type: Marketing Products: Farm Supplies, Grain

Appendix Table 2 (cont). Traditional U.S. Wheat and New Generation Wheat Cooperatives

East Central Iowa Cooperative
P.O. Box 300
Hudson, IA 50643-0300
George W. Rude, General Manager Telephone: (319) 988-3257
Fax: (319) 988-3371
E-Mail Address: Sphillipsecic@cedornet.org Type: Marketing Products:
Grains, Farm Supplies, Services

Farmers Cooperative Company
P.O. Box 35
Farnhamville, IA 50538
Roger Koppen, General Manager
Telephone: (515) 544-3213 FAX: (515) 544-3243 Type: Marketing, Farm
Supply Products: Grain, Feed, Agronomy

Farmers Cooperative
P.O. Box 151
New Hampton, IA 50659-9302 Ron Pumphrey, General
Manager
Telephone: (515) 394-3052 FAX: (515) 394-2920 Type: Marketing Products:
Farm Supply and Grain

Farmers Cooperative Company
P.O. Box 1046
Hinton, IA 51024-1046
James A. Carlson, General Manager
Telephone: (712) 947-4212 FAX: (712) 947-4210 E-Mail Address:
farmers@willinet.net Type: Marketing Products: Grain, Feed, Fertilizer,
Chemical, Seed

Farmers Elevator Company
P.O. Box 9
Bondurant, IA 50035-0009 Jeff D. Nelson, General Manager
Telephone: (515) 967-4207 FAX: (515) 967-7902 Type: Marketing Products:
Grain, Fertilizer, Fuel, Feed, Chemical

Gold-Eagle Cooperative
Box 280 - 516 North Locust
Goldfield, IA 50542
Brad Davis, General Manager
Telephone: (515) 825-3161 FAX: (515) 825-3732
Type: Marketing
Products: Grain, Feed, Agronomy

Midwest Farmers Cooperative
Box 128 - (1016 2nd Ave) Sheldon, IA 51201-1104 Ellis
Hein, General Manager
Telephone: (712) 324-2548 FAX: (712) 324-5297 Type: Marketing
Products: Grain, Feed, Seed, Agronomy, Lumber, Petroleum, Poultry, Liquid Egg

NEW Cooperative, Inc.
2626 First Avenue South Fort Dodge, IA 50501-4381 Brent
Bunte, General Manager Telephone: (515) 955-2040 Type:
Marketing, Farm Supply
Products: Grain, Feed, Seed, Fertilizer, Chemicals, Petroleum

Appendix Table 2 (cont). Traditional U.S. Wheat and New Generation Wheat Cooperatives

New Horizon FS, Inc.
Box 31
Tipton, IA 52772
Kendall L. Miller, General Manager
Telephone: (319) 626-8555 FAX: (319) 626-8570 Home Page:
www.newhorizonfs.com Type: Marketing
Products: Grain, Petroleum Products, Liquid Fuels, Propane, Farm Supplies, Fertilizers, Crop Protection Chemicals, Application Services

Northland Cooperative
P.O. Box 45
Thompson, IA 50478-0045
Mike Albilotrup, General Manager
Telephone: (515) 584-2090 FAX: (515) 584-2665 Type: Farm Supply
Products: Grain, Feed, Seed, Fertilizer, Petroleum, Crop Protection Products

Prairie Land Cooperative
P.O. Box 309
Hubbard, IA 50122-0309
Rick Vaughan, General Manager
Telephone: (641) 864-2266 FAX: (641) 864-3221 Home Page:
www.prairielandcoop.com E-Mail Address: ricky@prairielandcoop.com Type:
Marketing Products: Grain, Feed, Agronomy, Energy

Pro Cooperative
Box 322
Gilmore City, IA 50541-0322 Rolland Svoboda, General
Manager Telephone: (515) 373-6532 Type: Marketing, Farm
Supply
Products: Grain, Feed, Fertilizer, Seed, Petroleum Products

Siouxland Farmers Cooperative
P.O. Box 489 913 Park Street Sheldon, IA 50201
Randy Teclen, Interim Manager
Telephone: (712) 725-2386 FAX: (712) 324-9905
Products: Grain, Feed, Agronomy Products, Petroleum and Related Products

Superior Cooperative Elevator Company
Box 77
Superior, IA 51363-0077
Gary L. Strube, General Manager
Telephone: (712) 858-4491 FAX: (712) 858-4610
Home Page: www.superiorcoop.com
Type: Marketing, Farm Supply
Products: Grain, Fertilizer, Petroleum, LP Gas, Feed, Agricultural Chemicals

Top-of-Iowa Cooperative
Box 181, 104 South Front Street Joice, IA 50446-0181 Tom
Boeka, General Manager
Telephone: (641) 588-3131 FAX: (641) 588-3135
Type: Marketing
Products: Grain, Agronomy Sales and Service

Appendix Table 2 (cont). Traditional U.S. Wheat and New Generation Wheat Cooperatives

West Bend Elevator Company
P.O. Box 49
West Bend, IA 50597-0049 Joe Arniss, General Manager
Telephone: (515) 887-7291 FAX: (515) 887-7211 Type: Marketing, Farm Supply
Products: Grain, Feed, Seed, Chemicals, Fertilizer, Merchandise, Petroleum Products, Soybean Processing

West Central Cooperative
P.O. Box 68
Ralston, IA 51459-0068
Jeff Stroburg, Chief Executive Officer
Telephone: (712) 667-3200 FAX: (712) 667-3215 Home Page: www.west-central.com Type: Marketing, Farm Supply
Products: Grain, Feed, Fertilizer, Chemicals, Seed, Soy Plus

Western Iowa Cooperative
P.O. Box 106
Hornick, IA 51026-0106
John F. Cronin, General Manager Telephone: (712) 874-3211 Type: Marketing, Farm Supply, Service
Products: Grain, Feed, Fertilizer, Agricultural Chemicals, Petroleum, Lumber

Kansas

Andale Farmers Cooperative Company
P.O. Box 18 219 Main Andale, KS 67001-0018
Doug Trumble, General Manager
Telephone: (316) 445-2141 FAX: (316) 444-2112 Type: Marketing Products: Grain, Feed, Fertilizer, Petroleum

Dodge City Cooperative Exchange
P.O. Box 610, 710 West Trail Dodge City, KS 67801-0610
William C. Fitzke, General Manager
Telephone: (316) 225-4193 FAX: (316) 225-3366 Type: Marketing, Farm Supply, Service
Products: Grain, Petroleum Products, Fertilizers, Agricultural Chemicals, Feed, Hardware

Farmway Cooperative, Inc.
P.O. Box 568, 204 East Court Beloit, KS 67420-0568
Byron Ulery, President
Telephone: (785) 738-2241 FAX: (785) 738-5150 Type: Marketing, Farm Supply, Service
Products: Grain, Feed, Fertilizer, Farm Supplies, Chemicals, Petroleum Products, Custom Application

Frontier Equity Exchange
P.O. Box 998
Goodland, KS 67735-0998
Randy Schoenthaler, General Manager
Telephone: (785) 899-3681 FAX: (785) 899-7283 E-Mail Address: frontier@goodland.ixks.com Type: Marketing Products: Grain, Fuel, Fertilizer, Feed, Merchandise

Appendix Table 2 (cont). Traditional U.S. Wheat and New Generation Wheat Cooperatives

Iuka Cooperative Exchange
P.O. Box 175
Iuka, KS 67066-0175
Bruce Krehbiel, General Manager
Telephone: (316) 546-2231 FAX: (316) 546-2235 Type: Marketing Products:
Grain, Fertilizer, Petroleum, TBA

Mid-Kansas Cooperative Association
P.O. Box D, 307 West Cole Street Moundridge, KS 67107-0582
Robert D. Nattier, General Manager
Telephone: (316) 345-6328 FAX: (316) 345-6330 Home Page:
www.mkcoop.com Type: Marketing Products: Grain, Retail Farm Supply

Nemaha County Cooperative Association
P.O. Box 204
Seneca, KS 66538-0204
Regis Schmitz, General Manager
Telephone: (785) 336-6153 FAX: (785) 336-6256 Type: Marketing Products:
Grain, Fertilizer, Fuel, Feed, Chemicals

The Garden City Co-op, Inc.
P.O. Box 838, 106 North 6th Street Garden City, KS 67846-0838
Irvin Clubine, CEO/President Telephone: (316) 275-6161 Type:
Marketing, Farm Supply
Products: Wheat, Corn, Milo, Fertilizer, Feed, Petroleum, Custom Feed, Manufacturing, Livestock Production

Wallace County Cooperative Equity Exchange
P.O. Box 280
Sharon Springs, KS 67758-0280 Jay Minton, General Manager
Telephone: (785) 852-4241 FAX: (785) 852-4286 Type: Marketing
Products: Grain, Fertilizer, Feed, Seed, Petroleum Products

Kentucky

Hopkinsville Elevator Company, Inc.
P.O. Box 767
Hopkinsville, KY 42241-0767 James E. Doss, Jr., General
Manager
Telephone: (502) 886-5191 FAX: (502) 887-1608 Home Page: www.hop-
elevator.com Type: Marketing, Farm Supply
Products: Corn, Soybeans, Wheat, Fertilizer, Seed, Chemicals

Louisiana

Pointe Coupee Farmers Cooperative
Box 236
Batchelor, LA 70715-0180
P. J. Daigrepont, General Manager
Telephone: (337) 492-2166 FAX: (337) 492-2168 Type: Marketing, Service
Products: Wheat, Corn, Soybeans, Milo, Oats

Appendix Table 2 (cont). Traditional U.S. Wheat and New Generation Wheat Cooperatives

Massachusetts

United Co-operative Farmers, Inc.
Twenty-Two Kimball Place Fitchburg, MA 01420
Donald A. Upton, General Manager
Telephone: (978) 345-4103 FAX: (978) 345-7187 Type: Marketing, Farm Supply Products: Grain, Farm Supplies

Michigan

B & W Co-op, Inc.
P.O. Box 518, 216 Eastman Street Breckenridge, MI 48615-0518
Patrick Frasco, CEO Telephone: (517) 842-3104 Home Page: www.bwcoop.com E-Mail Address: info@bwcoop.com Type: Marketing, Farm Supply
Products: Grain, Soybeans, Dry Beans, Feed, Seed, Fertilizer, Farm Supplies

Minnesota

Farmers Cooperative Association
P.O. Box 228
Jackson, MN 56143-0228
Dennis Hunwardsen, General Manager
Telephone: (507) 847-4160 FAX: (507) 847-2521 Type: Marketing
Products: Grain, Feed, Chemicals, Fertilizer, Petroleum Products, C-Store

Farmers Cooperative Elevator
P.O. Box 59
Hanley Falls, MN 56245-0059 Scott Dubbelde, General Manager
Telephone: (507) 768-3448 FAX: (507) 768-3675 Home Page: www.farmerscoopelevator.com Type: Marketing
Products: Grains, Feed, Seed, Hardware, Services, Grain Marketing

Farmers Cooperative Elevator Company
Box 98
Buffalo Lake, MN 55314-0098 Warren Gerdes, General Manager
Telephone: (320) 833-5321 FAX: (320) 833-2340 Type: Marketing Products: Grain, Feed, Fertilizer, Chemicals

Meadowland Farmers Cooperative
Box 338, 101 1st Avenue East Lamberton, MN 56152-1044 John D. Valentin, General Manager
Telephone: (507) 752-7352 FAX: (507) 752-7106 Type: Marketing, Farm Supply
Products: Service, Grain, Feed, Seed, Fertilizer, Agricultural Chemicals, Petroleum, General Merchandise

New Vision Cooperative
P.O. Box 407
Heron Lake, MN 56137
Frank McDowell, General Manager
Telephone: (507) 831-2527 FAX: (507) 831-2240 Type: Marketing Products:
Grain, Feed, Seed, Agronomy

United Farmers Cooperative
P.O. Box 4, 840 Pioneer Avenue Lafayette, MN 56054-0004
Jeff Nielsen, General Manager
Telephone: (507) 228-8344 FAX: (507) 228-8766 Type: Marketing Products:
Grain Marketing, Farm Supply

United Farmers Elevators
Box 47
Murdock, MN 56271-0047 Thomas Traden, General Manager
Telephone: (320) 875-2811 FAX: (320) 875-2813 Type: Marketing

Western Consolidated Cooperatives
P.O. Box 78
Holloway, MN 56249-0078 Dean Isaacson, General Manager
Telephone: (320) 394-2171 Type: Marketing
Products: Grain, Feed, Fertilizer, Farm Chemicals, Seed, Petroleum, Truck Freight

Wheaton-Dumont Cooperative Elevator
1115 Broadway
Wheaton, MN 56296-1736 Orval Kohls, General Manager
Telephone: (320) 563-8152 FAX: (320) 563-4392 Type: Marketing Products:
Grain, Feed, Seed, Fertilizers, Chemicals

Mississippi

Farmers Grain Terminal, Inc.
P.O. Box 1796
Greenville, MS 38702-1796 Steven F. Nail, CEO
Telephone: (662) 332-0987 FAX: (662) 332-0999 Type: Marketing Products:
Grain, Rice, Soybeans, Wheat, Corn, Milo

Missouri

Farmland Industries, Inc.
Box 7305, Dept. 140 Kansas City, MO 64116
Robert W. Honse, President and CEO
Telephone: (816) 459-6000 FAX: (816) 459-6979 Home Page:
www.farmland.com Type: Manufacturing, Marketing
Products: Fertilizer, Petroleum, Feed, Chemicals, Farm Supplies, Pork Marketing, Grain, Beef

MFA Incorporated
201 Ray Young Drive Columbia, MO 65201-3599
Don Copenhaver, President and CEO
Telephone: (573) 874-5111 FAX: (573) 876-5423 Home Page: www.mfa-
inc.com Type: Marketing, Farm Supply Products: Grain, Livestock, Fertilizer,
Seed, Feed

Appendix Table 2 (cont). Traditional U.S. Wheat and New Generation Wheat Cooperatives

Nebraska

AGRI Co-op
310 Logan Street
Holdrege, NE 68949-2723 Ronald Jurgens, General Manager
Telephone: (308) 995-8626 FAX: (308) 995-6836 Type: Marketing
Products: Grains, Farm Supplies

Ag Valley Cooperative Non-Stock
P.O. Box 68
Edison, NE 68936-0068
Ronald Hunter, General Manager
Telephone: (308) 927-3681 FAX: (308) 927-2455 Type: Marketing Products: Grain and Farm Input Supplies

Crossroads Cooperative Association
P.O. Box 153
Sidney, NE 69162-1532 Bob Kelly, General Manager
Telephone: (308) 254-4230 FAX: (308) 254-5319 Home Page: www.crossroadscoop.com Type: Marketing Products: Corn, Winter Wheat, Millet

Dorchester Farmers Cooperative
P.O. Box 263, 208 West Depot Dorchester, NE 68343-0263
Ron Velder, General Manager
Telephone: (402) 946-2211 FAX: (402) 946-2062 Type: Marketing Products: Grain, Fertilizer, Petroleum

Farmers Cooperative Company
P.O. Box 70
Waverly, NE 68462-0070
Harold R. Hummel, General Manager
Telephone: (402) 786-2665 FAX: (402) 786-2187 Type: Marketing, Farm Supply
Products: Grain, Feed, Fertilizer, Agricultural Chemicals, Petroleum, Hardware

Farmers Cooperative Elevator Company
Box 66
Plymouth, NE 68424-0066
Dave Schneider, President/General Manager Telephone: (402) 656-3615 FAX: (402) 656-3016 Home Page: www.fcecply.com Type: Marketing, Farm Supply, Service
Products: Grain, Feed, Fertilizer, Petroleum, Agricultural Chemicals, Farm Accounting and Record Keeping, Farm Supply Financing

Frenchman Valley Farmers Cooperative, Inc.
Box 578
Imperial, NE 69033-0578
Martin Leibbrandt, General Manager
Telephone: (308) 882-4381 FAX: (308) 882-4380 Type: Marketing, Farm Supply, Service
Products: Corn, Wheat, Milo, Soybeans, Oats, Edible Beans, Sunflowers, Popcorn, Petroleum, Feed, Fertilizer, Agricultural Chemicals, Insurance, Tires, Farm Financing, Feed Manufacturing, Consulting Services, Trucking

2 (cont). Traditional U.S. Wheat and New Generation Wheat Cooperatives

Frontier Cooperative Inc.
P.O. Box 37
Brainard, NE 68626-0037
Randy Robeson, General Manager
Telephone: (402) 545-2811 FAX: (402) 545-2821 Type: Marketing, Farm Supply, Service
Products: Grain, Fertilizer, Feed, Petroleum Products, Agricultural Chemicals, Miscellaneous Farm Supplies

United Farmers Cooperative
P.O. Box 310
Shelby, NE 68662-0310
Jerry Johnson, General Manager
Telephone: (402) 527-5511 FAX: (402) 527-5515 Type: Marketing, Farm Supply
Products: Wheat, Corn, Milo, Soybeans, Oats, Fertilizer, Agricultural Chemicals, Petroleum Products, Feed, Miscellaneous Farm Supplies

North Dakota

Berthold Farmers Elevator Company
Box 38
Berthold, ND 58718
Daniel W. DeRouchey, General Manager
Telephone: (701) 453-3431 FAX: (701) 453-3424 E-Mail Address: bfec@berthold.nd.net Type: Marketing

Dakota Growers Pasta Company
One Pasta Avenue
Carrington, ND 58421-0021 Tim Dodd, General Manager
Telephone: (701) 652-2855 FAX: (701) 652-3552 Home Page: www.dakotagrowers.com Type: Marketing, Processing Products: Pasta

Dakota Quality Grain Cooperative
P.O. Box 128 Parshall, ND 58770
Harold Rasmusson, General Manager
Telephone: (701) 862-3113 FAX: (701) 862-4103 Type: Marketing Products: Durum, Barley, Oats, Spring Wheat, Flax, Rye

Souris River Grain Cooperative
8674 County Road 20 Newburg, ND 58762
Timothy Bullinger, General Manager
Telephone: (701) 272-6179 FAX: (701) 272-6342 Type: Marketing Products: All Grain and Oil Crops

Ohio

Country Star Cooperative
P.O. Box 110, 3202 St. Rt. 98 Bucyrus, OH 44820-0110 Ron Dentinger, General Manager
Telephone: (419) 562-5010 FAX: (419) 562-5686 Type: Marketing Products: Grain and Farm Supply

Appendix Table 2 (cont). Traditional U.S. Wheat and New Generation Wheat Cooperatives

Country Spring Farmers Cooperative
P.O. Box 870, 2025 West State Street Fremont, OH 43420-0870
George D. Secor, President and CEO
Telephone: (419) 332-6468 FAX: (419) 332-7741 Type: Farm Supply Products:
Grain and Supply

Country Star Cooperative
P.O. Box 110, 3202 St. Rt. 98 Bucyrus, OH 44820-0110 Ron
Dentinger, General Manager
Telephone: (419) 562-5010 FAX: (419) 562-5686 Type: Marketing Products:
Grain and Farm Supply

Gerald Grain Center Inc.
Rural Route #1, 14-540 Road U Napoleon, OH 43545 Chester
Phillips, General Manager Telephone: (419) 598-8015 Type:
Marketing

Sunrise Cooperative Inc.
82 Townsend Avenue Norwalk, OH 44857-9708
Robert J. Sunderman, Chief Executive Officer Telephone: (419) 668-3336
Type: Marketing
Products: Grain Marketing, Agronomy, Feed and Petroleum

The Farmers Commission Company
P.O. Box 59
Upper Sandusky, OH 43351-0059 Eric Parthemore, General
Manager
Telephone: (419) 294-2371 FAX: (419) 294-2948 Type: Marketing Products:
Grain, Agronomy

Oregon

Pendleton Grain Growers, Inc.
Box 1248, 1000 Southwest Dorion Pendleton, OR 97801-1938
Albert Gosiak, General Manager
Telephone: (541) 278-5001 FAX: (541) 276-4839 Home Page:
www.pggcountry.com Type: Marketing, Farm Supply
Products: Wheat, Barley, Dry Peas, Petroleum, Fertilizer, Chemicals, Hardware, Feed Milling, Seed, Grain

South Dakota

Fremar Farmers Cooperative, Inc.
300 North Broadway Marion, SD 57043-2109 Steve Domm,
General Manager
Telephone: (605) 648-3941 FAX: (605) 648-3943 E-Mail Address:
fremar@gwte.net
Type: Marketing
Products: Grain, Feed, Agronomy

2 (cont). Traditional U.S. Wheat and New Generation Wheat Cooperatives

North Central Farmers Elevator
Box 366
Ipswich, SD 57451-0366 Keith Hainy, General Manager
Telephone: (605) 426-6021 FAX: (605) 426-6161 Type: Marketing, Farm
Supply, Service
Products: Wheat, Oats, Barley, Corn, Sunflowers, Flax, Millet, Rye, Fertilizer, Chemicals, Feed, Animal Health Supplies, Custom Applications, Gasoline, Bulk Gas, Fuel, Oil

South Dakota Wheat Growers Association
P.O. Box 1460
Aberdeen, SD 57402-1460 Donald Gales, General Manager
Telephone: (605) 225-5500 FAX: (605) 225-0859 E-Mail Address:
sdwg@iw.net Home Page: www.sdwg.com Type: Marketing, Farm Supply
Products: Grain, Fertilizer, Petroleum, Feed, Seed

Watertown Cooperative Elevator Association
810 Burlington North Drive Watertown, SD 57201 Arnold
Suhr, General Manager
Telephone: (605) 886-3039 FAX: (605) 886-0601 Type: Marketing Products:
Grain, Feed, Seed, Fertilizer, Chemicals

Texas

Sunray Cooperative
Box 430
Sunray, TX 79086-0430
Don Wiseman, General Manager Telephone: (806) 948-4121
Type: Marketing
Products: Grain, Fertilizer, Feed, Farm Supplies

Washington

Central Washington Grain Growers, Inc.
Box 649
Waterville, WA 98858-0649
John C. Anderson, General Manager
Telephone: (509) 745-8551 FAX: (509) 745-8108 Type: Marketing, Farm
Supply, Service
Products: Wheat, Barley, Oats, Triticale, Hardware and Parts, Seed, Machinery Maintenance Shop

Farmer's Warehouse & Commission Company
60 Railroad Avenue
Roosevelt, WA 99356-9707 Keith Keller, General Manager
Telephone: (509) 384-5411 FAX: (509) 384-5971 Type: Marketing,
Warehousing Products: Wheat, Barley

Northwest Grain Growers, Inc.
850 North 4th
Walla Walla, WA 99362 -0310
David Gordon, General Manager
Telephone: (509) 525-6510 FAX: (509) 529-6050
Home Page: www.nwgrgr.com
E-Mail Address: nwgrgr@nwgrgr.com
Type: Marketing, Storage
Products: Wheat, Barley

2 (cont). Traditional U.S. Wheat and New Generation Wheat Cooperatives

Pomeroy Grain Growers Inc.
P.O. Box 220
Pomeroy, WA 99347-9501
Roger Dumbeck, General Manager
Telephone: (509) 843-1694 FAX: (509) 843-1694
Type: Marketing
Products: Grain, Fertilizer, and Farm Chemicals

Ritzville Warehouse Company
P.O. Box 171, 291 East 1st Avenue Ritzville, WA 99169-0171 Vern Regennitter, General Manager Telephone: (509) 659-0130 E-Mail Address: ritzwhse@ritzville.org Type: Marketing Products: Wheat, Barley, Canola

Wheat New Generation Cooperatives

21St Century Alliance Chris Williams, VP of Operations, 315 Houston Suite C, Manhattan, KS. 66502, (785) 587-8798. The Alliance operates as an incubator, helping value-added businesses develop and grow. The businesses themselves are independent enterprises, owned by their producer-investors. Businesses developed and owned by 21st Century Alliance members have been created to increase the financial returns from agriculture by turning farmers into food and fiber producers. By participating in Alliance businesses, producers retain more equity in the retail value of commodities they raise.

American White Wheat Producers Association Kent Symns, General Manager
511 Commercial Street Atchison KS 66002, phone 800-372-4422
American White Wheat Producers Association (AWWPA) is a producer-owned cooperative marketing corporation formed in 1988 with the mission to develop white wheat markets for wheat producers. AWWPA has spent the last ten years perfecting a proprietary, identity preserved, targeted delivery, process for value added white wheat products.

Dakota Growers Pasta Company, Tim Dodd, General Manager, 1 Pasta Avenue, P.O. Box 21, Carrington, ND 58421, (701) 652-2855, www.dakotagrowers.com/. Dakota Growers is the first and only fully integrated, entirely farmer-owned pasta plant. This 1,100 member NGC started in 1993.

Drayton Grain Processors, Roger Wienleader, HCR3, Drayton, ND 58225,
(701) 454-66498. Wheat growers add value to their crop by cooperatively processing wheat to make high-protein frozen bread dough and partially-baked bread products at a plant located in Fargo.

Rocky Mountain Farmers Union, 10800 East Bethany Drive, Aurora, CO 80014-2606, (303) 752-5800. This cooperative was formed by wheat farmers to process grain harvest into bread.

United Spring Wheat Processors, Gary Lee, President, 4614 Amber Valley Parkway, Fargo, ND 58104, (800) 963-9256. This 2,850 member NGC was started in 1996 to maximize the value of members' spring wheat crop. They currently produce frozen dough and frozen partially-baked bread product. The cooperative is also involved in merchandising Identity Preserved Spring Wheat.

Value-Added Products Cooperative An Oklahoma Food Processing Co-Operative Mike Dunker, Project Manager, 2101 College Ave, Alva, Oklahoma 73717, phone: (580) 327-0400 - Fax: (580) 327-0314. Value Added Products was started in August of 1999. Its objective is to enhance the revenue of agricultural producers and to increase the value of agricultural commodities (wheat) by processing value added foods. They currently produce frozen dough and frozen partially-baked bread product.

Appendix Survey 1. California Wheat Growers Survey

1. What variety(s) of wheat and how many acres of each are you currently growing?

	Variety	**Acreage**	**Tons Sold**	**County**
a)	_____	_____	_____	_____
b)	_____	_____	_____	_____
c)	_____	_____	_____	_____
d)	_____	_____	_____	_____

2. Where do you store your wheat?

a) _____ don't store any
b) _____ on farm
c) _____ commercial facility
d) _____ commercially & on farm

3. How do you store your wheat?

a) _____ silo b) _____ bunker silo c) _____ concrete slab d) _____ elevator

4. What firms do you use to transport your wheat?

Hauling _____
Firm's name

5. What is the name of your first handler's facility and where is it located?

Name _____ Location_____

6. What is the cost per ton to deliver the wheat from the field to the first handler's facility? $_____/ton

7. Who is the primary buyer of your grain? _____
Name *Location (City)*

8. Who is the secondary buyer of your grain? _____
Name *Location (City)*

9. What is the most recent price received for each variety of wheat grown?

Variety	Year	Price $/ton	USDA Grade	Quality Factors		
				% Dockage	*% Protein*	*Other*
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

10. Have you used any of the following price support services in the last five years?

Service	**Frequency over the last five years**					
Crop Insurance	☐ Annually	☐ 4 years	☐ 3 years	☐ 2 years	☐ 1 year	☐ Do not use
Market Loans	☐ Annually	☐ 4 years	☐ 3 years	☐ 2 years	☐ 1 year	☐ Do not use
Turn grain over to government in loan defeficiency program	☐ Annually	☐ 4 years	☐ 3 years	☐ 2 years	☐ 1 year	☐ Do not use

Have you used any other federal support programs in the last five years? _____ Yes _____ No

If yes, please name: _____

Appendix Survey 1 (Cont). California Wheat Growers Survey

11. In the past 3 years, what percent of your total wheat crop has been used for:

	Percentage of Crop			
	less than 25%	25% to 50%	50% to 75%	over 75%
Green Chop	☐	☐	☐	☐

12. Are you involved in any cooperatives? _____ Yes _____ No
If yes, please name those cooperatives: _____
_____

13. What farm organizations do you belong to?
a) _____ Local Farm Bureau
b) _____ California Association of Wheat Growers
c) _____ Western Growers
d) _____ California Grain & Feed Association
e) _____ Other *Please Specify* _____

14. In the last two years, which of the following marketing and pricing methods did you use for your wheat?

	Percentage of crop			
I market with:	less than 25%	25-50%	50-75%	75% or more
Cash/spot price at harvest time	☐	☐	☐	☐
Forward contract with handler/processor	☐	☐	☐	☐
Hedge with futures market	☐	☐	☐	☐
Directly to the end user (flour mill, exporter, etc.)	☐	☐	☐	☐
*Other*_____				

15. If a wheat growers' cooperative was established, what services should it offer? (If more than one service is selected, rank your preferences with 1 as most preferred.)

Rank	**Service**	Rank	**Service**
	Marketing of wheat		Storage facilities
	Cooperative milling of wheat		Drying facilities
	Custom harvesting		Cleaning facilities
	Production and harvesting supplies		Transportation facilities
	Equipment rental		Develop & market wheat specialty products
	Crop insurance	Other: _____	

Appendix Survey 1 (Cont). California Wheat Growers Survey

16. Please rank the following statements, using one choice for each statement:

	Agree Completely	Agree Somewhat	Neither Agree or Disagree	Disagree Somewhat	Disagree Completely
Given the world supply and demand situation, I receive a fair price.	☐	☐	☐	☐	☐
We are not paid the premium prices we should be for quality differences.	☐	☐	☐	☐	☐
Adequate market strategy information is readily available to wheat growers.	☐	☐	☐	☐	☐
Given costs and returns for all crops grown, wheat is a good alternative.	☐	☐	☐	☐	☐
I will most likely be growing more acres of wheat in 3-5 years.	☐	☐	☐	☐	☐

17. Please rank the following statements, using one choice for each statement:

Idea – Concept	Agree Completely	Agree Somewhat	Neither Agree or Disagree	Disagree Somewhat	Disagree Completely
Farmer's vertical integration through cooperative ownership of processing or distribution facilities is sound strategy.	☐	☐	☐	☐	☐
Today, cooperative forms of business are viable and strong (compare with proprietary firms, corporations, partnerships, LLC, sole proprietor)	☐	☐	☐	☐	☐
Cooperatives provide California farmers with greater market power and returns to a commodity than if they did not exist.	☐	☐	☐	☐	☐
I am willing to make a start-up cooperative investment given the many factors to evaluate are reasonable.	☐	☐	☐	☐	☐
Generally, I favor investing/developing cooperative marketing.	☐	☐	☐	☐	☐
Cooperative business was acceptable for the 19th and 20th century, but not today.	☐	☐	☐	☐	☐
Farmers and ranchers should focus on production, not lose focus by integrating forward into processing, packaging or distribution.	☐	☐	☐	☐	☐
Managing price risk & market access assurance (a home for my product) are the major long run success issues of my farm.	☐	☐	☐	☐	☐

Appendix Table 3. Dataset based on the AMS California Food and Feed Grain Weekly Reports from January 1999 through May 2002.

California Grain and Feed Report

	Flour Milling			Feed				Farm Price HRW :#2; 13%	Farm Price HRW;#2 Ord Prot	Farm Price Durum	Farm Price Feed Wheat
Date	13%	13.50%	14%	Petaluma -Santa Rosa	Stockton-Modesto	Fresno-Tulare	Los Angeles-Chino Valley				
1/14/99	$6.83	$6.89	$6.96				$6.00	$6.00			
1/21/99	$6.68	$6.75	$6.82				$6.00			$5.40	
1/28/99	$6.73	$6.80	$6.87		$5.60		$6.00	$6.65			
2/18/99	$6.23	$6.29	$6.36		$5.50		$6.00			$5.10	
2/25/99	$5.93	$6.00	$6.07				$6.00			$5.10	
3/4/99	$6.14	$6.21	$6.28		$5.40		$6.00	$4.55		$5.10	
3/11/99	$6.43	$6.50	$6.57		$5.30		$6.00				
4/29/99	$5.89	$5.96	$6.03	$5.25	$5.20		$6.00			$5.50	
5/13/99	$6.11	$6.18	$6.24		$5.20		$6.00			$5.50	
5/20/99	$5.76	$5.85	$5.90		$5.10		$6.00			$5.50	
5/27/99	$5.78	$5.85	$5.91				$5.50	$4.85		$5.50	
6/3/99	$5.99	$6.06	$6.12	$5.15	$5.00		$5.50			$5.50	
6/10/99	$6.19	$6.26	$6.32				$5.50	$5.00		$5.50	$4.50
6/17/99	$5.94	$6.01	$6.07		$4.72		$5.75	$5.05		$5.50	$4.00
6/24/99	$6.00	$6.07	$6.13		$4.76		$5.50	$5.12	$4.60	$5.50	$4.25
7/1/99	$6.05	$6.11	$6.18	$4.90	$4.80		$5.50	$5.10		$5.50	$4.25
8/19/99	$6.73	$6.79	$6.86		$4.75		$5.75				
9/3/99	$6.68	$6.75	$6.82		$4.95		$5.75				
9/9/99	$6.66	$6.73	$6.79		$4.90		$5.75			$5.65	
9/30/99	$6.57	$6.64	$6.71	$5.00						$5.85	
10/7/99	$6.39	$6.46	$6.53				$5.75			$5.85	
10/21/99	$6.38	$6.45	$6.51		$5.05						
10/28/99	$6.37	$6.44	$6.51				$5.75				

Appendix Table 3 (Cont). Dataset based on the AMS California Food and Feed Grain Weekly Reports from January 1999 through May 2002.

California Grain and Feed Report

	Flour Milling			Feed				Farm Price HRW :#2; 13%	Farm Price HRW;#2 Ord Prot	Farm Price Durum	Farm Price Feed Wheat
Date	13%	13.50%	14%	Petaluma -Santa Rosa	Stockton-Modesto	Fresno-Tulare	Los Angeles-Chino Valley				
12/29/99	$6.16	$6.23	$6.29		$5.15		$5.75				
1/14/00	$6.42	$6.48	$6.55	$5.25			$5.75				
1/20/00	$6.46	$6.53	$6.60				$5.75				
1/27/00	$6.43	$6.50	$6.56		$5.00		$5.75				
2/3/00	$6.27	$6.34	$6.41				$5.75				
2/10/00	$6.52	$6.59	$6.66		$5.00		$5.75				
2/17/00	$6.39	$6.46	$6.52		$5.10		$5.75				
3/9/00	$6.43	$6.49	$6.56		$5.10		$5.75				
3/30/00	$6.17	$6.23	$6.30		$5.00		$5.75				
5/18/00	$6.33	$6.40	$6.47		$5.00		$5.75	$5.55			
5/25/00	$6.62	$6.68	$6.75		$5.00	$5.00	$5.75	$5.45			$4.40
7/6/00	$6.52	$6.58	$6.65	$4.85	$4.70		$5.75				$4.15
7/20/00	$6.30	$6.36	$6.43		$4.50		$5.75	$5.25			
7/27/00	$6.12	$6.18	$6.25	$4.40	$4.35		$5.75				$3.90
8/3/00	$6.03	$6.10	$6.17	$4.40	$4.35		$5.75	$5.02			
8/10/00	$5.97	$6.04	$6.11		$4.25		$5.75	$5.05			
8/17/00	$6.06	$6.12	$6.19		$4.50		$5.50				
8/24/00	$6.11	$6.18	$6.25	$4.45	$4.50		$5.75				$5.30
8/31/00	$6.29	$6.36	$6.43		$4.80		$5.75				
10/19/00	$6.56	$6.63	$6.70		$5.15		$6.00				
10/27/00	$6.50	$6.57	$6.63		$5.10		$6.00				
11/2/00	$6.71	$6.78	$6.84		$5.15		$6.00				
11/9/00	$6.66	$6.73	$6.79		$5.20		$6.10				
11/16/00	$6.62	$6.68	$6.75		$5.25		$6.10				
11/30/00	$6.65	$6.72	$6.78		$5.25		$6.10				

Appendix Table 3 (Cont). Dataset based on the AMS California Food and Feed Grain Weekly Reports from January 1999 through May 2002.

California Grain and Feed Report

	Flour Milling			Feed				Farm Price HRW ;#2; 13%	Farm Price HRW;#2 Ord Prot	Farm Price Durum	Farm Price Feed Wheat
Date	13%	13.50%	14%	Petaluma -Santa Rosa	Stockton-Modesto	Fresno-Tulare	Los Angeles-Chino Valley				
12/7/00	$6.63	$6.70	$6.77	$5.30			$6.10			$7.00	
12/14/00	$6.57	$6.63	$6.70		$5.30		$6.10				
11/21/00	$6.74	$6.81	$6.88		$5.30		$6.10			$6.90	
1/11/01	$6.96	$7.03	$7.09		$5.40		$6.10				
1/18/01	$6.78	$6.85	$6.92		$5.35		$6.25				
1/25/01	$6.72	$6.78	$6.85				$6.25				
2/1/01	$6.61	$6.68	$6.74	$5.00	$5.00		$6.25				
2/8/01	$6.45	$6.52	$6.58			$5.25	$6.25				
2/15/01	$6.45	$6.51	$6.58				$6.25				
3/1/01	$6.63	$6.70	$6.76	$5.00			$6.25				
3/8/01	$6.68	$6.74	$6.81		$5.15		$6.25				
4/26/01	$6.73	$6.76	$6.86				$6.25				
5/11/01	$6.71	$6.77	$6.84		$4.85		$6.25		$4.70	$6.25	
5/17/01	$6.91	$6.98	$7.05				$6.25	$5.90		$6.25	
5/24/01	$6.61	$6.68	$6.74		$4.75		$6.25	$5.60		$6.25	
6/1/01	$6.81	$6.87	$6.94		$4.75		$6.00	$5.57		$6.25	
6/7/01	$6.61	$6.68	$6.75	$4.85	$4.75		$6.00	$5.40	$4.10	$6.25	$4.20
6/14/01	$6.54	$6.61	$6.68		$4.80		$6.00	$5.43	$4.40		
6/21/01	$6.43	$6.49	$6.56		$4.80		$5.95	$5.39	$4.15		
6/28/01	$6.16	$6.23	$6.29	$4.75			$5.95	$5.15	$4.15	$6.25	
8/16/01	$6.33	$6.39	$6.49				$6.25			$6.50	
8/30/01	$6.37	$6.44	$6.51		$4.75		$6.25				
9/6/01	$6.40	$6.47	$6.54		$5.05		$6.25		$4.00		
9/13/01	$6.47	$6.53	$6.60				$6.25				
9/20/01	$6.31	$6.37	$6.44				$6.25			$7.00	

Appendix Table 3 (Cont). Dataset based on the AMS California Food and Feed Grain Weekly Reports from January 1999 through May 2002.

California Grain and Feed Report

	Flour Milling			Feed				Farm Price HRW :#2; 13%	Farm Price HRW;#2 Ord Prot	Farm Price Durum	Farm Price Feed Wheat
Date	13%	13.50%	14%	Petaluma -Santa Rosa	Stockton-Modesto	Fresno-Tulare	Los Angeles-Chino Valley				
9/27/01	$6.42	$6.48	$6.55		$5.00		$6.25			$7.00	
9/27/01	$6.42	$6.48	$6.55		$5.00		$6.25			$7.00	
10/11/01	$6.31	$6.38	$6.45				$6.25			$7.10	
10/18/01	$6.38	$6.45	$6.51	$5.00			$6.25			$7.00	
12/20/01	$6.23	$6.30	$6.31		$5.50	$5.80	$6.25				
1/10/02	$6.33	$6.40	$6.46	$5.60			$6.25				
1/17/02	$6.43	$6.49	$6.56		$5.60		$6.25				
1/31/02	$6.26	$6.33	$6.39	$5.50			$6.25				
1/24/02	$6.36	$6.43	$6.50				$6.25				
2/7/02	$6.26	$6.33	$6.40		$5.45		$6.25				
2/14/02	$6.25	$6.32	$6.38		$5.40		$6.00				
2/21/02	$6.27	$6.33	$6.40	$5.50	$5.60		$6.00				
2/28/02	$6.11	$6.18	$6.25	$5.55	$5.60		$6.00				
3/14/02	$6.17	$6.24	$6.31		$5.25		$6.20		$6.75		
3/21/02	$6.14	$6.21	$6.28				$6.20				$4.53
3/28/02	$6.25	$6.32	$6.38		$5.45		$6.20				
4/4/02	$6.44	$6.51	$6.58				$6.20				
4/18/02	$6.33	$6.40	$6.46	$5.05			$6.25		$4.50		
4/25/02	$6.08	$6.15	$6.22				$6.25		$4.25		
5/2/02	$6.04	$6.11	$6.17				$6.25		$4.25		
5/9/02	$6.13	$6.20	$6.26				$6.25			$6.75	$4.35
5/16/02	$6.31	$6.37	$6.44		$5.80		$6.25		$4.50	$6.50	
5/27/02		$6.48	$6.54				$6.29	$5.41			

Appendix Table 4. California Wheat Commission First Handler Database.

CONTACT NAME	COMPANY	ADDR	CITY	ST	ZIP	AREA CODE	W_PHONE	FAX AREA CODE	FAX
	BILL ZANOLA	169 GRACE COURT	LEMOORE	CA	93245	559	924-3496	559	924-3336
	EHLERS ELEVATORS INC	P O BOX 2239	LODI	CA	95241	209	334-5911	209	466-6526
	FOSTER FARMS COMMODITIES DIVISION	2950 S. CHERRY AVENUE	FRESNO	CA	93706	559	457-6500	559	457-6555
	HARTMANN BROS	104 MATMOR ROAD	WOODLAND	CA	95776	530	662-8658	530	662-8659
	HUARTE GRAIN CO	P O BOX 547	MADERA	CA	93639	559	673-5145	559	662-1178
	J D HEISKELL & COMPANY	P. O. BOX 1379	TULARE	CA	93275	559	685-6100	559	686-8697
	L A HEARNE CO	512 METZ ROAD	KING CITY	CA	93930	831	385-5441	408	385-4377
	PHILLIPS GRAIN CO	P O BOX 548	DELANO	CA	93216	661	725-3725	661	725-9260
	RIVERSIDE LTD	BOX 668	ISLETON	CA	95641	916	777-6076	916	777-6321
	WESTERN GRAIN MARKETING	P O BOX 220	YOLO	CA	95697	530	662-9626	530	666-7401
	A L GILBERT CO	P O BOX 38	OAKDALE	CA	95361	559	233-8823		
	ARGIA INC	P O BOX 306	HOLTVILLE	CA	92250	760	356-4489	760	353-6844
	ARTOIS FEED INC	P O BOX 120	ARTOIS	CA	95913	530	934-6910	530	934-6914
	AZEVEDO HAY & GRAIN	P.O. BOX 760	DIXON	CA	95620	707	678-2247	707	678-5607
	BAGLIETTO SEED	301 S AURORA	STOCKTON	CA	95203	209	466-0433	209	466-6377
	BRIGHT'S NURSERY INC	5246 S PLAINSBURG ROAD	LE GRAND	CA	95333	209	389-4511	209	389-4501
	C-SHORE INTERNATIONAL	1102 N BRAND BLVD STE 63	GLENDALE	CA	91202	818	909-4684	818	909-4703
	CALIFORNIA MILLING	1861 EAST 55TH ST	LOS ANGELES	CA	90058	323	585-0131		
	CATTLEMEN'S FEED & MILL	907 BROCKMAN RD	EL CENTRO	CA	92243	760	352-4531	760	357-5479
	COALINGA FEED YARD	P O BOX 835	COALINGA	CA	93210	559	935-1681	559	935-1684
	CORCPORK, INC	PO BOX 247	CORCORAN	CA	90071	559	992-8421	559	992-2516
	D'ARTENAY FARMS	RR 1 BOX 330	COALINGA	CA	93210	559	935-2031	559	935-5357
	E W MERRITT FARMS	11188 RD 192	PORTERVILLE	CA	93257	559	784-8916	559	784-8916
	EL TORO LAND & CATTLE	P O BOX G	HEBER	CA	92249	760	352-6312	760	352-1063
	FALL RIVER FEED STORE	PO BOX 385	FALL RIVER MILLS	CA	96028	530	336-5507	530	336-5507
	GRANGE CO-OP SUPPLY ASSN	P O BOX 3637	CENTRAL POINT	OR	97502	541	664-1261		
	GUNTER BROTHERS INC	17620 MONTEREY ST	MORGAN HILL	CA	95037	408	779-3136	408	778-3256
	HARRIS FEEDING CO	RT 1 BOX 400	COALINGA	CA	93210	559	884-2435	559	884-2253
	HATCH MILLING CO	9400 W MAIN	TURLOCK	CA	95380	209	632-2424	209	632-4098
	HURST TRADING INC	9957 MEDFORD AVE	OAKLAND	CA	94603	510	632-6795		
	IMPERIAL VALLEY MILLING CO	P O BOX 387	HOLTVILLE	CA	92250	760	356-2914	760	356-2916
	J G BOSWELL	P O BOX 457	CORCORAN	CA	93212	559	992-2141	559	992-3558
	JOHN GRIZZLE FEEDLOT	1395 BONDS CORNER ROAD	HOLTVILLE	CA	92250	760	356-4381	760	356-2577
	K - F SEEDS	4307 FIFIELD ROAD	BRAWLEY	CA	92227	760	344-6391	760	344-6394

Appendix Table 4 (Cont.). California Wheat Commission First Handler Database.

CONTACT NAME	COMPANY	ADDR	CITY	ST	ZIP	AREA CODE	W_PHONE	FAX AREA CODE	FAX
	LACEY MILLING	217 W FIFTH ST	HANFORD	CA	93230	559	584-6634	559	584-9165
	LOHSE MILL	P O BOX 168	ARTOIS	CA	95913	530	934-2157	530	934-9106
	MALIN GRAIN & FEED CO	P O BOX 438	MALIN	OR	97632	541	723-2555		
	MAST & SON	15416 GOTTLOB MAST WAY	ESPARTO	CA	95627	530	787-3372		
	N F DAVIS DRIER & ELEVATOR	P O BOX 425	FIREBAUGH	CA	93622	559	659-3035	559	659-2275
	NEWELL GRAIN GROWERS ASSN	P O BOX 576	TULELAKE	CA	96134	530	667-2603	530	667-4845
	OAKDALE TRADING CO	P O BOX 1829	OAKDALE	CA	95361	209	848-8012	209	848-8424
	PHILLIPS CATTLE	PO BOX 728	IMPERIAL	CA	92251	760	353-1175		
	REATA CATTLE FEEDERS	180 MARJORIE STE E	BRAWLEY	CA	92227	760	344-7500	760	344-6060
	RUEGGER & RUEGGER	398 W RUTHERFORD	WESTMORLAND	CA	92281	760	344-1734	760	344-1439
	S & W SEED CO	P O BOX 235	FIVE POINTS	CA	93624	559	884-2535	559	884-2750
	SOUSA AG SERVICE	P O BOX 235	MONTAGUE	CA	96064	530	459-5661	530	459-5683
	THREE BRAND CATTLE	34377 LERDO HWY	BAKERSFIELD	CA	93308	661	399-9521	661	399-4730
	TRI-CORD FARMS	20201 HWY 97 SOUTH	KLAMATH FALLS	OR	97603	541	883-3466	541	883-7792
	WESTMORELAND CATTLE CO	2205 WESTMORELAND RD	IMPERIAL	CA	92251	760	352-3040	760	352-1679
ABATTI JR, ALEX	ALLSTAR SEED COMPANY	2015 SILSBEE	EL CENTRO	CA	92243	760	353-4170	760	353-1767
ADAMS, MIKE	ADAMS GRAIN CO	P. O. BOX 799	ARBUCKLE	CA	95912	530	476-2000	530	476-2315
ARAKI, DELL	BRITZ INC	P O BOX 9050	FRESNO	CA	93790	559	448-8000	559	448-8020
Attn: GRAIN ACCOUNTING	PENDLETON FLOUR MILLS	PO BOX 1427	PENDLETON	OR	97801	541	276-6511		
BORBA BROS FARMS	BORBA FARMS INC	11054 W MT WHITNEY	RIVERDALE	CA	93656	559	866-5671	559	866-5666
BRUNDAGE, KIP	G & K SEED	720 LAS ANIMAS AVE	GILROY	CA	95020				
COALE, DWIGHT	GENERAL MILLS, INC COMMERCE STATION	PO BOX 15003,	MINNEAPOLIS	MN	55415	612	540-4439	612	540-4818
COPE, JW	WINEMA ELEVATORS INC	P O BOX 848	TULELAKE	CA	96134	530	667-2275	530	667-4075
CORREA, TONY	SHANCO COMMODITIES	3600 W. ORCHARD CT.	VISALIA	CA	93277	559	636-1936	559	636-2553
EDGAR, MICHAEL	BARKLEY SEED INC	P O BOX 5540	YUMA	AZ	85366	520	782-2571	520	782-4656
FOSTER, ROD	FOSTER MILLING	3403 CASEY RD	BRAWLEY	CA	92227	760	352-4171	760	356-2275
GIESBRECHT, BILL	SUNSET DRYER	8069 RD 48	GLENN	CA	95943	530	934-2330	530	934-4901
GIUSTO, KEITH	GIUSTO'S SPECIALTY FOODS	344 LITTLEFIELD AVE.	S SAN FRANCISCO	CA	94080	707	321-2253	707	762-8756
GRAY, W R		P O BOX 784	HEMET	CA	92343	909	658-5161		
GRUNSKY, TIM	PHIL O'CONNELL GRAIN CO	P O BOX 1687	STOCKTON	CA	95201	209	465-5871	209	465-1303
HARRISON, DICK	DAN'S FEED & SEED INC.	240 E FOURTH ST	PERRIS	CA	92570	909	657-5111	909	943-2098
JAMES-ROGERS, JANELLE	GRAIN BROKERS, INC	8101 E. BULLARD AVE	CLOVIS	CA	93691	559	297-6591	559	297-9067

Appendix Table 4 (Cont.). California Wheat Commission First Handler Database.

CONTACT NAME	COMPANY	ADDR	CITY	ST	ZIP	AREA CODE	W_PHONE	FAX AREA CODE	FAX
JANIE	LAUGHLIN CARTRELL, INC.	P. O. BOX 399	CARLTON	OR	97111	503	852-7151	503	852-7056
JERMIN, TOM	TEMPLETON FEED & GRAIN	PO BOX 127	TEMPLETON	CA	93465	805	434-1136		
LEIMGRUBER, MAX		798 VENCILL RD	HOLTVILLE	CA	92250	760	356-2472		
LEVINE, JONATHAN A	LEVINE GRAIN COMPANY, INC.	P. O. BOX 1325	WOODLAND	CA	95776	530	662-2774	530	662-4322
LOFTON, ROBERT A	SUPERIOR CATTLE FEEDERS	P O BOX 1828	CALIPATRIA	CA	92233	760	348-5133	760	348-2655
MEZGAR, DAN	FARMERS GRAIN ELEV	P O BOX 220	YOLO	CA	95697	800	834-9626	530	666-7401
MEZGER, DAN	MEZGER GRAIN CO	P O BOX 220	YOLO	CA	95697	800	834-9626	530	666-7401
MEZGER, DAN	MEZGER BROS	P O BOX 220	YOLO	CA	95697	800	834-9626	530	666-7401
MURRPY, BETTY	FRENCH CAMP GRAIN ELEVATOR L.L.C.	P.O. BOX 97	FRENCH CAMP	CA	95231	209	982-1121	209	952-1123
NANNEN, RICK	VALLEY COMMODITIES	P.O. BOX 67	COLUSA	CA	95932	530	458-3047	530	458-5769
NICOLETTI, MIKE	PENNY NEWMAN GRAIN	P O BOX 26240	FRESNO	CA	93729	559	448-8800	559	448-0500
OLDT, WILLIAM	NICHOLAS TURKEY BREEDING FARMS	P.O. BOX Y	SONOMA	CA	95476	707	938-1111		
ORLOPP, RON	ORLOPP TURKEY BREEDING FARMS	42055 ROAD 160	OROSI	CA	93647	559	528-4784	559	528-4786
PARRY, KATHY	ROSEMARY FARMS	PO BOX 699	SANTA MARIA	CA	93456	805	922-3531	805	928-6539
PERKINS, LEE	PACIFIC GRAIN & FOODS	P O BOX 3928	PINEDALE	CA	93650	559	276-2580	559	276-2936
PLOURD, BILL	EL TORO EXPORT	P.O. BOX 66	IMPERIAL	CA	92251	760	353-7990	760	355-4129
SAMUELSON, ROBERT	LOCKWOOD SEED & GRAIN	26777 CHOWCHILLA BLVD.	CHOWCHILLA	CA	93610	559	665-5702	559	665-4911
SHERWOOD, ROBERT	R C SHERWOOD GRAIN	P O BOX 929	LOS BANOS	CA	93635	209	826-6006	209	826-6013
SKELLEY, JOHN	ARIZONA GRAIN INC	P O BOX 11188	CASA GRANDE	AZ	85230	520	836-8228	520	421-0832
STEDMAN, KAREN	BLAIR GRAIN COMPANY	P O BOX 1467	STOCKTON	CA	95201	209	948-4466	209	948-0614
SUEDMEYER, K.A.	CARGILL, INCORPORATED	P.O. BOX 5606	MINNEAPOLIS	MN	55440	612	742-5019		
THOMAS, MIKE	IMPERIAL GRAIN GROWERS INC	P O BOX 184	BRAWLEY	CA	92227	760	344-0420	760	344-1309
YOUNGMARK, BOB	COUNTY LINE WAREHOUSE	PO BOX 175	DUNNIGAN	CA	95937	530	724-3301	530	476-2441

Appendix Survey 2. First Handler Phone Interview Questionnaire.

1. Name of Firm_____
2. Location_____
2. Contact_____

3. Willing to answer questions? Yes ___No____
4. Types of business activities involving wheat (a) Storage services? Yes___ No___
   If yes, does person perceive a shortage of wheat storage space in their area?
   Yes____No_____

Storage rates for wheat: In charges _____ storage rate _____ Load out charges_____

Normal time wheat in storage? _____

(b) Transportation services? Yes__ No___
(c) If yes, Transportation rates (per mile) _____
(d)

Does person see transportation shortage during harvest? Yes____ No_____

Other than harvest period? Yes____ No____When?_____

(c) Other wheat activities
Merchant (buy and re-sale) Yes_____ No_____ Other? _____

If yes, primary merchandizing is to:
feed lot _____ export_____ flour mills _____ Other_____

Types of wheat handled? Amounts?
_____ _____
_____ _____
_____ _____

Appendix Table 5. Toll Milling Estimates

*Note: If competitive markets then no pure profits exist and firms would charge only what is necessary to cover all costs and reasonable returns to capital used. Given that - toll milling would be equal to flour/wheat price differentials assuming Kansas City firm transfer costs are minimal and assuming away differences from individual market SR price variance and speculation.

Wheat & Flour "Cash Prices" from *Wall Street Journal* — Price/flour-Price/wheat=Toll Milling Charge

	Pflour HRW KC/cwt		*Mnpls Spr 14%Prot/bu*		*KC HRW/bu*		*Toll Milling+TC($/cwt)+Market Fluctuations*			
Date	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000
4-Sep	8.75	9.15	3.49	3.45	3.17	3.00	$1.82	$2.60	21%	28%
14-Sep	8.60	8.70	3.44	3.20	3.08	2.96	$1.87	$2.24	22%	26%
17-Sep	8.55	8.80	3.46	3.30	3.09	3.03	$1.79	$2.19	21%	25%
18-Sep	8.70	8.70	3.47	3.27	3.14	2.98	$1.85	$2.19	21%	25%
19-Sep	8.60	8.45	3.46	3.32	3.10	2.99	$1.84	$1.92	21%	23%
21-Sep	8.60	8.70	3.47	3.39	3.12	3.00	$1.78	$2.15	21%	25%
24-Sep	8.75	8.85	3.47	3.15	3.13	3.04	$1.91	$2.21	22%	25%
25-Sep	8.75	8.90	3.52	3.20	3.16	3.10	$1.86	$2.14	21%	24%
26-Sep	8.75	9.10	3.51	3.45	3.16	3.18	$1.86	$2.16	21%	24%
28-Sep	8.70	9.45	3.47	3.65	3.14	3.12	$1.84	$2.64	21%	28%
1-Oct	8.60	9.45	3.48	3.62	3.08	3.33	$1.88	$2.19	22%	23%
2-Oct	8.50	9.45	3.46	3.61	3.03	3.32	$1.89	$2.20	22%	23%
3-Oct	8.60	9.50	3.50	3.65	3.06	3.34	$1.91	$2.21	22%	23%
4-Oct	8.60	9.45	3.57	3.65	3.09	3.31	$1.84	$2.22	21%	23%
5-Oct	8.70	9.50	3.57	3.65	3.11	3.34	$1.92	$2.20	22%	23%
8-Oct	8.75	9.60	3.57	3.68	3.12	3.36	$1.94	$2.26	22%	24%
9-Oct	8.80	9.75	3.55	3.72	3.10	3.46	$2.03	$2.19	23%	22%
10-Oct	8.85	9.85	3.56	3.79	3.07	3.55	$2.15	$2.09	24%	21%
11-Oct	9.00	9.80	3.68	3.83	3.21	3.47	$1.98	$2.21	22%	23%
12-Oct	9.00	9.70	3.60	3.73	3.16	3.41	$2.09	$2.26	23%	23%
15-Oct	8.90	9.80	3.65	3.80	3.16	3.45	$1.99	$2.27	22%	23%
16-Oct	9.05	9.70	3.68	3.82	3.26	3.40	$1.94	$2.27	21%	23%
17-Oct	9.20	9.55	3.79	3.75	3.35	3.33	$1.89	$2.27	21%	24%
29-Oct	9.40	9.30	3.91	3.41	3.64	3.28	$1.45	$2.13	15%	23%
30-Oct	9.40	9.35	3.82	3.43	3.61	3.28	$1.52	$2.18	16%	23%
Average	*8.80*	*9.30*	*3.56*	*3.54*	*3.17*	*3.24*	*$1.87*	*$2.22*	*21%*	*23.9%*
n =	25	25	25	25	25	25	25	25	25	25
Std Dev	0.2475	0.4147	0.1249	0.2159	0.1512	0.1839	0.1468	0.1401	0.0187	0.0160
COV	35.58	22.43	28.53	16.40	20.98	17.62	12.77	15.87	11.40	14.95

Toll Milling = Pfl less Pwht differential adjusting for conversions of bu to cwt (1.639 bu/cwt)
and Flour "Extraction Rate" of 75% (or 1.333 cwt wheat grain to yield 1.0 cwt flour).

Thus: ***(Pwh/bu)(1.639 bu/cwt)(1.333 cwt wh/1cwt flour) ~ Pwh in flour |** *cet. paribus*.

Assume: 61 lbs/bu wheat US (avg last 2 years 61-64lbs/bu), 75% flour extraction rate in US,
and assumes byproducts are sold for the benefit of the toll miller, not the grain owner.

Toll Fees are estimated for this project to be an average of 2001 toll fees: $2.20/cwt.

Sources: Prices - *Wall Street Journal*, ExRt - *Milling and Baking News.*

fn:WSJImpTollMill.xls

Appendix Table 6. Wheat Containing Foods, Company Labels, Item Count for Three SLO Store Exploratory Sample

Count	Food Company Label-3 Store Exploratory Sample	Number of Products	Address	Retail Food Labels SLO	Number Prdts	CumPrdt	%Prdts	Cum%
1	Adrienne'sGourmet Foods	3	1	Mother's (Archway) Cookies	78	78	9.33%	9.3%
2	Ak-Mak Bakeries	1	2	Health Valley Co (HV)	51	129	6.10%	15.4%
3	Alternative Baking Co.	16	4865 PasadenaAve,Suite1,Sacramento 95841	Golden Grain	44	173	5.26%	20.7%
4	Alvarado St Bakery	20	3	Sara Lee Bakery	38	211	4.55%	25.2%
5	Amy'sKitchen,Inc	1	Box 449, Petaluma 94953	NF-bulk foods	30	241	3.59%	28.8%
6	Bagel Basement	2	673 Higuera, SanLuisObispo,	Maruchan Inc	28	269	3.35%	32.2%
7	Benefit Nutrition	1	NF	Earth Grains	27	296	3.23%	35.4%
8	Betty'sDinnerPrdts	3	4240 Hollis St, Emeryville 94608	Superstore Industries	25	321	2.99%	38.4%
9	Bimbo Bakeries, Inc.	1	4	Pure&Simple Bread Bakers	24	345	2.87%	41.3%
10	Breadshop Natural Foods	1	16100 FoothillBlvd, Irwindale 91706	Svenhardts	23	368	2.75%	44.0%
11	Calbee America, Inc.	6	Buena Park 90621	FantasticFoodsInc	21	389	2.51%	46.5%
12	Calif Goldminer	8	Oxnard 93003	Alvarado St Bakery	20	409	2.39%	48.9%
13	Con Agra Foods	5	Irvine 92619/800-BUTTERBALL	Linn's Cambria	20	429	2.39%	51.3%
14	ContadinaFoods	1	San Francisco 94105	Food For Life Baking Co., Inc	18	447	2.15%	53.5%
15	Countryside Baking Co.	1	Irvine	The Spice Hunter	17	464	2.03%	55.5%
16	Cynthia's	3	Exeter /800-705-3379	Alternative Baking Co.	16	480	1.91%	57.4%
17	Diana's Mexican Food Prdts	1	16330 S.Pioneer, Norwalk 90650/562-926-5802	Kashi Co.	16	496	1.91%	59.3%
18	SanLuisSourDough(div-Earth Grains)	27	5	Harmony Food Corp.	15	511	1.79%	61.1%
19	Escondido Mills	1	1345 Specialty Dr-#C,Vista 92083	Newman's Own	15	526	1.79%	62.9%
20	FantasticFoodsInc	21	Napa 94558-7517/800-258-1089	Nissin Foods Co	15	541	1.79%	64.7%
21	Francis Ford Coppola Pasta	4	Rutherford/800-RUBICON	Otis Spunkmeyrer	14	555	1.67%	66.4%
22	Florance Macaroni	1	Los Angeles 90011	MrsCubbison's Foods, Inc	11	566	1.32%	67.7%
23	Food For Life Baking Co., Inc	18	6	UpperCrust Biscotti	11	577	1.32%	69.0%
24	Freund Baking Co.	2	7	Sofia's Mexican Food Prdts	10	587	1.20%	70.2%
25	Future Fine Foods	7	2618 DeLaVina,SantaBarbara93105	Harvest Mills-LosAng	9	596	1.08%	71.3%
26	Gabriele Pasta Products	1	City of Industry 91748	Calif Goldminer	8	604	0.96%	72.2%
27	Garden of Eatin'	3	Los Angeles 90029	King'sHawaiian BakeryWest	8	612	0.96%	73.2%
28	GardenTimeNaturals	3	Napa Valley /800-688-7233	Natural Value	8	620	0.96%	74.2%
29	Golden Grain	44	8	Future Fine Foods	7	627	0.84%	75.0%
30	Goldrush Prdts Co	1	491 W.SanCarlosSt, SanJose 95110	Heaven Scent	7	634	0.84%	75.8%
31	Harmony Food Corp.	15	Santa Cruz 95060/www.harmonyfoods	La Reina Family Brands	7	641	0.84%	76.7%
32	Harvest Hills	9	Box66 1468, LosAngeles, 90066/310-390-1997	Life Spring Nutrition	7	648	0.84%	77.5%
33	Health Best	1	San Marcos 92078	Calbee American Inc.	6	654	0.72%	78.2%
34	Health Valley Co (HV)	51	9	Jon Donaire Desserts	6	660	0.72%	78.9%
35	Heaven Scent	7	Santa Monica 90403	North's Bakery Calif, Inc.	6	666	0.72%	79.7%
36	House of Bread	4	858 Higuera Street, SanLuisObispo	Spaans Cookie Co.	6	672	0.72%	80.4%
37	Huxtable's kitchen	1	2100 E.49th St, Vernon 90058	Tumaro's Inc	6	678	0.72%	81.1%
38	Indo-European Foods Inc.	1	Glendale 90201	Con Agra Foods	5	683	0.60%	81.7%

Appendix Table 6 (Cont). Wheat Containing Foods, Company Labels, Item Count for Three SLO Store Exploratory Sample

Count	Food Company Label-3 Store Exploratory Sample	Number of Products	Address	Retail Food Labels SLO	Number Prdts	CumPrdt	%Prdts	Cum%
39	Interstate Bakers	3	10	LompocTortilla Shop	5	688	0.60%	82.3%
40	IntermountainTrading Co.	1	Box 6157,Albany,94706/800-323-0042	Mrs.Leeper's Inc	5	693	0.60%	82.9%
41	J&J Snack Foods Corp	2	11	Napa Valley Pantry	5	698	0.60%	83.5%
42	JFC Int'l, Inc.	4	South San Francisco 94080	Organic Food Prdts Inc	5	703	0.60%	84.1%
43	JGF Prdts Inc	1	LongBeach 90802/800-378-6476	FFCoppolaPasta	4	707	0.48%	84.6%
44	Jon Donaire Desserts	6	SantaFe Springs 90670	House of Bread	4	711	0.48%	85.0%
45	Kashi Co.	16	Box8557, LaJolla,92038 www.kashi.com	JFC Int'l, Inc.	4	715	0.48%	85.5%
46	King'sHawaiian BakeryWest	8	12	Laguna Bakery	4	719	0.48%	86.0%
47	Lady J Inc.	2	Box 1307 Menlo Park 94025	Milton'sCorp	4	723	0.48%	86.5%
48	Laguna Bakery	4	13	Nature's Best	4	727	0.48%	87.0%
49	La Reina Family Brands	7	Los Angeles 90022	Ruiz Food Prdts	4	731	0.48%	87.4%
50	LaTortilla Factory	1	14	Sahara Natural Foods	4	735	0.48%	87.9%
51	Life Spring Nutrition	7	383 Beach Dr, Burlingame,94010	Sanyo Food Corp US	4	739	0.48%	88.4%
52	Linn's Cambria	20	Cambria 93428/www.linnsfruitbin /800-676-1670	SF French Bread Co.	4	743	0.48%	88.9%
53	LompocTortilla Shop	5	138 N. D Street,Lompoc 93436/805-736-7362	Vitasoy USA Inc	4	747	0.48%	89.4%
54	Marin Food Spec.	3	Byron 94514	Western Sierra Foods	4	751	0.48%	89.8%
55	Martha's	2	Redwood City 94063/800-973-3966	Adrienne'sGourmet Foods	3	754	0.36%	90.2%
56	Maruchan Inc	28	Irvine 92618	Betty'sDinnerPrdts	3	757	0.36%	90.6%
57	Masaniello	3	921 Griffin St,UnitA,GoverBeach,95423	Cynthia's	3	760	0.36%	90.9%
58	MC Cookie Co.	2	810 81st Avenue, Oakland 94621/800-225-5429	Garden of Eatin'	3	763	0.36%	91.3%
59	Milton'sCorp	4	3702 ViaDeLaValle,Su.2,Del Mar92014	GardenTimeNaturals	3	766	0.36%	91.6%
60	Moringa Nutritional Foods, Inc.	2	Torrance	Interstate Bakers	3	769	0.36%	92.0%
61	Mother's (Archway) Cookies	78	15	Marin Food Spec.	3	772	0.36%	92.3%
62	Mrs Denson'sCookies	1	16	Masaniello	3	775	0.36%	92.7%
63	Mrs.Leeper's Inc	5	17	Nana's Cookie Co.	3	778	0.36%	93.1%
64	MrsCubbison's Foods, Inc	11	1325 S.Peerless Way,Montebello, 90640	Nestle Inc	3	781	0.36%	93.4%
65	Nana's Cookie Co.	3	San Diego 92117 /800-836-7534	Organic Milling Co.	3	784	0.36%	93.8%
66	Nanka Seimen Co.	1	Los Angeles 90058	Santa Barbara Biscotti	3	787	0.36%	94.1%
67	Napa Valley Pantry	5	Box 50, Oakville 94562/888-234-5536	Summerfield Foods Inc.	3	790	0.36%	94.5%
68	Natural Food Mill Bakery	3	2991 E.DiheartaSt,Corona 91719	Natural Food Mill Bakery	3	793	0.36%	94.9%
69	Natural Value	8	Sacramento 95831/www.NaturalValue.com	Bagel Basement	2	795	0.24%	95.1%
70	Nature's Best	4	Brea 92621	Freund Baking Co.	2	797	0.24%	95.3%
71	Nestle Inc	3	Glendale 91203	J&J Snack Foods Corp	2	799	0.24%	95.6%
72	Newman's Own	15	Box2098,Aptos, 95001	Lady J Inc.	2	801	0.24%	95.8%
73	NF-bulk foods	30		Martha's	2	803	0.24%	96.1%

Appendix Table 6 (Cont). Wheat Containing Foods, Company Labels, Item Count for Three SLO Store Exploratory Sample

Count	Food Company Label-3 Store Exploratory Sample	Number of Products	Address	Retail Food Labels SLO	Number Prdts	CumPrdt	%Prdts	Cum%
74	Nissin Foods Co	15	Gardena 90249	MC Cookie Co.	2	805	0.24%	96.3%
75	North's Bakery Calif, Inc.	6	18	Moringa Nutritional Foods, Inc.	2	807	0.24%	96.5%
76	Organic Food Prdts Inc	5	Box 550, Aptos 95001	Rosetti Fine Fds	2	809	0.24%	96.8%
77	Organic Milling Co.	3	505 W.Allen Ave,SanDimas 91773/800-638-8686	Scolari's	2	811	0.24%	97.0%
78	Otis Spunkmeyrer	14	19	Ak-Mak Bakeries	1	812	0.12%	97.1%
79	P&C Bakeries	1	20	Amy'sKitchen,Inc	1	813	0.12%	97.2%
80	Power Bar Inc.	1	Berkeley 94704	Benefit Nutrition	1	814	0.12%	97.4%
81	Pure & Simple Bread Bakers	24	FairField 94533/ Templeton 93446	Bimbo Bakeries, Inc.	1	815	0.12%	97.5%
82	Quinoa Corp	1	21	Breadshop Natural Foods	1	816	0.12%	97.6%
83	Rosetti Fine Fds	2	Clovis 93612/559-323-6450	ContadinaFoods	1	817	0.12%	97.7%
84	Ruiz Food Prdts	4	22	Countryside Baking Co.	1	818	0.12%	97.8%
85	Sahara Natural Foods	4	16100 Foothill Blvd, Irwindale 91706	Diana's Mexican Food Prdts	1	819	0.12%	98.0%
86	Santa Barbara Biscotti	3	805-968-2410	Escondido Mills	1	820	0.12%	98.1%
87	Sanyo Food Corp US	4	11955 Monarch St, GardenGrove 92641-2194	FloranceMacaroni	1	821	0.12%	98.2%
88	Sara Lee Bakery	38	23	GabrielePastaPrdts	1	822	0.12%	98.3%
89	Scolari's	2	ArroyoGrande 93420-Retailer	Goldrush Prdts Co	1	823	0.12%	98.4%
90	SF French Bread Co.	4	Oakland 94621	Health Best	1	824	0.12%	98.6%
91	Shelton's	1	Pomona 91767	Huxtable's kitchen	1	825	0.12%	98.7%
92	Sofia's Mexican Food Prdts	10	1100 E.Holt St, Pomona91767/909-865-8900	IndoEuro Foods Inc.	1	826	0.12%	98.8%
93	Spaans Cookie Co.	6	465 C Street, Galt 95632/209-745-1974	IntermountainTrading Co.	1	827	0.12%	98.9%
94	Summerfield Foods Inc.	3	555 5thSt-Su100,Santa Rosa 95401/707-579-3938	JGF Prdts Inc	1	828	0.12%	99.0%
95	Superstore Industries	25	Lathrop 95330	LaTortilla Factory	1	829	0.12%	99.2%
96	Svenhardts	23	24	Mrs Denson'sCookies	1	830	0.12%	99.3%
97	The Spice Hunter	17	Box 7110, San Luis Obispo 93401	Nanka Seimen Co.	1	831	0.12%	99.4%
98	Tumaro's Inc	6	5300 SantaMonicaBlvd, LA 90029/800-446-1516	P&C Bakeries	1	832	0.12%	99.5%
99	UpperCrust Biscotti	11	25	Power Bar Inc.	1	833	0.12%	99.6%
100	Valley Lahvosh Baking Co.	1	Fresno	Quinoa Corp	1	834	0.12%	99.8%
101	Vitasoy USA Inc	4	SanFrancisco, 94080/800-328-8638	Shelton's	1	835	0.12%	99.9%
102	Western Sierra Foods	4	4887 Davenport Pl, Fremont 94538/510-623-7676	Valley Lahvosh Baking Co.	1	836	0.12%	100.0%

Appendix Survey 3. Food Processor Flour Buying Survey

1. Name of firm: _____

2. Location and phone number: _____

3. Contact Person: _____

4. Position: _____

5. What types and quantity of flour are purchased?

plain flour Yes No Quantity _____

blended flour mixes Yes No Quantity _____

specialty flour Yes No Quantity _____

if specialty flours, type/quantity_____

type/quantity_____

type/quantity_____

6. Are their specific quality characteristics that your firm requires? Yes No, if yes, what characteristics _____

7. Quality characteristics average protein _____

sieve size _____

other _____

8. How do you purchase flour: Cash Market Percentage_____

Contract Percentage_____

9. Names of firms from purchase flour from

a. _____ Type and average amount of total used _____

b. _____ Type and average amount of total used _____

c. _____ Type and average amount of total used _____

d. _____ Type and average amount of total used _____

e. _____ Type and average amount of total used _____

10. Do your purchase flour in bulk, packaged, bulk bag, or other. If packaged, bulk bag, or other what are the amounts? _____

Appendix Survey 3 (cont.). Food Processor Flour Buying Survey

11. Purchase price: spot market price contract price

13. Term of price fob, warehouse fob, processing plant

14. Flour prices (based on answer to q5): Flour 1_____

Flour 2_____

Flour 3_____

Flour 4_____

Flour 5_____

15. Could you send us a price list for your products? yes no

Appendix Table 7. Food Processor Wheat/Flour User Survey Compilation, Cal Poly 2002.

		Q5:1-Yes 2-No		Ques5b DescrptvQual Characteristics			Ques6 Quality Characteristics			Q7PurchApproach%		Prices Per 50# Wt		
ID	County	QualSpecs	QCharac1	QCharac2	QCharac3	QCharac4	Q6AvgProt%	Q6SieveSize	Q6 Other	CashMrkt	Contract	PriceA	PriceB	PriceC
1	Fresno	1	absorpLvl	Protein	Moisture	Ash	12.5	Powdery-minimal	Stability	10	90			
2	Orange	2	Na	na	na	na	na	na		0	100			
3	San Diego	1	Unbleached	nonBromide						100	0			
4	SanFrancisco	1		Protein			standard			0	100			
5	Orange	1	Gluten%						Gluten%	25	75	6.25 varies		
6	Alameda	1	Protein Qual	AbsorpChar			12.5-13%		Color/VitC	0	100			
7	Sacramento									0	100	5.90	21.49	
8	San Diego	1	BakeConsist	Protein			13.2			0	100	5.50		
9	Santa Cruz	2	miller supplied infor			Uses 30 types of flour		MediumWholeWheat		DK	DK			
10	SanFrancisco	1	Protein	Absorption			Varies			0	100	10.00	23.00	15.00
11	Los Angeles	1	Kosher	clean						10	90	6.10	20.00	
12	Los Angeles	1	Protein				11			30	70	10.70		
13	Imperial	1	hi humidity		High Moist	bleached	Avg	Avg		0	100			
14	Los Angeles/Fresno						11.5			0	100	10.00		
15	Alameda	2					Avg			0	100	15.20		
16	Monterey	1	Ash count	Consistency			DK	DK		0	100			

				Ques9 PurchType%Volume			Q12Price	Q13 %Flour Types			
ID	Q8a%Flour	Q8b%Flour	Q8c%Flour	Q9Bulk	Q9Pkgd	Q9BagBulk	Terms	Plain	WhlWheat	Blended	Specialty
1	90	10		90	0	10	Delivered	98	2	0	0
2	90	10		0	0	10	Delivered	90	0	0	10
3	100			0	0	100		100	0	0	0
4	32	32	32	0	0	100		33	0	33	33
5	90	5	5	0	0	100	Net 30	75	0	0	25
6	99.7	0.2	0.1	99	0	0.2	Delivered	99	<1	<1	0
7	64	36		0	100	0	Fob Plant	64	36	0	0
8	100			100	0	0	Fob Plant	100	0	0	0
9				DK			Delivered				
10	80	7	13	87	0	13	Fob Warehouse	80	0	7	13
11	100			0	0	100	Delivered	80	0	20	0
12				95	0	5	Fob Plant			Tortilla-Spec	100
13	100			0	0	100	Fob Plant	100			
14	100			95	5	0		99	1	0	0
15	100			80	20	0	Fob Plant	100	0	0	0
16	100	Durum		100	0	0	Delivered	43	0	0	57