FEASIBILITY OF FORMING A NEW GENERATION COOPERATIVE FOR FRESH GREENS MARKETING IN OKLAHOMA

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CHAPTER I

INTRODUCTION

Background

Leafy green vegetables are arguably the foundation of the vegetable industry. The term "leafy greens" refers to lettuce, cabbage, endive, escarole, spinach, broccoli, collards, turnip greens, mustard greens and kale. The consumption of leafy green vegetables has been trending higher over the past two decades. Most leafy green vegetables carry impressive nutritional credentials, as they are excellent sources of vitamins A and C, and several other nutrients. Leafy greens accounted for about $2.5 billion or 16 percent of all farm cash receipt for vegetables in 1996, up 13 percent from a figure of 1.1 billion in 1986.[1]

Spinach was cultivated over 2,000 years ago in Iran. It was used by the Greek and Roman civilizations. It was introduced into China and was then transported to Spain in 1100. By 1806, spinach had become a popular vegetable and was listed in American seed catalogs. In the 1920's, the U.S. pushed spinach commercially, with the "Popeye the Sailorman" cartoon being a great advocate for spinach consumption. Spinach is used as a

1 Source: Economic Research Service/USDA.

leafy green and eaten raw in salads. It is also used as a cooked green much like turnip greens or collard greens.

Spinach and leafy greens are grown across the U.S. from California to Florida. California is responsible for over one half of the production in the U.S. Texas is also a large producer of spinach, with about one third of the total crop in the U.S. Colorado, Florida and New Jersey also have significant acreage. California is a leader in the processing industry, with over one third of the total U.S. production. Arkansas and Oklahoma produce most of the remainder of the processed spinach[2].

Spinach is the fastest growing fresh-cut vegetable market segment in the United States (Foltz, 2002)[3]. Sales of packaged and baby spinach for the fresh market have been growing at about 36 per cent a year for packaged spinach, and 44 percent a year for baby spinach, according to A.C. Nielsen scanner data[4]. Oklahoma has proven to be a very good location for the production of spinach and fresh greens. However, Oklahoma's producers are not benefiting from the fresh market growth. Currently, Oklahoma's production is primarily marketed to food processors in Arkansas and very little fresh marketing of the product is done.

In order to seize the opportunities offered by the growing fresh market for leafy greens, investment in packing facilities would be needed. The fastest growing segments of the market are the small size, packaged spinach and greens (6 and 10-ounce bags). Producers may recognize the possible advantages of having a fresh outlet for their products but may not individually have the financial capacity, land resources or

2 Historic facts taken from: Http://www.uga.edu/vegetable/spinach.html

3 Foltz, T. "Spinach production increase slightly." The Packer, Vol. 109, No. 18, May 6, 2002, Page D-8.

4 Harvey, C. "Retailers, restaurants adopt baby varieties.", The Packer, Vol. 107, No. 33, Aug. 14, 2000, Page 6.

marketing expertise to operate an independent fresh greens packing and marketing facility. Marketing institutions that involve coalitions of producers may be necessary because of economies of size, risk, quality measurement costs, marketing costs and marketing expertise.

The State of Oklahoma has offered tax incentives in the form of tax credits [5] to producers who form processing ventures. Article 2357.25 of Title 68 of the Oklahoma Statutes explicitly allows a 30 percent tax credit for direct investments by Oklahoma agricultural producers in producer-owned agricultural processing cooperatives, Oklahoma producer-owned agricultural processing ventures, or Oklahoma producer-owned agricultural processing marketing associations created and designed to develop and advance the production, processing, handling and marketing of agricultural commodities grown, made or manufactured in Oklahoma. The credit might be adjusted, but must not exceed the 30 percent cap, so that the total estimate of credits does not exceed $1,000,000.

Within horticultural product marketing systems, the capacity for a closed form cooperative will be a major determinant of successful and institutional development. This form may have an advantage over a corporate organization, partnership or sole proprietorship because the traditional disadvantages attached to these forms of businesses are attenuated. These disadvantages include but are not limited to:

- Unlimited personal liability;
- Difficulties in ownership transfer;

5 See legislation §68-237.27, §68-237.25v1, §68-2357.25v2 available on the Oklahoman Public Legal Research System at http://oklegal.net/

- The need to provide stable dividends to investors precluding the extent to which internally generated funds maybe used to finance operations; and
- Double taxation (both corporate earning and investor returns are taxed).

New Generation Co-operatives (NGCs) are income tax exempted, and members have the opportunity to benefit from additional tax credits on their investment. NGCs operate with a different set of rules than traditional cooperatives. Membership is closed and members have specific delivery responsibilities and rights that are tied to the level of equity invested. The initial equity investment is high and the delivery rights are transferable. The value of delivery rights can appreciate or depreciate. Because of the explicit treatment of rules, game theory is a particularly useful way of analyzing and understanding the probability of new generation cooperative development.

New generation cooperatives are coalitions. According to Friedman (1986), a coalition is a subset of players that is able to make a binding agreement. The coalition can achieve a profit that it freely divides among its members in a mutually agreeable fashion. In a new generation cooperative, membership is closed and tied to equity shares, which assign delivery rights, and determine returns.

Marketing institutions are a necessary component of systems for satisfying human food and fiber needs, and inefficient institutions prevent making the most efficient use of resources. New generation cooperatives may be a way of sustaining the economic viability of farm operations, particularly farms that have the capacity to produce fresh spinach and greens.

Objectives

The overall objective of this research is to determine the feasibility of forming a new generation cooperative for fresh greens marketing in Oklahoma.

The specific objectives are:

- To estimate the potential payoffs of a new generation cooperative for fresh spinach and greens producers in Oklahoma; and
- To determine whether existing or potential producers would be willing to participate in the establishment of a closed form cooperative to package and market fresh spinach and greens.

Conceptual Framework

To accomplish the first objective, a business plan for a closed form new generation cooperative is completed. The analysis is similar to that completed for Three Rivers Produce in Atoka, Oklahoma. Dayvault et al. (1988) studied the application of a business development plan to start-up of a fresh vegetable packing plant in a previously undeveloped commercial fresh vegetable production region. The business plan incorporates an analysis of risk taken by the producer when he decides to join the coalition. This analysis is based on the "Value at Risk" tool recently developed in the finance literature (Chorafas 1998; Jorion 1999; Buttler 1999). The payoff function for a new generation cooperative coalition of grower/owners is estimated using an updated

version of "The Packing Simulation Model" (PACKSIM), developed by Falk et al. of the Agricultural Economics Department at Oklahoma State University.

For the second objective, existing and potential producers are interviewed to determine their interest in forming a closed cooperative. The results from the interviews may influence how the business plan and payoff rules are developed for the closed cooperative.

Procedures for Obtaining Data

Data on Oklahoma's greens and spinach production are limited. The U.S. Census of Agriculture publishes only rough data on fruit and vegetable production. According to the USDA annual vegetable production report, the U.S. produced 4,138,000 hundredweights of spinach in 2001 for fresh market roughly valued at $168,947,000, while 4,710,000 hundredweights of greens was produced for a total value of $108,461,000. In 2000, Oklahoma produced 21,000 tons of vegetables for the fresh market. However, Oklahoma's data are believed to be underestimated. A processing capacity of an entry-level fresh vegetable packing plant will be considered for this study.

Table 1. U. S. Spinach and Greens Production for Fresh Market (2001)

	Area Planted Acres	Area Harvested Acres	Production 1000 cwt	Value 1000 dollars
Spinach	32,610	31,250	4,138	168,947
Collards Greens	15,200	14,100	1,676	36,121
Kale Greens	4,580	4,510	870	23,148
Mustard Greens	9,660	9,160	1,040	29,434
Turnip Greens	11,500	10,500	1,124	19,758

Source: USDA

Dissertation Organization

This dissertation includes 4 chapters organized as follows: Chapter 1 presents the introduction and the problem statement. In the first Section of chapter II, the history of cooperatives as well as the New Generation Cooperatives is briefly reviewed; section II discusses the application of game theory to the study of cooperatives, with an emphasis on new generation cooperatives.

In Chapter III, an outline of a business plan is completed for a new generation cooperative. The business plan includes:

- A description of the cooperative, its objectives and strategies to reach its objectives,
- The survey results and their implications,
- A marketing plan,
- A production and operations plan, and
- Financial plans, including a risk analysis and similar to previous stochastic simulation analysis (Branch and Tilley, 1992; Jones et al., 1999; Nott, 2001; Boehlje, 1992, Nudell et al., 1999) is developed.

Chapter 4 presents the summary, conclusions and recommendations

CHAPTER II

COOPERATIVE AND COALITION THEORY

Introduction

A cooperative is a business or service organization that is owned and democratically controlled by the people who use its services and receive the benefits (services and earning allocations), which are distributed on the basis of how much they use it. As a self-help business form, agricultural cooperatives were designed to move product to market, buy inputs and influence price and other terms of trade, while providing fair treatment and other benefits to members.

Cooperative marketing has been fostered by farmers' professional associations in a sociological sense, as a social movement of independent farm operators seeking to enhance and protect their place in the economic organization of agriculture. Many schools of thought have influenced cooperative theory (Torgerson et al., 1997). First, the Cooperative Commonwealth School of thought, led by Howard A. Cowden and Murray Lincoln, saw cooperatives evolving into the dominant form of business activity, creating an economic and social order through utilization of federations and other linkages between cooperatives and allied support groups such as professional farmers as a class.

The California School, initiated by Aaron Sapiro, sought to correct imbalances in grower treatment and improve marketing coordination by using cooperatives organized along commodity lines to achieve improved marketing. This school aimed at unifying farmers in commodity-wide cooperatives that could exert market power and raise the total returns to agriculture. The Competitive Yardstick School (Nourse) argued that cooperatives should not seek market power, but simply bring enough competition to the system to give farmers a "competitive yardstick" against which to judge the performance of investor-owned firms. Emphasis was on local control, which manifested itself in cooperatives organized to meet the needs of producers in a local community.

The increased efficiency and productivity due to technology allowed farmers to become more independent in their farming operations, but also contributed to increased volume that affected crop prices. Traditional cooperatives face numerous limitations, mainly organizational, caused by vaguely defined property rights. The five major vaguely defined property rights cooperative problems include: the free-rider problem, the portfolio problem, the horizon problem, the control or agency problem and the influence cost problem (Cook, 1995).

The free rider problem concerns a conflict between individual incentives and Pareto optimality, which arises when a group of people are concerned with the provision of a public good, and each person knows only his or her own preference (Friedman 1986). When property rights are untradeable, insecure, or unassigned, the free rider problem emerges. Current members or nonmembers use a resource for their individual benefit. Property rights are not sufficiently well suited and enforced to ensure that current member-patrons bear the full costs of their actions and/or receive the full benefit.

The horizon problem, which is caused by restrictions on transferability of earnings, occurs when the time period of a member's residual claim on the net income generated by an asset is shorter than the productive life of that asset. This creates a pressure on the management to increase the proportion of cooperative cash flow devoted to current payment to members relative to investment, and to accelerate equity redemptions at the expense of retained earnings.

The portfolio problem is similar to a firm's equity acquisition problem. The lack of transferability, liquidity, and appreciation mechanisms for the exchange of residual claims prevents members from adjusting their cooperative asset portfolios to match their personal risk preferences. Members therefore hold suboptimal portfolios, and those who are forced to accept more risk than they prefer will pressure cooperative decision makers to rearrange the cooperative's investment portfolio, even if the reduced risk portfolio means lower expected returns.

The control problem is related to the agency cost associated with trying to prevent the divergence of interests between the membership and their representative board of directors and management in a cooperative. This problem increases with the size of the cooperative.

The influence cost problem appears when a cooperative engages in a wide variety of activities, and the diverse objectives among its members leads to damaging influence activities. These activities arise when organizational decisions affect the distribution of wealth or other benefits among members or constituent groups of the organization.

Jensen and Meckling (1976) argued, "Specification of individual rights determines how costs and rewards will be allocated among the participants in any

organization". The free rider and horizon problems require a solution that aligns members' investment with their level of patronage. On the other hand, a solution to the portfolio problem must align members' investment with their level of risk and reward. Reducing the agency problem and overseeing management performance without costly monitoring and enforcement measures could correct the control problem.

The solution to these problems requires a clearer specification of each member's property rights, which is what New Generation Cooperatives attempt to do, in order to create investment incentives to producers.

New Generation Cooperatives (NGCs)

Farm products are normally used as inputs into production processes that result ultimately in the delivery of finished goods to customers. The imperative of the reduction of input prices and the increase in the production volumes in the farms as well as the existence of more middlemen has contributed greatly to the price decline.

Capturing some of the margin that exists between the farm price and the finished product price (or retail price) has been a goal of cooperatives for some time. To do so, cooperative members must focus on manufacturing, instead of just concentrating on farm operations. Fulton (1997) argues that manufacturing represents a major paradigm shift from a mentality of producing and then selling an agricultural commodity to that of manufacturing a food product with characteristics that consumers or other buyers have identified as important.

Boehlje (1992) added that as the production of agricultural food products becomes more industrialized, there will be a shift of control and associated power. He argues further that power lies with those in the market who have access to the final consumer, the raw material inputs and the genetics. NGCs allow farmers to add some manufacturing capability to their farming operation via a cooperative, and potentially increase their revenues while maintaining their power through the control of their product from the seed to the finished product.

NGCs operate with a set of rules different from those of traditional cooperatives. While the later acts as a clearinghouse for products, a NGC is restricted to only accepting a predetermined amount of product from its members. Membership is closed and members have specific delivery responsibilities and rights that are tied to the level of equity invested. According to Stefanson et al. (1995), a "two-way" contract exists between the members and the cooperative that requires the member to deliver a certain amount of product to the cooperative and requires the cooperative to take delivery of this product. Cook and Iliopoulos (1999) describe the following organizational characteristics as providing the skeleton of NGCs:

- Transferable equity shares;
- Appreciable equity shares;
- Defined membership;
- Legally binding delivery contract or a uniform grower agreement; and
- Minimum up-front equity investment requirement.

However, NGCs keep some similarities with traditional cooperative structures (Stefanson et al. 1995):

- Democratic tradition is maintained through a policy of one member, one vote;
- Excess earnings are distributed among the members as dividends; and
- Members elect the Board of Directors from the membership.

New Generation Cooperative and Game Theory

Because of the explicit treatment of rules, game theory is a particularly useful way of analyzing and understanding the probability of new generation cooperative development. New generation cooperative development could be classified as a coalition with a transferable characteristic function. According to Friedman (1986), a coalition is a subset of players that is able to make a binding agreement. The coalition can achieve a profit that it freely divides among its members in a mutually agreeable fashion. In a new generation cooperative, producers purchase equity shares that assign membership and allocate delivery rights and obligations. The total quantity of delivery rights (shares) that the cooperative sells to producers depends on the processing capacity of the cooperative's operations. Membership is restricted once the targeted amounts of delivery right shares are sold.

The NGC is a cooperative game, different from a non-cooperative game according to Friedman (1986) in that it allows binding agreements. Other differences cited are (a) the fairness of outcomes, (b) the naturalness of outcomes, (c) the scope for players to make active choices, and (d) the levels on which players can interact. The fairness of outcomes is a debatable concept. However, the outcome of the NGC can be considered fair for each party as long as the payoff is equitably distributed among the

members, and in this case, according to the number of equity shares owned by each member. If producers can come together and reach an agreement, the outcome of the agreement should be fair for each of them. Otherwise, they are more likely to leave the coalition, or refuse to join it.

The naturalness of outcomes is defined as how reasonable it is to expect a particular solution or equilibrium to be realized in practice. Outcomes are "natural" if farmers with common interests reach binding agreements and behave in harmony with the achieved equilibrium. The equilibrium to be reached here, which is the core of the game, is roughly the main objective of the value-added cooperative: to capture the value of the finished goods that are produced and marketed from their low priced commodities (Brown, 2001). Regardless of the motivations of parties in the game, they all agreed on this objective. The scope for players to make active choices is captured in this game in the form of the Shapley values (sum of the marginal contributions). In fact, the equity shares and the delivery rights allocated to the parties are contributions of individual members to the solution of the game. Finally, the level on which players interact is high. Members can trade product among themselves, some buying from others in order to fulfill their obligation to deliver a certain amount of product of a predefined quality.

The Characteristic Function

The NGC is a cooperative game, which means it is a coalition with a transferable characteristic function.. This means that the coalition can achieve a certain amount of utility that it can freely divide among its members in a mutually agreeable fashion. In our

case the total amount of utility is divided based on the quota allocated to each member. In fact, the NGC satisfies the definition of a coalition. Friedman (1986) defines a coalition as a subset of players that is able to make a binding agreement. The transferable utility characteristic function of a game having the set of N is defined as a scalar valued function, $v(K) \in R$ (R is the set of finite real numbers) with each $K \subset N$, where $v(K)$ is the maximum payoff to members of the coalition K that the coalition can guarantee to itself

The characteristic functions are based on this key assumption:

If $u^K \in R^K$ can be achieved by the coalition K, then K can achieve any u'^K satisfying

$$\sum_{i \in K} u'_i \leq \sum_{i \in K} u_i \qquad \text{Where } u^K \text{ is the utility of the coalition } K \tag{1}$$

It is assumed that coalitions can achieve at least as much as the sum of what their members can achieve. This is the superadditivity condition, which is defined in terms of any partition of a subset. That is

$$K \cap L = \varnothing, \text{ Then } v(K \cup L) \geq v(K) + v(L) \tag{2}$$

Where K and L are subsets of N.

The characteristic function of a game, also called coalitional form, is given by $\Gamma = [N, v(K)]$, and is characterized by the set of players N and the characteristic function v.

The Core

The core is a solution concept for coalitional games that requires that no set of players be able to break away and take a joint action that makes all its members better off (Osborne and Rubinstein, 1994). Friedman (1986) defines the core of the game $\Gamma = (N, v)$ as the set of undominated imputations. An imputation is a payoff vector that gives each player at least as much as they can guarantee themselves and gives all players together *v(N)*. That is: $\sum_{i \in N} x_i = v(N)$. An imputation x is in the core if $\sum_{i \in K} x_i \geq v(K)$ for all coalitions *K*. Every game with a transferable utility characteristic function has a nonempty core. A nonempty core of the game $\Gamma = (N, v)$ is the solution of the linear programming problem, whose form is:

$$\text{Minimize } \sum_{i \in N} x_i \tag{3}$$

$$\text{Subject to } \sum_{i \in K} x_i \geq v(K) \text{ for all } K \in N, K \neq N \tag{4}$$

The core of this particular game is the solution upon which all the members agree. The main objective of the NGC is to capture the value of the finished goods that are produced and marketed from their commodities. The equilibrium achieved through this objective is undominated.

Let say we are interested in determining the delivery rights; the delivery rights will be the solution of the linear programming model, whose constraints are derived from the objectives of the agreements.

$$\text{Maximize } \sum_{i \in N} y_i \tag{5}$$

Subject to (6), the target quantity of product that the plant can process;

Subject to $\sum_{i \in K} y_i \leq v(P)$ (6)

Where y_i represents the individual deliveries of members, while $v(P)$ the processing capacity of the plant.

It should be noted that equations (5) and (6) are just equations (3) and (4) rewritten to fit the case of delivery rights. This time, the sum of delivery rights is equal or less than the capacity of the plant.

This quantity is then divided among members in proportion with their equity share and level of production.

The coalition would be stable if no imputation in the core is dominated by another imputation in the core, or if the imputations in the core are not dominated by other imputations outside the core. That is:

$$\sum_{i \in K} y_i \leq v(P) \quad (7)$$

We could say the epsilon-core (ε-core), which consists of imputations that are within epsilon of being in the core, would exist in the NGC. If the production capacity of a certain member cannot allow them to satisfy is his/her delivery obligations, this member will either buy the amount of product needed to complete their obligations, or the NGC will purchase the needed commodity and charge it against the member's account. The member can also quit the coalition by selling their equity shares and delivery rights to a new or existing member. The fact that benefits are higher and property rights are well defined for the members of the cooperative is an incentive to stay in the coalition. The core would be expanded by the issuance of additional equity shares that can be sold to the existing members and/or new members.

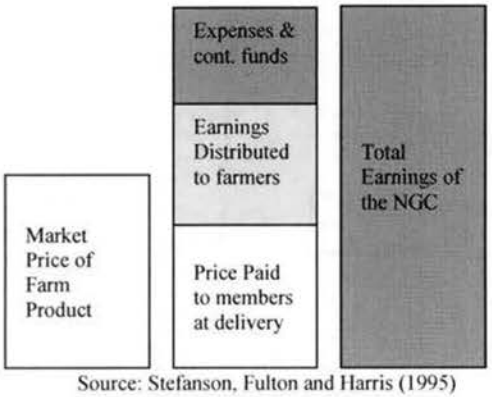
The Bargaining Set

The bargaining set consists of individually rational payoff configurations for which every objection can be met with a counter objection (Friedman, 1986). If a group of dissident members tried to convince a few others to go along with them, it should be possible for the original group to offer a better plan to attract the dissidents. When all objections can be met by counter objections, and an allocation in the core is not dominated by any other allocation inside and/or outside the core, the set is stable. If any allocation inside the core is dominated, some members will find it more profitable to operate outside the core and quit the coalition. In our case, the stability of the NGC is not in question since the property rights are well defined through the equity shares and the binding delivery rights (obligations).

Benefits to members

The benefits to members that join a NGC are well described by Stefanson et al. (1995). Producers would not only benefit from a guaranteed market and a price for the primary product by establishing a grower-owned value-added business, but they would also receive a share of earnings of the processing plant.

Because members have financed the cooperative with an equity infusion, some of the earnings generated by the co-operative are returned to the members at the end of the year. For example, as shown on Figure 1, members receive a percentage (x is a variable) of the current market price when they deliver their product to the plant. At the end of the year, earnings are calculated by taking the total revenue generated from the sale of the processed product and subtracting the total expenses of the cooperative. Allowance for contingency funds is also made in determining the earnings to be distributed to members. The earnings are divided among members in proportion to the amount of product delivered.



Source: Stefanson, Fulton and Harris (1995)

Figure 1: Earnings distribution of an NGC

This diagram clearly shows that the producer can eventually earn more by joining a value added cooperative if the venture becomes profitable, compared to when they sell their product to a bulk buyer. In addition, producers can either fulfill their contract obligations with their own product or purchase the product elsewhere for delivery to the plant. This might encourage interaction and transactions between producers, where some producers sell their production surplus to others who are short of product to deliver or who for some reason chose not to produce for that season. Thus, in the event that a producer is unable or unwilling to meet his/her contract requirement, the cooperative purchases the required amount of commodity and charges the cost against the member's account. The member's dividends will reflect the change. However, it should be noted that producers who chose to market directly their product are paid faster than those who chose to sell to the NGC.

CHAPTER III

BUSINESS ANALYSIS

Introduction

All activities carried out are subject to risk or uncertainty[6]. Agricultural production is typically a risky business. Farmers face a variety of price, yield, and resource risks, which make their incomes unstable from year to year. The type and the severity of the risk affecting the farmers vary with the type of activity they undertake.

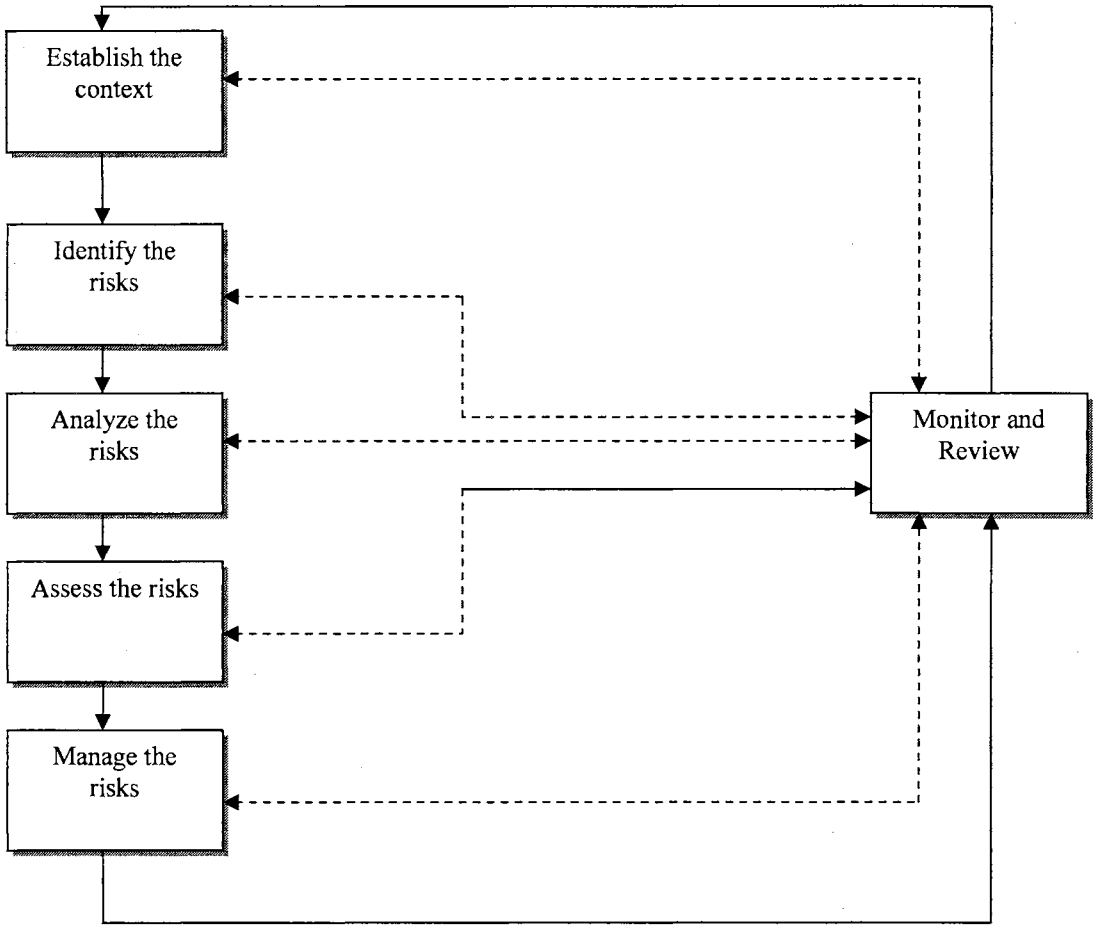
Numerous empirical studies have demonstrated that most people, especially farmers, are risk-averse (Binswanger, 1979; Hazell and Scandizzo, 1977). Farmers often prefer activities that provide a satisfactory level of security even if it means sacrificing income on average. Established technologies and less risky enterprises are sure ways to attract interest in new ventures (Hazell and Norton, 1986).

[6] Hardaker, Huirne and Anderson (1997) define risk as imperfect knowledge where the probabilities of the possible outcomes are known, whereas uncertainty exists when these probabilities are not known. They argue that this distinction is not useful since cases where probabilities are known are the exception rather than the rule in decision-making. Thus, uncertainty should be considered as imperfect knowledge and risk as uncertain consequences.

Financial and Risk Analysis

Decision-making in business implies that management has a choice among alternative actions. The alternative actions include different combinations of crops to produce, alternative production systems for crops or livestock and different marketing or financial strategies, for example. A decision taken in a risk-free setting is uninteresting because the decision maker can readily determine which strategy is the best. In order to be properly considered, sources of risk should be properly identified, assessed and managed.

Hardaker et al. (1997) describe a risk management process which involves a number of steps that should be undertaken in a routine and cyclical way by every organization to make sure all relevant risks are identified and managed. These steps include establishing the context, identifying the risks, analyzing the risks and managing the risks. Establishing the context deals with setting the scene and identifying the parameters within which a particular risk or range of risks are to be considered. Identifying the risk means making a list of all possible events that may have an important impact on the performance of the organization. Risk analysis considers the chances of occurrence of the risk, and assesses the consequences given current risk-management practice. Risk assessment flows from and is linked to the previous step of risk analysis. It is concerned with identifying those risks for which current risk management practices are not appropriate, so that further action is needed. Risk management means identifying the range of options for treating each particular risk, evaluating those options, selecting the most suitable option and implementing one's decision.



Source: Hardaker, Huirne and Anderson (1997)

Figure 2: Steps in Risk Management

Establishing the Context

It is useful, when dealing with risk identification, to consider all the types of risk common in agriculture and in this type of venture (NGC). The list of all possible risks is long, and only those that may have an important effect on the performance of the structure will be taken into account. According to Hardaker et al. (1997), the common types of risks encountered in agriculture are: production risk (quantity and quality), price or market risk, institutional risks, human or personal risk, business risk, and financial risk.

Risk Identification and Analysis

Production risk can be due to variability in yields and acreage planted. Once a crop is planted, production risk is related to the unpredictable nature and uncertainty of yield caused by uncontrollable factors (such as the weather) and by production practices.

Farm outputs as well as input prices are known to be difficult to predict. This is due to production risk as well as the effect of economic fundamentals, supply and demand. Price or market risk is due to the uncertainty tied to the price of inputs and outputs and it is very likely to occur in our case.

Institutional risk regroups all the change of rules that affect farm activities and related businesses: changes in income-tax provisions, laws governing the treatment of wastes, laws governing the creation of farmer's associations and more. Because these laws seem rather stable, we will not emphasize the treatment of this particular risk at this time.

Human and personal risks are related to issues regarding individual farmers. A farmer's slack can be picked up by another or many others. If for one reason or another, farmers cannot deliver their share of raw produce, they can purchase the equivalent produce from others to meet their obligations.

Business risk covers the aggregate effect of the uncertainty influencing the profitability of the firm (production, market, personal and institutional risks). It has its impact on measures of the business performance such as the net cash flow generated by the business activity. This type of risk is generally present, regardless of the type of activity undertaken.

Financial risk results from the method of financing the operation. Because of the leverage effect, the use of borrowed funds to provide some of the capital means that there will be an interest charge on the capital, thus reducing the share of profit allocated to equity holders. The higher the proportion of borrowed capital, the higher the financial risk associated with leverage. However, if the facility is totally financed by equity holders, the financial risk will be minimized as the risk associated with leverage is eliminated.

Risk Assessment and Management

Risk assessment is concerned with identifying those risks for which current risk-management practices are not appropriate, so that further action is needed. Several strategies are used to manage risks inherent to farmers. Strategies include enterprise

diversification, forward contracting, hedging, options, inventory management, participation in government programs, insurance and vertical integration by placing equity capital in off-farm ventures, including investing in a value-added cooperative.

Risk Monitoring and Review

Because risk management involves choices made with imperfect information, it is likely that risk-management options turn out to be unsatisfactory. When risks are originally identified and assessed, the information collected then might be either incomplete or inappropriate. Risks need to be monitored and reviewed to account for the change or the correction of knowledge and information accumulated. Monitoring and review are necessary to establish that risk-management is working and to identify aspects where further decisions need to be made. If adjustments are needed, one or more of the steps in risk management may need to be revisited to deal with the problem appropriately, so that better risk-management plans can be devised and put into operation.

Risk Mitigation aspects for the New Generation Cooperative

As Sporleder and Goldsmith (1997) point out, an important aspect of an agricultural supply or marketing cooperative is their ability to mitigate risk for their members, with mitigation defined as an action that results in a reduction in the variability of income per unit of time. Even though risk mitigation is not explicitly recognized

within the context of cooperative principles, cooperatives may pursue strategies which result in risk mitigation for their members.

Cooperatives offer the producers a way to take on other marketing functions in addition to their primary function. The cooperative development process is similar to vertical integration. Through vertical integration, a farm becomes less vulnerable to market swings by controlling its own source of supply or guaranteeing an outlet for products (Erickson et al., 2002).

However, any new venture is very risky. Producers under contract with an integrator face numerous risks, including risks of contract renewal, contract terms and contract negotiation. The fear the integrator may default on agreements is always present. Moreover, many production management and technology decisions are transferred to the integrator. Thus, management quality and continuity provide additional risks for contract producers (Royer, 1997). Producers, through their delivery rights, have a sure market for their produce, and are relieved from the uncertainty related to market availability. The cooperative (NGC in our case) is thought to be part of the producer's portfolio management. Other strategies investors use to reduce their risks and optimize their portfolio are complementarity and diversification (Lintner, 1965; Markowitz, 1952), which allows even the most risk averse agents to keep risky assets in their portfolio. The NGC is not exactly an extension of the farm, but a distinct entity adjacent to the farm. Investing offers farmers the opportunity to diversify their portfolio even though the new venture is risky.

Pooling is another method to mitigate farmers' risks. Accomplished through members' obligation to deliver, pooling consist of delivering one's product to a

determined stable market or pool and receiving a determined constant price. It has both the theoretical and empirical basis for risk mitigation. Theoretically, risk mitigation occurs through the potential reduction in income variability due to a constant delivery to a seasonal pool and earning a pool price representing some average of spot prices within a season, as opposed to a spot price at the time of sale. Empirically, Sporleder and Goldsmith (1997) have shown that a pooling marketing cooperative reduces the equity-assets ratio (or increases the solvency ratio, which is Owner Equity/Total Net Assets) about nine percent on average, compared to non-pooling cooperatives. This means that it results in a greater efficiency of equity capital through greater total assets controlled by equity owners, which allows the cooperative to function more efficiently in the long run.

The incentive to mitigate risk from selling to downstream markets with less variable prices per unit time and the motivation to protect the fixed investment already sunk in on-farm activities can encourage farmers to invest in a value added venture, and more so if they believe that the off-farm investment in a cooperative represents value-added marketing or potentials for product differentiation (Sporleder and Goldsmith, 1997).

Risk Management and PACKSIM

Risk is included in our analysis through the use of the simulation package "@Risk®". Financial plans, including a risk analysis based on the value at risk model [similar to the stochastic simulation analysis of a small-scale catfish processing plant developed by Branch and Tilley (1992)] will be developed. A stochastic simulation

model of a processing plant operation is used to analyze the sources and financial consequences of risk on a small-scale processor, based on generated distributions of revenues and costs. The risk evaluation is based on a sophisticated version of the value at risk model called "cash flow at risk", which is a single, summary, statistical measure of possible portfolio losses due to market movements (Linsmeier and Pearson, 1996).

About the Value at Risk (VAR)

The value at risk (VAR) concept summarizes the predicted maximum loss (or worst loss) over a target horizon within a given confidence interval, and provides the investors a way to decide whether the returns they receive are appropriate compensation for risk. It can be defined as the worst loss that can happen under normal market conditions over a specified horizon at a specified confidence level. More formally, VAR measures the shortfall from the quintiles of the distribution of trading revenues (Jorion, 1999).

VAR measures are based on two quantitative parameters: the confidence level and the horizon. For example, historical data on monthly returns can be ranged from a low of –6.5% to a high of +12.0%. By constructing regularly spaced "buckets" going from the lowest to the highest number, and counting how many observations fall into each bucket, a probability distribution for monthly returns, which counts how many occurrences have been observed in the past for a particular range, can be constructed. For each return, a probability of observing a lower return can be computed. At the 95% confidence level, there is a 5% probability of finding a return lower than –1.7%. Suppose we have a

portfolio of $100 million; since there is only a 5% chance that the portfolio will fall by more than $ 100 million times –1.7%, the VAR of a $100 million is 1.7 million, which is the market risk of this portfolio. Clearly, the asset's value can fall below $98.3 million (100 – 1.7), but there is only a 5% chance of doing so.

This result could also be obtained from the sample standard deviation if we assume that the returns are normally distributed. The choice of the parameters depends on the application at hand. If VAR is used to compare or report risk, the parameters can be arbitrarily chosen, as long as they are consistent. If VAR is used as the basis for setting the amount of equity capital, the parameters must be chosen with care. The confidence level must be high enough that the probability of exceeding it is very low. The value at risk evaluation could be performed using three different methods: the variance/covariance method, the historical method and the Monte Carlo Simulation method (Jorion, 1999).

The Variance/Covariance method or delta-normal method assumes that all asset returns are normally distributed, and consists of computing variances and correlations for all risk factors over 5 years to generate portfolio risk by a combination of linear exposures to many factors that are assumed to be normally distributed.

The Historical-Simulation method consists of applying current weights to a time-series of historical asset returns which do not represent an actual portfolio but rather reconstruct the history of a hypothetical portfolio using the current position. If returns are normally distributed, the result here is the same as that obtained under the variance/covariance method.

The Monte Carlo method proceeds in the following steps: first, basic market factors are identified and the mark-to-market value (which consist of recording the price

or value of a security, portfolio, or account to reflect the current market value) of the forward contract is obtained; second, a specific distribution of changes in the basic market factors is determined and its parameters are estimated; third, once the distribution has been selected, a pseudo-random generator is used to generate *n* hypothetical values of changes in the market factors, where *n* is usually greater than 1000. These hypothetical values of market factors are used to calculate mark-to-market portfolio values. The mark-to-market profits and losses are ordered from the largest profit and largest loss, and the VAR is the loss that is equaled or exceeded 5 percent of the time (The choice of 5 percent). The choice of distributions and parameters such as risk and correlations can be derived from historical data (Linsmeier and Pearson, 1996).

Unlike the value at risk, which is more adapted to daily portfolio risk management, cash flow at risk is a reasonable choice for non-financial corporations concerned with managing the risks inherent in operating cash flows (Jorion, 1999). Cash flows at risk measures are typically estimated using Monte Carlo simulation to estimate value at risk. The simulation will be conducted using an Excel add-on software package, @Risk®, which produces distributions of possible outcomes. @Risk® solves an Excel spreadsheet many times (once for each iteration), saves the result of key variables for each of the iterations, performs statistical analysis of the output variables after the last iteration is completed, prepares graphs of simulated values for output variables, and prints reports.

Business Plan

Description of the Business

In order to achieve our main objective, a processing plant would need to be created. It is assumed that the processing plant will take the form of a new generation cooperative. A business plan for a fresh greens packing facility is presented in this section. The business plan includes the mission and objectives of the new entity, the production and operation plan, the marketing plan, the financial plan, the staffing and organization plan, and a contingency plan.

Objectives of the Processing Plant

The main objective of the fresh greens and spinach processing plant is to deliver high quality fresh cut spinach and greens on the regional market, while providing to producers a more profitable channel to market spinach and greens than the current system that consists of direct sales to bulk buyers or processors. The created NGC should be able to achieve profitability within five years from the startup date. Another objective will be to give the producers a better control over their products.

Strategies

The primary strategy for reaching the objective of the processing plant is to process, pack and deliver fresh-cut vegetables to buyers. Other potential services include repacking fresh vegetables using brand names or packing for other producers during the off-season.

Contingency strategies would include:

- Creating an own brand;
- Creating new salad mixes;
- Maintaining a year round presence on the market by teaming up with Arkansas producers (where seasons are similar to Oklahoma) and Texas producers, thus making fresh spinach available to consumers all year.

Production and Operations Plan

To complete the production and operations plan, it will be important to address these questions:

- How many producers are interested in growing spinach/greens for the fresh market?
- How much are they willing to grow?
- Can we achieve a consistent quality across producers?
- How much can be profitably marketed during the time period when Oklahoma/Arkansas are in production?

A farmers' survey was made that answered most of these questions. The results of the survey are discussed in the following section.

Survey Results

Twenty active greens/spinach producers were identified and surveyed in Oklahoma. Most of them are based in Eastern Oklahoma. The bulk of them are located in the following counties: Le Flore, Muskogee, Caddo, Canadian, Cherokee, Custer and Blaine. While this number does not represent all the current producers in the state, it gathers the most important farmers engaged in the production of spinach and fresh greens. All twenty respondents returned their questionnaires. Seventeen were filled out correctly, while three responses were unusable. Sixteen respondents (94% of valid responses) expressed their strong interest in engaging in cooperative activities for fresh greens and spinach. Eight respondents (61%) said they were ready to sell through a processing plant while seventeen (95%) said they would sell to a cooperative as well. On average, each respondent knew at least two or more spinach and greens producers they could persuade to join an eventual value-added cooperative.

Of all farmers, 14 (82%) are full time; three are part time. Five of the farmers have 30 or more years of farming experience; four have a farming experience between 26 and 39 years; two between 21 and 26; two between 16 and 20, two between 11 and 15 and two between 3 and 5. Two of the farmers have more than 30 years of experience in greens and spinach production. One has 26 to 30 years, while two have 16 to twenty years; two have 11 to 15 years, two have 6 to 10 years, one has 3 to 5 years and six have

0-2 years of fresh greens and spinach experience. Most farms are individually owned (11 or 65%) while a few are owned in partnership (4 or 23%) or are incorporated (2 or 11%). Seven farmers (41%) mentioned available market as the reason for producing greens and spinach, while two farmers cited good prices and one cited production experience as reason for engaging in that activity.

The seventeen farmers who replied owned a total of 1620 acres of land and rented 1820 acres that were used to produce greens and spinach. Of all, 1435 acres were used for the production of greens, with an average yield of 9.9 tons per acre, while 1770 acres were used to produce spinach, with an average yield of 8.18 tons per acres in 2001.

The most important factor to farmers when selling their product was the existence of an outlet that provides technical assistance. This factor scored 4.36 on a scale of 6, while having an outlet that furnishes harvesting and other equipment came second, scoring 3.54. An outlet that buys large quantities came third (3.33) and an outlet that provides good prices only fourth with a score of 2.27. A more detailed summary of these results is available in appendix D.

Farmers expressed several concerns regarding the operations of the eventual cooperative, most of which are answered in this section, for example:

- How will the NGC operate during the off-season?

The NGC would have to rely on spinach from neighboring states for a year round operation. Packing for others as well as packing other types of greens may be feasible without costly extra investment. An interesting example would be to explore the possibility of packing cowpeas during off-season. In case it is not feasible, the plant will operate when Oklahoma and Arkansas are in production.

- How will the cooperative handle large volumes of spinach in such a short amount of time?

The crops would be harvested to match the processing capacity of the plant, given the perishable nature of spinach. The plant is projected to process 2,400 pounds of greens/spinach per hour, and would pack approximately 12 percent of the actual of the current acreage.

Where will laborers and specialists come from?

Laborers would have to be trained to handle spinach and other greens for the fresh market. Specialists are available on the job market.

- Will the Cooperative help them harvest their crop, just as the current contractor does?

The NGC would eventually help smaller producers with crop harvesting. Various alternatives exist: An agreement through the NGC could allow smaller producers to use bigger producers' equipment to harvest their crops. The NGC could also rent harvesting equipment during the crop season and make it available to its members to use. Crop specialists from the NGC would have to advise farmers on greens and spinach production.

- What product quality would be necessary for the fresh market? And what would happen to the spinach that does not match the quality standard?

The product is destined to the fresh market. Therefore, specific quality and special care are required. The NGC would determine the quality needed for the fresh market, and assist farmers during planting, growing and harvesting stages of greens production and spinach production to make sure the right quality is grown and harvested. Quality

standards are available from the USDA, and the manager of the co-operative should make use of them. The NGC could make arrangements to help farmers rid themselves of off-grade products by organizing their removal.

Production Facilities

The magnitude of the production facility depends on the volume and the type of activity being undertaken. The following factors are important:

- Packaged versus product to be repackaged;
- Degree of automation of the production facility; and
- Seasonal facility utilization.

The only option analyzed here is the packaging of farmers' products. The NGC could contract with others to repackage their products destined to the regional market during the off-season. The original equipment will consist of an entry level processing line adapted to the level of production of participating farmers.

Plant Size and Equipment

Plant size will be determined by the size of the equipment that will be housed as well as provisions for any eventual expansions. The minimum equipment for a startup will consist of a 6-station preparation table trim line with hand packing facility as detailed in Table 2 and Figure 3.

Table 2. Estimated Production Equipment Cost

A 6-station hand packing trim line processing 800 to 2400 pounds per hour average, with a crew of 16, packing spinach or chopped greens in a 10 ounce VacPac bag up to a 2 pound Perfed Bag.

		Equipment (DWG- 4 & 5)	Estimated Prices	
Item	Qtity	Description	Each	Extended
1	1	Bin Dumper w/Hydraulics	$12,000	$12,000
2	1	Hopper/Conveyor w/flow controls	$15,000	$15,000
3	1	6-station 3 Conveyor Prep Line	$32,005	$32,005
4	1	GS- 25 Belt Cutter w/Precutter & 3 wing Knife	$70,066	$70,066
5	1	GEWA 4000 Wash System single deck	$43,411	$43,411
6	2	FP-95 Spin Dryers	$19,570	$39,140
7	1	Jib Crane and Hoist	$10,000	$10,000
8	1	4 Station Pack Table w/Scales	$15,000	$15,000
9	4	Heatsealers	$18,000	$72,000
10	1	Bag Transfer Conveyor	$18,000	$18,000
11	3	Extra Baskets	$3,400	$10,200
12	1	Water Chiller With its refrigeration	$35,000	$35,000
13	1	Extra Shaker Screen for Wash System	$1,600	$1,600
	Subtotal.		$293,052	$373,422
	Mechanical Install, Electrical Hook up, Plumbing Hook up Includes Freight, Taxes, Permits, Licenses, and Crating Fees etc (30%)		$0.00	$112,026
			$256,452	$485,448

Additional Equipment needed to start the plant includes:

- Forklift Truck[7] $25,000
- Tape Machine (Carton Sealer) $15,000
- Delivery Vehicle (If Necessary) $25,000
- Phone System $300
- Office Equipment[8] $7,350
- Miscellaneous $15,000

[7] A Fork Lift Truck (could be leased for $360 per month; $360*6 = $4320 per year)

[8] Includes: 3 computers and miscellaneous software ($4,500); Printer-Scanner-Fax ($350); 3 Desks ($1,000) and Various office furniture ($2,000);

Description of Packing System Product Flow Reference

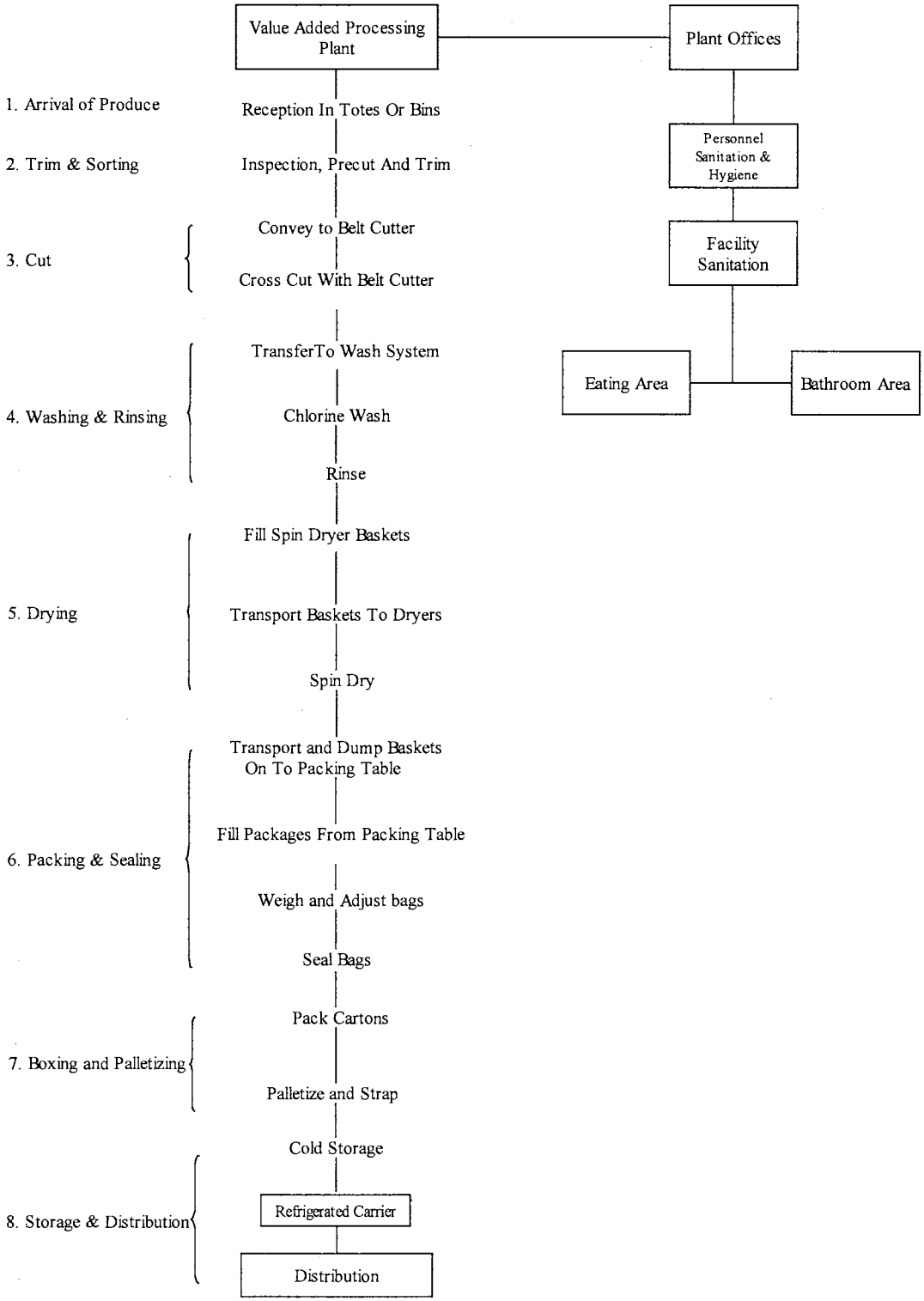


Figure 3: Fresh-cut Processing Flow Chart

The 6-station preparation table (Figure 4) can produce up to about 2400 pounds per hour of greens/spinach. This is about 38,400 pounds a day (2 shifts of 8 hours each) or 19.2 tons a day, which is the equivalent of around 2 acres a day. It has provision for waste receptacles under the trim area to receive the trimmed material from the trim line's waste chutes.

- The raw product is received in totes or bins and placed close to the workers at the 6-station prep line. The workers inspect, trim and make longitudinal cuts before placing the produce on the feed conveyor of the belt cutter.
- The belt cutter (2) makes the cross cuts to the greens. The cut product is fed from the GS-25 belt cutter onto a transfer conveyor (3), which elevates the product up, and into the helical wash system (4).
- The helical wash system shown in Figure 4 is sized to handle the volume from the cutter. The helical wash action thoroughly cleans the product without damaging the more delicate items such as greens. The wash system includes the dewatering shaker, pumps, an electrical control panel, adjustable water jets, and large tank drains for water that changes every 5 minutes.
- The dewatering shaker shown is a single deck type but a double deck option is available to remove fines and protect the water chiller if required. The shakers are designed with changeable screens for different size cuts and products and for easy cleaning.
- The product will leave the wash system at the shaker and move into a spin-dryer basket on a dolly (a second dryer is shown to handle the volume).

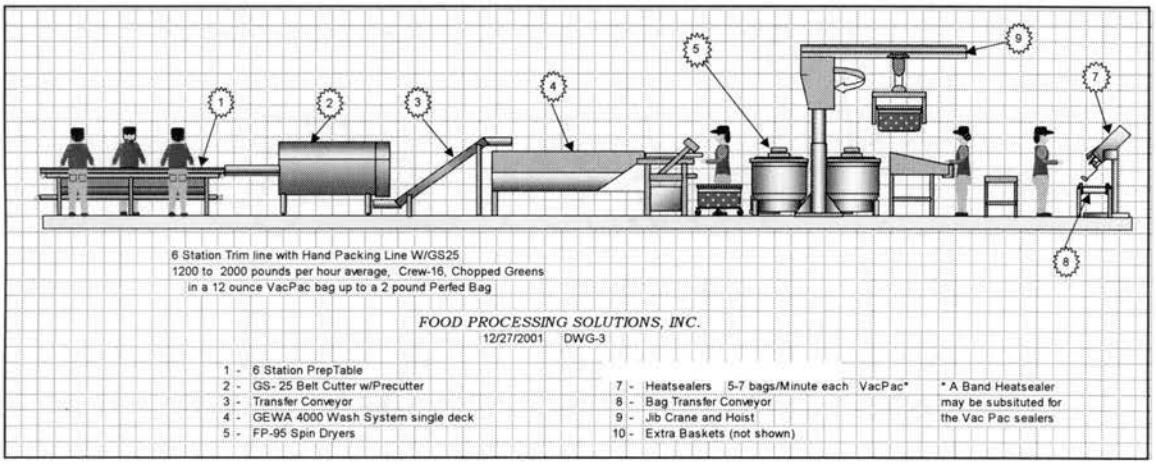


Figure 4: 6-Station Trim Line With Hand Packing

Figure 4 represents a simple hand packing facility that would be adjusted depending on the volume of spinach or greens to be processed. The facility could be automated to some degree, if needed. Drawings showing higher capacity processing lines are available in appendix A.

Marketing Plan

The marketing plan for the fresh vegetable packing facility includes an assessment of the intended target market, distribution tactics to deliver the product to the target market, packaging the product in the form desired by the customers, pricing strategies, and promotion of the product.

Good marketing plans generally require knowledge of competitors' marketing tactics as well. Organizations that have access to people with experience with the fresh greens market and the relevant customers are more likely to be successful. Other alternatives are hiring brokers and setting up a company's own sales staff. In this regard, we suggest the company hire a dedicated worker or use brokers and use existing distribution channels to market its product. The distribution should be concentrated on fresh produce outlets and groceries stores. There are possibilities of partnerships with other producers with a complementary production and marketing season.

Table 3. Expected Harvest Season for Oklahoma and Arkansas

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Spring Spinach					■	■						
Fall Spinach											■	■
Overwinter Spinach				■	■	■						
Fall Greens										■	■	
Spring Greens				■	■	■						

Market Analysis

Recent developments in the fresh food industry have led many to discover the benefits of vegetables (including greens) in their diet. In consequence, the consumption of spinach has increased drastically, from 0.3 lbs/person in 1970 to 1 lbs in 1998[9]. Given a population of 281.5 million[10], the potential market for fresh cut and packed spinach and greens is around 280 millions lbs. The plant has the capacity to pack 6,912,000 lbs per year, which is about 2.4 percent of the U.S. potential market.

Products

The cooperative's products are leafy greens cut and packed in 10 ounce bags for the fresh market. Baby spinach is prepackaged and shipped in cartons of 25, and is very popular because of its size and convenience. Additional products would be salad blends that consist of mixing different vegetables in one small size package that is convenient and ready to use. All these products use the same production methods and need little extra investment, if any. Spinach and greens are seasonal crops. Spinach has a fall and a

9 Heacox, L. "New spin On Spinach: Texas and Arkansas are not about to let California rule the lucrative fresh market spinach boom", American Vegetable Grower, Vol. 48, No.5, May 2000.

spring crop with an overwinter crop in between them. Table 3 illustrates the expected greens and spinach harvest season for Oklahoma and Arkansas. The fall crop is planted in early September and harvested in November-December. The spring crop is planted in mid February and harvested in May-June. The overwinered crop is planted in early October and harvested in April-June. Greens likewise have two seasons, fall and spring. The fall crop is planted in early September and harvested in October-November. The spring crop is planted in early March and harvested in April-June. The harvest period appears to be 180 days; 90 days (April-June) for spring and overwinter crops and 90 days (October-December) for fall crops. The expected harvest volume should be around 19 tons per day or the equivalent of 2 acres, in order to meet the capacity of the plant.

Consumers

According to Greenwood and Cook (1998), the fresh cut industry has enjoyed double digit growth rates, reaching an estimated $6-8 billion in annual U.S. sales of packaged salads and fresh-cut vegetables and fruits. The amount of time spent on meal preparation has been decreasing substantially, as the trend of the two-income family continues to increase. Consumers today do not have enough time to prepare their meals, while salad preparation requires time and patience. Only twenty-two percent of Americans spend 60 minutes or more to prepare a meal, while 50 percent spent less than 45 minutes. (Food Institute Report, April 7, 1997).[11] many Americans are cooking less at home. According to the USDA, Americans spent 53 percent of their dollar on food

10 Source: US Census Bureau available online at: www.census.gov/clo/www/redistricting.html, on April 21, 2001

11 Reported by R. Cook in "Consumer Trends for the New Millennium Impact Fresh-Cut Produce" International Fresh-Cut Association (IFPA), December 1998.

prepared at home and 47 percent on food prepared outside the home in 1997. According to *Fresh Trends,* 1998,[12] greater than 75 percent of consumers who purchased fresh-cut vegetable/salads in the first six months of 1997 say they bought them at least once a month with one-fourth making a purchase once a week or more.

Cook (2001) found that processing companies are moving towards meeting consumers' preferences for the convenience of ready to use attractive bagged products. Moreover, the development of the fresh cut sector during the recent years is aimed almost entirely at the foodservice market (as many shippers have introduced special foodservice packs, smaller than the regular foodservice's retail packs), where limited availability of labor and high worker turnover turn convenience of preparation to an asset. This explains why the fresh market has been experiencing a drastic rise of washed leafy greens, cut and packed in small attractive bags ready for consumption. California currently plays the role of leader in this market segment. The state now commands 70 percent of the U.S. fresh spinach market and this share is growing.[13] However, our major competitors would be from Texas and Arkansas. A fresh processing plant located in Oklahoma would cover the entire Midwest region, and could eventually co-pack product for major brand companies that are willing to establish themselves in these markets.

The Marketing Channel

The principal marketing channels in the U.S. fresh fruit and vegetable marketing system are retail food stores, foodservice establishments, hotels, restaurants, and

12 Idem.

13 Heacox, L. "New spin On Spinach: Texas and Arkansas are not about to let California rule the lucrative fresh market spinach boom", American Vegetable Grower, Vol. 48, No.5, May 2000.

institutions (schools, the military, hospitals, nursing homes, shelters and prisons), and direct farmer-to-consumer sales, farmers markets and roadside stands (Cook, 2001). Although the majority of produce still moves through retail channels, foodservice may now account for 45 percent of total volume, and direct sales may account for 1.5 percent. Prior to early to mid-1990, the majority of fresh cut produce was sold in foodservice channels.

Produce sold in retail or foodservice outlets may be procured directly from shippers or via intermediaries such as wholesalers operating in terminal (wholesale) markets or in independent warehouses in local communities. Thus foodservice and retail food stores are the main channels through which the produce will be marketed.

The Competition

Most companies producing spinach and greens for the fresh-cut market are based in California and try their best to ship nationally. In 1999, few California based companies controlled 86% of total bagged salads through mainstream supermarkets, according to Information Resources, Inc (IRI) scanner data (Cook, 2001). Only a few companies are located in the Midwest region, which leaves room for new companies to enter the market segment in this region.

The number of competitors outside the top five firms in the fresh-cut industry shrank from 58 to 48 between 1994 and 1999 (Calvin and Cook, 2001), because they were unable to compete with the market leaders. Success may be achieved through shifting the production away from branded products to private labels (store labels) or food service. Private label grew from 2.4% of national supermarket bagged salad sales in

1994 to 10% in 2000 (IRI data). Private label sales enable processors to utilize plant capacity without incurring the marketing costs associated with supporting brands, including slotting fees paid to retailers to secure shelf space (Calvin et al. 2001).

The prominent companies in the fresh cut segment are Ocean Mist Farms, Metz Fresh LLC, NewStar/Ceres Fresh Foods LLC, Ready Pac, Fresh Express Inc., Verdelli Farms Inc., and Burch Farms.

NewStar/Ceres ships spinach from Salinas and Huron, CA, throughout the winter. Ocean Mist is located in Salinas, CA, and ships 10-ounce bags of spinach for retail as well as 2.5-pound bags for foodservice. Metz Fresh is located in King City, CA, and ships baby spinach to foodservice in 4-pound cartons as well as an 8-ounce baby spinach retail pack.

Fresh Express is located in Salinas, CA. It ships a 6-ounce blended bagged salad that combines lettuce of different colors with purple and white Salad Savoy™. It also offers baby spinach. Ready Pac Produce Inc., an Irwindale, CA based company offers baby spinach, but mostly salad blends. Blends are the top growing segment of the salad market with 40% of dollar sales totaling almost $2 billion, according to Ready Pac[14]. Verdelli Farms Inc., Harrisburg, Pa., introduced two new salads packed in domed containers: The All American Salad Bowl and Caesar Salad Bowl, which are meant to fill a consumer need for convenience. Both include a fork and a napkin, packed dressing, and croutons. Burch Farms, Faison, NC, sells greens up and down the East Coast and also in the Midwest, and is the first company in North Carolina to sell value added leafy greens

14 Harvey, C. "Leafy blends, spinach spice up salad lines", The Packer, Vol. 109, No. 12, P. 4.

year-round. It packages and sells 1-2-pound spinach bags, as well as fresh packed jalapenos and sweet potatoes.

Strengths, Weaknesses, Opportunities and Threats

- Competition Strengths

The main strength of the competition is their experience in the industry. They benefit from the first mover advantage, and use recognizable name brands to market their products. The competitors have a broad knowledge of the marketing channels as well and benefit from a year-round production.

- Competition Weaknesses and Threats

The main weakness of the competitors remains the distance between their plants and the national market. Most of them are based in California, and it is not an easy task to cover the national market from a particular region. Due to the proximity to market, the demand for just-in-time deliveries and the perishable nature of fresh-cut vegetables, plants close to the target market may have an advantage.

- The Plant's Strength

The main strength of the processing plant will be the members of the cooperative, spinach and greens growers who know each other and are willing to work together to succeed. The absence of fresh cut processing plants in this region of the United States is also an advantage that the cooperative can use to attract joint-ventures from private and national brands owners who are willing to expand the distribution of their products into new geographic markets.

- The Plant's Weaknesses and Threats

The major weakness of the plant is the seasonality of the crops involved, which could cause the operation to close during the off-season. The lack of experience in the fresh-cut industry and the difficulty of establishing a brand are also important concerns.

Financial Plan

A financial plan outlines the source of and the use of the funds, the equipment needed and its utilization, as well as the cash flow implications and profitability of the activity. Members will have to provide at least part of the equity capital, with the remainder borrowed from financial institutions.

The possibility of obtaining a loan from the Small Business Administration exists. The new processing plant should be eligible under "Pickled Fruits and Vegetables, Vegetable Sauces and seasonings, and salad dressings" (SBA program code 2037: Frozen Fruits, Fruit Juices and Vegetables). The amount of the loan should be determined after the amount of the equity is evaluated and member contributions decided.

To avoid having to support an opportunity cost due to the non-use of the facility during the off-season, packing for others may be an alternative. State incentive programs will be integrated in such a way that producer profitability can be easily determined.

The State of Oklahoma offers tax incentives to Oklahoma agricultural producers who invest in Oklahoma-owned agricultural processing cooperatives, ventures or marketing associations (Oklahoma Statutes, Title 68; Section 2357.25 and Rule 710:50-15-85). Thirty per cent of qualified investment in a qualified agricultural processing facility may be used as a credit against any Oklahoma income tax due. In case the tax

credit is unused, a 6-year carryover is currently allowed. This means that in case the credit allowed exceeds the tax liability of the producer, the amount unused maybe carried forward for a period not to exceed 6 years.

Organization and Staffing Plan

Organization and staffing plans include management, accountability, job-descriptions, personnel policies, potential problems, and contingency plans. Labor availability, recruitment and training must be considered as well.

The NGC will hire four full-time employees. The processing crew and miscellaneous labor are remunerated on an hourly basis. The following employees will work full time from the startup of the operation:

- President and Chief Operating Officer

This individual must possess experience in fresh vegetable processing and marketing. The President will be responsible for all operational aspects of the business, work with growers and will report directly to the Board of Directors.

- Operations Manager/Supervisor

This individual must possess experience in food manufacturing, with a successful track record in fresh vegetable processing. The supervisor reports directly to the president and C.O.O., with responsibilities of revenue attainment, new product development, engineering, production planning, safety, sanitation, shipping, receiving and warehousing.

- Sales Agent

This individual must have significant experience in fresh product sales. He or she reports directly to the President, with responsibility of customer management, revenue attainment and customer service.

- Administrative Assistant

This individual must have experience in finance, accounting, human resources, information systems and member communications, and must have demonstrated success in administering the financial, informational and human relations requirements for manufacturing entities.

Table 4. Labor requirement

Category	Number of Employees	Base/Year	Base/Month	Estimated Wage $/hr/Actual Wage
President and C.O.O.	1	$70,000	$5,850	$70,000
Operations manager/Supervisor	1	$50,000	$4,160	$50,000
Sales Agent	1	$35,000	$2,916	$35,000
Secretary/Administrative	1	$25,000	$2,500	$25,000
Processing crew	14	-	-	$5.15
Miscellaneous Labor and Dumper	2	-	-	$5.15

Several organizational forms are available to choose from, a closed cooperative being the latest form of cooperative especially tailored for agricultural processing activities. A knowledgeable manager is critical, and acquiring the necessary marketing expertise is a must. Staffing and training people for a packing facility is challenging, and the seasonality of the crops involved might bring additional problems. A trusted and respected veteran of the food processing industry, with previous ties to the fresh processing industry, should be considered to lead the processing plant.

The organization of the cooperative could be similar to that of the Sunrise Energy Cooperative, located in Benton County, east-central Iowa (Fink, 2001a). The cooperative would have the following characteristics:

- Most or all the equity is raised and farmer-members provide the crop;
- Co-op members do not commit a "risky" percentage of crops they are capable of raising;
- Farmers-members hold a large majority of the voting stock and control the board;
- Boards members are skilled and committed to their role of serving the interests of the farmer-members;
- The board does not try to manage the plant, but rather hires a manger who in most cases, has fresh vegetable processing experience. The manager will do the job while remaining accountable to the board;
- Fiscal and financial matters, including profitability, investment, and distribution of dividends are under the supervision and control of the board.

The board members would meet frequently to make decisions regarding the management of the plant. The following organizational chart could describe the cooperative.

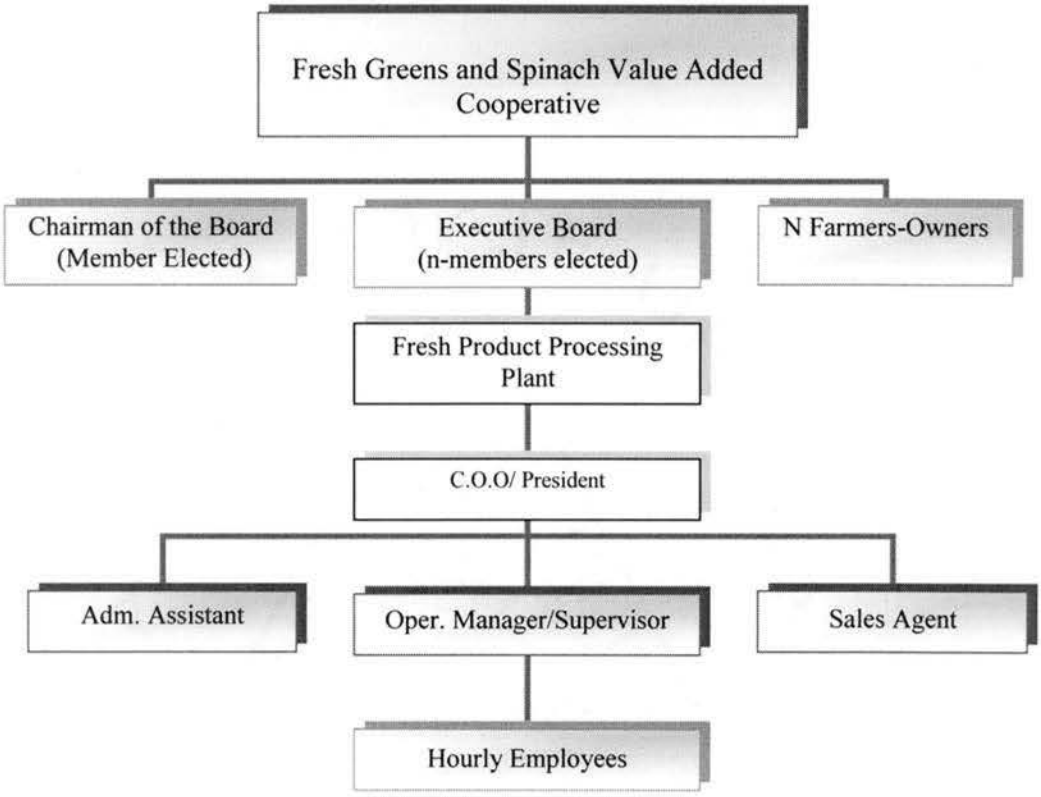


Figure 5: The Value Added Cooperative Organizational Chart

PACKSIM: The Simulation Model

Background

The financial analysis for the processing plant is formulated using a revised version of a simulation tool entitled The Packing Simulation Model (PACKSIM) originally developed by Constance L. Faulk, Daniel S. Tilley, and R. Joe Schatzer of the Agricultural Economics Department at Oklahoma State University. PACKSIM was developed to serve the needs of analysts and managers who conduct financial planning for packing facilities. PACKSIM was initially designed to use a Lotus 1-2-3 spreadsheet template to analyze financial operations of a packing facility. PACKSIM simulates packing operations under flexible cost and revenue assumptions and calculates financial statements based on those assumptions. The model enables one to quickly examine the impact of changes in yield, quality, wage rate, fixed cost, loan term, packout rate, and plant capacity on cash flow, income statement, balance sheet, breakeven analysis, and financial ratio. PACKSIM can be used to:

- Forecast one or more upcoming seasons
- Evaluate packing performance of previous seasons
- Control the current packing performance of a previous season
- Control the current packing operation

Features of the model include:

- Overhead costs allocated on the basis of tonnage

- Payments to farmers are either set by the user or calculated as the difference between selling price and a packing charge set by the user
- Product rejected at the packing facility incurs labor and overhead costs which increase costs of packed product
- Three qualities or grades of each product are allowed with different selling prices, when applicable
- Specialty and standard machinery can be analyzed separately, if applicable.

Assumptions

The primary location of the plant for the operation would be Shawnee, Oklahoma (Pottawatomie County), because of its midway location between different farming regions. Alternative choices would be Bristow (Creek County) or Oklahoma City (Oklahoma County). The unemployment rate for those regions averaged 4.5 percent in July 2002 (4.6% for Creek County, 4.4% for Pottawatomie County and 4.2% for Oklahoma County). The unemployment rate in the city of Shawnee reached 5.3% in June 2002[15]. All have excellent interstate highway access. A 9,000 square foot facility is projected for the operation. This includes 1,000 square foot for a raw products warehouse, 6,100 square feet of factory area, 1,000 square foot for a cool store warehouse suitable for the storage of finished product, and 900 square foot for office and break rooms. Building construction costs are estimated and rounded at $593,500, based on the

15 The data on unemployment rates are from the U.S. Department of Labor, Bureau of Labor Statistics.

U.S. average per square foot commercial building cost of $55.40[16]. The model's assumptions are summarized in Tables 5 and 6.

[16] The estimation was obtained from the Illinois Department of Commerce and Community Affairs (DCCA). Estimations used in the model are slightly different from this one, given the nature of the constructions to be made.

Table 5. General Assumptions

Long term Interest Rate	10%
Collection Days	30 days
Payments Days	30 days
Sales on Credit	100%
Personnel Burden	15%
Initial Minimum Equity	$700,000
Initial Working Capital	$700,000
Initial Start Up Expenses	$1,169,600
Long term borrowing	$502,155
Depreciation Schedule	10 Years plant equipment
	39 Years Building
	5 Years Office Equipment
	15 Years Land Improvement
Income Tax Application	Exempt Cooperative

Table 6. Source and Use of Funds

Capital Expenditures	Cost +Freight + Install
Building (Factory + Warehouse + Cool store + office) (*)	$593,500
Process Equipment	$485,450
Tape Machine (Carton Sealer)	$15,000
Used Delivery Vehicle	$20,000
Used Forklift Truck	$15,000
Others (**)	$18,240
Working Capital	$700,000

(*) Factory + Warehouse estimated at $60.00 per sq. ft., A Cold Storage and its refrigeration estimated at $100.00 per sq. ft., and an office block for estimated at $75.00 per sq. ft.

(**) Office Equipment ($7,850); Phone System;($300); Pallets and Miscellaneous equipment ($10,090).

Further assumptions include:

As a result of local business development incentives,

1. City/County provides utility hook-ups;
2. City/county provides any necessary road construction/repairs.

Modified PACKSIM

For the purpose of this research, the original PACKSIM model is modified to use an EXCEL spreadsheet. PACKSIM is associated to @RISK®, to account for risk management in the financial analysis. The various identified risks are included in the analysis through @RISK® macros embedded into the PACKSIM model.

@RISK® adds the power of Monte Carlo simulation to any spreadsheet model. Uncertain values in the spreadsheet are replaced with @RISK® functions, which represent a range of possible values. @RISK® recalculates the spreadsheet hundreds or even thousands of times, each time selecting random values from the @RISK® functions entered. The result is a distribution of possible outcomes and the probability of getting those results. This not only tells what could happen in a given situation, but how likely it is that it will happen.

The first step in using PACKSIM is to enter the crop mix. The original PACKSIM was designed to use eight major crops, making up the bulk of the processing plant output. Thus the model, which currently uses five crops, is ready for additional crops. The second step is to enter for each crop, units per crate and crate per acres, total acres, and the percentages of the crop harvested each month (Table 7).

Table 7. Product Mix

PRODUCT MIX						
CROP	Fall Spinach	Spring Spinach	Overwinter Spinach	Fall Greens	Spring Greens	TOTALS
Pounds per Carton	15.0	15.0	15.0	15.0	15.0	15.0
Cartons per Acre	1,000	1,000	1,000	1,133	1,133	1,057.1
Total Acres	102	45	71	91	74	383
Total Cartons	101,949	44,978	70,465	103,103	83,842	404,336
Total Tons	764.6	337.3	528.5	773.3	628.8	3,033
Percent of Total	25.21%	11.12%	17.43%	25.20%	20.74%	100.0%
PERCENTAGE OF CROP SOLD EACH MONTH						
JANUARY	0.00%	0.00%	0.00%	0.00%	0.00%	
FEBURARY	0.00%	0.00%	0.00%	0.00%	0.00%	
MARCH	0.00%	0.00%	0.00%	0.00%	0.00%	
APRIL	0.00%	0.00%	50%	0.00%	50%	
MAY	0.00%	60%	30%	0.00%	30%	
JUNE	0.00%	40%	20%	0.00%	20%	
JULY	0.00%	0.00%	0.00%	0.00%	0.00%	
AUGUST	0.00%	0.00%	0.00%	0.00%	0.00%	
SEPTEMBER	0.00%	0.00%	0.00%	0.00%	0.00%	
OCTOBER	0.00%	0.00%	0.00%	60%	0.00%	
NOVEMBER	60%	0.00%	0.00%	40%	0.00%	
DECEMBER	40%	0.00%	0.00%	0.00%	0.00%	
TOTAL	100%	100%	100%	100%	100%	

Hourly wages and labor requirements, wage rates and the number of workers needed to pack each crop are specified (Table 8). Additional information required for each crop includes the percentage of the total received of each crop which is actually packed, i.e., the number of units packed per hour, and the percentage of the capacity at which the plant is expected to operate.

The cost of materials per packed crate for each crop is entered. The costs of items such as crates, ice, bags, cartons and pallets are incorporated into the model at this point. Average monthly prices are input for each crop allowing for eventual product grades. Fixed overhead items including insurance, maintenance and administrative salaries are also specified. PACKSIM takes into account the timing of accounts receivable and

payable and cash flow carryover from the previous year. The section allows receipts and payments to be spread over three months. The allocation to those three months is by estimated percentages. In addition, payments to farmers are broken out from other payables to allow for a separate payment schedule, which might differ from the other payables.

General expenses including fuel/oil, utilities, phone, office supplies, promotion, property taxes and so on are entered in the model. The Assets Part sets the value of assets in three categories. First, the standard machinery line, which includes all machinery, equipment, and vehicles, which are used in processing all crops, is set (Table 2). The second category is the specialty machinery line. Included is all machinery used to pack specific crops only. The model then writes the specialty equipment to a different location in which the user indicates for which crop(s) the machinery is used. This category will not be used in this study. The third category accounts for building and land improvements. Loan and loan analysis are also included. Packing charges and freight charges are considered. Packing charges are set above the packing costs to allow a margin for profit or uncertainty.

After all the data input have been completed, output statements can be generated. Balance sheets, income statements, cash flow statements, and break-even analyses complete the financial plan as part of the business development plan. In addition, ratio analysis, packing budget, a labor usage summary, farmer payment and a credit balance report can be generated.

Table 8. Labor requirement for each crop in PACKSIM

Crop---------->		Fall Spinach	Spring Spinach	Overwinter Spinach	Fall Greens	Spring Greens
Percent Packed-->		90.00%	90.00%	90.00%	90.00%	90.00%
Hourly Packout-->		160	160	160	160	160
Percent Capacity>		100.00%	100.00%	100.00%	100.00%	100.00%
Actual Packed--->		160	160	160	160	160
	LABOR	Workers	Workers	Workers	Workers	Workers
	CLASS	Number	Number	Number	Number	Number
1. LABOR CHARGED TO PACKED AND REJECTED CARTONS						
Forklift Op.		0.00	0.00	0.00	0.00	0.00
Placer		0.00	0.00	0.00	0.00	0.00
Washer		0.00	0.00	0.00	0.00	0.00
Grader		0.00	0.00	0.00	0.00	0.00
2. LABOR CHARGED TO PACKED CARTONS ONLY						
Trimmer		6.00	6.00	6.00	6.00	6.00
Boxers/Crate Former		4.00	4.00	4.00	4.00	4.00
Packer/Sealers		3.00	3.00	3.00	3.00	3.00
Forklift Op.		1.00	1.00	1.00	1.00	1.00
3. LABOR CHARGED TO REJECTED CARTONS ONLY						
Misc. Labor		1.00	1.00	1.00	1.00	1.00
Dumper		1.00	1.00	1.00	1.00	1.00
TOTAL PER HOUR		16.00	16.00	16.00	16.00	16.00

For the purpose of our study, labor costs are assigned to packed boxes. Social Security (FICA) and State workmen's compensation taxes are taken into account (Table 9). Three columns can be used to enter any combination of benefits as percentages of the base wage rate. The total wage is calculated automatically. It is assumed that all the employees included in this section are hourly employees and are paid only for the hours they work. Annual salaries for non-hourly employees are entered in a different table.

Table 9. Employee classes and hourly wages

EMPLOYEE CLASSES AND HOURLY WAGES				2001	
	BASE WAGE RATE		W.C.TAX		TOTAL WAGE
ITEM	$/hr.	FICA	State	Fed.	$/hr.
1. LABOR CHARGED TO PACKED AND REJECTED CARTONS					
Forklift Op.	5.15	7.65%	6.00%	0.00%	5.85
Placer	5.15	7.65%	6.00%	0.00%	5.85
Washer	5.15	7.65%	6.00%	0.00%	5.85
Grader	5.15	7.65%	6.00%	0.00%	5.85
2. LABOR CHARGED TO PACKED CARTONS ONLY					
Trimmer	5.15	7.65%	6.00%	0.00%	5.85
Crate Former	5.15	7.65%	6.00%	0.00%	5.85
Packer/Icer	5.15	7.65%	6.00%	0.00%	5.85
Forklift Op.	5.15	7.65%	6.00%	0.00%	5.85
3. LABOR CHARGED TO REJECTED CARTONS ONLY					
Misc. Labor	5.00	7.65%	6.00%	0.00%	5.68
Dumper	5.00	7.65%	6.00%	0.00%	5.68

The percent packed, hourly packout rate, percent capacity and the number of workers at each stage of packing are entered for each crop. Percent packed is the percentage of the harvested volume that is actually packed. A 90 percent packout means that 10 percent of the crop is dumped or rejected at the packing facility. Labor costs are incurred for handling the rejected produce. Hourly packout is the number of boxes per hour that the facility can pack. Percent capacity determines whether this hourly packout is achieved. Idle labor costs are incurred whenever less than 100 percent packing capacity levels are indicated. For the purpose of this study, a 90 percent packout rate is assumed. The number of workers entered should be the number required to achieve the hourly packout rate previously determined.

Per carton costs of materials for each crop are entered in Table 10. Material costs are transferred to the individual crop packing budgets and the appropriate financial

statements. Raw product cost are entered or calculated as a residual. Table 11 summarizes the credit terms and the cash flow carryover. The cost of packing materials is entered in Table 10.

Table 10. Materials cost per packed crate for each crop

MATERIAL	Fall Spinach	Sprint Spinach	Overwinter Greens	Fall Greens	Sprint Greens
Cartons	$.60	$.60	$.60	$.60	$.60
Ice	0.00	0.00	0.00	0.00	0.00
Bags	0.25	0.25	0.25	0.25	0.25
Other	0.00	0.00	0.00	0.00	0.00
Other	0.00	0.00	0.00	0.00	0.00
Other	0.00	0.00	0.00	0.00	0.00
TOTAL	$0.85	$0.85	$0.85	$0.85	$0.85

- Annual salaries for non-hourly employees are entered in Table 12. All compensations to administrative personnel such as payroll taxes, workmen's compensation, or insurance should be included in the administrative salaries. Miscellaneous financial data are entered in Table 12 for use in the financial statement:
- The beginning and ending value of the land, if owned;
- The value of beginning and ending inventory;
- The interest rate paid on the operating loan;
- The interest rate earned on cash balances;
- The minimum cash balance desired each month.

Table 11. Credit terms and Cash Flow Carryover

WHEN PAID OR RECEIVED	RECEIVABLES	PAYABLES	PAYMENTS
		Except payments to farmers	TO FARMERS
1. Percent Same month:	30%	30%	20%
2. Percent One month later:	70%	70%	70%
3. Percent Two months later:	0%	0%	10%
CASH FLOW CARRYOVER FOR CURRENT STATEMENT FROM:	2001	JAN	FEB
1. Receivables		0	0
2. Payables		0	0
3. Payments to Farmers		0	0
4. Beginning cash balance:		700,000	
5. Beginning retained earnings:		0	
6. Accrued Interest on Oper. Loan		0	
7. Operating Loan Balance		0	

Table 12. Fixed Overhead and Miscellaneous financial Inputs

FIXED OVERHEAD \ MISC. FIN. INPUTS		2002
1. Annual Insurance on Buildings ($ / year)		8,000
2. Annual Maintenance & Repairs on Buildings ($ / year)		2,000
3. Annual Insur. on Mach. & Equip. (% of Investment)		2.00%
4. Annual Maint. & Repr. on Mach. & Equip. (% of Investment)		2.00%
ANNUAL ADMINISTRATIVE SALARIES ($ / Year)		
1. Supervisor	50,000	
2. Sales Agent	35,000	
3. Secretary/Administrative Assistant	25,000	
4. President/Market Specialist (C.O.O)	70,000	
MISC. FINANCIAL DATA	Beginning	Ending
1. Current value of land (Dollars)	30,000	30,000
2. Value of inventory (Dollars)	0	0
3. Interest Rate Paid on Operating Loan (Monthly %)		1.50%
4. Interest Rate Received on Cash Balance (Monthly %)		0.50%
5. Minimum Monthly Cash Balance (Dollars)		2,000

Table 13. Monthly sales distribution and prices by crop

MONTH	ITEM	Fall Spinach	Spring Spinach	Overwinter Spinach	Fall Greens	Sprint Greens
JANUARY	% QUAL.#1	0%	0%	0%	0%	0%
	PRICE #1	$0.00	$0.00	$0.00	$0.00	$0.00
	% QUAL.#2	0%	0%	0%	0%	0%
	PRICE #2	$0.00	$0.00	$0.00	$0.00	$0.00
	% QUAL.#3	0%	0%	0%	0%	0%
	PRICE #3	$0.00	$0.00	$0.00	$0.00	$0.00
FEBURARY	% QUAL.#1	0%	0%	0%	0%	0%
	PRICE #1	$0.00	$0.00	$0.00	$0.00	$0.00
	% QUAL.#2	0%	0%	0%	0%	0%
	PRICE #2	$0.00	$0.00	$0.00	$0.00	$0.00
	% QUAL.#3	0%	0%	0%	0%	0%
	PRICE #3	$0.00	$0.00	$0.00	$0.00	$0.00
MARCH	% QUAL.#1	0%	0%	0%	0%	0%
	PRICE #1	$0.00	$0.00	$0.00	$0.00	$0.00
	% QUAL.#2	0%	0%	0%	0%	0%
	PRICE #2	$0.00	$0.00	$0.00	$0.00	$0.00
	% QUAL.#3	0%	0%	0%	0%	0%
	PRICE #3	$0.00	$0.00	$0.00	$0.00	$0.00
APRIL	% QUAL.#1	0%	100%	100%	0%	100%
	PRICE #1	$0.00	$5.68	$5.68	$0.00	$5.68
	% QUAL.#2	0%	0%	0%	0%	0%
	PRICE #2	$0.00	$0.00	$0.00	$0.00	$0.00
	% QUAL.#3	0%	0%	0%	0%	0%
	PRICE #3	$0.00	$0.00	$0.00	$0.00	$0.00
MAY	% QUAL.#1	0%	100%	100%	0%	100%
	PRICE #1	$5.68	$5.68	$5.68	$0.00	$5.68
	% QUAL.#2	0%	0%	0%	0%	0%
	PRICE #2	$0.00	$0.00	$0.00	$0.00	$0.00
	% QUAL.#3	0%	0%	0%	0%	0%
	PRICE #3	$0.00	$0.00	$0.00	$0.00	$0.00
JUNE	% QUAL.#1	0%	100%	100%	0%	100%
	PRICE #1	$0.00	$5.68	$5.68	$0.00	$5.68
	% QUAL.#2	0%	0%	0%	0%	0%
	PRICE #2	$0.00	$0.00	$0.00	$0.00	$0.00
	% QUAL.#3	0%	0%	0%	0%	0%
	PRICE #3	$0.00	$0.00	$0.00	$0.00	$0.00

An estimated monthly selling price per box is entered through Table 13 for up to three grade qualities per crop, as well as the percentage of each produce category sold in a given month.

General expenses can change during the actual packing season. For that reason, these costs are entered on a monthly basis. The monthly figures are then automatically transferred to the cash flow and income statement. The general expenses included are fuel and oil, utilities, telephone, office supplies, promotion, property tax and other (Table 14). Property tax is assumed to be $4,000, which will be paid in two installments. The actual value of the property tax could be lower or higher than the reported figure, but should not have a great impact on the future profitability of the operation. The utilities costs are based on the assumption that the operation will use close to 600,000 kWh of electricity and 1,000,000 gallons of water during the year. Advertisement and promotion costs were budgeted at $3,500 per year, and are also overestimated for a small fresh vegetable packing facility.

The standard machinery line should include all items of machinery used by all crops packed such as forklifts, packing lines and vehicles. Standard machinery costs are apportioned to the crops based on the percentage of the total tonnage of the product mix that each crop represents.

Table 14. General Expenses

GENERAL EXPENSES				2002								
	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Fuel & Oil	100	100	500	1000	1000	1000	1000	100	100	1000	1000	1000
Utilities	500	500	500	2,000	2,500	2,500	2500	500	500	2,000	1,750	1,750
Telephone	100	100	500	500	500	500	500	100	100	500	500	500
Office Supplies	100	100	300	400	400	400	300	100	100	400	400	400
Promotion	0	0	0	500	500	500	500	0	0	500	500	500
Property Tax	0	0	0	0	0	0	0	0	0	0	2,000	2,000
Other Gen. Exp.	0	0	0	0	0	0	0	0	0	0	0	0

Crops Prices, Shipping Prices and Crop Data

Data on crop prices are obtained from the Agricultural Marketing Service of the United States Department of Agriculture. The prices paid to farmers are derived from the Dallas terminal market prices. Crops on the Dallas terminal market are priced for a 25-pound container including brokerage fees. To determine the price paid to farmers, prices for 15 pounds of product are derived from the terminal market price (the cartons hold 15 pounds), and then 20 percent abatement is subtracted to account for brokerage fees. Farmers only receive a fraction of the crop price, plus an eventual return to equity[17]. Shipping prices are aligned on competitors' average prices[18]. The acreage and yields are based on the values obtained in the farmer survey. The amount of crops processed for each product is entered in Table 15. This amount is based on processing capacity of 1,728 tons for 3 months, which is equivalent to a processing capacity of 2400 pounds per hour and 16 hours a day. These variables are made stochastic and summarized in Table 16. For the purpose of the study, the price range in the uniform distribution was ($2.5, $3.75).

17 In this case, Farmers receive 60 percent of crop prices. Prices on Dallas terminal Market are $9.00-12.00 for spinach and $9.50-$13.00 for greens.

18 Foltz, Todd. "Spinach production increases slightly." The Packer, Vol. 109, N0.18, May 6, 2002. Page D-8.

Table 15. Amount processed per crop and per month (in tons)

	April	May	June	Total
Spring Spinach	-	192	192	384
Overwinter Spinach	288	192	192	672
Spring Greens	288	192	192	672
Subtotal	576	576	576	1,728
	October	November	December	Total
Fall Spinach	-	288	576	864
Fall Greens	576	288	-	864
Subtotal	576	576	576	1,728

Table 16. Stochastic Input Variables and Historical Data Source

Variable	Distribution	Historical Data Source
Spinach price	Uniform (2.5, 3.75) (Min, Max)	USDA/AMS Jan 1985 – Dec 2000 monthly prices
Greens	Uniform (2.75, 3.6) (Min, Max)	USDA/AMS Jan 1985 – Dec 2000 monthly prices
Shipping Prices	Uniform (4.75, 6.6) (Min, Max)	The Packer, report on competitor shipping prices
Acreage – Spring Greens	Uniform (74, 84) (Min, Max)	Based on the processing capacity of the plant
Acreage – Fall Greens	Uniform (94, 190) (Min, Max)	Based on the processing capacity of the plant
Acreage-Spring Spinach	Uniform (42, 48) (Min, Max)	Based on the processing capacity of the plant
Acreage - Fall Spinach	Uniform (96, 108) (Min, Max)	Based on the processing capacity of the plant
Acreage-Overwinter Spinach	Uniform (67, 74) (Min, Max)	Based on the processing capacity of the plant
Carton Per Acre Spinach	Uniform (933, 1,066) (Min, Max)	Based on the average yield reported in the farmers' survey
Carton Per Acre Greens	Uniform (1,066, 1,200) (Min, Max)	Based on the average yield reported in the farmers' survey

CHAPTER IV

RESULTS, DISCUSSIONS AND IMPLICATIONS

Results

The model was run using @Risk® to perform a Monte Carlo Simulation. In this model, the output not only includes an expected return or mean, but it also provides a standard deviation of the return as well as each of the values from the number of iterations. The number of iterations, in this analysis, was 2000. The statistical results of the simulation of the stochastic input variables and selected output variables are summarized in Tables 16 and 17. Table 19 displays the sensitivity analysis results for total sales, after tax profits and return on Investment (ROI). It shows significant inputs that influence total sales and ranks them using correlation and regression. Multivariate stepwise regression and rank order correlations are used to determine the relationships between input and output variables, and then to rank them from the most to the least important. The input variables are the stochastic variables defined in Table 16. It appears that the acreage of crops (fall, spring and overwinter) as well as the yield of all three spinach crops (expressed in boxes per acre) influence the total sales more than any other

variable. Spinach prices followed by selling prices are the main factors influencing the profit after taxes and the return on total asset.

Table 17. Simulation Result of Stochastic Input Variables

Name	Min	Max	Mean	Std Dev.	Var	Skew	Kurt	Mode
Carton per Acre / Fall Spinach	933.06	1,065.90	1,000.25	38.04214	1447.204	-0.036	1.801	1,030.65
Carton per Acre / Spring Spinach	933.03	1,066.00	999.97	37.84045	1431.9	-0.019	1.826	959.01
Carton per Acre / Overwinter Spinach	933.15	1,065.86	999.07	38.078	1449.934	0.012	1.821	949.11
Carton per Acre / Fall Greens	1,066.00	1,199.96	1,131.14	38.60418	1490.282	0.051	1.819	1,145.28
Carton per Acre / Spring Greens	1,066.04	1,199.99	1,135.71	38.53678	1485.083	-0.100	1.807	1,183.75
Total Acres / Fall Spinach	96.01	108.00	102.07	3.429545	11.76178	0.005	1.803	100.42
Total Acres / Spring Spinach	42.00	48.00	45.05	1.754931	3.079781	-0.014	1.771	42.41
Total Acres / Overwinter Spinach	67.01	74.00	70.55	2.023251	4.093544	-0.039	1.795	69.62
Total Acres / Fall Greens	86.01	96.00	91.01	2.87146	8.245282	0.001	1.811	86.50
Total Acres / Spring Greens	74.00	74.00	74.00	0	-	-	0.000	74.00
PRICE / Overwinter Spinach	4.75	6.60	5.67	0.53471	0.2859148	-0.011	1.837	6.36
PRICE / Spring Greens	4.75	6.60	5.66	0.5335866	0.2847147	0.018	1.785	5.82
PRICE / Spring Spinach	4.75	6.60	5.67	0.5386357	0.2901284	0.012	1.773	6.54
PRICE / Overwinter Spinach	4.75	6.60	5.66	0.5285372	0.2793516	0.058	1.819	4.86
PRICE / Spring Greens	4.75	6.60	5.68	0.5213095	0.2717636	-0.016	1.851	6.11
PRICE / Spring Spinach	4.75	6.60	5.67	0.5308865	0.2818405	0.012	1.803	6.35
PRICE / Overwinter Spinach	4.75	6.60	5.66	0.5327913	0.2838665	0.055	1.805	5.36
PRICE / Spring Greens	4.75	6.60	5.66	0.5431335	0.294994	0.074	1.746	5.08
PRICE / Fall Greens	4.75	6.60	5.69	0.5393726	0.2909227	-0.032	1.779	6.26
PRICE / Fall Spinach	4.75	6.60	5.67	0.5356637	0.2869355	0.005	1.785	5.36
PRICE / Fall Greens	4.75	6.60	5.67	0.538563	0.2900501	0.020	1.800	4.88
PRICE / Fall Spinach	4.75	6.60	5.67	0.5286863	0.2795092	0.000	1.835	5.37
Pay. to Farmers / Fall Spinach	2.50	3.75	3.12	0.3633515	0.1320243	0.029	1.796	3.07
Pay. to Farmers / Spring Spinach	2.50	3.75	3.13	0.3614028	0.130612	-0.012	1.798	2.52
Pay. to Farmers / Overwinter Spinach	2.50	3.75	3.11	0.3635046	0.1321356	0.038	1.798	3.12
Pay. to Farmers / Fall Greens	2.75	3.60	3.17	0.2465884	6.08E-02	0.044	1.798	2.95
Pay. to Farmers / Spring Greens	2.75	3.60	3.17	0.2474979	6.13E-02	-0.001	1.805	3.19

Table 18. Selected Output Variables Statistics

Name	Total Acres	Total Tons	Break-Even Sales	Ending Cash Balance	Net Sales	Profits After Taxes	Return on Total Assets (ROI)
Description	Output	Output	Output	Output	Output	Output	Output
Minimum	367	2,825	1,181,929	2,000	1,818,909	-185,866	-0.11
Maximum	398	3,226	4,170,663	391,178	2,301,036	338,731	0.23
Mean	382	3,034	1,859,361	135,729	2,065,705	58,653	0.07
Std Deviation	5	66	348,318	74,610	78,921	82,880	0.05
Variance	27	4,471	121,325,900,000	5,566,650,000	6,228,618,000	6,869,147,000	0.00
Skewness	0.02	0.06	1.12	0.21	0.11	0.09	-0.17
Kurtosis	2.65	2.74	5.22	2.59	2.82	2.73	2.70
Target #1 (Value)			1,797,998.0			-1,000.0	
Target #1 (Perc%)			50.44%			25.24%	

Table 18 shows that there is a least a 25 percent chance of having a loss at the end of the first year of operation; there is also a least a 50 percent chance that the operation will break even on its first year.

Figure 6 shows that 90 percent of the distribution of the profits after taxes lies between 199,847 and $511,387. This means that the probability of having a lost is very small and has been evaluated at around 25 percent at worse (Table 18). Similarly, 90 percent of the distribution of the break-even sales lies between $1,088,073 and $1,648,722, which is very close to $1,797,988 needed to break even on the first year of operation. In consequence, the plant has 50% chance of breaking even on the first year of operation (Table 18).

The farmers would receive a total of $1,109,218 or $2,896 per acre (It is assumed that 383 acres would be produced). A recent farmer budget from the cooperative extension service at Oklahoma State University shows that farmers receive an average of $140 per ton for greens and spinach they produce for processing. The results here show that they will receive an average of $310 per tons if the greens and spinach they will

produce for the fresh market, which is more than what they would receive from the processing market.

Table 19. Sensitivity Analysis

Rank Inputs for Output B.E. SALES			
Rank	Name	Regression	Correlation
#1	Set Pay. to Farmers / Fall Spinach	0.449	0.41
#2	PRICE / Fall Greens	-0.329	-0.303
#3	Pay. to Farmers / Overwinter Spinach	0.319	0.295
#4	PRICE / Fall Spinach	-0.31	-0.337
#5	Set Pay. to Farmers / Fall Greens	0.295	0.297
#6	Set Pay. to Farmers / Spring Greens	0.248	0.264
#7	PRICE / Spring Greens	-0.22	-0.272
#8	PRICE / Fall Spinach	-0.211	-0.226
#9	PRICE / Fall Greens	-0.21	-0.228
#10	Pay. to Farmers / Spring Spinach	0.206	0.212
	R-Squared=	0.9248739	

Rank Inputs for Output NET SALES			
Rank	Name	Regression	Correlation
#1	PRICE #1 / Fall Greens	0.381	0.353
#2	PRICE #1 / Fall Spinach	0.374	0.381
#3	PRICE #1 / Spring Greens	0.257	0.33
#4	PRICE #1 / Fall Greens	0.253	0.255
#5	Carton per Acre / Fall Spinach	0.249	0.292
#6	PRICE #1 / Fall Spinach	0.247	0.302
#7	Carton per Acre / Fall Greens	0.227	0.247
#8	Total Acres / Fall Spinach	0.222	0.222
#9	PRICE #1 / Overwinter Spinach	0.215	0.255
#10	Total Acres / Fall Greens	0.21	0.245
	R-Squared=	0.9984319	

Rank Inputs for Output PROFITS AFTER TAXES			
Rank	Name	Regression	Correlation
#1	Pay. to Farmers / Fall Spinach	-0.402	-0.354
#2	PRICE / Fall Greens	0.364	0.332
#3	PRICE / Fall Spinach	0.357	0.366
#4	Pay. to Farmers / Overwinter Spinach	-0.287	-0.258
#5	Pay. to Farmers / Fall Greens	-0.278	-0.263
#6	PRICE / Spring Greens	0.252	0.303
#7	PRICE / Fall Greens	0.239	0.248
#8	PRICE / Fall Spinach	0.236	0.255
#9	Pay. to Farmers / Spring Greens	-0.233	-0.24
#10	PRICE / Overwinter Spinach	0.213	0.231
	R-Squared=	0.9977132	

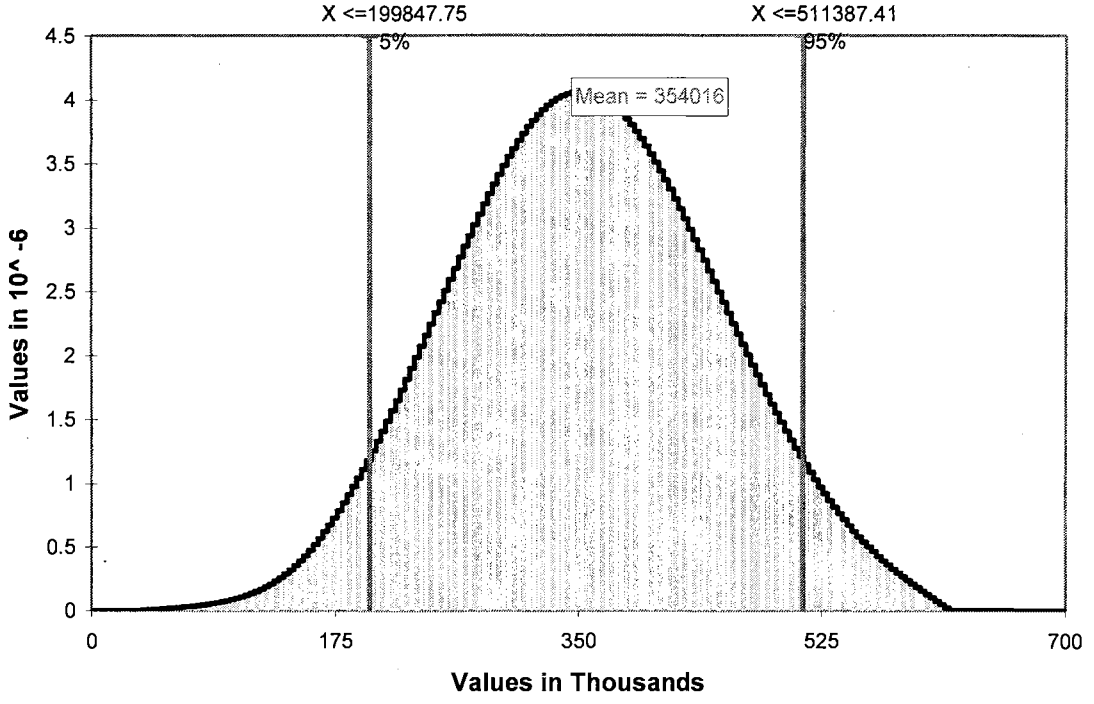


Figure 6. Distribution of Profits after taxes

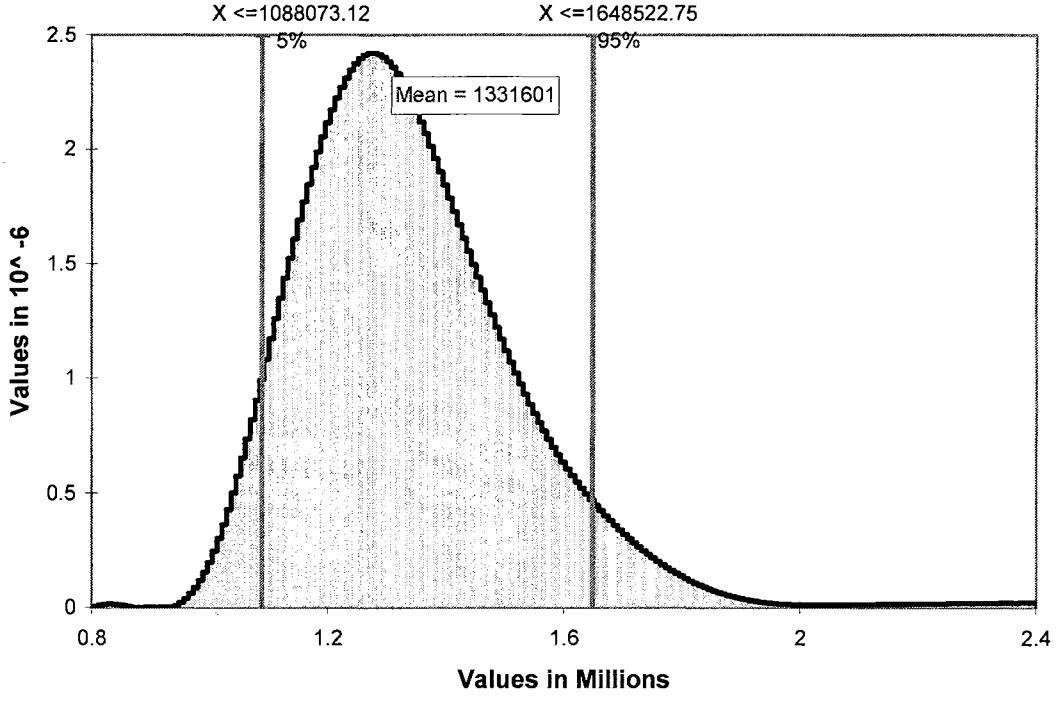


Figure 7. Distribution of Break-Even Sales

Cash Flow Analysis

The Annual Cash Flow (Table 20) shows the flow of cash transactions across twelve months. The cash flow statement calculates the cash position for the packing facility after all the expenses, taxes, and farmer payments are paid. If the cash position is negative, the model will borrow enough money to cover the negative cash flow amount, and to attain the minimum cash balance. This minimum cash balance will appear in the "Ending Cash Balance" row of the annual cash flow statement as long as the cash position after operations is negative, or the positive cash position is used to pay outstanding operating loan balances. When the cash position is positive, funds will be used to pay the outstanding loan balance and an interest payment based on a monthly interest rate. When the outstanding loan balance is paid off, and the cash position continues to be positive, the funds exceeding the minimum cash balance are invested at the monthly interest rate also. The projected ending cash balance for this operation after the first year is $176,021.

Table 20. Annual Cash Flow

ANNUAL CASH FLOW	2002						
MONTH	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY
CASH BALANCE	700,000.00	15,969.73	2,000.00	2,000.00	2,000.00	26,958.86	72,038.91
Bank Loans	502,155.00	0.00	0.00	0.00	0.00	0.00	0.00
Receivables	0.00	0.00	0.00	118,218.26	388,123.62	336,843.06	174,659.36
Other Revenues + Interest	2,303.40	46.10	0.00	0.00	0.00	82.36	231.13
TOTAL INFLOWS	1,204,458.40	16,015.83	2,000.00	120,218.26	390,123.62	363,884.29	246,929.41
Accounts Payables	0.00	0.00	0.00	17,706.70	58,133.05	50,452.26	26,160.43
Direct Labor	0.00	0.00	0.00	36,126.14	34,311.79	22,874.53	0.00
New Purchases	1,169,600.00	0.00	0.00	0.00	0.00	0.00	0.00
Overhead	6,005.33	6,005.33	6,005.33	6,005.33	6,005.33	6,005.33	6,005.33
Administrative Salaries	12,083.33	12,083.33	12,083.33	12,083.33	12,083.33	12,083.33	12,083.33
Fuel & Oil	100.00	100.00	500.00	1,000.00	1,000.00	1,000.00	1,000.00
Utilities	500.00	500.00	500.00	2,000.00	2,500.00	2,500.00	2,500.00
Telephone	100.00	100.00	100.00	500.00	500.00	500.00	100.00
Office Supplies	100.00	100.00	300.00	400.00	400.00	400.00	300.00
Promotion	0.00	0.00	0.00	500.00	500.00	500.00	500.00
Property Tax	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Gen. Exp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Expenses	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Scheduled Int. Payments	0.00	2,517.95	2,516.06	7,514.14	2,512.21	2,510.27	7,404.47
Scheduled Prin. Payments	0.00	227.73	229.62	4,385.20	233.47	235.41	4,494.87
Freight & Misc. Charges	0.00	0.00	0.00	6,943.80	6,595.07	4,396.71	0.00
TOTAL OUTFLOWS	1,188,488.67	21,634.35	22,234.35	95,164.65	124,774.26	103,457.85	60,548.44
CASH AFTER PACKING	15,969.73	(5,618.51)	(20,234.35)	25,053.61	265,349.37	260,426.44	186,380.97
Payments to Farmers	0.00	0.00	0.00	42,387.30	188,482.09	188,387.53	113,691.84
Income Taxes	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CASH POSITION	15,969.73	(5,618.51)	(20,234.35)	(17,333.69)	76,867.28	72,038.91	72,689.13
Oper. Int. Payment	0.00	0.00	0.00	0.00	721.86	0.00	0.00
Oper. Loan Prin. Payment	0.00	0.00	0.00	0.00	49,186.55	0.00	0.00
Oper. Loan Increase	0.00	7,618.51	22,234.35	19,333.69	0.00	0.00	0.00
ENDING CASH BALANCE	15,969.73	2,000.00	2,000.00	2,000.00	26,958.86	72,038.91	72,689.13
OPER. LOAN INTEREST ACCRUED	0.00	0.00	63.46	312.14	0.00	0.00	0.00
OUTSTANDING OPERATING LOAN	0.00	7,618.51	29,852.86	49,186.55	0.00	0.00	0.00

Table 20. (Continued)

ANNUAL CASH FLOW					2002 *	
MONTH	AUG	SEPT	OCT	NOV	DEC	TOTAL
CASH BALANCE	72,689.13	37,912.55	16,396.71	2,000.00	55,135.32	700,000.00
Bank Loans	0.00	0.00	0.00	0.00	0.00	502,155.00
Receivables	0.00	0.00	94,787.74	378,090.04	428,628.04	1,919,350.13
Other Revenues + Interest	233.27	118.51	47.51	0.00	175.35	3,237.63
TOTAL INFLOWS	72,922.40	38,031.06	111,231.96	380,090.04	483,938.71	3,124,742.77
Accounts Payables	0.00	0.00	14,197.28	56,630.23	64,199.79	287,479.76
Direct Labor	0.00	0.00	28,966.05	47,952.53	19,094.56	189,325.60
New Purchases	0.00	0.00	0.00	0.00	0.00	1,169,600.00
Overhead	6,005.33	6,005.33	6,005.33	6,005.33	6,005.33	72,064.00
Administrative Salaries	12,083.33	12,083.33	12,083.33	12,083.33	12,083.33	145,000.00
Fuel & Oil	100.00	100.00	1,000.00	1,000.00	1,000.00	7,900.00
Utilities	500.00	500.00	2,000.00	1,750.00	1,750.00	17,500.00
Telephone	100.00	100.00	500.00	500.00	500.00	3,600.00
Office Supplies	100.00	100.00	400.00	400.00	400.00	3,400.00
Promotion	0.00	0.00	500.00	500.00	500.00	3,500.00
Property Tax	0.00	0.00	0.00	2,000.00	2,000.00	4,000.00
Other Gen. Exp.	0.00	0.00	0.00	0.00	0.00	0.00
Other Expenses	0.00	0.00	0.00	0.00	0.00	0.00
Scheduled Int. Payments	2,506.33	2,504.33	7,292.04	2,500.29	2,498.25	42,276.34
Scheduled Prin. Payments	239.35	241.35	4,607.30	245.39	247.43	15,387.12
Freight & Misc. Charges	0.00	0.00	5,567.56	9,216.95	3,670.16	36,390.26
TOTAL OUTFLOWS	21,634.35	21,634.35	83,118.90	140,784.06	113,948.86	1,997,423.07
CASH AFTER PACKING	51,288.06	16,396.71	28,113.07	239,305.98	369,989.85	1,127,319.69
Payments to Farmers	13,375.51	0.00	34,240.51	175,975.51	235,792.84	992,333.13
Income Taxes	0.00	0.00	0.00	0.00	0.00	0.00
CASH POSITION	37,912.55	16,396.71	(6,127.44)	63,330.47	134,197.00	134,986.57
Oper. Int. Payment	0.00	0.00	0.00	67.70	0.00	789.56
Oper. Loan Prin. Payment	0.00	0.00	0.00	8,127.44	0.00	57,313.99
Oper. Loan Increase	0.00	0.00	8,127.44	0.00	0.00	57,313.99
ENDING CASH BALANCE $	37,912.55	16,396.71	2,000.00	55,135.32	134,197.00	134,197.00
OPER. LOAN INTEREST ACCRUED	0.00	0.00	0.00	0.00	0.00	0.00
OUTSTANDING OPERATING LOAN	0.00	0.00	8,127.44	0.00	0.00	0.00

The Annual Income Statement (Table 21) posts by month the income and expenses generated by the assumptions set in PACKSIM. After the first year, the operation posts a profit after tax of $57,314. The NGC is classified as a cooperative exempt of income tax, as long as a non-member business is not undertaken.

Table 21. Annual Income Statement

ANNUAL INCOME STATEMENT	2002						
MONTH	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY
NET SALES	0.00	0.00	0.00	394,060.86	374,270.07	249,513.38	0.00
INTEREST ON CASH BALANCE	2,303.40	46.10	0.00	0.00	0.00	82.36	231.13
Other Revenues	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL SALES & REVENUES	2,303.40	46.10	0.00	394,060.86	374,270.07	249,595.74	231.13
Direct Materials	0.00	0.00	0.00	59,022.33	56,058.07	37,372.05	0.00
Direct Labor	0.00	0.00	0.00	36,126.14	34,311.79	22,874.53	0.00
Factory Overhead	6,005.33	6,005.33	6,005.33	6,005.33	6,005.33	6,005.33	6,005.33
TOTAL COST OF PACKING	6,005.33	6,005.33	6,005.33	101,153.81	96,375.19	66,251.91	6,005.33
Other Expenses	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GROSS MARGIN	(3,701.93)	(5,959.23)	(6,005.33)	292,907.06	277,894.87	183,343.83	(5,774.20)
GENERAL EXPENSES							
Administrative Salaries	12,083.33	12,083.33	12,083.33	12,083.33	12,083.33	12,083.33	12,083.33
Fuel & Oil	100.00	100.00	500.00	1,000.00	1,000.00	1,000.00	1,000.00
Utilities	500.00	500.00	500.00	2,000.00	2,500.00	2,500.00	2,500.00
Telephone	100.00	100.00	100.00	500.00	500.00	500.00	100.00
Office Supplies	100.00	100.00	300.00	400.00	400.00	400.00	300.00
Promotion	0.00	0.00	0.00	500.00	500.00	500.00	500.00
Property Tax	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Gen. Exp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL GEN/ADMIN EXP.	12,883.33	12,883.33	13,483.33	16,483.33	16,983.33	16,983.33	16,483.33
FUNDS FROM OPERATIONS	(16,585.27)	(18,842.57)	(19,488.67)	276,423.72	260,911.54	166,360.50	(22,257.54)
NON-CASH OPERATING EXPENSES							
Depreciation	5,534.90	5,534.90	5,534.90	5,534.90	5,534.90	5,534.90	5,534.90
OPERATING PROFIT (LOSS)	(22,120.17)	(24,377.47)	(25,023.57)	270,888.82	255,376.63	160,825.60	(27,792.44)
Interest	0.00	2,517.95	2,516.06	7,514.14	3,234.07	2,510.27	7,404.47
REVENUE AFTER PACKING	(22,120.17)	(26,895.42)	(27,539.63)	263,374.68	252,142.56	158,315.33	(35,196.91)
Payments to Farmers	0.00	0.00	0.00	211,936.51	200,632.65	133,755.10	0.00
Freight & Misc.	0.00	0.00	0.00	6,943.80	6,595.07	4,396.71	0.00
PROFITS BEFORE TAXES	(22,120.17)	(26,895.42)	(27,539.63)	44,494.37	44,914.85	20,163.51	(35,196.91)
Income Taxes	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PROFITS AFTER TAXES	(22,120.17)	(26,895.42)	(27,539.63)	44,494.37	44,914.85	20,163.51	(35,196.91)

Table 21. (Continued)

ANNUAL INCOME STATEMENT					2002 *	
MONTH	AUG	SEPT	OCT	NOV	DEC	TOTAL
NET SALES	0.00	0.00	315,959.14	523,062.14	208,281.81	2,065,147.40
INTEREST ON CASH BALANCE	233.27	118.51	47.51	0.00	175.35	2,303.40
Other Revenues	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL SALES & REVENUES	233.27	118.51	316,006.65	523,062.14	208,457.15	2,068,385.03
Direct Materials	0.00	0.00	47,324.28	78,344.11	31,196.39	309,317.23
Direct Labor	0.00	0.00	28,966.05	47,952.53	19,094.56	189,325.60
Factory Overhead	6,005.33	6,005.33	6,005.33	6,005.33	6,005.33	72,064.00
TOTAL COST OF PACKING	6,005.33	6,005.33	82,295.66	132,301.98	56,296.29	570,706.83
Other Expenses	0.00	0.00	0.00	0.00	0.00	0.00
GROSS MARGIN	(5,772.06)	(5,886.82)	233,711.00	390,760.16	152,160.87	1,497,678.20
GENERAL EXPENSES						
Administrative Salaries	12,083.33	12,083.33	12,083.33	12,083.33	12,083.33	145,000.00
Fuel & Oil	100.00	100.00	1,000.00	1,000.00	1,000.00	7,900.00
Utilities	500.00	500.00	2,000.00	1,750.00	1,750.00	17,500.00
Telephone	100.00	100.00	500.00	500.00	500.00	3,600.00
Office Supplies	100.00	100.00	400.00	400.00	400.00	3,400.00
Promotion	0.00	0.00	500.00	500.00	500.00	3,500.00
Property Tax	0.00	0.00	0.00	2,000.00	2,000.00	4,000.00
Other Gen. Exp.	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL GEN/ADMIN EXP.	12,883.33	12,883.33	16,483.33	18,233.33	18,233.33	184,900.00
FUNDS FROM OPERATIONS	(18,655.39)	(18,770.16)	217,227.66	372,526.83	133,927.53	1,312,778.20
NON-CASH OPERATING EXPENSES						
Depreciation	5,534.90	5,534.90	5,534.90	5,534.90	5,534.90	66,418.85
OPERATING PROFIT (LOSS)	(24,190.30)	(24,305.06)	211,692.76	366,991.93	128,392.63	1,246,359.36
Interest	2,506.33	2,504.33	7,292.04	2,567.99	2,498.25	43,065.90
REVENUE AFTER PACKING	(26,696.63)	(26,809.39)	204,400.72	364,423.93	125,894.38	1,203,293.45
Payments to Farmers	0.00	0.00	171,202.53	280,668.71	111,022.46	1,109,217.97
Freight & Misc.	0.00	0.00	5,567.56	9,216.95	3,670.16	36,390.26
PROFITS BEFORE TAXES	(26,696.63)	(26,809.39)	27,630.63	74,538.27	11,201.76	57,685.23
Income Taxes	0.00	0.00	0.00	0.00	0.00	0.00
PROFITS AFTER TAXES	(26,696.63)	(26,809.39)	27,630.63	74,538.27	11,201.76	57,685.23

The Credit Balance Report (Table 22) provides the outstanding principal for all standard lines, specialty lines, building, working capital, and operating capital loans. This information is aggregated for the balance sheet. The cash flow carryover for the first two months of the next accounting year is provided for accounts payable and receivable and

payments to farmers. In addition, the ending cash balance, accrued interest on operating loan, and ending retained earnings values are provided. The carryover data can be entered in the model for the following year's financial statements.

Table 22. Pro Forma Credit Balance Report

END-OF-YEAR CREDIT BALANCE REPORT				2002
PRINCIPAL OUTSTANDING ON LOANS				
Standard Machinery Loans			187,224.89	
Building and Improvements Loans			299,542.98	
Specialty Machinery Loans			0.00	
Working Capital Loans			0.00	
Operating Capital Loan			0.00	
DUE	ACCOUNTS PAYABLE	PAYMENTS TO FARMERS		ACCOUNTS RECEIVABLE
JAN	2003	21,837.48	105,782.59	145,797.26
FEB	2003	0.00	11,102.25	0.00
Ending Cash Balance			134,197.00	
Accrued Interest on Operating Loan			0.00	
Ending Retained Earnings			57,685.23	

Break-Even Analysis

Break-even cartons and acres are computed two ways: weighted and unweighted. The weighted computation calculates the number of cartons and acres to break-even given that all of the crops change by the same percentage. The weighted results are specific to the particular assumptions of selling prices, variable costs and number of cartons.

The breakeven calculations for the unweighted acres and cartons have a different meaning. The unweighted figure indicates how many cartons and/or acres of each

particular crop would need to be sold for the packing facility to breakeven, holding the other crops constant at the "number of crates sold" level.

The weighted change to breakeven figure (% to BE) indicates the amount by which all crops must increase (decrease) to reach breakeven. A positive weighted change to breakeven number indicates that the operation lost money during the season; a negative number (-0.13) indicates that the packing facility earned a profit. The breakeven sales volume, ($1,797,997.76), is less than the actual gross sales volume, ($2,065,147.40). Table 23 analyzes break-even sales by crops and also provides total break-even sales for the packing facility. Table 24 displays the pro-forma balance sheet for 2002.

Table 23. Pro Forma Break Even Analysis

BREAKEVEN ANALYSIS	2002					
TOTAL SALES:	$2,065,147.40					
FIXED COST:	$366,448.75					
% TO B.E.:	-0.13					
B.E. SALES:	$1,797,997.76					
Crop	Fall Spinach	Spring Spinach	Overwinter Spinach	Fall Greens	Spring Greens	TOTAL
Cartons Sold	91,754.10	40,479.75	63,418.28	92,792.70	75,457.80	363,902.63
Avg. Selling Price	5.68	5.68	5.68	5.68	5.68	
Tot. Variable Cost	4.50	4.50	4.50	4.55	4.55	
Gross Margin	108,245.57	47,755.40	74,816.79	104,831.21	85,247.36	420,896.34
Weighted BE Cartons	79,884.69	35,243.25	55,214.42	80,788.94	65,696.50	316,827.80
Weighted BE Acres	88.81	39.18	61.38	79.23	64.43	333.02
Unweighted BE Cartons	45,601.73	-5,672.62	17,265.90	44,597.71	27,262.81	129,055.54
Unweighted BE Acres	50.69	-6.31	19.19	43.74	26.74	134.05

Table 24. Pro Forma Balance Sheet

B A L A N C E S H E E T			2002
ASSETS	BEGINNING	ENDING	CHANGE
CURRENT ASSETS			
Cash	700,000.00	134,197.00	-565,803.00
Acounts Receivables	0.00	145,797.26	145,797.26
Inventory	0.00	0.00	0.00
Total Current Assets	700,000.00	279,994.27	-420,005.73
FIXED ASSETS			
Buildings and Land Improvements			
(less deprec.)	0.00	586,946.15	586,946.15
Machinery and Equipment			0.00
(less deprec.)	0.00	516,235.00	516,235.00
Value of Land	30,000.00	30,000.00	0.00
Total Fixed Assets	30,000.00	1,133,181.15	1,103,181.15
TOTAL ASSETS	730,000.00	1,413,175.42	683,175.42
LIABILITIES			
CURRENT LIABILITIES			
Accounts Payables	0.00	21,837.48	21,837.48
Payments to Farmers	0.00	116,884.84	116,884.84
Accrued Interest	0.00	0.00	0.00
Operating Loan	0.00	0.00	0.00
Total Current Liabilities	0.00	138,722.32	138,722.32
LONG-TERM LIABILITIES	0.00	486,767.87	486,767.87
TOTAL LIABILITIES	0.00	625,490.19	625,490.19
OWNER'S EQUITY	730,000.00	730,000.01	0.01
RETAINED EARNINGS	0.00	57,685.23	57,685.23
TOTAL LIABILITIES & CAPITAL	730,000.00	1,413,175.42	683,175.42

Ratio Analysis

Ratio analysis at this point will not be very important because we are dealing with projected figures. However, it is interesting to know where the business is likely to be headed. It could also serves as a boost if the NGC promoters decide to seek a bank loan to finance the operation.

Table 25. Pro Forma Ratio Analysis

R A T I O A N A L Y S I S		2002
	PACKING HOUSE BUDGETED	PACKING HOUSE ACTUAL
A. PROFITABILITY RATIOS		
Net Profit Margin on Sales	2.79%	100.00%
Return on Investment (ROI)	7.13%	0.00%
Return on Equity	7.32%	0.00%
B. CREDIT WORTHINESS RATIOS		
Current Ratio (Liquidity)	2.018	
Debt Ratio (Leverage)	0.443	
Debt to Equity Ratio	0.794	
Fixed Charge Coverage	2.339	#N/A
C. ACTIVITY RATIOS		
Fixed Assets Turnover (Times per Year)	1.825	0.00
Total Assets Turnover (Times per Year)	1.464	0.00

The current ratio shows that the operation has the potential to be very solvent, as it disposes of $2.018 for every $1.00 dollar of current debt (Table 25). This signifies ample liquidity for the NGC. The Debt to Equity Ratio indicates the relationship of the owner equity to the total liabilities of the operation. The Debt to Equity Ratio is 0.794, which means that total liabilities are equal to 79 percent of owner equity. The operation will turn its assets about 2 times during the year. This rate appears to be rather modest,

because fresh packing facilities usually have high assets turnover rates. The return on equity is 7.32 percent while the return on investment is 7.13 percent.

Table 26 shows the net present value (NPV), and the internal rate of return (IRR) for the project calculated on a 5 year horizon, taking in account its initial investment and the residual value of assets at the end of the fifth year. It appears that at $3,535,273 the NPV is not only positive, but also, it is superior to the initial investment. The internal rate of return is also equally impressive at 27 percent, far above the market interest rate. This suggests that the project has the potential to be very profitable to its investors.

Table 26. Net Present Value and IRR

Year	Cash Flows	INV	VN	Rate	
Initial Value		-1,169,600		6.0%	
Year 1	$134,197				
Year 2	$126,442				
Year 3	$352,978				
Year 4	$758,725				
Yaear5	$1,125,210				
Residual Value at Year 5			$835,971		
Net Present Value					$3,535,273
IRR					27%

Conclusion

The feasibility study on forming a New Generation Cooperative is completed. The NGC was found to be a coalition and could therefore be analyzed using the concept of coalition theory. With respect to the first objective of this study, the potential payoff of a New Generation Cooperative for fresh greens marketing in Oklahoma was determined. The study was conducted used an adapted version of The Packing Simulation Model (PACKSIM), associated with @Risk® to account for risk analysis. The results of the financial analysis clearly show that such a venture would be profitable and would not require a very high initial equity investment.

With respect to the second objective, a survey of potential farmer-members was conducted. From the surveys results that are reported in the previous chapter and in the appendix, it is evident that farmers are eager to be part of this venture. They all showed their enthusiasm to be part of the new cooperative, but also showed some concerns, which are answered by the present study. The business analysis of the project shows that the operation has the potential to generate a relatively high return on capital equity as well as a profit.

Limitations

The lack of data on Oklahoma greens and spinach production as well as the limited number of potential producers made it difficult to perform any motivational analysis that could have determined the true factors influencing the eventual enthusiasm or lack thereof of farmers towards a New Generation Cooperative for fresh greens and

spinach in Oklahoma. Nevertheless, the data obtained through the small group of available producers indicate that they are very interested in a project of that nature.100 percent of these producers expressed their willingness to join a cooperative or a similar venture. This study, however, only applies to this particular project and should not be generalized.

Implications

A fresh marketing co-operative with the capacity to package and sell 3,500 tons of products operating at two shifts per day can pay growers prices equivalent to 60-70 percent of the terminal market plus an eventual return to equity. However, this requires a full utilization of the facility 180 days per year, given the seasonality of the crops involved. Farmers should explore the possibility of make the plant functional during off-season, either by processing different crops or processing for other farmer with a different season, so as to maintain a year-round presence on the market.

Eligible farmers would be able to benefit from a 30 percent state tax credit for every dollars invested in the value added operation. A farmer is eligible if he is an Oklahoma agricultural producer who made a direct investment in an Oklahoma producer-owned agricultural processing venture, cooperative or marketing association. If it is assumed that the $700,000 invested as equity are done so from revenue generated from Oklahoma farm activities, and those farmers are eligible for a 30 percent tax credit, they will be able to deduct together the total amount of $210,000 on their taxable income. This makes their investment equity investment be a lot lower, about $490,000.

After the first year the operation posts a profit after tax of $57,314, which is not only unusual, but will increase for the subsequent years. The New Generation Cooperative exempt of income tax. The eventual possibility of avoiding double taxation of revenue generated make presents an additional attractiveness of this operation. There is at least 50% percent chance that the operation will break even its first year of operation and just 28 % chance of making a lost.

SELECTED BIBILOGRAPHY

Anson E. R. "Marketing Through Farmer-Owned Cooperatives." *Small Farm Digest*, Vol.3 No.2 Winter 2000.

Aoki, M. *The Co-operative Game Theory of the Firm.* Oxford University Press, London, 1984.

Binswanger, H. P. "Risk and Uncertainty in agricultural development: An overview". In: Roumasset, J. A., Boussard, J-M. and Singh, I. (eds), *Risk and Agricutural Development*. ADC and SEARCA, College, Laguna, Philippines, 1979.

Boehlje, M. "Planning The Financial/Organizational Structure of Farm and Agribusiness Firms: A Primer", *Department of Agriculture and Applied Economics,* University of Minnesota, 1992.

Branch, W., and D. S.Tilley. "A Stochastic Simulation Analysis of a Small-Scale Catfish Processing Plant." *Southern Journal of Agricultural Economics*, (Dec. 1992):183-196.

Brown, R. "21st Century Alliance: Building Value-Added Agribusiness", *New Generation Cooperatives*: Case Study, Illinois Institute for Rural Affairs, http://www.iira.org, September 2001.

Butler, C. *Mastering Value at Risk: A step-by-step guide to understanding and applying VaR.* Financial Times/Prentice Hall, London, 1999.

Calvin, L., and R. Cook (coordinators), with M. Denbaly, C. Dimitri, L. Glaster, C. Handy, M. Jekeanowski, P. Kaufman, B. Krissoff, G. Thompson, and S. Thornsbury. *"Fresh fruit and vegetable marketing: Emerging trade practices, trends and issues"*. U.S. Department of Agriculture, Economic Research Service, Agricultural Economic Report No. 795, 2001

Chorafas, D. N. *The Market Risk Amendment: Understanding the Making-to Model and Value-at-Risk.* McGraw-Hill, New York, 1998.

Cook, M. L. "The Future of U.S. Agricultural Cooperatives: A Neo Institutional Approach", *American Journal of Agricultural Economics,* 5 (Dec. 1995): 1153-1160.

Cook, M., and C. Iliopoulos. "Beginning to inform the theory of the Cooperative firm: Emergence of the New Generation Cooperative." *Finnish Journal of Business Economics* 4(1999):525-535.

Cook, R. "Consumer Trends for the New Millennium Impact Fresh-Cut Produce" *International Fresh-Cut Association (IFPA)*, December 1998

Cook, R. "The U.S. Fresh Produce Industry: An Industry in Transition," Chapter 2 in *Postharvest Technology of Horticultural Crops*, Adel A. Kader (eds.), University of California Division of Agriculture and Natural Resources, Publication 3311, pp.27-117, 2001

Dayvault, B., D. S. Tilley, R. J. Schatzer, and C. Falk. *Business Development Planning for Fresh Vegetable Packing Facilities: A Case Study of Three River Produce.* Research Report P-899, Agricultural Experiment Station, Oklahoma State University, April 1988.

Dreze, J. H. "The Pure Theory of Labor-Managed and Participatory Economies, Part I: Certainty." CORE Discussion Paper No. 7422, *Center for Operation Research and Econometrics*, Catholic University of Louvain, 1974.

Erickson,S. P., J. T. Akridge, F. L.Barnard and D. W. Downey. *Agribusiness Management*, McGraw-Hill, 3rd Ed., New York, NY, 2002

Fink, R. J. "Sunrise Energy Cooperative", *New Generation Cooperatives*: Case Study, Illinois Institute for Rural Affairs, http://www.iira.org, January 2001a.

_____. "South Dakota Soybean Processors", *New Generation Cooperatives*: Case Study, Illinois Institute for Rural Affairs, http://www.iira.org, January 2001b.

Foltz, T. "Spinach production increase slightly", *The Packer*, Vol. 109, No. 18 May 6, 2002, Page D-8.

_____. "Ready Pac microwave greens hit market" *The packer*, Vol 108, No 40, October 1, 2001, Page A-6.

Friedman, J.W. *Game Theory with Applications to Economics*. Oxford University Press, New York, 1986.

Fulton, J. "Evolution of Cooperative Thought, Theory and Purpose: Reaction." *Cooperatives: Their importance in the Future Food and Agricultural System*, ed. D. Paalberg. pp. 21-28. Gainsville, Fl: University of Florida.

Hardaker, J.B., R. B. M. Huirne and J.R. Anderson. *Coping with Risk in Agriculture*. Cab International, New York, NY, 1997.

Harvey, C. "Retailers, restaurants adopt baby varieties", *The Packer*, Vol. 107, No. 33 Aug. 14, 2000, Page 6.

_____. "Leafy blends, spinach spice up salad lines", *The Packer*, Vol. 109, No. 12, P.4, March 25, 2002.

Hazell, P., and R. D. Norton. *Mathematical Programming for Economic Analysis in Agriculture.* Macmillan, New York, 1986.

Hazell, P. B. R. and Scandizzo, P. L. "Farmers expectations, risk aversion and market equilibrium under risk", *American Journal of Economics* 59(1977):204-209.

Heacox, L. "A new Spin On Spinach: Texas and Arkansas growers are not about to let California rule the lucrative fresh market spinach boom" *American Vegetable Grower,* Vol. 48, No. 5, May 2000.

Holz-Clause, M. "U.S. Premium Beef", *New Generation Cooperatives*: Case Study, Illinois Institute for Rural Affairs, http://www.iira.org, 2001.

Ichiisi, T. "Coalition Structure in a Labor-Managed Market Economy." *Econometrica* 45, Issue 2 (Mar. 1977): 341-60.

_____. *The Cooperative Nature of the Firm.* Cambridge University Press, 1993.

Jensen, M. C., and W. Meckling. "Theory of the Firm: Managerial Behavior, Agency Costs, ans Ownership Structure." *Journal of Financial Economics* 3(1976):305-360.

Johnson, S. R. "Strategic Behavior, Institutional Change, and the Future of Agriculture." *American Journal of Agricultral Economics* 80 (Dec. 1998): 898-915.

Jones, B. R., Joan R. Fulton and Frank J. Dooley. "Hog Producer Investment in Value-Added Agribusiness: Risk and Return Implications", *Selected Paper*, AAEA, 1999.

Jorion, P. *Value at Risk: The New Benchmark for Managing Financial Risk.* Second Edition,- McGraw-Hill New York, 1999.

Kenkel, P. and C. Lyford. "The Potential for 'New Wave' Cooperatives in Oklahoma". *Current Farm Economics,* 70 (1997): 39-45.

Linsmeier, T. J. and N. D. Pearson. *Risk Measurement: An Introduction to Value at Risk.* University of Illinois at Urbana-Champaign, July 1996.

Lintner, J. "Security prices, Risk and Maximal Gains from Diversification." *Journal of Finance*, 20(1965):587-615.

Lorenz, O.A., Donald N. Maynard. *Knott's handbook for Vegetable Growers*, 3rd Ed. Wiley-Interscience Publication, New York, NY, 1988.

Markowitz, H. "A Portfolio Selection." *Journal of Finance*, 7(1952):77-91.

Nott, S. B. "2000 Business Analysis Summary for Fruit Farms", staff Paper 2001-20, *Department of Agricultural Economics,* Michigan State University July 2001.

Nudell, D., David G. Kranzael, Tim Petry, Tim Faller, Harlan Huges and Erin Brown. " A Preliminary Feasibility For Establishing a Multi-Species Meat Processing Plant in Southwestern North Dakota", *The Institute of Natural Resources and Economic Development (INRED),* North Dakota State University, July 1999.

Ohlemeier, D. "Glory Foods tries fresch-cut yams", *The Packer,* Vol. 108, No. 47, November 26, 2001, Page A-5.

Osborne, J. M, and A. Rubinstein. *A Course in Game Theory.* MIT Press, Cambridge, M. A., 1994.

Palisade. *@Risk: Advanced Risk Analysis for Spreadsheets*, Version 4, Palisade Corporation, Newfield, NY, Nov.2000.

Royer J. S., "The Risk Mitigation Aspects of Agricultural Cooperatives: Reaction." In *Cooperatives: Their Importance in the Future Food and Agricultural System*, ed. Michael L. Cook, Randall E. Torgerson, Thomas L. Sporleder, and Daniel I. Padberg, pp. 83-87. Proceedings of a symposium sponsored by the National Council of Farmer Cooperatives and the Food and Agricultural Marketing Consortium, Las Vegas, Nev., Jan. 16-17.

Schotter, A. "The Evolution of Rules." Chap. 5 in *Economics as a Process: Essay in the New Institutional Economics.* Cambridge University Press, Cambridge, 1986.

Sexton, R. J. "Imperfect Competition in Agricultural Markets and the Role of Cooperatives: A Spatial Analysis." *American Journal of Agricultural Economics* 72 (August 1990): 710-20.

_____. "The formation of Cooperatives: A Game-Theoretic Approach with implications for cooperative Finance, Decision Making and Stability." *American Journal of Agricultural Economics* 68(May 1986):423-436.

Shubik, M. "Game Theory, Complexity, and Simplicity Part III: Critique and Perspective." *Complexity* 3(1998, No. 5): 34-46.

Sporleder, T. L. and P.D. Goldsmith. "The Risk Mitigation Aspects of Agricultural Cooperatives." In Cook, Torgerson, Sporleder and Padberg, Editors, *Cooperative: Their Importance in the Future Food and Agricultural System*, National Council on Farmer Cooperatives and The Food and Agricultural Marketing Consortium, 1997.

Staatz, J. M. "Farmer Cooperative Theory: Recent Developments." USDA, ACS Research Report Number 24, Washington, DC; July 1987a, pp87-107.

_____. "The Cooperative as a Coalition: A Game-Theoretic Approach." Amer. J. Ag. Econ. 65(December 1983): 1084-1089.

_____. " Farmers' incentives to Take Collective Action via Cooperatives: A Transaction-Cost Approach." in Royer, Jeffry S., editor, *Cooperative Theory: New Approaches*. USDA, ACS Service Report Number 18, and Washington, DC: July 1987a, pp. 87-107.

_____. "A Game-Theoretic Analysis of Decision Making in Farmer Cooperatives." in Royer, Jeffry S., editor, *Cooperative Theory: New Approaches*. USDA, ACS Service Report Number 18, Washington, DC: July 1987b, pp. 87-107.

_____. "Recent Developments in the Theory of Agricultural Cooperatives." *Journal of Agricultural Cooperation* 2(1987c): 74-95.

Stefanson, B., M. Fulton, and A. Harris. *New Generation Co-operatives: Rebuilding Rural Economies,* Centre for the Study of Co-operatives, University of Saskatchewan, Saskatoon, Saskatchewan, Canada, September 1995.

Swala H.M., and D. Curry. "Iowa Turkey Growers and West Liberty Foods," *New Generation Cooperatives*: Case Study, Illinois Institute for Rural Affairs, http://www.iira.org, January 2001.

Torgerson, R. E., Reynolds, and T. W. Gray. "Evolution of Cooperative Thought, Theory and Purpose." In Cook, Torgerson, Sporleder and Padberg, Editors, *Cooperative: Their Importance in the Future Food and Agricultural System*, National Council on Farmer Cooperatives and The Food and Agricultural Marketing Consortium, 1997.

Walzer, N. and M. Holmes. "Case Study of Southern Iowa Cooperative" *New Generation Cooperatives*: Case Study, Illinois Institute for Rural Affairs, http://www.iira.org, July1999.

APPENDIX A

PRO-FORMA STATEMENTS AND

ADDITIONAL PLANT GRAPHICS

Pro-forma statements are projected over five years and include balance sheets, cash flow statements and income statements.

The drawings are provided by Food Processing Solutions, Inc. They comprise additional drawings for the 6-station packing table as well as drawings for higher capacity and semi-automated lines such as the 12-station packing table that could process up to 5000 lbs per hour with a crew of 27 employees.

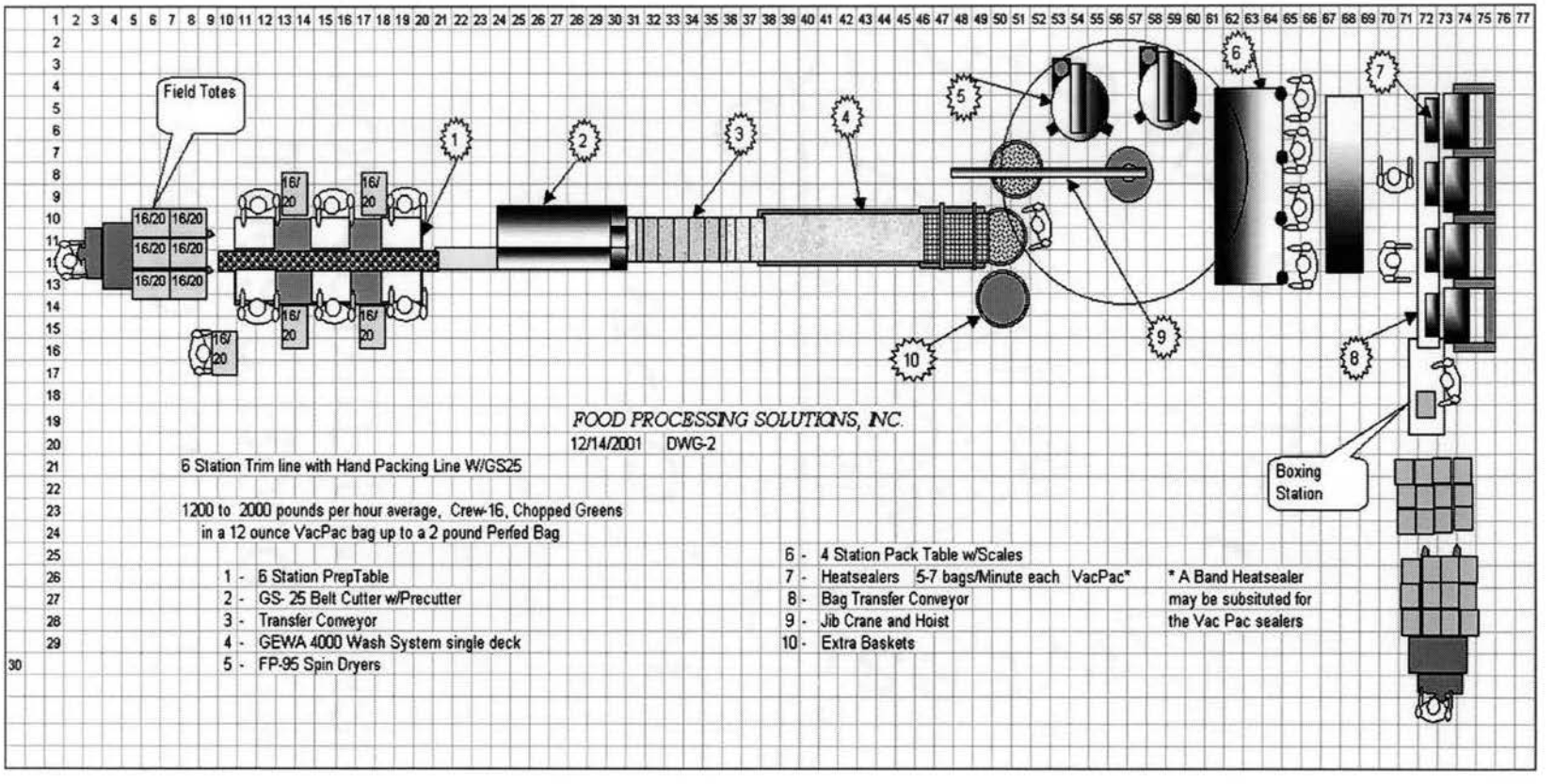
PRO-FORMA ANNUAL CASH FLOW

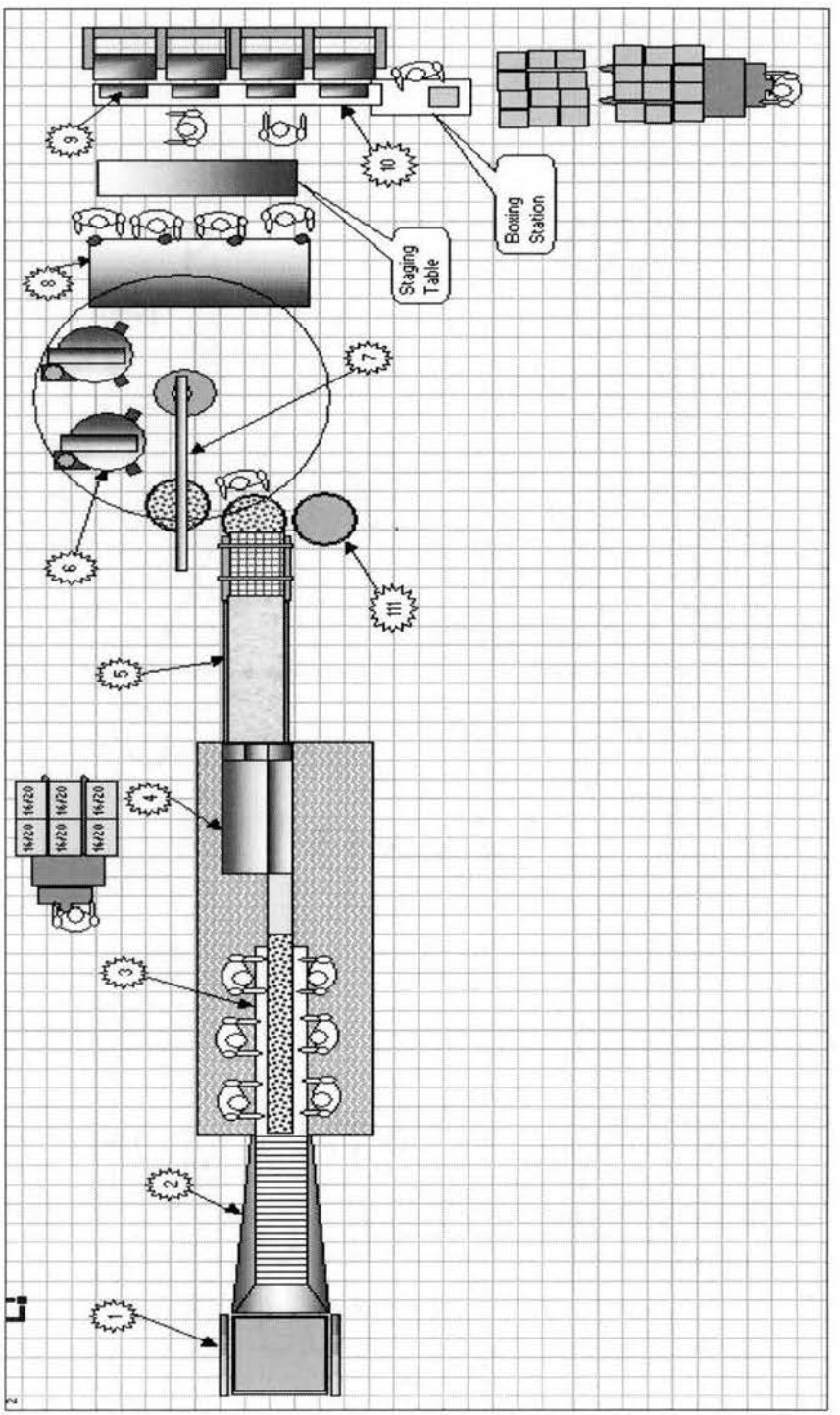
YEAR	1	2	3	4	5
CASH BALANCE	700,000.00	134,197.00	126,442.00	352,978.00	722,828.00
Bank Loans	502,155.00	0.00	0.00	0.00	0.00
Receivables	1,919,350.13	2,094,081.12	2,377,311.85	2,570,161.84	2,582,997.84
Other Revenues + Interest	3,237.63	3,239.92	5,723.31	17,124.86	32,791.46
TOTAL INFLOWS	3,124,742.77	2,231,518.04	2,509,477.16	2,940,264.69	3,338,617.30
Accounts Payables	287,479.76	313,650.48	313,650.48	302,236.93	313,650.48
Direct Labor	189,325.60	269,507.81	287,823.87	287,823.87	287,823.87
New Purchases	1,169,600.00	0.00	0.00	0.00	0.00
Overhead	72,064.00	72,064.00	72,064.00	72,064.00	37,064.00
Administrative Salaries	145,000.00	145,000.00	145,000.00	145,000.00	145,000.00
Fuel & Oil	7,900.00	7,900.00	7,900.00	7,900.00	7,900.00
Utilities	17,500.00	17,500.00	17,500.00	17,500.00	17,500.00
Telephone	3,600.00	3,600.00	3,600.00	3,600.00	3,600.00
Office Supplies	3,400.00	3,400.00	3,400.00	3,400.00	3,400.00
Promotion	3,500.00	3,500.00	3,500.00	3,500.00	3,500.00
Property Tax	4,000.00	4,000.00	4,000.00	4,000.00	4,000.00
Other Gen. Exp.	0.00	0.00	0.00	0.00	0.00
Other Expenses	0.00	0.00	0.00	0.00	0.00
Scheduled Int. Payments	42,276.34	47,853.41	45,596.86	43,105.77	40,355.75
Scheduled Prin. Payments	15,387.12	21,709.39	23,965.94	26,457.03	29,207.05
Freight & Misc. Charges	36,390.26	44,280.14	44,280.14	44,280.14	44,280.14
TOTAL OUTFLOWS	1,997,423.07	953,965.22	972,281.29	960,867.74	937,281.29
CASH AFTER PACKING	1,127,319.69	1,277,552.82	1,537,195.88	1,979,396.95	2,401,336.01
Payments to Farmers	992,333.13	1,151,110.55	1,184,217.49	1,240,671.44	1,276,125.17
Income Taxes	0.00	0.00	0.00	0.00	0.00
CASH POSITION	134,986.57	126,442.27	352,978.39	738,725.52	1,125,210.84
Oper. Int. Payment	789.56	0.00	0.00	0.00	0.00
Oper. Loan Prin. Payment	57,313.99	0.00	0.00	0.00	0.00
Oper. Loan Increase	57,313.99	0.00	0.00	0.00	0.00
ENDING CASH BALANCE $	134,197.00	126,442.27	352,978.39	738,725.52	1,125,210.84
OPER. LOAN INTEREST ACCRUED	0.00	0.00	0.00	0.00	0.00
OUTSTANDING OPERATING LOAN	0.00	0.00	0.00	0.00	0.00

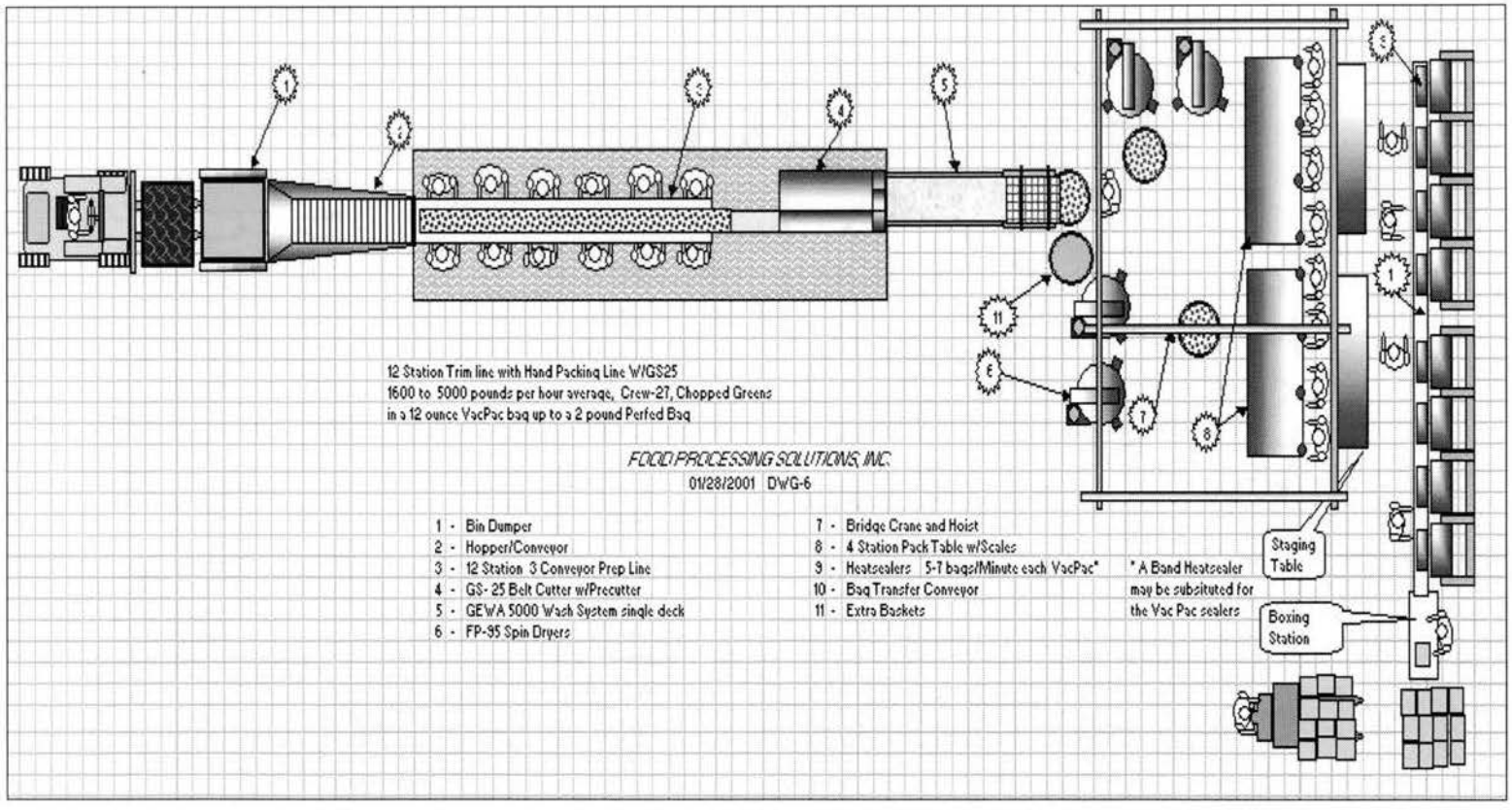
PRO-FORMA ANNUAL INCOME STATEMENT					
MONTH	1	2	3	4	5
NET SALES	2,065,147.40	2,094,081.38	2,398,507.31	2,583,007.88	2,583,007.88
INTEREST ON CASH BALANCE	2,303.40	436.25	410.66	1,158.234	2,378.73
Other Revenues	0	0	0	0	0
TOTAL SALES & REVENUES	2,068,385.03	2,097,321.31	2,404,230.63	2,600,132.73	2,615,799.34
Direct Materials	309,317.23	313,650.96	313,650.96	313,650.96	313,650.96
Direct Labor	189,325.60	269,507.81	287,823.87	287,823.87	287,823.87
Factory Overhead	72,064.00	72,064.00	72,064.00	72,064	37,064.00
TOTAL COST OF PACKING	570,706.83	655,222.77	673,538.83	673,538.83	638,538.83
Other Expenses	0	0	0	0	0
GROSS MARGIN	1,497,678.20	1,442,098.54	1,730,691.80	1,926,593.9	1,977,260.51
GENERAL EXPENSES					
Administrative Salaries	145,000.00	145,000.00	145,000.00	145,000	145,000.00
Fuel & Oil	7,900.00	7,900.00	7,900.00	7,900	7,900.00
Utilities	17,500.00	17,500.00	17,500.00	17,500	17,500.00
Telephone	3,600.00	3,600.00	3,600.00	3,600	3,600.00
Office Supplies	3,400.00	3,400.00	3,400.00	3,400	3,400.00
Promotion	3,500.00	3,500.00	3,500.00	3,500	3,500.00
Property Tax	4,000.00	4,000.00	4,000.00	4,000	4,000.00
Other Gen. Exp.	0	0	0	0	0
TOTAL GEN/ADMIN EXP.	184,900.00	184,900.00	184,900.00	184,900	184,900.00
FUNDS FROM OPERATIONS	1,312,778.20	1,257,198.54	1,545,791.80	1,741,693.9	1,792,360.51
NON-CASH OPERATING EXPENSES					
Depreciation	66,418.85	66,511.15	66,511.15	66,511.15	66,725.90
OPERATING PROFIT (LOSS)	1,246,359.36	1,190,687.39	1,479,280.64	1,675,182.74	1,725,634.61
Interest	43,065.90	47,853.41	45,596.86	43,105.77	40,355.75
REVENUE AFTER PACKING	1,203,293.45	1,142,833.98	1,433,683.78	1,632,076.97	1,685,278.86
Payments to Farmers	1,109,217.97	1,154,973.52	1,186,424.75	1,244,993.49	1,289,445.90
Freight & Misc.	36,390.26	44,280.14	44,280.14	44,280.13	44,280.14
PROFITS BEFORE TAXES	57,685.23	-56,419.68	202,978.90	342,803.35	351,552.83
Income Taxes	0	0	0	0	0
PROFITS AFTER TAXES	57,685.23	-56,419.68	202,978.90	342,803.35	351,552.83

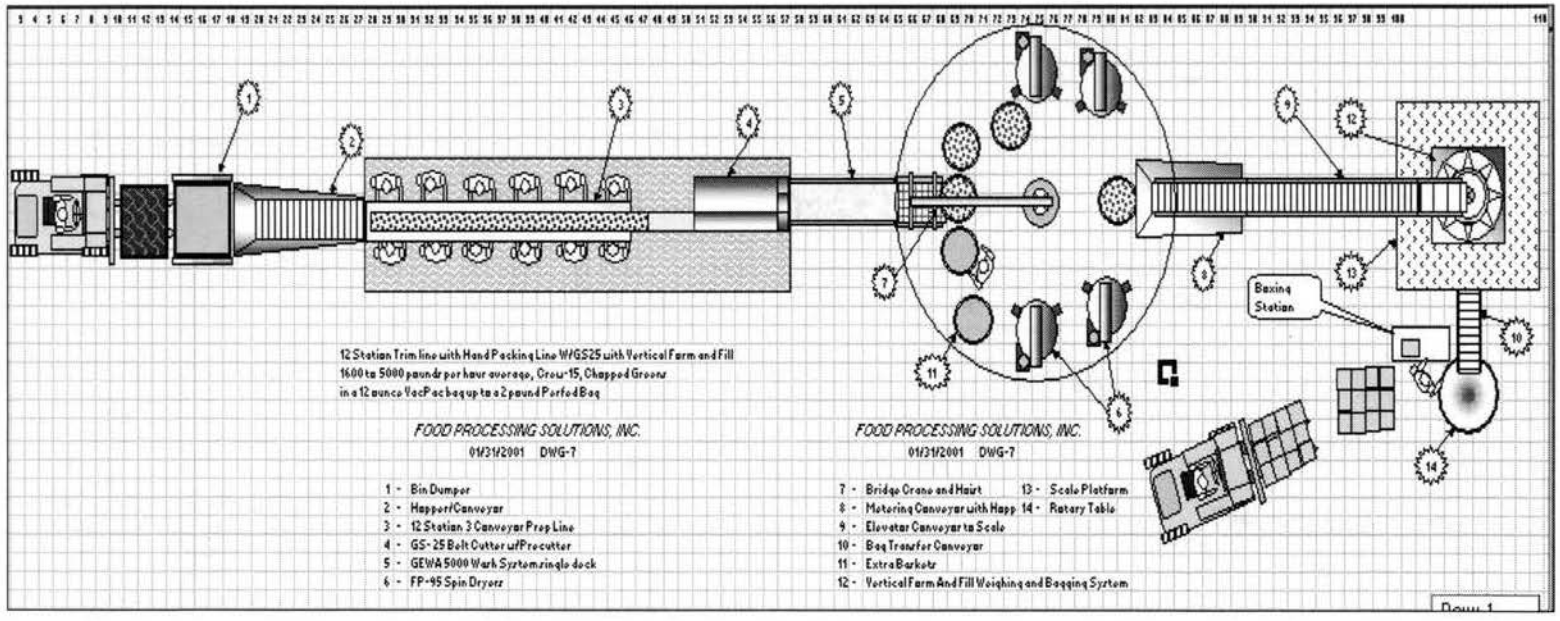
PRO-FORMA BALANCE SHEET

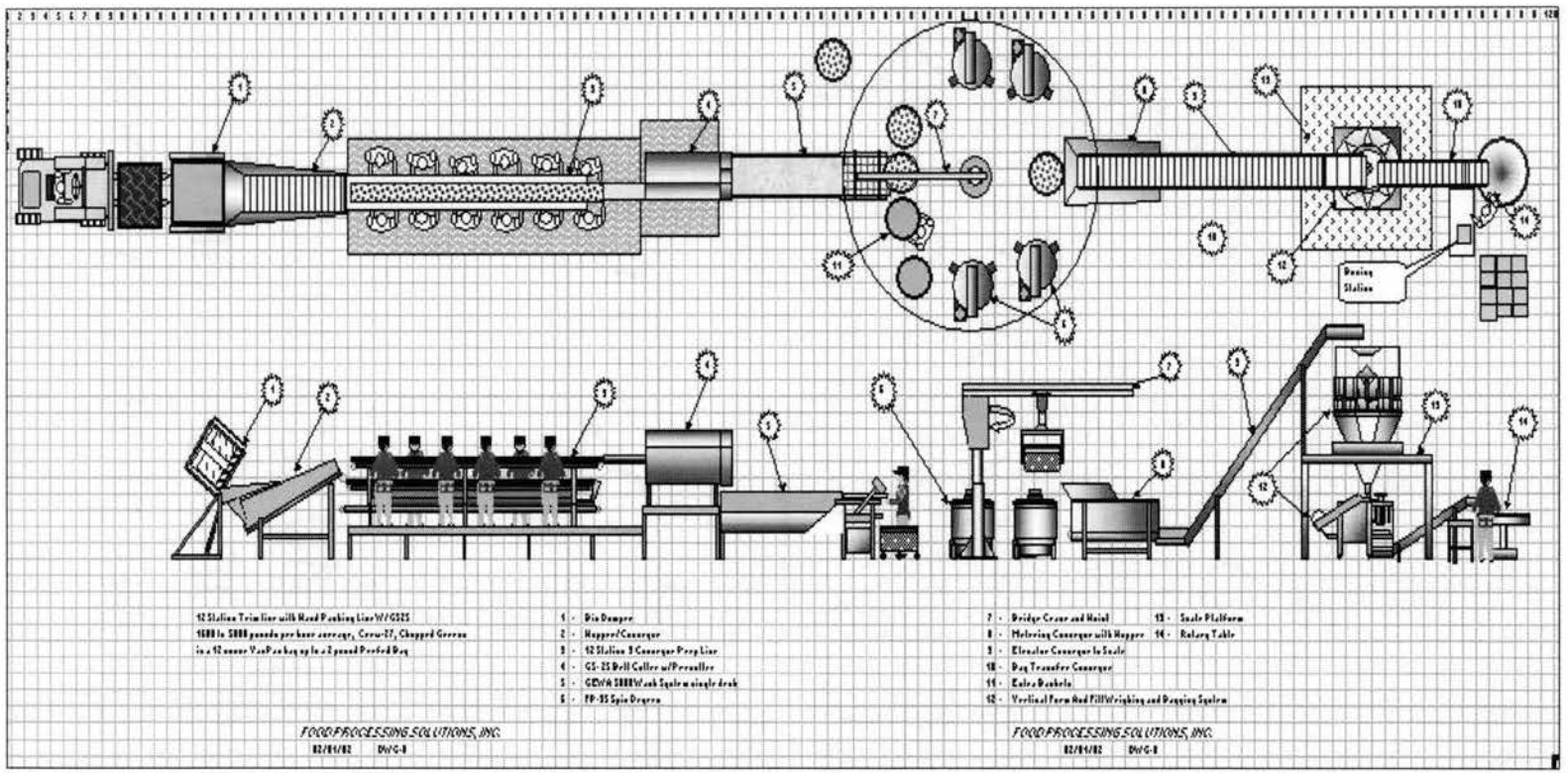
ASSETS	1	2	3	4	5
CURRENT ASSETS					
Cash	134,197.00	126,442.27	352,978.39	738,725.52	1,125,210.84
Accounts Receivables	145,797.26	145,797.26	166,992.46	179,838.04	179,838.04
Inventory	0.00	0.00	0.00	0.00	0.00
Total Current Assets	279,994.27	272,239.53	519,970.85	918,563.55	1,305,048.88
FIXED ASSETS					
Buildings and Land Improvements					
(less deprec.)	586,946.15	572,707.69	558,561.54	544,415.38	529,195.51
Machinery and Equipment					
(less deprec.)	516,235.00	463,870.00	411,505.00	359,140.00	306,775.00
Value of Land	30,000.00	30,000.00	30,000.00	30,000.00	30,000.00
Total Fixed Assets	1,133,181.15	1,066,577.69	1,000,066.54	933,555.38	865,970.51
TOTAL ASSETS	1,413,175.42	1,338,817.23	1,520,037.39	1,852,118.94	2,171,019.39
LIABILITIES					
CURRENT LIABILITIES					
Accounts Payables	21,837.48	21,837.48	21,837.48	21,837.48	21,837.48
Payments to Farmers	116,884.84	120,749.97	122,957.26	127,279.05	129,764.72
Accrued Interest	0.00	0.00	0.00	0.00	0.00
Operating Loan	0.00	0.00	0.00	0.00	0.00
Total Current Liabilities	138,722.32	142,587.45	144,794.74	149,116.53	151,602.20
LONG-TERM LIABILITIES	486,767.87	465,058.48	441,092.55	414,635.53	385,428.49
TOTAL LIABILITIES	625,490.19	607,645.93	585,887.29	563,752.06	537,030.69
OWNER'S EQUITY	730,000.01	729,905.98	729,906.20	741,319.53	735,603.87
RETAINED EARNINGS	57,685.23	1,265.32	204,243.90	547,047.35	898,384.83
TOTAL LIABILITIES & CAPITAL	1,413,175.42	1,338,817.23	1,520,037.39	1,852,118.94	2,171,019.39

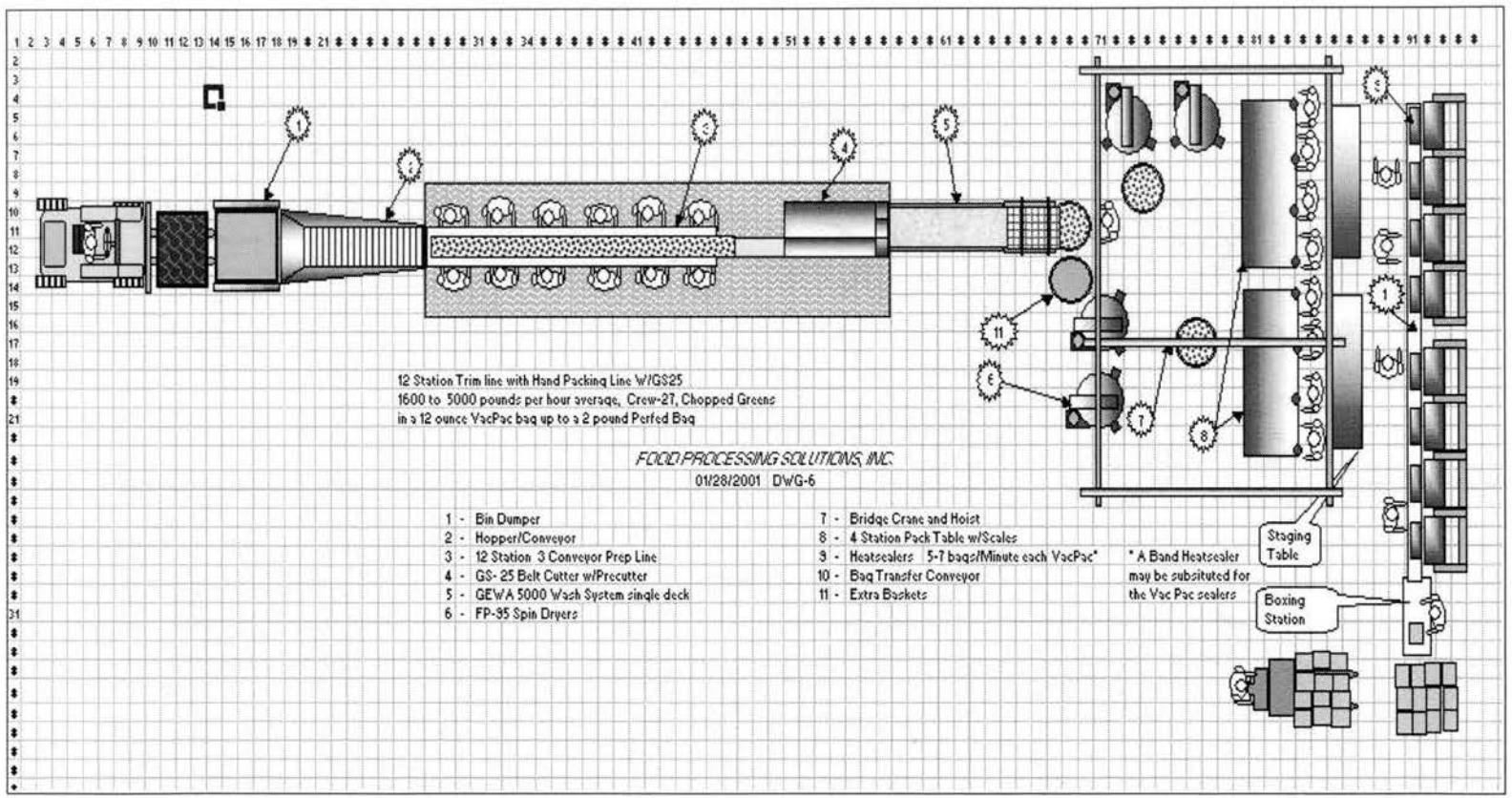

Field Totes
16/20
1
2
3
4
5
6
7
8
9
10
Boxing Station
FOOD PROCESSING SOLUTIONS, INC.
12/14/2001 DWG-2
6 Station Trim line with Hand Packing Line W/GS25
1200 to 2000 pounds per hour average, Crew-16, Chopped Greens
in a 12 ounce VacPac bag up to a 2 pound Perfed Bag
1 - 6 Station PrepTable
2 - GS- 25 Belt Cutter w/Precutter
3 - Transfer Conveyor
4 - GEWA 4000 Wash System single deck
5 - FP-95 Spin Dryers
6 - 4 Station Pack Table w/Scales
7 - Heatsealers 5-7 bags/Minute each VacPac*
8 - Bag Transfer Conveyor
9 - Jib Crane and Hoist
10 - Extra Baskets
* A Band Heatsealer may be subsituted for the Vac Pac sealers


Staging Table
Boxing Station
16/20
16/20
16/20
16/20
16/20
16/20


12 Station Trim line with Hand Packing Line W/GS25
1600 to 5000 pounds per hour average, Crew-27, Chopped Greens
in a 12 ounce VacPac bag up to a 2 pound Perfed Bag
FOOD PROCESSING SOLUTIONS, INC.
01/28/2001 DWG-6
1 - Bin Dumper
2 - Hopper/Conveyor
3 - 12 Station 3 Conveyor Prep Line
4 - GS- 25 Belt Cutter w/Precutter
5 - GEWA 5000 Wash System single deck
6 - FP-95 Spin Dryers
7 - Bridge Crane and Hoist
8 - 4 Station Pack Table w/Scales
9 - Heatsealers 5-7 bags/Minute each VacPac*
10 - Bag Transfer Conveyor
11 - Extra Baskets
* A Band Heatsealer may be substituted for the Vac Pac sealers
Staging Table
Boxing Station


12 Station Trim line with Hand Packing Line WFGS25 with Vertical Form and Fill
1600 to 5000 pounds per hour average, Crow-15, Chopped Greens
in a 12 ounce VacPac bag up to a 2 pound Perfed Bag
FOOD PROCESSING SOLUTIONS, INC.
01/31/2001 DWG-7
1 - Bin Dumper
2 - Hopper/Conveyor
3 - 12 Station 3 Conveyor Prep Line
4 - GS-25 Belt Cutter w/Precutter
5 - GEWA 5000 Wash System zinglo dock
6 - FP-95 Spin Dryers
FOOD PROCESSING SOLUTIONS, INC.
01/31/2001 DWG-7
7 - Bridge Crane and Hoist
8 - Motoring Conveyor with Hopp
9 - Elevator Conveyor to Scale
10 - Bag Transfer Conveyor
11 - Extra Baskets
12 - Vertical Form And Fill Weighing and Bagging System
13 - Scale Platform
14 - Rotary Table
Boxing Station


Dressing Station
12 Station Trimline with Head Packing Line W/ GS25
1600 to 5000 pounds per hour average, Cross-Cut, Chopped Carcass
in a 12 ounce Vac Pac bag up to a 2 pound Poofed Bag
1 - Bin Dumper
2 - Hopper/Conveyor
3 - 12 Station 3 Conveyor Prep Line
4 - GS-25 Drill Collar w/Pressaflex
5 - GEMA 5000 Weak Squirrel w single deck
6 - FP-35 Spin Dryers
7 - Bridge Crane and Hoist
8 - Metering Conveyor with Hopper
9 - Elevator Conveyor to Scale
10 - Bag Transfer Conveyor
11 - Enviro Buckets
12 - Vertical Form Head Fill Weighing and Bagging System
13 - Scale Platform
14 - Rotary Table
FOOD PROCESSING SOLUTIONS, INC.
02/01/02 DWG-0
FOOD PROCESSING SOLUTIONS, INC.
02/01/02 DWG-0


12 Station Trim line with Hand Packing Line W/GS25
1600 to 5000 pounds per hour average, Crew-27, Chopped Greens
in a 12 ounce VacPac bag up to a 2 pound Perfed Bag
FOOD PROCESSING SOLUTIONS, INC.
01/28/2001 DWG-6
1 - Bin Dumper
2 - Hopper/Conveyor
3 - 12 Station 3 Conveyor Prep Line
4 - GS- 25 Belt Cutter w/Precutter
5 - GEWA 5000 Wash System single deck
6 - FP-35 Spin Dryers
7 - Bridge Crane and Hoist
8 - 4 Station Pack Table w/Scales
9 - Heatsealers 5-7 bags/Minute each VacPac*
10 - Bag Transfer Conveyor
11 - Extra Baskets
* A Band Heatsealer may be subsituted for the Vac Pac sealers
Staging Table
Boxing Station

APPENDIX B

TAX CREDIT INFORMATION

APPENDIX B.1

AGRICULTURAL CREDIT - 68 O.S. SECTION 2357.25 AND RULE 710:50-15-85

There shall be allowed a credit for direct investments by Oklahoma agricultural producers in Oklahoma producer-owned agricultural processing cooperatives, ventures or marketing associations created and designed to develop and advance the production, processing, handling and marketing of agricultural commodities grown, made or manufactured in this state. The credit shall be thirty percent (30%) of the amount of the investment. If the credit allowed exceeds the tax liability, the amount of unused credit may be carried forward for a period not to exceed six (6) years.

The credit shall not be available or taken for any calendar year during which the claimant of the credit received any incentive payments pursuant to the Oklahoma Quality Jobs Program Act or the Saving Quality Jobs Act.

DEFINITIONS:

"Oklahoma agricultural producer" means any person who produces agricultural commodities in this state.

"Direct investment" means the payment of money in or the transfer of any form of economic value, whether tangible or intangible, other than money to an Oklahoma producer owned agricultural processing cooperative, venture or marketing association.

"Agricultural commodities" means a farm or ranch product, including but not limited to, wheat, corn, soybeans, cotton, timber, cattle, hogs, sheep, horses, poultry, animals of the families bovidae, cervidae and antilocapridae or birds of the ratite group produced in farming or ranching operations or a product of such crop or livestock in its unmanufactured state such as ginned cotton, wooldip, maple syrup, milk and eggs, or any other commodity listed under any Industry Group Number under Major Group 20 of Division D of the Standard Industrial Classification (SIC) Manual.

"Oklahoma producer-owned agricultural processing cooperative" means a legal entity, in the nature of a partnership or business, undertaking agricultural transactions or agricultural commercial enterprises for mutual profit. The entity must be controlled by the Oklahoma agricultural producers and a community of interest in the performance of the undertaking, transaction or enterprise; a right to direct and govern the policy in connection therewith; and the duty, which may be altered by agreement, to share both in profit and losses are required. The term does not include a cooperative that provides only, and nothing more than, storage, cleaning, or transportation of agricultural commodities.

"Oklahoma producer-owned agricultural processing venture" means a legal entity, in the nature of a corporation or company, organized to invest in or operate an agricultural commodity processing facility. The facility must be operated primarily for the processing or production of marketable products from agricultural commodities. The term shall include a dairy operation that requires a depreciable investment of at least two hundred fifty thousand dollars ($250,000) and which produces milk from dairy cows. The term does not include a venture that provides only, and nothing more than, storage, cleaning, or transportation of agricultural commodities.

"Oklahoma producer-owned agricultural processing marketing association" means a legal entity organized to jointly market agricultural commodities; facilitate the marketing process; and to promote and stimulate the processing, sales, and marketing of agricultural commodities. The term does not include a marketing association that provides only, and nothing more than, storage, cleaning, or transportation of agricultural commodities.

"Dairy operation" means and includes equipment and facilities to store and prepare feed, dairy cows, milking parlors, bulk cooling tanks, buildings, and all such depreciable investment commonly utilized in the dairy industry.

OKLAHOMA AGRICULTURAL PRODUCER CREDIT

FORM 520 TAX YEAR 2001

For Oklahoma agricultural producers who invest in Oklahoma agricultural processing or marketing ventures. 68 O.S. Section 2357.25 and Rule 710:50-15-85

Name as shown on return (investor)	Social Security Number or Federal Identification Number

Provide the location(s) and the type of agricultural commodities being produced by the investor.

Name of the agricultural processing cooperative, venture or marketing association	Federal Employees Identification Number

Provide the location(s) and the type of agricultural commodities being produced, processed or marketed. Also provide a detailed description of activity.

CREDIT COMPUTATION

1.	Total Amount of Direct Investment	$ _____
2.	Rate	30%
3.	Total Credit Allowable	$ _____
4.	Amount of Credit Used in 2001 (carry to form 511CR)	$ _____
5.	Amount of Unused Credit	$ _____

CREDIT CARRYOVER-The credit not used may be carried over, in order, to each of the six (6) years following the year in which the investment was originally made. If any of the investment is sold or otherwise disposed of in a year prior to the credit being used, the credit, available for carryover, must be reduced. See below for computation.

TAX YEAR	2002	2003	2004	2005	2006	2007
Unused Credit from Previous Year						
Amount of Credit Used						
Unused Credit Available for Carryover						

DISPOSITION OF INVESTMENT

For the taxable year during which the investment, or any portion thereof is sold or otherwise disposed of, the amount of the credit allowed in prior years or being allowed in the current year shall be added to Federal Adjusted Gross Income to arrive at Oklahoma Adjusted Gross Income. Any unused carryover credit will be reduced to account for the sale or disposition.

		DOLLAR AMOUNT	
1.	Total Amount of Original Investment 2001	1.	00
2.	Less: Amount of Investment Sold or Disposed of	2.	00
3.	Net Investment Remaining after Sale or Disposition	3.	00
4.	Rate	4.	30%
5.	Revised Credit Allowable	5.	00
6.	Less: Credit used in previous or current tax year(s) and not previously recaptured	6.	00
	Subtract the amount on line 6 from the amount on line 5, if the result is a negative number enter amount on line 7. If the result is a positive number enter amount on line 8.		
7.	Credit to be recaptured and included in income. Enter amount as a positive number on the other income or other additions line of the Oklahoma tax return.	7.	00
8.	Revised credit available for carryover to tax year _____	8.	00

APPENDIX C

QUESTIONNAIRE

AND

SURVEY RESULTS SUMMARY

Questionnaire No.__

Oklahoma State University

Department of Agricultural Economics

Fresh Greens and Spinach Producers Survey

The purpose of this survey is to study the feasibility of forming a new generation cooperative for fresh greens and spinach producers within Oklahoma. The cooperative might market a fresh processed (washed, trimmed and bagged) product. Your cooperation in filling out this form will be greatly appreciated. All answers will be kept confidential. Please complete only one producer survey for a single production operation.

Thank you for your cooperation.

1. How many years have you operated a farm? (Check one)

0-2 ☐	6-10 ☐	16-20 ☐	26-30 ☐
2-5 ☐	11-15 ☐	21-25 ☐	Over 30 ☐

2. How many years have you been producing fresh greens and/or spinach? (Check one)

0-2 ☐	6-10 ☐	16-20 ☐	26-30 ☐
2-5 ☐	11-15 ☐	21-25 ☐	Over 30 ☐

3. Which type of organization best describes your farm business? (Check one)

Individually Owned ☐		Corporation ☐	
Partnership ☐		Cooperative ☐	

4. Do you consider yourself a part time farmer? ☐ A full time farmer? ☐

5. a) How many acres do you own and use for the production of fresh greens and/or spinach? _____
   b) In what county is most of this acreage located? _____
6. a) How many acres do you rent from others to produce fresh greens and/or spinach? _____
   b) In what county is most of this acreage located? _____

7. List yields and acres produced in 2001, and circle whether you plan to increase, decrease, or maintain production during 2001.

   a. How many acres of fresh greens did you produce in 2001? _____ Yield per acre? _____

   b. How many acres of spinach did you produce in 2001? _____ Yield per acre? _____

8. What is the primary one reason your operation is producing fresh greens and spinach? (Check one)

   Available Market_____ Available Equipment_____ Production Experience_____ Good Prices_____

9. Do you think at least some level of cooperation, or coordination among producers of fresh greens and spinach is desirable? Yes ☐ No ☐

10. If a grower fresh processing and marketing cooperative was organized in your area would you be interested in selling through a cooperative? Yes ☐ No ☐

11. If a Processing Plant or receiving station was established in your area, would you be interested in selling to a plant?
Yes ☐ No ☐

12. Check the resources used when you have a question or problem relating to fresh greens and/or spinach
(Check all that apply)

☐ Extension Personnel ☐ Fact Sheets ☐ Textbooks ☐ Grower Publications

☐ Other Growers ☐ Equipment/Chemical Suppliers ☐ Other

13. Rank factors you consider that is the most important when selling your produce, from 1 to 6 (1 is the most important and 6 the least important):

_____ Outlet buys large quantities _____ Outlet provides good prices

_____ Outlet furnished equipment such as harvesting and trucking equipment _____ Outlet is reliable and consistent market every year

_____ Outlet provides technical assistance _____ Other (list)_____

14. Do you know some farmer that might consider producing fresh greens and/or spinach, given the type of crop they produce now? Yes ☐ No ☐

15. If you responded yes on the previous question (14), how many farmers do you know that may engage in the production of fresh greens and/or spinach?

_____ 1 farmer _____ 3 farmers

_____2 farmers _____ 4 or more farmers

16. Would you be willing to talk to them about the possibility of forming a cooperative for fresh greens and spinach?

Yes ☐ No ☐

17. Gross income for 2000 from the farm

0-1,499 ☐ 10,000-49,999 ☐ 100,000-249,999 ☐ 500,000 + ☐

1,500-9,999 ☐ 50,000-99,999 ☐ 250,000-499,999 ☐

18. Gross income from other source in 2000. (Include interest, part-time job, pensions etc.)

0-2,499 ☐ 10,000-19,999 ☐ 30,000-39,999 ☐ 50,000 + ☐

2,500-9,999 ☐ 20,000-29,999 ☐ 40,000-49,999 ☐

19. Sex (Check one) Male ☐ Female ☐

20. Race/Ethnic Group (Check one)

White ☐ Black ☐ Native American ☐ Hispanic ☐

Other ☐

21. Age (Check one)

Under 18 ☐ 26-35 ☐ 46-55 ☐ 66+ ☐

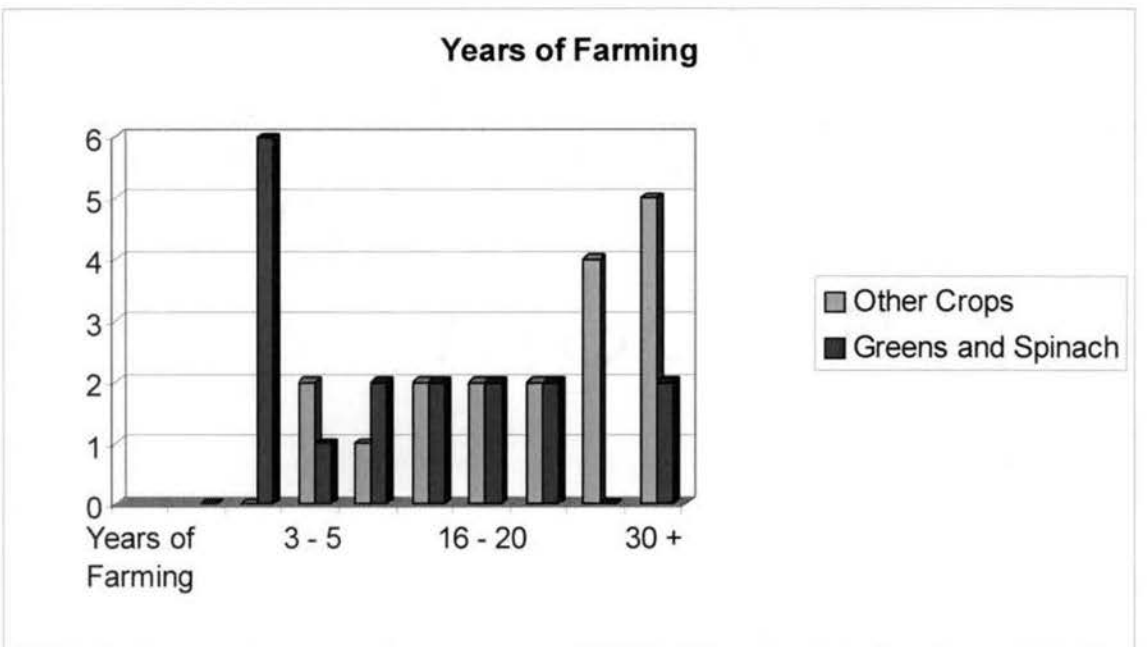
18-25 ☐ 36-45 ☐ 56-65 ☐

22. Education Level (Check one)

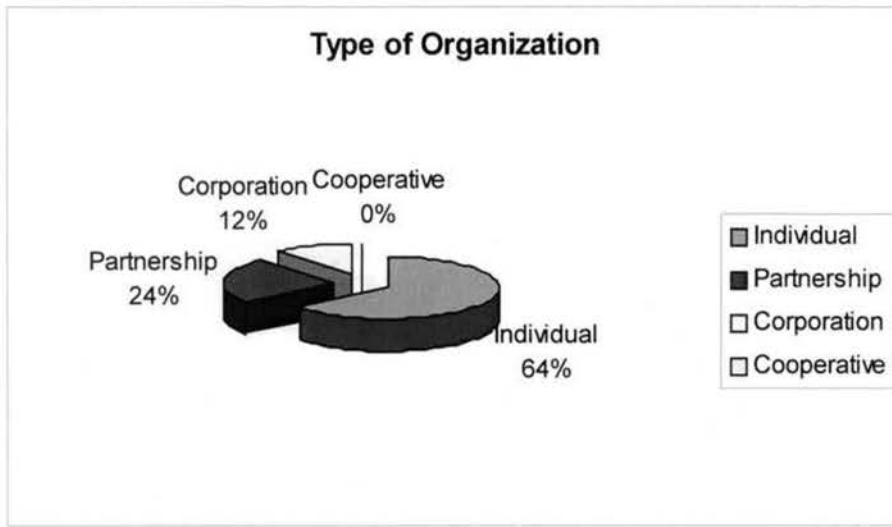
Elementary ☐ High School ☐ College ☐ Post Grad ☐

Survey Results

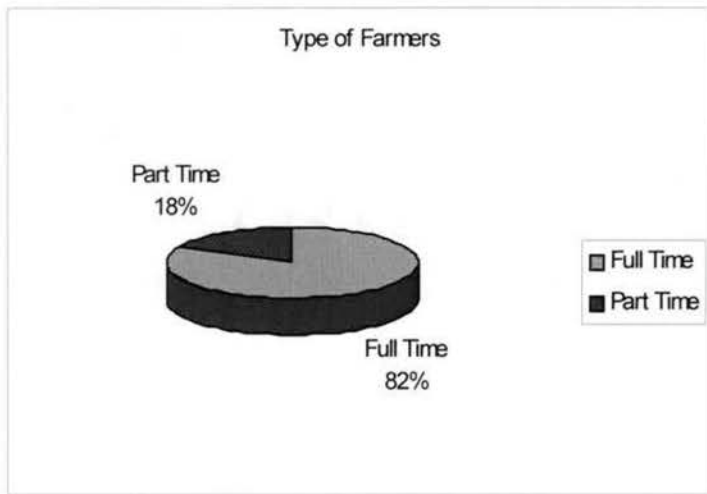
Years of Farming		
	Other Crops	Greens and Spinach
0 - 2	0	6
3 - 5	2	1
6 - 10	1	2
11 - 15	2	2
16 - 20	2	2
21 - 25	2	2
26 - 30	4	0
30 +	5	2



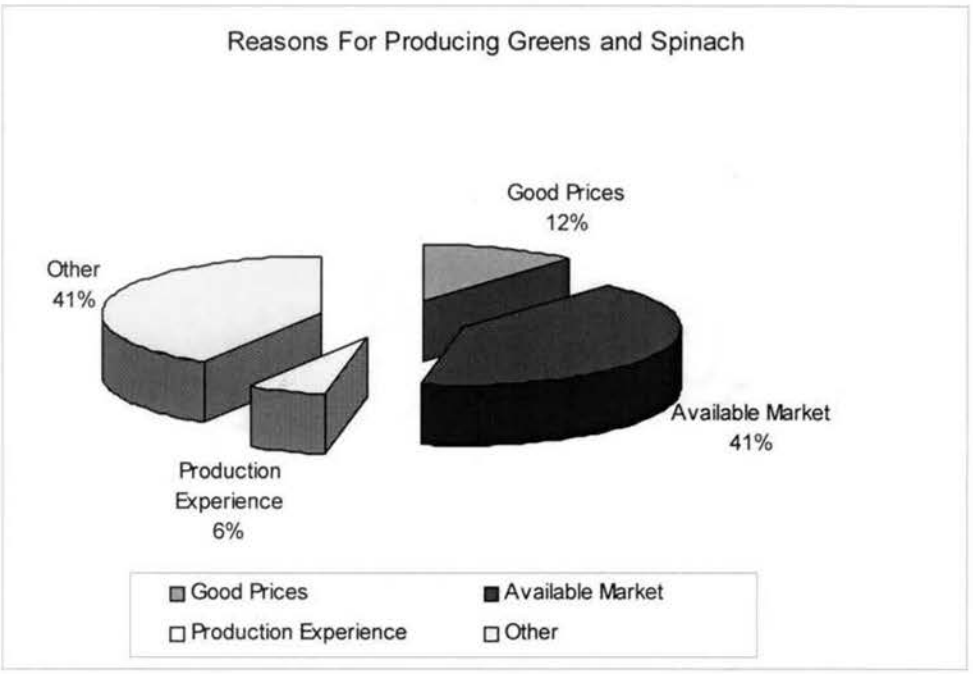
Type of Organization		
Type	Number	%
Individual	11	64.7
Partnership	4	23.5
Corporation	2	11.8
Cooperative	0	0

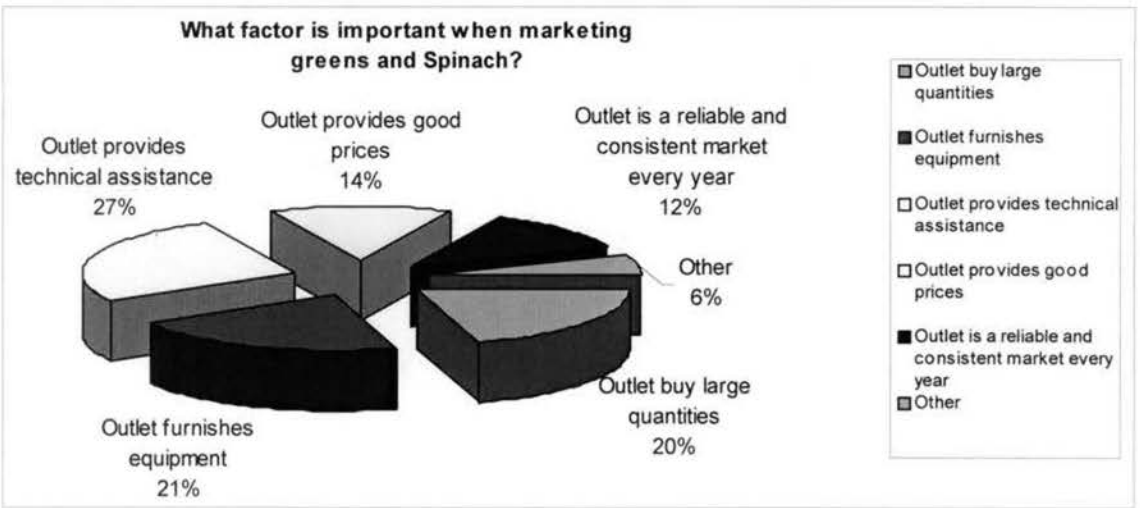


Type of farmers	
Full Time	14
Part Time	3



Important Reason for Producing Greens and Spinach	
Reason	Frequency
Good Prices	2
Available Market	7
Production Experience	1
Other	7



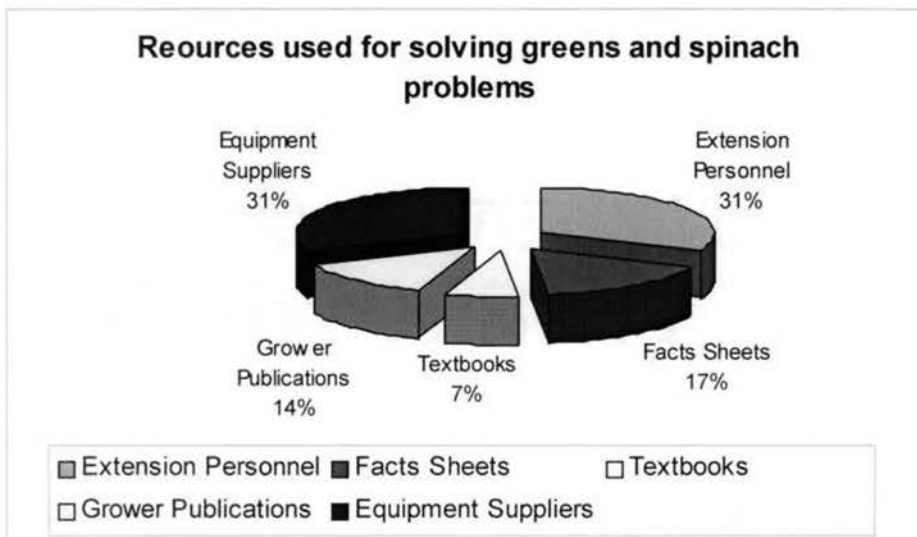


Factors Important when marketing the crop

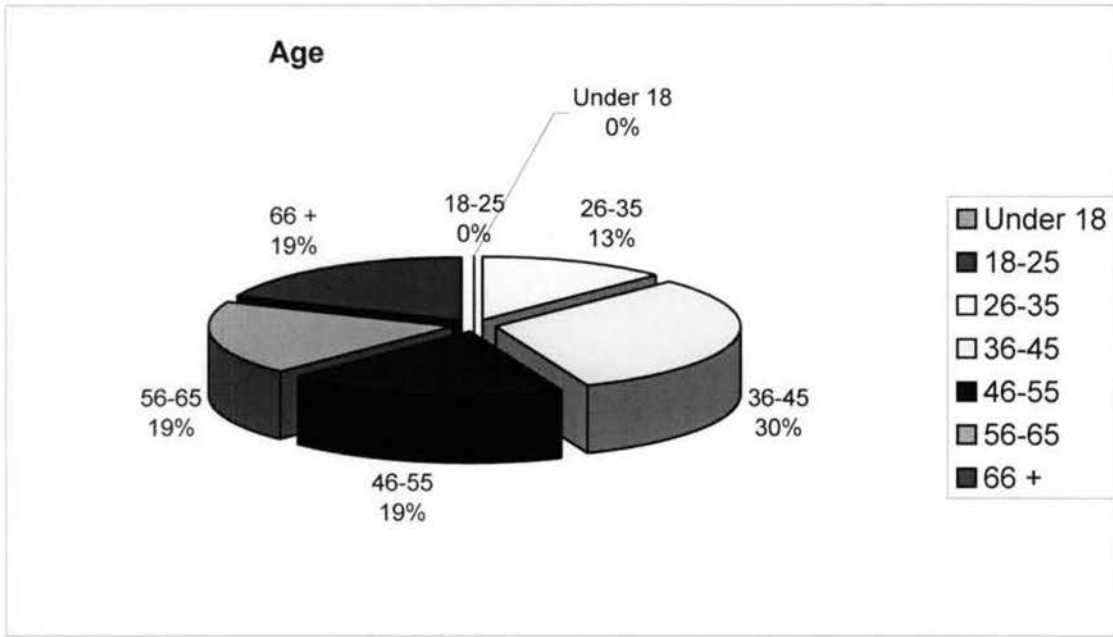
Factor	Score
Outlet buy large quantities	3.33
Outlet furnishes equipment	3.54
Outlet provides technical assistance	4.36
Outlet provides good prices	2.27
Outlet is a reliable and consistent market every year	2
Other	1

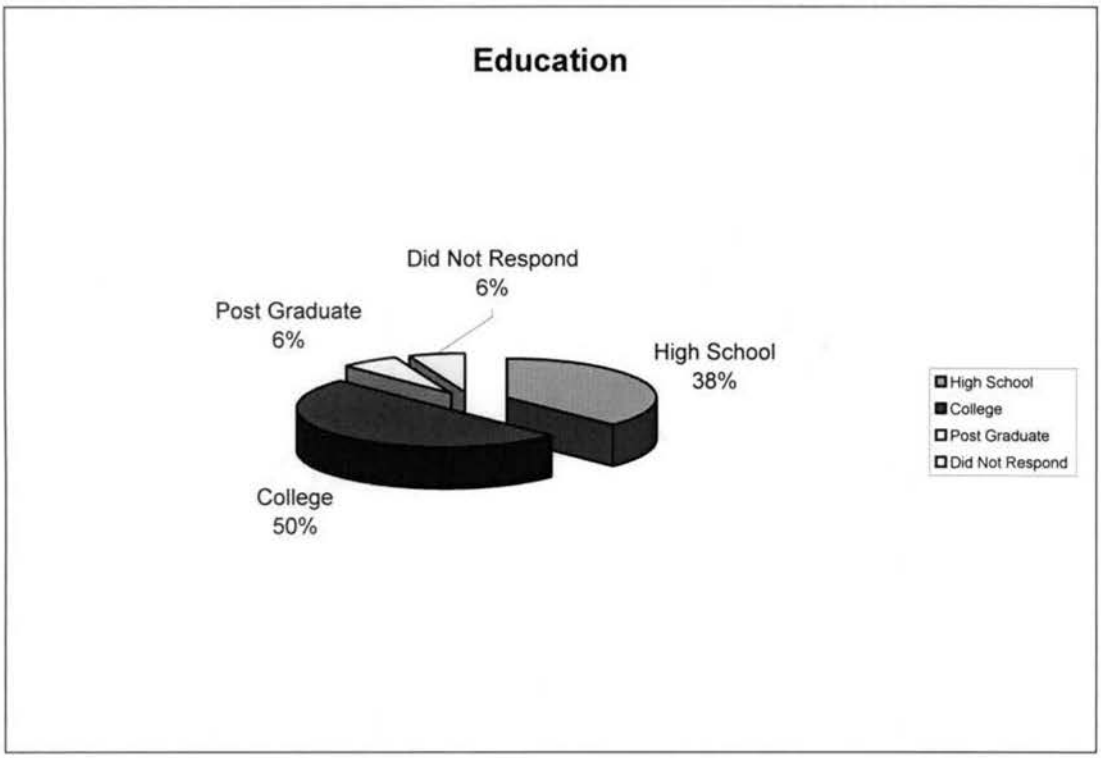
What resources do you use when you have a question related to fresh greens or spinach?

Resource	Freq
Extension Personnel	9
Facts Sheets	5
Textbooks	2
Grower Publications	4
Equipment Suppliers	9



Age	
Under 18	0
18-25	0
26-35	2
36-45	5
46-55	3
56-65	3
66 +	3

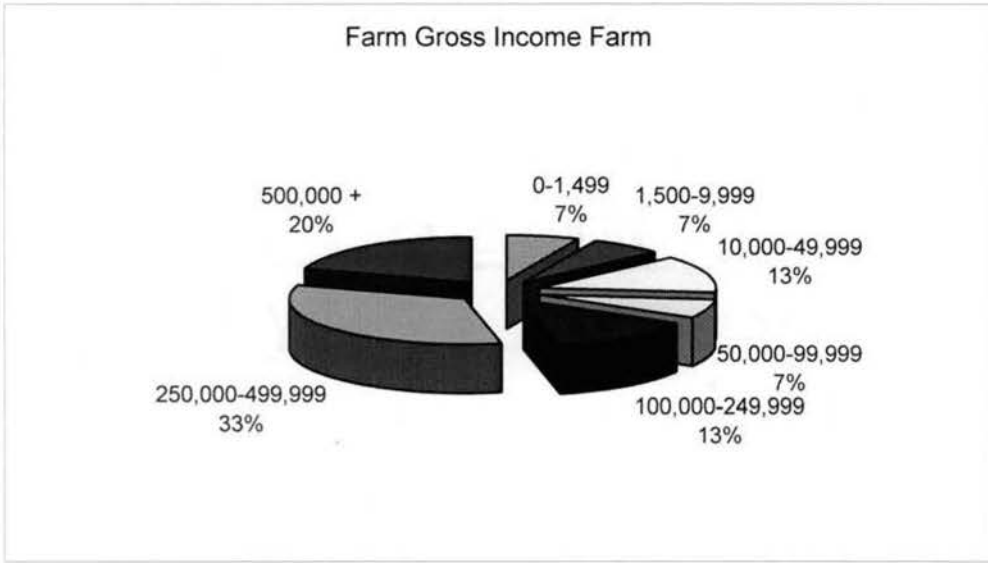




Education	
High School	6
College	8
Post Graduate	1
Did Not Respond	1

Non Farm Income	
Range	Non Farm
0-2499	5
2500-9999	0
10000-19999	2
20000-29999	0
30000-39999	3
40000-49999	2
50000 +	1

Farm Gross Income	
Range	Farm
0-1,499	1
1,500-9,999	1
10,000-49,999	2
50,000-99,999	1
100,000-249,999	2
250,000-499,999	5
500,000 +	3

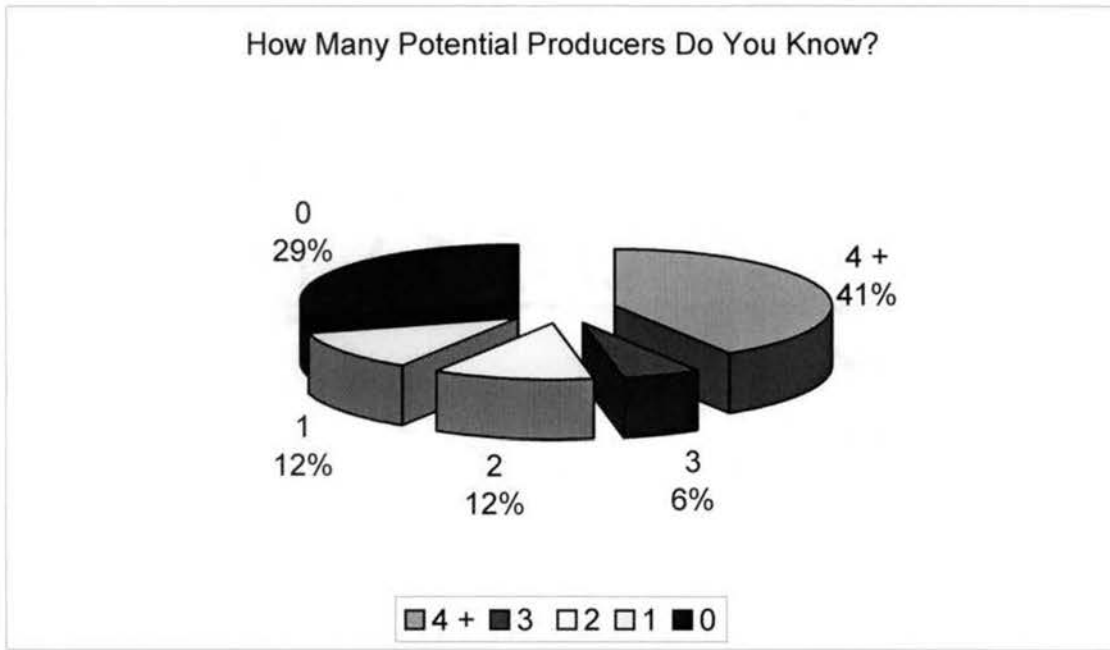


Race		Gender	
White	17	Male	17
Other	0	Female	0

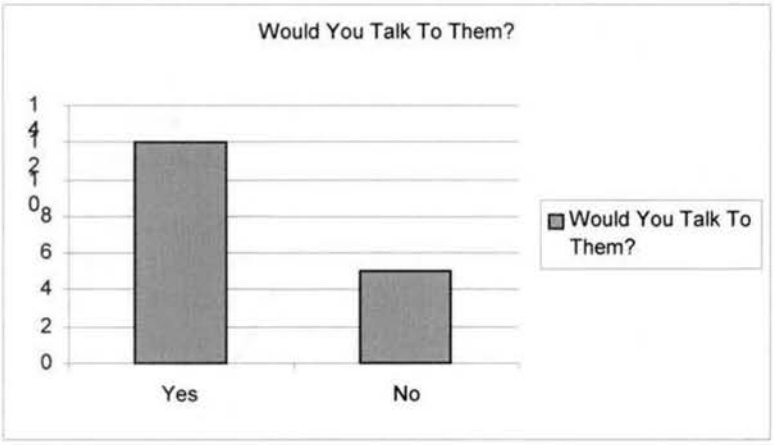
Miscellaneous	
Acres Owned	1620
Acres Rented	1820

Produced in 2001		
	Acres	Avg. Yield in tons
Greens	1435	9.9
Spinach	1770	8.18

How Many Potential Producers Do You Know?	
Number of Pot. Producers	Frequency
4 +	7
3	1
2	2
1	2
0	5
Average: 2.17	



Would You Talk To Them?	
Yes	12
No	5



Cooperation	
Do You think a minimum of cooperation is necessary?	
Yes	16
No	1
Would you sell through a cooperative?	
Yes	17
No	0
Would you sell through a processing plant	
Yes	15
No	2

Oklahoma State University
Institutional Review Board

Protocol Expires: 6/14/02

Date: Friday, June 15, 2001 IRB Application No AG0141

Proposal Title: STUDY OF THE FEASIBILITY OF FORMING A NEW GENERATION COOPERATIVE FOR FRESH GREENS AND SPINACH IN OKLAHOMA

Principal Investigator(s):

Germain Nkengoum
421A Ag Hall
Stillwater, OK 74078

Dan Tilley
422 AG
Stillwater, OK 74078

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

Dear PI :

Your IRB application referenced above has been approved for one calendar year. Please make note of the expiration date indicated above. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved projects are subject to monitoring by the IRB. If you have questions about the IRB procedures or need any assistance from the Board, please contact Sharon Bacher, the Executive Secretary to the IRB, in 203 Whitehurst (phone: 405-744-5700, sbacher@okstate.edu).

Sincerely,

Carol Olson, Chair
Institutional Review Board

Oklahoma State University
Institutional Review Board

Protocol Expires: 4/24/03

Date : Thursday, April 25, 2002 IRB Application No: AG0141

Proposal Title: STUDY OF THE FEASIBILITY OF FORMING A NEW GENERATION COOPERATIVE FOR FRESH GREENS AND SPINACH IN OKLAHOMA

Principal Investigator(s) :

~~Germain Nkengoum~~
421A Ag Hall
Stillwater, OK 74078

Dan Tilley
422 AG
Stillwater, OK 74078

Reviewed and Processed as: Exempt **Continuation**

Approval Status Recommended by Reviewer(s) : Approved

Signature :

Carol Olson, Director of University Research Compliance

Thursday, April 25, 2002
Date

Approvals are valid for one calendar year, after which time a request for continuation must be submitted. Any modifications to the research project approved by the IRB must be submitted for approval with the advisor's signature. The IRB office MUST be notified in writing when a project is complete. Approved projects are subject to monitoring by the IRB. Expedited and exempt projects may be reviewed by the full Institutional Review Board.

VITA2

Germain Pichop Nkengoum

Candidate for the Degree of

Doctor of Philosophy

Thesis: FEASIBILITY OF FORMING A NEW GENERATION COOPERATIVE FOR FRESH GREENS MARKETING IN OKLAHOMA

Major Field: Agricultural Economics

Biographical:

Personal Data: Born in Nkongsamba, Cameroon, on December 7, 1969, the son of Christophe and Regine Epichop.

Education: Graduated from "Lycee Polyvalent de Bonaberi" (High School), Douala, Cameroon in June 1990; received Bachelor of Science degree in Economics and Business Management from the University of Yaounde II in August 1994; received a Master Degree with a major in International Marketing and International Relations from the International Relations Institute of Cameroon in October 1996; completed the requirements for the degree of Doctor of Philosophy at Oklahoma State University in May 2003.

Experience: Employed as Farm Laborer during summers; employed as Marketing Associate by a Company in Douala in 1997; employed as graduate research assistant; Oklahoma State University, Department of Agricultural Economics 2000 to present.

Professional Memberships: American Agricultural Economics Association, Southern Agricultural Economics Association.

Honors: Fulbright Scholar (1998-2000);
President of the Agricultural Economics Graduate Student Association, 1999-2000;
Leadership Recognition from the Department of Campus Life at Oklahoma State University, 2000.