

Briefing Memo

Developing a Pecan Industry in Zimbabwe

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Summary:

- Zimbabwe's ideal climate, perfect soils and excellent water resources make it the ideal place to grow pecan trees in southern Africa.
- Pecan trees can contribute over \$US250.0 million per year in annual sustainable foreign exchange earnings to Zimbabwe.
- The Pecan industry is well developed in South Africa and the concept has been proved in Zimbabwe over the last several decades.
- The industry is poised to expand greatly in Zimbabwe on the back of increased uncertainty in South Africa around land rights and the superior growing conditions in Zimbabwe.
- Government has an opportunity to create PPPs in terms of which RDCs, Universities, Prisons etc. can lever their significant land and water holdings to partner with large scale pecan farmers to generate long term sustainable US Dollar income on existing land.

Zimbabwe's competitive advantage is:

1. The unique climate: there are only a few places in the world suitable for growing Pecans – Many areas of Zimbabwe are ideal;
2. Low cost of entry for the access to large scale agricultural estates (land)
3. Excellent water resources
4. A government committed to allowing large scale farming to establish and farm dedicated export crops like pecans. Most recently over 100 hectares of Pecans have been planted at ARDA Balu estates in Matabeleland.
5. An already developed large scale pecan tree nursery which has \pm 300,000 seedlings already in production.

History of the Pecan

The history of pecans can be traced back to the 16th century. The only major tree nut that grows naturally in North America, the pecan is considered one of the most valuable North American nut species. The name "pecan" is a Native American word of Algonquin origin that was used to describe "all nuts requiring a stone to crack." Originating in central and eastern North America and the river valleys of Mexico, pecans were widely used by pre-colonial residents.

Pecans were favored because they were accessible to waterways, easier to shell than other North American nut species and of course, for their great taste.

Because wild pecans were readily available, many Native American tribes in the U.S. and Mexico used the wild pecan as a major food source during autumn.





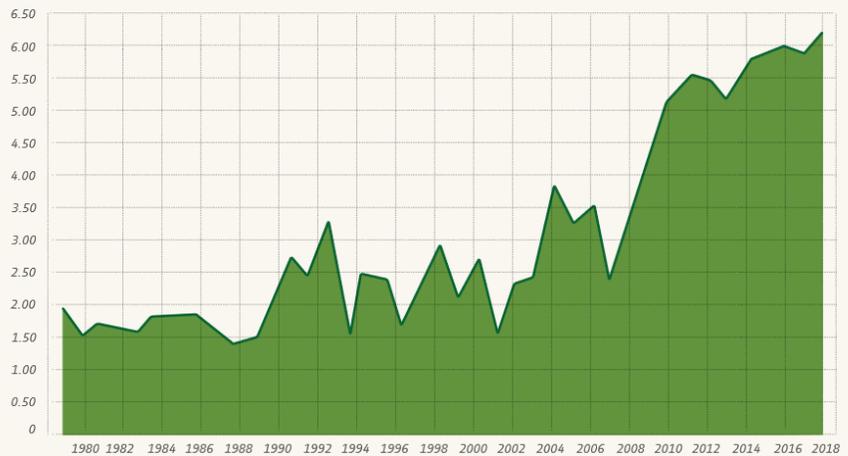
For the past 30 years from a growing market, the constant increase in demand has exceeded supply, resulting in maximum sales at a high price. While production is estimated to double in the upcoming years, the market demand is forecasted to grow by 400% over the same time span.

80% of the pecans that are supplied to the global pecan industry originate from the United States. In most seasons, up to 140,000 metric tons are produced.

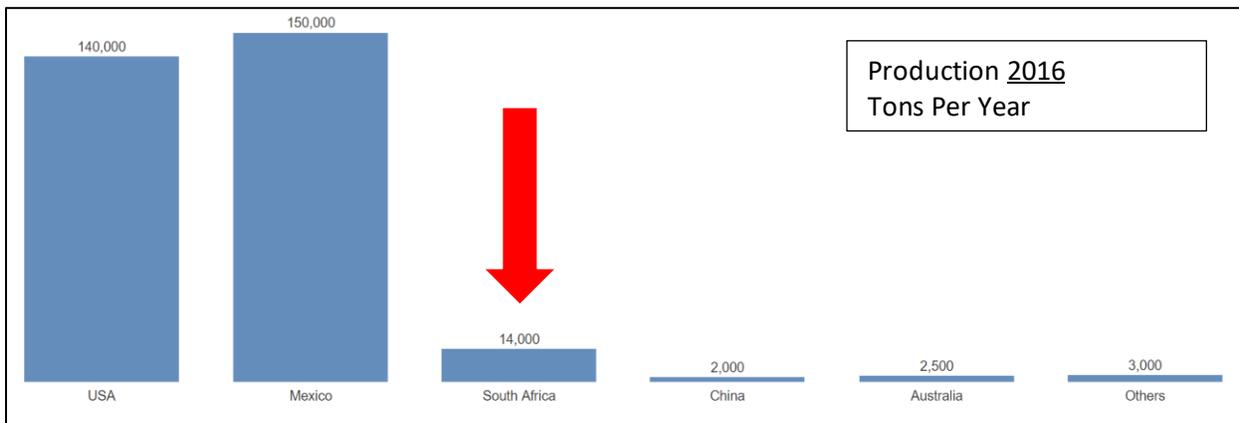
Pecan prices are rising steadily along with increased demand from consumers for healthy alternative food. In recent years China has emerged as one of the largest new export customers for Pecans and demand is projected to steadily increase as is price

Price Development Pecans 1980-2018

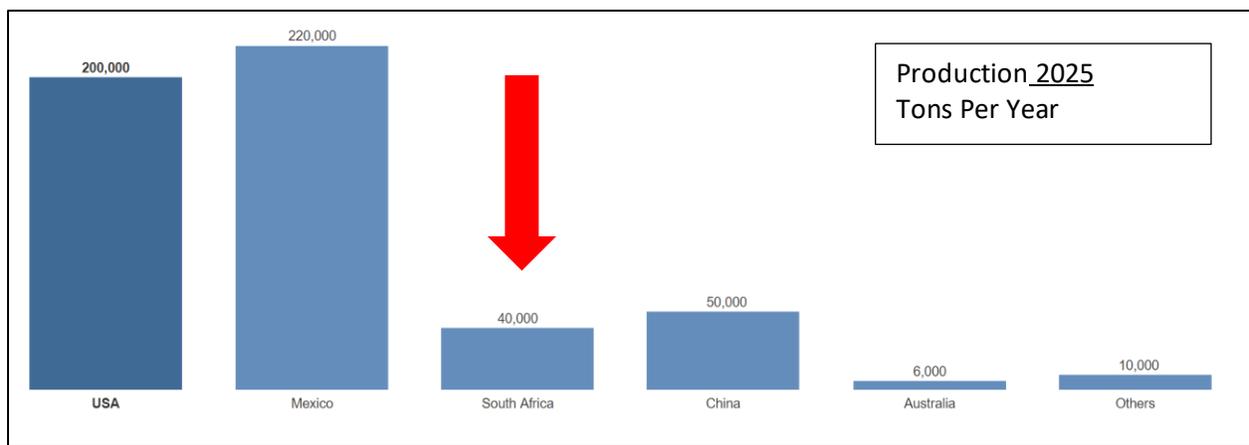
Price evolution of in-shell pecans in USD/Kg from 1980 to 2018
Price USD/Kg



Sources: The Wall Street Journal (1980-2012) and PecanReport.com (2012-2018)



Production in Southern Africa is growing – Zimbabwe needs to be a large part of that growth.



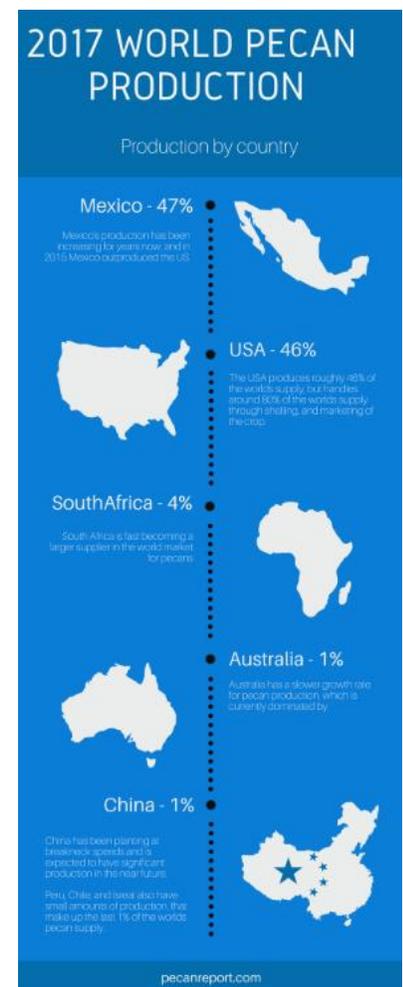
As Southern Africa expands its production of Pecans, it can start **dictating pricing** to its export customers globally (primarily in Europe and China). A suggestion is to ally Zimbabwe’s pecan marketing efforts with those of South Africa to benefit from increased trade leverage.

Why Zimbabwe? Zimbabwe and South Africa

Ideal Pecan growing conditions are only found in certain areas around the world. Almost 90% of production takes place in the Northern Hemisphere which gives the Southern Hemisphere an excellent opportunity to produce in the “opposite” season. Zimbabwe’s climate, water and unique setting make it the perfect place to grow pecans.

Nuts harvested in the “opposite” season have the advantage of better quality and lower cost compared with nuts grown in the Northern hemisphere which have to be placed in cold storage to hit the premier export marketing season.

- The Pecan tree is well adapted to sub-tropical areas. It also grows well in areas with short, cold winters and long very hot summers such as Matabeleland and the Midlands.
- In South Africa, the first pecan trees were imported to Kwazulu-Natal around the turn of the 19 / 20th centuries. In Zimbabwe Pecans have been grown in Masvingo and various other areas for the past 30 years.
- Due to optimal conditions, the largest plantings today exist in the Vaalharts region of South Africa, with the small hamlet Tadcaster as the Pecan Capital of South Africa.
- JG Goddard has planted over 100 ha of Pecan orchards in Matabeleland; P DeChassart and E Galante have planted the first 100 hectares of 1000 hectares (projected) on ARDA Balu Farm in Matabeleland; H Schur has planted over 40 Ha in Matabeleland and new plantings are starting to be planted Zimbabwe.
 - Today, South African Pecan Production is in excess of 15,000 tons/ year. This represents export revenue of over \$90.0 million annually.
 - However – there are a number of problems in South Africa which make the development of the Zimbabwe Pecan Industry very attractive:
 - Political uncertainty, land reform and land redistribution remain a large challenge in South Africa.
 - The cost of electricity in South Africa has increased dramatically.
 - The focus will have to change from low labour cost, to higher productivity.



- Water quality is under constant threat – with the Vaal river being limited and the quality compromised due to upstream mining activities
- Disease pressure will increase as more orchards are planted.
- There are several reasons that Zimbabwe – and Matabeleland South in particular is a superior region for growing Pecans:
 - The Zimbabwe government is 100% export focused and supportive (i.e. ARDA JV)
 - Zimbabwe has the Perfect climate, soils and water for growing the Pecan tree.
 - Our weather patterns are more stable (with less spikes in overheating)
 - Our water quality is pure – in the numerous farm dams which are underutilized
 - Our soils are perfect sandy loam soils
 - Our labour is better educated and less cost



**Pecan Orchards being Planted at ARDA Balu Farm – August 2018
Matabeleland, Zimbabwe**



IN late 2017, ARDA signed a long-term farming agreement with Kalimba Enterprises (Pvt.) Ltd. in terms of which Kalimba will plant up to 1000 hectares of Pecan orchards on Balu Farm. 100 hectares are being planted in the 2018 season. In 2019, Kalimba will plant an additional 150 hectares on Balu, and thereafter, 250 hectares per year for the next 3 years. This will result in a farm, whose annual export revenues will be ± \$US22.0 million.

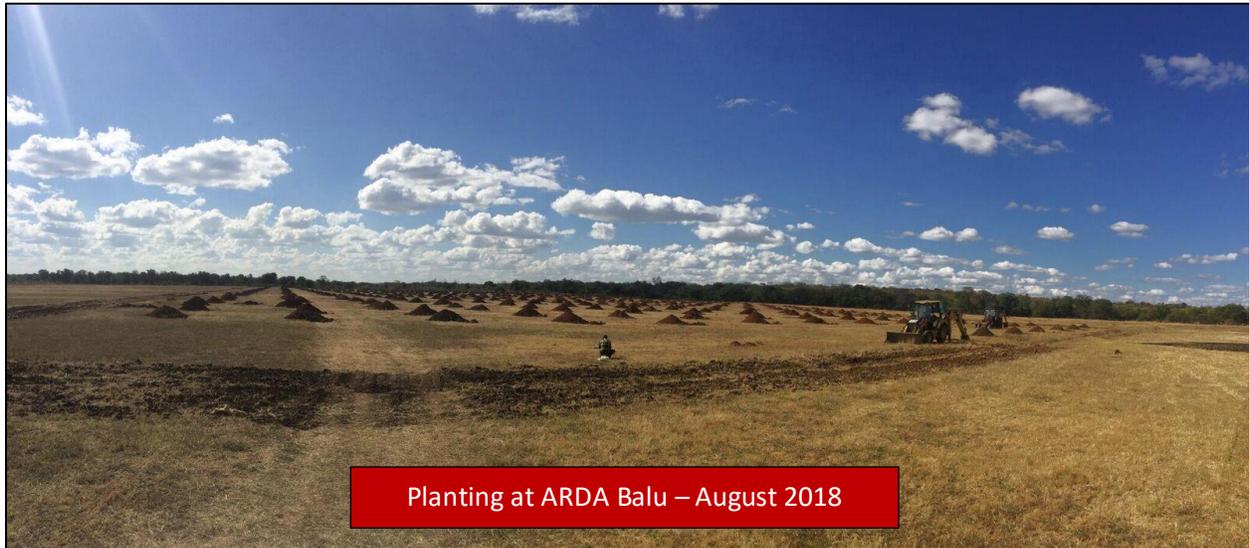
ARDA is actively assisting the Kalimba promoters with acquiring further farms for Pecan plantations.

Zimbabwe Pecans (Pvt.) Ltd. are planning a similar farm at Fort Rixon where they plan to plant 1,500 hectares of Pecans. Application for the land allocation has been made to the Ministry of Lands. Support from the executive is requested to facilitate this project.

JG Goddard is planning on expanding his pecan plantation in Matabeleland to 500 ha.

Additional Zimbabwean farmers are purchasing trees from the nursery in Ft Rixon. The nursery has over 300,000 pecan seedlings planted – enough to plant 3000 hectares of Pecan trees in the next two years. More seedlings are being planted annually.

There is increasing interest from South African Farmers who wish to invest their capital and expertise in building a pecan industry in Zimbabwe.



A pecan tree will start to produce nuts after the fourth year of planting but will only reach full potential after seven years and beyond.

- The pecan-nut tree is well adapted to subtropical areas.
- It also grows well in areas with short, cold winters and long, very hot summers.
- Low temperatures and even frost during June to August are required for successful budding and flower formation.
- During the summer months (October to April) the tree requires high temperatures for fruit growth.
- Trees are successfully established in valleys and along rivers where the winter temperature is low and frost occurs.

Vision:

Scaling the Pecan Industry in Zimbabwe

To create a series of large scale PPPs between Rural District Councils (RDCs), Universities, Prisons, ARDA etc. in all suitable provinces, in order to roll out large scale pecan plantations which will be sustainable enterprises, earning foreign currency over generations.

Zimbabwe Pecans will bring trees, agricultural extension services, and training to the Partnerships, and will source capital for the farming enterprises. Landowners will provide access to land and water. These PPPs will result in Long-term, sustainable sources of foreign currency income for the RDCs, Prisons, ARDA etc.

Temperature

The average monthly maximum temperature should be higher than 28 °C during summer and lower than 23 °C in winter.

The average monthly minimum temperature during the summer must rise above 16 °C, but drop below 8 °C in winter.

Humidity and rainfall

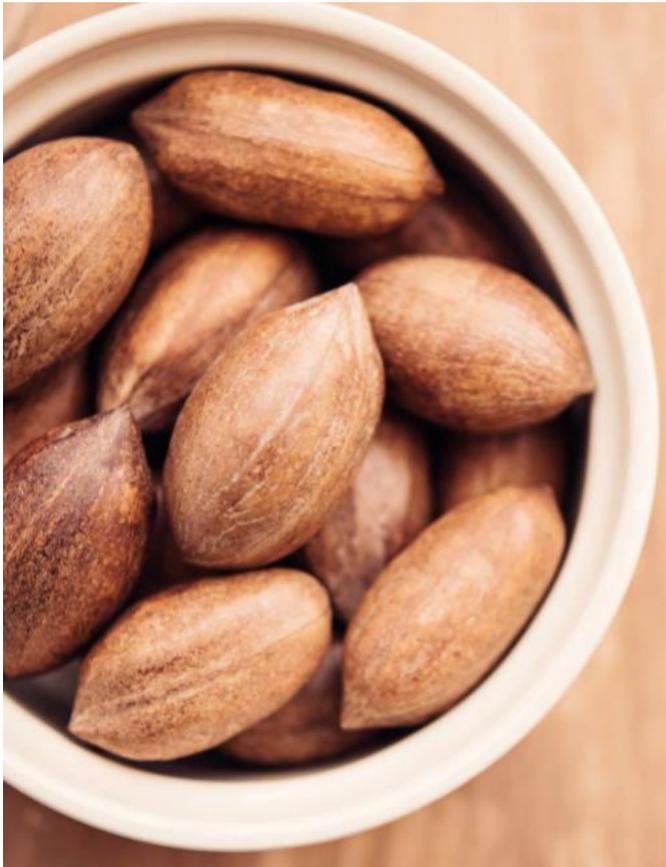
High humidity and rainfall are ideal for the development of scab.

The most suitable production areas are therefore those with short, cold winters and long, hot summers, with no early or late frost and a humidity below 55 % during the greater part of the growing season.

Soil requirements

The pecan-nut tree performs best in a fertile, well-drained, deep soil with a loose to medium texture.

In summary – Pecans are



- Perfectly suited to many areas of Zimbabwe
- a 100% high value export crop
- require little or no foreign inputs
- resistant to disease and pests
- represent diversification away from traditional export crops such as tobacco
- renewable over 100 years
- increasingly in demand.
- Suitable for small scale farming

Small Scale Farming – the “hub and spoke” system:



Pecan orchards in Ft. Rixon Zimbabwe

The concept is to implement an out grower scheme from each major Pecan Farm that would develop the required nurseries, fertilizer and chemical supply, agricultural extension services and ultimately collection points of the pecans from small scale farmers for onward transport of the harvest to a centralised shelling, packing and marketing facility.

Each Hub would, in addition to supporting the 100,000 pecan trees grown on each 1000 ha Zim Pecan Farm, look to place an additional 50,000 pecan trees on land belonging to Zimbabwean small-scale farmers who would be supported by the Hub in respect of fertilizers, chemicals and technical advice. Once the farmers started to produce pecans, the ‘hub farm’ would collect the harvest for onward transport to a centralised shelling, packing and marketing facility.

At 20 kilograms of pecan nuts per tree per year, at a price to the farmer of US\$6.00 of pecan nuts in shell, a farmer could generate US\$120.00 per tree per year (after 7 years). Our research demonstrates that a Zimbabwean small scale farmer supported by his family

could reasonably manage an orchard of 50 pecan trees depending on his resources, commitment, land available and distance to reliable permanent water.

A pecan tree will start to produce nuts after the fourth year of planting but will only reach full potential after seven years and beyond. In order to make this project sustainable to a small scale farmer, the Hub will need to subsidise the initial cost of planting the pecan trees and then incentivise the small scale farmers with a small annual payment related to the growth of the pecan trees until they start to produce.

Other Technical Data

Orchard Establishment Operating Costs

The land is assumed to be deep, well drained, and either a class I or II soil. The orchard site allows for a uniform water flow by microjet irrigation.

Site Preparation.

Land preparation is by excavation and breaking up the soils 1.5 – 2.0 m deep in the tree row and subsoiling the middles to break up any underlying hardpan or mix stratified soils that would affect root penetration and water infiltration. Following ripping and slip plowing, the ground is disked twice; then leveled with a triplane to allow for efficient irrigation. Tree rows are sprayed (20% of the land area) with an herbicide and then incorporated by disking one time. Although all operations that prepare the orchard for planting are done in the year prior to planting, these costs are included in the first year's expense.

Trees.

Rootstock planted is Eucalinga, the proven rootstock for Southern Africa. Cultivars that represent the majority of recent pecan acreage in South Africa are: Wichita, Shoshone, Barton and Pawnee. These orchards include Wichita or Pawnee as the main variety (75% - 80%) with one or two of the remaining three varieties included where pollen shedding and bloom periods coincide to ensure adequate pollination. The trees on this farm will be planted on a 10 metre X 10 metre spacing, 100 trees per hectare. Pecan trees have a long production life (> 100 years) if they are well maintained.

Planting

Planting the orchard starts by marking tree sites, digging holes, planting and watering in the trees. Later, trunks are treated with white, water-based paint to protect them from sunburn. New trees are topped soon after planting and one shoot trained up to be the trunk. Regular pruning begins in the second year. Trees are pruned to a modified central leader shape (similar to walnuts) and most limb selection is done during the third and fourth years. Hand pruning continues through the fifth year, after which mechanical pruning (hedging and topping) is the typical practice. Pruning is done in the winter months. In the second year, 2% - 5% of the trees are replaced due to tree death or poor growth.

Production Cultural Operating Costs**Pruning.**

Pruning is done during the winter months (July - August) with the use of mechanical hedgers, but mechanical towers for hand pruning are also commonly used. Beginning in the sixth year, one-half of the trees are hedged and topped each year, usually every other middle, resulting in a hedging and topping cut to one side of every tree adjoining that middle. Prunings are placed in the alternate row middles and shredded.

Nut Thinning. Nut thinning by mechanical shaking is done as needed on over-loaded trees. Nut thinning improves nut quality (size and kernel fill) and mitigates alternate bearing. The assumption is that one third of the trees require thinning each year.

Fertilization. Nitrogen such as UN-32 (liquid fertilizer) is applied to the soil surface prior to an irrigation. Zinc is applied as a foliar spray four times from. Zinc sulfate is mixed with low biuret urea (L.B.) or potassium nitrate each time to enhance zinc uptake. Low biuret urea is applied and also adds a small amount of foliar nitrogen to the trees.

Leaf Sampling. Leaf - tissue samples - sampling for nutritional analyses are taken in July. It is assumed the cost will include an individual who will collect one sample per 20 acres and take approximately 3 1/2 hours to collect, package, and ship the samples.

Weeds. Prior to planting, herbicide is applied to the marked tree rows and incorporated by disking. In the second fall residual herbicides are sprayed in the tree rows (20% of the orchard). The row middles are disked during the first two years, and in the third year and subsequent years, they are mowed. Zim Pecans will rotate plastic sheeting/ inter row to kill weeds on an ongoing basis.