

Assam Lemon – A Prospective NPD Initiative Aimed at Global Market Positioning

Dr. Bipasha Chetiyā Barua & Mr. Samrat Bharadwaj

¹Assistant Professor, Department of Commerce, Dibrugarh University

²Assistant Professor, Department of Commerce, Salt Brook Academy

Abstract

Assam has been the home of many citrus fruits. The most common citrus fruit found in the state is the 'Assam Lemon' regionally known as 'Kazi Nemu'. The purpose of this paper is to draw focus to the indigenous Kazi Nemu for providing a better transcend in the global markets and thereby, to bring out the business opportunities in respect of the fruit by identifying various indigenous and low-cost New Product Development prospects of the same. Subsequently, the next attempt is to study the possibility of globally positioning the products thus produced.

The paper in hand, being one of the virgin efforts in NPD initiatives using Assam Lemon and analyzing global market positioning prospects of the same, is largely based on secondary data regarding the current production, marketing and usage patterns of the fruit as available in various agri-based research publications. Some amount of primary data has been collected, regarding indigenous usages and preservation techniques of the fruit, from local dwellers, agriculturists and agri-researchers, through unstructured verbal interviews and discussions. The paper finds and concludes the fact that Assam Lemon being one of the most commonly found resource in Assam has the potential to grab the world market and contribute a lot towards the economic development of the region.

Key words: Assam Lemon, New product Development (NPD), zest, juice, taste enhancer.

Introduction

Assam has always been a treasure land of exotic flora and fauna. However, despite being endowed with natural resources, Assam tends to be an almost untapped economy in the world market. Most of what is produced in the state grows naturally with very little or without any modern machine and/or mechanism in use. This stands true in case of processing of the produces for further commercial purposes too. A very meager share of the produce is processed. Most of the fruits and vegetables are sold raw; mostly in the local markets. Moreover, as most of the

indigenous people are either first generation entrepreneurs or lacking in the appropriate resources to tap entrepreneurial opportunities, there is a dearth of people ready to risk plunging into a new venture.

Assam has also been the home to many exotic citrus fruits which are abundantly found across the state. The most common citrus fruit found in the state is the 'Assam Lemon'- locally known as 'Kazi Nemu'. It is found growing in the backyards of almost every Assamese household. The Assam lemon is comparatively larger than the commonly found Rough Lemon and hence, the juice contained in each Assam Lemon also tends to be much more than the Rough Lemon. This apart, the Assam Lemon is the proud beholder of a number of other useful characteristics like aroma, medicinal value, so on so forth.

The main intention behind writing this paper is to draw focus upon the indigenous Kazi Nemu (Assam Lemon) for creating a greater outreach in the larger global markets and thereby, to bring out the business opportunities in respect of the fruit by identifying various indigenous and low-cost New Product Development prospects of the same. Subsequently, the next attempt is to study the Marketing Feasibility and accordingly globally position the products thus produced.

1. Statement of the problem

In spite of tremendous capability to be processed and preserved in various simple ways and be used to serve many purposes and benefits, the Kazi Nemu of Assam remains underutilized and is yet to be commercially explored. Hence, the researchers intend to draw attention of the masses towards this exotic fruit of the state by attempting New Product Developments using indigenous and economical methods and thereby, to explore possible business opportunities for the so-developed finished and by-products both within and outside the state as well as beyond the country.

2. Conceptual framework

○ New Product Development (NPD):

NPD refers to the culmination of the entire process of bringing out the new product to the market. It involves the definition and description of the product to be produced. It also involves the ways to-

- Identify the market needs and helps to answer the questions like-
 - a) What is the target market?
 - b) What does the market need?
 - c) What are the benefits of the new product?
 - d) Is there any market frustration from existing products?
 - e) What is the specialty of the new product?
- Establish time frames which estimate the adequate time to develop and implement the product. It helps to answer the questions like-
 - a) What is the appropriate season for sale of the new product?
 - b) How to develop the right product at the right time?
- Identify the key issues and approaches and involves the steps of-
 - a) Evolution of the idea
 - b) Screening of the idea
 - c) Developing the idea
 - d) Analyzing the marketing and business strategies
 - e) Development of the product
 - f) Market testing of the product
 - g) Positioning of the product

3. Background of the study

○ Production Capacity:

Assam Lemon is a significant kind of lemon which is grown only in select regions of the country with Assam having its maximum

production. It is grown in the backyards of almost every household in every district of the state without much significant productive measures taken for it. Accordingly, it is the highest grown citrus fruit in the state with a total cultivated area of 8705 hectares yielding a production of 47233 metric tonnes per annum. In other words, the average yield per annum is 5426kg/hectare. Assam Lemon is generally oval in shape and green in color with a standard size of 85gm to 125gm. This citrus fruit is grown all round the year with the peak season being from April to November. The production of Assam Lemon is suitable in the state primarily because of two reasons, viz –

- a) Sandy Clay loam soil, which is abundantly found in the state, and
- b) Abundant rainfall which results in the larger quantity of juice storage inside the fruit as compared to the Rough Lemon.

The economic life of a single tree ranges from 15 to 25 years within which period it produces around 1200 to 2000 lemons annually. The juice content per lemon is 36% to 44% of the total volume of the fruit. (Suppose, volume of the fruit is 100gm and the quantity of juice extracted is 40ml. Then, the juice content is 40%). The most significant characteristic of Assam Lemon is its bio-chemical property of measuring sweetness. It is called Total Soluble Sugar (TSS) which is 4⁰ brix and this is considered as the most appropriate level of sweetness required in the juice.

○ Production method:

Production of Assam Lemon is done mainly through cut-down stems aging within 9 to 12 months with an average size within 18 to 20cm. The leaves should be removed from the stem. The land should be sandy clay loam type where cow dung should be added at least a month earlier with necessary fertilizers. If the stems are cut within the months of March to August they should be planted at a distance of 20x20 cm with a height of 20 to 30 cm and with a density of 1 meter with and 5 meter length horizontally. It is to be noted that the stems planted should be planted slanting to south. If

watered regularly, the saplings will begin to flourish within 9 months and thus can be planted for farming accordingly. Before planting the saplings, the land should be dug at a size of 50cm x 50cm x 50cm and should be exposed to sunlight for 2 months. Accordingly, after adding manures to the land, the saplings should be planted at a density of 10 feet.

○ **Cost of Production:**

As productivity of Assam lemon is mainly done through the cut-down stems, its fruit bearing is faster and better. Therefore, cost involves the expenses like manures and fertilizers, cleaning the land, labor charges, irrigation facilities etc. which can be rounded up to Rs.10000/- only. However, irrigation is not a problem in the state as Assam is rich in rainfall.

It is justified to grow 62 trees per Bigha which bears within 1000 to 2000 lemons per tree. However, standards estimate 50 trees bear good results with an average of 1200 fruits per tree of standard size, juice content and quality which is sold at a whole sale rate of roughly Re.1 per lemon.

Therefore, Income (per Bigha) = $50 \times 1200 \times 1$
= Rs.60000 annually
(7 and a half Bighas equals to 1 hectare of land)

○ **Types of pests and control measures:**

Most common pest is Trunk Borer and Bark Eating Caterpillar which can be controlled by spraying of pesticides like Bevestin.

However, it can also be controlled by cheaper methods like-

Prophylactic smearing of 50ml Endosulfan+ 2kg lime in 10ltrs of water along with a gum at the tree trunk up to 1mtr height from ground level during March-April. Cleaning of Infected holes and insertion of cotton soaked in Dichlorvos @ 0.05% followed by mud plastering will have to be done where and when the trunk borer attack is noticed.

○ **Government schemes in India:**

Minimum 5 hectares of land is required to avail government schemes like gaining various subsidies, supply of equipments etc. However, the schemes are only a part under the Horticulture Department and no such scheme is taken as a whole by the government.

○ **Constraints in export:**

- The MNCs wanting to purchase the juice or the lemon desire for such sizes which are very less in quantity.
- The MNCs provide an amount to the local producers which are much lesser than what they get in the local market.
- There is very less number of foreign buyers.
- The National Horticulture Board is not focusing more on export-oriented production and marketing strategies.
- Non-availability of international level food processing units in the state.
- Lack of entrepreneurial skill in the state.

4. Research gap

Although there have been studies done from the cultivation-side, regarding Assam Lemon, and a few studies which have also been done from the demand-side; the researchers did not come across many significant studies that has seen into prospective NPD ideas by use of the fruit. Particularly, the researchers did not come across any study that aims primarily to identify indigenous methods of preservation of the product produced thereof; meant to be innovatively marketed globally in a way that serves multiple purposes of consumption by varied categories of consumers.

5. Objectives of the study

It is a fact to be widely accepted that two of the greatest markets in the world today are of lifestyle and food. These two markets seem to significantly influence the society and constant development takes place in these two markets from time to time.

In view of the aforesaid, this paper is an attempt to focus on one of the two markets i.e. the food market for NPD and marketing of Assam Lemon.

Thus, more specifically, the primary objectives of the study include-

- 1) To analyze New Product Development opportunities by using the raw materials derived out of Assam Lemon using indigenous and low cost methods of production.
- 2) To generate ideas to globally market the newly developed products.

6. Research methodology:

The research methodology for carrying out the study has been primarily analytical and descriptive by nature. Major sources of data collection have been research-based literature from both the agricultural and commercial perspective. However, some amount of primary data have also been collected following the Unstructured Interview Method wherein the Researchers have purposively approached 50 indigenous dwellers of the state (more specifically, 25 from Dibrugarh town and 25 from Sivasagar town) and employees of Assam Agriculture University, Jorhat. The primary data collected was intended at drawing information regarding the various indigenous methods of processing and preservation of Assam Lemon that have been in practice in the state since long.

7. Analyzing Objective No.1:

As foretasted, Objective 1 intends “To analyze New Product Development opportunities by using the raw materials derived out of Assam Lemon using indigenous and low cost methods of production.”

After extensive review of research-based literature and in-depth discussions with local residents and experts, the researchers have identified prospects for developing the following tentative New Products out of various raw-materials derived from Assam Lemon:

- **Lemon Squash:** It refers to the processed juice extracted from the lemon to which preservatives and certain other edible ingredients are to be added for better flavor and taste.
- **Fresh Juice:** It refers to the preservation of the raw juice of the lemon which is fresh in nature.
- **Taste Enhancer/Flavoring agent:** The zest and leaves can be used as a flavoring agent in many food items by processing them accordingly.
- **Medicines:** The zest, leaves and roots of Assam Lemon have always been used as an indigenous medicine in Assam which has tremendous worth. As for example, the zest and leaves can be used to create a Vitamin C powder for medicinal purpose.
- **Pickles:** The locals of the State have, since a long time, been engaged in preparing a variety of pickles and home-remedies for common diseases. It has become an accepted fact that the older these pickles, the better they are as lemon has naturally in-built characteristics of preservation.

Thus, from the above, it is clear that the raw materials derived from the Assam Lemon which can be used for the New Product Development includes more-or-less the entire plant parts, i.e.-

- The Juice
- The Zest
- The Leaves
- The Roots

However, it is to be noted Assam Lemon cannot be stored in its raw form for many weeks. It is therefore suggested to preserve the extracted juice. This will not only help to keep a proper stock of juice to the manufacturers but will also help them to get an access to the zest of the lemon.

- Preservation of juice can be done at a very minimal cost for a long period of time using the local indigenous methods used in Assam since time immemorial. These methods can be cited as under-
 - Mix 30ml of cream of tartar and stir them thoroughly until they are mixed well in room

temperature for every 1 liter of lemon juice. Subsequently, remove the pulp and chunks of un-dissolved cream of tartar by pouring the juice through a muslin cloth in a glass container. Next, fill the neck of the bottle with olive oil as it will act as a natural preservative and prevent the air entering into the bottle and not spoiling the juice and thereby tightly putting a cork into it. This juice can be stored for months. However it is to be noted that prior to using this preserved juice; the olive oil should be separated from the juice by pouring it before hand.

- Fill a bottle with sugar till a level (maximum till below the neck of the bottle) and mark that level with a marker or pen. Subsequently, pour the fresh extracted juice to the bottle upto the marked level. Do not shake the bottle while pouring. You will notice the sugar gets dissolved and the level comes down. Close the lid and shake it well then. The sugar level will be noticed going further down within a few hours. And in due course of time the sugar will get dissolved more. This juice can be kept fresh for years. However, further sugar is not to be added.

There is also some low cost modern techniques like-

- The raw juice can also be stored in a freezer at zero degrees Fahrenheit by simply poring it into an air tight container and leaving ½ inch space to allow for expansion. This type of preserved juice can be stored up to six months.
- Potassium Meta-bisulphate is another preservative which is added to lemon juice for preservation.
- The next expected raw material is the zest of the lemon and the leaves from the tree.

The zest to be obtained from the Assam lemon is comparatively more than the rough lemon. This is so because of the larger size of the lemon. Besides, the

unique smell of Assam lemon makes it unique. The zest can be used as a taste enhancer and flavoring agent. The zest can be stored in a very simple manner. Simply grate the rind or chop it into long light pieces and dry it in the sun. Drying will not decrease its smell and flavor but on the contrary it can be used to store it for a longer period of time. The rind of the Assam lemon can also be used as a face scrubber in the raw form as it is believed to act as a cleansing agent. Besides these, the zest is also used to add flavor to baked goods, cake, pudding, rice and other foods.

Similarly, the leaves of the tree can also be used as a taste enhancer. Its smell is very much unique that gives a tangy flavor which is much different from other types of lemons. The leaves can be used to garnish various food items to add a tangy flavor to it. It can also be used to make tea, meat and sea foods. The best part of it is, it does not create food poisoning unless it is added to or mixed with ghee or butter. The leaves can also be used as a room freshener as it gives a subtle scent. Besides, the leaves store Vitamin P in it which helps to strengthen the blood vessels in the body. It also stores Vitamin C which helps to fight against infections. The leaves of Assam lemon need not be stored as they can be found throughout the year in the tree. However, if storing of leaves is required, it can be stored for a few days by freezing it.

- Another benefit that can be derived from the Assam lemon tree is the medicinal values from the roots. Assam lemon has been considered as a medicinal tree since time immemorial in Assam. Its benefits are plenty. Significant contribution in the local medicinal field is also being done by the roots of the tree. The roots of Assam lemon is also claimed to have anti cancer elements present in it.

Thus, it can be seen that the entire tree is of some benefit or the other. Right from the fruit the tree bears to its roots, Assam lemon is of immense benefits. Its more-or-less all-season availability, larger size, unique taste and smell and medicinal values make it a tree of immense commercial potential.

8. Analyzing Objective No.2:

As forestated, Objective 2 intends “To generate ideas to globally market the newly developed products.”

The physical infrastructure required for materializing NPD initiatives and marketing the new products is very meager. All that is required in raw materials are-

- Assam lemon trees growing well
- Fertilizers like Urea, SSP and MOP
- Preservatives like Potassium Metabisulphate

Similarly, in the form of labour force neither many people are required nor is it compulsory for them to be skilled. About 5 to 10 persons can start out such ventures at a very low cost.

On the other hand, the utilities (power, fuel, electricity, etc) required are also minimal. Water is abundantly found in Assam in the form of rainfall which is the most essential requirement.

The prospects for processing and marketing may be totally pollution free as the methods of developing the new products could mostly be traditional and indigenous ways used since long in the society. Thus, the processing units may be established anywhere in the state. The only pre-condition should be accessibility to transportation and communication networks. As the machinery and equipment required also tend to be very conventional with no or minimum use of high-technology, the NPD process shall ensure economy in fund requirement. This, in turn, would prove to be strength as well as an opportunity in designing attractive competitive pricing mechanisms for entry into newer domestic and global markets.

Now, as there exist a rising demand for lemon juice across the globe. The juice can be used to make lemonade, soft drinks and cocktails. It is also used in marinades for fish where the acid neutralizes amines in fish by converting them into non volatile ammonium salts and meat where the acid partly hydrolyzes through collagen fibres, tendering the meat. Lemon juice can also be added to pancakes as it is always done in UK. Another significant benefit from the juice is it can be used as a preservative on certain foods that tends to oxidize and turn brown after being sliced such as apples, bananas etc where its acid denatures the enzymes. The juice can also be used as a cleansing agent for the kitchen utensils by mixing it with salt or baking soda. When it is upto benefits, its medicinal purposes cannot be

subsidied. Lemon juice can be used to cure the diseases like scurvy, boils, constipation, cough, acne, obesity, disinfect cuts and wounds, prevents kidney stones etc.

Land for cultivation: Assam Lemon grows abundantly all throughout the monsoons and the season extends to all those months when the state evidences rainfall apart from the peak monsoons too. In the backyards of almost every Assamese household, lemon plants are either planted or they grow wildly. This is true for both rural and urban Assam. Hence, no prospective cultivator or entrepreneur of the fruit and/or its processed products need to compromise on any other crop that grows in their plot of land for the sake of lemon plantation. It may be done in a consorted effort with partnerships built up among those in business and those with vacant plots of land (either bought for residential or commercial construction yet to start) on some temporarily renewable agreement between the parties concerned. Even the model followed by Varghese Qurién may set an example. Entrepreneurs without cultivable plots of land of their own may even approach residents of particular localities/townships/villages having reasonably-sized backyards for some extra plantation of the fruit in exchange for some extra income for the same.

The juice can be launched in two forms-

Firstly, the raw juice that is being extracted can be preserved and exported to different parts of the globe. As the quantity of juice extracted from a single lemon is more therefore it would be able to meet the needs of the foreign customers by providing an ample profit to the cultivators. Besides, its unique taste and smell would be able to grab more customers. For this purpose, the juice should be bottled into containers of different sizes v.i.z 500ml, 1 litre and 5 litres etc and be branded accordingly. As the prime objective is to enter the world market, the product should go for attractive competitive pricing strategies and be launched in different market segments to cater to varying customer groups. The target customer may be the elite or the economical or the health conscious. By charging prices suitable to each segment and through proper promotion, it would help to create distinctive brand image among all groups of target customers.

The second way is entering into contracts with foreign companies and supplying them the fresh juice. The companies on the contrary would use this juice for processing their respective products. Earlier researches have proved that various MNCs withdraw contracts when

they are not satisfied with the shape and size of the fruit. There also exists exploitation of local cultivators by the big MNCs. Therefore, it is expected to be more profitable to rather supply the extracted and preserved juice than the fruit as a whole.

Next, can be launched the lemon squash which is in high demand in almost every market of the world. It not only acts as a refreshing drink but can also be mixed with drinks to create cocktails. The method for making the squash using the indigenous low cost method is-

20 lemons give 1 liter of juice. The seeds should be removed from the juice by using a muslin cloth. To 1 liter of juice, 1 liter of water and 1 and a half kg of sugar should be added. 1 gram of Potassium Meta-bisulphate should be added to liter of juice. It will keep the juice preserved for 1 year. A yellow color is often added in order to get a bright color. The Net content thus received is 3 liters.

From the Asian countries to the European nations, tangy flavored foods are in high demand. The dried zest and leaves of Assam Lemon can be packaged and launched in the international markets. The leaves can be used as a flavoring agent both in the fresh and crushed dry form. The latter does not reduce the tangy fragrance and taste.

Another significant product that can be developed is the Vitamin C powder. As the citrus fruit is rich in Vitamin C, the rind can be grated and dried in a 200 oven and let to dry completely; then crushed to make Vitamin C powder. This acts as a natural skin toner.

Finally, the roots which are believed to have many medicinal values, even anti-cancer elements, can be commercially explored by different medical companies.

Now, in order to globally market the so-developed new products, as stated above, the following are some of the marketing strategies with low cost involvement that can be adopted:

1. Creating awareness about local fruits among the locals.
2. Creating an aura of exotic-ness around the fruit both within and outside the state as well as the country.
3. Tapping the health conscious lot of customers who have a special soft spot for organic products.
4. Designing concerted efforts and initiatives at natural cultivation of the fruit in every possible cultivable land to increase production and supply at economical costs

and thereby, motivating every individual household to participate in the move to create a global presence of Assam Lemon and also enjoy the incentives of such a status.

5. Building cross-country linkages with the 'more affordable countries' to sell the indigenously produced new products at differential pricing to balance the profit portfolio and make for successful extension of the products.
6. Ensure better preservation of the finished products to ensure extension of the sales season.
7. Strong networking with suitable industry partners from sectors like fooding (both packaged and restaurants/hotels), medicine, health, beauty, etc. with an intention to not only create regular buyers of the NPDs but also to create partners in production for gaining a competitive edge in product quality, packaging, promotion, supply chain management and other marketing functions.
8. By "celebrating the fruit" in a way that it attracts global buyers and business consumers. Cue may be taken from the way Spain celebrates its tomatoes in the form of a festival which has gained global popularity over time. The State of Assam may also take up initiative to promote its indigenous "Kazi Nemu/Assam Lemon" in such a way alongwith its other indigenous fruits.

10. Conclusion

As goes the saying "teaching and preaching begins at home", so also does marketing. The first step towards extensive marketing of any product of service would see success only when the local people are convinced about its goodness and believe the product/service to be profitable enough to engage in its production/processing and marketing. This stands true in case of Assam Lemon as well. The awareness initiatives and marketing efforts need to start with the home state where the fruit grows. If residents of the state can be given proper training and a support system (comprising of financial to managerial support), both by public and private organizations, in so far as its commercial cultivation and processing is concerned, can it be expected that the fruit shall very soon see international acceptance and popularity. There are many other such valuable indigenous fruits of the state – Leteku, Poniylol, Thekera, Ou Tenga, Nooni, among others, to name

a few – which hold immense market potential if seriously focused and researched upon.

Being a still untapped but easily available resource with natural preservation characteristics that makes for longer durability in storage and processing, the Assam Lemon has ample scope for being used in New Product Development Initiatives and marketing the same across the globe. With more in-depth research in respect of its cultivation and processing/preservation alongwith smart marketing strategies being developed to make for global distribution of the newly developed products, it can go a long way in becoming one of the “most demanded” products in

References

- 1) Umashanker et al., *‘Traditional Indian Herbal Medicine Used as, Antipyretic, Antiulcer, Anti-Diabetic and Anticancer: A Review’*, published in International Journal of Research in Pharmacy and Chemistry, IJRPC 2011, 1(4) ISSN: 2231-2781, www.ijrpc.com.
- 2) Umadevi .M. et al, *‘Traditionally Used Anticancer Herbs In India’*, published in Journal of Medicinal Plants Studies, 2013, Volume: 1, Issue: 3, ISSN: 2320-3862, **Impact Factor:** RJIF: 5.69, www.plantsjournal.com.
- 3) George Stanley, *‘Occasion Based Promotional Strategies of Consumer Durable Segment in Kerala’*, published in International Journal of Academic Research in Business and Social Sciences, June 2012, Vol. 2, No. 6 ISSN: 2222-6990, www.hrmas.com/journals.
- 4) Ahmed Ashfaq, *‘Rural Marketing Strategies for Selling Products & Services: Issues & Challenges’* published in Journal of Business Management & Social Sciences Research (JBM&SSR) January 2013, Volume 2, No.1, ISSN No: 2319-5614, www.borjournals.com.
- 5) Shukla Arpit, et al, *‘Advertising Strategy for FMCG Product : Analysis Using Interpretive Structural Modeling’*, published in International Journal of Engineering Research & Technology (IJERT), October

categories like refreshment, health and medicine, skin care and beautification, and a host of others. This statement may be further emphasized upon considering the growing customer alignment towards natural and ayurvedic products all over the globe. If and when such a status is held by Assam Lemon, there can be a growth in trade and business opportunities expected in the region where it is produced. This, in turn, can lead to an economic boost in the region; particularly in respect of the cultivators as also of the small and medium scale entrepreneurs engaged in producing, processing and marketing the fruit and products produced out of it.

– 2012, Vol. 1, Issue 8, ISSN: 2278-0181, www.ijert.org.

Pamphlets

- 1) Bora C.S., et al, *‘The Procedures and Practices For Rejuvenation of Declining’*, Khasi Mandarin Orchards, Extension Bulletin No. 4/2011, Citrus Research Station, Assam Agricultural University, Tinsukia, Assam.
- 2) *‘Nutrient Deficiency in Citrus and their Management’*, Citrus Research Station, Assam Agricultural University, Tinsukia, Assam.
- 3) *‘Citrus Diseases & Their Management’*, Citrus Research Station, Assam Agricultural University, Tinsukia, Assam.
- 4) *‘Insect Pest Management of Citrus’*, Citrus Research Station, Assam Agricultural University, Tinsukia, Assam.

Websites

- 1) http://www.fruitpedia.com/lemon_citrus_limon.html
- 2) http://www.women_planet.in/health-fitness/benefits-of-lemon-water-and-juice
- 3) <http://www.trueactivist.com/45-uses-for-lemons-that-will-blow-your-socks>
- 4) <http://www.thankyourbody.com/31-ways-to-use-lemon-peel/>