



**PROPOSAL FOR ESTABLISHING
GREENFIELD
SUGAR ESTATE WITH INTEGRATED
SUGAR COMPLEX AT SONGEA,
RUVUMA REGION IN TANZANIA**

November, 2022



MADHVANI GROUP

PROPOSAL FOR ESTABLISHING GREENFIELD SUGAR ESTATE WITH INTEGRATED SUGAR COMPLEX AT SONGEA IN TANZANIA

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1.0 PREAMBLE

The Madhvani Group has expressed their interest to invest in Tanzania, accordingly, forwarded a letter to Tanzania Investment Centre (TIC), dated 6th July, 2022, requesting land for Sugar Project measuring 44,000 ha in Magwamila and Nakawale in Songea District, Ruvuma Region, Tanzania. TIC responded positively vide their letter dated 13th October, 2022, and mentioned to submit the following information from the Madhvani Group:

- i) Company registration document,
- ii) Business plan,
- iii) Justification of the need of the size of the land that has applied,
- iv) Total value of the proposed project,
- v) Number of people to be employed,
- vi) Proposed installation and annual sugar production capacity,
- vii) Investment plant,
- viii) Company experience in managing sugar plantation and factory,
- ix) Company experience in sugar marketing and distribution,
- x) Proposed Outgrowers scheme,
- xi) Evidence of financial capacity to finance the proposed project,
- xii) Any information needed to facilitate the decision in favour of the Madhvani group

Accordingly, The Madhvani Group is submitting this Proposal for Establishing Greenfield Sugar Estate with Integrated Sugar Complex at Songea District, Ruvuma Region in Tanzania.

This Proposal details of all the points mentioned in the TIC letter, however, for ease of presentation and understanding, the proposal is bifurcated as following:

- A About the Madhvani Group**
- B About the Project**
- C Summary**

Each of the above are detailed in the below paragraphs.

A ABOUT THE MADHVANI GROUP

1.0 INTRODUCTION TO THE MADHVANI GROUP

The Madhvani Group is one of the largest diversified private-sector groups in East Africa. Starting in Uganda in the early 1920s, the Group has developed into a widely-diversified conglomerate with a geographical spread into various African countries, the Middle East, India and North America. The Group's current turnover in Uganda exceeds USD 300 million. The Group's assets in Uganda are valued in excess of USD 1.0 billion, with several units undergoing major expansion.



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The Group is the largest Private sector investor in industry in Uganda, with a substantial presence in the following:

- Agriculture and agro-processing
 - Sugar cane
 - Tea
- Sugar
- Sweets & confectioneries
- Renewable energy,
- Ethanol / Potable spirits,
- Packaging (glass, corrugated cartons, poly-sacks etc)
- Matches
- Steel

In the growing services sector of Uganda, the Madhvani Group has a presence in:

- Hotels & tourism
- Insurance
- Construction
- Distribution of industrial products and consumer durables

The group has an outstanding track record in turning around dormant companies, and has achieved a market leadership position in most of the sectors in which operates.

The flagship of the group is Kakira Sugar, which was formed in 1985 to take over the old assets of Madhvani Sugar Works Ltd in Eastern Uganda – a factory that was no longer operational and a nucleus estate that had reverted to bush. Under the group's management, the Kakira sugar complex has been fully rehabilitated with the original financing from the World Bank, African Development Bank and Uganda Development Bank.

The sugar factory currently operates at a crushing capacity of 8,000 tons cane per day during the 11.5 months crushing season. Sugar cane is cultivated on the company's own estate of over 16,500 ha supplemented by cane from over 10,000 Outgrower farmers grown on 25,000 ha. During the 2021-22 season, the factory has crushed over 2.2 million tons of cane to produce 187,000 tons of sugar maintaining its position of Uganda's largest sugar producer.

The company employs over 12,500 people and has been the catalyst for socio economic development of the rural area surrounding the mill, providing the means of livelihood to over 150,000 people in the South Busoga region.

The sugar complex includes 51 MW cogeneration plant which supplies about 32 MW to the Uganda National Grid with the remaining electricity generation being used for internal consumption.

The Group owns and operated the only sugar complex in Rwanda – Kabuye Sugar Works.



In Uganda, the Group owns two tea estates over 500 ha with a tea factory and exports over 1,000,000 kg of tea each year.

Another focus area for the Group is tourism with activities centered in the various National Parks / Reserves. The Madhvani Group operates the four leading safari lodges in Uganda and three premium safari properties in Kenya.

The Madhvani Group's Presence in Tanzania

In Tanzania, the Group has an associated company Kioo Ltd in Dar-es salaam, which has the largest container glass plant in East Africa.

The Group is also planning a beach resort in Zanzibar.

Considering the Madhvani Group's long-established presence in East Africa with 100 years' experience of business in diverse fields and the core values of integrity and long-term commitment, the Group has a vision of continuing growth and contributing to the prosperity in the region.

2.0 GROUP'S EXPERIENCE IN MANAGING SUGAR PLANATION AND FACTORY

The Madhvani Group has decades of in-depth experience in managing sugar complexes (both nucleus cane estate and plant) in several countries including – Uganda, Rwanda, India and Tanzania.

The Madhvani Group owned and successfully managed the Mtibwa Sugar complex in Tanzania until it was nationalised by the government.

Summary of the Madhvani Group role is given below in rehabilitating the sugar estate and the sugar plant in Uganda since 1985 to make it the largest sugar complex in Uganda crushing around 2.2 million tons of cane each year to produce more than 50% of the country's sugar consumption. This includes development of over 10,000 Outgrower farmers to supplement the cane supply from the Company's own nucleus estate as well as diversification into value-added products such as

- Bagasse cogeneration of steam and 51 MW of green electricity (including 32 MW for sale to the grid).
- Production of 22 million litres per year of ethanol from molasses – both 96.4% Extra Neutral Alcohol (ENA for potable spirits) and 99.8% Anhydrous Bio Ethanol (for blending with petrol)
- Blending, flavouring, maturation and bottling of premium Potable Spirits using ENA
- Sweets and confectionary (based on sugar).

❖ Adding Value to Sugarcane since 1930

Kakira Sugar Limited is Uganda's leading processor of sugar cane, with a state-of-the-art fully integrated complex to add value to every by-product.



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Our core brand, Kakira Sugar, is extracted from cane grown on lush plantations on the fertile shores of Lake Victoria. The sweet crystals, with their distinctive flavour and rich golden colour, have sweetened foods and beverages all over Uganda since the 1930s. Kakira is the flagship enterprise of a diverse portfolio of affiliates that make up the Madhvani group.

❖ History

Kakira Sugar Limited (KSL) is one of the oldest sugar milling companies in Uganda and the flagship enterprise of the Madhvani Group. Established and owned by the late Muljibhai Prabhudas Madhvani, the company was first set up in 1930, with the capacity to crush 150 Tonnes Of Cane Per Day [TCD]. By 1954/5 – this sugar complex had been expanded to a capacity of 2,500 TCD with 2,800 hectares of land under sprinkler irrigation.

In 1972, political upheaval completely disrupted the Ugandan economy.

In 1985, a new government enabled the Madhvani family to repossess the dilapidated factory. The new company set out to establish a new plant and rehabilitate the sugar cane plantation and other infrastructure at a cost of over US\$60 million funded by loans from the World Bank, African Development Bank and Uganda Development Bank.

Currently, KSL is fully owned by East African Holdings Ltd and has been expanded in phases to the present capacity of up to 8,000 tonnes of cane per day (TCD). This translates to over 2 million tonnes of cane crushed per year to produce over 180,000 tonnes of sugar annually.

❖ Our Values

We aim to excel in producing sugar, power and down-stream products, while maintaining our position as the leading sugar manufacturer in Uganda. With a well-trained experienced team and motivated Outgrowers, we process sugarcane to produce and sell top quality branded sugar and provide reliable green electricity for the Uganda grid. In addition, we distil our molasses by-product to produce premium ethanol, for use for potable spirits or as a bio-fuel when blended with automotive petrol.

We pursue operational best practices whilst maintaining quality, safety and the highest ethical standards in order to satisfy customers, increase stakeholder value and maintain a sustainable environment. We continuously improve the use of natural resources in a sustainable manner.

At KSL, we set and regularly review our integrated management system objectives to ensure:

- Effectiveness
- Sustainability
- Continuous improvement



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We comply with prevailing legal requirements regarding quality and environment as well as international standards and best practices necessary for meeting our targets. We utilise modern and develop complementary products to add value to the business.

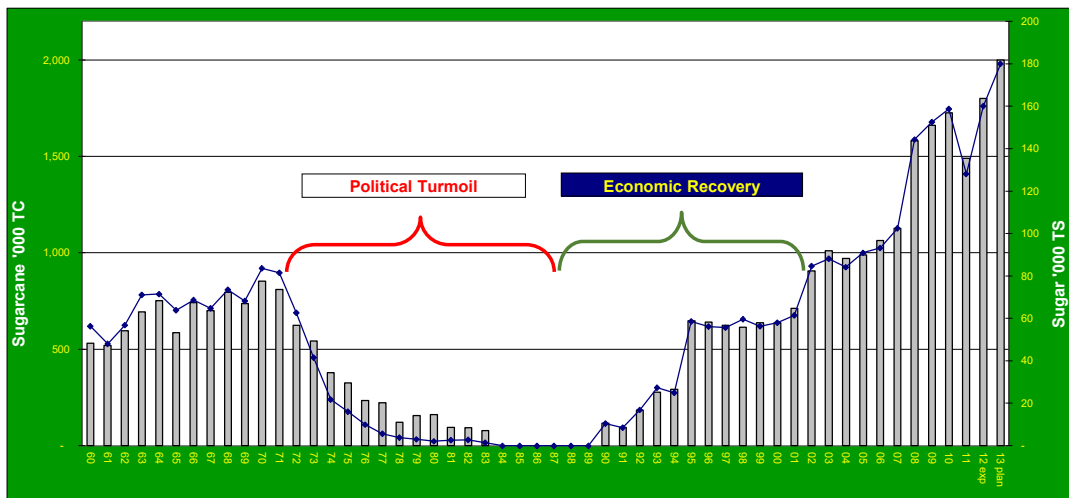
❖ Team

Kakira Sugar Limited is a socially responsible employer of over 12,500 people, providing them with several amenities such as serviced accommodation and a midday meal. Workers freely associate in an active trade union that holds a regular collective bargaining. Together with direct employment, KSL activities support the livelihoods of over 150,000 Ugandans through outgrower farmers, cane transporters, customers, ancillary and support industries, and contribute significantly to the government's effort for improved livelihood of Ugandans.

We believe in facilitating and enhancing professionalism, employee loyalty and worldwide business relationships. All employees are involved in converting our vision into action, and management strives to communicate and support norms and values that enhance continuous improvement.

Under the supervision of professional directors and management, our loyal and dedicated workforce continue to pursue the best business practices that ensure brand continuity and seal the Kakira Sugar legacy for decades to come.

Kakira Sugar Production (1960 – 2012)





❖ Our Business

Sugar

Kakira Sugar Limited makes sugar from cane grown on 9,500 hectares of its own nucleus estate, as well as an additional 7,000 hectares in KSL-managed satellite projects.

The balance cane is supplied by over 10,000 Outgrower farmers independently cultivating more than 25,000 hectares.

The Kakira factory produces over 187,000 tonnes of sugar per year, and nearly 50% of the sugar consumed in Uganda. Our brand is the most popular countrywide because it is sweet, with distinctive taste and flavour, and a rich, golden colour. Kakira Sugar is offered in range of attractive pack sizes addressing the needs of all our consumers, from 6.5 mg sachets to 50 kg bags.

Electricity

The residual fibre left after the juice is extracted out of the sugar cane crushing is called “bagasse” in the industry. The factory needs electricity and steam to run, both of which are generated using this fibre as a fuel. The bagasse is burnt in specially-designed large high-pressure boilers to generate high pressure steam. This high-pressure steam drives turbines in order to produce electricity. The low-pressure steam from the turbine exhaust is redirected into the sugar factory thereafter and its heat is used in the process of converting cane juice to sugar. Producing steam and electricity in this way is called ‘bagasse co-generation’. Kakira generates 51MW of electric power and currently sells up to 32 MW of power to Uganda’s national grid. Our cogeneration facility is one of the largest in Africa, with annual electrical power generation of around 370GWh.

Extra Neutral Alcohol

At Kakira we constantly improve and refine our farming and production processes to enhance efficiency and conserve the environment.

The sugar making process yields about 74,000 tonnes of molasses as a by-product, and in the spirit of continuous improvement and zero waste, KSL diversified into distilling in 2016. The state of the art Kakira Distillery has a capacity of 20 million litres per annum of either anhydrous (99.8%) bio-fuel ethanol or 96.4% purity Extra Neutral Alcohol (ENA). Anhydrous biofuel ethanol can be easily blended with petrol for use as an engine fuel for automobiles, which is good for the environment as it not only reduces fossil fuel consumption but also results in lower carbon monoxide and carbon dioxide emissions. Our production focus is currently on ENA, as we eagerly anticipate legislation that will operationalise the use of anhydrous biofuel ethanol in Uganda.

Spirits

At Kakira we use some of our premium ENA to blend, flavour, mature and produce a range of premium potable spirits which include gin, rum and vodka. Although new to



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the market, these top-notch Kakira products have already been recognised in international blind-tasting spirits competitions in the UK and the US. As of May 2022, Kakira's spirits had gathered four international medals.

Sweets

At a separate factory within the Kakira complex, we produce a variety of sweets made from our sugar. This ISO certified unit specialises in hard boiled sweets, and currently produces about 3,000 tonnes a year. This facility is the largest of its kind in the country, with a regional market base.



3.0 CORPORATE SOCIAL RESPONSIBILITY (CSR)

The Madhvani Group has an exceptional reputation for corporate social responsibility as well as sustainable business practices. This information facilitates TIC to make "allotment of Songea land" decision in favour of the Madhvani Group.

➤ THE KAKIRA COMMUNITY

• Life at Kakira

Kakira Sugar established and maintains **16 schools** (7 nursery schools, 8 primary schools and 1 secondary school) to provide education to over 4,000 children of employees. The performance of the primary schools is among the best in the country.

The company also provides **medical support** through a 75-bed hospital, 2 clinics, outreach services clinics and 2 standby ambulances for quick patient referral. The Kakira Hospital is a 4-star Ministry of Health Uganda recognised facility, managed by 4 full-time doctors. It serves a total population of over 100,000 people within the township and the surrounding communities, in accordance with the Ministry of Health guidelines. Furthermore, Kakira Sugar Limited Hospital is ISO 18001 certified.

Social infrastructure includes staff housing (over 4,000 units), potable water supply, electrical distribution systems and roads.

• Our Farmers

In addition to growing sugarcane on its own estate, KSL also buys sugarcane from over 10,000 Outgrower farmers, who cultivate cane on 25,000 hectares of their own land. About 60-65% of the sugarcane milled is purchased from the Outgrower farmers.

KSL invests heavily in farmer development to ensure that our partners in production can get their cane to the factory. We provide them facilities such as cash advances, seed



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cane, agro-chemicals and training, in addition to land development. KSL also maintains several kilometres of roads in the Outgrower area to enable the farmers move their cane safely.

- **Environment**

Tree planting : KSL has planted millions of trees in the Busoga region, with a vibrant dedicated horticultural department raising and planting seedlings. The company plants an average of 60,000 trees each year on the estate and farmers' areas.

Sustainable no-waste production and effluent treatment: Kakira received ISO 14001 certification in 2011. The ISO 14001 Environment Management System standard is an internationally recognised systematic framework to manage the immediate and long-term environmental impacts arising out of an organisation's activities, products and services. We use cleaner production techniques and manage our water and steam usage to reduce wastage. KSL is also one of the few companies in Uganda which operates a state-of-the-art effluent treatment plant with an Upflow Anaerobic Sludge Blanket [UASB] reactor to treat all waste water from the plant before it is released back into the environment.

Emergency response: Not only are our production processes eco-friendly, we have the facilities to actively respond to emergencies in our environment. Kakira has a fully trained and equipped team of fire marshals and three fire trucks, which are freely available to also handle emergencies in surrounding areas off the estate.

- **Community outreach**

The company maintains a road network for surrounding communities, which allows for quick and easy access to many underserved areas. The maintenance and support for roads, also extends to health centres and schools in the Outgrower farmer areas. Kakira Sugar also makes regular donations of food items and cleaning supplies to several homes that care for hundreds of orphans and vulnerable persons.

- **Kakira Outgrowers Rural Development Fund**

Kakira Outgrowers Rural Development Fund (KORD) is a not-for-profit joint venture between farmers and KSL, with the objective of improving the quality of life of the farmer communities. Registered in 2005, KORD is the brainchild of Kakira Sugar Limited and the Busoga Sugarcane Growers Association. The initiative has won awards for being the best African NGO-business development partnership. KORD administers a development fund which both the Outgrowers and KSL contribute to. For every tonne of Outgrower sugarcane that is crushed by Kakira, 250 Uganda shillings is deposited by the farmer, and 125 Uganda shillings by Kakira Sugar Limited. This money is then channelled to the development of key services in the Outgrower areas.

For instance, since inception KORD has been responsible for the construction and maintenance of 55 kilometres of roads, specifically in swampy areas, to improve farmers' access to the cane growing area. KORD has also built school classroom blocks,



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laboratories and health centres in the area. They are also responsible for the care and education of orphans and vulnerable children.

KORD has spent over US\$ 1.5million since 2007 to build infrastructure and provide care. These include:

- Facilitating over 1,000 orphans and vulnerable children to access formal education, training in modern farming and making basic household items.
- Constructing maternity wards, outpatient clinics, counselling/laboratory blocks and facilitates community talk shows on malaria, HIV/AIDS, etc.
- Building over 23 classrooms and 6 science laboratories to enhance education services
- Rehabilitating community roads in swampy areas located in various districts of Busoga

- **Electricity**

Kakira's Co-generation power plant produces a total of 51MW of electricity. This meets the entire energy requirements of the factory and the estate, and also supplies 32MW of sustainable green power to the Uganda national grid.

- **OTHER CSR ACTIVITIES**

- **Education**

Muljibhai Madhvani Foundation: The Muljibhai Madhvani Foundation is a charitable trust established in 1965, with the aim of empowering Ugandans by providing scholarships to students pursuing scientific and technical tertiary education in Uganda. The fund is supported by the rent earnings from Madhvani Group-owned property in the central business district of Kampala city. The annual scholarship fund currently stands at UGX 750 million, allocating 75% to undergraduate courses and 25% postgraduate courses. Beneficiaries are selected exclusively on merit, competence, ability of the candidates and financial background of the family. Please see www.madhvanifoundation.com

Kakira Sugar Busoga Foundation: In 2018, Kakira Sugar Limited established the Kakira Sugar Busoga Foundation. The UGX 400 million scholarship fund is aimed at specifically sponsoring students in vocational training to address the high levels of unemployment in the region. Thirty percent (30%) of the scholarship is distributed to biological dependents of KSL employees, thirty percent (30%) to dependants of registered KSL out-grower farmers and the balance forty percent (40%) to students within the Busoga sub-region.



4.0 EXPERIENCE IN SUGAR MARKETING AND DISTRIBUTION

The Kakira factory produces over 187,000 tonnes of sugar per year, and nearly 50% of the sugar consumed in Uganda. Our brand is the most popular countrywide because it is sweet, with distinctive taste and flavour, and a rich, golden colour.

➤ **Sugar Sales May 2021-April 2022**

Sales:

- 200,767 Tons sold from May 21 to April 22. Out of that 189,043 tons for 50/25/10 Kg bags and balance 11,723 for consumer packs consisting of 5/2/1 kg + 500/250 grams.
- In terms of Domestic and Exports Sales, it is 151,189 tons and 49,577 tons respectively
- In June 2021 Kakira launched 10 Kg PP Bag aimed at bridging the price differential between high end laminated consumer packs and 50/25 kg positioned at relatively lower end. 10 Kg bags have recorded 3,698 tons sales in a span of 10 months. Looking at its steep growth, competitors are now joining in the fray.

Exports:

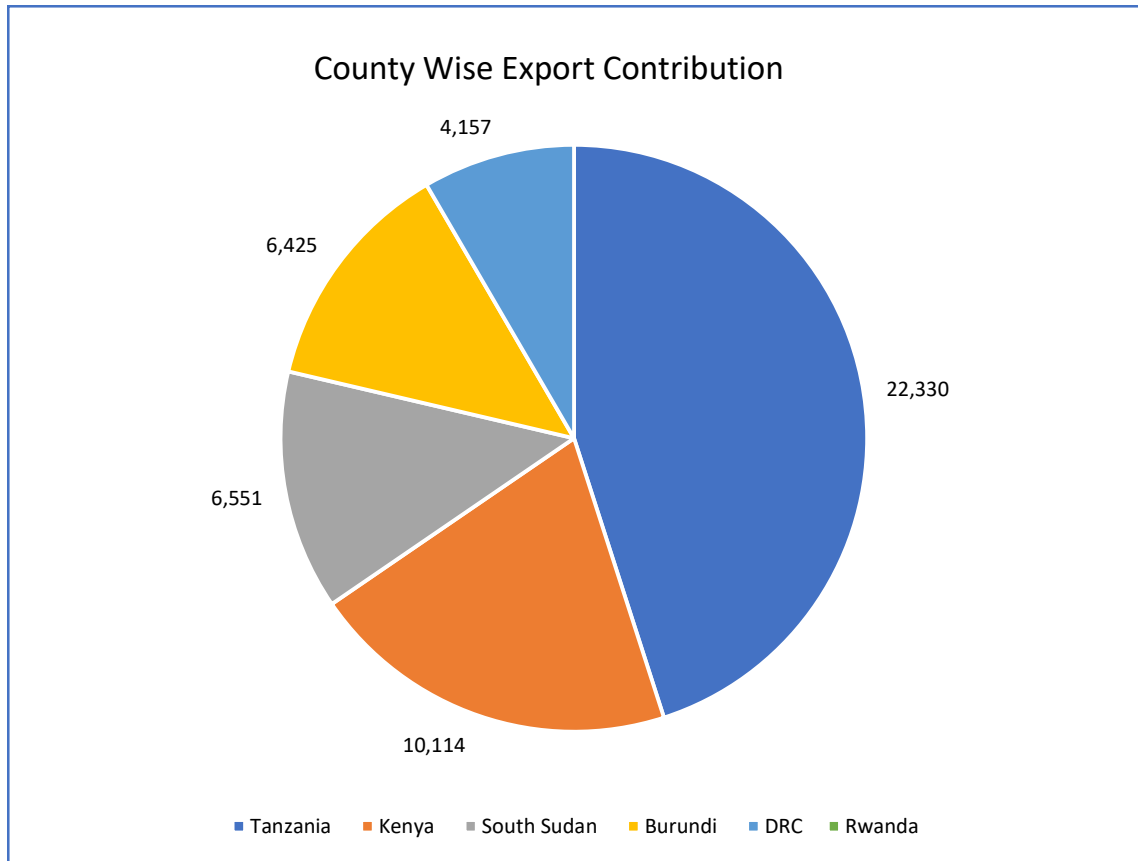
- **Tanzania** emerged as top most destination accounting for 22,330 tons out of 49,578 tons, but the exports remain huddled up in Government of Tanzania imposed policy framework allowing the importation only during three months window i.e. April to June when their mills are out of crop. Moreover, during these three months, Ugandan mills are allowed to export only to Tanzania Sugar Mills who in turn add on their profit before routing through distribution network thus making our sugar relatively more expensive for end consumers.
- **Kenya** govt through Agriculture and Food Authorities (AFA) have created a maze of bureaucratic controls over the whole paradigm. Starting with allowing only those commercial entities registered with Kenya Sugar Directorate costing USD 1,000/- per annum. Next phase leads to these registered importers have to apply for Pre-Shipment Approval costing another USD 1,000/- per annum to be approved by Sugar Board as per their own discretion without any predetermined policy directive. Pre Shipment approval once issued is valid for 45 days only.
- **Burundi:** This market opened up for the first time contributing 6,425 tons
- **South Sudan:** Contributed 6,551 tons but can do more if they apply CET Tariff structure on sugar sourced World Market.
- **Democratic Republic of Congo:** Contributed 4,157 tons but can do more if they apply CET Tariff structure on sugar sourced World Market.



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- **Rwanda:** Potential market of 100,000 tons totally closed for Uganda due to macro level issues.



Domestic Distribution Network:

Supported by company owned and operated 5 warehouses, 32 distributors across 2nd / 3rd tiers towns we serve more than 700 wholesalers across more than 50 strategic towns.

5.0 FINANCIAL STRENGTH

The Madhvani Group has had a very successful record in arranging financing for all projects under taken by the Group worldwide – including the following in Africa:

- The development and expansion and diversification of Kakira Sugar in Uganda
- The development and expansion and diversification of Kabuye Sugar Works in Rwanda
- The development and expansion of Kioo Ltd in Dar es Salaam



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- Various hospitality and tourism projects in Africa
 - Mweya Safari Lodge Queen Elizabeth National Park, Uganda
 - Paraa Safari Lodge Murchison Falls National Park, Uganda
 - Chobe Safari Lodge Murchison Falls National Park, Uganda
 - Aberdare Country Club Kenya
 - The Ark Kenya
 - Hotel Intercontinental Lusaka Zambia

For Kakira Sugar in Uganda, in addition to promoter funding, the Madhvani Group has arranged total project loans of over USD 250 million since 1985.

1985 – 1987 Kakira Factory + Agriculture Rehabilitation at 2,500 TCD

Rehabilitation + funding of USD 54 million (from World Bank - USD 32.30 million., ADB - USD 18.10 million, UDB - SD 3.60 million)

2000 Kakira Factory Expansion to 3,000 TCD

Loan of USD 6.4 million from FMO

2005-07 Kakira Expansion: Factory to 6,000 TCD + Cogeneration Plant 21 MW

Total loans USD 23.6 million (from EADB - USD 8.6 million + FMO - USD 11.70 million + GEF Grant - USD 3.30 million)

2012 Kakira Expansion: factory to 7,500 TCD and Cogeneration Plant by 30MW to 51 MW

Total loans amounting to USD 115 million by the following financial institutions:

❖ Standard Chartered Bank (SCB)	USD 35.0 million
❖ Stanbic Bank (SBU)	USD 30.0 million
❖ Citibank	USD 10.0 million
❖ East African Development Bank (EADB)	USD 15.0 million
❖ SBU – Bridge Loan	USD 25.0 million

2013 Kakira Expansion: Forex risk management

Part of the US Dollar loans were refinanced by a Medium Term Note of the UGX equivalent of USD 30.0 million on the Uganda Securities Exchange to reduce KSL foreign exchange risks.

2016 Kakira Diversification: Molasses Distillery Project

Kakira established a 60,000 litres per day distillery to produce both Extra Neutral Alcohol (ENA) and Anhydrous Bio-Ethanol for petrol blending. This USD 26 .3 million capex was financed by:



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❖ Standard Chartered Bank (SCB)	USD 8.5 million
❖ Stanbic Bank (SBU) in UGX	USD 8.5 million
❖ Uganda Development Bank (UDB)	USD 7.0 million [UGX equivalent]
❖ Bank of Baroda ACF 1	USD 2.3 million

2020 Kakira Agricultural Fleet enhancement

❖ Bank of Baroda ACF 2	USD 2.4 million
------------------------	-----------------

2021 Kakira Mill Replacement and Irrigation Projects : 2021 CTA Loans

Arranged financing amounting to USD 26.5 million for the Kakira New 9,000 TCD Mill and two Irrigation Projects by the following international and local financial institutions:

❖ UDB (UGX equiv)	USD 5.0 million
❖ Stanbic Bank (UGX equiv)	USD 5.0 million
❖ Citibank	USD 10.0 million
❖ EADB	USD 6.5 million

All of these loans have always been regularly serviced on their respective due dates, and the total balance project loans outstanding as at 30-Sep-22 is USD 38.6 million.

The Group has excellent relationships with various international development banks:

- African Development Bank, Abidjan, Cote d'Ivoire
- International Finance Corporation (World Bank Group), Washington, USA
- DEG – Germany
- Proparco – France
- FMO – Netherlands
- British International Investment (prev. Commonwealth Development Corporation – CDC), UK

The Group also has an excellent track record with the following regional development Banks:

- East African Development Bank (Please see the attached EADB letter confirming this.)
- Uganda Development Bank.

In addition, the Group's activities are supported by the following international and regional commercial banks:

- Stanbic Bank / Standard Bank of South Africa
- Standard Chartered Bank
- Absa Bank
- Citibank
- Bank of Baroda



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- Tropical Africa Bank.

B ABOUT THE PROJECT

6.0 COMPANY REGISTRATION DOCUMENT

The Madhvani Group incorporated “**SONGEA SUKHARI LIMITED**” in Tanzania as a Special Purpose Vehicle, whose sole business will be the establishment and subsequent operation of the new sugar complex in Songea District, Ruvuma Region of Tanzania.

The Certificate of Incorporation of Songea Sukari Limited is given below:



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TANZANIA

C.1



Certificate of Incorporation of a Company

Section 15

No: 158658550

I HEREBY CERTIFY THAT

SONGEA SUKARI LIMITED

is this day incorporated under the Companies Act, 2002 and that the Company is Limited.

GIVEN under my hand at Dar es Salaam this **31st** day of **OCTOBER TWO THOUSAND AND TWENTY TWO.**



PRINC ASST. REGISTRAR OF COMPANIES



7.0 PROJECT AREA: SONGEA FARM +

Songea is the capital of Ruvuma region, which consists of 6 districts spread over geographical area of 66,669 km² having a population of 1.38 million (2012 census). Ruvuma region is classified under the Sothern Highland Zone.

Coordinates of the region:

Latitude: 10°64'S

Longitude: 35° 64'E

Altitude:

550 to 650 m above mean sea level and sloping down towards the Ruvuma river.

Songea farm location

The Songea farm is under the village council of Magwamila Village at a road distance of 115 km from Songea town. Majority of the land is forest cover with native trees medium to thick, observed minor rivulets within the farm. The area has flat lands to the extent of 5% with 200 ha approximately under rice cultivation.

River and water availability:

Ruvuma River originates from Morogoro hills and passes through Songea and Nkusu farms and then to Mtwara Region and then joining Indian Ocean. Another river namely Ndongosi river passes in between Songea farm and Nkusu farm and joins Ruvuma River at one of the ends of the farm areas. Another perennial stream also passes through the Songea farm and joins the Ruvuma River.

The Ruvuma River flows all along the boundaries of both the farms. The distance between the farm and the river varies from 0 to 5km for 50% of the farm and 5 to 10km for the remaining 50% of the farm boundaries.

As per the preliminary estimation, the Ruvuma River water flow is sufficient to irrigate 7500 ha during the peak water requirement period i.e., 15th September to 15th November. It may be possible to irrigate 15,000 ha by regulating the water flowrate to irrigation by 50 %, but the crop yield will be reduced.

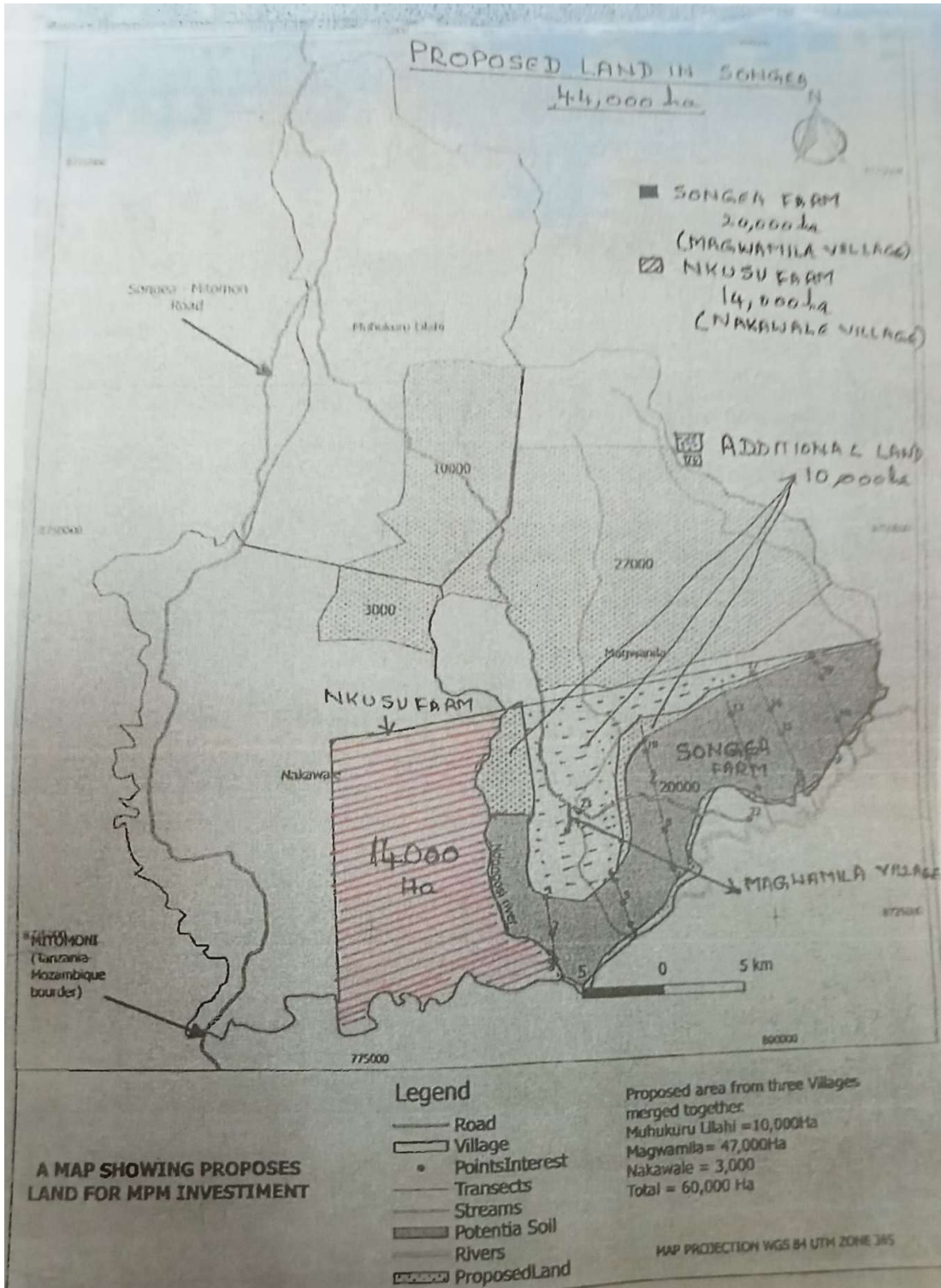
The balance area has to be cultivated as a rainfed crop at an estimated productivity of 45 t/ha. Further, this balance area can be used for suitable value-added seasonal crops, namely maize, beans etc for seed production.



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The area is shown in the below figure.





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The Songea farm consists of 20,000 ha the adjoining Nkusu farm size is 14,000 ha.

Soils:

Top soil is sandy loams up to 10 to 20cm followed by clay which facilitates better infiltration of water from top soil to sub soil and hence better storage of water. It is anticipated that 15 % of the area may require drainage.

These soils are good for all crops including sugar cane.

Road condition and total distance:

The distance from Songea town (airport) to Magwanila Village is 115 km and to the Ruvuma River through the present approach path is 130 km. The distance from the site to Dar-es-Salaam via Iringa is about 1065 km.

Railway and Port Networks:

The distance from the Farm site to the nearest railway station, Makambako is 430 km via Songea town. The main railway stations between Makambako and Dar-es Salaam are Milimba and Ifakara with total distance of 643km.

For transport of goods through railways from the Farm site to Dar-es-Salaam is 1073 km.

The nearest port from the Farm is Mtwara at a distance of 772 km by road.

Power:

Ruvuma Region power consumption is about 17 MW.

33KV line is passing up to the first 75 km and for the balance 40 km up of line from Songea town upto village / project site, the forest is cleared and the electrification will be completed by TANESCO under their rural electrification programme by December 2022.

Availability of Workforce:

The villages surrounding the farms are Magwamila, Nakawala and Muhukuru Lilahi. The workers are available for initial development and as when the development area increases, workers are to be recruited. The existing procedure for recruitment of seasonal workers is through contractors. This procedure is being followed in the plantations of Songea district.

Crops grown in the region:

Total area under different crops in the region is 589,005 ha producing 1.56 million tons. Major crops grown and their area are maize 41%, rice 9%, cassava 12.2% and coffee 4.7%. Cashew nuts, vegetables and tobacco and horticultural crops are also being



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grown. Coffee is grown in the high altitudes of the region, namely Bringa (1300m) and Songea (1100m).

Population of Ruvuma:

The adjoining regions of Ruvuma area are Mtwara and Njombe part of Lindi and part of Mbeya. Population of each region are given below:

Ruvuma	1.66 Million
Njombe	0.84 Million
Part of Mbeya	1.50 Million (60% of population)
Part of Lindi	<u>0.55 Million</u> (half population)

Total: **4.55 Million**

Sugar Demand in the region:

The per capita consumption of Tanzania is 10.15 kg and if the Ruvuma and adjoining regions are considered as rural, the per capita is likely to be 8.5 kg and the demand is 40,000 T approximately.

8.0 METEOROLOGICAL DATA FOR PROJECT AREA

The meteorological data on rainfall, rainy days, maximum and minimum temperatures, relative humidity and sunshine hours are studied and are presented in the following table. The individual parameters also are shown in the subsequent figures for better clarity.

Meteorological data of Songea

Parameter	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	TOT
Rain fall	198	161	205	75	17	7	4	5	7	24	65	187	955
Rainy days	26	22	28	24	14	9	7	9	9	10	19	25	202
Max T°C	25.6	25.6	25.1	24.6	23.9	23.3	23.3	25.9	28.1	29.6	29.5	27.5	312
Min T°C	18	17.9	17.8	16.7	14.3	12.3	11.9	13.9	15.5	17.4	17.9	18.2	191.8
T°C-Range	7.6	7.7	7.3	7.9	9.6	11	12.4	12	12.6	12.2	11.6	9.3	121.2
RH%	89	90	91	90	84	78	71	60	54	56	66	82	911
Sunshine hr	6.6	6.5	5.8	6	7.6	8.7	9	9.2	9.4	9.1	8.6	7.4	93.9

Rainfall in mm; T°C= Temperature in °C: T°C-Range = temperature difference

Rainfall and Rainy days:

The total average annual rainfall recorded is 955 mm spread over 202 days. The duration of the main precipitation period is 4 months starting from December to March and it contributes about 78.6% of total rainfall distributed in 101 rainy days.



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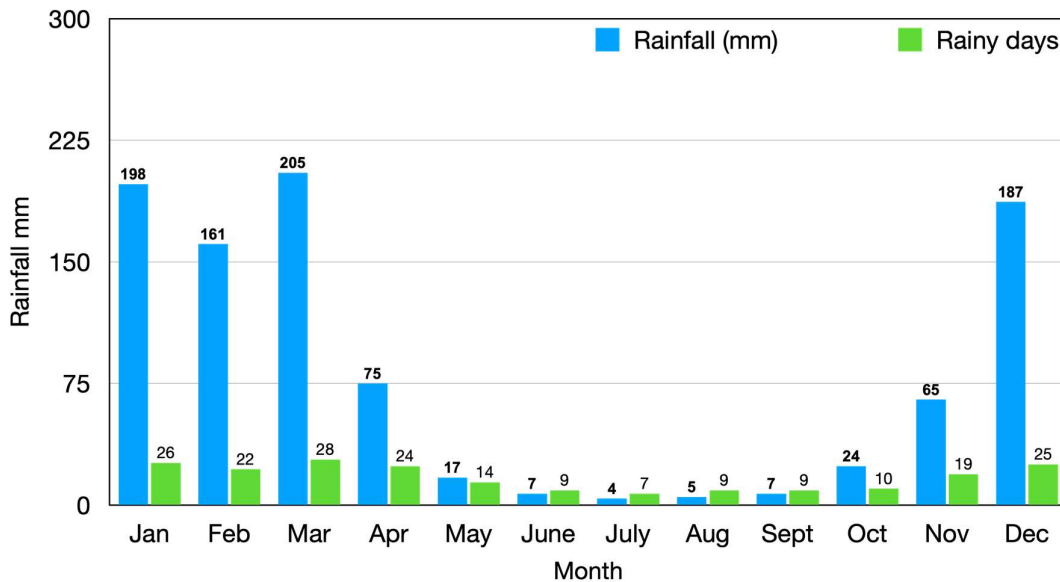
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The dry period starts from May to October (6months) and the rainfall during this period is about 61mm (6.4%) spread over rainy 58 days.

The balance 2 months, i.e, April and November are in the intermediate zone contributing 14.6% of total rainfall spread over 43 days.

In general, the rain fall is well distributed in both wet and dry seasons. However, the rain fall received during dry period of 6 months is not effective and it is mainly due to average rainfall @ 1mm/ day, which is less than 20 % of the evaporation demand.

Monthly rainfall mm



Temperature:

Maximum temperature: The annual monthly mean maximum temperature is about 26°C and it varies from a peak of around 29.6°C in October and November to a low of 23.3°C in June and July.

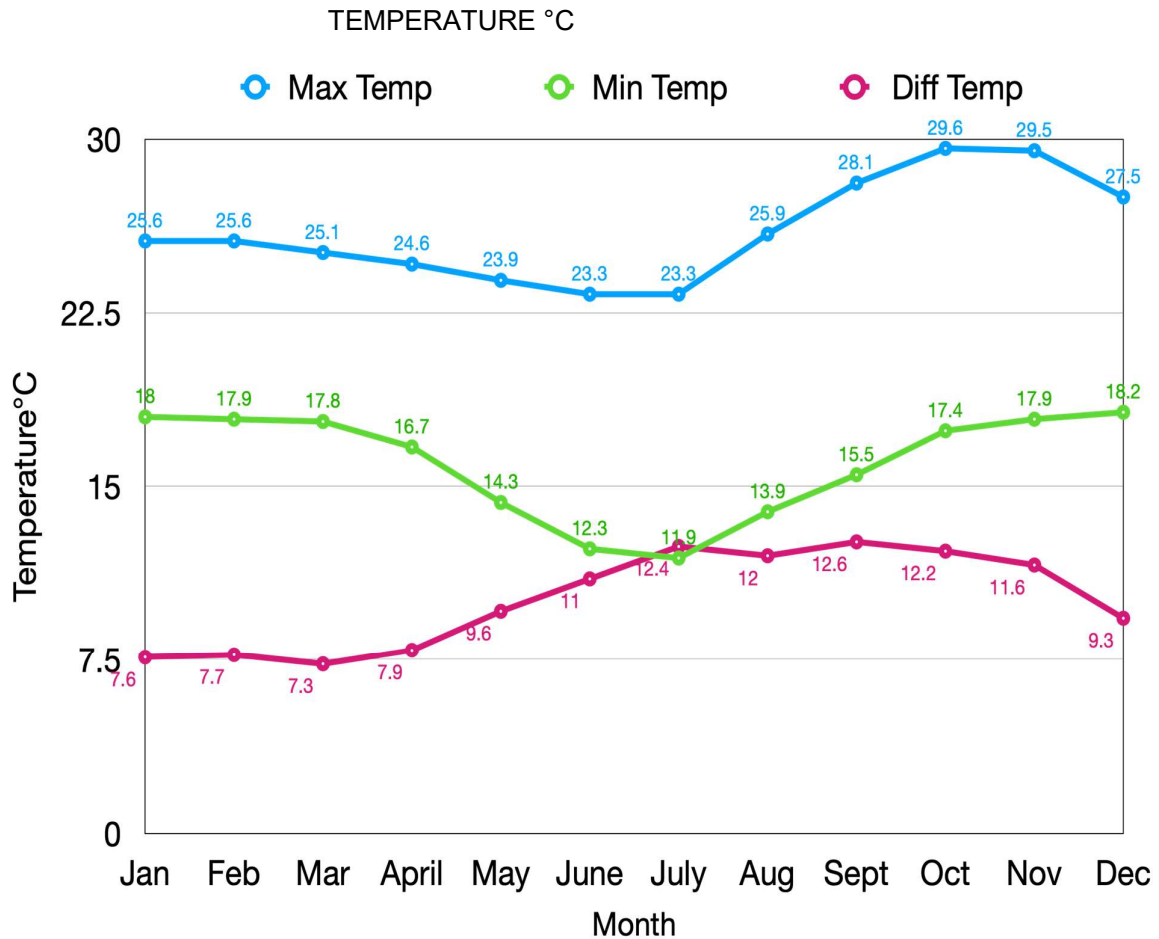
Minimum temperature: The annual monthly mean minimum temperature is around 16°C and it varies as high as 18.2°C in December and as low as 11.9°C in July.

Temperature difference: The annual monthly mean temperature difference between maximum and minimum temperatures is around 10°C. The maximum variance of 12.6°C is observed in September while the minimum variance of 7.3°C is recorded in March.



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Relative Humidity:

The annual monthly mean relative humidity is 75.8%.

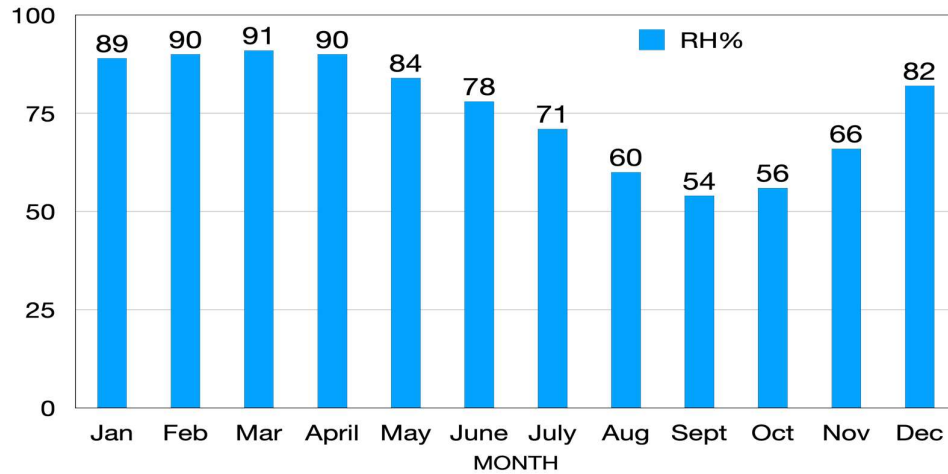
In the month of March records highest relative humidity of 91% while the lowest humidity of 54% is recorded in the month of September.



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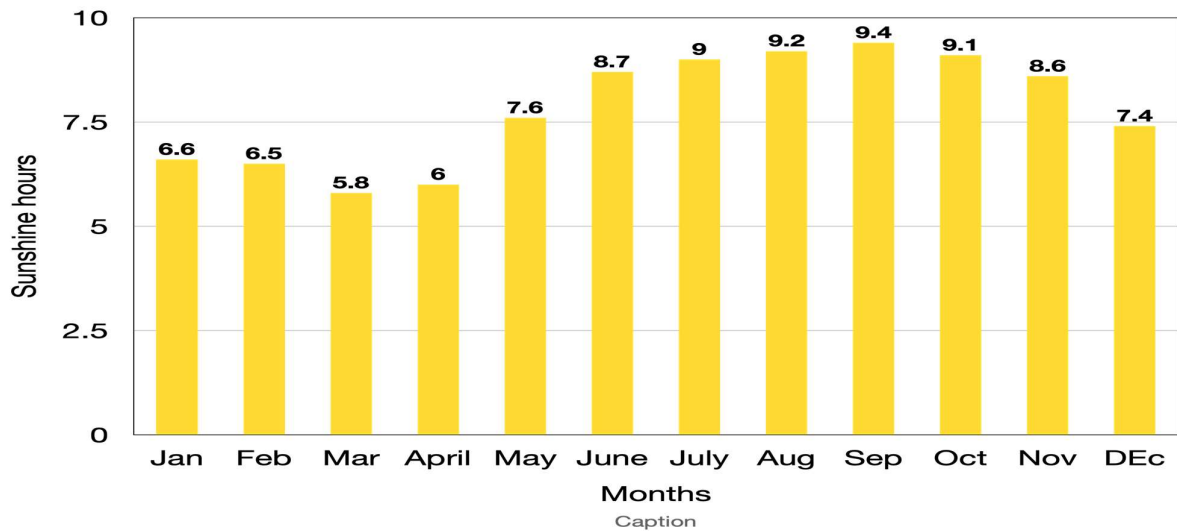
RELATIVE HUMIDITY%



Sunshine hours:

The annual mean daily sunshine hours are 7.83 hr with a peak of 9.4 hr in the month of September and a low of 5.8 hr in March.

Sunshine hours per day



Based on the preliminary observation of soil conditions and meteorological data, the farm is suitable for sugar cane growing.



9.0 PROPOSED AGRICULTURAL DEVELOPMENT PROGRAM AT SOGEA

Total identified area near Songea farm comprises of three parts

The Songea farm	-	20,000 ha
Additional land North to Songea farm- (Shown in Figure)		10,000 ha
Nkusu Farm (west of Songea farm)	-	<u>14,000 ha</u>
TOTAL	-	44,000 ha

Most of the Songea farm is by the side of River Ruvuma, hence, it is proposed that irrigation facilities will be started with this farm.

After reviewing meteorological data and climatic conditions, following points are noted:

- i) Soil conditions and climatic conditions are suitable for growing cane and also other crops, like maize, coffee, beans and horticulture crops.
- ii) River Ruvuma water is adequate to irrigate about 7,500 ha of land during peak water requirement (from 15th September to 15th November). Hence, it is proposed that, at initial stages, irrigation scheme will be developed at Songea farm for 7,500 ha and it will be developed in two phases.
- iii) At other areas, it is proposed rainfed plantation during initial stages and gradually implement the irrigation facilities after detailed study of water availability.
- iv) It is expected that with the proposed irrigation facilities and rainfed plantation, sugar cane yield per hectare is as below, however, yield per ha may vary depending on actual water availability.

Expected cane yield with irrigation facilities:

Plant crop	-	100 t/ha
Ratoon	-	90 t/ha
Number of ratoons	-	6
Average yield of plant crop & Ratoon-		92 t/ha

Expected cane yield with rainfed:

Plant crop	-	45 t/ha
Ratoon	-	40 t/ha
Number of ratoons	-	6
Average yield of plant crop & Ratoon-		41 t/ha

- v) Based on climatic conditions and sunshine hours, it is expected that recovery of sugar will be 11.0 % cane.



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- vi) From the rain fall pattern, it is observed that from May to December is dry period, hence, sugar plant crushing duration can be nearly 8 months.
- vii) River Ndongosi water will also be utilised for irrigation of Songea farm and also Nkusu farms.
- viii) Following is the plan for utilisation of 44,000 ha and it will be implemented in two phases:

Total area requested for allotment - 44,000 ha

Area required for internal roads, drains (block & main drains) factory complex, agricultural colonies, agricultural offices / satellite workshops, main workshops, water bodies, Outgrowers offices and other infrastructure etc will be about 20 % - 8,800 ha

Water dams, water streams and area not suitable for sugar cane cultivation @ 10 % - 4400 ha

Net farm area available for cultivation - 30,800 ha

Nucleus area proposed for irrigation facilities- 7,500 ha

Rainfed Nucleus estate plantation at Songea & North of Songea farms - 13,500 ha

Rainfed plantation at Outgrowers farms - 9,800 ha

Summary of Phase – 1 & Phase – 2 implementation program is as below:

S. No	Description	Units	
1	Total Songea farm and north of Songea farm	Ha	30,000
2	Area required for internal roads, drains (block & main drains) factory complex, agricultural colonies, agricultural offices / satellite workshops, main workshops, water bodies, Outgrowers offices and other infrastructure etc will be about 20 % of total farm	Ha	6,000
3	Water dams, water streams and area not suitable for sugar cane cultivation @ 10 %	Ha	3,000



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4	Net Nucleus Estate available for cultivation	Ha	21,000		
			Phase – 1 In first 6 years	Phase – 2 From 7- 10 years	Total
5	Farm will be developed in each Phase	Ha	14,000	7,000	21,000
6	Farm will be used for cultivation in each Phase	Ha	12,850	8,150	21,000
7	Farm will be under irrigation	Ha	4,350	3,150	7,500
8	Farm will be under rainfed	Ha	8,500	5,000	13,500
A	Irrigated Farm				
9	Farm will be used for cane cultivation which is under irrigation	Ha	4,350	3,150	7,500
10	Fallow area @ 17 %	Ha	740	535	1,275
11	Farm under cane harvesting @ 83 %	Ha	3,610	2,615	6,225
12	Yield per ha considering plantation and 6 ratoons	t/ha	92	92	92
13	Total cane will be harvested for sugar plant	tons	332,120	240,580	572,700
B	Rainfed plantation				
14	Farm will be used for rainfed plantation	Ha	8,500	0	8,500
15	Farm will be used for seed development and beans production	Ha	0	5,000	5,000
16	Fallow area @ 17 %	Ha	1,445	0	1,445
17	Farm under cane harvesting @ 83 %	Ha	7,055	0	7,055
18	Yield per ha considering plantation and 6 ratoons	t/ha	41		41
19	Total cane will be harvested for sugar plant	tons	289,255		289,255
20	Total cane will be available from Nucleus Estate at Songea and north of Songea farm	tons	621,375	240,580	861,955
C	Outgrowers farm				
21	Total Outgrowers farm	Ha	14,000		
22	Area required for internal roads, drains (block & main drains), agricultural colonies, water bodies, Outgrowers offices and other infrastructure etc will be about 20 %	Ha	2,800		
23	Water dams, water streams and area not suitable for sugar cane cultivation @ 10 %	Ha	1,400		
24	Net area available for cultivation	Ha	9,800		



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			Phase – 1 In first 6 years	Phase – 2 From 7- 10 years	TOTAL
25	Farm will be developed	Ha	4,000	5,800	9,800
26	Farm will be used for cultivation	Ha	2,900	6,900	9,800
27	Farm will be under irrigation	Ha	0	0	0
28	Farm will be under rainfed	Ha	2,900	6,900	9,800
	Irrigated farm				
29	Farm will be used for cane cultivation under irrigation	Ha	0	0	0
30	Fallow area @ 17 %	Ha	0	0	0
31	Farm under cane harvesting @ 83 %	Ha	0	0	0
32	Yield per ha considering plantation and 6 ratoons	t/ha	92	92	92
33	Total cane will be harvested for sugar plant	tons	0	0	0
	Rainfed plantation				
34	Farm will be used for rainfed plantation	Ha	2,900	3,350	6,250
35	Farm will be used for seed development and beans production	Ha	0	3,550	3,550
36	Fallow area @ 17 %	Ha	493	570	1063
37	Farm under cane harvesting @ 83 %	Ha	2,407	2,780	5,187
38	Yield per ha considering plantation and 6 ratoons	t/ha	41	41	41
39	Total cane will be harvested for sugar plant	tons	98,687	113,980	212,667
40	Total cane will be available from Outgrowers farm to sugar plant	tons	98,687	113,980	212,667
41	TOTAL CANE WILL BE AVAILABLE FROM NUCLEUS FARM AND OUTGROWERS FARM TO SUGAR PLANT	TONS	720,062	354,560	1,074,622
42	Plant capacity	TCD	3,500	5,000	5000
43	Time efficiency	%	90	90	90
44	Number of days operation	days	229	239	239

- ix) Irrigation scheme details will be reviewed after the comprehensive hydrology study of the entire area of 44,000 ha.
- x) Detailed, year-wise, cane development and production plan of Songea Farm, Farm North side of Songea Farm and Outgrowers Farm is given below:



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	cultivation @ 10 % of farm area														
A2	Area available for cultivation	Ha	21,000	21,000	21,000	21,000	21,000	21,000		21,000	21,000	21,000	21,000	21,000	21,000
A3	Land development	Ha	1,000	2,000	2,500	2,500	3,000	3,000		3,000	3,000	1,000			
	Cumulative area development	ha		3,000	5,500	8,000	11,000	14,000		17,000	20,000	21,000	21,000	21,000	21,000
A4	Area under irrigation	ha	100	750	750	750	1,000	1,000		1,000	1,000	1,150	-	-	-
	Cumulative area development	ha		850	1,600	2,350	3,350	4,350		5,350	6,350	7,500	7,500	7,500	7,500
A6	Fallow area	ha				400	570	740		910	1,080	1,275	1,275	1,275	1,275
A5	Area under rainfed	ha		1,000	1,500	2,000	2,000	2,000		2,000	2,000	1,000	-	-	-
	Cumulative area development	ha		1,000	2,500	4,500	6,500	8,500		10,500	12,500	13,500	13,500	13,500	13,500
A6	Fallow area	ha				765	1,105	1,445		1,785	2,125	2,295	2,295	2,295	2,295
A6	Area available for cane cultivation	%		100%	100%	100%	100%	100%		100%	100%	75%	67%	63%	63%
	Area will be utilised for seed development	%		0%	0%	0%	0%	0%		0%	0%	25%	33%	37%	37%



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B3	Area used for cultivation	ha	9,800	9,800	9,800	9,800	9,800	9,800	9,800	9,800	9,800	9,800	9,800	9,800	9,800
B4	Land development	ha			1,000	1,000	1,000	1,000		1,000	1,000	1,800	2,000		
	Cumulative area development	ha			1,000	2,000	3,000	4,000		5,000	6,000	7,800	9,800	9,800	9,800
B5	Area under rainfed	ha				500	1,200	1,200		1,200	1,200	1,500	1,500	1,500	
	Cumulative area development	ha				500	1,700	2,900		4,100	5,300	6,800	8,300	9,800	9,800
B6	Area will be utilised for cane	ha	%		100%	100%	100%	100%		100%	74%	68%	69%	64%	64%
	Area will be utilised for seed cane development	ha	%		0%	0%	0%	0%		0%	26%	32%	31%	36%	36%
B7	Fallow area	ha					289	493		697	901	1,156	1,411	1,666	1,666
B7	Yield per ha cane plantation rainfed	tons				41	41	41		41	41	41	41	41	41
B8	Cane yield area	tons					57,851	98,687		139,523	133,466	157,355	194,890	213,436	213,436
B9	Total cane available from Outgrowers farm	tons				-	57,851	98,687		139,523	133,466	157,355	194,890	213,436	213,436



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C	Total cane available from Songea, additional farm and Outgrowers farm	tons			249,700	332,581	534,852	720,108		905,364	1,043,727	1,074,608	1,075,391	1,075,391	1,075,391
D	Plant capacity	TCD				3,500	3,500	3,500		5,000	5,000	5,000	5,000	5,000	5,000
E	Plant operation	Days				106	170	229		201	232	239	239	239	239
F	Sugar produced	tons				36,584	58,834	79,212		99,590	114,810	118,207	118,293	118,293	118,293



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Sugar cane development program

The above table details the development and production plans of Songea farm, farm North side of Songea farm and Outgrowers farm, total 44,000 ha. Total development and production plan is given for 12 years, however, development of total land of 44,000 ha & sugar complex will be installed in nine years.

- Year 1 is land allotted to the Madhvani Group.
- Total Farm will be developed in two Phases, Phase – 1 & Phase – 2.
- Phase – 1 is land development suitable for a sugar complex of 3,500 tons cane crushing capacity per day and Phase – 2 is remaining land development suitable for expansion of the sugar complex to 5,000 TCD.
- Phase – 1 is planned from Year – 1 to Year – 6 and Phase – 2 will be from Year – 7 to Year – 10.
- The production plan table details the annual hectarage increase from cane cultivation and sugar production.
- It is proposed that initial three years will be for the land development and cultivation of initial hectares of land required for establishment of sugar plant.
- During Year 4, it is anticipated that about 332,000 tons of cane will be available for commercial production of sugar. Accordingly, sugar factory planning will be started from Year 2 onwards, so that by end of Year 4 both commercial cane and sugar factory will be ready for operation.
- Initial three years, development activities will be under taken at Songea farm and Year 4 onwards, land development for Outgrowers will also be planned.
- By the end of Phase – 1 (Year – 6), it is anticipated that about 14,000 ha of own estate and about 4,000 ha of Outgrowers farm will be developed.
- Total cane estimated at Year – 6 will be about 720,000 tons, and proposed sugar plant capacity of 3,500 TCD will be operated about 230 days at its rated capacity.
- During Year – 7, expected cane will be about 905,000 tons and the plant will be expanded from 3500 TCD to 5000 TCD. During this year, the plant will operate about 200 days.
- From 8th Year onwards, adequate cane will be available for operation of 5000 TCD sugar plant about 230 – 240 days.
- During initial years, sugar production will be lesser because of less cane availability to the sugar plant and on Year – 6, it is expected that about 79,000 tons of sugar will be produced.



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- Year – 9 onwards, the plant will be operated at full capacity and also full season of 240 days, as adequate cane will be available from both own estate and also Outgrowers, producing about 118,000 tons of sugar per annum.
- It is estimated that total water requirement for cultivation of total farm is about 24 million m³/annum. Hence, water availability will be studied in detail before start of the Project.
- It is envisaged that some hectares of own estate and also some hectares of Outgrowers will be reserved for seed cane development
- The capacity of the plant may be further enhanced after Year 10 depending on progress of development of cane.

10.0 OUTGROWERS DEVELOPMENT PROGRAM

West side of the Songea farm, about 14,000 ha Nkusu farm is available for the out-growers area for the development.

The Madhvani Group has over 45 years of experience with Outgrower Operations at its flagship sugar mill at Kakira Sugar Ltd, in Uganda.

Kakira Sugar Ltd at present has around 9,350 Outgrower farmers with cane grown on 33,000 hectares and harvested on a 18 month cycle. At present, cane delivered from Outgrowers to Kakira Sugar is about 1.4 - 1.5 million tons of per annum, which is about 60 % of total cane crushing capacity.

Some of the key features of Kakira Sugar Limited are given below:

- A professional Outgrower Department of 65 staff members works closely with the farmers, which consists of operational experienced agricultural field supervisors as well as full administrative support.
- A huge database is managed with all farmers details and cane delivery records as well as cane payments, crop inputs etc.
- Support for farmers as well as contractors is continuous to ensure optimal cultivation of sugar cane and ensure all sugar cane is delivered to the mill at the right age.
- A Farmer's Association represents the farmers and works closely with the Outgrower Team.
- Partnership, strong communication, co-operation, support are a critical part of this operation.

Initial Proposal to develop Outgrowers farm

- The proposed area to develop Outgrower sugar cane is 14 000 hectares in total.



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- The suggested farm size per farmer is minimum 10 hectares.
- It is also proposed to have 500 hectares of Outgrower Trust Farmland under cane, this would provide extra revenue to support a major Community Trust that would use the funds to develop the local community for critical requirements.
- It is further suggested that woman farmers also make up at least 20 % of the farmers in total.
- The total number of Outgrower Farmers with 10 ha blocks of sugar cane would be :
 - 1 Community Trust Farm - 500 hectares
 - Male Outgrower farmers - 1080 (10 800 ha)
 - Female Outgrower farmers - 270 (2 700 ha)
 - Total Outgrower Cane area - 14 000 ha**
- An Outgrowers Department would be formed at the inception of the project with a professional Senior Outgrower Manager, administrative structure and office, and a agricultural support field team of at least 10 supervisors, each overseeing 1400 ha of Outgrower cane.
- This Team would be trained and developed to ensure it has the capacity to perform at its peak and ensure the success of Outgrower Farmer development from the onset.
- A Farmers Organisation to represent the farmers would be constituted at the onset, training of the committee and members would also be undertaken so they are able to form an active and well run organisation.
- Mapping using GIS (Geographic Information System) would take place to ensure all infrastructure including roads and farms are laid out as per environmental requirements and laws.
- The farm size would be 10 hectares for each farmer to ensure economically viable business units.
- The Outgrowers Department would plan a training program so that all Outgrower Farmers are fully trained on Agronomic Practises of growing sugar cane as well of the financial costs and income involved. Field support from there on would be constant.
- Seed-cane Nurseries would also be developed by the Outgrower Department so that farmers can access the correct cane varieties and that all seed-cane is certified disease free and of a good quality for planting.
- A Co-operative would also be formed at the centre of the Outgrower area to ensure all inputs required by the farmers are available at competitive prices,



these include fertiliser, herbicide, hand tools like hoes, cane knives and other critical inputs.

- Contractors to carry out all activities to develop the land to sugar cane would be facilitated through the Outgrower Department to ensure farmers get services at the correct price and of the correct quality.
- When it comes to harvesting, loading and transporting of sugar cane, farmers will be supported with the correct contractor support.
- These contractors where available will be sourced, developed and supported within the local community and area to further stimulate entrepreneur development.
- Business Training for local business and potential business owners, contractors and suppliers will be undertaken to strengthen the local business community and cash flows

The Madhvani Group would "mirror" it's very successful Kakira Outgrower System at Songea District to ensure the same upliftment and growth of the local farming community would take place and be a major success. The Songea Outgrowers Team would have experienced staff training, mentoring and support to develop them right from the start if this project is implemented.

11.0 PROPOSED SUGAR COMPLEX

Sugar plant is basically an agro-based industry and it is self-sufficient with fuel required for steam & power generation to meet sugar plant demand. The proposed new sugar complex not only helps the farmers in cultivating profitable crops like sugarcane but also provides employment potential and overall socioeconomic development of rural areas.

The proposed sugar project in Tanzania is being planned to fully utilize the byproducts such as bagasse for co-generation of surplus power for export to Tanzania National Grid and molasses to ethanol & Extra Neutral Alcohol (ENA).

Design Basis:

Based on the preliminary observation of climatic conditions, it is expected that pol % cane will be about 13 – 13.5 % on cane. Average yields of rainfed and partial irrigation are discussed in the above paragraphs and based on the sugar cane yields and average plant operation period, initial sugar plant capacity is proposed at 3500 TCD and as agricultural activities progresses, during subsequent years, factory capacity will be expanded to 5,000 TCD.

As the dry season extends from May to December, sugar plant will be in operation for about 240 days and cogeneration and distillery plants will be operated few days in off season to the extent of bagasse and molasses availability.



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Area required for sugar complex

Approximately about 40 – 45 hectare land is required to establish the Sugar plant, Cogeneration Plant, Distillery and ancillaries like sugar godowns, cooling towers, bagasse storage yard/shed, laboratory, administrative & technical buildings, factory workshop and engineering stores etc.

The proposed project description

1.0	Sugar Plant	
	Sugar plant capacity	3,500 TCD
	Average crushing rate TCH	146 TCH
	Number of days of operation	Maximum 240 days
	Time efficiency of the plant	90 %
2.0	Sugar Plant input & Output	
	Net cane crushed per annum	756,000 tons
	Sugar Recovery % cane	11.0%
	Molasses Recovery, % cane	4.00%
	Total Sugar Produced per annum	83,160 tons
	Sugar quality	Brown sugar of about 800 IU colour
	Total Molasses Produced per annum	30,240 tons
	Expected factory steam consumption	42 %
	Filter cake produced	24,990 tons
3.0	Cogeneration Plant	
	Steam Generation Plant	
	Steam Parameters	85 bar(a), 520 deg C
	Installed Capacity	1 x 90 TPH
	Power Generation Plant	
	Double Extraction Condensing Turbine (DEC)	1 X 16 MW
	Season Operation	
	Power Loading	15.10 MW
	Captive Power required for Sugar complex	6.80 MW
	Surplus Export Power to irrigation and grid	8.30 MW
	Off - Season Operation	
	Power Loading	11.2 MW
	Captive Power required for Sugar complex	2.86 MW
	Surplus Export to irrigation and grid	8.34 MW
4.0	Distillery	
	Capacity suitable for expanded capacity	45 KLPD
	Ethanol/ENA produced per annum	8,013,600 lit



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Brief details of the proposed Greenfield Sugar Project are as follows:

Description	Details
Sugar Plant	
Capacity	Crushing green harvested cane of 3,500 TCD
Number of season working days in year	240 days
Product Sugar	Raw Sugar - 800 IU
Process to be followed	
Juice extraction	4 mills of 36" x 72" or 40" x 80" driven by AC VFD motors
Clarification	Defecation Process, clarifier
Evaporation	Quintuple effect evaporator with flash system
Pan Boiling and Crystallization	Three massecuite boiling scheme
Cogeneration	
Boiler	1 x 90 t/h Bagasse fired travelling grate Boiler Pressure – 85 bar(a), Temperature – 525 °C Complete with bagasse handling system, feed water handling station, FD, SA, ID Fans, ESP, soot blowing system, chemical dosing system, steam distribution header, PRDS stations, bagasse feeding system, ash handling system, automation, electrical system, piping, fittings, structure, staircase, etc.
Power Turbine	1 x 16 MW Triple extraction condensing turbo-alternator set with all auxiliaries units, cooling towers & pumps, EOT Crane, pressure ventilation system & air conditioning system, electrical systems, instrumentation & controls system, etc
Distillery Plant	Capacity of distillery plant shall be 45 KLPD and shall be complete with Molasses receiving & Storage, Molasses Pumps, Molasses day tank and pumps, Fermentation, Multi Pressure Vacuum Distillation Wash to RS Section, MSDH mole sieve dehydration Section, RS to Ethanol, Integrated Cum Standalone Multiple Effect Evaporation station, product storage & Plant Utilities like Cooling Towers and Air-compressors, condensate polishing system, water treatment, etc
Other sections of sugar and cogeneration plant	Complete Electrical Systems, automation, instrumentation, Distributed Control Systems (DCS), Water Treatment Plant, Effluent Treatment Plant, Workshop, Laboratory, Fire protection system, etc.



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Description	Estimated Cost (USD)
Sugar plant of 3500 TCD capacity, mill house and process house expandable to 5000 TCD	\$ 15,500,000
Cogeneration Plant, comprising of 1 # boiler of 90 t/h, 1 # 16 MW power turbine, bagasse handling system, DCS, electrical system etc	\$ 15,500,000
Other sections of the plant, like workshop, laboratory, water treatment plant, effluent treatment plant, DG set, Fire protection system, electrical systems, DCS etc	\$ 5,500,000
Ethanol Plant of 45 KLPD	\$ 8,500,000
FOB Cost	\$ 45,000,000
Transportation, Insurance, local transportation etc	\$ 7,000,000
Installation cost	\$ 5,500,000
Civil works	\$ 6,500,000
Total installed Cost of plant and machinery	\$ 64,000,000
Spares	\$ 2,000,000
Total project cost	\$ 66,000,000

After land is allotted, it will take about 4 years to develop required agricultural land (with seed cane nurseries) adequate to start 3500 TCD plant. Hence, the plant will be installed and starts commercial operation from 4th year onwards during Phase – 1.

Within Year 1, land will be identified for the proposed sugar plant and soil investigations, geotechnical study, contour mapping, etc will be undertaken at the proposed project site. Total Project Design, Detailed Project Reports, bid documents and procurement enquiries will be finalised by end of Year 2. Equipment Supply Contracts will be signed by end of Year 2, so that 24 months will be available to the Contractor for construction and commissioning of the complete plant. Hence, by end of Year 4, the plant will be ready and also adequate cane will be available.

During the initial 2 seasons, the plant will be operated for lesser number of days as per the cane availability. It is anticipated that, during the 3rd season, the plant will reach its rated capacity and will be operated for the full crushing season of 240 days.

As agricultural land will be developed on continuous basis, it is expected that plant will be expanded to 5000 TCD during Year – 7, in Phase - 2. Expansion will be carried out at all sections of the plant, i.e., sugar plant and cogeneration plant. As partial augmentation may not be possible at Distillery, it is proposed that 45 KLPD will be installed during Phase- 1, which is suitable upto 5,000 TCD.

In Phase – 2, during expansion of the plant, various options will also be evaluated, like,

- by diverting part juice/syrup to distillery
- installation of backend sugar refinery, etc



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However, budgetary cost estimates of this expansion program will be done at later stage after detailed analysis of various options and prevailing market conditions.

Depending on the progress of cane development, there is enough scope for further expansion of the sugar plant.

12.0 NUMBER OF PEOPLE EMPLOYED

The Songea project company will have around 4000 – 5000 direct employment by the end of the 1st Phase of implementation upto 3500 TCD. It is expected that equal number of indirect Employment will be available in that local area.

The number of employees will increase steadily over time as the project is implemented.

Our initial focus will be establishing the sugarcane cultivation estates (both the Company's own nucleus estate and Outgrower farmers) and initial employment will be for agricultural and general administration.

We envisage that the new Songea factory installation will start after two years (End of Year 2) and will be completed in two years, hence, by end of Year 4 both the sugar plant will be ready and also adequate cane will be available for factory operations.

Employment of staff for the factory will start around six (6) months prior to commencement of crushing - so that the staff can be suitably trained for this operation.

13.0 PROPOSED INSTALLATION AND ANNUAL SUGAR PRODUCTION CAPACITY

As explained above, at the end of year 4, Phase – 1 of the Sugar factory with an initial crushing capacity of 3500 TCD will be installed. During 1st two seasons, the factory will operate lesser number of days as per the cane availability. It is expected that during Year - 6, the plant will operate at rated capacity and about 230 days producing about 79,212 tons of sugar.

Expected annual sugar production program is given in the below table:

		Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
		Phase - 1			Phase - 2					
Plant capacity	TCD	3,500	3,500	3,500	5,000	5,000	5,000	5,000	5,000	5,000
Plant operation	Days	106	170	229	201	232	239	239	239	239
Sugar produced	tons	36,584	58,834	79,212	99,590	114,810	118,207	118,293	118,293	118,293

The plant will be expanded during Year 7 to 5,000 TCD. After expansion, during initial two seasons, the plant will be operated lesser number of days as per cane availability and will ramp up to rated capacity and rated number of days by Year 9 onwards, producing about 118,000 tons of sugar per annum.



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14.0 INVESTMENT BUSINESS PLAN

Total farm area requested is 44,000 ha and it will take 8 – 9 years for development of total farm. During 1st year, nursery and seed cane area will be developed and gradually in the span of 8 – 9 years, total area will be developed accordingly, the investment will also be distributed.

The Project will be successful when the cane development and installation of sugar complex, both, will be implemented simultaneously, hence, it is planned to implement the Project in two Phases.

Following summarized plan is proposed for development of agricultural area and also sugar complex in each Phase.

S. No	Description	Unit	Phase – 1 In first 6 years	Phase – 2 From 7- 10 years	Total
1	Farm Development in each Phase	Ha	18,000	12,800	30,800
2	Total farm will be used for cultivation in each Phase	Ha	15,750	15,050	30,800
3	Farm will be under irrigation	Ha	4,350	3,150	7,500
4	Farm will be under rainfed	Ha	11,400	11,900	23,300
5	Sugar plant capacity	TCD	3,500	5,000	
6	Cogeneration plant capacity	MW	18	*	
7	Distillery capacity	KLPD	45	*	

Summary of estimated capital investment for development of Songea farm, adjoining Outgrowers farm, totalling 44,000 ha, and also Phase – 1 installation of 3,500 TCD sugar plant are given below:



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S. No	Description	Phase – 1	Phase - 2
1	Estimated cost of Bush clearing, Land development, Land preparation, Drain development and Road development @ USD 1500/ha	\$ 27,000,000	\$ 19,200,000
2	Estimated cost of Irrigation @ USD 5000/ha	\$ 21,750,000	\$ 15,750,000
3	Seed cane development, cane plantation @ USD 1000/ha	\$ 15,750,000	\$ 6,500,000
4	Agricultural machinery, including cane harvesting & transportation equipment	\$ 11,000,000	\$ 4,000,000
5	Agricultural workshop, tools & tackles	\$ 4,000,000	\$ 1,000,000
6	Capital costs for Agricultural offices, Agricultural villages and other infrastructure	\$ 4,000,000	\$ 2,000,000
7	Installation of sugar complex	\$ 66,000,000	**
	TOTAL	149,500,000	48,450,000

In summary, total Phase – 1 investment of about USD 149.50 million will be distributed in first 6 years and about USD 48.50 million will be distributed from 7th- 10th year for agricultural development.

** During Phase – 2 expansion of sugar complex, various options will also be evaluated depending upon the prevailing market conditions, like,

- Distillery capacity will be expanded by diverting part juice/syrup depending upon prevailing ethanol/ENA prices
- High pressure cogeneration boiler & back pressure/ condensing steam turbine depending upon prevailing power tariff
- Installation of backend sugar refinery, depending on market conditions of refined sugar

As these options will depend upon the market conditions of the output products after 7 years, hence, budgetary cost estimates of sugar complex expansion are not detailed for Phase – 2.

Year-wise Capital cost distribution for both agricultural development and sugar complex are not projected here and would be estimated at a later date.



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C SUMMARY

15.0 SUMMARY

In summary, considering

- The substantial experience of managing large sugar complexes in East Africa
- Managing Uganda's largest sugar estate in Kakira
- Adequate experience for marketing and distribution of final products through out East Africa and other neighboring countries
- Successfully managing more than 10,000 Outgrower farmers
- Our significant presence in Tanzania in other industries
- Our exceptional financial strength to develop the given area and fully utilize these resources for development of sugar cane
- Our Company has already been registered in Tanzania for establishment of the Proposed Sugar Project
- Last but not least, excellent reputation of corporate social responsibility as well as sustainable business practices

the Madhvani Group is deserved to be allotted the proposed Songea and its neighboring farms of 44,000 ha for successful implementation and operation of the proposed new farm and sugar complex.