



Risk Mitigation Strategies for the Cultivation of *Croton megalocarpus*

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Introduction

This brief serves to explain how the Company is seeking to mitigate and thereby minimize the various risks it perceives in the cultivation of the biodiesel feedstock, the indigenous tree *Croton megalocarpus*, known locally as *muhihi* and by various other names.

Political Risk

We have reason to believe that the center of the tree's endemism is the Aberdare Mountains in Kenya, and households certainly grow the tree as an ornamental throughout Kenya's mountains, as well as across the border in highland Tanzania. Kenya, however, is a country renowned for its corruption and its tribalism, as well as for tensions surrounding land issues. Conversely, Tanzania has been ruled amicably for several decades following a failed attempt at imposed socialism by the country's first president, Julius Nyerere through the *ujamaa* program. Tanzania elects the country's president through democratically contested elections. Occasional disruptions in offshore islands (Zanzibar and Pemba) and far away from Kagera region, the project site occasional occur. There are neither signs nor symbols of discontent, and people are proud of the fact that the tribal-based politics of Kenya are far removed from the political ethos of Tanzania.

We view the political risk of doing business in Tanzania as by far the lowest in the East African community that now includes Rwanda, Burundi and the third original member, Uganda. The recent wars in eastern Congo, Rwanda, and Burundi saw refugee influxes largely into Kigoma, the region south of Kagera. There has never been any political fallout in Tanzania from these conflicts.

Business Risk

Tanzania welcomes foreign investors, and requires them to register with, and follow the procedures of, the duly established intermediary entity, the Tanzania Investment Corporation (TIC). The company has complied with all Tanzanian procedures in this regard. We have also briefed all Tanzanian stakeholders through established visits and reporting. This information conveyance extends to all stakeholder classes from the President to the local farmers and grassroots coalitions. The purpose of these communications is to ensure that we are perceived as running a transparent business in the best interests of the country. Furthermore, the Company's Tanzanian partner is the National Investment Corporation (NICO), the country's predecessor to the stock exchange. NICO currently manages a mutual fund for very small local investors. Together, the Company seeks a 99-year lease from the government for the core plantation area which is the maximum land ownership allowed by law.

Labor Strife

The company has always insisted on a one-third/two-thirds plantation/out-growing ratio in order to contend with potential labor issues. If out grower farmers decide to boycott and refuse to sell product to the company unless higher prices are offered, the core plantation area will allow the company to continue operations notwithstanding. Operating out growers plantation program as an adjunct to the core plantation serves to mitigate labor risk should plantation workers strike for any reason.

Biophysical Requirements of *Croton megalocarpus*

The scarce literature that exists on the tree indicates that it flourishes in relatively cool, moist conditions, i.e., above 1200 m in altitude and with 800-1600 mm of annual rainfall. We have purchased SRTM90 (the US Space Shuttle radar mission) elevation data to ascertain with excellent precision the location of the 1200 m contour. We have also determined from long-term interpolated climate datasets and satellite-derived rainfall data from 1998 forward, both at 0.25° spatial resolution, that rainfall fell just barely below 800 mm in only 2 of 55 years of record. This same database



demonstrates that rainfall never exceeded 1600 mm. We have concluded that our site is in the optimal location in Tanzania for plant cultivation.

We have seen that bees pollinate the tree, and the Company has approached an apiary Consultancy on Mt. Kilimanjaro, Tanzania, for the provision of sting less bees. The company plans to train Kagera households in apiary science which provides an additional benefit of this company to local farmers. In the event that disease should wipe out the hives, we also have the opinion from the nation's premier agricultural university that the morphology of the tree's flowers indicates that wind-borne pollination is also occurring.

Pests and Fire Risks

The extant literature indicates that the tree may be vulnerable to various fungi. The company will source dried shrimp/crab/lobster shell, grind it up, and spread it around the trees. According to India's *Appropriate Technology Institute*, this will induce the tree to mobilize its own chemical defenses against fungi, as well as "inoculating" the soil through causing fungiphagous bacteria to sense that a plentiful food supply is available and thus multiply profusely. Simultaneously, microbial pests and fire risk will be addressed through (a) a wide geographic distribution across the region among out growers, and (b) the planting of blocks of trees in the core area, with buffers of local vegetation in between.

Social Disruption

Once the enterprise proves to be as successful as projected, it is very likely that Tanzanians from other regions, as well as cross-border economic migrants especially from Rwanda and Burundi, may believe it to be in their best interests to move to Kagera to become involved in the production process. The Company is well aware of this possibility, and plans to establish a routine contact with Government to assist in plans to avoid negative outcomes of such migration.

Pricing and Market

As long as crude oil prices remain high, above \$50/barrel, the Company will do very well provided that Government imposes no additional taxes on the business. We are continuing negotiations with Government to create the right "enabling environment" for biofuels in general, and are also cognizant of the efforts of The United Nation's Develop Program (UNDP)-Nairobi to harmonize a biofuels policy across East Africa. Thus, regional markets should eventually be easily accessed, and Kagera is ideally poised to take advantage of possible exports to Rwanda, Burundi, and Uganda (possibly even eastern Congo) by road, and Kenya by lake barge. The Company may provide biodiesel to Tanzania's coastal region once the Mwanza-Dar railway is privatized and freight charges rationalized. In addition, the Company may be able to sell unrefined "straight vegetable oil" to Tanzania's electrical utility, TANESCO, or perhaps to utilities of its neighbors. The company will also closely follow technological innovation in alternative end-uses of the biodiesel co-product glycerol, and it will mine the carbon credits market to the utmost of its ability.

Competition

The Company is the only entity currently seeking to use *Croton megalocarpus* as a biofuel feedstock anywhere in East Africa. Our competitors, and there are several, are focusing on *Jatropha curcus* (see our information brief on feedstock). Regardless, there is at this time sufficient demand in-country, regionally, and globally to suggest it to be extremely unlikely that any single entity will be able to gain a monopoly on biofuel production in Tanzania.