



**Kenaf Agro-Climate Industrial Complex (KACIC):
Investing in Kenaf for a
Transformative Circular Economy
in Africa**

**Product Catalogue and
Investment Guide**



Brief about Green-Ef

Green-Ef Eco-Business Village Ltd is a Social and Environmental Innovation business that researches, designs and builds transformative and eco-friendly solutions in Agriculture and agribusiness to ameliorate consumer pains in poor quality, high price and periodic unavailability of essential products and services through innovation, steady provision, industry leadership, and profitability. Using the triple bottom-line framework, our products and services achieve economic profitability, import substitution, social benefit and environmental preservation, reservation and regeneration.

Among some of our products and services are;

1. Kenaf Eco-Feeds (Protein concentrate for poultry)
2. Pure Kenaf edible oil
3. Geo-referenced soil testing and fertilizer (nutrient) recommendation
4. Production and sale of rhizobium inoculants for legumes
5. Organic home gardening for households, hotels and restaurants
6. Premium quality vegetable production, aggregation and supplies.
7. EcoChar for soil, poultry and livestock applications
8. Eco Soil - growth medium for seedlings
9. Production and sale of biochar-based soil amendments
(*transition compost*)
10. Research, training and capacity building services in agriculture
11. Kenaf Agro-climate industrial complex (KACIC) – Research, product development and innovations in Kenaf (*Hibiscus Cannabinus L.*) as a 4-F crop.

KENAF AGRO-CLIMATE INDUSTRIAL COMPLEX (KACIC): INVESTING IN KENAF (HIBISCUS CANNABINUS L.) FOR A TRANSFORMATIVE CIRCULAR ECONOMY IN AFRICA

Kenaf Agro-Climate Industrial Complex (KACIC) is a multimillion-dollar investment project in kenaf for the production of over 11 essential products and services in a carefully scalable manner. 'Kenaf' (Hibiscus Cannabinus, L.) is a plant that belongs to the Malvaceae family and indigenous to West Africa having been cultivated some 4000 BC as a food and fibre crop. Though kenaf is indigenous to West Africa, the utilization of the plant still remains at rudimental levels with most, if not all, of its products and services remaining permanent items on the import bills of many African economies causing significant balance of trade deficits. After about seven years of extensive research, experimental farms, local and international laboratory analysis and partnerships, Eco-Design iterations and prototyping, Green-Ef Eco-Business Village Ltd has established the feasibility of utilizing the entire kenaf plant for the production of over 11 essential products and services for which samples (MVPs) have been developed and currently seeking financing for commercialization. Some of these products and services are;

Phase1:

1. Edible oil
2. Poultry Feed - High in protein, energy, calcium phosphorous etc
3. Fresh, dried and par-boiled edible leafy vegetables
4. Charcoal briquettes
5. Pure and activated biochar for soil fertility, poultry and livestock health improvement.

Phase 2:

1. Cosmetic and pharmaceutical grade oils
2. Newsprint paper from the stalk
3. Eco-Friendly Carrier
4. Jute sacks (a product which is heavily imported by many African

countries in excess of 74,000Mt per annum and over 845,000Mt globally

5. Generation of renewable electricity from the pyrolysis process.
6. **EcoAquaTab™** (R&D is a revolutionary formula in water purification that treats both biological and chemical contaminants in drinking water par WHO standards. It is over 40% cheaper than the residually toxic *calcium hypochloride* which is currently the industry practice in water purification in Ghana and globally. **It is also organic**

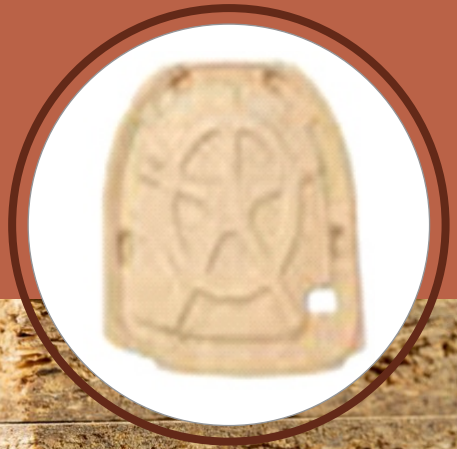
Kenaf Agro-Climate Industrial Complex (KACIC)
has an excellent **Scalability** profile, attractive **Returns on Investment** and provides unmatched **Social and Environmental Benefits**.

Selected Product and Service Lines from the Kenaf Plant

c	Problem (Ghana, Africa and globally)	Kenaf Solutions	Product Line
1	Jute sacks imports amounts to over 24000t/a in Ghana, 74,000t/a in Africa and over 845,000t/a globally.	Using fibre from the Kenaf plant, we plan to produce customized jute sacks for clients of various agricultural produce including Cocoa, cashew, grains (maize, sorghum, groundnuts, soybeans), onions etc	
2	The environmental hazards caused by Polyethylene (PE) carrier bags and other plastic materials are a global challenge.	From the fibre of the Kenaf plant, we plan to produce Eco-friendly carrier bags as an alternative to and a replacement for polyethylene carrier bags which have been a major environmental menace in Ghana, Africa and globally.	
3	High rate of environmental degradation for inefficient energy production and utilization (Charcoal and fuel wood). Data from the Ghana Ministry of Trade the export Market size of charcoal briquettes is about 755Mt/a valued at \$400/Mt	From otherwise wasted stalk of the kenaf plant, we plan to produce several tons of charcoal briquettes for both the domestic, regional and global markets.	
4	Increasing prices of imported edible oil and uncertainty about the nutritional value and health concerns of cholesterol, GMO oils and oils from unknown and unhealthy sources is a major concern for consumers. As of 2019, Ghana imports 298,000 Mt of edible oil annually.	<p>Kenaf seed oil is a nutritious edible oil which is high in polyunsaturated fatty acids (PUFA), essential antioxidants, anti-inflammatory and anti-mutagenic properties that find useful applications in the food, cosmetic and pharmaceutical industries depending on the extraction technology.</p>  	
5	According to the latest Ghana Living Standards survey Round 6, (GLSSRND6, 2014:146), the estimated Value of Urban vegetables consumption is about GHC1.8m/annum and the share of urban food budget on vegetables is about 11%	Kenaf leaves are a good source of highly nutritious vegetables that can be grown all year round. Hotels, restaurants, health and educational institutions with boarding/feeding facilities use large quantities of these leaves for cooking on a daily basis.	

6	Ghana imports on average 29,588Mt of poultry Feed annually worth \$14,794,000	Over the years, we have developed and tested a unique formula of poultry feed from the kenaf plant that is competitively high in protein, energy, calcium, phosphorous etc which also helps to reduce GHG Emissions and sten from poultry pens and also helps to significantly reduce antibiotic use in poultry birds. A Protein concentrate has already received preliminary approval from the FDA through the NBSSI	
7	Over 8 million hectares of the Great soil Groups of the Northern Savannah Ecological Zones of Ghana are poor in Soil Organic Matter content, soil macro/micronutrients and soil water holding capacity	Both Pure and Activated Biochar can help to significantly improve the fertility of the soils of this area and also help retain nutrients from chemical fertilisers and remediate their chemical effects on the soil. Biochar Application to soils has also been recognized by the IPCC as a carbon negative emission technology which qualifies it for carbon credits under emission trading protocols.	
8	Climate change challenge and Opportunities with GHG Emission Trading (Carbon Credits)	The Kenaf plant absorbs about 1.5 tons of CO2 to produce 1 ton of dry matter. For every 1 hectare, the plant consumes 30-40 tons of CO2 for each growing cycle. Well organized cultivation based on emission trading protocols could therefore yield significant carbon credits.	 
9	Frequent energy crises in Ghana and the West African sub-region summarises the significant shortfalls in our generation capacity. Rural industry and economic activities are very low due partly to the lack, inadequate and unreliable source of electricity (energy). Government of Ghana has not been able to meet commitment of 10% renewables in the generation mix comes from renewables by the year 2020 and biomass generation is still under 1%	Using the synthesis gas from industrial pyrolysis systems and char from the kenaf stalk several megawatts of biomass-based renewable electricity generation has been proven feasible by Green-Ef.	
10	Ghana spends over \$1.5m /a importing residually toxic calcium hypochloride for commercial water treatment as in many other African countries and globally.	EcoAquaTab™ (R&D) is a revolutionary formula in water purification that treats both biological and chemical contaminants in drinking water par WHO standards. It is over 40% cheaper than the residually toxic calcium hypochloride which is currently the industry practice in water purification in Ghana and globally.	

With increasing concerns over deforestation and species extinction caused largely by forest wood harvesting for the (processed) wood and furniture industry, innovations aimed at alternative and sustainable sources of wood are the new direction in both product design and sustainable consumption. Using kenaf stalk, Green-Ef Eco-Business Village Limited is prototyping the manufacturing of particle boards from the stalk of the kenaf plant for various wood processing, furniture and furniture accessories, pulp and insulation panels for use in the automotive industry.



PROPOSED INVESTMENT TICKET SIZES

A. \$100,000 - \$1million will comprise the following product lines:

- Fresh, dried and Par-boiled Leafy Vegetables
- Edible Oil
- Poultry Feed
- Charcoal Briquettes

B. \$2million - \$60 million will comprise the following product lines:

- Fresh, dried and Par-boiled Leafy Vegetables
- Edible Oil
- Poultry Feed
- Charcoal Briquettes
- Jute Sacks
- Eco-Friendly Carrier Bags
- Water Purification Tablets* (**EcoAquaTab™**)
- Cosmetic and Pharmaceutical Grade Oil

C. \$60 million - \$150+ million will comprise the following product and service lines:

- Fresh, dried and Par-boiled Leafy Vegetables
- Edible Oil
- Poultry Feed
- Charcoal Briquettes
- Jute Sacks
- Eco-Friendly Carrier Bags
- Water Purification Tablets* (**EcoAquaTab™**)
- Cosmetic and Pharmaceutical Grade Oil
- Newsprint and other paper products etc
- Generation of renewable electricity using industrial pyrolysis for biomass generation.

GREEN-EF ECO-BUSINESS VILLAGE LTD
Kenaf Agro-Climate Industrial Complex



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Simply natural