Study and Action Plan for Promoting Fruit and Vegetable Processing Industries In the State of Arunachal Pradesh

District profiles

EXECUTIVE SUMMARY

TITLE OF THE STUDY

STUDY & ACTION PLAN FOR PROMOTING FRUITS & VEGETABLES PROCESSING INDUSTRIES IN THE STATE OF ARUNACHAL PRADESH

The assignment of Study and Action Plan for Promoting Fruit & Vegetable Processing Industries in the State of Arunachal Pradesh was commissioned by The North Eastern Development Finance Corporation Ltd (NEDFi) to develop a broad action plan for the government for development of fruits and vegetable sector. It included identification of projects based on availability of raw material for fruits and vegetable processing sector, scope for value addition, assessing export potential, requirement of technology, potential for employment generation etc. Overall the objective of the project aimed at providing basic information to prospective entrepreneurs, investors, financial institutions, government agencies etc. regarding availability of the raw material, infrastructure and other basic amenities to set up processing units based on fruits and vegetable available in the State of Arunachal Pradesh.

Initially a survey was conducted in various districts of Arunachal Pradesh to collect the data for various fruits and vegetables in the state. It also included undertaking a study for understanding of the policy level changes and views of the various government and private sector analysis on the outlook of the agricultural sector of the state. The survey was conducted in all the districts of Arunachal Pradesh and accordingly a value chain analysis of high value horticultural produces in the state was done based on the information and data collected from field. Assessment of the existing infrastructure was also done including marketing infrastructure; gaps/requirements including identification of the nature/magnitude of insufficiencies/gaps at each stage of value chain, for clusters/identified zones.

Based on the qualitative analysis of the outputs a comprehensive list of factors/ parameters which may have direct impact on the development of the food processing industry of Arunachal Pradesh were identified. They are as follows:

- Information base of agriculture and horticulture sectors
- Road Network
- Cultivation area including Demonstration Plots
- Market Modernization
- Farmer Groups/SHGs
- Collection Centers and Rural Agri Business Centers
- Multi-purpose Cold Storages
- Fruit and Vegetable Processing Units
- Value Addition Centers
- Market Linkage support
- Agriculture & Food Processing Cell

Based on the study it was found that the production volumes of various crops currently do not provide the economies of scale for large food processing industries for any specific crop. In the case of fruits and vegetables, the only fruits having sizeable production are pineapple, orange and apple. Few other fruit crops such as kiwi, passion fruit and walnutshow potential but the current volumes have to be enhanced significantly for worthwhile interventions. In the case of vegetables, only potato and tomato, along with ginger and large cardamom from spices offer scope for processing and value addition.
Thus, there is need to undertake an integrated and concerted approach to develop the food production system in the state, expansion of areas under cultivation, adopting Good Agricultural Practices including

scientific crop/orchard and water management practices for enhanced productivity in tune with market and processing requirements. The integrated approach would have components such as establishment of demonstration plots on pilot basis in major clusters in the state for the identified crops, establishment of seed production units, modern nurseries, soil, water testing and certification facilities, developing linkages with input supplying firms, popularization of micro irrigation and protected farming techniques, skill and capacity building including strengthening of extension services etc.

The key activities that are required to be undertaken in the state to develop the fruit and vegetable processing sector in the state are elucidated below:

1. **Expansion of cultivation areas under different crops**

Arunachal Pradesh has a wide range of agro-climatic zones and the accordingly the crop wise major horticultural zones in the state are as follows:

Horticulture Zone	**Suggestive crops suitable for cultivation**
Foothills and Valleys (170-915 Mtr. Altitudes)	Orange, Pineapple, Plum, Pear, etc. and seasonal vegetables.
Mid Hills (915-1803 Mtr).	Apple, Plum, Apricot, Pear, Almond, etc. and seasonal vegetables for seed
High Hills (above 1830 Mtr.)	Apples, Cherry, Walnut, Chestnut etc. off season vegetables and production of temperate vegetable seeds.
Rain shadow area below 40" annual rainfall	Apple, Pear, Plum, Preach, Apricot, Almond, Walnut, Pomegranate, etc. and off season vegetables.

The potential area for expansion according to the different zones are as follows :

Horticulture Zone	**Potential area (Ha)**
Foothills and Valleys (170-915 Mtr. Altitudes)	1,45,000
Mid Hills (915-1803 Mtr).	1,40,000
High Hills (above 1830 Mtr.)	1,15,000
Rain shadow area below 40" annual rainfall	31,300
Total	**431,300**

The crop-wise potential of area expansion of the focus crops in the state are given below:

Focus crop	**Utilized area (Ha)**	**Potential area (Ha)**
Apple	14,070	14,000
Ginger	7,000	46,000
Kiwi	3,450	9,500
Large Cardamom	12,770	12,500
Orange (citrus)	39,050	109,000
Pineapple	12,280	27,500
Potato	4,700	34,500
Walnut	4,810	10,500
Total	**98,130**	**263,500**

2. Development of a State Level Agri-Solutions Centre (ASC) including Testing Laboratory

In order to provide an impetus to increase the production and productivity of fruits and vegetables in the state, development of a state level Agri-Solutions Centre (ASC) including testing laboratory is proposed at Itanagar. The ASC will provide services which would include the following:

- Information dissemination on best farm practices, weather conditions, inputs, price info, market info, etc.
- Operating of a testing laboratory
- Certification of Products
- Training and capacity building
- Entrepreneurship Development Programs
- Conducting industry/quality related workshops, seminars, conferences, etc.

3. Post-Harvest Infrastructure/Value Addition & Marketing Infrastructure

a) Revival and modernization of existing supply chain infrastructure

As mentioned earlier Arunachal Pradesh has 6 wholesale markets and 63 Rural Primary Markets. The infrastructure in most of these markets is minimal and basic in nature comprising mostly of simple marketing/ trading sheds and very basic drainage facilities. There is a lack of critical infrastructure such as storing, sorting, grading and packaging facilities. Weighing is done by traditional methods using mechanical scales.

The lack of market infrastructure has resulted in loss of value to the farmers as also in high percentage of wastages, particularly for horticultural crops. The lack of inter-linkages and price discovery mechanism within the markets has further aggravated the loss of value to the farmers. Thus, there is an imperative need to upgrade the marketing infrastructure and facilities within the markets in Arunachal Pradesh. Hence, it is proposed that the 6 wholesale markets in the state to be modernized by providing facilities such as cold stores, washing, sorting, grading, packaging facilities, electronic weighing machines with proper drainage and sewerage disposal systems. The markets should also have auction sheds with information kiosks for efficient price discovery. The markets should also have infrastructure for the sale of agri inputs such as fertilizers, seeds, pesticides and agri equipment. Extension service centres should also be provided in the market.

The Government of Arunachal Pradesh has been trying to address the infrastructure concerns in the APMC markets. Towards this under Technology Mini Mission –III, a sum of Rs. 208 lakhs was sanctioned for establishment of 6 wholesale markets. Considering the remote locations and complete lack of modern infrastructure in the markets, it is proposed the state government may provide additional facilities such as modern storage, sorting, grading and packaging facilities. Toward this an outlay of Rs 10 crore is proposed. The Arunachal Pradesh government can leverage schemes such as the assistance under MIDH, the RKVY, AMI (NABARD) and Schemes of DoNER for the purpose and develop/modernize the markets as proposed.

b) Setting up of farm proximate collection centres at strategic locations with facilities such as sorting, grading, packaging (and other crop specific minimal processing facilities) and storage for efficient evacuation of produce and minimization of wastages

A major problem which is being faced by the horticulture sector in the state is inefficient evacuation mechanism and high wastages due to complete absence of farm proximate post-harvest infrastructure along with the remote locations of the production clusters. To overcome such issues, farm proximate collection centres at identified clusters are proposed with facilities such as modern sorting, grading, packaging and other crop specific minimal processing facilities. The clusters (and locations for collection

centres) have been identified based on the field visits and survey work. The tentative locations and the facilities for collection centres are given below:

District	Collection Centers	Crops	Facilities
Tawang	Namtsering	Apple, Kiwi	Sorting, Grading, Pre-cooling
West Kameng	Dirang	Apple, Kiwi, Walnut	Sorting, Grading, Pre-cooling, Walnut Dryers
	Bomdila	Apple, Kiwi, Walnut, Vegetables	
	Rupa	Apple, Kiwi, Vegetables	Sorting, Grading, Pre-cooling
	Kalaktang	Apple, Kiwi	
	Nafra		
	Shergaon		
East Kameng	Pampoli	Orange, Vegetables	Sorting, grading
Kureng Kumey	Palin	Orange	Sorting, grading
East Siang	Pasighat	Orange, Pineapple, Large Cardamom, Ginger	Sorting, Grading, Pre-cooling, Cardamom and Ginger Dryers
	Mebo		
	Boleng		
Upper Siang	Yingkiong	Orange, Pineapple, Large Cardamom, Ginger	Sorting, Grading, Pre-cooling, Cardamom and Ginger Dryers
	Gobuk		
	Nariyang		
	Ramsing		
Dibang Valley	Awali	Ginger	Sorting, Grading, Ginger Drying
Lower Dibang Valley	Roing	Ginger	Sorting, Grading, Ginger Dryers
	Dambuk		
	Balek	Orange	Sorting, Grading
Lohit	Wakro	Pineapple, Orange, Ginger, Potato, Vegetables	Sorting, Grading, Ginger Dryers
	Tezu		
	Chowkham		
Tirap/ Longding	Khonsa	Large Cardamom, Potato	Sorting, Grading, Large Cardamom Dryers
	Lazu		
	Longding		
Changlang	Changlang	Ginger and Vegetables	Sorting, grading
Upper Subansiri	Rukurijoo	Pineapple, Large Cardamom	Sorting, grading, Large Cardamom Dryers
	Baririjo		
Lower Subansiri	Ziro	Kiwi, Pineapple, Large Cardamom	Sorting, grading, Large Cardamom and Walnut Dryers
	Hapoli	Walnut, Pineapple, Large Cardamom	
West Siang	Rungong	Pineapple, Orange, Large cardamom	Sorting, grading, Large Cardamom Dryers
	Along		
	Jomlo		
	Passing		

It may be noted that the land requirement for the collection centres is small (typically less than 500-600 sq. m per collection centre). The exact identification of land for collection centres in each cluster is required to be done by the government in consultation with the local farmers/ communities who will be benefitted by such infrastructure. The local entrepreneurs may be encouraged to set up the collection centres with state government support. The financial incentives available under various central and state government schemes may be availed for this purpose.

c) Developing of Value Addition Centres with linkages to major consumption centers (including the proposed Mega Food Park in Assam)

Road connectivity in Arunachal Pradesh is a major issue which affects the movement of goods and products in the state. Due to the extreme terrain, many of the districts in the state are not directly connected and in many cases, the motorable roads connecting such district pass through Assam before re-entering Arunachal Pradesh. The field visits and the surveys revealed that there are certain important evacuation routes through which presently most of the fruits and vegetable move out of the state. The major evacuation routes of F&V from the state and the districts which the routes cater to are as follows:

1.	**Bomdila-Bhalukpong-Tezpur Road (NH-229)**	**West Kameng, Tawag, East Kameng**
2.	Ziro-Yupia-Tezpur Road (NH-229)	Lower Subansiri, Upper Subansiri, Papum Pare, Kurung Kumey
3.	Yingkiong-Along-Pasighat Road (NH-229/ NH-52)	East Siang, West Siang, Upper Siang
4.	Roing-Tezu-Wakro-Namsai (NH-52)	Lower Dibang Valley, Dibang Valley, Lohit, Changlang

d) Storage Infrastructure

Arunachal Pradesh has an acute shortage of cold stores. The total combined capacity of all the cold stores in the state is about 5000-6000 MT. There is an urgent need to develop more cold stores at important locations. It is proposed that the state government may develop 4 multipurpose cold stores with a capacity of 2000 MT each at each of the VACs proposed in the following locations:

e) Processing Infrastructure

Arunachal Pradesh has a negligible presence of fruit & vegetable processing units presently. The present level of production of horticultural crops in the state is not adequate to support many food processing units. It is suggested that the development of food processing units in the state should be one of the medium/long term intervention which would follow the area expansion program for production increase and productivity enhancement programs. The intervention should begin at least 3-4 years after the commencement of the area expansion and productivity enhancement initiatives.

The processing units should be located at strategic locations in the state which would have good accessibility with the production clusters and with the markets outside the state. The range of products to be processed should be lined with demands in the consumption centres outside the state. Also, the units should be mostly multi-product processing to maximize processing volume and days of operations in a year. In crops like apple, pineapple, tomato and orange the possibility of processing a diversified range of products is enormous - products such as crisps, jams, juice powder, puree, tidbits besides the usual juice concentrates have good market and will add to the viability and optimal resource utilization. It is worthwhile noting that currently orange, tomato and pineapple are the three most consumed juices in the global markets.

Based on the availability of raw materials, connectivity, assessment of demand and observations made during the field visits and survey work it was found that there is an opportunity to develop the following

fruit and vegetable processing and allied units in the state by the private sector/Co-operatives/Producer Companies etc. with support from the central/state government:

Sl. No.	Units	Crops	Location	Investment (Rs. Crore)
1	Multi-product Processing Unit • Pulping, Juice & Concentrate (5.4 Lakh bottles/Annum)	Orange, Pineapple, Kiwi, Apple, Passion Fruit, etc.	Bhalokpong, Pasighat, Tezu	2.5 x 3 No.s
2	Tomato Ketchup, Vegetable Sauce And White Vinegar Unit	Tomato and other vegetables	Bhalokpong	1.1
3	Pickle Manufacturing Unit	Fruits & Vegetables	Ziro	0.48
4	RTS Beverage (Fruit Based Juices) Aseptic Packing	Orange, Pineapple, Kiwi, Passion Fruit, Apple, etc.	Nahar Lagun	9.2
5	Walnut De-shelling & Vacuum Packing	Walnut	Bhalokpong	0.16
6	Canning of Fruit & Vegetables And RTS in Pet Bottles	Fruits & Vegetables	Itanagar	3.15
7	Vegetable and Fruit Frozen Unit (IQF)	Fruits & Vegetables	Itanagar	4.05
8	Vegetable and Fruit Dehydration Unit	Fruits & Vegetables	Likabali (West Siang) /Pasighat	3.72
9	Spice Grinding and Packing Unit	Ginger, Large Cardamom, Chilli	Tezu, Pasighat	1.07 x 2 No.s
10	Vegetable and Fruit Jam & Jelly Unit	Fruits & Vegetables	Likabali	0.23
11	Instant Dried Pickle	Fruits & Vegetables	Ziro	0.25
12	Potato Processing- Chips	Potato	Bhalukpong/ Pasighat	0.35
13	Canned Mushroom Unit	Mushroom	Bhalukpong	1.16
14	Fruit Wine	Fruits	Pasighat	1.56
15	Citrus Honey Processing	Honey	Wakro	0.02
16	Papaya Candy	Papaya	Changlang	0.02
17	Osmo-dried Fruits	Fruits	Pasighat	0.58
18	Canned Bamboo Shoots	Bamboo Shoots	Roing	0.13
19	Fruit Preserve	Fruits	Roing	0.15
20	Lime/Lemon (Citrus) Processing	Lemon	Aalo	1.71

4. Implementation Plan

The implementation of all the proposed interventions may be undertaken in two phases. They may be planned in the following manner:

Interventions	Short Term (Within next 1-3 years)	Mid to Long Term (Within next 10 years)
Expansion of cultivation areas under different crops	✓	
Development of a State Level Agri-Solutions Centre (ASC) including Testing Laboratory	✓	

Revival and modernization of existing supply chain infrastructure	✓	
Setting up of farm proximate collection centres	✓	
Developing of Value Addition Centres		✓
Development of 4 multipurpose cold stores with a capacity of 2000 MT each	✓	
Promotion of fruit & vegetable processing units in different locations in the state	✓	✓
Creation of Mini Food Parks		✓
Facilitation of strengthening/establishment of farmer co-operatives societies/SHGs	✓	
Innovative PPP for F&V processing sector in the state	✓	
Facilitating Credit Linkages including Micro-credit	✓	

f) Other initiatives

i. **Creation of Mini Food Parks:** Once the short term interventions have been successfully implemented, the state government could consider the establishment of 2-3Mini Food Parks in the major production clusters in the state. The production clusters through an integrated dynamic supply chain will get linked to the processing units housed within the Mini Food Parks. The Mini Food Parks will be developed by attracting private investment/entrepreneurs for establishment of post-harvest infrastructure and processing units like on-farm collection centers, Primary Processing Centers, Central Processing Centers. The Mini Food Parks would be linked to major consumption centres in North East and other parts of India for forward market linkages. It is proposed that the land parcels of about 20 acres may be identified by the state government for setting up of each of the Mini Food Parks. However, this particular intervention may be taken up at a later stage once the other interventions proposed have been implemented as sufficient quantity of raw materials and adequate basic/ support infrastructure are required for the success of the Mini Food Parks. The state government may set up the Mini Food Parks in PPP mode. For Mini Food Parks the state government should ensure a regular supply of power.

ii. **Facilitation of strengthening/establishment of farmer co-operatives societies/SHGs:** It is also proposed that F&V producers' societies (FPS) under a cooperative framework or as SHGs should be promoted. These societies /SHGs are envisaged to perform the following roles:

- Set up and manage field level collection centers for farmers produce,
- Propagate new technology & practices among the farmers in collaboration with government agencies and marketers
- Function as aggregators, packagers and suppliers
- Undertake procurement and distribution of inputs and generation of quality planting materials
- Act as institutional mechanisms to enable farmers avail credit,
- Avail funding under RIDF to develop last mile linkages and the required supportive infrastructure development therein,
- Act as institutional mechanisms for contract farming,
- Facilitate certification and training in good agricultural practices etc.

Later these groups/SHGs can be federated to form a producers company with equity participation of growers, if required the traders and undertake value added services on the lines of Anand Pattern Co-operatives.

iii. **Innovative Models for Backward Linkages and Food Processing Sector in the State:** To create the pull-side demand for higher production of fruit and vegetables in Arunachal Pradesh, innovative models involving large private companies should be promoted in the state. Such models would endure assured marketing linkages for the farmers by connecting them with the consumption centers outside the state through the procuring companies. In such a model, the private players should provide the following:

- Large scale farming arrangement may be entered with village/tribal councils with appropriate risk coverage for farmers. In such arrangements it is desirable that state government is also involved to alleviate concerns regarding alienation of land through appropriate contractual arrangements.
- Ensuring availability of quality inputs to farmers
- Assured market through buy-back arrangements with farmers
- Provisions of crop insurance to farmers
- Credit availability to farmers

Such model can play a vital role in developing the horticultural production and food processing sector in the state. The involvement of large private players may be promoted by providing the following:

- Incentives to private players to set up units
- Single Window Clearance for all regulatory/ statutory requirements
- Dovetailing of incentives and creation of common/basic infrastructure in locations suitable for food processing industry
- Provisioning of uninterrupted electricity to the units
- Creation of a suitable environment for such models to come up in the state

iv. **Facilitating Credit Linkages including Micro-credit:** Access to credit is one of the issues faced by the producers and entrepreneurs. Since the Action Plan envisages large scale involvement of grass roots organizations in various interventions, access to credit will pose a major problem. To overcome this, line of informal credit through micro-finance needs to be promoted aggressively in the state, at least in the proposed project areas. Presently there is negligible activity by micro finance institutions in the state. Such institutions need to be encouraged and supported to start their operations in the state and to link them to the large network of SHGs and societies. The state could leverage the existing schemes and programmes for micro finance to augment such initiatives such as SHG Bank Linkage Programme of NABARD.