

PROJECT SUMMARY
FOR
JOHIL GREEN FRAM

---Cultivation of Soybean---



Project Type:	Agricultural – Cultivation of Soybean
Project Title:	JOHIL GREEN FARM
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PROJECT SUMMARY

Introduction

According to "The Economist" Magazine, between now and 2050 the world's population will rise from 7 billion to 9 billion. Its income is likely to rise by more than that and the total urban population will roughly double, changing diets as well as overall demand because city dwellers tend to eat more meat. The UN's Food and Agriculture Organisation (FAO) reckons grain output will have to rise by around half but meat output will have to double by 2050. This will be hard to achieve because, in the past decade, the growth in agricultural yields has stalled and water has become a greater constraint. By one estimate, only 40% of the increase in world grain output now comes from rises in yields and 60% comes from taking more land under cultivation. In the 1960s just a quarter came from more land and three-quarters came from higher yields.

So if you were asked to describe the sort of food producer that will matter most in the next 40 years, you would probably say something like this: one that has boosted output a lot and looks capable of continuing to do so; one with land and water in reserve; one able to sustain a large cattle herd (it does not necessarily have to be efficient, but capable of improvement); one that is productive without massive state subsidies; and maybe one with lots of savannah, since the biggest single agricultural failure in the world during past decades has been tropical Africa, and anything that might help Africans grow more food would be especially valuable. In other words, you would describe Brazil. The increase in Brazil's farm production has been stunning. Between 1996 and 2006 the total value of the country's crops rose from 23 billion reais (\$23 billion) to 108 billion reais, or 365%. In less than 30 years Brazil has turned itself from a food importer into one of the world's great breadbaskets. It is the first country to have caught up with the traditional "big five" grain exporters (America, Canada, Australia, Argentina and the European Union). It is also the first tropical food-giant; the big five are all temperate producers.

This production has been achieved mainly through the utilization of the savannah lands in central Brazil and the work of Embrapa, its main research facility. When Embrapa started, the *cerrado* was regarded as unfit for farming. Norman Borlaug, an American plant scientist often called the father of the Green Revolution, told the *New York Times* that "nobody thought these

soils were ever going to be productive." They seemed too acidic and too poor in nutrients. Embrapa changed that.

Guyana like Brazil is also blessed with similar conditions in the Rupununi, why can't the same growth experienced by Brazil be transferred to this area? This project is all about transferring the technology and systems adapted in Brazil to a small area of approximately 5,000 acres as an initial pilot. The developers are Guyanese of Brazilian heritage with strong connections. The proposal entails accessing the services of skilled technical personnel from Brazil along with appropriate technology to get the project off the ground. It is expected that by the end of three years, Guyanese personnel would be fully integrated into the system so as to allow for increase in local employment levels.

Guyana imports all of its present needs of soya for the production of livestockfeeds, as such there is a local demand for grain. The Rupununi is also expected to see a dramatic increase in the production of cattle, sheep and other small ruminants in the very near future. The demand for livestock feed would be significantly increased and transportation from Georgetown would make this option more costly. The presence of a ready market in Region 9 adds to the expectations of easy marketing.

With the regard, Ms. Jeanne Disarz (hereinafter referred to as the developer), owner of JOHIL GREEN FARM, is undertaking a soybean cultivation project of which will boost Guyana's agricultural sector. Prior to the commencement of this project, the developer is required to apply for and obtain an Environmental Permit from the Environmental Protection Agency (EPA). In complying with this requirement, the developer therefore submits an application. The following document presents a summary of the above project and contains the necessary details that may complement the attached application in all efforts to ensure a smooth and timely processing.

Location of Project:

The proposed area chosen for the project lies on the lands formerly held by the ManariCattle Company and lies closer to the North Western extremities of the ranch in the vicinity of

Lamparino Lake within the North Rupununi Savannahs in Region 9. It is also bordered by the Takutu River to the west which forms the natural border with Brazil (see appendix 1). The project area consists of approximately 2023.4 hectares (5,000 acres).

Description of the Project Site:

The Rupununi savannahs are part of a large complex of savannahs in the Amazon basin that stretches across the southern lowlands of the Guiana Shield. The vegetation is composed of various species of *Phytophysognemies* non-forest vegetation. This feature is also dominant in nearby Roraima state in Brazil. The area is also much similar to the Cerrados of Central Brazil where massive agriculture plantations are located. These areas are very legally appealing due to the restrictions imposed by REDD + and the Low Carbon Development Strategy being pursued by Guyana against deforestation. Generally, the area is marked by flat grasslands and mountainous terrain. The main land use type within and around this area is cattle grazing (see appendix 2).

Description of Project Phases:

1. Preoperational Phase/Land Development

Development of this area will commence once all legal requirements are met and the land is issued by the state to the developer for the proposed project. As such, development will begin with clearing of the natural shrub like *Phytophysognemies* non-forest vegetation which currently covers the proposed location. These shrubs commonly referred to as "wild cashew" and "sandpaper" shrubs, are not present on all sections of the land, and in the areas where they are present they exist in varying degrees of density. Shrub clearing is a delicate exercise and due care will be taken during this process to minimize the disturbance of the top soils. This shrub clearing process has been developed to a highly scientific level by Brazilian farmers who clear these shrubs with minimal top soil disturbance.

- ***Farm Infrastructure***

- ***Housing and Administrative Office***

The upper northeastern section of the land identified for the project will be developed to house the farm's residences and administrative offices (see appendix 3). Housing accommodations will be provided for all management and support staff. Buildings will be equipped with potable water and electricity. Medical services will be provided to all staff in the form of an onsite "medics".

An office complex will also be developed so as to provide a proper working environment for managerial staff as well as other personnel. This consists of the administrative and financial unit of the farm. The office will have meeting rooms, human resources, financial, managerial and auxiliary staff in order to keep the management of the farm organized and efficient.

A machinery and equipment storage shed and a fully equipped workshop will be developed on site.

There will be several storage facilities for temporary storage of harvested produces until these are transported to markets.

- ***Roads***

A network of access roads will be constructed on the farm to facilitate the movement of machinery, equipment, inputs and personnel to the various sections of land under cultivation. These roads will be savannah like road, 4 meters – 5 meters wide, covered with compacted laterite. Other existing roads within the project area will be upgraded and maintained where necessary.

- ***Water Supply***

The farm will require the use of freshwater from nearby sources such as the Takutu River, the Lamparina Lake and creeks, which are in close proximity, to irrigate large sections of the farm land, especially the area under soya bean cultivation, during the prolonged dry season. The land will be irrigated by using large pumps to move water from the Takutu River to various sections of the land via canals.

A network of canals will be constructed to facilitate the irrigation and drainage of the land, a system that is currently being utilized across the border in Brazil for agricultural development. The canals will be small ditches dug into the land.

A well will be dug at a strategic location so as to provide portable water for domestic uses such as drinking and laundry.

- **Energy**

A 500 kVa generator will be used to supply the farm with power; as such a small building will be constructed onsite to house the generator.

Project's Capital Investment:

The project will be executed in four annual phases, however the capital cost for year one of the development is estimated, based on current prices, to be G\$664,485,425 (US\$ 3,322,425).

Possible Employment:

The JOHIL Green Farm development will require a number of staff which will fluctuate at various phases of the development. The farm will require a management complement of three (3) persons, consisting of a Farm Manager, an Accountant and a Maintenance and Facilities Manager.

During first phase of the project, it is anticipated that a total of thirty (30) staff will be employed in the farm's operations. During the land preparation, construction and farm start up phases this number will be closer to fifty (50) persons employed. However, due to the nature of this development, it is expected that most of the key management positions will have to be filled initially by personnel not currently residing in Region 9. Nevertheless, JOHIL Green Farm will be committed to capacity building among the locally hired personnel in order to provide them with equal access to key positions within the company.

Project's Life Span:

The lifespan of such development is difficult to anticipate since it is highly dependent on the demands for the produces and its accompanied markets as a preference over other supplies around the globe. Nevertheless, this development is envisioned as one that is permanent with possible phases of expansion so as to ensure continuous growth and sustainability.

Possible Environmental Impacts and Mitigation Measures:

Farmed areas provide important habitats for many wild plants and animals. When farming operations are sustainably managed, they can help preserve and restore critical habitats, protect watersheds, and improve soil health and water quality. But when practiced without care, farming presents the greatest threat to species and ecosystems.

Negative Environmental Impacts From Unsustainable Farming Practices

- **Land Conversion and Habitat Loss**

Farming is considered to be a major and growing land use. Approximately fifty (50) % of the world's habitable land has been converted to farming land and approximately thirty eight (38) % of the world's total land area is covered by farmland (CBD/UNEP (2001) Global Biodiversity Outlook).

Experts predict that in developing countries, a further 120 million hectares of natural habitats will be converted to farmland to meet demand for food by 2050. This will include land with high biodiversity value, such as the Savannah lands of Guyana.

Agricultural ecosystems provide important habitats for many wild plant and animal species. This is especially the case for traditional farming areas that cultivate diverse species. However, rising demand for food and other agricultural products has seen large-scale clearing of natural habitats to make room for intensive monocultures, such as Soya Bean and Cattle Farming

Operations. This ongoing habitat loss can threaten entire ecosystems, as well as many species that reside within those ecosystems.

In addition to land conversion to facilitate farming practices, road construction through forested areas and savannah lands results destruction of these habitats. If access through the afore-said ecosystems area not regulated deforestation will increase and endanger the livelihoods of persons residing in those areas.

- **Soil Erosion and Degradation**

When natural vegetation is cleared and when farmland is ploughed, the exposed topsoil is often blown away by wind or washed away by rain. A lack of soil cover and deficient protection from the wind in varying scales of farming lead to erosion and infertile. Erosion due to soy production, for example, sees Brazil lose 55 million tons of topsoil every year. This leads to reduced soil fertility and degraded land. Consequently, the resulting fertility decline is compensated with increasing fertilizer use.

A secondary impact that arises from soil erosion and degradation is **clogged and polluted waterways**. Soil carried off in rain or irrigation water can lead to sedimentation of rivers, lakes and other vulnerable areas. The problem is exacerbated if there is an absence vegetative buffer along the banks of rivers and other watercourses to hold the soil. Sedimentation causes serious damage to freshwater and marine habitats, as well as the local communities that depend on these habitats.

Mitigation Measures for Soil Degradation and Degradation

1. **Vegetated buffer zones**

A vegetated buffer zone between the water body and farmland can act as an effective filter for soil particles, nutrients and particle-bound pesticides in surface runoff from agricultural land. Vegetation zones can also reinforce the stream and river banks and protect against landslides and excavation by the stream water.

2. Grass-covered waterways

On erosion-prone soils where surface water is collected in natural depressions, erosion can be prevented by establishing grass-covered waterways. The waterways can either consist of permanent grass cover, or they can be sown every year.

3. Delayed Seedbed Preparation

Any cropping system in which all crop residue is maintained on the soil surface until shortly before the succeeding crop is planted. This reduces the period that the soil is susceptible to erosion.

4. Crop residue use

This involves the use of plant residue to protect cultivated fields during critical periods of erosion.

5. Critical Area Planting

This entails the planting of vegetation such as trees, shrubs, grasses on highly erodible or eroding areas.

6. Conservation Cropping

A sequence of crops designed to provide adequate organic residue for maintenance of soil tilth. This practice reduces erosion by increasing organic matter. It may also disrupt disease, insect and weed reproduction cycles thereby reducing the need for pesticides. This may include grasses and legumes planted in rotation.

• Loss of Arable Land

It is estimated that since 1960, one-third of the world's arable land has been lost through erosion and other degradation. The problem persists, with a reported loss rate of about 10 million hectares per year.

Over the last five (5) decades, increases in agricultural productivity have made it possible to produce more crops on the same amount of land (Carey C, Oettli D. (2006) Determining links between agricultural crop expansion and deforestation. A report prepared for the WWF Forest

Conversion Initiative). However, agricultural land post production is often degraded and rendered almost useless. As a result, producers keep on moving to more productive land. Globally, the land used and abandoned in the last fifty (50) years may be equal to the amount of land used today.

Mitigation Measure

1. Conservation Cover

Establish and maintain perennial vegetative cover to protect soil and -water resources on land retired from agricultural production.

- **Pollution**

Agriculture is one the leading source of pollution in many countries. One of the major factors that contribute to the pollution of the environment is the use of pesticides and fertilizers. Since the 1950's, the use of pesticides, fertilizers and other agrochemicals has increased hugely in many developed and developing countries.

Inappropriate water management and irrigation technology often result in rainwater and irrigation runoff from fields to adjacent rivers and lands. This runoff can contain varying concentrations pesticides and fertilizers that can pollute waterways, impact groundwater and threaten the existence of various native plants and animal species. Further, pollution due to fertilizers and pesticides represents a human health risk, especially for agricultural labourers and indigenous population groups.

Another point to note, pesticides also killsbeneficial insects in and around the fields and harm animals consuming poisoned insects. Further, soil micro-organisms that essential to maintain healthy soil can be also be impacted negatively thus resulting in a decrease in soil fertility and ultimately leads to continuous cycle of pesticides and fertilizer use.

Pesticide pollution of rivers, lakes and wetlands also directly poisons freshwater species, as well as people. Some pesticides are suspected of disrupting the hormone messaging systems of wildlife and people, and many can remain in the environment for generations.

An associated impact of pollution due to run-off is eutrophication. Unlike pesticides, fertilizers are not directly toxic. However, their presence in freshwater and marine areas alters the nutrient system, and in consequence the species composition of specific ecosystems. Their most dramatic effect is eutrophication which is an explosive growth resulting algae due to excess nutrients. This depletes water of dissolved oxygen, which in turn can kill fish and other aquatic life.

Mitigation Measures for Pollution

1. Fertilizer Planning

Fertilizer planning involves systematic quantification of the need for plant nutrients for the individual agricultural crop at each field of a farm. The fertilizer requirement is calculated based on a number of factors, primarily from the soil nutrient status and the crop's production potential for each location.

2. Conservation Tillage

Conservation tillage involves minimum tillage before seeding, e.g. harrowing or direct seeding. Further, conservation tillage can reduce the loss of soil and nutrients especially in steep fields, and can also be less time and energy intensive.

3. Hydrotechnical Measures

Control of surface runoff from agricultural land is important to minimize the loss of soil and nutrients. Hydrotechnical installations can regulate and control the runoff from agricultural areas. Maintenance of hydrotechnical installations, in particular the drainage systems/pipelines, is important.

4. Sedimentation Ponds, Constructed Wetlands

Sedimentation ponds are constructed wetlands that retain soil particles, nutrients and pesticides from diffuse sources such as agricultural land. The ponds can also improve biodiversity and add an aesthetic quality to the cultural landscape.

5. Vegetative Buffer Zones

- **Unsustainable Use Water Resources**

Agriculture is considered to be one the greatest users of water resources. Globally, the agriculture sector consumes approximately seventy (70) % of the Planet's accessible freshwater. The Millennium Ecosystem Assessment (2005) shows that between fifteen- thirty five (15-35) % of water use by agriculture is estimated to be unsustainable. Moreover, agriculture wastes sixty (60) % or 1,500 trillion litres, of the 2,500 trillion litres of water it uses each year.

Some of the main causes of wasteful and unsustainable water use have been as leaky irrigation systems, wasteful field applications methods and cultivation of crops requiring heavy water resources in environments not suited for the environment.

Unsustainable water use harms the environment by changing the water table and/or depleting ground water supplies. Excessive irrigation can also increase soil salinity and wash pollutants and sediment into rivers causing damage to freshwater ecosystems and species as well as those further downstream.

Mitigation Measures for Unsustainable Use of Water Resources

- 1. Irrigation Management Systems**
- 2. Water subsidies**
- 3. Adhere to national policies on water management**
- 4. Water subsidies**

- **Genetic Erosion**

The replacement of traditional and local crops with more genetically uniform, modern varieties has caused the genetic erosion of crops around the world. The widespread use of genetically uniform modern crop varieties has caused agricultural crops to lose about seventy five (75) % of their genetic diversity in the last century. This lost genetic diversity reduces the potential for modern crops to adapt to, or be bred for, changing conditions – and so directly threatens long-term food security.

Mitigation Measure for Genetic Erosion

1. Practice Organic Soy Cultivation

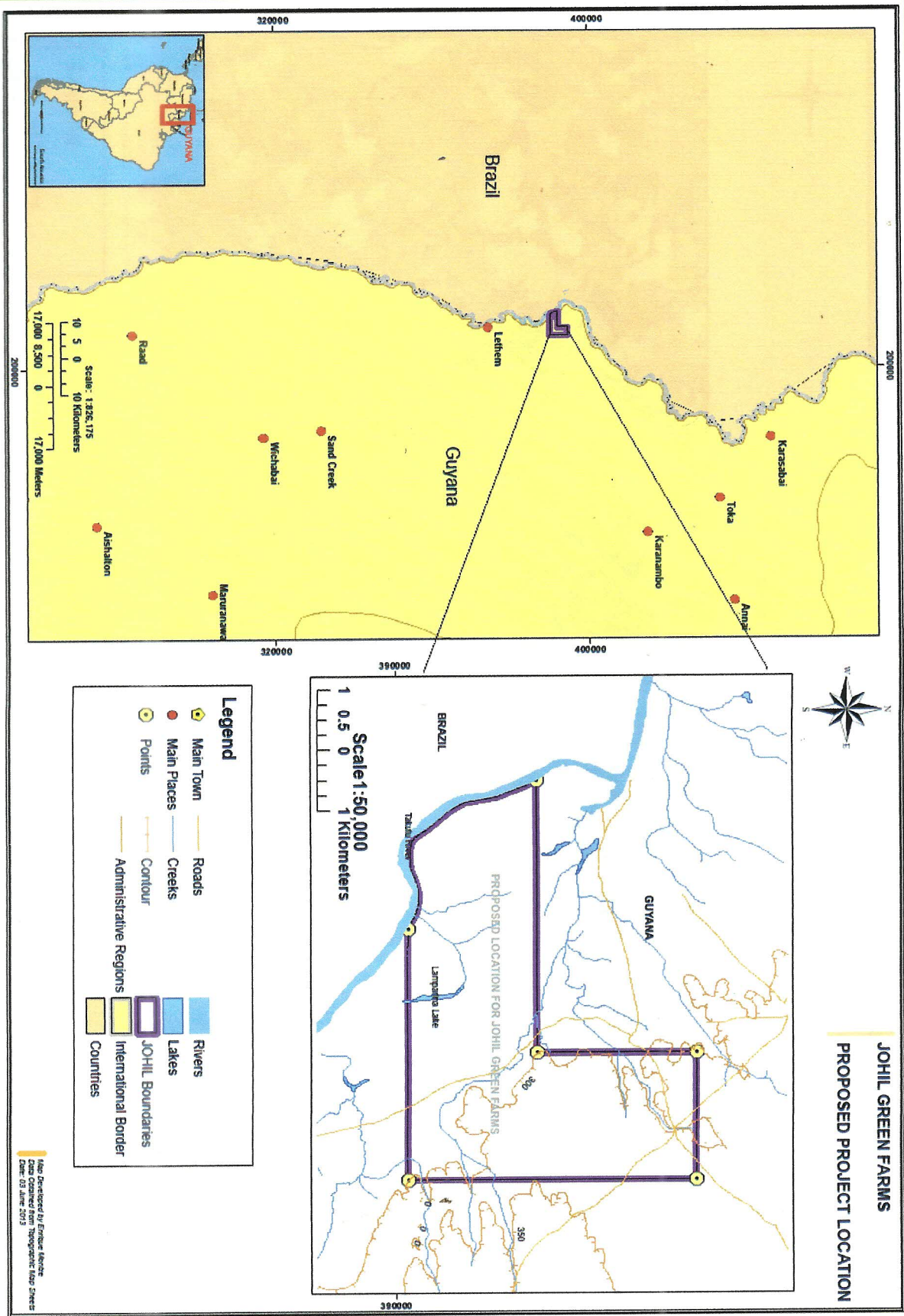
- **Climate Change**

Farming practices and clearing of land for agriculture are significant contributors to the build-up of greenhouse gases in the atmosphere. Agriculture practices are often considered to be multiple sources of emissions and account for fourteen (14) % of greenhouse gas emissions. Sources include fertilizers, livestock, manure management, burning of savannahs and agricultural residues, and ploughing. Additionally, the conversion of forests and savannahs lands to agriculture farmlands accounts for a roughly similar percentage of greenhouse gas emissions as agriculture itself.

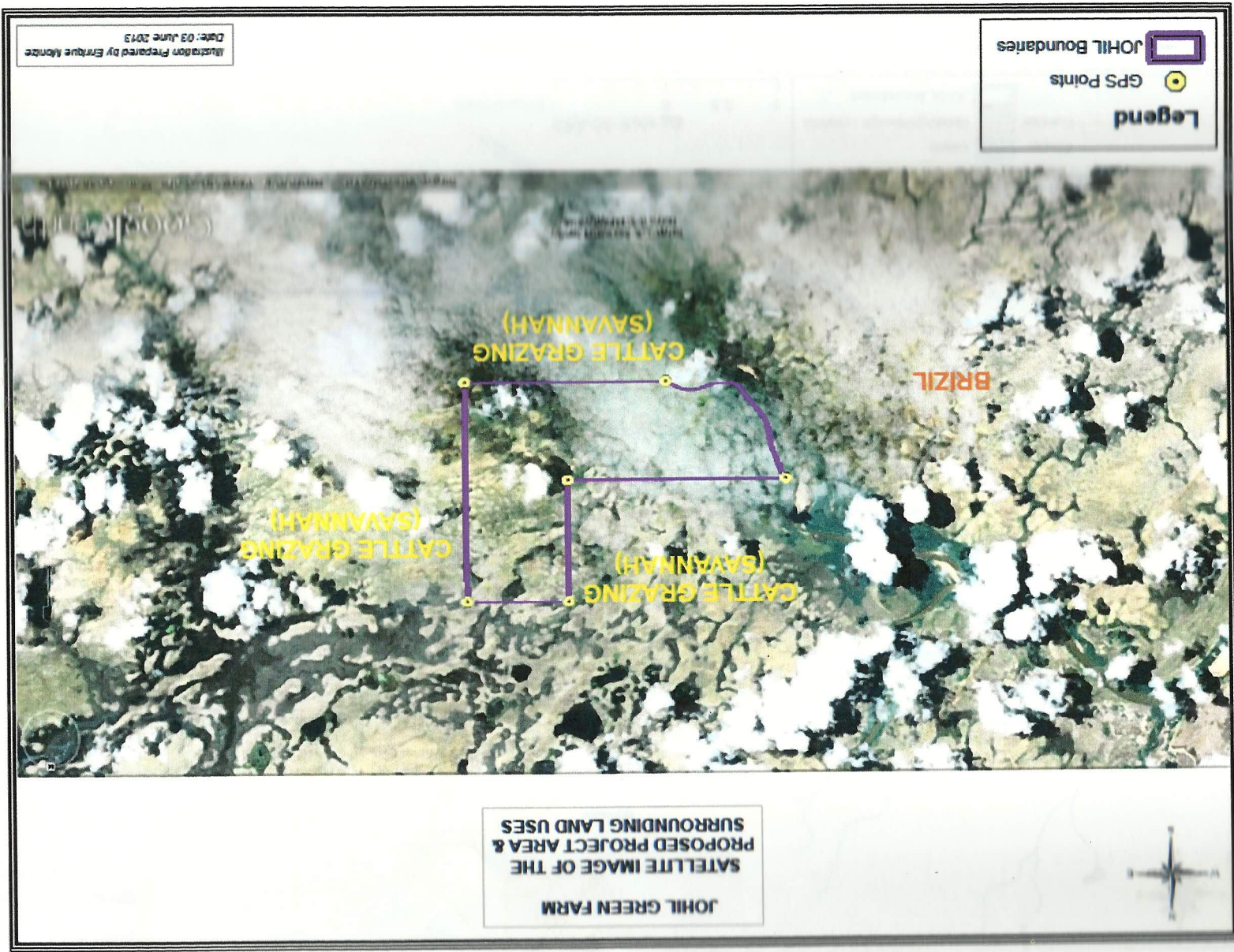
Environmental Compliance:

The developer intends to comply with all regulations and guidelines prescribed by the EPA as well as, those prescribed by other governmental entities, in all efforts to ensure good environmental and agricultural practices are maintained throughout the various phases of this operation.

Appendix 1 – Map of Proposed Project Location



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Appendix3 – Map of Proposed Project Location and Location of Buildings (Site Plan)

