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Processed Chili Peppers for Export Markets: A Capital Budgeting Study on the AgroFood Company

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Abstract

The AgroFood Company, which currently exports fresh chili peppers to European clients, desires to expand the product mix offered. The company, as it expands its production of fresh peppers for export, has an increasing supply of grade 2 peppers that are unmarketable in Egypt. However, an attractive market for processed frozen chili peppers exists in Europe. To expand their client base, capitalize on a value added product, and minimize product waste, the AgroFood Company desires to develop processing practices for chili peppers produced in Egypt. The AgroFood Company would like to identify its options in the processed pepper market. An analysis of the company, competition, consumer, market channel, and conditions, provides insight into possible solutions to the challenges faced by the farm management. Designed for undergraduate classroom use, this case will provide students with an opportunity to evaluate the merits of business expansion into a high capacity, automated mechanical processing facility for grade 2 vegetables.

Keywords: Decision case, horticulture, agriculture economics, chili pepper production, protected vegetable production

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IFAMA Agribusiness Case 14.1A

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Introduction

In Egypt at the corporate headquarters of AgroFood Company, a discussion is taking place between the company owners, Mr. Salah Hegazy, Mr. Ahmed Farrag, and Ms. Nada Polis. The company has significantly increased their production of fresh chili peppers to meet European Union (EU) client requests. The increased production has resulted in a surplus of grade 2 peppers. The discussion is about how to capitalize on what is normally a wasted product by adding value to the grade 2 peppers through processing and packaging.

“The demand for AgroFood chili peppers is a little overwhelming. I knew the market was attractive, but never thought it would expand so rapidly. Our production facilities are running at capacity.” said Salah.

“Yes, the chili pepper products are a great opportunity for the company. I am concerned however with the amount of peppers that do not meet export standards for the fresh market. We’re doing a great job of keeping the percentage of grade 2 product low, but our increase in production level is generating a fairly large tonnage of grade 2 peppers. I wonder if there might be a way to capitalize on these cull peppers. Nada, did you connect with the local restaurants and hotels to see if they might be interested in processed frozen chili pepper?” said Ahmed.

“I not only contacted local outlets, I was able to connect with a potato processing company to determine if we may be able to partner with them for distribution of processed frozen chili peppers to European clients. After discussions with the potato company owners and potential clients in Europe, I believe that we can fill a niche for organically produced, processed, and frozen chili peppers. We need to determine if our pilot program for processing the grade 2 peppers should be expanded to a highly automated system.” said Nada.

“We need to analyze the situation a bit more before we commit to the expansion. After that, I think we will be able to determine if this opportunity is financially beneficial to the AgroFood Company.” said Salah.

After this conversation, the management of AgroFood Company embarked upon a fact finding expedition to determine if expansion into processed and frozen vegetables was in the company’s best interest.

The Case

Company Background: The AgroFood Company was established in 1992 by three partners, two Egyptians, Mr. Salah Hegazy and Mr. Ahmed Farrag, and one Italian, Mr. M. Simaria, with each partner taking responsibility for a different operation within the company. Mr. Hegazy oversaw general affairs and communications with import companies, Mr. Farrag was responsible for the production of fruit and vegetables, and Mr. Simaria took care of marketing. Upon the death of Mr. Simaria in 2004, his wife, Mrs. Nada Polis, acquired her husband’s portion of the AgroFood Company and maintains an active role in company management.

In the beginning, the firm exported only fava beans, but it quickly expanded its operations to include the exportation of potatoes to Turkey. The owners then discovered that potato exportation to the European Union (EU) market was profitable and expanded their potato cultivation accordingly. The company has altered its product mix over several years to meet market requirements and fill market niches. Because of this, the AgroFood Company is now one of the leading Egyptian agricultural firms exporting potatoes and onions to the EU market.

The AgroFood Company believes that the EU market is a key to future success of the company. With a population of more than 491 million people, the EU market is considered the largest market to which products may be exported from the AgroFood Company. The EU market is geographically close to Egypt and has limited raw materials and production capacity (EuroStat, 2008). Consumers in the EU market have tremendous purchasing power (GDP per capital = 23,500 €), healthy lifestyles, and enjoy convenient ready-to-use products. Dolan and Humphrey (2000) state that retail supermarkets have emphasized fresh, healthy food, ease of preparation and innovation to attract consumers. In many instances, processed frozen vegetables meet consumer expectations when fresh vegetables are unavailable.

The AgroFood Company owners have witnessed the dramatic change in marketing channels that has occurred recently within the EU market. The development of tightly knit supply chains where EU retail outlets, such as supermarkets, drive production in and exportation from African countries has resulted in major multinational food companies gaining a larger percentage of the market, while smaller retailers are forced out of the market (Dolan and Humphrey, 2000; 2004). To ensure product quality and integrity, large retailers are increasingly specifying the parameters that must be followed along the value chain including how products are grown, harvested, processed, transported, and stored (Dolan and Humphrey, 2004). Companies wanting to increase their market share in the EU must develop detailed production guidelines, invest in cold storage/processing facilities, and rapid transportation routes (Dolan and Humphrey, 2004). Success in the current EU market requires a significant paradigm shift for many specialty crop producers towards large-scale production.

The exception in the tendency toward tightly knit supply chains and large scale production is in organic produce. For organic produce, the EU supply base is fragmented and smaller companies, including Egyptian companies, can fill the unmet market demand (Dolan and Humphrey, 2000). With sales near 1.83 million United States Dollars (USD)¹, the AgroFood Company is considered a small vegetable processing company by the Union of Producers and Exporters of Horticultural Crops² (UPEHC, 2007). Recently, due to changing market demands, the AgroFood Company started organic production of high value specialty crops, such as peas, colored chili peppers, green chili peppers, green beans, broccoli, and cucumbers.

When asked to describe their reasoning for shifting production towards specialty vegetable crops under organic conditions, the company owners identified the following points:

¹Local currency of Egyptian pound (L.E.) converted to USD (\$) for publication. Conversion factor of one L.E. = 0.174 USD in November 2006 when information was collected for case.

² UPEHC categories of large, medium, and small processors are based upon sales and capital expenditures of ≥ 8.7 million USD, 2.6 to 8.6 million USD, and < 2.6 million USD, respectively.

1. Brown rot, a fungal disease which exists in some Egyptian potatoes, is unacceptable in the EU making the production of alternative crops (i.e., crops other than potatoes) more attractive.
2. Commodity products, such as potatoes and onions, are subject to tremendous price fluctuations based on supply and demand.
3. EU supermarkets are demanding more specialty crops, including organically produced products, on a year-round basis.
4. Consolidation in the EU market has necessitated the development of partnerships and contracts for some high value specialty vegetables.

Company Strengths: In light of the stated goals and justifications for shifting production towards specialty vegetable crops, the owners of the firm were asked “*What are specific strategies or strengths currently within the company that will assist you in achieving your stated goals?*” In response, the owners and managers indicated that the AgroFood Company has adopted several strategies to maintain its position as a leading producer and exporter of Egyptian vegetable products. First, the firm has adopted organic cultivation methods as prices of organic products are about 25% higher than products produced using non-organic methods. Opportunities in the organic fruit and vegetable market for developing countries, including Egypt, arise from the fact that they have advantages in land and labor, and often climatic conditions and product seasonality, compared with other countries. Partnerships with Expo Link, Industrial Modernization Center (IMC), Chamber of Food Industries (CFI), and Horticultural Export Improvement Association (HEIA) provide increased market exposure. These partnerships also provide Hazard Analysis and Critical Control Points (HACCP) analysis, gap analysis, and employee training to ensure that organic certification requirements are met by the AgroFood Company. Egyptian exporters and growers are using these advantages to become competitive in the global economy even when the overall trend of prices for organic products is decreasing due to an increased supply of products.

Second, the firm has three production locations northwest of Cairo along the Cairo-Alexandria Desert road. The first is a potato production site; the second is devoted to onion cultivation; and the third location is for specialty crops. The specialty crops production site is a 40 hectares (ha)³ organic production facility with 31.5 ha of greenhouses and 8.5 ha of open fields. Cultivation of vegetables occurs in plastic covered greenhouses which allows for protected winter production by increasing the daytime air temperature (El-Sayed, 2006a; 2006b). The use of greenhouses extends the fruiting season from 2 months up to 9 months, thereby increasing vegetable crop yields compared with open field production (Exhibit 1).

Third, the AgroFood Company has positioned itself to be able to partner with clients seeking specialty vegetables and is willing to accept some of the risks associated with evaluating new crops under Egyptian conditions. Cultivation trials at the specialty crop farm near Cairo are used to determine if proposed crops are technically feasible and financially viable. As a result of these

³ The local measure of land, a Feddan, converted to hectares for manuscript. One feddan = 0.42 hectares or 1.038 acres

efforts, the AgroFood Company has seen an increase in production and exportation of nontraditional Egyptian vegetable products, such as ‘Tenderstem’ broccoli (El Sayed et al., 2010) and chili peppers, to Europe.

Finally, the firm has begun expanding its product offerings to include processed fresh vegetables. Processing is seen as a future opportunity by the company owners, who have invested significant resources into establishing a cold supply chain that meets organic certification requirements for the EU market. Company owned refrigerated trucks pick up pre-cooled field packed vegetables and deliver them to a modern processing and packinghouse that only handles organically produced crops. This AgroFood Company owned post-harvest processing and cold storage capacity facility ensures that products destined for exportation are handled in a hygienically and temperature-controlled manner meeting organic certification standards. Products, after being custom packed to meet EU client requirements, are delivered by airfreight to maximize product quality, aesthetics, and freshness. As a result of this investment, the AgroFood Company has increased their market share of packaged fresh vegetables being exported to Europe.

The Opportunity: The firm owners and management described an opportunity resulting from an increased market share and demand for an AgroFood Company product. As production of fresh chili peppers for export increases, the AgroFood Company has an increasing supply of grade 2 peppers that are unmarketable in Egypt as a fresh product. To expand their client base, capitalize on a value added product, and minimize product waste, the AgroFood Company desires to develop processing practices for organic chili peppers that can be marketed to Egyptian restaurants and hotels catering to international visitors or that can be exported to European markets. The company will continue to export the highest quality (first grade) peppers as a packaged fresh vegetable item, but the lower quality (second grade) chili peppers will be processed, packaged, and frozen for distribution to alternate markets at a later date. Currently, the company is conducting small scale processing trials with lower quality chili peppers, but has not assessed the total costs or benefits associated with expansion of this venture.

Thus, one of the first questions that must be addressed by the AgroFood Company is “*Is it feasible to use grade 2 chili peppers grown in Egypt to develop a processed and frozen specialty vegetable product for domestic and/or international markets?*” In response to this question the owners and managers of AgroFood Company provided a detailed description of current production practices in use at the specialty crops farm and their market assessment for chili peppers.

The Chili Pepper Crop: Pepper cultivation at the AgroFood Company specialty crops farm occurs in plastic covered greenhouses, which allows for production in winter, when it is impossible to produce such crops in open field (See UIUC 2008 for DVD on pepper production in Egyptian greenhouses). To meet the year-round demand for fresh products, chili pepper seedlings are transplanted on a total of 6.3 ha (3.15 ha per planting) on August 1 or April 1 for winter or summer seasons, respectively. From this area, the average total output per week is 7.5 metric tons, with 6 metric tons exported as fresh product and 1.5 metric tons (20%) considered grade 2 peppers.

The Market Potential: The value of exportable fresh peppers is 3.48 USD per kilogram in winter and 2.09 USD per kilogram in summer (AMAL, 2010). Unfortunately as a fresh product, the grade 2 peppers are not suitable for exportation and must be sold on the local market at 0.35 USD per kilogram because hot chili peppers are undesirable to most local users. The owners have decided that the optimal solution to the grade 2 pepper issue is to cut and freeze the peppers before marketing. The owners of the AgroFood Company indicated that the price of frozen pepper is 1.57 USD per kilogram for green or red chili peppers on the international market. Thus, the company has begun small scale processing and marketing of frozen grade 2 peppers to local restaurants and hotels. The firm is convinced that processing will create a more valuable product while avoiding some of the rapidly expanding competition in the world fresh vegetable products market. The AgroFood Company management has partnered with an existing potato processing company with established markets in the EU in an effort to introduce the AgroFood product to new clients.

Three Options: When asked what they considered possible options for the company to take advantage of the grade 2 peppers, the AgroFood Company management indicated there were three possible options under consideration:

1. Manually process the grade 2 peppers at the current processing facility and sell any future excess production to the local market as a fresh product;
2. Increase the volume of peppers processed by partial automation at the current processing facility; or
3. Increase the volume of peppers processed by building a larger processing facility with an automated processing line at a new location.

To determine if chili peppers could be processed at their current facility, AgroFood Company management began a pilot program for grade 2 chili peppers. The owners were asked to describe this pilot program.

AgroFood Company Pilot Program for Processing Chili Peppers: After bulk harvest and precooling to remove field heat, peppers are transported to the AgroFood Company processing facility by refrigerated trucks. Upon arrival, the peppers are washed, sorted into grade 1 and grade 2 fruit, and then packaged or processed accordingly. The first grade peppers are packaged, weighed, and sealed in plastic bags before being palletized and cold stored until shipping to fresh market clients. About 30 employees are required to process the grade 1 peppers. The second grade peppers are hand cut into small cubes by 10 workers at a rate of 1.5 metric tons per week. Workers processing vegetables are paid about 8.70 USD per week. After cutting, the processed product is packed, weighed, sealed, palletized, and frozen. The chopped chilies are stored frozen until a suitable quantity is acquired to attract a large scale buyer.

The success of chili pepper production in Egypt, the ease with which chilies can be processed at the AgroFood Company station, and the identification of buyers for the product indicated to the management that expansion to a highly mechanized processing line for vegetables may be a strategic investment. Company owners and management were asked “*What would a highly*

mechanized processing line look like and what might be the costs for expansion?” The following section highlights what can be considered a “standard” vegetable processing line and some of the initial capital investments needed to establish such a line.

Vegetable Processing Line: Vegetable processing is highly specialized and requires an integrated system from harvest to market to ensure that the delivered product meets acceptable industry and consumer standards. The standard steps for a frozen vegetable processing line from field to storage include:

1. Harvesting vegetables, presorting in the field, and bulk packaging,
2. Removing soil and field heat by washing and precooling,
3. Sorting into grades for fresh market or processing,
4. Processing
 - a. Hand trimming/coring if needed,
 - b. Sanitizing wash,
 - c. Chopping or shredding,
 - d. Blanching, and cooling
 - e. Freezing,
 - f. Packaging/labeling,
5. Storing product or shipping to client.

Vegetable processing lines must be hygienic and temperature-controlled to ensure consumer health and maintain product quality. Precoolers or hydrocoolers rapidly remove field heat from produce and significantly reduce product perishability during processing. The use of refrigerated trucks and docks will prevent the produce from warming during the transport and delivery to the processing station. The processing of vegetables involves simple physical operations such as cleaning, washing, trimming, coring, slicing, shredding, and other related steps to eliminate inedible parts. Washing the whole and cut products in sanitized water is an essential step in reducing the number of microbes on the product to meet food safety standards.

After the product has been prepped by hand and sanitized, it travels to a mechanical cutter for slicing, chopping, or shredding depending upon final product form. For frozen vegetables, blanching (scalding) at 85° C for 2 minutes is required to stop enzyme functions and mitigate pathogens. Once blanched, the processed vegetables are cooled to 30° C, individually quick frozen (IQF) to – 10° C, and then transferred to a packing station for weighing, bagging, and sealing. When IQF processing is unavailable, large freezer units are used for freezing loose, small-sized processed vegetables after packaging. These free standing freezers may also be used for storage of packaged products before shipping to clients.

Using mechanical processing allows fresh produce to be handled in an efficient and economical manner. Processing lines are often modular in nature, meaning that companies can pick and choose the specific units of equipment needed for their particular location, desired product, or price (See Exhibit 2). Processing capacity is limited by the slowest machine used in the line. Additionally, many units on the line may be used with multiple crops. This flexibility and dual-use capacity makes the initial evaluation of processing equipment a critical choice for most companies. This flexibility and dual-use capacity can also create challenges for companies

seeking to maintain organic certification, in that processing lines handling organic products must maintain spatial separation from processing lines handling non-organic products. Proper firewalls, such as separate facilities, must be in place for organic certification to be maintained.

Future Forecast: After investigating vegetable processing lines and potential equipment needs, the AgroFood Company management decided that Options 1 and 2 listed above may not be possible due to space constraints at the existing facility. A maximum of 70 employees can effectively utilize the space. Given the projected annual growth rate in production of 10%, the current facility would reach maximum capacity during year 7 when 53 employees would be needed for the fresh pepper stations and 18 employees would be needed for the processed pepper stations. Grade 2 processing stations would be unavailable after year 7 as all facility space would house grade 1 pepper stations to meet the anticipated demand for fresh chili peppers through year 10. The current facility is too small to install an automated line for processing peppers. Therefore, Option 2 is not a solution to the situation. Thus, the company needs to determine the benefits and costs of Options 1 and 3 given these constraints. The owners and managers assisted the authors in identifying essential processing line equipment, determining labor needs for the proposed line, and projecting company growth over the next ten years. With this information, individual scenarios can be calculated to identify how expansion into processed frozen chili peppers may benefit the AgroFood Company.

Essential Equipment for Expansion: For Option 1, the owners expect to purchase a minimal amount of new equipment including three trim stations and one packing station. An existing pre-cooler and a free standing freezer will be used to remove field heat and freeze the packaged product. The purchased equipment has a useful life of five years with a salvage value of five percent of the original price (See Exhibit 2). Replacement of the equipment should occur after five years and is expected to cost 25% more than the original price.

For Option 3, the Agro-Food Company desires to install a partially automated pepper processing line for their grade 2 peppers. To remove field heat, a second pre-cooler will be purchased and stationed at the AgroFood Company specialty farms production site. Cooled product will be transported to the processing facility in company owned refrigerated trucks at a cost of 5.22 USD per metric ton. The company plans to construct and equip a 500 square meter building. Building construction is projected to cost 348,000 USD (Swanson et al., 2004). This building will contain a 6-person trim station, one flume system with shaker, one mechanical cutter, a blanching system, a cooling system, a 4-person packing table, and two free standing freezers. The building and equipment have a useful life of five to ten years with salvage values of 5 to 20% of the original purchase price (See Exhibit 2). Replacement of the processing line equipment will occur after five years and is expected to cost 25% more than the original purchase price. Exhibit 2 provides readers with costs (year 1), capacity, life expectancy, and salvage value for line equipment.

In addition to capital expenses, the costs of operating this processing line will include peppers for processing, labor, and utilities. The AgroFood Company specialty crops site currently produces 390 metric tons of chili peppers annually at a cost of 161.80 USD per metric ton. Grade 2 peppers represent 78 metric tons of the total production and yield 70 metric tons of peppers suitable for processing. Additional shrinkage (10%) during processing due to trimming and

coring results in 63 metric tons of processed chili peppers. Local delivery costs are estimated at 5.22 USD per metric ton. The planned processing facility will employ eleven individuals; five product handlers at 34.80 USD per month, five equipment operators at 52.20 USD per month, and one manager at 174.00 USD per month. Processing facility utilities (electric and water) are estimated to cost 522.00 USD per month. Consumable supplies used in packaging the processed peppers are estimated to be 121.80 USD per metric ton. Once processed and packaged, the value of the product is 1,566.00 USD per metric ton when exported to the E.U.

The AgroFood Company management plans to increase chili pepper production 10% annually to meet the growing demand for fresh chili peppers. Consequently, the company estimates that the volume of peppers for processing will increase 10% per year, from 70 to 166 metric tons in 10 years. Production and packaging costs are expected to rise 10% annually. Utility, labor, and local shipping costs are expected to increase 5% annually. Exhibits 3, 4, and 5 present expected production and cost increases given the parameters set forth by AgroFood Company management.

The management of the AgroFood Company is seeking assistance in identifying the best options available for this expansion and a financial assessment for the long term success (10 year outlook) of this endeavor. Using the information above, the management of the AgroFood Company would like to know:

- 1. What is the decision you would make, according to the information provided, whether to invest in a partially automated processing line or not?*
- 2. Given a 10 year time frame, do you think it is profitable to implement the expansion?*
- 3. If only half of the processed peppers can be sold to E.U. clients, what impact would selling the other half to local clients at 50% of the international price have on your decisions?*

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