

AROMATIC CULTIVATION IN ASSAM TARGETING THE INTERNATIONAL MARKET

By

Nripen Barua, CEO

Acinom Aromatics Private Limited

Introduction

- Lemongrass oil, extracted from lemongrass plant, is an essential oil with fresh and citrus fragrance.
- It is widely used in food flavor, fragrances, and pharmaceutical industries (a natural source of Vitamin A).
- Lemongrass supports health and well-being and is widely used in aroma therapy.
- Aroma therapy market is currently estimated at \$13 billion and is growing at a rate of 16-17% per year. Essential oil is a growing market in the U.S.A, with an annual growth at 12%-13%.
- In a span of 2 years, we have grown from a team of 19 to 155 farmers, and from 15 acres (33 bighas) to 84 acres (210 bighas) of land. Our goal is to have more than 1000 families cultivating lemongrass on 120 acres and citronella on another 100 acres.
- We started with farmers from Ukium village; have now grown to include farmers from neighboring villages, viz., Borkhuli, Deeghal beel, Jalukbari and Daledonga.

Acinom Aromatics Inc.

Innovative enterprise for Essential Oil Extraction in Assam.

- **Founder-CEO: Nripen Barua, BSc & MSc in Dairy and Food Science & Technology.**
 - **Industry leader with outstanding expertise in Research, Development, Management and Commercialization of aseptic foods. More than 35 years experience with leading North American companies including Kraft, General Foods, Catelli Foods, Tropika, John Labatt's Gaylea Foods and Private Consulting.**
 - **Notable achievements with patents in development of high protein aseptic shakes , apple juice products for retention of colour and flavour with enhanced shelf life.**
 - **Other core members of the team:**
 - **Mr. Vimal Sangma (Farmer)**
 - **Mr. Diganta Kalita (Industrial experience in fibre extraction).**

Mr.Barua's Professional Philosophy: Empower rural communities of Assam with sustainable agriculture employing abundant natural resources of the State, with focus on essential oil production. An integrated approach will not only uplift the farmers, but also help the education, and health of the population and develop infrastructure to elevate the communities.

Opportunity

- Approximately 70% of the state population is directly dependent on agriculture for income. However, there has not been a steady development in the agricultural sector despite abundant land and fertile soil. Lack of innovation, application of new technologies, farmer education, awareness and market linkage are some of the reasons for the slow growth in the sector. Farmers' low income and unavailability of the low-cost financing is another contributing factor.
- Lemongrass and citronella oils offer an excellent opportunity economically with viable cultivation, that can more than double their income with a minimum cost of production. It is a non-grazing cultivation with no risk of damage caused by other animals. Once cultivation is initiated, it will keep generating income for up to six years before replanting.
- The land around Ukium village is ideal for the cultivation of lemongrass and citronella. It is located about 26 km from Chaygaon near the Meghalaya border. Ukium is also a tourist attraction for its natural beauty.
- The village is underprivileged, economically down and the farmers earn meager income from paddy and betel nut cultivation. There is no proper infrastructure such as telecommunication, roads or transportation system; additionally, there is inconsistent power supply, poor school system in which education is almost negligible.

Review of National and International Market

- The major markets for essential oils are West Europe, U.S.A. and Japan. A substitute oil from *Litsea cubeba* (rich in citral) is exported by China (price Rs. 400 / kg), that competes with the trade of lemongrass oil.
- The present market price for lemongrass oil is \$12-\$13 or approximately Rs. 840-910 per kilogram. According to the report: '*Lemongrass Oil Market - Trends and Global Outlook for 2018-2025*', the present worldwide market is about 20,000 tons and is expected to go to 30,000 tons.
- The market for these essential oils in aroma therapy is estimated at ~\$13 billion and is growing @ 12-15% per year.
- The annual demand for citral, a major part of lemongrass oil, is over 40,000 tons. There is a huge scope for lemongrass oil to overtake the citral market - only if its cost of production can be brought down.
- India grows lemongrass in 3,000 hectares, largely in Kerala, Karnataka, U.P., and Assam. The annual production ranges between 300-350 tons / annum,
- The cost of production for lemongrass oil in India on the average is between Rs 550-700 per kilogram. Kerala produces about 60-70% of total India's oil production.

Objectives

- Our primary goal is to uplift the economic condition of our farmers with sustainable cultivation of lemongrass and citronella and their processing, to obtain essential oil with revenue generation in an assured market.
- Empower local people in managing the project, create opportunities for diversification of their income and bring about community development.

Long Term Goals:

- To lift the economy of farmers through sustainable development of essential oil production.
- Develop rural community in terms of farmer income, infrastructure, education, banking and healthcare. Community fund will be created for profit sharing, emergency and societal needs.
- Make Assam an important hub for essential oil production and replicate the Ukium model to other parts of the state with sustainable development.

How will farmers benefit?

With technical training, they will be:

- **Provided slips for the cultivation at a nominal fee.**
- **Given guarantee for the leaves for as long as lemongrass is cultivated.**
- **Assisted in land preparation for planting.**
- **Given cost sharing for transportation of the leaves to the distillation plant.**
- **Provided increase in annual income of each farmer between Rs. 37,000 to Rs 54,000 per acre from lemongrass cultivation.**

A portion of the profit will be used for community service like for the library, computers for the school, improve the quality of the school lunch programme, emergency medical help and other basic needs. Also, we will assist in any other community work, if necessary, and requested by the farmers.

Our Progress

- Pilot scale equipment has been installed in Ukium and has been operational for ~two years. Despite the lockdown, we have been able to produce 200 liters of the oil in July and August 2020. It is ready for shipment to USA.
- With the water sourced from the river, initially, we had flavor problem with the product. This issue was resolved after we installed a tube well with solar unit to pump out water of uniform quality. The tube well water goes through a filtration system because of its high mineral content.
- Despite the lockdown due to Covid 19, we have completed planting of additional 100,000 slips.
- A new design for the distillation unit has been completed. It will produce 70-100 kg oil per day. This represents an increase from 10-15 kg per day with the present system. The scale-up will also reduce energy and labor cost.

Our Progress

- So far about Rs 40 lakhs have been invested in this project. Apart from the farmers engaged in cultivation, 4 full time employees are working for the resources allocated to this project:
- We are working to develop a delivery system of the essential oil as a natural preservative in a controlled way in retail vegetable packages.
- Lemongrass oil can be used with water as an ant and other natural insect repellants.
- Citral from lemongrass can be used in Pharmaceuticals, Food flavorings and Cosmetic industry with high returns.
- The sample of lemongrass oil produced at the Ukium plant has been accepted by the Buyer in USA. He has increased the order of lemongrass oil from 10,000 kg to 20,000 kg.

Innovation

Background & Problem Statement:

- The energy used for distillation is 30% of the total cost of oil production. The burning of wood for energy is expensive and is not desirable due to its high carbon print on the environment.
- The available electricity is unreliable as a power source.
- Irrigation is lacking.
- There is poor or no telecommunication and internet services.
- There are no Bank and ATM services for the farmers.
- The area has undesirable road conditions and connectivity with the farmers.

Solutions to the Problem:

- We propose to use solar power as a source of energy and steam generator to maintain consistent heat for higher quality and yield in operations.
- We will develop a continuous distillation unit.
- We will introduce automation in loading and unloading of the leaves.

Assistance Needed From The Government

- Consistent Power Supply
- Reliable Supply of Quality Water
- Irrigation
- Telephone and Internet Connectivity.
- ATM for the farmers to deposit and withdraw money.
- Improved Road Service.
- A market-driven Product Development Centre, to help farmers for Agricultural Extension Services (e.g., mint oil, dehydrated pineapple, jack fruit etc. etc....) in keeping with P.M.'s pronouncement : *Atmanirbhar*.



Step 2:

**Training session of
lemongrass cultivation**



Step 3:

**Training session of
lemongrass cultivation for
farmers.**





**Step 4: Land
preparation and
planting of lemongrass
crop**

Step 5: Growth of lemongrass crop

Leaves are
ready to be
harvested



Step 6: Movement of Harvested Leaves



Collection of leaves.

Step 7:

**Weighing and recording of
the leaves.**



Step 8:

Cutting and feeding the
leaves to the distillation
tank.





Step 9: As the steam goes up,
the heated leaves
release oil and the
steam carries the oil
with it to a receiver.

Step 10:

The top layer of oil is Collected and cooled to be packed in a 210 litres Plastic drums.



Handling and Salvage of Biomass **After Oil Extraction**

- Biomass of oil-extracted lemongrass is an excellent organic fertilizer; it also serves as an excellent weed inhibitor. It will be ploughed back into soil between rows to grow the next crop of lemongrass plants.
- Any surplus will be used as an emergency fuel to produce energy in water boiler of steam distiller.

How it could help the society at large

- Significant economic injection of Rs 5 crores to a very poor area. This will allow a greater upward mobility of people in that area and increase overall financial and societal benefits.
- The school system will be able to provide proper infrastructure — including computers and nutritious lunches.
- Technology infrastructure upgrades will also allow for better education and upward mobility of the community.
- There will be support for people in the area to visit a doctor in Chaygaon (26km) away in case of emergency health issue.

Current Market

- **A Company in USA has guaranteed to buy all the lemongrass and citronella Oil produced by Acinom Aromatics. The Company has written a letter confirming their buying intention. The entrepreneur, Tom Bucu, runs an essential oil business worth about \$500 million.**

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**Our farmer
community at
Ukium**