

ALASKA POTATO EXPORT MARKET AND STORAGE FACILITY ASSESSMENT STUDY

***PREPARED FOR:
ALASKA DEPARTMENT OF COMMUNITY
AND ECONOMIC DEVELOPMENT
550 W. 7TH AVENUE, SUITE 1770
ANCHORAGE, ALASKA 99501***



Research-Based Consulting

Juneau
Anchorage

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Study Purpose

Since the mid-1990s, the State of Alaska has been working with potato producers to export seed and table stock potatoes to the overseas markets of Taiwan and China. Since 1996, approximately 160 tons of seed stock and just over 80 tons of table stock potatoes have been sent to Taiwan. While Alaska enjoys preferential import regulations from Taiwan for its seed potatoes, the envy of all other U.S. seed producers, Alaska's export growth in these markets has been slow to respond. In addition, it is unclear how prepared Alaska's producers are to enter these foreign markets and what their ability and desire is to expand seed and table stock potato production.

To gain more insight into the market potential in Taiwan and China for Alaska's potatoes, and to assess the Alaska producers' ability to meet this potential, the Alaska Department of Community and Economic Development, in partnership with the U.S. Department of Agriculture contracted with McDowell Group, Inc., an Alaska research-based consulting firm, in association with Cunningham & Associates to conduct research and analysis on these issues.

The purpose of this study is to examine the market potential for Alaska's seed and table stock potato product in Taiwan and China – foreign demand for Alaska potatoes – and also Alaska's ability to meet that demand and develop those markets. The study also examines the need for additional storage facilities to support increased production for an export market and organizational and infrastructure requirements to develop those markets. The study team contacted more than 45 experts, including Alaska farmers, university researchers, industry representatives, and government officials, and researched production and trade data, industry journal articles, and pertinent Web site.

Taiwan Market Assessment

Alaska's competitive advantage exporting seed potatoes to Taiwan is largely the result of Taiwan's preferential import regulation that excludes other seed imports from the U.S. With Taiwan's recent membership in the World Trade Organization, preferential waivers may be required to be removed but official science-based phytosanitary requirements may remain, if necessary. Even if Alaska enjoys this window of opportunity for five more years, it is not long enough to provide an incentive to invest in an export infrastructure in Alaska supporting its ability to compete once the waiver is removed. Additionally, Taiwan's relatively small level of local production of potatoes is expected to decline as a result of changes in land tenure laws and the country's development plan, thereby lessening the demand for seed.

Alaska's table stock may have some advantage in the small yet newly emerging, niche, organic market in Taiwan. This market is high-end and the distribution channel to the hyper-marts and supermarkets is more direct. However, given the scale of Alaska's current production and the potential costs to change production practices to comply with "organic" import standards, it is unlikely that Alaska's product will be price -competitive with other organic potatoes imported from the U.S. or elsewhere in the world.

China Market Assessment

No U.S. fresh potatoes, seed or table stock, are currently allowed into the Chinese market. China is actively developing its own self-sufficiency in seed production, making significant investments in new testing programs, and attracting investment from international agricultural biotechnology companies to develop higher quality seed. These efforts were made in preparation for China's entry into the World Trade Organization since import regulations will need to be lifted. Even if China imposes an import waiver similar to the one in Taiwan, Alaska's seed export potential in the emerging market is likely to be limited because of strong competitive challenges from China's strengthened domestic seed production program, international players well-positioned in the market, and the inevitable short life span of the waiver against the financial, experience, and political clout of other U.S. and international potato exporters.

Much like Taiwan, China's higher income levels, particularly along the eastern coast, may provide some small, niche opportunities for Alaska "organic" table stock potatoes. Alaska's success in this niche market will depend on its ability to compete with other organic producers. Given Alaska's relative small size of production and uncompetitive transportation costs, achieving this success will be challenging. As seen in Taiwan and China, processed potatoes, from frozen to dehydrated, is dominating the global marketplace, not fresh table stock.

The fact that Alaska has been able to garner exclusivity in the Taiwan seed market, sell a limited number of containers stock, and appear to be about to enter the Chinese seed market is commendable. However, the shear force of the competition worldwide, the lack of financial support, and the small amount of production promises to edge Alaska farmers out of the markets they may risk much to enter.

Alaska's Production Capacity

Alaska's production capacity is set by the farmer's ability to sell his potatoes, both seed and table stock, to the local Alaska market and still profit. Some attempts have been made to "export" to the Lower 48, but high production and transportation costs make Alaska's product uncompetitive. So far, farmers have been able to provide small amounts of seed and table stock for export without expanding their production. While there is land available to increase production, farmers will not assume unnecessary risk to produce more potatoes without assurances they will have a buyer for their product.

Producer's Interest to Export

Alaska's farmers have some limited experience exporting their potatoes. While some farmers are inclined to export again, they have some key requirements before doing so. These requirements include: maintaining their current local market relationships; a mechanism to ensure potatoes destined for the export market do not flood the Alaska market, effectively collapsing the local market; spreading the risk between more exporters and more export markets; improved access to financial assistance to buy more equipment, land, and storage facilities; and the active participation of farmers in the developing the export market.

Storage Facility Assessment

Given current production, there does not appear to be an immediate demand for additional storage. The high yields of 2001 are stretching some farmers' storage capacities, but generally, most farmers appear to be able to handle their crop yields. Many farmers, however, would like to make improvements to their existing facilities. Yet, if markets expand and farmers increase production, there will be increased demand for storage capacity. The Delta Junction area shows the most potential for expansion given land availability to convert to potato production and may be the best choice for new centralized storage facilities. Increased production growth rates will determine the size of storage facility needed. Generally, the ideal location of a storage facility is within five to ten miles of a producing field. Given the distances between farms and the transportation costs to move the product, it is suggested that investment be made in smaller facilities (under 5,000 tons). It needs to be recognized, however, that smaller facilities are more expensive to build and operate on a per ton basis than a larger facility. These higher costs must be factored into the farmer's ability to be competitive.

In Summary

The market assessments for Alaska's seed and table stock in Taiwan and China are not encouraging. While limited, it appears the most promise for Alaska table stock potato exporters lies in the high-end markets in Taiwan. With Taiwan's entry into the WTO, however, Alaska's ability to stay in the market will become more challenging. This challenge will grow as Taiwan faces more competitive pressure from other U.S. and international producers to remove artificial barriers to entry in the market. Until China allows importation of fresh potatoes from the U.S., Alaska's ability to enter China's high-end table stock market is moot. However, once this restriction is lifted, this high-end table stock market offers the best potential, while still small, for Alaska's exporters of table stock potatoes to China.

Taiwan's import waiver of Alaska's seed potatoes is expected to expire in five years. This provides a short window of Alaska to establish itself as a supplier of superior seed potato quality. It must be recognized, however, that the agriculture sector in Taiwan is declining. While Alaska could potentially capture a higher percent of the market share, the overall pie is shrinking. Until China allows importation of Alaska's seed potatoes, Alaska export prospects in China are null. If China adopts a waiver similar to the one found in Taiwan, Alaska may have a small window of opportunity to establish itself in the seed potato market in China. However, Alaska's ability to be price competitive in China's price sensitive market will be difficult.

Alaska producers have the ability to expand production. However, unless they have assurances that they have buyers for any new production, the likelihood that they will risk flooding the market with excess supply is not likely.

Current demand for storage facilities is largely being met. If production is expanded much beyond the 2001 yield, new facilities will be needed. It is recommended that these facilities be relatively small in scale (under 5,000 tons) and be situated in the area of the state that experiences expanded production. The most potential for expanded production is in the Tanana Valley region.

Alaska boasts several advantages in seed and table stock potato production. Its climate is well-suited for potato production, and the diseases and pests that infect potatoes elsewhere are relatively uncommon or nonexistent in the Alaska environment. Given the relative isolation of individual farms in Alaska, the risk of diseases and pests contaminating and spreading to other farms is even lower. Yet, even with these advantages, Alaska potato production is small and underdeveloped when compared to production found elsewhere in the United States and in other competing foreign countries such as Canada and the Netherlands.

Market and economic conditions such as proximity to market, a supportive transportation and distribution network, level of infrastructure development, and economies of scale have limited the expansion of Alaska's potato industry. If Alaska's production of seed and table stock production is to expand and develop, several factors need to be addressed. Clearly, an important factor is finding new markets to absorb any expanded production.

With this result in mind, the Alaska Department of Community and Economic Development has worked with potato producers, the Alaska Department of Natural Resources, U.S. Department of Agriculture, and University of Alaska faculty to develop new markets in Taiwan and China for Alaska's potatoes. This effort started in the mid-1990s. However, to date, successful entry into these overseas markets has been limited.

There are several international trade conditions that account for this lack of success in Taiwan and China: new-to-market and non-tariff barriers, lack of market transparency, and price competitiveness. While some believe the export potential exists and that the state government has an important role in developing these markets, others express concern about public efforts to develop markets where Alaska potatoes may not be competitive. Some market research has previously been conducted to assess the market potential in the Taiwan and China.

Purpose of Study

The Alaska Department of Community and Economic Development in partnership with the U.S. Department of Agriculture believed a more comprehensive research and analysis effort was needed. Thus, in August 2001, the Department of Community and Economic Development contracted with McDowell Group, Inc. to conduct this effort. McDowell Group, an Alaska research-based consulting firm, took the lead in this project, with assistance from Cunningham & Associates, an Anchorage consulting firm with a specialty in international trade analysis.

The purpose of this study is to examine the market potential for Alaska's seed and table stock potato product in Taiwan and China – foreign demand for Alaska potatoes and also Alaska's ability to meet that demand and develop those markets. The study also examines the need for additional storage facilities to support increased production for an export market and organizational and infrastructure requirements to develop those markets.

Methodology

A Technical Advisory Group was organized to provide information and guidance on the research and analysis performed for this study. The Technical Advisory Group was comprised of representatives from the Alaska Department of Community and Economic Development, Alaska Department of Natural Resources, and the U.S. Department of Agriculture. The Technical Advisory Group met at the beginning of the project to review the study outline and provide contact and additional background information; during the project to assess progress and preliminary findings; and at the end to review and approve the final draft.

The methodologies used in this study were survey, executive interviews and secondary data analysis. The study team conducted interviews with more than ten Alaska potato producers who were either certified seed growers and/or prominent producers of table stock potatoes. These farmers are located in Tanana Valley or Matanuska Valley areas. They were asked for information about their farming operations, including their table stock and seed production, market, storage facilities, and export experience and interest.

Executive interviews were held with officials in Alaska and outside the state, including state and federal government officials, financial assistance providers, university researchers, cooperative representatives, potato industry officials, and storage facility construction company representatives. International trade officials with the U.S. Trade Representative, Foreign Agricultural Service, and Alaska's State Representative in Taiwan were also interviewed. More than 30 experts were contacted.

Secondary data was gathered on Alaska potato production and capacity, potato marketing and international trade experience, and other agricultural development issues. Alaska potato production data was gathered from the Alaska Agricultural Statistics Program. The study team also reviewed periodicals and pertinent Web sites for information on storage facility investment, operation, and management. Overseas market and statistical information on the Taiwan and China markets were largely obtained through the Internet.

This study is organized into four sections, as follows:

- Section I: Alaska's Export Competition
- Section II: Taiwan and China Market Assessment
- Section III: Alaska Production, Capacity, and Interest
- Section IV: Alaska Storage Facility Assessment

An appendix is attached, listing all people contacted during the course of this study.

SECTION I: ALASKA'S EXPORT COMPETITION

Alaska's potato product, both seed and stock, is dwarfed by production found in many states in the Lower 48. Alaska potatoes compete not only with other U.S. potatoes but also with those of other countries that spend heavily to keep their potatoes in overseas markets. Below is a brief discussion of the competition Alaska faces in the U.S. and global markets followed by an overview of the demand shift from fresh to frozen potatoes.

Competition from Other U.S. Producers

Acreage in production for the top U.S. potato producers in 2001 were Idaho (370,000 acres), Washington (165,000), North Dakota (110,000), Wisconsin (85,000), Maine (62,000), Minnesota (57,000) and Oregon (46,500).¹ By comparison, Alaska averages between 800-1,000 acres in production.² Approximately 8,000 potato growers reside in the United States,³ while there are roughly 20 Alaskans farming potatoes now.⁴ The top U.S. producers in 1999 were Idaho (7.0 million tons), Washington (4.7 million), Wisconsin (1.6 million tons), Colorado (1.4 million), North Dakota (1.4 million tons), Oregon (1.3 million tons), Minnesota (1.1 million tons), Maine (0.9 million tons), California (0.7 million tons) and Michigan (0.7 million tons).⁵ During the same time period, Alaska produced 9,250 tons. Of note, Alaska potato production fell in 2000 to 6,450.⁶

Competition from Other Countries

The top three potato exporting countries in the world are the United States, Canada, and the Netherlands.⁷

International marketing is aimed at larger consumers and typically government- or industry-led and expensive. For instance, in 1997, Canada launched a multi-level, multi-year campaign for entry of Canadian potatoes into China. The plan included addressing market access, preparing exporters, seeking market intelligence, and promoting Canadian product. Ongoing media campaigns that portray Canadian agricultural products as reputable added to the legitimacy of the federal plan. The goal was to increase Canadian exports of agricultural products to China from \$683 million to \$1.3 billion by 2005. The plan focused on seven regional markets within China that had populations exceeding 100 million and gross domestic products over \$27 billion.⁸ China agreed to import Canadian seed potatoes in April 2000, making Canada the only country in the world allowed to export seed potatoes to China.⁹ The Netherlands followed suit in June 2000, signing an agreement with Chinese officials allowing the import of Dutch seed potatoes. According to D. Coumou, director of the Netherlands Potato Consultative Institute (NIVAA), "Although China is not a

¹ Economic Research Service/USDA, "Vegetables and Melons Outlook," VGS-285 (August 2001).

² Doug Warner, Market Development Specialist, Division of Agriculture, Department of Natural Resources, phone conversation, October 2001.

³ USDA Economic Research Service, "Potato Industry Fact Sheet," (February 20, 2001).

⁴ Robert Wells, Director, Division of Agriculture, Department of Natural Resources, phone conversation, October 2001.

⁵ "U.S. Potatoes: Production in Leading States," <http://www.fas.usda.gov/htp2/highlights/1999/99-04/potato/1data>.

⁶ Susan Benz, Agricultural Statistician, Alaska Agricultural Statistics Service, USDA, phone conversation, October 2001.

⁷ "Potatoes: Selected U.S. Exports, By Type, 1971-2000," Bureau of the Census, U.S. Department of Commerce, FAS-USDA.

⁸ Agriculture and Agri-Food Canada, "Agri-Food Trade: An Action Plan for China," International Markets Bureau, Market and Industry Services Branch (June 1997).

⁹ "Canada Secures First-Ever Seed Potato Exports to China," <http://www.agr.ca/cb/news/2000/n00418ce.html>.

large sales area for seed potatoes, it is a major example for other Asian countries. Today we are opening up a continent."¹⁰

On the U.S. front, the U.S. Potato Board Seed Potato Task Force outlined in FY 2000 a plan to focus on Latin American markets for American seed potatoes. The targeted markets were Uruguay, Honduras, Brazil, Argentina, Venezuela, Jamaica, Columbia, and the Dominican Republic. These markets were selected because they had demand exceeding their local production and because the U.S. had advantages in technology, lower production costs, high production capacity, and high quality of seed.¹¹

Shift from Fresh to Frozen Product Exports

The global market for potatoes has undergone a rapid transformation. The age of fast food is resulting in a shift from fresh to frozen and processed potatoes. According to the USDA, "Over the years, the percentage of the potato crop used for processing has steadily increased. In 1959, only 19 percent of the crop was processed. In 1997, about 57 percent of the crop was processed. [In 2000] only 28 percent are sold as fresh table stock."¹²

Exports of U.S. frozen potatoes has grown from 26,450 tons in 1978 to 575,534 tons in 2000. Exports of fresh potatoes are approximately one-half of the total frozen potato exports.¹³ The U.S. is the third largest frozen potato exporter in the world (0.5 million tons, 1998-1999), following the Netherlands (1.3 million) and Canada (0.6 million tons.)¹⁴ Asia is clearly the leader in importation of U.S. frozen product (271 million tons, 1998-1999), followed by Canada (25 million tons) and Latin America (21 million tons.)¹⁵ Exports of fresh potatoes (table and seed) have increased slightly over the years but are still hampered by low product value and phytosanitary barriers.¹⁶ Eighty-one percent of U.S. fresh table stock and seed potatoes exports are destined for Canada.¹⁷ "Although the U.S. is an overall net exporter of potatoes and potato products, imports have increased in recent years. Much of the increase is due to rising imports of fries from Canada, where the frozen potato industry has grown rapidly."¹⁸

Currently, Alaska does not produce any frozen product for local or export consumption. As the export trade shifts to focus more on global frozen product purchases and as demand for seed and table stock remain flat, Alaska's ability to be a player in the export market becomes more challenging.

¹⁰ Netherlands Potato Consultative Institute (NIVAA), "China Admits Dutch Seed Potatoes," (June 13, 2000).

¹¹ The National Potato Promotion Board, *U.S. Seed Potato Export Guide*, (December 1, 1999).

¹² "Domestic and Trade Trends in the U.S. Potato Industry," <http://www.fas.usda.gov/htp2/highlights/1999/99-04/potato/potato.htm>.

¹³ "Potatoes: Selected U.S. Exports, By Type, 1971-2000," Bureau of the Census, U.S. Department of Commerce, and Foreign Agricultural Service, USDA.

¹⁴ U.S. Department of Commerce, Bureau of the Census, "Potatoes: U.S. Export Volume and Value to Selected Destinations, 2000."

¹⁵ "Potato Presentation," <http://www.fas.usda.gov/htp2/highlights/1999/99-04/potato/potato.htm>.

¹⁶ USDA Economic Research Service, "Briefing Room, Potatoes: Background," <http://www.ers.usda.gov/briefing/potatoes/background>.

¹⁷ "Potatoes: Selected U.S. Exports, By Type, 1971-2000," Bureau of the Census, U.S. Department of Commerce, and Foreign Agricultural Service, USDA.

¹⁸ "Domestic and Trade Trends in the U.S. Potato Industry," <http://www.fas.usda.gov/htp2/highlights/1999/99-04/potato/potato.htm>.

SECTION II: TAIWAN AND CHINA MARKET ASSESSMENT

Taiwan and China are two markets that have shown some promise for expanding Alaska's export market. Alaska currently enjoys an export relationship with Taiwan as a provider of table stock and as the sole U.S. state exporting seed stock to Taiwan. Although China currently does not import seed or potato stock from the United States, this could change, particularly as China moves to increase its own potato production. The future of both relationships, however, hinges on the impacts of upcoming World Trade Organization membership for both countries.

This section presents assessments of the Taiwan and China markets for Alaska's seed and table stock potatoes. Factors pertinent to each country—such as economic health, changes in land tenure laws, import competition, retail distribution and transportation networks, and import requirements—are discussed. General conclusions regarding market opportunities and threats for Alaska in the Taiwan and China are given, along with concluding recommendations.

Taiwan Market Assessment

Economic Health

Taiwan is the world's 16th largest economy (2001), with the world's third largest foreign exchange reserves, \$106.7 billion at the end of 2000.¹⁹ Taiwan's forecasted gross domestic product for the year 2001 is \$3.1 billion at an anticipated growth rate of 5.1 percent.

Known as The Republic of China (ROC), Taiwan was founded in 1912 by Dr. Sun Yat-sen. Taiwan is a series of islands known as the "Taiwan Group" and includes Penghu (the Pescadore Islands), Kinmen, Quemoy, Matsu, and dozens of other small islands. The islands of the Taiwan area are populated by more than 22 million, the most densely populated area in the world, with an average of 606 persons per square kilometer. The main island of Taiwan is slightly smaller than the Netherlands. Roughly 30 percent of the island is arable.²⁰

The Taiwanese consumer is affluent, well educated, and health-conscious, which is having a positive effect on imported high-end and organic foods.²¹ Taiwanese consumers are spenders and save only 20 percent of their income annually.^{22 23}

¹⁹ Maureen Pao, "Economic Monitor: Taiwan-Cloudy Forecast," *Far Eastern Economic Review* (February 15, 2001).

²⁰ Republic of China on Taiwan Government Information Office, *The Republic of China Yearbook 2000*.
<http://www.taipei.org/info/book2000/>.

²¹ Ibid.

²² Directorate-General of Budget, Accounting and Statistics, Executive Yuan, The Republic of China.
http://www.dgbas.gov.tw/english/dgbas_e0.htm.

²³ Agriculture and Agri-Food Canada, "Taiwan Agri-Food Export Market Assessment Report" (May 1997).

Agriculture represents 2.9 percent of Taiwan's gross domestic product. Major crops are rice, sugarcane, vegetables, corn, fruits, flowers, and tea. This compares to major industries, including technology and manufacturing, at 34.0 percent of gross domestic product. Worldwide exports equal \$110.6 billion. In the midst of Taiwan's general economic growth, the domestic agricultural sector continues to stagnate while agricultural imports expand. High and rising land costs, labor shortages, international pressure to liberalize trade, and the high cost of subsidization are some of the issues confronting the sector. Over the years, Taiwanese agriculture has shrunk to a minor part of the economy. Family farms are the backbone of domestic production and many farmers are now seeking part-time work to supplement their income.

The ROC government has plans to cut the agricultural workforce by more than 50 percent over the next ten years.²⁴ In the 1950s, agricultural reforms resulted in thousands of small-scale farms, saddled with protections that today are financially untenable. Land sales for any purpose other than agriculture were prohibited, and the rental of land to expand existing operations was difficult. Transfer of lands to anyone other than a farmer was also prohibited.²⁵

The ROC government began promoting an aggressive program of modernization in 1995. The plan for Taiwan to become the "hub" of southern Asia included movement away from labor-intensive, resource industries to become a technology-based economy. Part of this plan was realized for the agriculture industry in January 2001.

Changes in Land Tenure Law

In 1997, the Statute for Agricultural Development revised the structure of farming in Taiwan. Land transfers and sales were opened up to include non-farmers, cooperatives, and agribusiness enterprises, and the government undertook a buyout program for older farmers. This would allow the larger farming entities to have the capital available to use advanced farming techniques and production methods, while simultaneously reducing the overall number of farms in Taiwan. In general, agriculture in Taiwan is trending toward more specialized large-scale farming operations.

Another change to the statute included, for the first time, the conversion of farmlands to non-farm use. This opened the door for other industries, such as those covered by the ROC's planned modernization campaign as well as housing and recreation facilities. It will also serve to further reduce the availability of arable land. Policymakers are urging remaining farmers to supply high-value items to domestic and international markets, including organic vegetables. Funding is available now for biotechnology research to create new products and reduce input costs.^{26 27}

²⁴ Agriculture and Agri-Food Canada, "Taiwan Agri-Food Export Market Assessment Report" (May 1997).

²⁵ Dr. Torng-Chuang Wu, "Changes in Farmland Policy in Taiwan," Food & Fertilizer Technology Center, Taipei, Taiwan, nd.

²⁶ Taiwan Agricultural Information Center, "Agriculture: Republic of China," <http://www.taiwan-agriculture.org>.

²⁷ Council on Agriculture, Republic of China, <http://www.coa.gov.tw/english>.

Taiwan's Imports of U.S. Agricultural Products

The United States is Taiwan's top supplier of agricultural products, mainly bulk commodities and intermediate agricultural products. Demand for consumer-oriented high-value products has increased over the past decade as income levels have grown. U.S. fresh vegetable exports to Taiwan have grown from \$7 million in 1993 to \$14.5 million in 1997. The trend continues upward with lettuce, celery and broccoli as the fastest growing fresh vegetable import items in Taiwan often used in Western-style restaurants. Higher living standards and a rising health consciousness have made Taiwanese consumers appreciate imported vegetables as having high nutritional value.²⁸

U.S. Exports of Potato Products to Taiwan

As mentioned in the introduction, Alaska is the only state permitted to export seed potatoes to Taiwan. Some concern has been expressed, but not proven, that seed potatoes from other states have been included in shipments of fresh, table stock potatoes. These surreptitious seed potatoes may enter the market under the Taiwanese import quota of 5,000 tons of table stock potatoes allowed annually from the United States.²⁹ Taiwan imports of U.S. table stock potatoes are allowed from only five states: Washington, Oregon, Idaho, California and Alaska.

Ida Yao, Alaska State Representative in Taiwan, provided some information on production and pricing for seed and stock potatoes. As seen in the table below, she reports that Taiwan has 12,350 acres available for growing potatoes and generally one ton of seed is used per 2.5 acres. Government plant material sources can provide only 10 percent of total seed demand and the remainder is supplied by the private seed growers or by the farmers for their own use. In 1998, 44,000 tons of potatoes were produced in Taiwan. Combined with fresh potato imports, Taiwanese consumed an estimated 49,250 tons of potatoes.

Table 1
Taiwan's Consumption and Production of Fresh Potatoes, 1998

Production/Consumption	Amount
Area planted*	12,350 acres
Production	44,000 tons
Seed Production*	5,000 tons
Fresh Potato Imports	5,250 tons
Fresh Potato Exports	0
Consumption	49,250 tons

1999 data

Source: Ida Yao, Alaska State Representative, Taiwan, email correspondence, April 2001 and "Potato Market Brief", Taiwan, Agricultural Trade Office, American Institute in Taiwan, November 19, 1999.

²⁸ Foreign Agricultural Service, USDA, <http://www.fas.usda.gov>.

²⁹ Patricia Eckert, Development Specialist, Division of International Trade & Market Development, Alaska Department of Community and Economic Development, phone conversation, October 2001.

During high demand periods, seed potatoes sold for \$0.78-0.85 per pound (\$1,560-1,700/ton) and \$0.42 per pound (\$840/ton) from government sources. The government supplies seed only to contract cooperatives. Using information provided by Ida Yao and Dr. Jim Drew of Alaska Agricultural Development and Marketing, Inc., Alaska's seed potato pricing structure in 2001 is estimated to be \$735 per ton. This is price competitive with Taiwan government sources of seed.

Table 2
Price Per Ton of Seed Potatoes Sold to Taiwan, 2001

Price Components	\$/ton
Selling Price (FOB)	\$450
Shipping Costs	250
Import Tax	35
Total	735

Source: Ida Yao, Alaska State Representative, Taiwan, email correspondence, April 2001 and Dr. Jim Drew, Alaska Agriculture Development and Marketing, October 2001.

The move toward fast food is readily apparent in the U.S. export figures to Taiwan. The snack and fast food markets have grown at a record pace over the last 10 years. The export boom for processed and frozen potato products has been fueled by expansion of the international fast-food industry, product quality and market promotion efforts, tariff reductions, rising incomes, and growing consumer awareness. This demand is expected to grow rapidly through 2002. The primary reason behind this growth is demand from younger consumers for Western-style fast and snack foods, and the growth in local-style steakhouse establishments.

International fast-food franchises usually import their own frozen potatoes.³⁰ Imports of frozen potato products by Taiwan skyrocketed from 604 tons in 1995 to 51,380 tons in 1998. By the year 2000, the U.S. was exporting to Taiwan 1,760 tons of fresh potatoes. This figure for fresh includes both seed and table stock.³¹ Other potato exports included: frozen French fries (30,889 tons), other frozen potatoes (1,179 tons), chips (6,233 tons), flakes (40 tons), and other potato products (69 tons).^{32 33}

The U.S. is the dominant supplier of frozen potatoes imported by Taiwan (\$1.5 million in 1998); a small quantity was imported from Australia in 1998 (\$11,125).³⁴ However, as will be seen in the China Market Assessment section, Australia is poised to be a major player in potato exports to the Asia Pacific region.

Transportation Networks & Food Retail Distribution

Because it is an island nation, all shipping to Taiwan is by sea or air. There are more than 40 airports on the main island and five major ports. Kaohsiung, in southern Taiwan, is also one of the world's busiest seaports. The value/weight of potatoes dictates sea transportation. Intra-country shipments of product from airports or ports can be carried out by railroad and road. The railroad nearly circles the island and there are six major highway networks. Product movement within the cities is

³⁰ Foreign Agricultural Service, USDA, "Market Brief - Taiwan: Potato Product Brief, 1999."

³¹ Only Alaska has authorization from the Taiwan government to export seed potatoes.

³² U.S. Census Bureau, U.S. Department of Commerce, Foreign Agricultural Service, USDA.

³³ Robert Tse, Senior Policy Advisor, FAS-USDA, Washington, DC, phone conversation, October 2001.

³⁴ Statistical Department, Directorate General of Customs, Taiwan, <http://www.ait.org.tw/ait/agri>.

problematic; traffic congestion and very narrow streets force the use of small delivery trucks (1.7 ton truck or less).³⁵

Until recently, product distribution was typically handled through wholesaler/distributor middlemen adding to the product cost. Importers worked through the wholesaler/distributors to place products with large retailers and the hospitality industry. However, Taiwan's retail sector is changing rapidly with the advent of supermarkets, hyper-marts, retail food chains, and convenience stores.

Supermarkets have typically more than 3,600 square feet of floor space and stock a large variety of consumer food items, including fruits and vegetables. A supermarket chain consists of at least four stores. Generally, supermarkets avoid the middleman form of distribution to keep their costs lower. The government also operates over five hundred private discount shopping outlets, where teachers, military, and government personnel can purchase goods at 25 percent lower than supermarket prices.^{36 37 38 39}

Hyper-marts are emerging quickly on the Taiwan food retail picture. Between 1996 and 1997, the number of hyper-marts expanded 57 percent. They are on the competitive edge, cutting into the bottom lines of other outlets while enhancing the choices of consumers. The stores are large, clean, and well-organized; promote products heavily; and provide "on-the-go" service for busy consumers.

Taiwan is a market where under-pricing a product can limit customer acceptance. Consumers educate themselves on the value of the product and are willing to pay higher prices for perceived quality. As such, hyper-marts and convenience stores (such as 7-Elevens) are outpacing supermarkets and department store segments. Growth in supermarkets is expected to be slow, while department stores will expand only slightly.

With this shift in the food retail sectors, distribution methods are also rapidly changing. Avoiding the traditional many-layered distribution channels, hyper-marts are turning to direct imports, centralized distribution centers by food manufacturers, and direct sales by importers to food outlets. Distribution centers are a new concept—they are owned by a market that supplies their own outlets.

Import Requirements

The Taiwan Board of Foreign Trade controls the importation of potatoes. Taiwan has a ban on imported seed potatoes from the United States. As mentioned earlier, Alaska is the only state that has been granted a waiver to export seed potatoes to Taiwan. Stock potato imports are limited to 5,000 tons from five states only: Alaska, Washington, California, Montana, and Idaho. Potato imports are subject to quarantine inspection. Imported agricultural goods are routinely tested for compliance with strict standards and other requirements. Fresh vegetable imports must meet Taiwan's phytosanitary and pesticide residue standards. Fresh vegetables are considered "unprocessed foods" and need three additional

³⁵ Republic of China on Taiwan, Government Information Office, *The Republic of China Yearbook 2000*.
<http://www.taipei.org/info/book2000/>.

³⁶ Republic of China on Taiwan, Government Information Office, *The Republic of China Yearbook 2000*.
<http://www.taipei.org/info/book2000/>.

³⁷ Agriculture & Agri-Food Canada, "The Snack Food Market in Taiwan," (August 1999).

³⁸ , U.S. Agricultural Trade Office, Taipei, "Hypermarkets a Hit with Taiwan's Consumers," *Asia Market Intelligence* (April 12, 2001).

³⁹ Chiou Mey Perng, "Organic Products Finding a Ready Market on Taiwan," American Institute in Taiwan (March 1, 2001).

documents: Health Certificate Exporter, the Importer Label Exporter and the Certificate of Import Inspection.⁴⁰

There is a standard tax rate across a wide variety of product and service categories. According to the Bureau of Animal and Plant Health Inspection & Quarantine (BAPHIQ), there are no special labeling requirements for potatoes. According to importers, sacks are generally labeled with the name and address of the supplier and the net weight of the product.⁴¹ Within the distribution chain, a value-added (business) tax of 5 percent is applied.

Market Opportunities

Organic Market for Table Stock Potatoes

The "disease free" status of imported produce appeals to the Taiwanese consumer who is often suspicious of local production. Years of chemical use and environment damage make imported products generally more attractive. Organic food sales are rapidly growing beyond Taipei to central and southern Taiwan. The high-end market, including organic produce buyers, is a niche that Alaska stock potatoes may fill.

In January, 1997, the Taiwan Ministry of Agriculture authorities initiated an organic certification program for domestically grown vegetables, fruits, rice, and tea. Supermarkets in upscale communities started selling organic foods. While domestic organic produce represents some 2 percent of farmed land, over 80 percent of organic food is imported and the United States is the primary supplier. In 1999, Taiwan's annual imports of organic foods were worth approximately \$9.7 million.

Organic foods are mostly sold through specialty stores and some supermarkets located in department stores and upscale communities in northern Taiwan.⁴² There are about 1,000 specialty stores on Taiwan that carry organic foods.

Prices for organic vegetables vary with the distribution channel used. On average, imported organic fresh produce is priced about four times higher than conventional products. In 1999, Alaska table stock potatoes on the Taiwan organic market were retail priced at \$0.65 per 10 oz. carton.⁴³

Currently, there are approximately 1,000 domestic and imported organic food items available in Taiwan. Generally, imported organic food items are more desirable than those produced locally. This number is expected to increase by 50 percent in the coming year. In the next three years, annual sales of organic foods on Taiwan is expected to reach \$19.4 million. Importers of organic produce in Taiwan have been working cooperatively together and sharing supplies, reducing the complexity of distribution (and cost) to a number of sellers."^{44 45 46 47}

⁴⁰ Agricultural Trade Office, American Institute in Taiwan, "Market Brief--Taiwan: Potato Product Brief, 1999," (November 19, 1999).

⁴¹ The Taiwan Board of Foreign Trade, *Taiwan Customs Tariff Schedule*, nd.

⁴² Chiou Mey Perng, "Taiwan's Market for Organic Products, 2000," American Institute in Taiwan (February 4, 2000).

⁴³ Taiwan's Market for Organic Products, 2000," *FAS GAIN Report* (February 4, 2000).

⁴⁴ "1998 AMP Market Information Report," American Institute in Taiwan (July 15, 1998).

⁴⁵ "Chiou Mey Perng, "Organic Food Trends Wins in Taiwan," American Institute in Taiwan (September 21, 1998).

⁴⁶ Janise Zygmunt, "Organic Markets Offer U.S. Agriculture Current and Future Sales Opportunities," FAS/USDA, (March 1, 2001).

⁴⁷ "Taiwan's Market for Organic Products, 2000," *FAS GAIN Report* (February 4, 2000).

Taiwan does not have specific import regulations for organic foods. All import regulations for conventional foods also apply to organic products. Fresh fruit and vegetable imports must meet Taiwan's phytosanitary and pesticide residue standards. Taiwan's National Organic Standards include *organic* and *adjusted-organic* standards. To qualify as organic, vegetables must be grown without the use of any chemicals, including pesticides, herbicides, and chemical fertilizers.

It is important to point out, however, that any advantage Alaska may have in entering the organic food market may be stymied by upcoming Taiwanese regulations requiring spraying of all imported stock potatoes. Jonathan Gressel, chief of the agricultural affairs section of the American Institute in Taiwan, said that "organic regulations are not really set yet and table stock are one of the most difficult markets in which to compete in Taiwan." Alaska stock potatoes will fall under the same spraying regulations, potentially reducing their value as an "organic" product. Gressel recommends labeling Alaska potatoes as "organically grown" prior to spraying. Even with an "organic" product to offer, Gressel questioned Alaska potatoes' competitiveness given the high transportation costs to get the product to market. These high transportation costs and Alaska's higher priced product will make it difficult for its "organic" table stock to compete against "organic" product from the Lower 48 or elsewhere in the world.

New Import Regulations

Anne Dawson, trade policy specialist with FAS-USDA, confirmed that quota restrictions for stock potatoes will be lifted and likely have a positive impact on Alaska seed potato exporters. The Taiwan government will have in place new regulations around the end of 2001/early 2002 that require additional treatment to imported table stock potatoes. Dawson said that they have been aware of rumors that stock potatoes from the U.S. and other countries have been imported as stock and used as seed. Taiwanese officials have not confirmed this, and importers and farmers are not talking about it. The Taiwan government will soon require all imported stock potatoes to be accompanied by an affidavit of the shipper that the potatoes have been treated with sprout inhibitor. Sprout inhibitors work on roughly 90 percent of the potato load and their use will significantly reduce the amount of imported stock potatoes available to plant as seed. This regulation change will have the effect of extending Alaska's seed potato export exclusivity in Taiwan. The State of Montana has discussed making the same application to Taiwan, but has not yet begun the effort. The process for new market entry takes a number of years to complete and includes risk assessments, field visits and growing tests. For the present, Alaska enjoys exclusivity in Taiwan's seed potato market and, according to FAS, this should continue for at least five more years.⁴⁸ This will help protect Alaska's competitive advantage over other seed producers in the short term.

Market Threats

World Trade Organization Ascension

Taiwan's entered the World Trade Organization (WTO) on November 10, 2001. As a result, Taiwan will drop the quota on imported U.S. potatoes. Competition for the table stock potato market will be dramatically increased when the potato import quota is eventually removed under the WTO.

⁴⁸ Anne Dawson, Trade Policy Specialist, Foreign Agriculture Service, USDA, Washington, DC, phone conversation, October 2001.

The current negotiated tariff on potatoes is 22 percent and will drop to 20 percent upon WTO accession. This is unless another country successfully negotiates a lower potato tariff. In that case, Taiwan will be required to drop its tariff rate for all WTO members.

Adopting the WTO sanitary and phytosanitary (SPS) agreement could also improve access for seed potatoes. The successful results of these negotiations should lead to the elimination of many non-tariff barriers and discriminatory practices.

Domestic Production

Domestic agriculture in Taiwan is in decline. Reasons for this include lack of labor, high land costs, health & safety issues, and the liberalization of markets under WTO rulings. Local production cannot compete with imports. For many years, the domestic market did not have to compete, due in large part to the high tariffs protecting them.⁴⁹ This decline in local production means Taiwanese farmers have less need for imported seed stock. This clearly lowers the ceiling for Alaska's seed potato market potential in a contracting agricultural sector.

Diet Change

Rice has traditionally been the starch of choice in Taiwan. As the economy grows and the consumer expands his diet, rice consumption has declined over the last two decades. In 1996, the per capita rice consumption declined to 130 pounds per year compared to 187 pounds per year in 1986.⁵⁰ Much of the shift away from rice is the result of the lifestyle dietary change to fast and processed food products, including French fries.

Taiwan Market Assessment Summary

Alaska's seed potato exports to Taiwan will only enjoy a competitive advantage as long as the import waiver is in place disallowing other seed imports from the U.S. Once this waiver is removed, so will Alaska's competitive advantage. Alaska's opportunities to export seed potatoes to Taiwan are limited for the following reasons:

- Now that Taiwan is a member of the World Trade Organization, it will be required to remove any preferential treatment toward certain importers. Even if Alaska enjoys this window of opportunity for five more years, it is not long enough to provide an incentive to invest in an export infrastructure in Alaska supporting its ability to compete once the waiver is removed.
- With the change in land tenure law and the country's development plan, Taiwan's local production of potatoes is expected to decline and with it the demand for imported seed.
- Alaska has a unique position in the market with its import waiver, but even with this exemption, Alaska's exports to Taiwan have not grown. This fact establishes that as attractive or high-quality as Alaska's seed potatoes may be, the market is not responding to these factors.

⁴⁹ Agriculture & Agri-Food Canada, "Taiwan Agri-Food Market Assessment Report," (May 1997).

⁵⁰ American Institute in Taiwan, "1998 AMP Market Information Report," (July 15, 1998).

Alaska's table stock may have some advantage in the small, yet newly emerging, niche, organic market in Taiwan. This market is high-end and the distribution channel to the hyper-marts and supermarkets is more direct. However, given the scale of Alaska's current production and the potential costs to change production practices to comply with "organic" import standards, it is unlikely that Alaska's product will be price-competitive with other organic potatoes imported from the U.S. or elsewhere in the world. However, while costly to implement, Alaska may consider creating a "brand" concept for Alaska table stock potatoes, building recognition for a superior product and a corresponding higher price.

People's Republic of China

Economic Health

By land area, the People's Republic of China (PRC) is the world's fourth largest country. Total land mass is 3.7 million square miles with water accounting for 104,500 square miles. China's movement in the late 1970s to a market-oriented system has resulted in a quadrupling of GDP since 1978. In 2000, with its 1.26 billion people but a GDP of just \$3,600 per capita, China stood as the second largest economy in the world after the US (measured on a purchasing power parity basis).⁵¹ Agricultural output doubled in the 1980's, but continues to be hindered by bureaucracy, corruption and inflation. The PRC's population is 1.3 billion (July 2001 est.), the largest in the world. Sixty-eight percent of the citizens are between 15-64 years of age and the population growth rate is 0.9 percent (2001 est.). The population's average literacy rate is 81.5 percent.

The PRC is divided into 23 administrative regions and is governed by the Communist Party.⁵² By 1958, most farms in China were organized into collectives. When the PRC economy was decentralized, farmers were allowed to sell product in the marketplace and the agricultural output improved. State-owned communes have been gradually phased out and replaced with individual farms and economic cooperatives. In 1988, China's Ministry of Agriculture addressed food shortage problems with the "Vegetable Basket Program." The Vegetable Basket Program made investments in infrastructure and provided the farmers a network to sell potatoes on the wholesale market. There are currently more than 4,000 wholesale markets in China.⁵³

China's Potato Production

China has 340 million acres of arable land. This is expected to be reduced by 3 million acres in 2001 due to increased urbanization of the country.⁵⁴ China is the second largest potato producer in the world, 50 percent of which goes to animal feed.⁵⁵ As shown in the table below, in 1999, sown potato area reached 10.0 million acres and production was 62.9 million tons. Major growing areas include Hebei, Anhui, Fujian, Shandong, Henan, Hubei, Guangdong, Chongqing, Sichuan, and

⁵¹ CIA. *World Fact Book, China, 2000*; <http://www.cia.gov/cia/publications/factbook/geos/ch.html>.

⁵² Deborah D. Jung and Gwen B. Lyle, "Agricultural Machinery: China," U.S. & Foreign Commercial Service and U.S. Department of State, Beijing, China (1998).

⁵³ Economic Research Service, USDA, "China's Fruit & Vegetable Sector: A Changing Market Environment," *Agricultural Outlook* (June-July, 2001).

⁵⁴ Yi Wang, "Overview of Potato Production in China," CIP-China Liaison Office, Beijing.

⁵⁵ *Ibid.*

Guizhou. Production is expected to increase as new farms come on line in Western China. According to the Chinese Academy of Agricultural Science (CAAS), in 2000, it is estimated that production increased slightly over 1999 because potato production was regarded as one measure to alleviate poverty. The top three producing provinces in 2000 were Shandong, Inner Mongolia, and Guizhou. Researchers in CAAS also estimated that every year about 10 percent of production is used as seed.⁵⁶ However, as seen in the table below, other statistics indicate seed production may be as low as 4 percent of production.

Table 3
China's Consumption and Production of Fresh Potatoes, 1999

Production/Consumption	Amount
Area planted	10.0 million acres
Production	62.9 million tons
Yield	6.3 tons per acre
Seed production	2.8 million tons
Fresh potato imports	7,800 tons
Fresh potato exports	76,600 tons
Human consumption*	31.5 million tons

* 50 percent of China production is used for animal feed

Source: Food and Agriculture Organization of the United States, Syngenta Limited, 2001, <http://www.potatonews.com.statistics>

There are four agro-ecological zones in China: The Northern region crops are planted in the spring and harvested in the fall; the Central Plain region plantings take place in the spring and fall; the Southern region specializes in short growing seasons, with plantings in late October and mid-January; and the Southwestern Mixed region represents 30 percent of the national potato production and planting varies widely. There are critical environmental issues facing the Chinese potato producer, including fungal disease, bacteria, viruses, insects and nematodes.⁵⁷ The PRC government is aggressively addressing these problems through control of production and establishing a seed quality testing center in Hebei in 2001.⁵⁸

There is evidence that China is working rapidly to shore up in-country production of both table stock and seed potatoes. An Australian horticultural technology company, Technico Inc., developed their "Technituber" and, in the last five years, has invested heavily in China.⁵⁹ Technico's expertise includes supply chain management from seed to consumer. Technico has developed commercial alliances, on a global basis, with internationally established food processors and major producers, for the production and supply of early generation seed and, in some cases, commercial processing potatoes.⁶⁰ Technico has established joint venture agreements with Frito Lay, Inc. (annual revenues of over \$11 billion), McCain Foods (\$5 billion), and Simplot, Inc. (\$2.7 billion) specifically targeted at the China market.⁶¹

⁵⁶ Xiang Qing, American Embassy, Beijing, PRC, email correspondence, January 18, 2001 (original source: Chinese Agricultural Yearbook).

⁵⁷ "China," *World Potato Atlas*, <http://www.gis.cip.cgiar.org>.

⁵⁸ "First Domestic Detoxin Potato Seed Quality Testing Center Accepted," *Farm China* (October 11, 2001).

⁵⁹ Technico has also made investments in Thailand, India, Mexico, and the United States.

⁶⁰ Technico, "Seed Industry Overview" <http://www.technituber.com>.

⁶¹ Technico, "Global Relationships," <http://www.technituber.com>.

In 2000, Technico invested \$5.2 million to construct a Technituber plant in Kunming in response to the Chinese government's "Western Development Campaign." The campaign is focused on the country's ten poorest, western regions and aims to alleviate hunger. The Kunming facility has a first stage design capacity of over 10 million Technituber seeds and is the largest single-site, miniature seed production facility anywhere in the world.⁶² According to Technico, "In the USA, there are more than 20 miniature seed potato producers, located in a number of states, producing approximately 13 million miniature seed potatoes."

In China, potatoes are used as food, industrial raw material, and animal feed. There is a dietary shift in urban areas to potatoes as a vegetable selection rather than as starch as a major energy source, however, staple use is high and predominant in rural and poor areas.⁶³ In rural areas, the potato is a primary starch and there is a high on-farm consumption rate. In the cities, much like the rest of the global potato trends, the use of processed potatoes—primarily frozen potatoes—is rapidly increasing. Today, French fries are a booming business in China.⁶⁴

China's Imports of U.S. Agricultural Products

China's top imports of potato products come from the U.S and Canada. Only processed potato products are imported from the U.S. In 1990, China imported 6.7 million tons of frozen potato product. By 1999, imports skyrocketed to 49 million tons. The U.S. held 97 percent of this frozen potato import market.⁶⁵ All fresh U.S. potatoes (seed and table) are banned for import.⁶⁶ Discussions regarding U.S. exports of fresh tubers to the PRC were postponed for three years under recent U.S.-China trade talks. According to Christina Lund, China market specialist, U.S. Trade Representative's Office, reciprocity will be difficult because Chinese fresh potato imports are not allowed into the United States. There is concern that cheaper potatoes from China will enter the U.S. market, driving prices down, and supersaturating the U.S. market.

There are some indications that the Alaska seed potato will be granted a phytosanitary waiver as occurred in Taiwan. According to Robert Tse, Senior Trade Policy Advisor for FAS-USDA, Alaska has cleared most of the phytosanitary barriers and has an advantage over other U.S. seed producers. Tse suggests Alaska potato exporters focus on northern China in provinces such as Heilongjiang. While a relatively poorer region of China, Alaska does share a long-standing sister state relationship with Heilongjiang, and it has a similar climate and growing season. In June 2001, the State of Alaska hosted the Heilongjiang Agricultural Committee in Alaska to promoting Alaska's potatoes.

It will be difficult for Alaska table stock potatoes to compete in price in the China market. While the U.S. government does not track wholesale prices, Danial Chan of the U.S. Embassy in Beijing was able to provide retail prices for fresh potatoes. In Beijing, retail prices for fresh potatoes ranged from \$0.03-0.04 per pound in street markets, or \$0.11 per pound in the supermarket. The lowest street market price for potatoes was found in Jiangxi Province, \$0.03 per pound. The highest retail price paid in the country's street markets is in Shenzhen where the retail price was as high as \$0.07 per pound.

⁶² Ibid.

⁶³ "China," *World Potato Atlas*, <http://www.gis.cip.cgiar.org>.

⁶⁴ "Jacob Cee & Susan Theiler, "U.S. French Fries Heat Up China's Fast Food Industry," *AgExporter* (April 12, 2001).

⁶⁵ "Jacob Cee & Susan Theiler, "U.S. French Fries Heat Up China's Fast Food Industry," *AgExporter* (April 12, 2001).

⁶⁶ Doug Warner, Market Development Specialist, Division of Agriculture, Department of Natural Resources, phone conversation, October 2001.

China's export of fruit and vegetables are bolstered by the relatively low cost of production, reflected in wholesale prices. In Beijing, for example, wholesale prices for fruits and vegetables are only one-tenth to one-third the level of prices in other countries.⁶⁷ Even though Alaska table stock may be superior quality, the higher price associated with this quality would be beyond the reach of the average consumer in China. Only the affluent, a small percentage of the population found in some coastal cities such as Beijing or Shanghai, may be able to afford Alaska table stock potatoes. As attractive as this high-end niche market may be, Alaska's product will still need to be cost-competitive in the import market.

Transportation Networks & Food Retail Distribution

China is an enormous country and over-populated with an underdeveloped infrastructure. The northeastern part of the country enjoys the best transportation infrastructure, due to the Japanese-built high-quality rail system and highways designed to move product quickly. In northeast China three factors remain key: the continued significance of the state-managed rail system; the fact that goods transport often involve mostly private, small scale truck transport; and that the Port of Dalian's role in any system is likely to grow significantly in the coming years due to its potential for growth.

In-country distribution of domestically-produced table stock potatoes is handled through a variety of government-owned stores, supermarkets, street markets, grocery stores, and restaurants. More typical, however, is selling potatoes at farmers' markets, which are found throughout the country. Because no U.S. table stock or seed potatoes are allowed entry into China, it is unclear how the distribution channel would be organized. The likelihood is high, however, that the distribution system would be controlled by the government.

Market Opportunities

World Trade Organization Accession

On September 17, 2001, China and the U.S. reached agreement on the majority of terms for China's entry into the World Trade Organization (WTO). China agreed to abide by non-discriminatory treatment of U.S. goods, and removal of dual pricing policies, preferential treatment of goods, and price controls for domestic production. Within three years, most entities will have the right to import and export all goods throughout the customs territory, and there will be no maintenance or introduction of export subsidies on agricultural products.

On November 10, 2001 China's membership was accepted into the WTO. This recent development will loosen some regulations on processed potatoes and China's tariffs on frozen potato fries will drop from 25 to 13 percent. Given that exports of this product have significant market opportunities due to rapid expansion of the fast-food industry, this lowering of tariff will have dramatic effects.

Fresh potatoes are still under negotiation. China has committed to abide by the terms of the WTO Agreement on Sanitary & Phytosanitary Measures. This requires that sound science, not political agendas or protectionist concerns govern imports. In the September agreement, the U.S. and China agreed bilaterally to the terms for

⁶⁷ Economic Research Service, USDA, "China's Fruit & Vegetable Sector: A Changing Market Environment," *Agricultural Outlook* (June-July, 2001), p. 12.

the removal of scientifically unjustified restrictions on the importation of U.S. wheat, citrus, and meat. Discussions continue on removing SPS barriers for other U.S. products—including potatoes.

Lynn Alfalla, China trade policy specialist, FAS-USDA, said progress has been made on a work plan and protocol dealing with phytosanitary issues regarding fresh potatoes. China is expected to make a very public statement soon assuring adherence to WTO phytosanitary terms, but Alfalla said this is the toughest part of negotiation. China must agree to show valid, reasonable, scientific reasons in rejecting potato imports. The entire import process must be made more transparent, and import regulations and rules are to be published across the country. China's entry into the WTO will dramatically cut import barriers currently imposed on American agricultural products. Bound tariff rates for fresh seed and stock potatoes will remain at 13 percent, and Washington, Oregon and Utah have all requested access for both seed and stock potatoes.⁶⁸

Alfalla did point out that Alaska has done well with its efforts to enter the Chinese seed potato market. Chinese officials have been impressed with the clean stock, lack of pest problems, and their visits to Alaska farms. Alfalla said the Chinese government is currently completing its analysis of the Alaska seed potato and she expects a final determination for an import waiver by China before 2001 ends.

China Market Assessment Summary

No U.S. fresh potatoes, seed or table stock, are currently allowed into the Chinese market. As import regulations are lifted, Alaska's potential in the emerging market is likely to be limited for the following reasons:

- In preparation of its entry into the WTO, much work has been done by China to improve its own seed production. China has made significant investments in new testing programs to improve their seed quality.
- International players, such as Technico of Australia, have been working to position themselves in the market. These type of corporate investors are financially strong and are well-situated to take advantage of the market.
- Even if China imposes an import waiver similar to the one in Taiwan that gives Alaska a competitive advantage, this advantage will be short-term. Alaska does not have the political or market presence to resist the efforts of Canada, the Netherlands, or other U.S. producers to remove this waiver. Additionally, with entry into the WTO, China will be required to remove this preferential treatment to Alaska. Once that waiver is removed, the chances of Alaska holding onto its edge against strong international suppliers is unlikely.

⁶⁸ The "Bound rate" is the final tariff rate at the end of the WTO implementation period. The implementation period is normally six years for developed countries and ten years for developing countries.

Much like Taiwan, China's higher income levels, particularly along the eastern coast, may provide some small, niche opportunities for Alaska table stock potatoes. It will be difficult for Alaska to compete on price, especially given the low retail prices found in the market (under \$0.04 per pound in Beijing). However, frozen product is unmatched in the China import market, essentially swallowing up the fresh table stock potential.

Other Export Market Considerations

There are several U.S. government programs and marketing forums that Alaska should consider being involved in if it wishes to strengthen its export potential. The USDA Cochran program promotes trade by arranging contacts and visits between retailers in developing countries and U.S. suppliers. Typically, the program works with a group of four to five producers to establish trading relationships. China is currently on the eligible list; Taiwan has been removed. The State of Alaska may want to use this program or others, such as the Western U.S. Agricultural Trade Association's program, to fund a delegation visit of Alaska producers to the Taiwan and/or China market. Such a visit will expose Alaska's farmers to the needs of the foreign buyers and give them more information to assess their potential involvement in the overseas market.

The Market Access Program (MAP) offers exporter protection. Because Alaska's farms are so small, teaming up with other smaller producing states may be helpful. A FAS-USDA official recommended that Alaska join with other under-represented states, such as Arizona and New Mexico, in the MAP, promoting U.S. agricultural products overseas through ventures with state organizations, trade groups, and cooperatives. MAP helps with advertising, trade show participation, public education and media exposure, national branding, in-store promotions, trade missions, and technical assistance.

Finally, in March, 2001, the USDA amended the list of commodities eligible for coverage under the Community Credit Corporation Export Credit Guarantee Program (GSM-102) and Supplier Credit Guarantee Program (SCGP) to include potatoes. Given the vulnerability of Alaska's relatively small exporters, they should explore transaction insurance available under the GSM Export Credit Guarantee Program. This program underwrites agricultural transactions up to 97-98 percent of the total value of the sale and goes far to ease bankers' minds. If the State wished to go further, it could guarantee the remaining 2-3 percent of the transaction and completely shield the farmer-exporter from loss. Export finance officials from USDA are available to travel to Alaska to educate farmers and bankers.

Concerning marketing forums, the World Potato Congress will be held in Kunming, PRC, April 20-25, 2003. The Congress is a gathering of experts in the fields of potato production, exporting, economic development, policy and regulation, and research.⁶⁹

In-country promotions will elevate the visibility of Alaska agriculture in the eyes of the USDA. Specifically, appearances at the weekly USDA Farmers' market (May to November) held in Washington, DC will remind federal officials that there are agricultural products available from Alaska.

⁶⁹ World Potato Congress, <http://www.potatocongress.org>.

If Alaska is seeking another export market, it might consider Latin America. One source of support for exporting seed potatoes to Latin America is the Seed Export Program of the National Potato Promotion Board. The seed program leverages a Board budget of \$150,000 with equal funding from four USDA/FAS funding programs.⁷⁰ The Board's seed program is currently focused on seven Latin America countries: Columbia, Venezuela, Brazil, Uruguay, Honduras, Dominican Republic, and Panama.⁷¹

Alaska, if seeking high-end markets, might also consider looking at Southeast Asian economies that are doing relatively well. Neighboring markets to be considered include Hong Kong and Singapore.⁷²

Taiwan and China Market Assessment Conclusion

There is little promise of increased potato exports to either Taiwan or China, although the markets are quite dissimilar. Taiwan's agricultural sector is shrinking through government mandate. China's economic policies are leaning toward self-sufficiency in potato production. The Chinese government has seed import agreements with both Canada and the Netherlands, and Technico of Australia is supplying much of the seed for Western China. In both countries, stock potatoes are dominated by major competitors with bigger budgets, more production, more experience, and more political clout. Other factors dim the prospects for increased potato exports:

- The comparative advantage that Alaska currently enjoys in Taiwan and potentially in China is short-lived, perhaps five years. Potatoes from Alaska are the only seed potatoes Taiwan allows imported from the United States. Alaska's relationship with the Taiwan government, importers and growers is important, and its exclusive access is envied by other states. Robert Tse, Senior Policy Advisor, FAS-USDA, says that "Oregon, Washington and Idaho complain loudly about Alaska's premier position." This favored status will end once Taiwan assumes membership in the World Trade Organization, as would any potential advantage in China.
- Demand for fresh table stock potatoes in both Taiwan and China is relatively flat. Processed potatoes, from frozen to dehydrated, is dominating the global marketplace, and Alaska has yet to enter into potato processing. If Alaska farmers are to enter and remain in these markets with fresh seed and table potatoes, the focus needs to be on export readiness, reliance on state and federal programs, alliances with states in similar situations, and a recognition that Alaska farmers do not have the economic ability to hold market share alone.

⁷⁰ www.uspotatoes.com/seed.htm. [October 16, 2001]

⁷¹ Ibid.

⁷² The World Bank, <http://www.econ.worldbank.org>.

The fact that Alaska has been able to garner exclusivity in the Taiwan seed market, sell a limited number of containers of stock, and appear to be about to enter the Chinese seed market is commendable. However, the sheer force of the competition worldwide, the lack of financial support, and the small amount of production promises to edge Alaska farmers out of the markets they risked much to enter. In Taiwan, where the best opportunities lie in organic and high-end product, spraying regulations may limit the attractiveness of the Alaska potato, while protecting seed potato exports in a declining market. The entry of China and Taiwan to the WTO is a double-edged sword. Taiwan will eliminate quotas on stock potatoes and allow entry to major U.S. producers who far outpace Alaska's farms. China has not yet agreed to the import of U.S. fresh potatoes and is focusing on in-country production while making seed import agreements with other countries. Finally, there are predictions that China will follow Mexico's pattern of devaluing its currency post-WTO, mirroring Mexico post-NAFTA. Should this occur, the result will be a huge increase in Chinese exports to the U.S. and a simultaneous reduction in imports.⁷³

As will be seen in the next section, Alaska's potato production is relatively underdeveloped. The available supply of seed and table stock is nominal in comparison to production found in other states, let alone other countries. While the overseas markets may offer some appeal to the exporter, it is highly important that appropriate consideration be paid to the Alaskan producer. Issues such as capability, capacity, risk absorption, and export readiness must be addressed before embarking on an ambitious export plan for Alaska's seed and table stock potatoes in the Taiwan and China market.

⁷³ Robert E. Scott, "The High Cost of the China-WTO Deal," *EPI Issue Brief* 137 (February 16, 2000).

SECTION III. ALASKA PRODUCTION, CAPACITY, AND INTEREST

Having examined the potential demand for Alaska table and seed potato stock in Taiwan and China, the study now turns to potato production in Alaska and particularly to Alaska's experience in and potential for exporting potatoes. Statistical information, reports and articles, executive interviews with key experts, and results of a telephone survey of Alaskan potato farmers provide the content for this section, which is organized as follows:

- Overview of Alaska's Potato Production
- Table Stock Profile
- Seed Stock Profile
- Alaska's Potato Export Experience
- Government Support and Expanding the Potato Industry
- Seed Potato Production Expansion
- Table Stock Potato Production Expansion

In the survey of Alaska potato farmers, eleven participants were interviewed based on their level of potato production and/or whether they produced certified seed. All together, the farmers interviewed raise 430 acres of potatoes, roughly half of the total potato acreage within the state. Three farmers raise exclusively seed potatoes. Most raise a combination of seed and table stock potatoes, with four raising mostly table stock.

Overview of Alaska's Potato Production

In 2000, Alaska potato production comprised about 69 percent of the state's total land in commercial vegetable production, and the potato harvest was worth more than double the combined value of all other non-greenhouse vegetables produced. Potato production in the state occurs primarily within the Railbelt region: in the Matanuska Valley (Palmer and Wasilla area) and the Tanana Valley (Nenana, Fairbanks and Delta Junction areas). These areas rely on road transportation and local marketing to the state's largest population centers to profitably produce potatoes.

Matanuska Valley farmers produce about 81 percent of the state's potatoes (including both table stock and seed), with Tanana Valley farmers accounting for the remaining 18 percent. From 1990 to 2000, the number of acres harvested has been steady in recent years, ranging from 820 to 850 acres from 1997 to 2000. Seed production showed a similar trend during the same period, ranging from 16,600 to 17,400 cwt. (830-870 tons). Approximately 100 to 150 acres of seed potatoes are harvested annually in the Tanana Valley district, with about 50 acres in production in the Matanuska Valley.⁷⁴

⁷⁴ Bill Campbell, Agronomist, Division of Agriculture, Alaska Department of Natural Resources, phone conversation.

Alaska potato production operates under a 100-day growing season augmented by long day-length.⁷⁵ Producers average between 8 and 20 tons per acre, depending on irrigation use and management intensity. Alaska's production can fluctuate dramatically from year to year. For instance, Alaska potato production ranged from 220,000 cwt. (11,000 tons) in 1995 to 126,000 cwt. (6,300 tons) the following year. Over the last 10 years, Alaska's potato crop has averaged approximately 120,000 cwt. (6,000 tons), worth nearly \$3 million annually.⁷⁶ Production costs per acre range from \$1,200 to \$2,000 annually.⁷⁷

Table 4
Alaska Potato Production, 1990-2000

Year	Acres Harvested	Seed Production (1,000 cwt.)	Table Production (1,000 cwt.)	Home Use* Production (1,000 cwt.)	Shrinkage /Loss (1,000 cwt.)	Total production (1,000 cwt.)	Avg. Price/Cwt.	Value (\$ millions)
1990	600	12.5	96	15.5	14	138	\$19.90	\$2.75
1991	650	15.8	91	16.2	17	140	17.50	2.45
1992	560	15.3	87	9.7	18	130	19.00	2.47
1993	680	14.9	107	14.1	21	157	18.90	2.97
1994	780	19.8	95	3.2	16	134	19.40	2.60
1995	1,040	16.7	126	16.3	61	220	18.60	4.09
1996	630	16.6	83	7.4	19	126	19.80	2.49
1997	820	16.6	124	7.4	20	168	20.00	3.36
1998	820	17.1	97	5.9	30	150	20.70	3.11
1999	850	16.3	119	7.7	42	185	20.70	3.83
2000	840	17.4	88	1.6	22	129	20.70	2.67

Use for home consumption, livestock feed, or seed stock on same farm.

Source: U.S. Department of Agriculture, Alaska Agricultural Statistics Service. *Alaska Agricultural Statistics*, various issues.

Table Stock Profile

Three-quarters of the potato farmers interviewed were involved in table stock production, to a greater or lesser extent. Total acreage devoted to table stock of those interviewed was 325 acres. Table stock farmers raise upwards of 15 varieties, including Shepody, Bake King, Highlite, Russet Norkotah, Red Pontiac, Chieftain, Yukon Gold, Sand Green, Alaska Red, All Blue, Kennebec, Cal White, Specialty Purple, Gold Rush, and Alaska Red Eye. At least one of the farmers raises completely organic potatoes.

⁷⁵ Jahns, Thomas R., "Crop Profile for Potatoes in Alaska," <http://pestdata.ncsu.edu/cropprofiles/docs/akpotatoes.html>.

⁷⁶ Brown, D.A., and M. Burgess. Alaska Agricultural Statistics. USDA National Agricultural Statistics Service and Alaska Department of Natural Resources, various issues, 1995, 1996, 1997.

⁷⁷ Jahns, Thomas R., "Crop Profile for Potatoes in Alaska," <http://pestdata.ncsu.edu/cropprofiles/docs/akpotatoes.html>.

Table 5
Table Stock Potato Farmer Profile
(Includes both farmers who exclusively raise table stock and those raising table and seed stock)

Length of time raising table stock potatoes	2-40 years
Average length of time raising table stock potatoes	17 years
Acreage devoted to table stock	10-100 acres
Average number of acres devoted to table stock	47 acres
Table stock yield in 2000	3-15 tons/acre
Table stock yield in 2001	10-20 tons/acre
Varieties of table stock grown	15+

Alaska farmers provide about 57 percent of the state’s fresh potato market demand.⁷⁸ According to an Alaska Division of Agriculture official, approximately 80 percent of this fresh market is supplied by four farms: Palmer Produce, VanderWeele Farms, Matanuska Potato Growers, and Delta Produce. The farmers interviewed sell their table stock potatoes to a variety of outlets, including supermarkets, military bases, restaurants, farmers’ markets, and local people through u-pick operations. Some farmers are in the very beginning stages of developing a market for their produce and are in the process of establishing sale commitments.

Nearly all table stock farmers interviewed are interested in expanding their production but indicate that expansion is contingent upon having a solid, secure market into which to expand. As one farmer indicated, “I won’t plant hoping I’ll get something out of it. I’m not interested in speculation.”

Table stock expansion is limited by the fact that Alaska farmers are unable to produce a russet potato with a typical “Idaho russet skin” preferred by many in the in hospitality, restaurant, and institutional industries; such potatoes have to be “imported” from the Lower 48. There are also no potato-processing facilities in Alaska that meet the in-state demand for frozen or other processed potato products, such as French fries.

Seed Stock Profile

Nearly all the farmers interviewed are involved in seed stock production, to a greater or lesser extent. There are more relative newcomers to seed stock production than table stock production. The total seed stock acreage of farmers interviewed is 103 acres. Potato farmers raise more variety of seed than table stock, growing upwards of 27 different varieties, including Shepody, Bake King, Highlite Russet, Norkotah Russet, Red Pontiac, Chieftain, Yukon Gold, Sand Green, Alaska Red, All Blue, Kennebec, Tundra, Iditarod, Denali, Snowchip, White Criebé, Norland, German Butterball, Allagash, Yellow Fin, Mainstay, Rote Erstling, Peanut B&Bs, Gold Rush, and Alaska Red Eye. Currently, seed stock potato farmers sell their stock to greenhouses, farmers markets, Native corporations, commercial growers, and Taiwan, and they also raise seed stock for themselves.

⁷⁸ Jahns, Thomas R., “Crop Profile for Potatoes in Alaska,” <http://pestdata.ncsu.edu/cropprofiles/docs/akpotatoes.html>. Original source: D. M. Mueller, Alaska Agricultural Statistics, USDA National Agricultural Statistics Service, Palmer

Approximately three-quarters of farmers involved in seed stock production are interested in increasing their production, a slightly smaller percentage than those involved in table stock production. For some farmers, seed potato farming is clearly a side endeavor, and they are content with their current size. Others are less interested in expanding seed production than table stock production, given the level of risk and the logistics of storing up to two generations of seed stock. Many see both the risk and the cost of production as greater. Of those who want to expand, all indicate that their interest is dependent upon having a reliable market. As one farmer phrased it, "If these guys won't sign on the line for next year's production, then I won't do it." Another indicated that he would need to have a stable market at least five years ahead in order to feel comfortable expanding production. Having additional land is also a consideration. However, farmers also see more potential in this market as well. As one farmer put it, "There's plenty of opportunity at 30 cents per pound."

Table 6
Seed Stock Potato Farmer Profile
 (Includes both farmers who exclusively raise seed stock and those raising table and seed stock)

Length of time raising seed stock potatoes	3-40 years
Average length of time raising seed stock potatoes	15 years
Acreage devoted to seed stock	2-30 acres
Average number of acres devoted to seed stock	11 acres
Seed stock yield in 2000 and 2001	3-15 tons/acre
Varieties of seed stock grown	27+

Although potatoes will grow well elsewhere in the state, farmers indicated that large-scale production is inhibited by high transportation costs, high growing costs, and small local markets.

Alaska's Potato Export Experience

By the mid-1990s, it became apparent that local production of table stock potatoes was meeting local demand from grocery stores in Alaska. This demand had leveled off and had the potential to start declining. If potato farmers were going to maintain or expand their production, clearly other markets needed to be found. Taiwan and China became the focus of export efforts. Following is a discussion of how these efforts were and are organized; how farmers participated in and were impacted by them; and what assurances farmers would want for further potato export endeavors.

Early Potato Export Efforts

Individuals, together with the State of Alaska Department of Community and Economic Development (Division of International Trade and Market Development) and the Alaska Department of Natural Resources (Division of Agriculture), started to explore the markets of Taiwan and China. These markets were chosen largely because of efforts by Dr. Jenifer Huang McBeath, a professor at the University of Alaska Fairbanks' Plant Pathology and Biotechnology Laboratory. She felt Alaska's seed and table stock could be competitive in these markets. Fluent in Mandarin

Chinese and with academic institutional connections to these markets, Dr. McBeath was involved in an \$11,000 shipment of seed potatoes to Hong Kong in 1991 and organized a test shipment to Taiwan and Northern China in 1995.⁷⁹

In 1996, the Department of Commerce and Economic Development conducted an examination of the Taiwanese Seed Potato Market.⁸⁰ This examination, while admittedly not an in-depth analysis, concluded that the market for seed stock was limited, and expressed concerns about Alaska's competitiveness, given the high price of Alaska product. It was suggested that table stock may find niche markets with the "high end niche for quality, health-conscious Taiwanese consumer."⁸¹

In 1996, 80,000 pounds (2-40,000 containers) of Alaska seed stock was cargo shipped to China, and 660 pounds of seed stock was sent by airfreight to Taiwan for test trials. The seed stock included 400 pounds of seed typically used in Taiwan (some of which was produced in Alaska), and 200 pounds of an Alaskan seed stock variety. The agreed upon purchase price was \$45 per pound.⁸²

Role of Alaska Agricultural Development and Marketing, Inc. (AADAM)

In 1997, a nonprofit 501(c)3 was formed to continue these overseas marketing efforts. Alaska Agricultural Development and Marketing, Inc., (AADAM) established its headquarters in Fairbanks, Alaska and continues to be the only known exporter of Alaska seed and table stock potatoes to Taiwan and China. It has acted as the only *de facto* fresh produce export broker in Alaska. According to Philanthropic Research, Inc., AADAM's programs included "outreach for farm cooperatives provid(ing) successful demonstrations of production systems to help reach markets outside Alaska."⁸³ In 2000, AADAM changed its Internal Revenue Status to a 4947(a)(1) Nonexempt Charitable Trust Treated as a Private Foundation. Professor McBeath is the president of this organization, and currently there are two other officers and two committee members.

During 1997, the seed shipped to Taiwan in 1996 was tested, and according to an officer of AADAM, the seed performed well.⁸⁴ Also in 1997, 17,205 pounds of seed were shipped to China. Most of this seed came from Interior Alaska farmers. Since 1997, Alaska has not been successful in making any more shipments to the Chinese market.

In 1998, 80,000 pounds of seed stock and 40,000 pounds of table stock were shipped to Taiwan. This stock came from Interior Alaska farms. In 1999, 60,000 pounds (1.5 containers) of seed and 80,000 pounds of table stock from the Delta Junction area were shipped to Taiwan. An issue of quality control occurred during shipment of these table stock potatoes. The table stock potatoes were washed by a farmer and not allowed to fully dry. The potatoes were placed in 50 pound cardboard boxes and by the time the potatoes had arrived in Taiwan, the cardboard was soaked, the boxes fell apart, and some of the potatoes were spoiled. In a separate arrangement, a special shipment of 1,000 pounds of baby red potatoes was air-shipped to a Taiwanese grocer for an in-store promotion campaign.

⁷⁹ Department of Commerce and Economic Development, Alaska Center for International Business, and the Small Business Development Center. "Examination of the Alaska-Taiwan Seed Potato Market" (February 20, 1996):7.

⁸⁰ Ibid.

⁸¹ Ibid.

⁸² Ibid.

⁸³ www.guidestar.org [October 15, 2001].

⁸⁴ Jim Drew, Secretary / Treasurer, Alaska Agricultural Development & Marketing, Inc., phone conversation, October 17, 2001.

No potatoes were shipped in the year 2000. Changes in political leadership in Taiwan created some instability in banking and importer channels. During this same period, the U.S. Congress was debating the extension of Most Favored Nation status to China. For these reasons, it is believed no shipments to Taiwan or China occurred in 2000.⁸⁵

AADAM continued its marketing efforts despite the 2000 season. At the time of this report, 80,000 pounds of seed potatoes from Interior Alaska and 40,000 pounds of mixed variety table stock potatoes from Palmer are being shipped to Taiwan. The table stock potatoes included red, blue, white, and peanut potatoes. These were shipped in 50 pound boxes. Five and 10 pound bags were included in the shipment so the potatoes could be re-bagged by the Taiwanese grocers. This year, 2001, was the first year that AADAM was able to manage a forward contract for the seed potatoes. It is hoped that this transaction process will be continued.⁸⁶

According to Jim Drew, an officer of AADAM, all of these table stock sales have been commercial. Seed stock sales in Taiwan and China have been made with government entities.

Totem Transport is the trucking company that collects the potatoes from the individual farmers, consolidating the load, and trucking the potatoes to the Port of Anchorage. Over the years, barge services from Mitsui, Presidential, and Sealand have been used.⁸⁷ For all but one year, the barges were routed from Anchorage to Seattle to Taiwan. In one year, the barge route was from Anchorage to Dutch Harbor to then be transshipped to a ship destined for Taiwan. Unfortunately, this routing was unsuccessful due to poor weather in Dutch Harbor. The containers were returned to Anchorage and local buyers were found for the stock.

Transportation costs from moving the potatoes from Alaska farms to Taiwan are between \$5,000 - \$5,250 per container. The trucking costs for the Alaska transport portion are roughly 40 percent of these costs.

Table 7
Alaska Agricultural Development and Marketing, Inc.
Potato Sales to Taiwan and China (1996-2001)

Year Shipped	Amount	Destination
1996	2 containers seed*	China
	660 pounds seed	Taiwan
1997	17,205 pounds seed	China
1998	2 containers seed	Taiwan
	2 containers table	Taiwan
1999	1.5 containers seed	Taiwan
	2 containers table	Taiwan
	1,000 pounds baby red table	Taiwan
2000	None	
2001	2 containers seed	Taiwan
	1 container table	Taiwan

* one container holds 40,000 pounds.

Source: Alaska Agricultural Development and Marketing, Inc.

⁸⁵ Jim Drew, Secretary/Treasurer, Alaska Agricultural Development & Marketing, Inc., phone conversation, October 17, 2001.

⁸⁶ Ibid.

⁸⁷ Ibid.

Farmers' Export Experience and Interest

Approximately half of the potato farmers interviewed have exported potatoes, with most of them having experience in exporting seed stock. An even higher percentage have had some experience in shipping to the Lower 48. Some would have been interested in exporting but feel that they were not welcome to participate in Alaska Agricultural Development and Marketing, Inc.'s (AADAM) exports or did not have enough information to feel comfortable working with AADAM. And most farmers feel they must first honor their commitments to their current markets in Alaska.

Most farmers express interest in exporting potatoes, indicating that the experience was generally positive, albeit risky. For example, after nearly ten years of sending test shipments of 20 or so seed varieties to Taiwan, a group of farmers had an order two years in advance. The farmers assumed the risk of growing potatoes, not knowing if they would pass the inspections that take place before, during, and after shipment. AADAM then sold the potatoes to Taiwan and shared any profits according to arrangements made with the farmers. There were no guarantees up front. There were also concerns expressed that farmers did not have good enough communication with AADAM to understand the needs of the Taiwan market and felt they were denied the ability to discuss these needs directly with the Taiwanese buyer.

Farmers would be inclined to export seed or table stock potatoes again but have key requirements for doing so. These requirements include:

- A developed market and infrastructure in Alaska to support the export of potatoes.
- More realistic requirements on the part of the country importing seed potatoes.
- Security in honoring their commitments to their current markets in Alaska.
- More growers participating in potato exports to share the risk.
- A mechanism to ensure that if the potatoes are not sold to the export market they do not flood the Alaska market and jeopardize farmers who have long-standing contracts with markets within the state.
- Smaller load sizes, since the 22-1/2 ton size can be challenging to fill, particularly in years with low potato yields.
- Contracts with multiple overseas markets, not just in one country, to lessen risk.
- More access to financial assistance to buy more equipment and land to increase economies and efficiencies in seed or table stock production.
- Active participation of Alaska potato farmers in developing new markets and establishing procedures for exporting seed and table stock potatoes.

Vis a vis alternative markets, Alaska potato farmers see much potential in the Pacific Rim markets. For seed potatoes in particular, farmers highlight their virtually disease-free condition and the fact that Alaska is one of the few places that can meet the standards set by countries like Taiwan. However, farmers are concerned about maintaining Alaska's isolation from disease. As one farmer explains, "Lack of diseases in Alaska make our potatoes a superior product, but it's only a matter of time before Alaska gets hit." Farmers also express concern over how to schedule the harvest in Alaska to allow for planting in the export countries. They generally see China and Taiwan as the most promising export markets, feeling that the logistics of shipping to Mexico and South America are problematic and that Russia has insufficient money to engage in importing potatoes. Some felt that with potato diseases getting more vicious in some of the major potato seed countries, Alaska could be poised to move into new markets.

Of those who have shipped to the Lower 48, they have done so when there was a sufficient price differential, and they took advantage of backhaul arrangements. Supermarket managers in the Pacific Northwest liked the Alaska potatoes because of their sweet taste, quality, and novelty, but they were frustrated because they could not offer them to their customers more consistently. The price differential is gone, and transportation costs are a major hindrance to expanding shipments to the Lower 48.

Government Support and Expanding the Potato Industry

Potato farmers offered a variety of suggestions to expand the potato industry within Alaska and to encourage exports. Some suggestions relate to the general potato industry while others apply specifically to table stock or seed stock potatoes.

Indirect Government Support

State of Alaska government efforts to support the export of Alaska's potatoes have included marketing seminars, trade show support, export assistance and advice, and promotion of Alaska's potatoes in Taiwan and China, as well as hosting buyer delegations in Alaska. Even with these efforts, farmers were most inclined to suggest that the government market Alaska potatoes more aggressively. As one farmer explained, "The state did a good job with salmon – they could do that with potatoes, too." For China and Taiwan, they feel it is important to have a knowledgeable person who can advertise the high quality of Alaska potatoes; that few, if any, chemical inputs (herbicides, pesticides, fungicides) are used; and that Alaska potatoes are farmed on relatively new lands. Having the government act as a mediator between the grower and the customer—to insure that Alaska growers are not taken advantage of and to help foreign countries set more realistic guidelines—was also seen as a key role for the government.

Better education in soil conservation education and more research into Alaska potatoes are also concerns. Areas of research include production, fertilizers, irrigation, harvest equipment, bruise control, sprout control, varieties suited to Alaska, and storage. One farmer ventured, "In order to be competitive, we'd need to increase production in the state by half as much again."

Some farmers felt Alaska should copy the same live plant requirements as California, Oregon, and Washington. “We have a beautiful market up here and we don’t want to see it ruined. Without protection, it’s just a matter of time. However, agricultural producers are in a minority and have less power compared to the supermarkets and [major retailers] and such.” Many farmers also support a more integrated testing program since they currently have to comply with two to three programs.

One other area of support may come from a recent appropriation of \$520,000 to the State of Alaska from the U.S. Department of Agriculture as part of its agricultural assistance package. The funding can be used for needs of specialty crop producers in Alaska in the areas of: (1) pest and disease prevention, control, and eradication; (2) food safety; (3) research; (4) market promotion; (5) WIC Farmers’ Markets; and (6) other areas that will put the funds to the best use to benefit agriculture in Alaska.⁸⁸

Direct Government Support

Although most potato farmers do not generally support subsidies, many feel that if our potato industry is going to be competitive with the Netherlands and Canada, it needs to be subsidized in the same way that these countries are. “The customer ultimately votes with his dollar. Talking about the pristine conditions for growing potatoes in Alaska doesn’t make a difference.” As another farmer stated, “All we have going for us is the quality and the lack of disease. From a strictly economic viewpoint, we don’t have a chance.”

In terms of market expansion, some farmers suggest that if the government would commit three years out to buy a crop it would work. They felt the government would not have to sustain this level of support for long.

Farmers also suggested financial assistance with buying land, storage, and equipment.

Transportation/Equipment Costs

Although not specifically given as suggestions for government involvement, farmers felt that in order for the export markets to increase (particularly to the Lower 48), farmers needed better backhaul arrangements to ship to Lower 48. Also, coming up with ways to get supplies at the same price as farmers in the Northwest was a consideration.

Seed Potato Production Expansion

Most farmers see the Delta Junction area as the more likely place of seed potato industry expansion, saying that Matanuska is more suited to table stock, with a longer growing season and better access to markets. Matanuska also produces larger potatoes, with table stock having the ideal size of 8 ounces. Delta Junction has more available land and better isolation and produces smaller potatoes than Matanuska, ideal for seed potatoes that should be less than 8 ounces.

⁸⁸ Letter to Governor Knowles from U.S.D.A. Secretary Ann Veneman, faxed copy dated August 28, 2001.

Import restrictions on seed potatoes and other plants that can carry potato diseases, similar to those in California are also popular suggestions. Some farmers even go so far as to suggest stopping importation of seed stock, particularly from Canada, to stimulate the local market and cut down on chances for disease. Having more quality control and assurances during inspection phase of seed certification and more stringent rules on what can be bought and sold are also concerns.

Table Stock Potato Production Expansion

Most farmers feel that the table stock market in Alaska is saturated. They see little room for expansion within Alaska. Some explain that local supermarkets have been bought out by nationwide chains that prefer to use their own produce arrangements with suppliers in the Lower 48 rather than encourage selling local Alaskan produce. Moreover, the job position at the Northern Region office of Division of Agriculture to encourage markets within Alaska to sell Alaskan produce has only recently been filled after a long and difficult search for a licensed and qualified candidate. Making sure that farmers adhere to the same level of quality and standards in packaging was also mentioned.

Possibilities for expanding within Alaska include increasing sales to restaurants and institutional settings and developing a potato processing industry in potato chips or hash browns. One farmer suggested producing an Alaska potpie with all Alaska vegetables and meat. Encouraging potato processing would likely require government financial support, farmers believe. One farmer estimated that it would be a \$10-\$20 million commitment from the government to get an experienced processor to come up to Alaska and start a plant. A processor would likely expect support until the product could stand on its own.

SECTION IV: ALASKA STORAGE FACILITY ASSESSMENT

Potato storage is a vital component in potentially expanding Alaska's potato industry. The breadth and depth of research in this area is impressive, covering such topics as the pathology of potato diseases, climate considerations throughout the storage process, storage architecture, economics of storage, innovations in ventilation and climate control equipment and many others. An exhaustive discussion of these topics is beyond the scope of this project; however, an overview is necessary to provide the basis for addressing the components of the potato storage assessment, as follows:

- Alaska's Current Storage Facility Profile
- Storage Facility Components and Requirements
- Construction Cost (Capital) Estimates
- Storage Operating Cost and Revenue Estimates
- Current and Potential Demand for Potato Storage
- Site Selection Considerations
- Ownership and Management Scenarios
- Storage Facility Financial Assistance

Alaska's Current Storage Facility Profile

Alaska potato farmers use a variety of structures to store their potatoes. Of those interviewed, potato storage buildings range from 320 sq. ft. in size to structures 12,000 sq. ft. in size with 6,400 sq. ft. of cold storage. Of those who provided descriptions in terms of capacity, facilities range from 15 to 1,000 tons. "Potato storage" clearly can mean different things to different farmers. Some denote just the area for cold storage; others include the washer area and packing area, and still others include areas for equipment storage and maintenance.

Nearly all farmers own the storage facilities that they use and have facilities located on their property. In by far the majority of cases, most farmers do not share their storage facilities with other farmers. Potato farmers do not store their potatoes with other vegetables, and if they do, it is done only on a very limited basis. Most farmers maintain an inventory of potatoes from 10 months each year to year-round.

Approximately half of the potato farmers interviewed feel that they need more storage—or better storage. Some would ultimately like an additional area to keep seed more separate and have more room in which to maneuver. Others are hoping to add a washroom and improve ventilation and temperature regulation. Those who see possibilities for additional markets are inclined to want to expand their own storage capabilities, and some have even built their storage so that it would be easy to expand, if needed.

Potato farmers view the possibility of having one or two centralized storage facilities in Alaska with some interest, although their interest is more general rather than related to their own personal situation. Some feel that the only way it would work is if it were run as a cooperative or as a wholesaler. Others are somewhat more skeptical, recalling times in the past when it was tried or when grants for such a facility were not funded. One simply said, "It's hard to get more than two farmers to agree to anything." Some feel that farmers would need to buy more trucks and equipment to get the potatoes to a centralized facility, particularly given Alaska's short harvest time. Others have concerns about managing disease spread, particularly of airborne diseases. Not surprisingly, farmers are somewhat divided between recommending Tanana Valley and the Matanuska Valley as a location. Most felt that the facility should be located close to the market or to shipping.

Storage Facility Components and Requirements

The main objective in potato storage is preserving the quality and quantity of potatoes put into storage through minimizing weight loss, quality loss, and loss due to spoilage.⁸⁹ Potatoes generally shrink 2 percent the first month, 0.5 percent for the second and third months in storage, and 1 percent for each month after that. For a 10-month storage season, shrinkage can be 10-15 percent.⁹⁰ It is generally agreed that for every percent in weight loss, a percent in quality is lost as well.

Biological Factors

Managing this quantity and quality loss involves managing a variety of biological factors:⁹¹

Respiration: Potatoes are living organisms, and as they release CO₂ through respiration (akin to breathing) they release heat that has to be managed. Respiration also contributes to shrinkage.

Transpiration: Potatoes release water through evaporation, particularly shortly after harvest, contributing to shrinkage.

Sprouting: Potatoes usually become dormant for two to three months after harvest; however, improper storage conditions can cause sprouting.

Physical Damage: Through the process of harvest and transportation to storage, some potatoes are injured. Wound healing and curing (the formation of a waxy protective coating) can be facilitated by proper storage.

Greening: High temperatures and excessive light exposure can cause green tissue to form.

Disease: Potatoes are susceptible to such fungal diseases as blight, black dot, and dry rot; and such bacterial diseases as ring rot and soft rot.

⁸⁹ Bob Hesse, "Storage for the New Millenium, Part 3," *Spudman* (January 2000): 24-25. <http://www.spudman.com/pages/issue00vol7storagepart3html>. [September 21, 2001].

⁹⁰ Joseph Guenther, University of Idaho, phone conversation, October 2001.

⁹¹ Joseph F. Guenther, "Fresh Potato Handling and Storage Guidelines," University of Idaho, nd.

Climate Factors

The relationship between temperature and humidity influences these biological factors throughout the storage process. These elements – temperature and humidity – are intricately related and make for a system that must be finely tuned to ensure optimum potato storage. Higher temperatures—necessary at the beginning of the storage process—mean increased respiration rates and increased shrinkage. Humidification necessitates proper ventilation to ensure that condensation does not form, which can cause disease in the potato. Ventilation is also needed to ensure that oxygen levels remain high throughout the potatoes in storage to ensure that cells within the tuber do not die and black heart does not form.⁹² However, ventilation should be intermittent, as weight loss is proportional to the amount of time ventilation occurs, rather than the rate of ventilation. Moreover, inadequate humidification means that water moves from the potato to the air, causing excessive shrinkage. Potato storage requires daily vigilant and educated monitoring of air temperature, plenum temperature (within the mass of potatoes) both at the top and at the bottom of the pile, and humidity.

Storage Stages

The storage process generally involves four stages. There are various nuances to these stages (depending whether the potato is to be used for table stock, processing, or seed); however, they can be summarized as follows:⁹³

Curing and Wound Healing: Potatoes need to be maintained at a temperature between 50 and 60 degrees and 95 percent or higher humidity for approximately 10-14 days. During this time, suberization takes place, where deposits of suberin (a waxy-like substance) form on the skin of the potato to protect it, minimize weight and quality loss, and lessen the chances of disease.⁹⁴

Final Holding: Temperatures should be between 38 and 40 degrees and 90 to 95 percent humidity.

Moving Potatoes out of Storage: Potato temperature should be raised to 45 degrees or higher to lessen chances of wounding.⁹⁵

Maintenance and Sanitization of Storage Facility: Checking and repairing equipment and disinfecting the facility to prevent build-up of disease organisms are necessary for optimum storage.⁹⁶

⁹² Alberta Agriculture, Food, and Rural Development. "Potato Storage and Handling." <http://www.agric.gov.ab.ca/agdex/potato/storage.html>. (September 21, 2001).

⁹³ "Storage and Processing," Oregon State University, Crop and Soil Science, nd. <http://www.css.orst.edu/potatoes/storproc.html>. (September 21, 2001).

⁹⁴ Bob Hesse, "Storage for the New Millennium, Part 3," *Spudman* (January 2000): 24-25. <http://www.spudman.com/pages/issue00vol7storagepart3.html>. (September 21, 2001).

⁹⁵ Joseph F. Guenther, "Fresh Potato Handling and Storage Guidelines," University of Idaho, nd.

⁹⁶ Alberta Agriculture, Food, and Rural Development. "Potato Storage and Handling." <http://www.agric.gov.ab.ca/agdex/potato/storage.html>. (September 21, 2001).

Structure and Equipment of Storage Facility

There are many different types of potato storage facilities and many variations in the equipment used to operate them; however, the two primary elements are the system and the structure.⁹⁷ The system consists of the fanhouse that provides humidification, refrigeration, and air distribution. The structure is usually made of steel with a double-bay center-plenum arrangement and 50- to 60-foot wide bays and is expected to facilitate loading, uniformly distribute system supply air, and minimize heat loss/heat gain, and control condensation.⁹⁸

Within the system portion, ventilation, humidification, and refrigeration elements work in concert. The humidifier is usually placed in the plenum chamber, downwind from the circulation fan.⁹⁹ Refrigeration coils are usually placed in front of the fans to allow fresh air or return air to be refrigerated.¹⁰⁰

The structure itself should ideally have a well-designed concrete underfloor for optimum air distribution, humidification, and reduced condensation. The insulation must be such that it can withstand the stresses of excessive humidification so that its thermal resistance is maintained. This can be done by inserting a cavity to isolate the primary exterior storage structure from the storage environment.¹⁰¹

Construction Cost (Capital) Estimates

Potato storage facility costs are calculated to include both the structure itself and all necessary mechanical equipment, excluding land purchase and site preparation. In the Lower 48, construction costs for a basic potato storage facility range from about \$60 to \$100 dollars per ton.¹⁰² However, Alaska construction costs are estimated to be about 1.5 those in the northern United States, or about \$90 to \$180 dollars per ton.¹⁰³ Once all turn-key costs are accounted, including mechanical system installations, the prices can be even as high as \$360 per ton for a 1,000 ton facility. As overall capacity increases, the per unit costs lessen. For example, Table 6 shows construction budget information for 1,000, 2,000, and 5,000 ton facilities. Suberizer, a renowned potato storage facility construction company, provided the following budgets.

⁹⁷ Bob Hesse, "Storage for the New Millennium, Part 3," *Spudman* (January 2000): 24-25. <http://www.spudman.com/pages/issue00vol7storagepart3html>. (September 21, 2001).

⁹⁸ *Ibid.*

⁹⁹ "Storage and Processing," Oregon State University, Crop and Soil Science, nd. <http://www.css.orst.edu/potatoes/storproc.html>. (September 21, 2001).

¹⁰⁰ Bob Hesse, "Storage for the New Millennium, Part 3," *Spudman* (January 2000): 24-25. <http://www.spudman.com/pages/issue00vol7storagepart3html>. (September 21, 2001).

¹⁰¹ *Ibid.*

¹⁰² Gail Kleinkopf, research professor and superintendent of the University of Idaho Kimberly Research and Extension Center, email correspondence, October 22, 2001, and Duane Preston, professor and area extension agent, University of Minnesota/North Dakota State University, email correspondence, October 22, 2001.

¹⁰³ Tony Yoruba, Architect, Jenson, Yoruba, and Lott, Inc., phone conversation, October 23, 2001.

Table 8
Estimated Capital Costs for
Potato Storage Facilities in Washington State

Storage Description	Size	Suberizer Kit Price*	Per Ton Cost	Budget Cost Suberizer Turn-key**	Per Ton Cost
Suberizer 1,000-ton Two Bay Storage	60' wide x 72' long	\$293,584	\$294	\$360,190	\$360
Suberizer 2,000 –ton Two-Bay Storage	60' wide x 136' long	359,682	180	435,280	218
Suberizer 5,000-ton Double-Bay Storage	132' wide x 144' long	422,814	85	557,890	112

*Includes structure, primary insulation, and complete mechanical systems. Does not include concrete, erection costs, electrical, and equipment rentals. F.O.B. Pasco, Washington.

** Budget number for complete "turn-key" cost, constructed in Washington State.

Source: Suberizer, fax correspondence (October 1, 2001).

To further illustrate the equipment costs of potato storage facilities, the following example, provided by agricultural economists at the University of Idaho calculates construction and equipment costs based on 1999 pricing, for a 4,250 ton seed storage facility in Idaho.

Table 9
Storage Construction and Equipment Costs for
4,250 Ton Storage Facility in Idaho, 1999

	Cost (\$)	Total Cost (\$)
Total Storage Facility Construction Cost		\$195,500
Equipment		
Air System w/Humidicel	\$57,750	
One Piler	36,525	
One Eliminator-Sizer	47,875	
One Dirt Bin w/Conveyer	21,800	
One Telescoping Conveyer 30"x65'	18,725	
Six Fixed Conveyers 30"x30'	40,170	
Scooper: 30"	25,725	
Equipment Total		248,570
Total Cost		440,070
Cost per cwt.		5.18
Cost per Ton		103.55

Source: Idaho Falls Research Center

Storage Operating Cost and Revenue Estimates

Potato storage costs fall into two categories: ownership costs (depreciation, insurance, repairs, taxes, and interest) and operating costs (labor, utilities, chemicals, and shrinkage).¹⁰⁴ Operating costs in the northern U.S. are reported to be about \$10 to \$12 per ton, with most of the cost in electricity.¹⁰⁵ Cost per kilowatt hour in Interior and Southcentral Alaska (Fairbanks, Delta, Wasilla and Anchorage) averages about 1.7 times that of Idaho. Thus, operating costs would be expected to range from about \$17 to \$20 per ton. As with construction costs, economies of scale would also indicate that larger facilities would have lower operating costs.

Table 10
Estimated Annual Operating Costs for Various Storage Capacity

Storage Facility Capacity (ton)	Operating Costs (\$)
1,000	\$17,000-\$20,000
2,000	34,000-40,000
5,000	85,000-100,000
10,000	170,000-200,000

Sources: Idaho Public Utilities Web site; Regulatory Commission of Alaska 2000 Annual Report; Gale E. Kleinkopf, Research Professor, Superintendent, Kimberly Research and Extension Center, University of Idaho; Duane Preston, Professor of Horticulture Science, University of Minnesota; Tony Yoruba, Jensen, Yoruba, and Lott, Inc., Juneau.

In agricultural economics, when calculating the relationship between storage costs and revenue, it is important to consider the market price for potatoes when they go into storage, the amount of shrinkage while they are in storage, and the market price when they are removed from storage. In the following example, at the time of harvest, the breakeven cost is \$100 per ton. However, if the potatoes are stored for six months, factors such as storage rent, interest, shrinkage and other expenses will drive the breakeven price to \$127 per ton. If the grower receives a price of more than \$127 per ton, or \$6.36 per hundredweight, the storage enterprise is profitable. Shrinkage is the greatest cost in storage.¹⁰⁶

Table 11
Example of Potato Storage Costs for 3,000 tons
(60,000 hundredweight (cwt.)) for Six Months

Cost Factors	Estimated Costs (\$)
Open Market Price for Potatoes (\$100/ton or \$5/cwt.)	\$300,000
Rent (\$5.00/ton)	15,000
Interest (6 percent annual percentage rate)	9,000
Shrinkage (7 percent)	21,000
Other Operating Expenses (labor, chemicals, utilities)	10,000
Total	355,000
Cost per ton	127.20
Cost per cwt.	6.36

Source: Joseph F. Guenther, "Economics of Potato Storage," *American Potato Journal*, vol. 72, 1995.

¹⁰⁴ Joseph F. Guenther, "Economics of Potato Storage," *American Potato Journal* 72 (1995): 494-502.

¹⁰⁵ Gail Kleinkopf, research professor and superintendent of the University of Idaho Kimberly Research and Extension Center, email correspondence, October 22, 2001, and Duane Preston, professor and area extension agent, University of Minnesota/North Dakota State University, email correspondence, October 22, 2001.

¹⁰⁶ Joseph F. Guenther, "Economics of Potato Storage," *American Potato Journal* 72 (1995): 494-502.

Current and Potential Demand for Potato Storage

It must be noted that nearly all farmers expressed interest in increasing table stock and/or seed stock production. If reliable markets were to open up, most farmers indicated that they would increase production. In this case, current storage facilities would not be able to meet storage needs.

Nearly all potato storage facilities in Alaska are owned by the farmers who use them, and there does not appear to be immediate demand for additional storage. Although half of the potato farmers interviewed expressed the need for more and/or better storage, the need does not appear to be strong or persistent, given their current farming operations. The high yields of this year are stretching some farmers' storage capacities, but in general, most farmers appear to be able to handle their crop yields. Most farmers are interested in improving their facility with better ventilation and temperature regulation and more area for equipment storage.

Site Selection Considerations

Centralized storage facilities can either be located close to production areas or to markets. Locating facilities close to production areas minimizes the challenge of transporting the produce during the harvest period, which is especially short in Alaska. For the farmers, it is easier to deliver out of storage to major markets than for farmers to deliver during the harvest period over long distances.¹⁰⁷ However, locating facilities close to transportation hubs and population centers makes for immediate and better availability of labor, power, roads, and distribution networks.¹⁰⁸ In this case, the quality of transportation equipment and trucks is even more important to ensure that the produce is not lost due to freezing or other damage.

Within the Delta Junction area, which shows the most potential for expansion, given land availability to convert to seed potato production, it would be possible to locate a centralized storage facility accessible to all the farmers in the area, at not too great a distance for any one farmer. Farmers would likely need to buy additional trucks, or a trucking company would need to be contracted to pick up the potatoes at the production areas and deliver them to the storage facility. Two centralized agricultural facilities already operate in the area: a grain and fertilizer storage facility on Hanson Road, two miles off of the Alaska Highway and a USDA certified slaughter facility eight miles east of Delta Junction on the Alaska Highway.¹⁰⁹

¹⁰⁷ Gail Kleinkopf, research professor and superintendent of the University of Idaho Kimberly Research and Extension Center, email correspondence, October 22, 2001, and Duane Preston, professor and area extension agent, University of Minnesota/North Dakota State University, email correspondence, October 22, 2001.

¹⁰⁸ Duane Preston, professor and area extension agent, University of Minnesota/North Dakota State University, email correspondence, October 22, 2001.

¹⁰⁹ Phil Kaspari, Land Resources Agent, Alaska Department of Natural Resources, Division of Agriculture, phone conversation, October 17, 2001.

Ownership and Management Scenarios

A centralized storage facility would be a significant change in how potato business is conducted in Alaska. Currently, farmers deal directly with their markets—whether they are markets for seed or table stock. A centralized storage facility—regardless of its ownership structure—would introduce an intermediary into that process. Managing that additional relationship would take careful consideration.

Centralized storage is a concept that holds some appeal to potato farmers; however, at this point, interest seems mild and generalized rather than related to their own personal needs. Given the challenges of site selection, described above, a potential alternative to centralized storage could be to offer loans or funding to farmers to increase the size of their own storage facilities. This could alleviate the problems of having to either buy additional trucks or contract with a trucking operation to transport the potatoes to a centralized facility.

If a storage facility were to be built, there are several management options that could be considered. These management options include sole proprietorship, corporation, cooperative or association, and private/public joint management. These different options relate not only to facility management but also to the marketing of Alaska's potato products. Simply put, developing a centralized storage facility should only be undertaken if it enhances the marketability of Alaska's potatoes.

Sole proprietorships

A sole proprietorship can be formed to build or expand existing storage facilities. Under this management option, the storage facility is owned entirely by one person, although the owner may have employees. According to an Agricultural Revolving Loan Fund official, Alaska potato farms mainly operate as sole proprietorships. Most potato storage facilities in Alaska are considered an asset of the individual farm. The chief advantage of this management system is the relative ease with which the business can be started, and the independence to operate the business as the owner sees fit. On the negative side, the sole proprietor is liable for injury caused by its product and is financially exposed if debts mount with suppliers and lenders. Suppliers and lenders can attach personal assets, such as equipment and facilities, in order to assure payment. In addition, if the business fails, the farmer is personally liable for paying off the business's debts, even if it means filing for personal bankruptcy. Furthermore, the availability of the farmer's own savings, business income and assets, and the leveraging power of these assets to secure loans may limit the level of capital investment.

If the sole proprietor wants to provide space to other farmers, he can rent out storage space and provide other services (such as trucking) under a contractual relationship. This would be one of the least cumbersome means of management, but would also expose the farmer to a maximum amount of financial risk.

Corporations

Corporations are businesses owned by a group of stockholders. Unlike a sole proprietorship or partnership, corporate shareholders enjoy limited liability. For example, if a shareholder invests \$5,000 into the corporation and it eventually fails, he has lost no more than the amount invested (\$5,000). Corporations can provide for larger pools of capital for production and marketing, permanence of the enterprise (they are not affected by the death of shareholders or directors), efficient management, and protection from legal matters. Disadvantages include “double taxation” (taxation of both the corporation profits and distributions to shareholders), incorporation expenses, and lack of personal interest. A profit corporation is privately owned and operated to make profits for its shareholders. A nonprofit corporation is similar to a profit corporation in structure, but any income realized by the corporation is used to further the purposes of the corporation and is not paid to shareholders. It also offers tax advantages. Alaska Agricultural Development and Marketing, Inc. is an example of how a nonprofit organization can be established to assist in foreign market development.¹¹⁰

Cooperatives and Associations

Cooperatives are corporation-like organizations owned by user members of the group. Unlike a corporation, a cooperative is owned and financed only by its user-members. In addition, differences exist in voting rights, limitations on the amount of stock that may be owned by a single member, and dividend and interest payments. Through pooling and marketing of their products, a cooperative can offer large-volume sales to large-demand customers whose demand could not be met by an individual producer. Members also can enjoy other benefits from pooling their resources, such as lower group insurance costs and bulk supply purchases. Under a cooperative arrangement, members could finance a storage facility. This arrangement could also be expanded to include the market development of seed and table stock potatoes in the state, domestically and internationally.

A cooperative could particularly benefit smaller potato farmers who wish to direct sell in Anchorage or Fairbanks but are impeded by high capital costs for trucks and equipment. By pooling their harvest, they could provide the larger volumes required for supermarket chain sales, provide cost efficiencies for transport equipment, and have greater assurance in being able to sell their product.

Even with a cooperative, expanding markets outside of Alaska or to areas of Alaska outside of the Railbelt proves difficult. For example, David Kensinger of Chelan Produce in Petersburg has bought produce in Washington State and sold it in Southeast Alaska for about 20 years. He has not brokered Mat-Su or Interior potatoes because costs by barge or air are too great.

The Alaska Farmers Union, the state branch of the National Farmers Union, is a potential focal point for forming a marketing association or cooperative, as it assists farmers in farm product development and promotion. According to President Vicki Trytten and her husband Craig Trytten, distance and training are the primary inhibitors to Alaska agricultural cooperatives. Just getting people to meetings can be a hurdle. Furthermore, a cooperative needs to have a specific mission when it is established, and members need training in the legal operation of a cooperative and the responsibilities and duties of board members. Due to the diversity of agriculture

¹¹⁰ Originally, formed as a nonprofit 501(c)3 corporation, AADAM converted to a public foundation in the year 2000.

operations and large distances between farmers, the Tryttens feel that for now, small local cooperatives operating for one or a few commodities are most appropriate. A central building built by a local cooperative could serve as a storage facility, a brokerage staging area, and as a retail outlet for products.

Some cooperatives have succeeded in marketing Alaska products, while others have failed, as shown in the following examples.

Seafood Producers Cooperative

The Seafood Producers Cooperative (SPC) is perhaps the most successful commodity cooperative in Alaska. Established in 1944, SPC has withstood the fluctuations in fish stock abundance, marketplace changes, and increasing competition from aquaculture. Most other seafood cooperatives established around the state (Ketchikan, Cordova, Bristol Bay) were short-lived. According to SPC executives, several factors have ensured its long-term stability. First, members make a significant financial and emotional commitment to the cooperative. SPC membership consists of a core group of about 200 fishing boats. Members must pay \$15,000 to join, usually over 5 to 10 years, and are required to deliver a minimum volume each year. When a member leaves the cooperative, he is refunded the money, but over the same time period as it was paid in, thereby discouraging a “take the money and run” mentality during poor years. SPC also maintains quality standards above most other companies, giving their product an identity in the world marketplace. Finally, SPC has enough product volume to provide the cooperative some economy-of-scale savings in storage, marketing, and transportation.

According to SPC executives, other cooperatives have failed because members were not financially committed to the organization for the long term, and because the cooperative’s products could not capture enough of the market to create a product identity. Others also failed because they tried to compete for membership by paying fishermen upfront the market price of cash buyers and then lost money re-selling the fish later. SPC pays only 70 percent of market price when fishermen sell their catch, and then makes two subsequent payments to the fishermen over the course of the year. This protects the company from paying too much for their catch, and provides adequate cash flow. In most years though, SPC ends up paying its members more than the cash buyer price. SPC has created a trust between fishermen and processor rarely seen elsewhere in the state.

Smaller-scale cooperatives with limited product volumes could work for a niche market, according to one SPC executive. A group of fishermen, led by Bruce Gore, markets high-quality frozen-at-sea salmon under strict quality guidelines. Although not a cooperative in the legal sense, this group has successfully marketed their catch to upscale buyers for many years.

Other Alaska Farming and Food Product Cooperatives

One quasi-cooperative of potato farmers currently exists in the Matanuska Valley. The Matanuska Valley Potato Growers (MVPG), formed in 1970, is operated by Robert Boyd and his son. Although not a cooperative *per se*, it operates as one, distributing business profits to the growers. It was formed because competition from individual farmers was driving down prices, and selling as a group helped to stabilize prices. Concerns about saturated local markets may affect the long-term viability of MVPG, according to Mr. Boyd.

Other agricultural cooperatives have had mixed success in Alaska. The Matanuska Maid cooperative in Palmer was operational from the 1940s until its bankruptcy in 1983. The Alaska Farmers Cooperative in Delta also went bankrupt and both Matanuska Maid and the Farmers Cooperative are now operated by the state. According to an Alaska Revolving Loan Fund loan officer, these cooperatives did not perform financially and were unable to operate a positive cash flow. The high costs of farming in Alaska, particularly in dairy and livestock, make it difficult for Alaska farmers to compete, since these same items can be shipped from Seattle cheaper than they can be grown in-state. While still difficult, Alaska produce farmers may have a relatively easier time competing with outside markets.

Some groups are at the beginning stages of exploring cooperative management to market their products, including a group of alternative livestock producers (e.g., elk, reindeer, bison). Organizer Delbert Simineo reports that the biggest obstacles to forming a market cooperative at this time are the distances between members for holding meetings (Kodiak to Delta), and the different product forms producers have to market -- from elk antlers to bison meat.

A group of wild berry producers located in Interior/Southcentral Alaska are also contemplating a cooperative association. According to Vicki Talbot, one of its members, the focus would be primarily on small businesses that make products from wild berries and to represent association members at trade shows. Once the association is in place, a central facility might be built under the auspices of the association. This facility would clean, glaze with ice, and store berries in a freezer facility. The berries would then be available year-round for value-added processing by association members.

Public/private partnerships

Public and private partnerships provide another option for businesses. Publicly owned and operated storage facilities that allow farmers to lease space would provide a central staging area for moving the product to market. Farmers who would otherwise be unwilling to increase crop production due to storage costs could do so knowing they would be able to lease affordable storage space. Examples of these include the state-owned Matanuska Maid milk processing plant in Palmer, and the grain storage facility in Delta. Both of these operations were originally cooperatives that went bankrupt, with ownership reverting to the state.

Public/private partnerships, such as the Alaska Seafood Marketing Institute (ASMI), can also be formed for marketing purposes. ASMI operates through the State of Alaska and is funded through salmon processor and landing taxes, federal grants, and other sources. It manages three distinct marketing programs: export, foodservice and retail. All three programs are designed to enhance the appeal and popularity of Alaska seafood. The export program operates in the European Union, Australia, China, Japan, and Taiwan, while the retail and foodservice programs focus their activities on the U.S. The State of Washington has a similar program for its apple growers.

While potato farmers could consider forming a marketing association based on the ASMI model, there are some disadvantages associated with this model. According to an ASMI executive, federal funding for marketing programs is being divided among an increasing number of users; some grants require matching funding and can only be used for specific purposes; and the paperwork for obtaining and administering federal grants can be enormous. Support from state coffers is also tenuous. ASMI was funded partially by general fund state dollars until 1997, when

the Legislature cut ASMI's appropriation. Even the funds collected by the state from the 1 percent tax go into the state's general fund. ASMI has to watchdog the funds through the legislative process annually to be sure they receive the ASMI tax, and some money from the tax goes to the state for administration expenses.

An agriculture marketing association might look to the state or federal government for seed money to start the organization, and then form a marketing cooperative funded primarily by the membership. This would provide the organization with autonomy to pursue its agenda according to membership direction, and not according to requirements of federal or state funding. Governmental grants could be pursued for specific projects without tying the organization's existence or direction to continued funding.

Storage Facility Financial Assistance

Farmers usually need financial assistance to either build or expand their storage facilities or support a marketing program. The programs below are not an exhaustive list but do provide some suggestions on where to find financial assistance.

U.S. Department of Agriculture

The U.S. Department of Agriculture (USDA) provides multiple services for rural enterprises. The Cooperative Services program of USDA's Rural Business-Cooperative Service (RBS) helps rural residents form new cooperative businesses and improve existing cooperatives. RBS provides financing to rural business owners, nonprofit organizations, cooperatives, public bodies, and Indian tribes for business ventures. RBS' Business and Industry (B&I) program creates partnerships with commercial lending institutions, the Farm Credit System and Farmer Mac to provide financing for qualified rural business enterprises, including cooperatives. This often takes the form of loan guarantees that bolster existing private credit structures in funding projects that foster lasting community benefits. The Rural Enterprise Grant program provides grants to public bodies and private, nonprofit organizations serving rural areas. These grants can finance small and emerging private businesses and cooperatives, or fund a revolving loan program. The Rural Technology and Cooperative Development Center Grant Program provides grants to public bodies and private, nonprofit organizations serving rural areas. Grants may be made for establishing and operating a center for rural technology or cooperative development.

The Farm Services Agency (FSA) is a federal lending agency under USDA. The FSA is a "lender of last resort", extending loans only to farmers who have been denied credit in the private sector. FSA lending is geared toward small family farms, with loans for storage facilities popular in Alaska. The FSA currently has a potato storage facility in Delta as part of its \$10 million state portfolio.

Alaska Department of Natural Resources

Under the state's Department of Natural Resources, the Alaska Division of Agriculture administers the Agricultural Revolving Loan Fund (ARLF). Loans of up to \$1 million are available to finance the start-up or operation of a farm (except for land purchase). As it stands now, the Fund cannot be used to fund new or expansion of storage facilities. However, the Board of ARLF is currently reviewing its regulations to see if it can fund this type of expenditure in the future. ARLF loans about \$2 to \$3 million annually, with a \$30 million portfolio. The ARLF receives no state funding for its operation.

Private, Nonprofit Corporations

The Alaska Rural Rehabilitation Corporation is a nonprofit corporation that extends loans to farmers through a revolving loan program to improve agriculture in the state. Founded in 1935, the corporation is headed by a board of directors that considers loan approvals. All loans are from a revolving loan fund, and lending is therefore conservative in nature. A total of up to about \$1 million is loaned annually.

Private, For-Profit Corporations

Some lending in the state is made through private banks. For example, the Wells Fargo branch in Delta Junction has extended loans to farmers. According to a Wells Fargo loan officer, most loans are for working capital (seed and fertilizer) and equipment.

Technical Advisory Group

- Alaska Department of Community and Economic Development, Division of Community and Business Development
 - Peter Freer, Acting Deputy Director (Juneau)
- Alaska Department of Community and Economic Development, Division of International Trade and Market Development
 - Patricia Eckert, Trade Specialist (Anchorage)
 - Greg Wolf, Director (Anchorage)
- Alaska Department of Natural Resources, Division of Agriculture
 - Robert Wells, Director (Palmer)
- U.S. Department of Agriculture
 - Chad Padgett, Director, Farm Service Agency (Palmer)
 - Dean Stewart, Manager, Guaranteed Loan Unit, Rural Development (Palmer)

Alaska Potato Producers

- Matanuska Valley Region
 - Jay Dearborn (Palmer)
 - Paul A. Huppert, Butte Farms (Palmer)
 - Keith Moore (Wasilla)
 - Robert Nelson (Wasilla)
 - Ted Pyrah, Pyrah's Pioneer Peak Farm (Palmer)
 - Ben VanderWeele, VanderWeele Farms (Palmer)
- Tanana Valley Region
 - Charles Andrews, Coldspot Farm (Delta Junction)
 - Frank Boreman (Delta Junction)
 - Lyall Brasier, Braisier Farms (Delta Junction)
 - Sven Ebbesson (Delta Junction)
 - Dan Green, My Father's Farm (North Pole)

Industry, University, and Government Representatives

- Alaska Agricultural Development and Marketing, Inc.
 - Dr. Jim Drew (Fairbanks)
 - Dr. Jenifer McBeath (Fairbanks)
 - Harold Worthen (North Pole)
- Alaska Alternative Livestock Group
 - Delbert Simineo (Palmer)
- Alaska Cooperative Extension Service
 - Phil Kaspari, Land Resources Agent (Delta Junction)
- Alaska Department of Community and Economic Development, Division of International Trade and Market Development
 - Ida Yao, Alaska State Representative, Taiwan Office, (Taipei, Taiwan)
- Alaska Department of Natural Resources, Division of Agriculture.
 - Bill Campbell, Alaska Plant Materials Center (Palmer)
 - Candy Easley, Loan Officer, Agricultural Revolving Loan Fund Program (Palmer)
 - Doug Warner, Developmental Specialist (Palmer)
- Alaska Farmers Union
 - Vicki Trytten, President (Wasilla)
- Alaska Rural Rehabilitation Corporation
 - Jackie DeYoung (Palmer)
- Alaska Seafood Marketing Institute
 - Laura Fleming (Juneau)
- Berry Cooperative
 - Vickie Talbot (Talkeetna)
- Chelan Produce
 - David Kensinger (Petersburg)
- Matanuska Valley Potato Growers
 - Robert Boyd (Palmer)
- Seafood Producers Cooperative
 - Barry Lester (Sitka)
 - Craig Shumacher (Sitka)

- Suberizer, Inc.
 - Bob Hesse, Director of Research and Development (Bellevue, Washington)
- Triad Fisheries
 - Bruce Gore (Seattle, Washington)
- University of Alaska Fairbanks
 - Donald Carling, Professor of Plant Pathology, Agriculture and Forestry Research Center (Palmer)
- University of Idaho
 - Dr. Joe Guenthner, Extension Economist (Moscow, Idaho)
 - Dr. Gale Kleinkopf, Research Professor and Superintendent, Kimberly Research and Extension Center (Kimberly, Idaho)
 - Phil Nolte, Extension Seed Potato Specialist (Moscow, Idaho)
 - Dr. Nora Olsen, Extension Potato Specialist (Moscow, Idaho)
 - Paul Patterson, Agricultural Economist, Idaho Falls Research Center (Idaho Falls, Idaho)
- University of Minnesota
 - Prof. Duane Preston, Professor and Area Extension Agent (Grand Forks, Minnesota)
- U.S. Department of Agriculture
 - Lynn Alfalla, China Trade Policy Specialist, Foreign Agriculture Service (Washington, DC)
 - Suzan Benz, Agricultural Statistician, Alaska Agricultural Statistics Service (Palmer)
 - Daniel Chan, Trade Policy Specialist, Foreign Agriculture Service (Beijing, China)
 - Anne Dawson, Trade Policy Specialist, Foreign Agriculture Service (Washington, DC)
 - Robert Tse, Senior Policy Advisor, Foreign Agriculture Service (Washington, DC)
- U.S. Trade Representative's Office
 - Christina Lund, China Market Specialist (Washington, DC)
- Wells Fargo Bank, Loan Officer (Delta Junction)