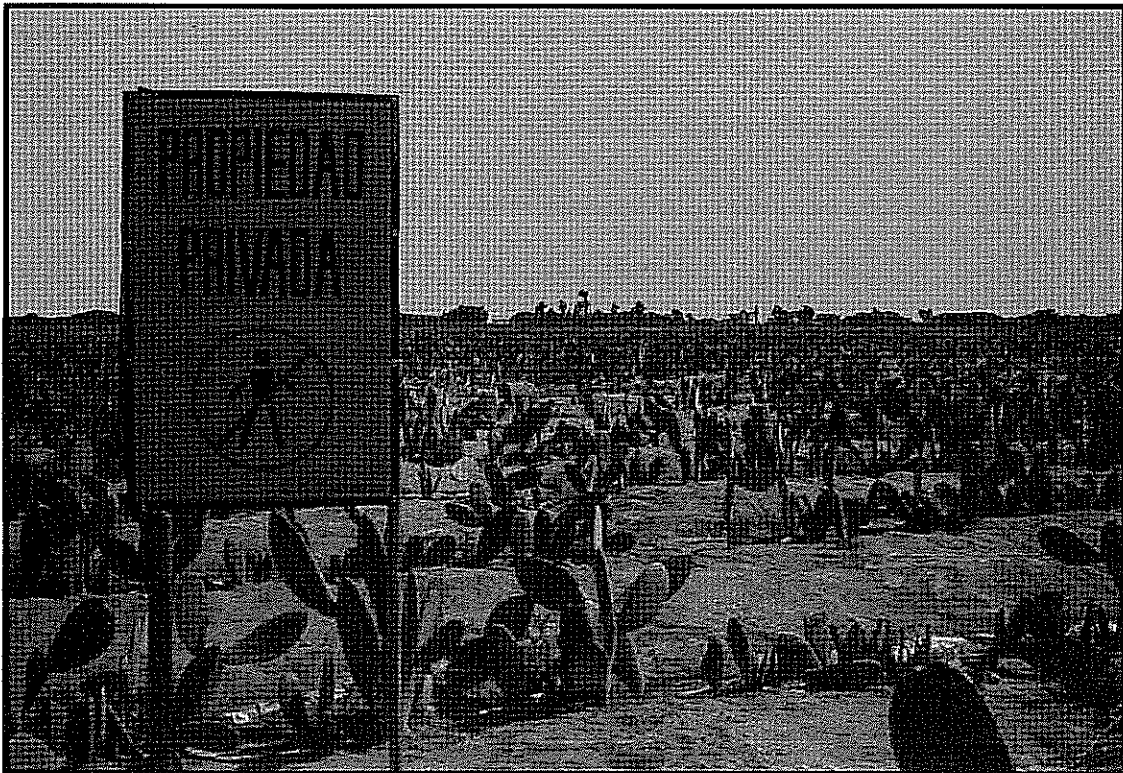


## **Opportunities for Namibian Farmers:**

### **Cactus Pear**



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### **Disclaimer**

Although this report was prepared under EDF funding, the EC bears no responsibility for, nor is in any way committed to, the views and recommendations expressed herein.

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## Executive Summary

Namibian farmers have generally relied on a narrow economic base, regardless of their farming activities. The limited market/product base means that markets in other countries as well as niche markets (and chances for import substitution) available within Namibia are not exploited. However, it is possible to move away from a limited market base and to take advantage of niche and novel products. One such a crop is cactus pear, also known as prickly pear, Indian fig, Barbary fig, tuna [Mexico], turksvy [Afrikaans], or efauyena [Oshiwambo].

Cactus pear is extremely well adapted to Namibian conditions. It can survive temperatures in excess of 50°C, and tolerate cold of up to -8°C. Though highly drought resistant and water-use efficient, the plants respond best to controlled irrigation. Too much water harms the plant therefore it does not grow well in clay soil. It prospers in deep, lightly textured, alkaline soil types of which there is an abundance in this country.

Due to virtually year-round sunshine Namibian producers enjoy a major advantage over other international commercial producers namely an early harvesting season of fruit. In some parts of the country the plants come into bloom as early as October. Harvesting can start in November. This means that local producers can have their produce at international markets almost a month before other competitors. If properly utilized, fruit production becomes a by-product of the plant as it has a host of other uses most of which are unknown in Namibia.

## List of abbreviations

SA	South Africa
EU	European Union
MAWRD	Ministry of Water, Agriculture and Rural Development
USDHS	US Department of Homeland Security
CSI	Container Security Initiative
FAO	Food and Agricultural Organisation
WHO	World Health Organisation
UN	United Nations
GAP	Good Agricultural Practices
HACCP	Hazard Analysis Critical Control Point
PPECB	Perishable Products Export Control Board
SPS	Sanitary and phytosanitary
MTI	Ministry of Trade and Industry
MFA	Ministry of Foreign Affairs
FSRIA	Farm Security and Rural Investment Act
FAIRS	Food and Agricultural Import Regulations and Standards Report
AMS	Agricultural Marketing Service
USFDA	US Food and Drug Administration
CFSAN	Center for Food Safety and Applied Nutrition
USDA	US Department of Agriculture
GSP	Generalized System of Preferences
GATT	General Agreement on Tariffs and Trade
WTO	World Trade Organization
MFN	Most Favoured Nation
MoF	Ministry of Finance

AGOA	African Growth and Opportunity Act
HTS	Harmonized Tariff Schedule
USITC	US International Trade Commission Tariff
TARIC	Integrated Tariff of the European Communities
SACPGA	South African Cactus Pear Growers' Association
SST	Smart and Secure Tradelanes
NASSP	National Agricultural Support Services Programme

## 1. Opportunities in Novel Products

Namibian farmers have generally relied on a narrow economic base, regardless of their farming activities. Sales of livestock are considered a mainstay of cash income by many farmers. In some parts of the country crops such as *mahangu* (pearl millet) and *white maize* provide for both own consumption and sale into the market. This limited market focus puts Namibian farmers at a disadvantage because their market options are narrow. The main destinations for Namibian products are either South Africa (SA), or the European Union (EU) with cattle, goats and sheep being the primary products. The limited market/product base means that markets in other countries as well as niche markets (and chances for import substitution) available within Namibia are not exploited. A limited product base means that income can be subject to shocks such as adverse changes in prices. It also increases the vulnerability of farmers to drought and other environmental shocks. However, it is possible to move away from a limited market base and to take advantage of niche and novel crops. One such a crop is cactus pear, also known as prickly pear, Indian fig, Barbary fig, tuna [Mexico], turksvuy [Afrikaans], or efauyena [Oshiwambo].

## 2. Why Farm with Cactus Pear?

Cactus pear (genus *Opuntia*) forms part of the cactus family (*Cactaceae*). It is a succulent. A succulent is a plant of which one or more of its organs – leaves, stem or roots – has developed the capability to store water (Succulent Society of South Africa, 2004). There are some 360 species of *Opuntia*. Within this grouping there are two distinct sub-groupings organised based upon appearance. These are *Platyopuntia* and *Cylindropuntia*. Plants from the first grouping have a stems consisting of flat joints called pads (cladodes). Both their fruit and pads are edible, though only a few species are suitable for commercial purposes. Plants from the second grouping have long, cylindrical stems and are commonly known as *Chollas*. They too produce fruit but are less popular commercially because they can be extremely thorny and grow so tall that it is becomes near impossible to harvest the fruit. Some grow up to 30 metres tall (Botany.com, 2004).



*Mature Opuntia ficus-indica*.<sup>1</sup>

In general, cacti are remembered for the sharp, thorny spines on their stems, though not all species have them. Some, instead, grow concentrations of sharp, bristly hairs called *glochids* for protection. They are extremely sharp and can penetrate the skin

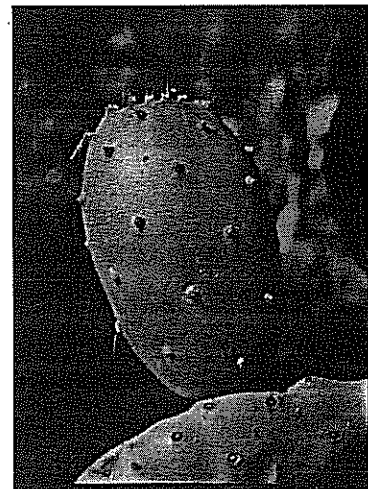
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<sup>1</sup> Picture courtesy of Rivenrock Gardens: <http://rivenrock.com/>.

when only brushed against. These hairs are also found on the fruit hence the name *prickly pear*. Commercial farmers are increasingly looking to breed thorn-less or glochid-less species of *Opuntia*. Cactus pear is found on some 90% of commercial farms in Namibia. Groves vary in size from a few plants to 5 hectares (Brand, 2003). The plants were originally brought into Namibia for the purpose of producing cattle fodder. When commercial feed was introduced into the country most farmers became indifferent to them. None are suitable for commercial fruit production. To date, no survey of the distribution of cactus pear in communal areas has been done.

Most local consumers are only aware of a limited range of uses associated with *Opuntia*, which includes eating the fruit, making jam or marmalade from it, or using it for stoking alcohol. The bulk of fruit is imported from SA. High pricing compared to local standards, low volumes and unprofessional marketing amongst others prevents sustained demand from developing. The relatively low status of the plant in Namibia, and even SA, can be attributed to ignorance regarding its potential. If properly exploited the fruit for which it is best known becomes a mere by-product. Its potential for diversifying crop production and/or alleviating poverty is vast. Here is a list of its potential uses:

- **The fruit:** To many the fruit of *Opuntia* is considered a delicacy. Increasingly, hairless varieties, or fruit cleaned with wax, are being marketed to make it more consumers friendly. In general, buyers prefer sweet to slightly acidic, fruit with lots of juice and little seed content. The flavour present in the fruit depends upon the species cultivated and includes strawberry, watermelon, fig, banana, and citrus. Skin can be green, yellow, orange, red, purple, or brown in colour, with the flesh being any of these also including white. Some prefer to eat the fruit chilled or served with lemon juice which enhances the flavour. In Namibia, on average, a hectare of plants produces six tons of fruit (Brand, 2003). In order to conserve water cacti (and the *Welwitschia mirabilis*) do not absorb carbon-dioxide (CO<sup>2</sup>) for photosynthesis during the daytime like other plants do. Since photosynthesis can only occur during daytime, carbon-dioxide is stored overnight in the form of malic acid (Charnay, 1999). In the case of cactus pear the acid build-up peaks at 08:00 (0.5%) and reaches a low point at 16:00 (0.1%). This imparts an undesirably sour taste to fruit and pads, meaning that harvesting should be done in the afternoon rather than in the morning (Rodriguez-Felix & Villegas-Ochoa, 1998). Fruit also becomes more acidic and fibrous as it matures.

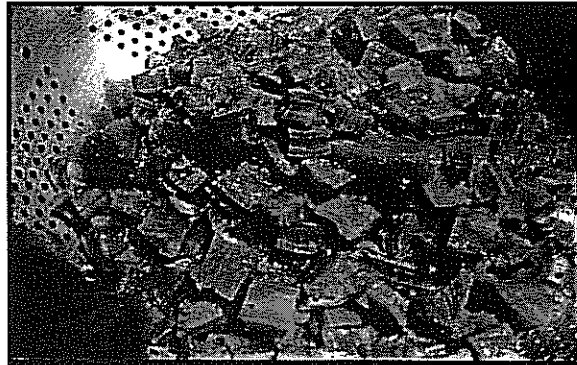


*Fruit of Opuntia ficus-indica.*<sup>1</sup>

- **Fruit rolls:** Fruit pulp can be dehydrated (sun-dried) and shaped into sheets. The pulp has a very low acidity (0,05 to 0,08% citric acid). This means that it is excessively sweet. This problem can be overcome by mixing it with that of acidic fruit such as sour peaches or apples (Sepúlveda, 1998).

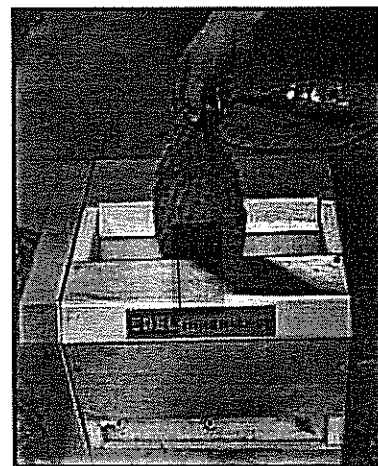


- Pads as a vegetable:** In Mexico and Texas young, tender pads are considered a vegetable. They are the most succulent, tender, and delicate in flavour, and have few spines. Though they can be eaten raw or as part of salads, most often they are peeled and then fried like eggplant, pickled with spices, or cooked with shellfish, pork, chillies, tomatoes, eggs, coriander, garlic, or onions. It is possible to harvest pads up to six times a year. Some are sold cut into small squares or strips called *nopalitos*. A machine called a *cortadora* can be used to cut or dice the pads (Paetel, 2003). Pictures of the machine and the dicing process are included below.




*Pads diced and cooked.<sup>1</sup>*

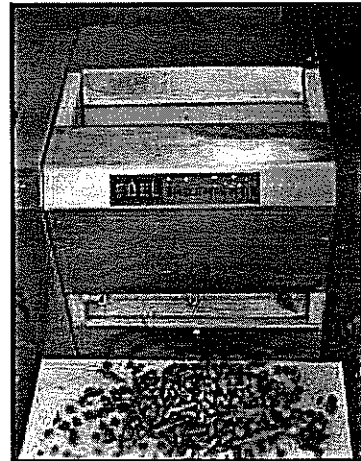
- Liquid sweetener (syrup):** Sugar content of fruit pulp ranges between 12,1 to 17,1 degree Brix (°Brix). For every one °Brix there is the equivalent of one gram of sugar per 100 millilitres of fluid. By using pulp with a sugar content of 16 to 17 °Brix, clarifying the juice with enzyme treatment, removing the colour by adding active carbon, and vacuum concentrating it, syrup with a sugar content of 60 °Brix can be obtained. This gives the final product the same taste as glucose, but is less sweet than fructose. It can be considered a supplementary product to grape sugar syrup or high fructose corn syrup (Sàenz et al, 1997). Starting in 1997 up to the end of 2001 some N\$ 359,019,849 worth of lactose and lactose syrup was imported into Namibia (Kahuika, Stork & Endjala, 2003).
- Juice:** The current trend towards healthier diets makes cactus juice an important natural food alternative. Despite the potential, no commonly used technology currently exists which can simultaneously clarify the juice and inhibit the growth of micro-organisms, while achieving an acceptable colour, taste and smell at low cost (Sepúlveda, 1998).
- Jam, marmalade, chutney and jelly spread:** Pads are chopped, cooked in copper pots to eliminate gum and mucus, and then liquefied in a blender. The liquid is heated to boiling point where sugar, pectin, sodium benzoate, and citric acid are added. It is constantly stirred to prevent sticking. Once a minimum sugar concentration of 65 °Brix is reached, the liquid is bottled at 85°C (Corrales-García, 1998). With the making of marmalade the same process is followed with the exception that lemon peel and juice are added instead of pectin. Lemons not only contain pectin which aids in gel formation, but is important to the taste and texture of the marmalade (Hernández, 1998). Pieces of cooked pad can be added to chutney.



Jelly spread is popular in the American market. Filtered juice is simmered just below boiling point, sugar and pectin added, and then heated beyond boiling point.

- **Glazed candy:** Pads are cut into 1,8 by 4 cm pieces and treated with calcium hydroxide to remove the mucus. The pieces are then placed in a sugar solution and left until the fluid evaporates. It is suggested that the sugar solution be made from sucrose or sugar cane syrup, but if cactus syrup is manufactured on site that would make little sense. Where apple was glazed, it was found that by adding 2% calcium chloride to a 20 to 30% strength sucrose solution, fungal decay was significantly reduced (Chardonnet et al, 2000). A second dehydration takes place where air is forced through a tunnel at 60°C. The product can be made more attractive by covering it in sweet or bitter chocolate (Hernández, 1998).
- 
- **Pickled pads:** Vinegar is heated to boiling point, and spices, aromatic herbs and olive oil added. The mixture is boiled for five minutes to allow the vinegar to absorb the aromas. Sliced onion, garlic, laurel, and carrot-discs are separately fried in vegetable oil. The vinegar, vegetables and diced pads are mixed and bottled (Corrales-García, 1998).
  - **Pads in brine:** Pads are salted in tanks containing 12% saline concentration. Approximately 1,7 litres of brine is used for every one kilogram of pads. The saline solution must be maintained at a minimum of 10%. Stirring with a wooden paddle should be done on a daily basis. The containers should be kept well covered to prevent contamination and discolouration. The pads must remain in the tanks for a minimum of ten days, but can be stored there for months depending on demand. Before final processing the pads are washed to remove the salt. They are then diced and bottled, or packaged together with an assortment of spices and 2% brine content (Corrales-García, 1998).
  - **Cosmetics:** Pulp from the pads has been used to make face and body lotions, hair gels and shampoos (McGraw-Hill, 2000). Gel can be made from cactus pulp by adding sugar, gelling agent (carragenine), and preservatives (sodium benzoate, parabens, potassium sorbate). The mix is heated to prevent colour change. The result is a gel with an attractive green colour and a firm a pleasant texture (Sepúlveda, 1998).
  - **Flour:** The pulp both fruit and pads can be dried and ground into flour. Research at the University of Santiago, Chile, indicates that the flour can contain up to 43% dietary fibre, with 28.5% of that being insoluble (Hernández, 1998). High content of insoluble fibre aids digestion.

- **Alcohol:** It is possible to distil alcohol from fruit and pads. In South Africa cactus has a long history of use in the making of high alcohol content drinks such as *Witblits/Mampoer*.
- **Chemicals:** Both fruit and pads can be used for ethanol production. According to the Politechnic University of Madrid some 1,000 litres of ethanol can be distilled from a hectare of average aged plants (Fernandez, 1997).
- **Plant oil:** Oil can be extracted from the seeds of the fruit (Chessa & Nieddu, 1998).
- **Bio-gas and bio-fertilizer:** Pruning waste mixed with manure can be used as a source of bio-gas and bio-fertilizer. During the process of drying the mixture, methane and carbon dioxide is formed. Refrigerators, stoves, heater, generators, etc. can be run on methane. The remainder (bio-fertilizer) is dry and odourless and can be used as a soil conditioner and nutrient for crop production (Varnero & García de Cortázar, 1998).
- **Health advantages of pads:** Pads are rich in vitamin B, calcium, magnesium, and iron. Juice from the pads has similar medical application as *Aloe Vera*. It soothes cuts, burns and bruises. In Central Africa the juice serves as a mosquito repellent. Already in 1911 Luther Burbank (Neighborhood GreenNet Project, 2003a) noted that if spread on water, it cuts off the oxygen supply to mosquito larvae (and anything else for that matter). The effect was observed to last for a year. It also lowers blood sugar, is anti-inflammatory on stomach ulcers, and has also been found to be effective in the treatment of kidney disease, hypoglycemia, high blood cholesterol, and obesity (Mondragon-Jacobo & Perez-Gonzalez, 1998). Pureed young pads can be used as a laxative (Brunelle, 2003).
- **Dried flowers:** A number of medical uses have been identified for the dried flowers of cactus pear. Those include the treatment of enlarged prostates (benign prostatic hypertrophy), and inducing the flow of urine (diuretic properties), and treating a number of intestinal problems such as colitis and diverticulosis (Palevitch, Earon, & Levin, 1994; Leonard, 2002).
- **Building construction:** It is common practice in rural Mexico to boil the juice from the pads down to a concentrate and mix it with whitewash and mortar to increase the strength thereof (Neighborhood GreenNet Project, 2003b).
- **Fibres and stiffening agent:** Strong fibres can be extracted from the pads by pounding and drying them. They can be woven into mats, baskets, fans, and fabrics. By compressing the fibres paper can be made. The juice from the pads



can be used as a stiffening agent for cotton cloth (Neighborhood GreenNet Project, 2003b).

- **Food colouring:** Natural skin pigments with hues ranging from greenish-white, yellow, orange, red and purple can be harvested from fruit for use as food colouring (Stintzing, 2003). This holds much promise since consumers in Western Europe and North America are increasingly rejecting synthetic food additives.
- **Dye:** Carmine dye is derived from the cochineal insect which feeds on certain species of prickly pear. Peru dominates the world market supplying some 80% thereof. Some 40% of its supply is in the form of processed dye and the rest in insect form (Grajdieru, 2003). The Canary Islands and Spain provide a large percentage of the remainder. Carminic acid is vivid red. This made the robes of the Aztec emperors famous and gave the English soldiers that fought in the colonial wars the nickname "Redcoats". Today, the dye is mainly used to prepare microscope slides, though it is also used as a pH indicator. It also has use as colouring in food, soft drinks and cosmetics. Some people are allergic to carmine and may go into anaphylactic shock (Gutkin, 2003). Packaging should contain a warning. The carmine extraction process is far from perfect with the best results providing a 23% yield of 62% pure carmine (Grajdieru, 2003). Around 140,000 female insects are needed to produce a kilogram of dye. In Peru, some 50,000 people are involved in the harvesting (Gutkin, 2003).
- **Live fencing, wind-breaks and erosion-control:** By planting cacti close together a living fence can be created that is impenetrable to livestock. If dense enough, it can keep out anything up the size of a rabbit. In addition, since some species of *Platyopuntia* grow up to 4,5 metres high and 3 metres wide, they make excellent wind-breaks. In Tunisia spineless cacti form an integral part in preventing soil erosion and in the promotion of soil stability. The cacti fix the soil and support the restoration of other plant cover. Some 500,000 hectares has been planted in Tunisia for rangeland improvement and erosion control (International Fund for Agricultural Development, 2003).
- **Feed:** The value of prickly pear as livestock feed is well known. If augmented by small quantities of other feed, goats, sheep, cattle and ostriches can be sustained on it (De Kock, 1998). Starting in 1997 and ending in 2001 some N\$ 298,501,063 worth of additives to animal feed was imported into Namibia (Kahuika, Stork, & Endjala, 2003). Table 1 on the next page provides information on the fodder yield of, and amount of digestible nutrients contained in, spineless cacti. Ingesting cactus pads decreases the water consumption of livestock (Nefzaoui & Salem, 1998). The pads are a highly prized commodity in the dairy industry in Mexico. When fed to dairy stock a distinctive flavour is imparted to milk and butter. Dairy farmers provide manure to the cactus farmers who in return provide the pads (Savio, 1989). It was found that the consumption of cactus increased milk production in goats by some 55% (Azócar, 1998).

**Table 1: Fodder Yield and Digestible Nutrients Produced per 25mm of Water for Three Species of Plants**

Season	Spineless cactus		Oldman Saltbush		Alfalfa	
	Fodder Yield Kg	Digestible Nutrients Kg	Fodder Yield Kg	Digestible Nutrients Kg	Fodder Yield Kg	Digestible Nutrients Kg
1	161,6	100,4	578,3	235,6	247,5	137,0
2	3001,0	1746,3	944,8	397,2	367,4	208,4
3	3551,8	2081,0	1229,4	555,8	394,9	210,5
4	2169,1	1279,5	752,6	303,2	316,4	180,5
Mean	2220,9	1301,8	876,3	373,0	331,5	182,0

Source: De Kock, 1998.

### 3. Well suited to Namibia

Cactus pear is especially well adapted to local soil and climatic conditions. Here are some reasons why:

- The plants are relatively easy to propagate. A single pad can grow into a full-sized plant. Research from India (Singh & Singh, 2003) indicates that the best results are achieved by planting 12 month old pads upright at a 30 degree angle, or on raised soil beds.
- The plants can survive maximum shelter temperatures of 50°C and above (De Kock, 1998), and minimum temperatures up to -8°C.
- They are extremely water-use efficient and respond well to controlled, limited irrigation in terms of yield. For more information see Tables 2 and 3.

**Table 2: Yield of Spineless Cactus Under Limited Irrigation (2,920 Plants/Hectare)**

Irrigation & Rainfall per Annum (mm)	No of Times Irrigated	Times of Irrigation	Production per Hectare	
			Fresh weight metric tons	Dry weight metric tons
No irrigation + 178 mm rain	0	-	24.89	3.27
75 mm irrigation + 178 mm rain	1	Sept	38.61	4.21
152 mm irrigation + 178 mm rain	2	Sept, Nov	66.49	6.11
229mm irrigation + 178 mm rain	3	Sep, Nov, Jan	97.60	9.09
305 mm irrigation + 178 mm rain	4	Sep, Nov, Jan & March	106.68	10.57

Source: De Kock, 1998.

- Cactus pear performs well in deep, lightly textured, alkaline soil, including coarse sand. Soil in Namibia is predominantly alkaline with the exception of the area around the Etosha-pans and the Caprivi region which is saline. The plants tolerate soil alkalinity up to pH 8,2 to 8,5. They do not do well in clay soils since too much water drowns the plants or may result in fungal infection. It is recommended that before any commercial investment is made, the Directorate

Research and Extension of the Ministry of Water, Agriculture and Rural Development (MAWRD) be contacted for a soil and climatic analysis.

**Table 3: Rain-use Efficiency (RUE), Water-use Efficiency (WUE), and Water-Use Rate (WUR) for Crops Under Rain-fed (200mm/Annum) and Irrigated Conditions**

Crop	RUE (kg Dry Matter/ ha/year/mm)	WUE (kg H <sup>2</sup> O/kg DM) Transpiration Coefficient	WUR (mg Dry Matter/g H <sup>2</sup> O)
Agave	45.0	93	10.7
<b>Cacti [<i>Opuntia</i>]</b>	<b>40.0</b>	<b>267</b>	<b>3.7</b>
<i>Atriplex nummularia</i>	28.0	304	3.3
Pearl millet	25.0	400	2.5
Barley	20.0	500	2.0
Sorghum	15.0	666	1.6
Wheat	13.3	750	1.3
Alfalfa	10.0	1,000	1.0
Rangeland	5.0	2,000	0.5

Source: De Kock, 1998.

#### 4. Worldwide production

Commercial farming with cactus pear is a relatively new undertaking. Even in Mexico where the plant has formed a part of the local diet for centuries, it only took off during the late 1960s and early 1970s. In most other parts of the world this only happened during the 1990s. No standardised system of reporting on production has been developed and most countries do not share information on their production. As a result data on worldwide commercial cactus pear production is sketchy at best. Table 4 provides some information pertaining to fruit production. However, these figures should be interpreted with caution since reports tend to contradict one another. For the remainder of this document the focus will fall on the export of cactus fruit.

**Table 4: Estimated Annual Worldwide Commercial Production of Cactus Fruit**

Country	Year of data	Production metric tons	Hectares Est.	Availability on UK markets 2002
Argentina	2001	7,500	1,000?	-
Brazil	-	-	-	According to market requirements
Chile	2001	8,000	1,050?	January – May
Colombia	-	-	-	All year round
Cyprus	-	-	-	July – August
Egypt	-	-	-	July – September
Israel	2000	974	130?	July – August
Italy (Sicily 95%)	1998, 2001	70,000	9,333?	September – October
Mexico	2001	300,000	40,000?	July – October
<b>Namibia</b>	<b>2003</b>	<b>66-82?</b>	<b>11?</b>	<b>November-April?</b>
New Zealand	-	-	-	Trials
Peru	-	-	-	December – April
South Africa	2003	1,500	200?	November – February
Spain	-	-	-	August – November
Tunisia	-	-	-	July – August
USA (California 50%)	2001	4,000	533?	September – May

Note: In estimating hectares per country an average yield of 7.5 tons per hectare was assumed. Sources: Rodriguez-Felix, & Villegas-Ochoa, 1998; Basile, 2001; Brand, 2003.

## 5. Target Markets

### 5.1 Domestic

Very little is known regarding the actual demand for cactus products in Namibia since no structured market research or coordinated marketing has been done to date. When sold as is at open markets in Namibia, cactus pear sells for an average price of N\$ 9,50 per kilogram (Brand, 2003). Unrealistic prices such as N\$ 10 for two fruits or N\$ 19 for four has been found at local retail outlets.

### 5.2 Regional

Like Namibian consumers, South African consumers remain largely uneducated regarding cactus products. Despite this, one should not underestimate current demand. Yearly, since 1986, Uitenhage in South has held a cactus festival. Up to 20,000 people attend the event (Sunday Times, 2002). For an overview of the volume and value of fruit sold during 2002/03 in South Africa see Table 5 on the next page. The largest market for cactus pear was the Gauteng region (Johannesburg, Pretoria, Vereeniging, Springs) where 71% of produce was sold (National Department of Agriculture South Africa, 2003). In the South African market cultivars such as Morado and Skinners Court sell well. Fruit exported from Namibia to South Africa on average fetch N\$ 12 (Brand, 2003).

**Table 5: South African Market Statistics May 2002 – April 2003**

Market	Ton	R/Ton	R Value	Best R/Ton [Ranking]
Pretoria	323	3,248	1,049,104	5
Johannesburg	249	3,615	900,135	4
Cape Town	159	2,844	452,196	7
Springs	27	2,810	75,870	8
Durban	26	4,607	119,782	3
Bloemfontein	25	1,593	39,825	14
Vereeniging	10	1,988	19,880	12
East London	8	2,660	21,280	10
Klerksdorp	6	5,083	30,498	1
Nelspruit	6	3,154	18,924	6
Pietermaritzburg	6	1,727	10,362	13
Welkom	5	2,348	11,740	11
Port Elizabeth	2	4,840	9,680	2
Kimberley	2	2,715	5,430	9
Witbank	1	822	822	15
<b>Total</b>	<b>855</b>	<b>Av 3,235</b>	<b>2,765,528</b>	

Source: National Department of Agriculture South Africa, 2003.

### 5.3 International

Producers interested in exporting to markets other than South Africa are advised to contract an export agent. Though there are multiple export agents in South Africa, only two could be identified that are serious about and geared for the export of cactus pear. Those are *Mardell Agencies* and *Prima Fruit* (see list of contacts). An export agent can handle every aspect of the export process beyond the production phase (growing and

packaging) of the fruit. This includes organising transport, off-farm refrigeration and cooling, loading and unloading, transport insurance, paperwork, etc. Other than that, the agent also identifies new markets, sets up distribution networks in target markets, and ensures effective marketing of the product. Depending on the arrangement reached, the agent may carry all off-farm expenses deducting the cost once the produce is sold. Entering into a profit-sharing arrangement with an agent is not uncommon. The list of export markets targeted by South African exporters, as well as the amounts transported by sea and air, can be found in Tables 6 and 7.

**Table 6: Main Export Destinations via Air**

Destination	Percentage	Kg est.
United Arab Emirates	62%	17,980
Germany	32%	9,280
Italy	4%	1,160
France	2%	580
<b>Total</b>	<b>100%</b>	<b>29,000</b>

Source: *Perishable Products Export Control Board, 2003.*

On average, for the period 2000 to 2003, some 56% of cactus fruit exports from South African occurred during January, with some 28% during February. For more information on average monthly export volumes see Table 8. Table 9 contains information on the average income received by the producer per 3 kilogram carton of fruit for the period 2000 to 2003 depending upon the type of transportation used. Transport via air is increasing even though on average it is three times more expensive. The cultivars of choice in European and Near Eastern markets (Bahrain, Saudi Arabia and the United Arab Emirates) are Algerian and Gymno Carpo. Red and orange skinned cultivars have appeal in the Near East for their decorative use.

**Table 7: Main Export Destinations via Sea**

Destination	Percentage	Kg est.
Netherlands	35	152,600
Britain	15	65,400
Canada	15	65,400
Bahrain	11	47,960
France	8	34,880
Saudi Arabia	8	34,880
United Arab Emirates	8	34,880
<b>Total</b>	<b>100%</b>	<b>436,000</b>

Source: *Source: Perishable Products Export Control Board, 2003.*

The sale of cactus fruit remains a niche market activity in the United States (US). Karp (1998) is of the opinion that key to breaking into the mainstream US market is producing better tasting fruit, and informing consumers that it is available. Most of the fruit sold tastes bland. The ideal is an intense, complex fruit with interesting flavour. It should not only be sweet, but have a tinge of acidity and a lingering aftertaste. Large, colourful fruit sells well. The less seeds the fruit contains the better. Consumer demand has been damaged by the marketing of immature fruit. Marketing channels should be used that minimizes the time fruit spends in cold storage. The romantic image of cactus fruit as exotic desert fruit sells, e.g. Treasure of the Namibian Desert. This makes presentation of both the fruit and the packaging very important. Potential markets to



consider are Texas, Florida, and California, as well as areas within a high concentration of Hispanics/Latinos.

**Table 8: Average Monthly Volumes Exported 2000-2003**

Month	Amount of 3kg cartons
July	0
August	0
September	0
October	0
November	0
December	12,000
January	100,000
February	50,000
March	13,000
April	1,000
May	400
June	800

Source: Lourens, 2003.

**Table 9: Rand Earnings by Producer per 3kg Carton by Transport Type 2000-2003**

Transport	2000/01	2001/02	2002/03
Average Air	20	24	26
Average Sea	16	18	18,5

Source: Lourens, 2003.

**Table 10: Top Hispanic markets for 2000**

	Place and State	Hispanic Population	Percentage of Total Population
1.	New York, NY	2,160,554	27.0%
2.	Los Angeles, CA	1,719,073	46.5%
3.	Chicago, IL	753,644	26.0%
4.	Houston, TX	730,865	37.4%
5.	San Antonio, TX	671,394	58.7%
6.	Phoenix, AZ	449,972	34.1%
7.	El Paso, TX	431,875	76.6%
8.	Dallas, TX	422,587	35.6%
9.	San Diego, CA	310,752	25.4%
10.	San Jose, CA	269,989	30.2%
11.	Santa Ana, CA	257,097	76.1%
12.	Miami, FL	238,351	65.8%
13.	Hialeah, FL	204,543	90.3%
14.	Laredo, TX	166,216	94.1%
15.	Philadelphia, PA	128,928	8.5%
16.	Brownsville, TX	127,535	91.3%
17.	East Los Angeles, CA	120,307	96.8%
18.	Oxnard, CA	112,807	66.2%
19.	McAllen, TX	85,427	80.3%
20.	El Monte, CA	83,945	72.4%

Source: Boy Scouts of America, 2003.

## 6. Points of Entry

If a local export agent is appointed, produce destined for Europe and the United States will ship from Walvis Bay or be flown out from Hosea Kutako International. If a South

African export agent is appointed, produce will ship from Cape Town or be flown out from Johannesburg International. Shipments via air to the East too will leave from there, with shipments via sea leaving from Durban. Air Namibia has no direct flights to destinations in the East so produce will have to be redirected through Johannesburg International.

## 7. Transport Costs and Considerations

Shipping companies determine freight rates according to weight or volume depending on which yields the greatest revenue. Shipping containers are classified as *general purpose* (GP) or as *reefers* (refrigerated containers). There are two standardised sizes namely 20 and 40 foot. If a shipment does not fill a container, shipments of other exporters are added until it is full. This is called *groupage cargo*. As such, groupage cargo ships less frequently. For a guideline of the cost involved in transporting a 20' reefer container by road within Namibia, see Table 11. For a list of handling costs at Walvis Bay, see Table 12. Shipping time varies according to whether freight is shipped directly port-to-port (more expensive), or redirected from a specific port (cheaper but slower). For a guideline to ocean freight charges and shipping time see Table 13. The procedure for exporting goods can be found in Table 14. A guideline to domestic and international airfreight cargo rates can be found in Table 15. For the importance of retaining an airway bill see Table 16. Since speed is of the essence when exporting cactus fruit and pads, railway transport has been excluded. Those that wish to export without the assistance of an export agent should consult the content of the International Chamber of Commerce's *Incoterms 2000*. Incoterms are standard trade definitions used in international sales contracts (International Chamber of Commerce, 2001).

**Table 11: Road Transport Cost for 20' Reefer Container February 2003**

Route	Full container N\$	Groupage cargo 1 ton rate N\$/KG
Rundu to Walvis Bay	22,880	1,65
Katima Mulilo to Walvis Bay	29,040	2,20
Oshikango to Walvis Bay	23,650	2,20
Oshakati to Walvis Bay	21,780	-
Tsumeb to Walvis Bay	16,280	1,10
Okahandja to Walvis Bay	7,700	1,10
Windhoek to Walvis Bay	9,900	1,10
Rehoboth to Walvis Bay	11,550	1,32
Mariental to Lüderitz	30,800	1,65
Keetmanshoop to Lüderitz	33,000	1,65

Source: Ministry of Trade and Industry Directorate of International Trade, 2003.

Export requirements to the US have become more stringent in the wake of the terror attacks on US soil during 2001. The US Department of Homeland Security (USDHS) has implemented what it calls the Container Security Initiative (CSI). Durban is the only harbour in southern Africa which is a party to the CSI. What does it involve? Containers shipped via sea considered a security risk are screened before being loaded by US customs officials. Identifying the containers is achieved by implementing what is called the *24-hour rule*. Detailed manifest information has to be submitted at

least 24 hours before loading. Where this information is too vague or submitted too late, the container is issued with a "Do Not Load" directive. It will not ship until all the necessary criteria are met. Should a container marked as such ship to the US it will be denied permission to be unloaded at any port in the US.

Containers can still be shipped from non-CSI ports *under normal circumstances*, i.e. when there is no palpable threat of terrorist activity. They will go through the same inspection on the US side, but according to US Customs Service Commissioner, Robert Bonner (Brew, 2003): "...the processing by the US of shipments from non-CSI ports may be *less efficient* [emphasis added] than the processing of shipments from CSI-affiliated countries". Already, before September 11<sup>th</sup> 2001 the EU has lodged complaints in this regard (European Commission, 2001). Though this will be officially denied, this possibility has effectively erected a barrier to trade in fresh produce with the US if shipped via sea. These means that goods shipped from Walvis Bay could be seriously delayed in transit, or even rot in a US port. The alternative of shipping the goods to Durban adds the cost of thousands of extra kilometres of transport, as well as extends the time in transit of the produce. Currently, considering the potential for delay in transit, the safer option is to fly the produce to the US. In future, Walvis Bay may join the Smart and Secure Tradelanes (SST) Scheme currently in its test phase.

**Table 12: Handling Costs at Walvis Bay Port February 2003**

	Full container N\$	Groupage cargo rate N\$/ton
Transport charges to Walvis Bay port (transporter)	303	
Terminal handling fee (Namport)	677	
Equipment handover fee (Shipping company)	825	
Base tariff fee (Namport)	2,031	
Customs documentation fee per Bill of Landing	539	539
Agency fee - first container/cbm	605	275 per cbm
- thereafter	330	110 per cbm
Communication fee per Bill of Landing	149	149
Courier documents per set	385	385

Source: Ministry of Trade and Industry Directorate of International Trade, 2003.

## 8. Quality Standards

In 1963 the Food and Agricultural Organisation (FAO) and World Health Organisation (WHO) of the United Nations (UN) established the Codex Alimentarius Commission to develop worldwide food standards through the Joint FAO/WHO Food Standards Programme. In 1993 the Commission released the *Codex Standard for Prickly Pear (Codex Stan 186-1993)*. It contains provisions regarding quality, classification and sizing of the fruit, prescriptions regarding tolerance surrounding classification and size, as well as guidelines on packaging and labelling. The quality control guidelines spelled out in the Codex are closely mirrored by the South African standard for the export of cactus pear as defined by the *Agricultural Product Standards Act, 1990 (Act No. 119 of 1990) Standards and Requirements Regarding Control of the Export of Cactus Pears*.

Though it is not formally required, it is recommended that exporters to Europe and the United States be able to prove that their produce conforms to the EuroGAP (Good

Agricultural Practices) safety and Hazard Analysis Critical Control Point (HACCP) quality control standards. EuroGAP as a standard addresses consumers' concerns regarding food safety, as well as animal, environmental and employee protection. Strong emphasis is placed on the monitored use of pesticides as well as the traceability of produce back to the point of origin. HACCP places emphasis on hygiene. This includes aspects of physically handling and cleaning the produce, specifying a standard of packaging, ensuring hygienic transport conditions, etc.

**Table 13: Ocean Freight Charges 20' Reefer Container February 2003**

Destination	Shipping time (days)	US\$ est.
Luanda	5	3,850
Cape Town	4	N\$ 5,500
Dublin	30	4,180
Hamburg	25	3,850
Frankfurt	35	3,960
Rotterdam	26	3,960
London	35	4,400
Madrid	35	3,850
Paris	35	4,400
Singapore	25	3,520
New York	40	4,620
Philadelphia	45	4,730
Los Angeles	45	4,950
Jakarta	35	3,520
Lagos	25	3,960
Baltimore	45	4,620

*Source: Ministry of Trade and Industry Directorate of International Trade, 2003.*

Currently, Namibia has no EuroGAP Certification Body. However, should exports pass via South Africa the Perishable Products Export Control Board (PPECB) can be requested to do an inspection of the produce to verify that it conforms to EuroGAP and HACCP standards. The PPECB is a EuroGAP Certification Body as well as enjoys ISO 9001 (component of HACCP) certification status (Perishable Products Export Control Board, 2004). Depending on the size of the consignment, this takes a few hours. Should a chemical analysis be requested, results will be returned within a maximum of three days depending on priority. It should be mentioned that the standards mentioned are safety and hygiene standards, not quality control standards. Ultimately, the easiest way to reach export standard is to comply with the requirements set by an export agent.

Adherence to the EuroGAP or HACCP standards aside, every government still applies particular sanitary and phytosanitary (SPS) measures pertaining to foods safety and animal and plant health of imports. In regards with exports this is the most critical concern. Irrespective of the export destination of produce, or where it leaves Namibia, it needs to be accompanied by a phytosanitary certificate (PC) issued in accordance with the stipulations of the import permit issued by the receiving country. The certificate is issued in Namibia by the MAWRD, Directorate Engineering Services subdivision Law Enforcement. This serves as both a certificate of origin and an inspection certificate. One needs to supply the scientific names of the plants exported. Most countries require that PC be dated within 14 days of shipment.

This sounds more simplistic than it is. For exports to pass smoothly into the importing country, it must be convinced that the standard of inspection locally meets or exceeds its own inspection standards. If this is not the case, one can expect a refusal of an import permit, or an extended period of negotiation before a permit is issued, or delays in transit. Therefore, it should be stressed again that absolute clarity must be had on SPS requirements of a country before shipping goods there. If the MAWRD cannot provide further information, contact the Ministry of Trade and Industry (MTI) or a local embassy or consulate, or alternatively the Ministry of Foreign Affairs (MFA) which may have a mission in the intended country of export.

**Table 14: Procedures for Export**

• Find out freight rates
• Select a shipping line or vessel
• Register cargo on a shipping note and send shipping note to shipping company
• Register details on customs entry forms and send to customs
• Clarify if export permit is required from Ministry of Trade & Industry
• Arrange for adequate packing including shipping marks
• Provide the buyer with storage instructions
• Receive call forward notice from shipping company
• Send goods to port with consignment note
• Receive Bill of Landing from shipping company
• Pay freight bill
• Send Bill of Landing to shipping company and customer and/or to bank acting as intermediary

Source: Ministry of Trade and Industry Directorate of International Trade, 2003.

**Table 15: Air Namibia Domestic Cargo Rates February 2004**

From ... to Eros	N\$/kg (normal rate) 2kg + container	Minimum charges N\$
Ondangwa	18	250
Walvis Bay	18	250
Lüderitz	18	250
Oranjemund	18	250
Swakopmund	18	250
Rosh Pina	18	250
M'Pacha	18	250

Source: Pangwa, 2004.

## 9. Packaging and Labelling Requirements and Costs

For the South African market a 2 kg carton is specified. The dimensions of the fruit cartons used by the Woolworth retail chain is 300 mm by 200 mm by 65 mm. For markets other than South Africa a 3 kg packaging standard is used. The dimensions are 300mm by 400 mm with the height varying between 60 and 90 mm. Under the EuroGAP and HACCP schemes every carton must contain a requisite set of information which allows it to be traced back to the producer. This information can be printed on the carton as is or in the form of a barcode, or attached with a label. The estimated average cost of a carton ranges between N\$ 3 to 5. An export agent may specify a particular type of packaging. For more information also consult Codex

Alimentarius Commission's (1995) *Recommend International Code of Practice for Packaging and Transport of Tropical Fresh Fruit and Vegetables (CAC/RCP 44-1995)*.

On May 13, 2002, the Farm Security and Rural Investment Act (FSRIA) came into force in the United States. It stipulates that perishable agricultural commodities imported into the United States must contain labelling specifying country of origin. Enforcement is the responsibility of the US Department of Agriculture's (USDA) Agricultural Marketing Service (AMS). The US Food and Drug Administration's (USFDA) Center for Food Safety and Applied Nutrition (1999) released a document titled *A Food Labeling Guide*. This guide, along with the guidelines for labelling specified within the *Food and Agricultural Import Regulations and Standards Report (FAIRS)* provides a comprehensive overview of what is demanded in the US market. For cactus pear nutritional information need not be printed on the container (Center for Food Safety and Applied Nutrition, 2004).

**Table 16: Air Namibia International Cargo Rates January 2004**

Windhoek (Hosea Kutako) to:	N\$/kg (shipment 500kg+)
Cape Town	13,37
Johannesburg	14,37
London Heathrow	23,59
Madrid	22,06
Luxembourg	22,06
Frankfurt	19,24
Paris	24,74
Amsterdam	22,06
Hong Kong	20,29
Singapore	29,13
Taipei	27,92
Houston	51,60
Miami	46,53
Los Angeles (LAX)	53,49
New York City	37,83
<b>Additional surcharges</b>	
Security surcharge	1,30
Fuel surcharge	1,20

Source: Kaveru, 2004.

**Table 17: Functions of an Airway Bill**

• Serves as documentary evidence of a Contract of Carriage
• A copy is given to the shipper as Proof of Receipt of Goods
• Serves as an Invoice
• Serves as a Certificate of Insurance
• Serves as a Customs Declaration (presented for customs clearance)
• Serves as a Waybill (where and how the goods are to be delivered)
• Contains an Airway Bill Number (eleven digits of which 1 <sup>st</sup> three are country code)

Source: Ministry of Trade and Industry Directorate of International Trade, 2003.

## 10. Tariff Barriers

Tariffs are levies attached to imported products. Though this may raise government revenue collected from imports, ultimately the aim is to protect local producers. Tariffs

set on cactus products will differ from country to country and from product to product. For queries regarding applicable import tariffs contact the MTI (2004). Namibia is party to a number of trade initiatives which serve to reduce the tariffs levied on goods imported into the US and EU.

- *The Generalized System of Preferences (GSP)*: This system came into effect some thirty years ago under the General Agreement on Tariffs and Trade (GATT), now the World Trade Organization (WTO). Under the Most Favoured Nation (MFN) principle GATT/WTO members had to extend the same tariff to all other members. The GSP was designed to bypass this rule allowing industrialized countries to extend special tariff rates to goods originating from developing countries. The US, EU and Japan all have their own GSP. If cactus pear is not included in the GSP of a country, it will still enjoy a reduced tariff under the MFN rule since Namibia is a member of the WTO. Exports to the EU has to be accompanied by a document called the *Certificate of Origin Form A*. This document can be obtained from the Ministry of Finance (MoF) Directorate Customs & Excise. It has also has to be accompanied by an invoice containing the declaration specified in Table 18. The US does not require GSP Form A. A declaration concerning the origin of the goods *such as* below is sufficient. For more information on the GSP see the section *Useful Websites*.

**Table 18: Invoice Declaration for EU**

<i>English version</i>
<p>The exporter of the products covered by this document (customs authorization No . . . <sup>(1)</sup>) declares that, except where otherwise clearly indicated, these products are of . . . preferential origin <sup>(2)</sup> according to rules of origin of the Generalized System of Preferences of the European Community.</p> <p style="text-align: center;">.....</p> <p style="text-align: center;">(place and date) <sup>(3)</sup></p> <p style="text-align: center;">.....</p> <p style="text-align: center;">(Signature of the exporter; in addition the name of the person signing the declaration has to be indicated in clear script) <sup>(4)</sup></p>

Source: European Commission Expanding Exports Helpdesk, 2004.

- *African Growth and Opportunity Act (AGOA)*: The AGOA was signed into force during 2000 by former US President Bill Clinton. According to the US Department of Commerce (2004): "AGOA authorizes the President to provide duty-free treatment under GSP for any article, after the U.S. Trade Representative (USTR) and the U.S. International Trade Commission (USITC) have determined that the article is not import sensitive when imported from African countries". The AGOA and the GSP overlap. Items not eligible for exemption of import duty under the AGOA are still exempt from it if eligible under the GSP, or if the statutory import duty is zero.

- *The Cotonou Agreement:* Under this agreement with the EU Namibian produce can enter the EU duty-free or at a reduced rate if certain criteria are met. The product must originate in Namibia as well as the bulk of the value added locally. In addition, the goods must be transported directly from Namibia to the EU. Goods must be accompanied by a document called the *Movement Certificate (EUR I)* as well as the invoice declaration specified in Table 18. The Movement Certificate is issued by MoF Directorate Customs & Excise. The Cotonou Agreement will be in force until the year 2008.

Every item exported has a particular customs code. In order to standardize customs codes worldwide a system called the *Harmonized Tariff Schedule (HTS)* has been adopted. Each country links its tariff schemes to the HTS. For information on import tariffs on cactus products for the US one should consult the *US International Trade Commission Tariff (USITC) Database* (United States International Trade Commission, 2004). The equivalent of the EU is the *Integrated Tariff of the European Communities (TARIC) Database* (European Commission, 2004). Tables 19 and 20 contain the tariff rates for cactus pear according to the trade scheme in question. Potential exporters should contact the American Embassy or Delegation of the European Commission in Windhoek, or the MTI, for more information on which tariff rate is applicable before exporting.

**Table 19: EU Import Tariffs on Cactus Pear Depending on Trade Scheme**

Trade Scheme	Duty rate
Third country duty (MFN)	8,8%
LOMA (Cotonou)	0%
SPGL (GSP)	5,3%
South African exports	3,5%

TARIC Code = 0810909550 (*Barbary fig*).

**Table 20: US Import Tariffs on Cactus Pear Depending on Trade Scheme**

Trade Scheme	Duty rate
MFN	2,2%
GSP	Eligible Code A
AGOA	Not eligible

USITC Code = 08109045 (*Fruit, not elsewhere specified or included, fresh*).

## 11. Constraints and Opportunities

There are a number of constraints to farming with cacti in Namibia. Those include:

- **The local market status of cactus products:** since there is no growers' or marketing association in the country, quality control remains an issue, as do the pricing of the product by retail chains, as well the absence of an organised marketing campaign to inform consumers regarding both the use and uses of cactus products. Thus, producers are faced with a very small, but underdeveloped market.
- **Some input costs are restrictively high:** game fencing and irrigation infrastructure if bought within Namibia is extremely expensive. The same



irrigation equipment as found in South Africa may be priced three to four times higher. For an estimate of the cost of establishing a hectare planted with a thousand plants see Tables 21 and 22. Table 22 demonstrates the extent to which input costs can vary. For example, an enterprising farmer may find a cheaper way of transporting the plants; a game fence may not be needed because one is already in place; fertilizing was calculated at the maximum needed - should organic farming methods be applied this input may not be required.

- **Distance to market is restrictive:** transport cost within Namibia and to destinations abroad is extremely high. The restrictive nature of transport cost may make commercial cactus farming only viable near Walvis Bay, near to Hosea Kutako, or the far south of Namibia.
- **Difficulty in accessing new information:** the South African industry is hallmarked by reluctance to the share information between producers. Even the South African Cactus Pear Growers' Association (SACPGA), amongst others founded to promote information sharing between producers, often struggles to obtain relevant information. If a successful local industry is to be established, local producers cannot assume the same attitude. Luckily, the internet is becoming increasingly accessible in the rural areas of Namibia allowing access to information generated by experts who believe information should be freely distributed.

**Table 21: Cost of Establishing One Hectare of Plants**

Item	Cost N\$
Labour clearing hectare	750
1,000 plants ZAR R1.20	3,500
Transport 3m container	4,800
Duties and taxes on plants	727.50
Fertilizers	2982.11
Game fence	4,750
Irrigation system 1,000 plants	10,700
Maintenance cost	1,000
<b>Total *</b>	<b>29,209.61</b>

\*: All prices reflect local market prices calculated at maximum where necessary.

Source: Brand, 2003.

**Table 22: Cost of Establishing One Hectare of Plants: No Game Fence & Certain Costs Reduced**

Item	Cost N\$
Labour clearing hectare	750
1,000 plants ZAR	3,500
Transport @ 50% max	2,400
Duties and taxes on plants	727.50
Fertilizers @ 2/3 max	1998.01
Irrigation system 1,000 plants @ 2/3 max	7,169
Maintenance cost	1,000
<b>Total</b>	<b>17,544.51</b>

- **Insect and animal damage:** though the extreme temperatures in some parts of the country limits the potential for insect damage, containing damage by birds, kudu, baboons and elephants poses its own challenge. One of the most effective ways of keeping animals at bay is solar-powered electrified fencing, though the solar cells may need baboon-proofing. In general, insect damage is controllable with the minimum amount of pesticide. Cochineal is controllable by brushing. The greatest threat to prickly pear is the Argentinean cactus moth (*Cactoblastis cactorum*). The presence of the moth has been verified in Namibia. Brushing the eggs of the plants and letting seriously infected plants die off was found to be the most effective way of controlling it.
- **Access to water:** the fact that the plants are very water-use efficient may create the misperception that they may not require a lot of water. In extreme heat conditions up to 15 mm of evaporation per 24 hour cycle per plant has been recorded in Namibia. This is an important consideration for those planning to farm commercially with the plants since yield is directly related to water supply.
- **Lack of a cold storage network:** Namibia lacks a well developed, nationally distributed cold storage network. Potential commercial producers may have to build on-site cold storage facilities. They may also have to purchase cold storage vehicles if the local transport companies cannot provide cold storage transport.
- **Lack of skilled managers and fruit pickers:** experienced and reliable managers trained in horticulture are hard to find in Namibia. Picking cactus fruit is as much skill as an art. Inexperienced pickers can damage both the fruit and the plant. Time will have to be invested in teaching workers this skill. The technique is to twist rather than pull.
- **Lack of experienced extension officers:** The MAWRD Directorate Research and Extension is currently suffering from a critical shortage of experienced extension personnel. This implies a delayed response time from the side of the Ministry.
- **Cactus pear as an invasive species:** Cactus pear is considered an invasive species in Namibia. This does not prevent commercial farming with the species, but does entail that certain measures must be put in place to prevent the plants from spreading beyond the plantation. For more information in this regard contact the NBRI.

Despite the constraints mentioned, and not ignoring the environmental factors discussed under section 3 of this document, there are a number of reasons why farming with cacti may be a profitable undertaking in Namibia:

- **Cheap access to high quality genetic material:** high quality cultivars such as Morado, Algerian, Gymno Carpo and Skinners Court can inexpensively be

bought in South Africa. Importing the plants into Namibia requires compliance with the stipulations of an import permit issued by the MAWRD, Directorate Engineering Services subdivision Law Enforcement.

- **An expanding health conscious market:** the health benefits of the plant have been mentioned before. Worldwide, the demand for natural derivatives to replace synthetic products is expanding. Especially the food processing and pharmaceutical industries are responding to this. Potential producers should be open-minded and explore opportunities other than fruit production.
- **Environmentally friendly:** conditions in Namibia allow for organic farming of prickly pear. The aim of organic farming is to avoid the use of chemical fertilizers, pesticides, herbicides, fungicides, and artificial growth enhancements thereby farming in harmony with nature, saving cost, as well as ensuring the welfare of farm workers and consumers.
- **Long season:** due to virtually year-round sunshine Namibian producers enjoy a major advantage over other international commercial producers namely an early harvesting season. In some parts of the country the plants come into bloom as early as October. Harvesting can start in November. This means that local producers can have their produce at international markets almost a month before other competitors. Table 23 rates the positive and negative aspects of cactus farming in Namibia.

**Table 23: Potential of Cactus Pear as a Crop in Namibia**

Criteria	Rating
Temperature (minimum & average)	Excellent
Solar radiation and duration	Excellent
Rainfall and distribution	Excellent
Soil conditions on average	Excellent
Availability of genetic material	Excellent
Environmental friendliness of product	Excellent
Local consumer opinion of product	Good
Net income margins on cactus fruit	Good
Human resources	Moderately restrictive
Availability of water	Moderately restrictive
Distance to market	Restrictive
Availability of agricultural information	Restrictive
Bird damage	Restrictive
Cost of irrigation infrastructure	Seriously restrictive
Cost of fencing	Seriously restrictive
Local market status	Seriously restrictive
Transport cost of genetic material	Seriously restrictive

Rating: Excellent, good, moderately restrictive, restrictive, seriously restrictive, near impossible.  
Source: Brand, 2003.

## 12. Getting Started

It is advised that those interested in farming with prickly pear contact the South African Cactus Pear Growers Association. More than 100 South African farmers are affiliated

with the Association. The Association sells a multi-media package which explains the basics of cactus farming. It is also recommended that prospective producers contact the extensions services of the Directorate Research and Extension of the MAWRD, as well as the National Agricultural Support Service Programme (NASSP), for further information.

### **13. Please Note**

All prices cited in this document are not fixed and will change over time. No party mentioned in this document is legally bound to deliver to the reader of this document preferential treatment in this regard. The responsibility rests with the reader to verify information included in this document before acting upon it, or to obtain additional information where needed.

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- Marius Deyzel (CEO)  
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- Bill Stiekema (CEO)  
Prima Fruit  
Export Agency (State President's Export Achievement Award 1994)  
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Cell: (0027) 83 282 0320
- Marco V. Ravetta  
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Clearing & Forwarding (Export Agent)  
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Southern Industrial Area, Windhoek  
Tel: (061) 259310  
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E-mail: [info@impexcargo.net](mailto:info@impexcargo.net)
- Professor Aldo Wessels  
Emeritus; Ex member of CactusNet  
Cell: (0027) 83 4533 270
- Dave McCawley  
Container Security Initiative  
United States Embassy, Windhoek  
Tel: (061) 221 601
- United States Embassy, Windhoek  
Ask for: Trade Advisor  
Tel: (061) 221 601

## 15. Useful Websites

- Codex Alimentarius  
<http://www.codexalimentarius.net/>
- Fresh Produce Exporters' Forum  
<http://www.fpef.co.za/>

- EU GSP  
<http://export-help.cec.eu.int/hdlinks/gsp.cfm>
- Japan GSP  
<http://www.mofa.go.jp/policy/economy/gsp/>
- US GSP  
<http://www.ustr.gov/reports/gsp/>

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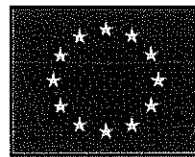


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