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" Without food, we cannot survive, and that is why issues that affect the food industry are so important. "

Marcus Samuelsson

FINER

FINER News & Views



FOOD PROCESSING in the North East

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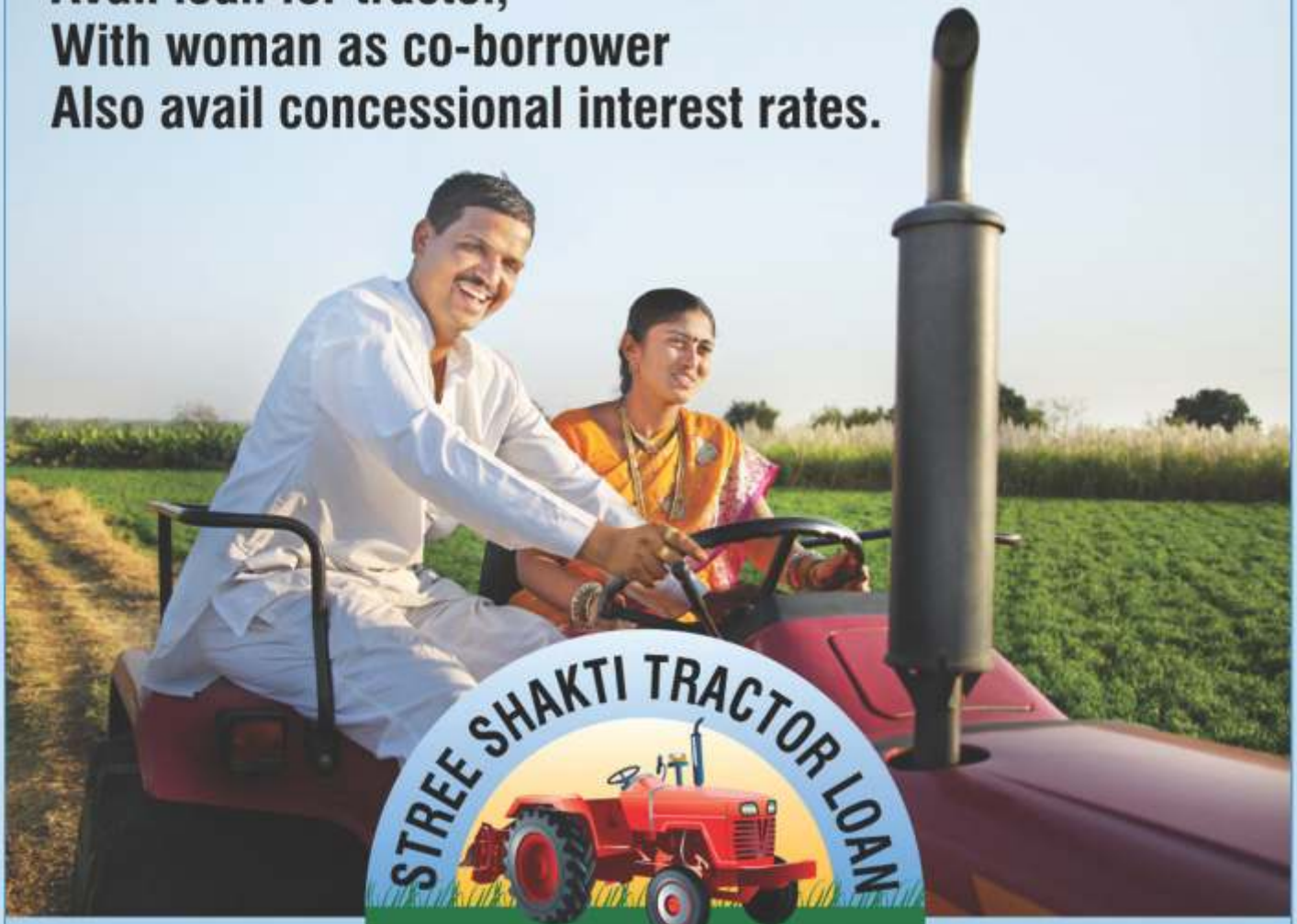

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President's Desk

For a region blessed with an abundance of fruits and vegetables, the role of food processing becomes increasingly significant.

As a matter of fact, the north-eastern region with its agro-friendly climate and agrarian roots has the potential to become a sunrise zone for food processing and other agro businesses. The weather and availability of water are conducive for food cultivation and is especially suitable for horticulture. Coupled with it, there are various subsidies and benefits that can make food processing a lucrative option in the North East.

The food processing industry in India is seen as a potential source for driving the rural economy as it brings about synergy between the consumer, industry and agriculture.

The Ministry of Food Processing Industries has been implementing central sector schemes in the country, including North East, for providing modern infrastructure for food processing industries. The infrastructure includes mega food parks, cold chains, value addition and preservation infrastructure, modernization of abattoirs and quality assurance, research and development and other promotional activities during the 12th Plan.

In addition, the Ministry had also launched a Centrally-sponsored scheme - National Mission on Food Processing (NMFP) - in the country including in the Northeast during the 12th Five Year Plan. Under the mission, all the State/UT governments have been empowered to receive applications, sanction and release the grant-in-aid to the eligible beneficiaries. The states also have flexibility in selection of location of projects as well as beneficiaries. This initiative is meant to augment the capacity of the food processors for up-scaling their operations by adopting new technologies.

Apparently, among all the states of the region, Assam has seen some progress of late, with a mega food park set up under the Ministry of Food Processing Industries (MoFPI) near Tihu, even as the industry has the potential to grow at a rapid pace with the demand for processed food increasing every day. Besides, several processing units of pineapple and orange have been set up in Assam with assistance from MoFPI. A banana park has been set up at Industrial Growth Centre, Matia to facilitate value addition and marketing of banana fresh and banana derivatives. MoFPI has also sanctioned two cold chain projects in the State under its 'Scheme for Cold Chain, Value Addition and Preservation Infrastructure'.

However, it is imperative that there is balanced growth in all the states of the North East when it comes to infrastructure and storage facilities needed for processing and preserving food. States such as Arunachal Pradesh, Meghalaya, Mizoram, Nagaland, Manipur and Tripura still have some distance to travel as far as exploiting resources in the sector is concerned.

Now, with food processing industries made an integral part of the Centre's 'Make in India' campaign, the thrust apparently will be on the creation of better connectivity and infrastructure in the region besides a support system that facilitates longer shelf life of processed food.

The Centre has of late laid stress on value addition of products and is looking at making food processing one of the thrust areas for growth and development in the region. So, the time is ripe for entrepreneurs and units in the Region to seriously look at the avenues that exist in the sector. Be it revenue or employment generation, food processing is certainly one sector in which the Northeast can compete, and more importantly, excel.

With Regards

Pabitra Buragohain

President

Ministry of Food Processing Industries, Government of India in association with the Federation of Industry and Commerce of North Eastern Region (FINER), organised the North East Food Processing and Technology Seminar in Shillong, Meghalaya on 13th of February 2017 at the State Central Library, Secretariat Hills in Shillong.

The main objective of the seminar was to disseminate appropriate information to the prospective investors and investment partners from the region regarding Government of India's thrust area and to emphasize on new products and processes and also R&D findings.

Shri M. Iboyaima Meitei, Adviser (Horti), Agriculture and Allied Sector, North Eastern Council, Government of India was the Chief Guest for the event while Smt. B.M Shylla, Managing Director, Meghalaya Industrial Development Corporation Ltd., Government of Meghalaya presided over as the Guest of Honour at the seminar. Shri Samrat Deka, Member, Food Processing and Agriculture Committee, FINER, welcomed the guests and the dignitaries present at the seminar.

The seminar revolved around presentations and interactive panel discussions on various aspects of the importance of development of food processing initiatives and challenges. The main topic of the seminar was the horticulture scenario in Meghalaya and its prospects in regard to food processing by Smt. K. Lyngdoh, Deputy Director, Department of Horticulture, Government of Meghalaya. Shri Pynkynmawlang Rymmaai, Branch Manager, NEDFI, Shillong, spoke about the scope of food processing industry in the State. An inspiring success story was also highlighted by a local entrepreneur, Smt. Phikaralin Wanshong from M/s Kara's Food Preservation, Shillong. Smt. M.B. Roy, Director, Commerce & Industry, Government of Meghalaya also graced the occasion. The seminar was followed by a one-on-one interaction between department officials, industry captains and participants from the State.

The seminar ended with summing up of the session followed by vote of thanks by Smt. Indrani Chaudhury, Deputy Director General, FINER.

NORTH EAST FOOD PROCESSING TECHNOLOGY SEMINAR

MEGHALAYA

NORTH EAST FOOD PROCESSING TECHNOLOGY SEMINAR SIKKIM

Ministry of Food Processing Industries, Government of India in association with the Federation of Industry and Commerce of North Eastern Region (FINER), organized the North East Food Processing and Technology Seminar at Hotel Delliso Abode, Gangtok, Sikkim on 21st of January, 2017.

The main objective of the seminar was to disseminate appropriate information to the prospective investors and investment partners from the region regarding Government of India's thrust area and to emphasize on New products and processes and also R&D findings.

Shri P.T. Bhutia, Principal Director, Department of Horticulture, Government of Sikkim was the Chief Guest of the event and Shri T.D. Bhutia, Deputy Secretary, Commerce & Industry, Government of Sikkim presided over as the Guest of Honour at the seminar. Shri Pabitra Buragohain, President, FINER, welcomed the guests and dignitaries present at the seminar.

The seminar revolved around presentations and interactive panel discussions on various aspects of the importance of development of food processing initiatives and challenges. The main topics discussed during the seminar were Agricultural Marketing and its prospects in the context of North East Region and the role of different market committees such as APMC by Shri Jiwan Sharma, General Manager, SIMFED, Government of Sikkim. Smt. Sujata Jena, Associate Professor, College of Agricultural Engineering & Post Harvest Technology spoke about R & D findings, packaging and flavour of incredible Sikkim in food processing. An inspiring success story was also highlighted by a local entrepreneur, Shri Shishir Kharka from Jaivik, Sikkim. The seminar was followed by a one-on-one interaction between department officials, industry captains and participants from the State.

The seminar ended with summing up of the session followed by vote of thanks by Smt. Indrani Chaudhury, Deputy Director General, FINER

NORTH EAST FOOD PROCESSING TECHNOLOGY SEMINAR
Tripura

The Ministry of Food Processing Industries, Government of India in association with the Federation of Industry and Commerce of North Eastern Region (FINER), organized the North East Food Processing and Technology Seminar at Hotel Sonar Tori in Agartala, Tripura on 28th January 2017 .

The main objective of the seminar was to disseminate appropriate information to the prospective investors and investment partners from the region regarding Government of India's thrust area and to emphasize on new products and processes and also R&D findings.

Shri D.P.Sarkar, Director, Agriculture,Horticulture & Soil Conservation,Govt.of Tripura was the Chief Guest of the seminar. Shri Amrit Deorah Member, Food Processing and Agriculture Committee, FINER, welcomed the guests and the dignitaries at the seminar.

The seminar revolved around presentations and interactive panel discussions on various aspects of the importance of development of food processing initiatives and challenges. The main topics discussed during the seminar was processing and value addition of fruit crops and vegetable crops by Dr. Sukhen Ch.Das, Assistant Prof.(Horticulture)College of Agriculture. Dr. Ezekiel Reang, Assistant professor (Horticulture) College of Agriculture, spoke about the new emerging technologies in post harvest management and processing of horticulture crops. An inspiring success story was also highlighted by a local entrepreneur, Shri Bhabesh Debnath, Annda Spice Industries. The seminar was followed by a one-on-one interaction between department officials, industry captains and participants from the State.

NORTH EAST FOOD PROCESSING TECHNOLOGY SEMINAR

GUWAHATI

Ministry of Food Processing Industries, Government of India in association Federation of Industry and Commerce of North Eastern Region (FINER), organized the North East Food Processing and Technology Seminar on 25th of February 2017 at the NEDFi Convention Centre in Guwahati.

The main objective of the seminar was to disseminate appropriate information to the prospective investors and investment partners from the region regarding Government of India's thrust area and to emphasize on new products and processes and also R&D findings.

Speaking as the chief guest, additional director, Industries and Commerce, Govt. of Assam, Shri Prafulla Saikia, spoke about the need for quality raw material to be made available to the producers in the Northeast. "Unfortunately, a majority of the raw material available is only seasonal, for about 90 days, as against the need for 270 days. This increases the cost of production as raw material has to be sourced from outside. Besides, there is also a limitation of production infrastructure such as rice and flour mills," Saikia said.

Earlier, FINER President Shri Pabitra Buragohain delivered the welcome address.

Immediate Past Chairman Shri R.S. Joshi spoke about the need for value addition to the fruits and vegetables available in the Northeast.

Chair of the Food Processing and Agriculture Committee of FINER Shri S. Bhattacharjee delivered the vote of thanks at the inaugural session.

During the technical session, Shri Puneet Agarwal, Director of Manjushree made a valuable presentation on the packaging methods and innovative ways food can be preserved and stored.

Shri Arindam Choudhury of APEDA gave an insight into the current state of the food processing industry in the North East while entrepreneur Smt. Mala Moni Hazarika of Kamdhenu Industries went down memory lane to describe how she scripted a success story from just a few kgs of mangoes to a flourishing enterprise.

Shri Ajit Sarma of Bhogali Jalpan spoke about his success story over the past couple of decades and also underlined the need for raw material and market linkage.

Shri. A. Deorah of Ashray Food Concepts said that food processing starts from one's kitchen. Besides, representatives from companies such as the Mangaldai-based SRD Group, Global Entrade, J-14 among others made lively presentations during the technical session.

Participants at the programme include various departments of state / development organizations and entrepreneurs, entrepreneurship development organizations, trade and industry association/ NGOs / training institutes/university and colleges/financial organizations/ industry captains/ diversified business persons.

The programme ended with a vote of thanks by Smt Indrani Choudhury, Deputy Director General of FINER.

NORTH EAST FOOD PROCESSING & TECHNOLOGY SEMINAR

Aizawl, Mizoram

Ministry of Food Processing Industries, Government of India in association Federation of Industry and Commerce of North Eastern Region (FINER), organized the North East Food Processing and Technology Seminar on 22nd of March 2017 at the Aijal Club, Aizwal, Mizoram

The main objective of the Seminar was to disseminate appropriate information to the prospective investors and investment partners from the region regarding Government of India's thrust area and to emphasize on new products and processes & and also R&D findings.

Shri Saurav Bora, Asstt. Director General, FINER welcomed the Guest. Speaking as the chief guest, additional director, Commerce & Industries, Govt. of Mizoram, Shri C. Lalbiakthanga, spoke about the challenges such as poor infrastructure and power that pose hurdles to entrepreneurs in the food processing sector. he urged both the central and the state governments to come up with schemes to help the new players in the sector. He also talked about the importance of the Quality Control and the need to adhere to food safety standards and certification for the product.

During the technical session, Shri Vanlalchhanhima Ralte from Koinonia Juice Plant & Koinonia Water Plant, and Shri B. Lalramlawma, from Red valley shared their success stories in the field of food processing.

ICFAI, Mizoram has actively participated in the Program. Other participants at the programme include various departments of state / development organizations and entrepreneurs, entrepreneurship development organizations, trade and industry association/ NGOs / training institutes/university and colleges/financial organizations/ industry captains/ diversified business persons.

The programme ended with a vote of thanks by Shri Saurav Bora, Asstt. Director General of FINER.

Seminar on Goods and Services Tax (GST)

on 22nd February, 2017 at the Nedfi Convention Centre in Guwahati.

The Ministry of MSME - DI, Government of India in association with the Federation of Industry & Commerce of North Eastern Region (FINER) organised a seminar on Goods and Services Tax (GST), on 22nd February, 2017 at the Nedfi Convention Centre in Guwahati.

The main objective of the seminar was to enlighten the participants on the implementation and application of Goods and Service Tax (GST) as well its impact on business sectors in the country. The seminar discussed topics such as Procedural Aspects of GST, Transitional Provisions, Migration and Regularisation of Registration and Returns and Tax Payments.

Speaking as chief guest, Shri Ravi Capoor, additional chief secretary, Industries & Commerce, Government of Assam, urged the industry associations in the State to make people in the districts and villages aware of GST, which he said, was an all-encompassing tax aimed at simplifying the structure as against the current multiplicity of taxes.

"The GST is one of the most challenging reforms across the globe. Once the system is in place, as citizens, we will begin to see its benefits which will be at the expense of people who are not paying tax," Shri Capoor said.

"Globally, we have seen some turbulence during its implementation but it has been seen that the national GDP goes up by 1.7 to 2 per cent following introduction of the GST. The process will take time—at least one and half year to normalize," he said.

Shri Capoor also urged industry chambers and the MSME department to engage master trainers so that traders in the last block are aware of GST and its procedures. "The outreach has to be done with the help of the industry," he said.

He also said there would be issues in regard to excise duty exemptions. "But in regard to VAT, the State government will have to see that a separate fund is created so that we can move to a refund mode from exemption mode," Capoor said.

Earlier, FINER president Shri Pabitra Buragohain welcomed the dignitaries and guests to the seminar.

Terming GST as a path-breaking reform, guest of honour, Shri Anurag Goel, IAS, Commissioner, Taxes, Govt. of Assam, said it was pertinent for dealers to activate their GST accounts in order to be registered under the regime on time.

Shri M. Shreenivasulu, Director, MSME-DI, Government of India, delivered the keynote address.

Addressing the technical session, advocate Shri Shailesh P. Sheth, from Mumbai, throwed light on the global experience of GST, procedural aspects of GST, general provisions, transitional provisions, migration and regularization of registration and returns and tax payments.

Shri Sheth, who has over 25 years' experience in consultancy, advisory and litigation practice in the field of Indirect Tax Laws, also gave an insight into the challenges of Dual GST.

Various development organizations and entrepreneurs, trade and industry associations, NGOs/community organizations, bankers/financial organizations, industry captains, took part in the seminar.

INDIAN FOOD PROCESSING INDUSTRY SECTOR
Opportunities, Challenges and Way Forward

Dr. Goutam Das
Assistant Professor and In-Charge
Indian Institute of Crop Processing Technology (IICPT)
Regional Centre, Guwahati

India with a production of 265 million tonnes of food grains (Agri. Stat. at a Glance 2014, GoI), 277 million tonnes of horticultural produce (Indian Hort. Database 2014, GoI) and 137.70 million tones of milk (Basic Animal Husbandry & Fisheries Statistics 2015, GoI) has come a long way in food production and thus emerged as a self reliant country. However, in spite of this achievement, ensuring future food and nutritional security on a sustainable basis is a huge challenge as Indian agriculture is seized by numerous problems like climate change, soil fertility degradation, increased marginal holdings, increasing population base (1.27 billion, Census of India 2011), inadequate farm infrastructure, lack of farm mechanization, inadequate credit disbursement, inefficient marketing, huge wastage of agricultural produce and many more to name. In this context, food processing can play a vital role not only to minimize wastage, add value and preserve agricultural produces but also to turn agriculture into a profitable activity by integrating it with market-driven business model through food processing entrepreneurship development.

Today, food processing industry (FPI) is seen as a golden sector. Performance of this sector reveals that FPI GDP has grown at an average annual growth rate (AAGR) of 8.42 per cent against 7.08 per cent AAGR of overall GDP during 2007-08 to 2012-13. Employment in registered food processing sector has increased at an AAGR of 4.09 per cent during 2005-06 to 2011-12. Fixed capital formation in registered FPI units has continuously increased from 41388 Crores (2004-05) to 145038 Crores (2011-12) whereas in un-registered FPI sector it has grown from 26128 Crores during 2005-06 to 60752 Crores during 2010-11 (NSS 62nd & 67th Round). Total outstanding bank credit in this sector has more than doubled from Rs. 537.79 billion (March 27, 2009) to Rs. 1187.56 billion (March 23, 2012). FPI's export has consistently increased form US $ 10832

million in 2006-2007 to US $ 37799 million in 2013-14 with slight decline in 2009-10. The upward trends in all the major performance indicators are further supplemented by the prospect of market expansion on account of increasing trend towards processed food consumption. Indian food and grocery market is the 6th largest in the world, with retail contributing 70 per cent of the sales. Indian FPI sector which was valued at around $ 40 billion in 2015 is expected to reach $ 65 billion by 2018. Rising consumer expenditure which was US$ 1 trillion in 2015 is expected to reach US$ 3.6 trillion by 2020 offering huge opportunities to the sector players.

The government of India is implementing several schemes and different policy initiatives to accelerate FPI growth. Schemes such as mega food park, cold chain infrastructure, modernization of abattoirs, establishment of food testing lab, implementation of HACCP /ISO 22000/ISO14000 under the Ministry of Food Processing Industries aims at strengthening infrastructure, food safety and quality and marketing opportunities. Further, the Prime Minister's Employment Generation Programme (PMEGP) scheme of KVIC; infrastructure, packaging, export promotion and market development schemes of Agricultural and Processed Food Products Export Development Authority (APEDA) also aim at encouraging entrepreneurship in the FPI sector.

The 'Make in India' initiative was taken by the Government of India in September 2014 to encourage multi-national and domestic companies to manufacture their products in India. It aims to attract investments, foster innovation, enhance skill development, protect intellectual property and build world class manufacturing infrastructure for accelerating economic growth and enlarging employment in India. Out of 25 sectors, Food Processing Industry (FPI) sector is one of the potential sectors identified for attracting FDI under this initiative. Presently, 100 per cent FDI is allowed through automatic route in processing and 100 per cent FDI through government approved route via Foreign Investment Promotion Board in multi brand retail of food items grown and processed in India. In the Budget 2015-16, government created a corpus of Rs. 2,000 crore with NABARD to provide cheaper credit to FPI units. Excise duty on plant and machinery for packaging and processing was brought down from 10 per cent to 6 per cent. Pre-conditioning, pre-cooling, ripening, waxing, retail packing, labeling of fruits and vegetables have been exempted from service tax. RBI has classified loan to food and agro-based processing units and cold chain under agriculture activities as priority sector lending up to maximum Rs. 100 crore per borrower.

However, in spite of good performance and huge opportunities in terms of increased agricultural production, large market size, different schemes and policy initiatives, the Indian FPI sector has a long way to go beyond its current level of processing which is only 1 per cent of meat and poultry, 2 per cent of fruits and vegetable, 12 per cent of fishery resources and 37 per cent of milk produced. The challenges are to bring the major part of the sector under organized structure, attract more investment, add value, exploit region-specific strengths and minimize huge annual losses in the entire supply chain which is around Rs 80,000 crore per year. There are several inherent challenges of this sector requiring appropriate intervention to achieve its full growth potential. Agriculture production in India is scattered due to large marginal land holdings, which makes it difficult to integrate the raw material to an efficient supply and value chain network. Therefore, it is necessary to aggregate these scattered produces through proper organizational structure and connect with efficient supply and value chain network. Pre-processing infrastructure in terms of cold stores, warehouses, pack houses, ripening chambers are still inadequate and also unequally distributed across the regions and therefore requires more investment. Several government projects for augmenting such infrastructure are underway, but inefficiently implemented and monitored and hence require strict supervision for getting timely output. Credit disbursement has to be augmented further in the sector. Quality and safety standards of food products have to be ensured and brought on a par with the international level. Strict implementation of the food safety provisions and creating world class quality testing infrastructure across the states with adequate trained scientific manpower is must. Augmenting manpower and imparting modern skills to them has to be taken up on urgent basis to meet industry demand. Research and development has to be given priority to get an edge over the competitors in the international market. Region-specific strength in processing and marketing of exclusive output has to be identified, ventured and supported. In spite of some unproved apprehensions with regard to negative impact of 100 per cent FDI in multi-brand food retail on small and unorganized domestic retailers, it is grossly expected that allowing 100 per cent FDI in food retail will strengthen supply chain network, minimize wastage and ensure adequate price to producers as the retailed product has to be sourced from within the country.

It is still believed that the Indian market is large enough to accommodate both foreign and domestic players in retail business as they will get their own consumer base. Inflow of FDI in the sector though showing an increasing trend in the recent times but it has to be further augmented and for that governments across the states have to adopt proper facilitation mechanism and ensure basic infrastructure such as communication, electricity and favourable socio-political environment which will ultimately boost the confidence of the foreign investors on getting higher marginal efficiency of their capital investment. Domestic entrepreneurs have to identify unique ventures based on market demand, plan optimum capacity based on input availability, ensure quality standards and find efficient models for output distribution either on their own or with outside investors. Above all, sincere efforts and coordination among all the stakeholders' are must for realizing the full growth potential of this emerging sector.

NEW EMERGING TECHNOLOGIES FOR PROCESSING OF FRUITS, VEGETABLES AND OTHER HORTICULTURAL CROPS IN NORTH-EASTERN REGION

Dr. Ezekiel Reang
Assistant Professor (Horticulture)
College of Agriculture, Tripura

The North-eastern region is endowed with abundant rainfall, ambient temperature, fertile land and rich flora, which offer immense scope for cultivation of a wide range of horticulture crops. Over the years, the horticulture sector has recorded growth in terms of production and productivity in some of crops such as citrus, banana, papaya, ginger, chilly, potato, jackfruit, pineapple, turmeric, etc. However, the realisation of such success in terms of economic benefits is still beyond the reach of the common farmer. Farmers are deprived of remunerative prices for their produce due to lack of sufficient storage, transport, market and processing facilities. This paradoxical situation can however be converted into an opportunity through the intervention of relevant processing technologies.

Eco-tourism and agro-based industries are the two promising sectors that have the potential to improve economic scenario and attain sustainable development in the Region, whereas the other sectors are unlikely to sustain in the long run due to its impact on the fragile ecology of the region.

The art of preservation is not new to the Region. Several techniques such as preservation of meat by boiling in salt solution, fermentation of fish and bamboo shoot, use of salt as a preservative, drying of fruit and vegetables have been practised by the natives of this Region for centuries, even though such techniques are inadequate to overcome today's problems. The familiarity of the techniques among the native farmers can be utilised for dissemination and adoption of new, efficient and market-oriented technologies to boost entrepreneurship and also attract investments from national and international companies in the Region in the processing sector.

The use of synthetic chemicals in our food has a negative impact on our health. Growing awareness among the consumers about such hazards is an important issue in big cities. For any business venture to be successful, the cost of a product is a key deciding factor, especially in the Indian context where the society is dominated by middle class families.

The benefits of processing include prevention of losses, avoiding glut during the season, enhancing shelf life, easy transportation, availability for a longer period, job creation and systematic utilization of resources. Currently, the processing methods employed for value addition are canning, drying or dehydration, freezing and use of chemical preservatives. This approach however is insufficient to meet the requirement for a large volume of produce and also the qualitative need. Hence, new technologies or modification of current technologies are essential.

Indian Institute of Horticultural Research (IIHR),

Surplus quantities of major horticultural produce in the North-eastern States

Commodity	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura	Total
Citrus		12000	1962	23000	5300	2000	1100	10500	74564
Banana	10168	85000	-	--	1200	--	-	-	96368
Pineapple	24919	29000	24000	70000	-	5400	-	31000	184319
Papaya	--	15000	5320	--	-	--	-	-	20320
Jackfruit	--	25000	-	--	-	--	-	93000	118000
Ginger	25163	42000	7045	35048	16500	--	24300	960	151016
Turmeric	--	-	-	6900	400	--	1300	1600	10200
Potato	--	-	-	117500	-	1750	32612	-	151862
Chillies	--	-	22200	--	424	--	-	11650	34274

Source: APEDA report, 2004-05

Bengaluru and Defence Food Research Laboratory (DFRL), Mysore are some of the premier institutes of the country engaged in research in frontier areas of the post-harvest management and processing of horticulture crops and were successful in making path-breaking research in the recent past and have come up with new relevant technologies and products.

Some of the new and relevant technologies from IIHR are:

1. Osmotic dehydration of fruits and vegetables.

The process involves removal of water from the product by use of sugar syrup as an osmotic agent and drying of osmosed product from 15% to 13% moisture level. The advantage of this novel technique over conventional method is the ability for retention colour, favour, texture, nutritional and other sensory qualities without the addition of chemical preservatives. The product is highly concentrated, less bulky and more nutritious. The need for bulk processing within a short harvesting period and conversion of partially processed product into a stable product are the main challenges the processing industries face at present. Convenience and preference for the product is the main criteria for marketing. Jackfruit, though highly nutritious and tasty, poses difficulty in consumption, as it is too large for a single person, and once cut, it will be further exposed to deterioration. Latex is another hindrance. If it can be transformed into a suitable form and package, the demand for the fruit will rise. The need for different equipment for different products is another problem. This new technology is relevant for the northeastern region as it overcomes all the above problems. Also, it can be easily adopted in the rural areas by small and medium entrepreneurs. This technique can be achieved in various ways:

a. Osmo-air dehydration

This process is achieved in two steps -- partial dehydration of fruits by osmosis and final dehydration with the use of air dryers. The examples of these products are infusion of carotene or Vitamin C into the slices of banana, osmotically dehydrated jackfruit slices, mango slices, guava slices, carrot slices, papaya slice, osmotically dried guava bars which can be packed in convenient sizes. (Source: Tiwari, R. B. PPT winter school 161116)

b. Osmotic dehydration by vacuum impregnation

This method is based on the principle of combined processing wherein value addition is carried out by infusion of flavours, nutrients or natural colours into a product from other products. This is done for example through infusion of kokum juice to improve colour and sensory appeal, infusion of mango slice in mango juice, blending fruits such as papaya and guava, Totapuri shreds and Alphonso, Neelum and Alphonso, sandwich pulp of mango and aonla . (Source: Tiwari, R. B. PPT winter school 161116)

2. Freezing of fruit and vegetables.

It preserves food for a longer period of time with good initial quality. It requires maintenance of a temperature below -18° C. The different methods of freezing are:

a. Individual quick freezing.

Here a low temperature of -32 to -40 degrees Celsius is used, which results in formation of fine crystals and reducing the freezing time. The advantage of this method is that a large amount of fruit and vegetables can be frozen in short time.

b. Osmo-dehydro freezing.

In this method the product is dried to 50% of its original weight and volume and thereafter the freezing is carried out. Osmotic pre-treatment improves the sugar acid blend, e.g. osmotic pre-treatment of mango and pineapple slices have better quality.

3. Vacuum frying.

In this method frying is done at a pressure below the atmospheric pressure level. It comprises deep frying device inside a vacuum chamber at a low temperature. It prevents nutrient loss from food due to high temperature and can retain original colour and flavour and the cost of processing is low. This method was successful in jackfruit, banana, potato, carrot, mushroom, sweet potato and purple yam.

The main focus of processing in the Northeast should be based on low cost, availability and ease of operation so that product reaches the common man without compromising on qualitative aspects. Our efforts to attain self sufficiency in food production will be incomplete if the population remains undernourished in spite of high production due to lack of suitable technologies for processing. A part of the solution lies in reduction of losses through technological interventions through processing. This necessitates development of ingenious and innovative ways to meet the demand of this generation.

FOOD PROCESSING:
In the context of Organic Produce

Jiwan Sharma
General Manager, Simfed, Gangtok

Food Processing

Food processing is the action of performing a series of mechanical or chemical operations on food in order to change or preserve. It is the transformation of raw ingredients, by physical or chemical means into food, or of food into other forms. Food processing combines raw food ingredients to produce marketable food products that can be easily prepared and served by the consumer.

Food processing activities

Mincing and macerating, liquefaction, emulsification, pickling, pasteurization, and many other kinds of preservation; and canning or other packaging methods are some of the food processing activities. Primary processing such as dicing or slicing, freezing or drying when leading to secondary products is also included.

Why process food?

1. Prevent, reduce, and eliminate infestation of food with microbes, insects or other vermin.
2. Prevent microbial growth or toxin production by microbes, or reduce these risks to acceptable levels.
3. Stop or slow deteriorative chemical or biochemical reactions.
4. Maintain and/or improve nutritional properties of food.
5. Increase storage stability or shelf life of food.
6. Make food more palatable and attractive.
7. Make food for special groups of people.

Food preservation

The term food preservation refers to any one of a number of techniques used to prevent food from spoiling. It includes methods such as canning, pickling, drying and freeze-drying, irradiation, pasteurization, smoking, and the addition of chemical additives. Food preservation has become an increasingly important component of the food industry as fewer people eat food produced on their own lands, and as consumers expect to be able to purchase and consume food that is out of season.

The vast majority of instances of food spoilage can be attributed to one of two major causes:

• the attack by pathogens (disease-causing microorganisms) such as bacteria and molds, or

• Oxidation that causes the destruction of essential biochemical compounds and/or the destruction of plant and animal cells. The various methods that have been devised for preserving foods are all designed to reduce or eliminate one or the other (or both) of these causative agents.

Why is Food Preservation Important?

1. To increase the shelf life of food as well as its supply. Although the freshness, palatability and nutritive value may be altered with time delay, perishable foods can be preserved to prevent spoilage and made to be available throughout the year. In this way, preservation helps to increase variety in our diet and makes it better balanced.

2. To save food for future use at the time of scarcity or drought etc. after suitable preservation and proper storage. Preservation of food also minimizes the preparation time and energy at home.

3. To stabilize the price of food throughout the year since seasonal food can be preserved and made available for consumption throughout the year.

Principles of Food Preservation

A. Prevention or delay of the growth of micro-organisms

I. Avoiding invasion of micro-organisms e.g. by aseptic techniques

ii. Removing micro-organisms e.g. filtration

iii. Inhibiting the growth and activity of micro-organisms e.g. freezing, refrigeration, drying, anaerobic conditions, chemicals or antibiotics

iv. Killing the micro-organisms e.g. heat or irradiation

B. Prevention or delay of self-decomposition

I. Destruction or inactivation of inherent enzymes naturally existing in food e.g. by blanching

ii.Prevention or delay of chemical reactions e.g. prevention of oxidation by using antioxidants

C. Prevention of damage from insects or animals

I. By using suitable chemicals to kill insects or animals from destroying the foods.

ii. By storing food in dry, air tight containers to prevent the insects or animals from destroying them.

Organic Food

The term “organic” refers to the process of how certain food is produced. Organic food is grown or farmed without the use of artificial chemicals, hormones, antibiotics or genetically modified organisms. In order to be labeled organic, a food product must be free of artificial food additives. This includes artificial sweeteners, preservatives, coloring, flavouring and monosodium glutamate (MSG).

Organically grown crops tend to use natural fertilizers like manure to improve plant growth. Animals raised organically are also not given antibiotics or hormones. Organic farming tends to improve soil quality and the conservation of groundwater. It also reduces pollution and may be better for the environment.

The most commonly purchased organic foods are fruits, vegetables, grains, dairy products and meat. Nowadays there are also many processed organic products available, such as sodas, cookies and breakfast cereals.

Organic Food Processing – Sikkim Scenario

Sikkim, after being officially declared as the first organic state in the country, has an immense role to play in the organic food processing segment. The major food crops include ginger, turmeric, buckwheat, cardamom, Mandarin oranges, etc. Keeping in mind the National Programme for Organic Production (NPOP) standards, all these produces are to be processed.

Organic food is minimally processed without artificial ingredients or synthetic preservatives to maintain the integrity of the product that began with practices on the farm. For example, the use of genetically-modified organisms is prohibited during the production *and* processing of certified organic products. A rigorous certification process, including periodic testing, is required. Also, irradiation is prohibited in organic processing.

Organic food must be processed in an operation that has been certified to organic standards, with special steps taken to make sure that organic ingredients are not co-mingled or contaminated with non-organic material.

National organic standards set out the methods, practices and substances used in producing and handling crops, livestock and processed agricultural products. The standards include a national list of approved synthetic and prohibited non-synthetic substances, not only for organic production but also for processing.

Standards for Organic Food Processing as prescribed by the Governing Authorities

To use the term “organic” on a food product, the

ingredients must be grown and the product manufactured according to the national standards specified by the NOP (National Organic Programme). "Handling" includes cooking, baking, curing, heating, drying, mixing, grinding, churning, separating, distilling, extracting, slaughtering, cutting, fermenting, eviscerating, preserving, dehydrating, freezing, chilling, or otherwise manufacturing, packaging, canning, jarring, or otherwise enclosing food in a container. Both the ingredients and the facility where the food is processed must be certified organic. This means that buildings where ingredients are stored, equipment, product packaging, and storage areas used for final products must all meet the NOP (National Organic Programme) requirements. Cleaning products and solvents must appear on the National List or must be completely rinsed away before organic production so that no residue on food contact surfaces will contaminate the final product.

Pest management in organic operations is most often dealt with through preventive practices such as exclusion, sanitation, removal of pest habitat, management of environmental factors, mechanical or physical controls or lures/repellents. Organic and non-organic products may be produced in the same facility – this is known as a "split operation." Split operations must take measures to prevent commingling and contamination of the organic ingredients and final products. Ingredient storage must be dedicated to organic or you must document that containers are clean before using them for organic.

Synthetic fungicides, preservatives, and fumigants may not be used on packaging materials or storage areas and containers. Any containers that have been in contact with non-organic products or prohibited substances must be thoroughly cleaned so that they pose no risk of contaminating the organic product. The certification agency must approve finished product labels for compliance with the National Organic Standards before use. Any handling and processing of organic products should be optimized to maintain the quality and integrity of the product. The operator must develop an organic production and handling plan. An organic production and handling plan must include:

I. Description of practices and procedures to be performed

ii. List of each substances/inputs used during production, storage and handling indicating its composition, source, locations where it will be used and documentation of commercial availability as applicable.

iii. Description of the monitoring practices and procedures followed and maintained to verify the plan is effectively implemented

iv. Description of the record keeping system implemented to comply with the requirements of NPOP

v. Description of the management practices and separation measures established to prevent commingling of organic and non organic products during parallel processing and handling

vi. Pollution sources shall be identified and contamination avoided.

vii. Processing and handling of organic products should be done separately in time or place from handling and processing of non-organic products.

viii. All products shall be adequately identified through the whole process.

ix. Certification programme shall regulate the means and measures to be allowed.

x. Recommended for decontamination, cleaning or disinfections of all facilities where organic products are kept, handled, processed or stored

Pest control

I. Pests should be avoided by good manufacturing practices. This includes general cleanliness and hygiene.

ii. Treatments with pest regulating agents must thus be regarded as the last resort.

iii. Recommended treatments are physical barriers, sound, ultra-sound, light and UV-light, traps (including pheromone traps and static bait traps), temperature control, controlled atmosphere and diatomaceous earth.

iv. A plan for pest prevention and pest control should be developed.

v. For pest management and control the following measures shall be used in order of priority:

- Preventive methods such as disruption, elimination of habitat and access to facilities
- Mechanical, physical and biological methods
- Pesticidal substances contained in the Appendices of the national standards
- Other substances used in traps

vi. Irradiation is prohibited.

vii. There shall never be direct or indirect contact between organic products and prohibited substances (such as pesticides). In case of doubt, it shall be ensured that no residues are present in the organic product.

viii. Persistent or carcinogenic pesticides and disinfectants are not permitted.

Ingredients

I. All the ingredients used in processing shall be

organic except where an organic ingredient is not available in sufficient quality or quantity; non organic ingredients may be used to a minimum extent only in case of essential technological need or for particular nutritional purpose. Such non organic raw material shall not be genetically engineered. The accredited Certification Body may authorize the use of non-organic raw material subject to periodic reevaluation.

ii. The same ingredient within one product shall not be derived both from an organic and non-organic origin.

iii. Preparations of micro-organisms and enzymes commonly used in food processing may be used, with the exception of genetically engineered microorganisms and their products. For the production of enzymes and other microbiological products, the medium shall be composed of organic ingredients.

iv. Water and salt may be used in organic products

v. Minerals (including trace elements), vitamins and similar isolated ingredients shall not be used. The certification programme may, grant exceptions where use is legally required or where severe dietary, or nutritional deficiency can be demonstrated.

vi. Ethylene gas is permitted for ripening

Processing Methods

I. Processing methods should be based on mechanical, physical and biological processes.

ii. The vital quality of an organic ingredient shall be maintained throughout each step of its processing methods and shall be chosen to limit the number and quantity of additives and processing aids. The following kinds of processes are approved : mechanical and physical, biological, smoking, extraction, precipitation and filtration

iii. Extraction shall be either with water, ethanol, plant and animal oils, vinegar, carbon dioxide, nitrogen or carboxylic acids. These shall be of food grade quality, appropriate for the purpose

iv. Filtration substances shall not be made of asbestos nor may they be permeated with substances which may negatively affect the product.

v. Irradiation is not allowed.

Packaging

I. Biodegradable, recyclable, reusable systems and eco-friendly packaging material shall be used wherever possible.

ii. Material used for packaging shall not contaminate food. Certain additives for use in manufacturing of packaging films for packaging of organic food are allowed for restricted use.

iii. The packages shall be closed in such a manner that substitution of the content cannot be achieved without manipulation or damage of the seal.

iv. The accredited Certification Body shall approve the packaging material for use

Labeling Requirements

I. Labeling shall convey clear and accurate information on the organic status of the product.

ii. When all the standard requirements are fulfilled, products shall be sold as "produce of organic agriculture" or a similar description.

iii. The label for conversion products shall be clearly

distinguishable from the label for organic products by mentioning the year of conversion.

iv. The name and address of the person or company legally responsible for the production or processing of the product shall be mentioned on the label.

v. Product labels should list processing procedures, which influence the product properties in a way not immediately obvious. All components of additives and processing aids shall be declared.

vi. Additional product information shall be made available on request.

vii. Ingredients or products derived from wild production shall be declared as such.

Processed products

I. Single ingredient products may be labeled "organic" when all standard requirements have been met.

ii. Multi-ingredient products where not all ingredients, including additives, are of organic origin may be labeled in the following way (raw material weight):

• Where a minimum of 95% of the ingredients are of certified organic origin, products may be labeled "certified organic" or similar and should carry the logo of the certification programme.

• Where less than 95% but not less than 70% of the ingredients are of certified organic origin, products may not be called "organic". The word "organic" may be used on the principal display in statements like "made with organic ingredients" provided there is a clear statement of the proportion of the organic ingredients. An indication that the product is covered by the certification programme should be used, close to the indication of proportion of organic ingredients.

• Where less than 70% of the ingredients are of certified organic origin, the indication that an ingredient is organic may appear in the ingredients' list. Such product may not be called "organic".

iii. Added water and salt shall not be included in the percentage calculations of organic ingredients. For aquaculture products the use of iodized salt shall be referred on the labels.

iv. All raw materials of a multi-ingredient product shall be listed on the product label in order of their weight percentage. It shall be apparent which raw materials are of organic certified origin and which are not. All additives shall be listed with their full names.

v. If herbs and/or spices constitute less than 2% of the total weight of the product, they may be listed as "spices" or "herbs" without stating the percentage.

vi. Organic products shall not be labeled as GE (genetic engineering) or GM (genetic modification) free in order to avoid potentially misleading claims about the end product. Any reference to genetic engineering on product labels shall be limited to the production method.

vii. The label of a certified organic product must depict the name and logo of the accredited certification body, accreditation number and India Organic Logo

viii. The accredited certification body shall verify the labeling requirement and approve the labels of their certified operators before the labels are used

Storage & Transport

I. Organic products shall be stored at ambient temperature. The following special conditions of storage are permitted

- Controlled atmosphere
- Cooling
- Freezing
- Drying
- Humidity regulation

ii. Product integrity should be maintained during storage and transportation of organic products. Organic products must be protected at all times from co-mingling with non-organic products and from contact with material and substances not permitted for use in organic farming and handling.

iii. Where only part of the unit is certified and other products are non-organic, the organic products should be stored and handled separately to maintain their identity.

iv. Bulk stores for organic products should be separate from conventional product stores and clearly labeled to that effect.

v. Storage areas and transport containers for organic products should be cleaned using methods and materials permitted in organic production. Measures should be taken to prevent possible contamination from any pesticide or other treatment

Conclusion

Food processing sector could be one of the largest sectors in the Northeast in terms of production, growth, consumption, and export. The sector can covers fruit and vegetables; spices; meat and poultry; milk and milk products, alcoholic beverages, fisheries, plantation, grain processing and other consumer product groups like confectionery, chocolates cocoa products, soya-based products, mineral water and high protein food.

The organic food processing industry is considered to be export oriented. There is an urgent need of our stakeholders to venture into the field. Further, there is a need to create a niche organic processed food channel to meet the aspirations of potential consumers across the world.

The current scenario of less competitiveness and less participation in the sector has to be re-modelled and re-designed to attract more participation of our stakeholders in the segment to make the food processing industry as one of the most viable industry in the Northeast region.

With Sikkim declared an organic farming state and subsequent announcement by the Prime Minister to make the Northeast an organic farming hub, there is reason for players to venture into the food processing segment and make it the most viable segment of industry.

Let us unite, adopt organic farming practices and venture into the high-potential yet unexplored fields of organic food processing industry in the Northeast.

Courtesy: APEDA for specification and standards of organic food processing.

Food Processing: A sunrise sector in North East India

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Introduction

India has the tenth-largest arable land resources in the world with 161 million tonnes. With 20 agri-climatic regions, all 15 major climates in the world exist in India. The country also possesses 46 of the 60 soil types in the world. India is the second-largest producer of food, and has the potential to be the largest on a global food and agriculture canvas, according to a Corporate Catalyst India (CCI) survey. India is primarily an agriculture-dependent country. It is the principal source of livelihood for more than 58 per cent of the population. It is the base for the majority of the food processing industries in India. Agriculture, along with fisheries and forestry, is one of the largest contributors to the Gross Domestic Product (GDP). As per the first advanced estimates by the Central Statistics Office (CSO), the share of agriculture and allied sectors (including agriculture, livestock, forestry and fishery) is expected to be 17 per cent of the Gross Value Added (GVA) during 2016-17 at 2011-12 prices.

India is the largest producer of milk, second largest producer of fruits and vegetables and third largest producer of food grains in the world. India has the largest livestock population across the globe which is equal to 512 million, including 119 million milch (in-milk and dry) animals, 80.06 million goats and 44.56 million sheep in Financial Year 2015. India is a net exporter of many agricultural products. However, processing and value addition of these products still remain quite low till date. The processing status in fruits and vegetable sector has not yet reached a value of even 10% compared to 40% in China, 70% in Brazil and 90% in USA. This is mainly due to huge post harvest losses which occur as a result of lack of proper infrastructure for storage and transport of fresh produce, dearth of sufficient number of food processing establishments and lack of sensitization among entrepreneurs to take up food processing as a viable business option. In the light of these facts, it is obvious that there is tremendous scope of food processing in India which will be instrumental in the development of the country.

The Northeastern region of India comprises eight states: Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura and Assam. It occupies only 8% of India's geographical spread, and is home to only 4% of the country's population. Assam accounts for 68% of the population (ICC, 2013). All the eight states have different developmental prospects and resources to support their efforts in contributing to the regional as well as national

economy. India's north east region (NER) is endowed with huge untapped natural resources and is acknowledged as the eastern gateway for the country's 'Look East Policy'. Agriculture provides livelihood to 70% of the region's population. In Mizoram, around 51% of the population lives in rural areas and is dependent on agriculture. The figure in Sikkim is high at 89%. However, the pattern of agricultural growth has remained uneven across regions. The states continue to be net importers of food grains even for their own consumption. The region, which is heavily dependent on the agriculture sector, needs a green revolution to eradicate poverty and boost its economy. Such a green revolution must be adequately backed by financial institutions, marketing functionaries and R&D. The region's comparative advantages in producing fruits, vegetables and other horticulture products can be tapped by setting up small-scale processing units for the local market which will also boost rural employment.

Status of Food Processing Industry in India

The food processing industry (FPI) is one of the largest industries in India. It is ranked fifth in terms of production, consumption, export and expected growth. Fuelled by what can be termed as a perfect ingredient for any industry – large disposable incomes - the food sector has been witnessing a marked change in consumption patterns, especially in terms of food. In India, the food sector has emerged as a high growth and high profit sector due to its immense potential for value addition, particularly within the food processing industry. The food industry, which is currently valued at US$ 39.71 billion is expected to grow at a Compounded Annual Growth Rate (CAGR) of 11 per cent to US$65.4 billion by 2018. Food and grocery account for around 31 per cent of India's consumption basket. Accounting for about 32 per cent of the country's total food market, the Government of India has been instrumental in the growth and development of the food processing industry. The online food ordering business in India is in its nascent stage, but witnessing exponential growth. The organized food business in India is worth US$ 48 billion, of which food delivery is valued at US$ 15 billion. With online food delivery players like FoodPanda, Zomato,TinyOwl and Swiggy building scale through partnerships, the organized food business has a huge potential and a promising future.

In India, the food processing industry is highly fragmented and is dominated by the unorganized sector. The food processing sector in rural areas is mostly unorganized. About 42% of the output comes from the unorganized sector, 25% from the organized sector and the rest from small players (Rais et. al 2013). Though the unorganized segment varies across categories but approximately 75% of the market is still in this segment. The organized sector is relatively bigger in the secondary processing segment than the primary processing segment. Increasing urbanization, consciousness on health and nutrition and changing lifestyle are changing the consumption habits of India. The number of working women, single students/professionals and nuclear families are creating demand for processed ready-to-eat foods.

Growth of organized retail, which makes the processed food readily available, is also driving growth of food processing.

The major segments in the Indian Food Processing sector comprise fruits and vegetables, dairy, edible oils, meat and poultry, non-alcoholic beverages, grain-based products, marine products, sugar and sugar-based products, alcoholic beverages, pulses, aerated beverages, malted beverages, spices, and salt. Out of these segments, dairy (16%), grain based Products (34%), bakery-based products (20%), and fish and meat products (14%) contribute to a major portion of industry revenues, apart from the manufacture of beverages (Rais et. al 2013). Major food processing states in India are Andhra Pradesh with 13.4% share of India's food processing industry, and a centre for fruits, vegetables, grains and livestock products viz. Poultry, dairy, fisheries, meat, etc.), Gujarat (12.7%, and a centre for edible oils and Dairy), Maharashtra (14%, and a centre for fruit, vegetables, grains, and beverages), and Uttar Pradesh (12%, across almost all product categories). This represents an uneven distribution of food processing sector in India which is concentrated only in certain states leaving behind huge unutilized food resources of other states which are yet to be tapped. There is a big market for products like sugar, coffee, tea and processed foods such as sauce, jelly and honey. The market for processed meat, spices and fruits is equally large. Value addition of food products is expected to increase from the current 8 per cent to 35 per cent by the end of 2025.

Food Processing Industry: Socio Economic Aspect

Food processing industry is an employment-intensive industry; it can be an answer to jobless growth of past decade. Currently, only 3 % of employment is in FPI, while in developed countries it handles 14% population. Again, much of the employment will be created into rural India. This can remedy problem of distress migration. Presence of food processing industry also increases the hired workforce in farms. It is over 75% for farms associated with industry in comparison to average of 72% of total hired workforce in agriculture. Even after all these benefits, farmers and the private sector are yet to exploit the full potential of food industries in India.

The food processing industry has strong backward linkages with rural economy, as all the raw material is produced by rural people. Hence, any growth in food processing industry, positive or negative will have a direct impact on economy of rural India. Out of the agro-processing sector in rural areas, the food processing industry is the second most important Industry, in terms of revenue generation. But there is a huge productivity gap because of the use of traditional technology in production.

Increasing incomes are always accompanied by a change in the food basket. The proportionate expenditure on cereals, pulses, edible oil, sugar, salt and spices declines as households climb the expenditure classes in urban India while the opposite happens in the case of milk and milk products, meat, egg and fish, fruits and beverages. A large part of this shift in consumption is driven by the processed food market the demand of which is growing day by day. The Confederation of Indian Industry (CII) has estimated that the food processing sector has the potential of

attracting US$ 33 billion of investment in 10 years and generates employment of 9 million person-days.

India is a hub of many traditional and ethnic food products. Processing and mechanization status in these products is still at a nascent stage. Processing offers the scope of improvement in the traditional technology through standardization and employment of mechanical systems which will ensure a uniform quality product with enhanced shelf life. This will pave the way for taking the Indian culture to the palettes of foreign countries leading to increase in the market size of food processing industry in India.

Food Processing Scenario in North East India

Scope and Opportunities

Diverse agro-climatic conditions, varied soil types and abundant rainfall have endowed NER with promising horticultural crops. These States have been producing substantial quantities of fruits and vegetables, which have considerable potential for domestic and international markets. With fruits like pineapple, kiwi, peach and plum, besides mango and banana, being abundantly cultivated in the North Eastern states, the food processing industry can emerge in a big way.

preserved years together in normal room temperature. It is very interesting to note that excess meat is processed and preserved by drying or by drying cum smoking or by salting and drying with local herbs or by fermentation. It is also observed that indigenous herbs, leaves of trees, roots, seeds, liquid vegetable extracts, spices and oils are used for preservation of some meat products. Many tribal people claim that certain herbal products used in meat preservation and processing has lypolytic, proteolytic, cholesterolytic and hepatoprotective properties (Hazarika, 2013). Their claim is probably true from the fact that in spite of heavy consumption of meat, few people are prone to heart problems. However, no efforts have been made till date to document and standardize these processes of indigenous meat products which offers tremendous scope for food processing and export of these products.

With its proximity to South East Asian markets, being home to diverse and exotic variety of fruits and vegetable crops, North Eastern states could emerge as a major centre of food processing industry. Even though the horticulture industry is not doing that well in the NER, there are examples where value addition of horticultural crops

Among other horticulture crops of the region are potato, onion, tapioca, sweet potato among vegetables and tuber crops. Northeast India can also be regarded as the land of exotic chillies like King chilli, cherry pepper etc. and home to high quality spices like ginger, turmeric and large cardamom. There is a need for proper data collection and storage about not only fruits and vegetables, but also their diverse breeds and varieties, if the industry in North East is to emerge competitive in national and international level where issues like brand and quality control are important.

The ethnic and tribal groups of Northeast India also have the secrets of many traditional meat products which are reflection of their unique culture. Apart from the fresh meat production and traditional processing, a sizeable portion is preserved using their indigenous methods and ingredients. The products as well as methods of preservation vary from region to region and even among the ethnic groups. Some of the meat products are

has clearly shown a contribution to income generation and poverty alleviation. Many value added products like ginger powder, ginger flakes, ginger paste, chilli flakes, chilli paste, chilli powder, processed large cardamom, osmo-dried pineapple rings, Ready to serve (RTS) beverages form ginger, pineapple, orange, passion fruits etc. can lead to increase in the socio economic status of many farmers. This will also help in boosting the number of food processing units in this region. With proper processing, many of the agri-horticultural crops of the state look promising for export. According to a report (APEDA, 2017) considerable potential lies in the export of many horticultural crops like banana, pineapple, citrus, jackfruit, ginger, turmeric, chilli and large cardamom which can be met only through proper processing techniques.

There is also scope for dairy processing and poultry, fishery processing in the region. There is huge demand for dried fish in the region, processing of which is not capital

intensive. The National Dairy Development Board (NDDB), which has extensive experience in mobilising producers in milk, vegetables as well as other areas, could play a key enabling role in this process. Increase in milk production will encourage the milk, butter and cheese processing industry in the region.

Private entrepreneurs need to be encouraged to set up storage, distribution and marketing infrastructure such as a cold storage chain along major arterial highways. This will help exploit the horticulture potential of the region and bring perishables speedily to marketing hubs. For cold chain operations, a public-private partnership (PPP) or lease could also be explored. Similar initiatives can already be seen in Meghalaya and Mizoram where flowers are being distributed outside the region by a private distributor, Zopar, which also supplies seed varieties to farmers.

Status of food processing industries in North East

In the present scenario, the food processing industry is mainly operated on a small scale and in small

numbers. In 2009, in North East, only 85 units received licenses under the FPO (Fruit Products Order) Act, and, of these, only 32 were functional units (MSME, 2009). The number of food processing industry is highly erratic in different years for NER. As per the Annual survey in 2013-14, the number of food processing factories in this region is about 1440 which is only 3.8 % of India's data (MoFPI, 2017).

The structure of food processing industry in the NER is mainly unorganized in accordance with the rest of India. The huge presence of the unorganized sector can be attributed to the fact that most of the units in the unorganized sector are less capital intensive, and the easy availability of raw materials makes it more attractive for small entrepreneurs (Rais et. al., 2013). The horticulture based food industry has more scope than rest of India in this region. Ministry of Food Processing Industries conducted a study through North-Eastern Regional Agricultural Marketing Corporation Ltd. (NERAMAC) based at Guwahati to assess the scope and potential of food processing industries in the States of Assam, Mizoram and Tripura. The study revealed that the production volumes of various crops in these States currently do not provide the economics of scale for setting up of large food processing industries, except for pineapple.

Apart from unorganized and small scale processing sector, another constraint in the expansion of food processing industry in this region is the cultural and religious values of people in the region. The rural community does not accept processing of fruits in a very kind manner (Rais et. al., 2013). The local people are orthodox and very skeptical regarding processed product as they have little knowledge about the ingredients and procedure of value addition.

Government Initiatives

Given the scope of the food processing industry and the nascent development stage, the food processing sector in this region is a key focus area for the Government of India. The government has therefore been focusing on commercialization and value addition to agricultural produce, minimizing pre/post harvest wastage, generating employment and export growth in this sector, through a number of regulatory and fiscal incentives. The new wave in the food industry is not only about foreign companies arriving here attracted by the prospective size of the market. It is also about the migration of the 'Made in India' tag on food products traveling abroad. The Government has formulated and implemented several schemes to provide financial assistance for setting up and modernizing of food processing units, creation of infrastructure, support for research and development and human resource development in addition to other promotional measures to encourage the growth of the processed food sector. Such schemes are discussed below.

1. Scheme on assistance for setting up/upgrade of food processing establishments:

Ministry of Food Processing Industries (MoFPI) has been implementing central sector schemes in the country including North East for providing modern infrastructure for food processing industries. The scheme covers setting up technology upgrade/modernization/establishment of food processing industries in fruits and vegetables, milk products, meat, poultry, fishery products, food flavours, colours, rice processing, Assam is the major beneficiary under this scheme, owing to its large size and population. However, most of the small states almost have no share in the scheme.

2. Mega Food Park Scheme: The Scheme of Mega Food Park aims at providing a mechanism to link agricultural production to the market by bringing together farmers, processors and retailers so as to ensure maximizing value addition, minimizing wastage, increasing farmers' income and creating employment opportunities particularly in rural sector. The Mega Food Park Scheme is based on “Cluster” approach and envisages a well-defined agree/ horticultural-processing zone containing state-of-the art processing facilities with support infrastructure and well-established supply chain. It is expected that each mega food park would have about 30 – 35 food processing units with collective investment of

about 250 crores that would eventually lead to a annual turnover of 400 – 500 crores and generate employment (Direct and Indirect) for about 30000 people. The scheme provides for a grant of 50% (75% for the NE region) of the capital cost excluding land cost, subject to a ceiling of Rupees Fifty Crores. At present there are three are Mega Food Parks in North East India: One each in Tripura, Mizoram and Assam.

3. Cold Chain Scheme: The objective of the scheme of Cold Chain, Value Addition and Preservation Infrastructure is to provide integrated cold chain and preservation infrastructure facilities without any break from the farm gate to the consumer. It covers pre-cooling facilities at production sites, reefer vans, mobile cooling units as well as value addition centres which includes infrastructural facilities like Processing/Multi-line Processing/ Collection Centres, etc. for horticulture, organic produce, marine, dairy, meat and poultry etc. Individual, Groups of Entrepreneurs,Cooperative Societies, Self Help Groups(SHGs), Farmers Producer Organizations (FPOs),NGOs, Central/State PSUs etc. with business interest in Cold Chain solutions are eligible to setup integrated cold chain and preservation infrastructure and avail grant under the Scheme.

4. Modernization of Abattoirs: This is a comprehensive scheme, which includes establishment of modern abattoirs and modernization of existing abattoirs. Modernisation of abattoirs will also include upscaling of infrastructure of existing abattoirs. The scheme is implemented with the involvement of local bodies (Municipal Corporations and Panchayats)/ Public Sector Undertakings/Co-Operatives/Boards under Government and has flexibility for involvement of private investors on PPP basis. Arunachal Pradesh, Nagaland, Mizoram and Sikkim are currently availing this scheme.

5. R&D, QA, Codex and Promotional Activities: Quality and Food Safety have become competitive edge in the global market for the enterprises producing and marketing foods products. For a successful food processing sector in the country, various aspect of Total Quality Management (TQM) such as quality control, quality system and quality assurance should function in a horizontal fashion for total success. Further, in the processed Food Sector, R & D is an important area where focused attention is required as it is related to improvement of production, quality, consumer safety and public health. There is need for R&D for development and up-gradation of products, processes and technologies in the processed food sector.

6. National Mission on Food Processing (NMFP): Under the Mission, all the State/UT Governments have been empowered to receive the applications, sanction and release the grant-in-aid to the eligible beneficiaries. States also have flexibility in selection of location of projects as well as beneficiaries. This initiative is meant to augment the capacity of the food processors for up-scaling their operations by adoption of new technologies.

7. Other Assistance Schemes: MOFPI launched a new Centrally Sponsored Scheme (CSS) National Mission on Food Processing to promote facilities for post-harvest operations, including setting up of food processing industries and agro-processing clusters in India. National Horticulture Mission (NHM) and National Horticultural Board gives assistance for cold storage (long term storage and distribution hubs) up to 5000 MT capacity with subsidy of 50% in case of Hilly & Scheduled area. Similar assistance for setting up cold chain facility is also being provided by Agricultural and Processed Food Products Export Development Authority (APEDA) and Micro, Small and Medium Enterprises (MSME). Under Horticulture Mission For North Eastern Region and Himalayan States (HMNEH) a sub scheme of MIDH Food processing units for horticulture products are extended credit linked back ended capital investment assistance of 50% of project cost (ceiling amount of project cost is Rs 8 crore). Many similar schemes have been launched by many other organizations of Central government to promote the food processing industries in North Eastern region.

Conclusion

The food processing industry has been recognized as a thrust area by all state governments of NER; however there has been no proper policy making body or department in any of the state which looks into the prospect of this sector. The states should also form a special department for food processing in line with the central government which will address the challenges and issues of food processing industry in the state. North eastern region also has large numbers of unemployed and unskilled youth who needs to be trained through incubation centers, vocational courses, and trainings to make them skilled. These can be taken up in collaboration with the educational, training and extension institutions in the region. The skilled human resource will play a major role in entrepreneurship development that will lead to a boom in the food processing sector in the NE region. In addition to the trained human resource, there is also immediate requirement of proper supply-chain infrastructure and roads without which presence of large scale food processing players will remain ever elusive in the region. The food processing industry has huge scope in NER which is yet to be tapped to its full potential. Food processing industry has been selected as the priority sector under “Make in India” campaign. With the aid and special incentives of many schemes of the central government for NE region, this industry shows promise of rapid growth. However, the northeastern states are yet to take full advantage of the schemes being implemented by the Union ministry of food processing and industries (MoFPI) for the benefit of the people, particularly farmers. The food processing industry in north east region can be developed through public-private partnerships for infrastructure creation and technology upgrade, promotional campaign for consumers highlighting the benefits of processed foods, increasing competitiveness of the small and medium enterprises by facilitating their access to best practices, technology, capital and marketing opportunities and creation of effective, inclusive and sustainable food processing infrastructure.

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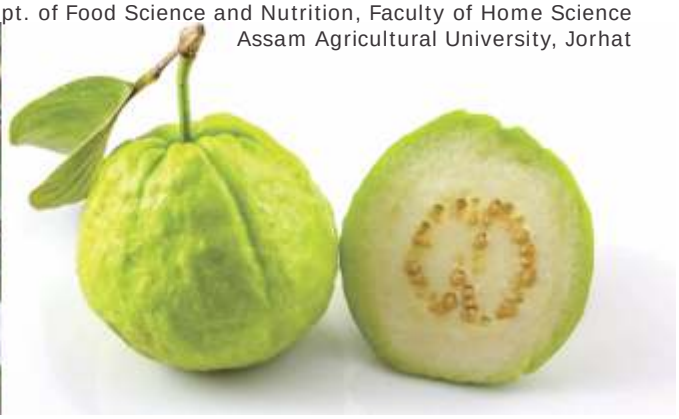
Mazbooti ka bharosa...hamesha

Scope of Value Addition to Indigenous Minor Fruits of Assam as Entrepreneurial Ventures

Dr. Nilima Neog
Rtd. Assoc. Professor, Principal Investigator
Dept. of Food Science and Nutrition, Faculty of Home Science
Assam Agricultural University, Jorhat



Fruits are rich sources of nutritional and bioactive compounds which confers immense health benefits. Assam, one of the major states of North Eastern Region is a unique gift of nature for production of a large number of fruit crops. Many commercially important major and minor fruits are produced here and believed to be indigenous to this region. Minor fruits play a key role in the diet of the people of Assam particularly in the rural areas. A large number of indigenous minor fruits are grown wildly as well as backyard plants.Many of them have medicinal, therapeutic and commercial values. Minor fruits are consumed by the people in rural and tribal areas and gaining popularity slowly in urban areas also due to their attractive colour, congenial taste and quality. These are known to be good sources of vitamins and minerals. Fruits like carambola are a good source of minerals such as calcium, magnesium, phosphorus, sulphur, copper, etc. The protein and vitamin content of 'Ponial' *(Flacourtia gangomos)* and 'Leteku' *(Baccaurea sapida)* are ten times higher than apples. Both the fruits are rich in calcium and may be considered as a good source of calcium particularly in the developing countries where there is shortage of supply of milk and milk products. 'Ou-tenga' *(Dillenia indica)* also contains a considerable amount of calcium and phosphorus. 'Bogori' (*Ziziphus jujube*) is highly valued as being nutritious and protective for its ascorbic acid content. Besides their nutritional contribution most of the indigenous minor fruits possess specific medicinal properties which are known to be used as a therapy for human diseases.Carambola is effective in treatingdiseases such as jaundice and piles. Ou-tenga is useful in curing cough.The seed of *'lateku'* is useful in treating asthma, bronchitis and vomiting. Minor fruits of this region are delicious with their attractive colour and quality. They can be used for preparation of jam, jelly, pickles and wine. A majority of these fruit plants provide wood and are used for making farm implements and also meet the demand forfuel. Moreover, many of the indigenous fruits are in a state of being extinct and this is mainly due to the loss of wild habitat and large scale destruction of forests. There is an urgent need to take up necessarystrategies for creating awareness and interest to popularize these minor fruits among the people of the region. Value addition as an entrepreneurial venture to process and preserve these minor fruits for economic growth and prosperity of the society becomes imperative here.

Minor fruits are known to be consumed by people as fresh fruits when ripe or sometimes for therapeutic purposes. However, they are rarely processed for preservation. Due to lack of adequate knowledge of processing and preservation, a major portion gets wasted. Considering these, there is an urgent need for development of appropriate technologies for processing and preservation by transforming the fruits into value added products. Popularization of such products among people will not only encourage cultivation and production but also link them to domestic and export markets. This will not only lead to entrepreneurship development but pave the way for a sound rural economy and sustainable society.

Keeping these facts in viewa research projecthad been proposed to the Ministry of Food Processing Industries, Govt. of India,New Delhi with an aim to develop some commercially viable processed products from selected minor fruits of Assam. Accordingly, the MoFPI,Govt.of India had approved the proposal and sanctioned an amount of Rs.65.93 lakhearmarked fortwo years for the R&D project entitled “Development of value added products from selected minor fruits of Assam”. The project was implemented and initiated in the Department of Food Science and Nutrition, Faculty of Home Science, Assam Agricultural University, Jorhat. The objectives of the project were to develop value-added products from selected minor fruits of Assam, analyse nutrient values of the fruits selected, process standardization, quality standardization of the products as per Indian standard specifications, acceptability studies and evaluation of their shelf-life. With a view to fulfil the objectives, 13 important indigenous minor fruits which are in a state of being extinct were selected for development of value-added products on the basis of easy approachability and availability during different seasons of the year. They are Mirika tenga (*Parameria polyneura*),

Noga tenga (*Rhus semialata*), Thereju (*Prunus jenkinsii*), Kuji thekera (*Garcinia cowa*), Rupohi thekera (*Garcinia lanceaefolia*), Borthekera (*Garcinia pedunculata*),Paramlakhi (*Phyllanthus acidus*), Leteku (*Baccaurea sapida*), Outenga (*Dillenia indica*), Bogori (*Ziziphus jujube*), Poniol (*Flacourtia jangomas*),Kordoi (*Averrhoea carambola*), Nuni (*Morus australispoir*) and 63value added products viable for commercialization have beendeveloped. The names of 13 minor fruits selected for development of value added products are presented in the Table No.1.

Table 1: The selected minor fruits of Assam for development of value added products

Sl No	Local Name	English Name	Scientific name	Plates 1-13
1.	Mirika tenga	-	*Parameria polyneura*	
2.	Noga tenga	Chinese sumac or nutgall	*Rhus semialata*	
3.	Thereju	-	*Prunus jenkinsii*	

4.	Kuji thekera	-	*Garcinia cawa*	
5.	Rupohi thekera	-	*Garcinia lanceaefolia*	
6.	Bor-thekera	-	*Garcinia pedunculata*	
7.	Paramlakhi	Country gooseberry	*Phyllanthus acidus*	

8.	Leteku	Baccaurea,latkan	*Baccaurea sapida*	
9.	Outenga	Elephant apple	*Dillenia indica*	
10.	Bogori	Indian date	*Ziziphus jujube*	
11.	Poniol	coffee plum, Indian cherry, Indian plum, rukam, runeal a plum	*Flacourtia jangomas*	

12.	Kordoi	Star fruit	*Averrhoa carambola*	
13.	Nuni	Mulberry	*Morus australispoir*	

All the selected fruits have an attractive colour, distinct flavour, taste and are in high demand. Some of these fruits are highly nutritious, some possess specific medicinal properties while others have good processing qualities.

In order to develop the products, the selected fruits were collected from the respective locality according to their proper stage of maturity considered for different products.Altogether, 63 value added products have been developed by following standard procedures andare presented in Table No.2.

Table: 2. Value added products developed from minor fruits of Assam

Sl. No	Name of the Fruits	Products Developed
1.	Mirika Tenga (*Parameria polyneura*)	Jam
		Jelly
		Pickle
		Chutney
		Squash
2.	Noga tenga	Pickle

	(*Rhus semialata)*	Squash
		Leather (Slab)
		Candy
3.	Thereju (*Prunus jenkinsii*)	Pickle
4.	Kuji thekera (*Garcinia cowa*)	Spicy drink from seed aril extract
		Candy
		Squash
		Dehydrated product
		Dry powder
		Kuji thekera spicy drink
		Pickle
		Chutney mix
		RTS
5.	Rupohi thekera (*Garcinia lanceaefolia*)	Pickle
		RTS drink
		Candy
		Chutney
		Squash Leather (Slab)
6.	Bor thekera (*Garcinia pedunculata*)	Candy
		Leather(Slab)
		Squash
		Dehydrated product

		Spicy drink
		Tuti-fruti
7.	Paramlakhi (*Phyllanthus acidus*)	Mouth freshner
		Squash
		Dehydrated product
		Pickle
8.	Leteku (*Baccaurea sapida*)	RTS drink
		Squash
9.	Outenga (*Dillenia indica*)	RTC (Ready to Cook) product
		Pickle
		Squash
		Spicy drink
		Chutney mix
10.	Bogori (*Ziziphus jujube*)	Pickle
		Jam
		Bori
		Chutney mix
11.	Poniol (*Flacourita jangomos*)	Jelly
		Candy
		Pulp incorporated cake
		Chutney
		Pickle
		Leather (Slab)

12.	Kordoi (*Averrhoa carambola*)	Squash
		Panna
		Candy
		Pickle
13.	Nuni (*Morus australispoir*)	Squash
		Leather (Slab)
		Wine
		Jam
		Chikki

It is observed from the table that different types of processed products such as jam,jelly,squash, RTS (Ready to Serve)drinks, leather (slab),pickle,chutney,candy, mouth freshener,chutney mix etc. could be developed from these minor fruits. The processing techniques for these were standardized for different products by following standard methods. The photo of different products developed from the selected minor fruits is presented from Plate No. 14-76.

The developed value added products are presented from Plate no. 14-76

MIRIKA TENGA PRODUCTS

Plate 14-Jam

Plate 15-Jelly

Plate 16-Pickle

Plate 17- Chutney

Plate 18-Squash

NOGA TENGA PRODUCTS

Plate 19 -Pickle

Plate 20-Squash

Plate 21-Leather

Plate 22-Candy

THEREJU PRODUCT

Plate 23-Pickle

KUJI THEKERA PRODUCTS

Plate 24-Spicy drink from wood ash extract

Plate 25 -Candy

Plate 26 -Squash

Plate 27 -Dehydrated product

Plate 28- Dry powder

Plate 29 -Kuji thekera spicy drink

KUJI THEKERA PRODUCTS

Plate 30 -Pickle

Plate 31-Chutney mix

Plate 32 -RTS

RUPOHI THEKERA PRODUCTS

Plate 33 -Pickle

Plate 34-RTS Drink

RUPOHI THEKERA PRODUCTS

Plate 35-Candy

Plate 36-Chutney

Plate 37-Squash

Plate 38-Leather

BOR THEKERA PRODUCTS

Plate 39-Candy

Plate 40-Leather

BORTHEKERA PRODUCTS

Plate 41-Squash

Plate 42-Dehydrated product

Plate 43-Spicy drink

Plate 44-Tati-fruit

PARAMLAKHI PRODUCTS

Plate 45-Mouth freshener

Plate 46-RTS drink

PARAMLAKHI PRODUCT

Plate 47-Dehydrated product

Plate 48-Squash

Plate 49-Pickle

LETEKU PRODUCTS

Plate 50-RTS drink

Plate 51 -Blended juice

Plate 52 -Squash

OUTENGA PRODUCTS

Plate 53 -RTC (Ready to Cook) product.

Plate 54-Pickle

Plate 55-Squash

Plate 56-Spicy drink

Plate 57 -Chutney mix

BOGORI PRODUCTS

Plate 58-Pickle

Plate 59-Jam

Plate 60-Bori

Plate 61-Chutney mix

PONIOL PRODUCTS

Plate 62-Jelly

Plate 63-Candy

Plate 64-Pulp incorporated cake

PONIOL PRODUCTS

Plate 65-Chutney

Plate 66-Pickle

Plate 67-Leather

KORDOI PRODUCTS

Plate 68-Squash

Plate 69-Puree

Plate 70- Candy

Plate 71-Pickle

NUNI PRODUCTS

Plate 72-Squash

Plate 73-Leather

Plate 74-Wine

Plate 75 - Jam

Plate 76-Chikki

Nutrient analysis of the selected fruits and their products were done by estimation of different physico-chemical parameters such as moisture content,TSS(Total Soluble Solids),acidity, pH and ascorbic acid and revealed that all the minor fruits are good sources of ascorbic acid, having the highest amount in Bogori (41.00mg/100g)followed by Lateku,Mirika tenga,Nuni, Thereju and Kordoi while the rest of the fruits contain ascorbic acid ranging from 2.00 mg-7.80 mg/100g.Thus, these fruits have possessed good antioxidant property that correlates with the traditional use of these fruits in various ailments as well as reported in various established research papers.

The analysis of the products showed that the products like jam,jelly, squash,RTS and other beverages such as Kuji thekera Spicy drink and Outenga Spicy drink developed had obtained the optimum TSS as per FPO(Fruit Products Order) specifications. Jam from Mirika tenga, Nuni and Bogori and the jelly from Poniol and Mirika tenga had also shown the optimum TSS. (FPO specification for jam and jelly are 68% and 65% respectively).The TSS of squashes from Outenga,Kordoi, Kujithekera Spicy drink, Outenga Spicy drink (TSS ranged within 40-50%) and RTS from Rupohi thekera and Leteku had also shown an optimum TSS of 10% as per FPO standards. On the other hand, Outenga Spicy drink contained a substantial amount of Ascorbic acid (28.8mg/100g) followed by Kordoi and Outenga squash,Rupohi thekeraRTS and Kuji thekera Spicy drink. Besides, the candy developed from Kordoi and Bor thekera had also obtained a high amount of ascorbic acid. Tuti-fruti from Bor thekera had also shown a substantial amount of ascorbic acid. From these findings it is evident that minor fruits can be utilized successfully to develop value-added products like jam,jelly,chutney,squash and spicy drinks,RTS,pickle and candy on commercial basis in which the physico-chemical parameters observed to be as per the FPO specifications.

Process standardization of the products has beendone by considering the stage of maturity for the considered products, type and time of blanching, shape and size of chopping for candy and pickle, drying time and temperature for candy, dehydrated products and standardization of packaging materials. Quality standardization of the products was done as per FPO Specifications. Acceptability studies of the products was evaluated by sensory evaluation using 9 point Hedonic scale and were well accepted with average overall acceptability score ranged between 6.2-8.6. Market acceptability of the products was assessed with the help of local entrepreneurs and self-help group members by distributing samples of the products to the consumers from all walks of life. The shelf-life of the products was evaluated by keeping the products in different packaging materials like glass bottles, PET bottles, polyethylene pouch, LDPE pouch, etc. and stored at both room temperature and refrigerated temperature for a period of 6 months and products were kept satisfactorily in all the packaging materials up to 6 months of storage evaluated visually and organoleptically.

Further, out of 63products developed, eight of the processing technologies have been transferred to three young entrepreneurs of Assam.

The technologies thus transferred were:

1) Outenga Chutney Mix, 2) Outenga Spicy Drink,

3) Borthekera Candy, 4)Noga Tenga Leather,

5) Kuji Thekera Spicy Drink,

6) Paramlakhi Mouth Freshner,

7) Rupohi thekera Pickle and 8) Noga tenga Plckle

Programmes have been conducted for women of different self-help groups of Jorhat and adjacent areas and local entrepreneurs on processing, preservation and packaging of products like juices, pickles, leather, candy, chutney- mix etc. developed from minor fruits which have benefitted more than 500 women and local entrepreneurs. In bringing awareness for cultivation and popularization of the fruits and their products, the team participated in two Farmers Fairs organized by *Regional Agricultural Research Station,* Titabar, Buralikson Sugar Cane Research Station, Dergaon and one Agri-Horti show at Khanapara, Guwahati through display of flex charts and distribution of folders on preservation of indigenous minor fruits of Assam. Popular articles on “Preservation of indigenous minor fruits of Assam” were published in a bi-monthly Assamese magazine *Sabda Silpa* and *The Telegraph*focusing on research activities and also participated in the Annual Summit of Society for Technology Management (STEM) in Hyderabad through display of developed food products and brochures. Officials of the World Bank and Peer Review Teams had visited the R&D Lab of the Department of Food Science and Nutrition during their visit to Assam Agricultural University and highly appreciated the technologies and products developed.

Assam is endowed with a boon in the form of a huge spectrum of such indigenous minor fruits. It is time worthy that such fruit species needs immediate intervention in terms of their processing, preservation, commercial utilization, protection and propagation, as these are on the verge of extinction. Results of the present investigation are expected to help in influencing the nutritional security of the people of this region. Besides, it can support the food processing sectors to process and develop numbers of value added products in the near future for the sake of health, nutrition and economic prosperity of the rural masses. Therefore, further research can be stressed in this direction for all round development of the society and the nation at large.

Food Processing In the North East

a future for farmers & producers

S Bhattacharjee, Chair
Food Processing Committee, FINER

According to World Bank CEO, Ms Kristalina Georgieva, “World needs a Revolution to fix the food system so that it produces enough food, improves nutrition and health outcomes, provides jobs, and does all of this in an environmentally sustainable way”. Economy of North Eastern Region being largely rural and agrarian, agriculture is the principal occupation of majority in terms of employment and livelihood. In India food processing industry is growing annually at close to 9%, contributing to 13% of the national exports and employing 60% of India's working population directly or indirectly. It has all the ingredients to catapult India into a virtuous cycle of sustainable development, inclusive growth & lower food inflation. However, the true potential of this highly significant sector still remains untapped in the north eastern region of India which is all the more predominant & critical for perishables which constitute the main farm produce of the region and are the important cash crop of farmers & producers.

In the region, value chain interventions from financial institutions for farm gate, post harvest management, modernization and capacity expansion in food processing and its eco system with regulatory enablers are at its infancy even today which is fundamentally essential for maximizing sustainable development and economic growth. Enhanced incentives for food processing industry's development and the latest move of the Government on promotion of FDI (Foreign Direct Investment) in food processing sector are some of the key measures that shall enhance credit flow and investments in the sector. FDI is yet to make a vibrant start in the north east and a strong awareness campaign & promotion is being made at different level / forum through seminars, workshop etc considering that 100 % procurement of farm produce has to be made locally as per the new FDI norm. These initiatives coupled with financial inclusion will not only benefit the economy but also create a multiplier impact on other high-growth sectors such as Manufacturing, Healthcare and Tourism, which will have significant employment generation potential in the region. This could be seen from the number of investments that have come in the north east during last couple of months which will help farmers to get a fair deal for their hard earned produce and youth jobs both direct & indirect.

In the present context, availability of large quantities of surplus provides the North Eastern Region with two options:

- either to export this surplus in its raw state, or
- to process the produce & market.

The processing of produce still provides a much better option and after processing the products can be exported, so as to have higher gains to the producers and others along the value chain. The processing sector not only benefits the people involved with service sectors like transportation, restaurants, packaging, advertising and marketing. In all, processing of surplus will create more employment and income generation opportunities in the north eastern region.

As processing & marketing of processed products are much more remunerative, farmer - processor linkages needs to be strengthened in a bigger way to add value as per demand of the consumers. Effective linkages need to be built between farmers and processors on a mutually beneficial contractual agreement. Appropriate & cost-effective packaging technology are also required to ensure safety and prolonged shelf life to the products for a healthy level of processing where exotic and naturally grown organic products & produces are available aplenty. North East hence needs to create dynamic institutional capacities for leveraging on its resource endowments and location advantage thereby enhancing farmer's income through value addition, product diversification, & entrepreneurship development. This will also bring up prospects in the region due to its proximity to the South-East Asian countries & its wide range of markets and market demand.

BNI-FINER BUSINESS CONCLAVE

BNI Prudent, Kolkata organised a conclave in association with the Federation of Industry and Commerce of North Eastern Region (FINER) at Hotel Brahmaputra Ashok in Guwahati on 18th of March, 2017.

The conclave served as a platform for both BNI and FINER members to interact and explore business tie-ups with each other and look for trade opportunities in the Northeast.

The conclave started with a welcome speech from Shri. Manoj Saraf, President, BNI. Shri Bajrang Lohia, Vice President, FINER, in his speech, welcomed the BNI members to Guwahati and also gave an overview about FINER. Shri Rajeev Agarwal, Vice-President, FINER, Shri Pradyut Kumar Bhuyan, Director, FINER, Shri S.C. Agarwala, Past Chairman, FINER, Shri Sandeep Khaitan, Director, FINER, along with several members of FINER attended the conclave.

Founded in 1985 by Dr. Ivan Misner, BNI is one of the largest business networking organizations with a reach in over 68 countries and as many as 2, 08,700 members worldwide.

As many as 36 entrepreneurs from diverse sectors such as travel, IT, hospitality, real estate, events and fashion represented BNI at the event. Audio-visual presentations were made by the BNI members during the programme. Members from FINER also introduced themselves and spoke about the sectors they represent and the prospects that exist in the Northeast.

The programme concluded with a vote of thanks by Shri Sahil Jain, Vice President, BNI-Prudent.

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- Platform to interact with state and central government, bank and other institutions.

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- Participate in Seminars I workshops on relevant topics conducted by experts in that field.
- Take part in training programs in house as well as outside in prestigious institutions of the country.

Information dissemination :

- Access to publications and reports on wide range of subjects at FINER office.
- Directory of members with Company profile.
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- Information on important events organized by FINER and other activities, press releases, important news etc. through FINER website :www.finer.in

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e-mail : info@finer.in, website : www.finer.in

APPLICATION FORM

FINER

To,
The President
FINER
Guwahati

Date :

Dear Sir,

We have the pleasure to apply for Membership of FINER as per details furnished below :

1) Name of Applicant Firm/Company

Registered Office

Address : _____

Phone No. : _____ Fax No : _____ E-mail : _____

Address for Correspondence _____

Phone No. : _____ Fax No : _____ E-mail : _____

2) Constitution : (Tick any one)

a) Proprietorship/Individual : ☐ b) Partnership : ☐

c) Private Limited Company : ☐ d) Public Limited Company : ☐

e) Chamber/Association : ☐ f) Society : ☐

g) Others (Specify) : ☐

3) Name of Proprietor/Partners/Directors/Office bearers (as applicable) :

_____

4) Name of Chief Executive/Regional head (in case Chief Executive is based outside NE Region :

_____

Telephone No. : _____ Fax No : _____ E-mail : _____

5) Nature of Activities : (Tick any one)

a) Industry : ☐ b) Commerce : ☐ c) Chamber/Association : ☐

6) Details of Principal Activities : _____

_____

7) In Case of Industry :

a) Factory Address : _____

Telephone No. : _____ Fax No : _____ E-mail : _____

b) Particulars of Manufacturing unit :

a) Products Manufactured : _____

b) Installed capacity : _____

c) Connected Power Load : _____

d) No. of Employees : _____

e) SSI Regn. No./SIA No./ IL No. : _____

(Photograph to be enclosed)

f) Investment in fixed assets as per latest audited balance sheet :

_____

8) In case of Chamber/ Association (enclose memorandum of Association) :

Membership Strength : _____

9) In case not covered by (7) or (8)

a) Annual turnover as per latest audited balance Sheet _____

b) No. of Employees : _____

10) Membership of any other Association : _____

11) Any Other Important/relevant information : _____

we enclosed herewith a Cheque/Demand Draft No. : _____

Dated _____ of _____ for Rs. _____

payable at _____ towards Admission fee and Annual Subscription in favour of **"Federation of Industry & Commerce of North Eastern Region," or "FINER".** We also agree to abide by the rules and regulations of FINER in force from time to time.

Introduced by

Signature & Seal

(Existing member of FINER)

Signature & Seal

of the Applicant

N.B.

Admission Fee & Annual Subscription

TICK	Segment	Basis	Admission Fee	Annual subscription
☐	Micro	Investment which does not exceed Rs. 25 lakh	3,000	5,000
☐	SME	Investment more than Rs. 25 lakh but does not exceed Rs. 5 crores.	4000	11,000
☐	MSME	Investment more than Rs. 5 crores but does not exceed Rs.10 crores.	6000	17,000
☐	Large	10 Crs to 100 Crs Investment	15000	45000
☐	MEGA	100 Crs +	20000	75000
☐	Chamber of Commerce / Association of Industry		6,000	11000
☐	Commerce and Service		10000	12000

The financial year of FINER runs from 1st April to 31st march. The applicant, seeking membership during 1st April to 30th September will have to pay pescribed Admission fee and the prescribed Annual Subscription in full. Applicants seeking membership after 30th September will pay the prescribed Admission fee in full and half of the prescribed Annual Subscription. To renew the membership, the annual subscription must be paid within 1st quarter of the financial year.

13. Membership

a) The Governing Board (hereinafter referred to as the Board) shall decide as to admission of members to the Federation.

b) Membership shall be open to all chambers, associations, bodies, societies, corporate entities, firms, individuals and other connected with the industry and commerce who are interested in the activities of the Federation. In case of trade, membership shall be open to its cambers and associations only

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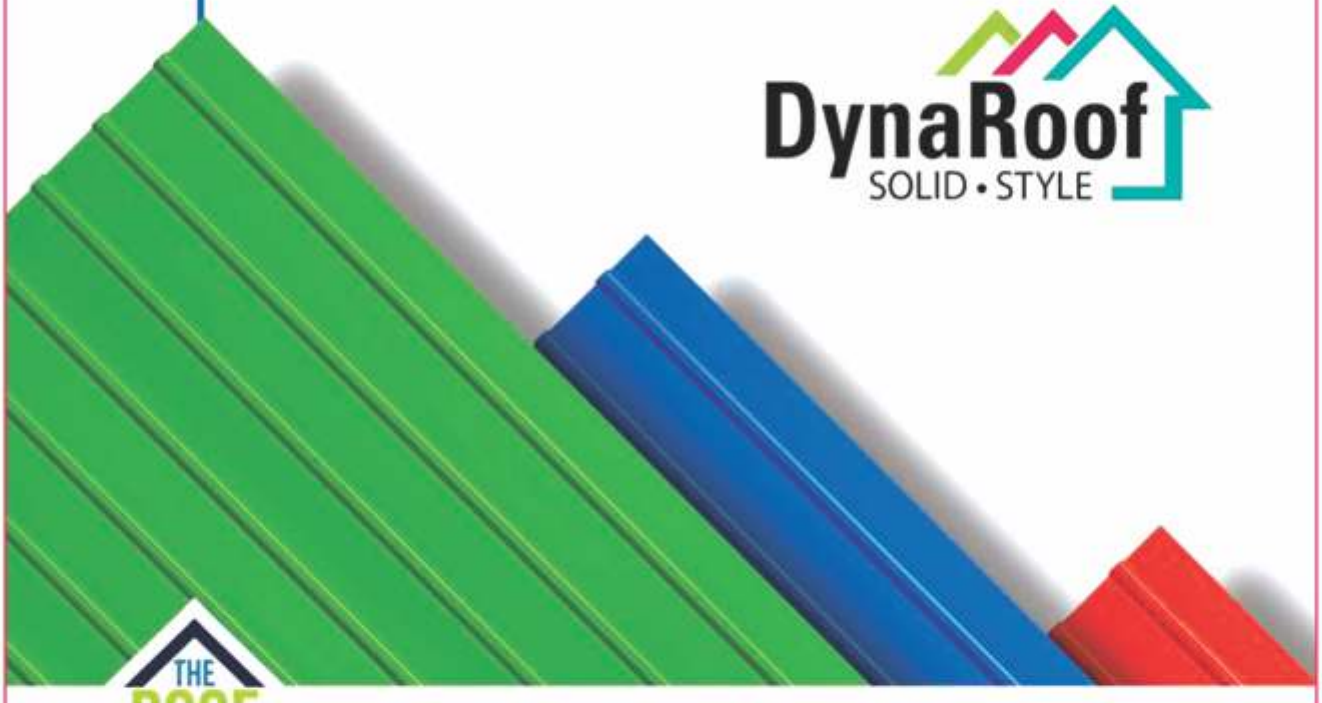

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