Prospectus 2007

Siwa Farms

State of proposal per May 18, 2008:
Draft text prepared by US kenaf expert Dr. Ralph Berenger for discussions in Egypt that resulted in much interest but no readiness to invest. This text was also discussed with experts from Wageningen University who commented that this project is feasibly IF started on the right scale with sufficient investment. The current available land of 220 feddans is certainly too small. Landowners in the area have shown interest but no one wants to initiate investments. They first want to see it is feasible before joining in. It was discussed at the Dutch Embassy in Cairo for potential PSOM support but since there is insufficient investment coming from Egypt and there is no Dutch partner these discussions were halted.

Introduction

The purpose of this prospectus is to introduce the opportunity of growing Kenaf in Egypt to potential funding organizations and individuals interested in rural development projects that could improve lives and economies in rural Egypt that are beneficial to the environment, enhance international commerce and relations, and that have a potential to create profitable revenue streams for Egyptian agriculturalists that replace traditional crops.

The authors of this report are currently seeking strategic partners to create a company we call Siwa Farms that could further process raw material produced on the farm for commercial uses, and assist the company in qualifying for grants from international organizations.

Siwa Farms is seeking funders who see the financial, environmental and social benefits of manufacturing, retailing and wholesaling of products containing cellulose and natural fibers in recently opened desert land near the historic city of Siwa.

Siwa Farms is seeking an immediate infusion of capital for equipment and operations for the first year. Under the proposed business plan, $850,000 would be required for 2008-2010 for capital improvements such as irrigation systems, wells, farm vehicles, equipment, and construction of various sheds and power houses, and a processing/office facility on the farm site. An additional sum of $300,000 for working capital over the same period would be covered by in-kind contributions by the company founding partners, short-term loans, grants from donor agencies, and commodity contracts. Operating expenses are expected to remain constant through the first three years of operation, increasing slightly in Year 4 as additional business opportunities are developed.

Conservative first-year revenues are estimated at $450,000 (if anticipated yields are realized on 224-acre demonstration project, and the harvest sold as unprocessed fiber stalks from the field) increasing to over $1 million in 2009, and $2 million in 2010, as additional acreages and crop cycles are realized. Figures for 2009 and 2010 are based on sale of dry stalks only, with the sale of two crops a year on at least 500 acres. Additional acreages will be planted in horticultural products -- some traditional orchards such fruit trees, olives and palm dates, as well as row crops. The figures above do not include the value of rotation crops or additional values realized through processing of both the primary crop (kenaf) and rotation crops as well as horticultural and livestock products. Value-added processing could increase these base incomes by as much as five fold, based on current market conditions.

About Siwa Farms

Headquartered in Cairo, Siwa Farms, located in Egypt's Western Desert, is engaged in desert reclamation/export agriculture of traditional and nontraditional food, fiber and forage crops.

Current landownership of two partners is 220 feddans of desert land. Other land owners owning 544 feddans showed interest in joining. Once started partnership may grow. The current partners have identified a kenaf (*hibiscus cannabinus L.*) a non-wood fiber plant native to Africa (Angola) as having the great potential for the area and Egypt's economy. Designated by the U.S. Department of Agriculture in 1980's as the most useful of over 5,000 non-traditional plant species, kenaf has been investigated as having long-term economic benefits for Egyptian agriculturalists and industries. Varieties of kenaf are grown extensively in Southeast Asia, Japan, China, the Indian Subcontinent, Iran and elsewhere. Though known for four millennia to grow in Egypt, the native variety of plant is not grown commercially as an irrigated cash crop in Egypt, and local varieties have not been genetically bred for high fiber yields and seeds. Cultivation is miniscule under the local name of teal (or teel) grown mostly along the Nile and in the Sinai Desert. After considerable research, Siwa Farms has identified the export potential of this fiber plant, and its various value-added components.

The company could be formed under the Companies Law No. 159/81 (amended by Laws Nos. 230/1989; 212/1994; 3/1998, 159/1998, and 94/2005), with active and passive partners. The value of the agricultural land has been estimated at $160,000, based on land values of 4,000 Egyptian Pounds/feddan and capital improvements, as of March 1, 2007. If adequate funding is procured, the company intends to add capital improvements during calendar year 2009-2013. Projected operating incomes in value-added products are indicated below.

Agronomic/Geographic Considerations

Siwa Farms is located 28 km east of the town site of Siwa (29.20 N Latitude, 25.32 E Longitude) in recently released governmental desert land near a well-maintained paved farm-to-market road that borders the farm site. The land is located over known deposits of non-replenishable, fossil water, trapped from the last ice age 25,000 years ago. The water is located in pockets in layers up to 1,000 meters underground, which has been tapped commercially for potable water. Most pockets above 1,000 meters should have sufficient water for 25-50 years of intense irrigation. Three wells were dug in January and February on the property, hitting sweet, cool water at 28 meters in sufficient quantities to ensure irrigation.

The proposed business plan calls for spray irrigation by eight center pivots of about 700 feddans (520 acres) of land, powered by three diesel generators. Soil tests have shown the virgin desert land will support agriculture with a minimum amount of nitrogen-based fertilization initially. Diversified traditional (date palms and olives) and experimental crop agriculture is planned on the remaining 164 feddans not covered by the center pivots, irrigated by spray and drip systems fed from the main wells. A small livestock and dairy operation and apiary are also under consideration.

Similar desert recovery efforts have been successful in Egypt, Saudi Arabia, Iran, Libya and elsewhere. To our knowledge, however, this would be the first time that large-scale center pivot irrigation technology would be used in the immediate Siwa area.

Average temperatures in Siwa range from 8-20° C. in winter, to 25-40° in the summer, though sustained temperatures of over 40 degrees are rare. Because Siwa's year-round ambient temperature precludes killing frosts (as found in single-harvest kenaf crops in Europe, the United States and China), multiple harvests can take place. Kenaf can be harvested green between 120 and 150 days after planting for maximum fiber.

Plant Pathology

Hibiscus cannibus L. is a close relative of cotton and okra families, but with different plant pathologies. Native to Africa, kenaf is a relatively new cultivar for commercial agriculture, and several varieties have been bred and tested for their fiber, oil seed and forage yields. Green leaves

are either variegated (such as those found in hemp) or palmated in different varieties. The plant establishes quickly and can be grown in a variety of soil conditions. Little research has been conducted on kenaf under center pivot irrigation. Each feddan is capable of producing up to 35,000 plants in a dense population.

The plant has no known pest or diseases, although it is susceptible to nematode invasion if irrigated by river water on sandy soil. Considering Siwa Farms' water source (fossil water), this aspect should pose little danger. Because of its pathology, the plant extracts nitrogen from the soil, but published scientific data are mixed about how this affects yields. A small amount of nitrogen-based fertilizer (natural or artificial) might need to be added to the soil before planting. An added benefit is that the plant is saline resistant up to 4dsm, and, in fact, some varieties in other parts of the world are cultivated with brackish water with high percentages of sodium potassium chloride or calcium chlorides. Siwa water tests show sodium levels considerably below that figure, and soil samples have shown salinity would not be a factor for kenaf or other field crops under consideration. When established, the plant creates a positive oxygen-carbon dioxide exchange, which militates against global greenhouse gases.

Each plant uses about 50-60cl of water through its growing cycle. A feddan would require 17,000 liters of irrigation over 120 days until the plant flowers and irrigation is reduced. The plant produces multiple flowers and seedpods. Each flower is 10 cm in diameter, with distinctive cream-colored petals with a deep magenta center. The plant is self-pollinating, though an experimental apiary (bee-keeping and honey production) is consdered as added income with small expense. The plant can be harvested after the plant's flowers defoliate (though the flowers, when pulverized, have medicinal properties and therefore commercial value). If unharvested, the plant would continue to grow with little additional increase in fiber percentage. If unwatered after 150 days, the plant would wilt and its fibers would be less valuable; but the plant would then divert its energy to greater seed production, a profitable component.

Kenaf grows up to five meters in height at maturity and contains 65% long fiber and 35% organic cellulose in its stalk which, when mature, can reach 2-4 cm in diameter.

In temperate climates, agriculturalists either wait for a killing frost, or spray their fields with herbicides to kill the stands in place to make harvesting more efficient. This is the preferred method if the plant is to be harvested by a forage chopper and the intent is to use the product to make paper, particularly newsprint. Kenaf is highly price competitor of wood chip products, especially with kraft (wood chips soaked in chlorine, which Egyptian papermakers currently import from North America). If the plant is harvested for its fiber, another method is used to preserve the long fibers in the outer bast (bark). They can be either mechanically decorticated by a modified sugarcane cutter, or cut by hand. In Siwa, techniques developed in Central America and Asia might work best because of low humidity, unlike similar procedures in more humid climes. In Siwa the plants would be cut green (decorticated) and left initially in the field to dry under the hot Egyptian sun. This strengthens fiber quality. Inexpensive hand labor could be employed to remove the green material from the plants and glean the flowers and seedpods for further processing, either as pressed seed oil or as seed for future crops and sale. After field retting (solar drying) the stalks would then be submerged in warm water baths to aid in separation of lingens that hold bast to core, making mechanical or hand processing easier with minimal damage to fibers or core.

Based on research in other parts of the world with similar climate and soil conditions, a yield of 10-15 tons (a short ton of 2,000 lbs., or 910 kg) of fiber/acre is possible twice a year on land seeded with certain varieties of kenaf. Siwa Farm's business plan includes total usage of this plant, including green leafy material for forage or silage, seeds and flowers.

Commercial Uses of Kenaf

Here are some identified uses of the fiber and seed material:

A. Whole plant

1. Bulk and fiber materials for papermaking, especially paper because it requires no additional chemical treatment. Highly valued for its environmental impact.
2. Dried stalks used as biodegradable bean poles and ornamental plant supports
3. As alternate fuel source for pellet stoves.
4. Seedlings can be sold as ornamental house plants.
5. Charcoal briquettes

B. Separated Bast (Long Fiber from the Outer Bark)

1. Valuable as composite material in plastics because of its price competitiveness with artificial fibers and because it is biodegradable.
2. Finely refined and combed bast fibers can be woven into cloth
3. Long fibers valuable in cardboard and papermaking manufacture
4. Press board and other building materials because of its sound proofing properties and fiber strength.
5. Animal bedding, especially for horses because of its softness and absorbency
6. Rope and twine manufacture
7. Mats and dashboard materials in the automotive industry
8. Woven mats for oil spill containment (since oil can be recovered; it is reusable)
9. Roofing material as a substitute for environmental unfriendly tarpaper.
10. Particle board as a wood-product substitute.

C. Separated Cellulose Core

1. Comparable in efficiency to artificial polymers in oil cleanup. More absorbent than much of the material on the market for this purpose; and oil can be recovered by pressing the plant. It is buoyant and ideal for cleaning oil slicks and spills. Highly competitive with artificial polymers currently used for such purposes.
2. As packing material around oil drills because it is expandable than bentonite, and competitive in price because of its low shipping costs (in comparison).
3. Cigarette filters
4. Coffee filters
5. oil and air filtration material
6. kitty litter
7. Commercial drilling rings that leave no residue and biodegrade
8. Shipping packing
9. Absorbent pads for sanitary napkins and diapers.

D. Seeds

1. Kenaf seeds currently sell on the open market for $7/kg after drying, separation and processing. Recently China issued a tender for over 1 million kg of kenaf seed.
2. Edible and essential oils. Contains much of the same properties as cotton seed oil without the poisonous enzyme that must be refined out. Contains many ingredients commonly found in pharmaceutical oils.
3. Light lubricant for machinery
4. Bath oil when mixed with fragrances
5. Cake left from cold or hot pressings has high nutritional value as an animal feed additive.

E. Flowers

1. Edible flowers are consumed as salads in Europe
2. Used as flavoring in cooking
3. Dried kenaf flours have been valued for centuries in Africa as a mild aphrodisiac and as a health food additive.

F. Green leaves

1. Can be consumed in salads
2. In dry, powder form, leaves have medicinal properties
3. High in fiber and protein, green material can be ensilaged for animal feed.
4. Composted, green material builds desert soil.

The Operational Plan

Being a new entity, Siwa Farms' demonstration project plans to grow kenaf on a commercial basis, and to sell its value-added products in the European market. Because of its unusual properties, components of this natural fiber plant are in high demand in Europe as a non-wood substitute in paper making, construction, animal feed and bedding, pharmaceuticals and natural foods, fiber for plastics, and environmental cleanup in the oil industry. The EU has mandated that all plastic products, including automobile bodies, by 2011 must contain biodegradeable material whenever possible. European growers, because of their geographic location and climates, are limited to a single crop of kenaf a year.

To build the sandy soil, other crops would be grown in rotation with kenaf including, but not limited to, legumes, clover, alfalfa, and tuber plants--all with commercial value as food and forage crops.

The potential yield per acre of kenaf has been estimated at 8-10 short tons of dry material (after retting) without controlled irrigation, with a raw market value of the dried kenaf stocks in Europe is $200 a short ton or $1,600-2,000 an acre. However, with separation of the long-fiber bast (65% of total weight) from the cellulose core (35%), the product would be valued from four to five times the raw market value per acre. Controlled irrigation has been shown to increase yield per acre.

A test plot at an Egyptian commercial farm yielded excellent results. A test plot in Siwa is planned near a recently reactivated well on the property for the beginning of June 2008. Irrigation with naturally warm water (35°C) is expected to balance the relatively cool, but plant-tolerable, ambient temperatures at that time of year. The plan calls for testing five kilos of five varieties of kenaf under various soil and fertilized conditions on five feddans of plowed and harrowed land, irrigated with sprinklers and water guns. A feddan is 1.04 acres. The test plot will be monitored continuously. Emergence is anticipated two to three weeks after germination; and the establishment phase should be five to six weeks after planting, at which time the feasibility of growing kenaf under irrigated desert conditions will be affirmed. The plant would be ready for harvest 120-150 days after planting, and the stalks would be ready for analysis and variety selection.

If tests are successful, as anticipated, and finance would be available, a demonstration project of 230 acres under center pivot irrigation could begin in autumn. The crop would have a market value (based on current European prices for unseparated kenaf) of $450,000. Bast and core separation on the demonstration project is expected to take two months, for a finished value-added product. The demonstration field can be tilled and harrowed and replanted with kenaf or another crop in 2009. Depending on resources, four other fields can be cultivated with either kenaf or a rotation crop following the determination of the success of the demonstration project.

The following are mathematical possibilities of yield and income based on market prices, where available, in Europe and the USA. At the present time, there is no formal world market for kenaf-related products. Because of the multiple uses, some of which have not been identified, the retail value of separated kenaf products are difficult to ascertain at this point.

The anticipated yield of the demonstration project is expected to be 2,150-2,250 short tons with a total unprocessed value of $440,000-460,000. If used by papermakers as a substitute for imported kenaf, the value would be over twice as high ($1.01 million) in value-added fiber and cellulose product or as a kraft substitute, equal to the separated value of bast and core.

If annualized, assuming two crops a year of similar quality and yield on 500 feddans (or 520 acres), Siwa Farms could be producing over $2 million a year of kenaf fiber material alone. In addition, 1,000 tons of the high protein, fibrous green material byproduct of harvests could be sold as animal feed for $50/ton or $50,000 of additional income per harvest, or $100,000 a year. Research is needed to determine a higher value cattle feed that mixes or ensilages kenaf and high forage valued plants such as alfalfa and clover, which have been selected as two-year rotation

crops with kenaf. Each acre under center pivot irrigation is capable of producing 5-6 tons of alfalfa hay, valued at $90 a ton or up to $540 an acre for each cutting, six times a year (some reclaimed desert lands in Egypt get up to 12 cuttings a year of alfalfa hay). Ensilage would add value to the tonnage produced. Alfalfa is an ideal rotation crop because it is a "green fertilizer" returning large amounts of nitrogen to the soil that would increase future kenaf yields per acre.

Research has shown that kenaf seed production is a high value item. With proper processing and storage, kenaf seeds have a commercial value to international growers. Based on seed yields elsewhere, up to 900 kg. of seeds can be produced per acre, with a market value of $6,300/acre. When stored at 0-10° C., seeds have been known to last up to five years with little loss in seed fertility.

Kenaf plants produce pods of 125 seeds each that contain 30-35 percent edible oils that are valued by upscale restaurants in Europe. Seed oil can also be used as a lubricant. Each acre is capable of producing 170 liters of cold pressed seed oil. Though a market price is difficult to determine, we assume at least $2 a liter is possible. Based on two crops on 500 feddans, a total of 170,000 liters of oil is possible, an additional annual income of $340,000. Generally, second crops of kenaf, planted in fall, would be primarily used for seed production since fiber quality is usually sacrificed by lower irrigation rates and less hours of sunlight. Considerable experimentation needs to be conducted to balance the fiber/seed production capabilities of the plant as adapted to Egypt's desert conditions to maximize profits.

Research prepared by:
Ralph D. Berenger, Ph.D., M.P.A., owned and managed a media, printing and investigative businesses with annual gross incomes of up to $5 million in the United States. He has published three books, scores of agriculture and agribusiness articles, particularly in tropic regions, and he is an authority on kenaf. He has consulted with governments and businesses in Bolivia, St. Lucia, Kenya, Zambia and Egypt, as well as in his native United States. He speaks English and Spanish.

Contact:
Drs. Cornelis Hulsman
4 Street 12b – Maadi
Cairo
Tel/fax: + 202 2380 3424
Mobile: +20 10 5684877
Email: kshulsman@yahoo.com
kshulsman.egypt@gmail.com

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