Action plan on Value Chain Development of Horticulture-Fruits & Vegetables Sector in NER

FINAL REPORT

Submitted to

North Eastern Council,
Ministry of Development of North Eastern Region (M-DoNER),
Govt. of India

Prepared by

North Eastern Development Finance Corporation Ltd (NEDFi)

April' 2021

Map of India


NORTH EAST INDIA
TAJIKISTAN
AFGHANISTAN
JAMMU & KASHMIR
HIMACHAL PRADESH
CHANDIGARH
PUNJAB
UTTARAKHAND
PAKISTAN
HARYANA
DELHI
New Delhi
CHINA (TIBET)
NEPAL
SIKKIM
BHUTAN
ARUNACHAL PRADESH
ASSAM
NAGALAND
MEGHALAYA
MANIPUR
BANGLADESH
TRIPURA
MIZORAM
RAJASTHAN
UTTAR PRADESH
BIHAR
JHARKHAND
WEST BENGAL
MADHYA PRADESH
GUJARAT
CHHATTISGARH
ODISHA
MYANMAR
DAMAN & DIU
DADRA & NAGAR HAVELI
MAHARASHTRA
BAY OF BENGAL
TELANGANA
ARABIAN SEA
GOA
ANDHRA PRADESH
KARNATAKA
LAKSHADWEEP (INDIA)
PUDUCHERRY
TAMIL NADU
KERALA
ANDAMAN & NICOBAR ISLANDS (INDIA)
SRI LANKA
Map not to Scale
Copyright © 2015 www.mapsofworld.com
(Updated on 13th July, 2015)
INDIAN OCEAN

Map of North East

Table of Contents

Abbreviation & Acronyms

Abbreviations	Acronyms
3G	Third Generation of Wireless Mobile Telecommunications Technology
4G	Fourth Generation of Wireless Mobile Telecommunications Technology
AAI	Airports Authority of India
AAP	Annual Action Plan
ABIC	Agri Business Incubation Centre
ACABC	Agri Clinic and Agri Business Centres
AIDC	Assam Industrial Development Corporation Limited
AMUL	Anand Milk Union Limited
AOAC	Association of Official Agricultural Chemists
APART	Assam Agribusiness and Rural Transformation Project
APEDA	Agricultural and Processed Food Products Export Development Authority
APMC	Agricultural Produce Market Committee
ASEAN	Association of Southeast Asian Nations
ASFAC	Assam Small Farmers' Agri Business Consortium
ASTA	The American Spice Trade Association
AutoID	Automatic Identification
B2B	Business-to-business
B2C	Business-to-Consumer
BFC	Business Facilitation Centre
Bn	Billion
BRC	Block Resource Centre
BT	Bio Technology
CA Vehicles	Controlled Atmosphere Vehicles
CC	Collection Centre
CDB	Coconut Development Board
CEFPPC Scheme	Creation/Expansion of Food Processing & Preservation Capacities Scheme
CEO	Chief Executive Officer
CFC	Common Facility Centre
CFF	Credit Facility to Federations
CFTRI	Central Food Technological Research Institute
CFU	Common Facility Unit
CGTSME	Credit Guarantee Fund Trust for Micro and Small Enterprises
CIH	Central Institute for Horticulture
CLCSS	Credit Linked Capital Subsidy Scheme
CMD	Chairman and Managing Director
COE	Centre of Excellence
COVID-19	Corona Virus Disease 2019
CPC	Central Processing Centre
CPU	Central Processing Unit
DAC&FW	Department of Agriculture, Co-operation and Farmers Welfare
DAP & SAP	District Agriculture Plans & State Agriculture Plans
DAY-NRLM	Deendayal Antyodaya Yojana – National Rural Livelihoods Mission
DCCB	District Co-operative Central Bank
DGFT	Director General Foreign Trade
DIDF	Dairy Processing and Infrastructure Development Fund
DPR	Detail Project Report
DRA	Debt Recovery Agent
DST	Department of Science Technology
e commerce	Electronic Commerce
ECIS	Export Credit Insurance Scheme
EDI	Entrepreneurship Development Institute of India
EDP	Entrepreneurship Development Program
EMS	Environmental Management System
EPCG	Export Promotion Capital Goods
ERP	Enterprise Resource Planning

Abbreviations	Acronyms
ETP	Effluent Treatment Plant
EU	European Union
EXIM Bank	Export-Import Bank of India
F&V	Fruits & Vegetables
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign Direct Investment
FI	Financial Institutions
FIDF	Fisheries and Aquaculture Infrastructure Development Fund
FMCG	Fast Moving Consumer Goods
FPC	Farmer producer Company
FPO	Farmer Producer Organization
FPU	Food Production Units
FSSAI	Food Safety and Standards Authority of India
FSSC 22000	Food Safety System Certification 22000
FTC	Farmer Training Centre
GI	Geographical Indication
GMP	Good Manufacturing Practice
GOI	Government of India
Govt.	Government
GPRS	General Packet Radio Service
GPS	Global Positioning System
GSDP	Gross State Domestic Product
GSS	Government Sponsored Schemes
Ha	Hectare
HACCP	Hazard Analysis and Critical Control Points
HDPE	High Density Polyethylene
HMNEH	Horticulture Mission for North East & Himalayan States
HORTI	Horticulture
HPP	High Pressure Processing
HS Codes	Harmonized System Codes
ICMR	Indian Council of Medical Research
ICPS	Interdisciplinary Cyber Physical Systems
IIAP	India-Israel Agriculture Project
IIE	Indian Institute of entrepreneurship
IIFPT	Indian Institute of Food Processing Technology
IIP	Indian Institute of Packaging
IMAC	Inter-Ministerial Approval Committee
IoT	Internet of things
IP	Internet Protocol
IQF	Individually Quick-frozen
ISO 22000	Food Safety Management System Certification, developed by The International Organization for Standardization (ISO)
IT	Information Technology
IYFV	International Year of Fruits and Vegetables
JLG	Joint Liability Group
KCC	Kisan Credit Card
KVK	Krishi Vigyan Kendra
MANAGE	National Institute of Agricultural Extension Management, Hyderabad.
M-DoNER	Ministry of Development of North Eastern Region, Government of India.
MEIS	Merchandise Exports From India Scheme
MFE	Micro Food Enterprises
MIDH	Mission for Integrated Development of Horticulture
MIF	Micro Irrigation Fund
MIS	Management Information System
MLM	Multi-level marketing
Mn	Million
MOFPI	Ministry of Food Processing Industries, Government of India.
MOU	Memorandum of Understanding

Abbreviations	Acronyms
MOVCD-NER	Mission Organic Value Chain Development for North Eastern Region
MT	Metric Tons
MUDRA	Micro Units Development and Refinance Agency Limited
NABARD	National Bank for Agriculture and Rural Development
NABCB	National Accreditation Board For Certification Bodies
NABCONS	NABARD Consultancy Services
NABL	National Accreditation Board for Testing & Calibration Laboratories
NAFED	National Agricultural Cooperative Marketing Federation of India Limited
NCCD	National Centre for Cold Chain Development
NCDC	National Cooperative Development Corporation
NE	North East
NEDFi	North Eastern Development Finance Corporation Limited
NERAMAC	North Eastern Regional Agricultural Marketing Corporation Limited
NERLP	North East Rural Livelihood Project
NESIDS	North East Special Infrastructure Development Scheme
NESRIP	North Eastern States Roads Investment Programme
NGCMA	National Good Laboratory Practice Compliance Monitoring Authority
NHB	National Horticulture Board
NHM	National Horticulture Mission
NIMAT	National Implementing & Monitoring Agency For Training
NIN	National Institute of Nutrition
NITI Aayog	National Institution for Transforming India
NLCPR	Non Lapsable Central Pool of Resources
NRDMS	Natural Resources Data Management System
NRLM	National Rural Livelihoods Mission
NWR	Negotiable Warehouse Receipt
OE	Original equipment
PACS	Primary Agricultural Credit Societies
PEB Structure	Pre-engineered Building Structure
PFP	Patent Facilitation Programme
PMAY-G	Pradhan Mantri Awaas Yojana - Grameen
PMFBY	Pradhan Mantri Fasal Bima Yojana
PMKSY	Pradhan Mantri Kisan SAMPADA Yojana
PPC	Primary Processing Centre
PPP	Public Private Partnership
PPPIAD	Public Private Partnership for Integrated Agriculture Development
QC	Quality Control
R&D	Research and Development
RCMC	Registration cum Membership Certificate
RDA	Recommended Dietary Allowance
RFID	Radio Frequency Identification
RIDF	Rural Infrastructure Development Fund
RKVY	Rashtriya Krishi Vikas Yojana
RKVY-RAFTAAR	Rashtriya Krishi Vikas Yojana - Remunerative Approaches for Agriculture and Allied sector Rejuvenation
RO	Reverse Osmosis
RoSCTL	Rebate of State and Central Levies & Taxes Schemes
S & T	Science and Technology
S E Asia	South East Asia
SAIDP	State Agriculture Infrastructure Development Programme
SAMPADA	Scheme for Agro-Marine Processing and Development of Agro-Processing Clusters
SAP	Systems, Applications & Products
SASRD	School of Agricultural Sciences and Rural Development, Nagaland University.
SBM-G	Swachh Bharat Mission-Gramin
SC	Scheduled Castes
SDG	Sustainable Development Goals

Abbreviations	Acronyms
SEIS	Service Export From India Scheme
SEZ	Special Economic Zones
SFAC	Small Farmers' Agribusiness Consortium
SHG	Self-help Group
SHM	State Horticulture Missions
SIDF	Social & Infrastructure Development Fund
SIMFED	Sikkim State Co-operative Supply and Marketing Federation Limited
SLBC	State Level Bankers committee
SME	Small and Medium Enterprises
SOP	Standard Operating Procedure
SPM	Special Purpose Machines
SPV	Special Purpose vehicle
ST	Scheduled Tribes
STBTP	Skill and Technology Base Training Program
STINER	Science and Technology Intervention in North Eastern Region
STP	Sewage Treatment Plant
SVEP	Start-up Village Entrepreneurship Programme
TCP	Transmission Control Protocol
TFO	Total Financial Outlay
TOR	Terms of Reference
TRIFED	Tribal Cooperative Marketing Development Federation of India
TTP	Trainer Training Program
UAE	United Arab Emirates
UK	United Kingdom
UN	United Nations
UNDFF	United Nations Decade of Family Farming
US FDA	United States Food and Drug Administration
USD	United States Dollar
USDA	United States Department of Agriculture
USFDA	United States Food and Drug Administration
USP	Unique Selling Proposition
V&F	Vegetables & Fruits
VAPU	Value Added Processing Unit
VC	Value Chain
VCF	Value Chain Finance
VGF	Viability Gap Funding
Wi-Fi	Wireless Fidelity
XML	Extensible Markup Language

List of Tables & Figures

Executive Summary

1.0 International Year of Fruits and Vegetables-2021:

The UN General Assembly has designated **2021 as the International Year of Fruits and Vegetables (IYFV).**The International Year of Fruits and Vegetables 2021 falls within the UN Decade of Action on Nutrition (2016-2025) and the UN Decade of Family Farming (UNDFF 2019-2028). These observances reinforce each other while providing greater visibility to small-scale producers and raise awareness on food security and nutrition. The IYFV 2021 can act as a springboard towards achieving the **Sustainable Development Goals (SDG)** by 2030.

The agenda of the FAO for the International Year of Fruits and Vegetables (IYFV) includes among others the following agendas:

- Improved sustainability of storage, transport, trade, processing, transformation, retail, waste reduction and recycling, as well as interactions among these processes.
- Integration of smallholders including family farmers into local, regional, and global production, value/supply chains for sustainable production and consumption of fruits and vegetables, recognizing the contributions of fruits and vegetables, including farmers' varieties/landraces, to their food security, nutrition, livelihoods, and incomes.
- To empower stakeholders, especially women and youth, through knowledge-building and skills development in the production and post-harvest handling, processing, preparation, marketing and consumption of fruits and vegetables.

1.1 The decision of the Ministry of DONER, Government of India to undertake an exercise to prepare a detailed Action plan for next 5 years for value chain development in Horticulture sector with focus on Fruits and vegetables of NER to tap the emerging potentials of North Eastern Region for empowering the farmers of the region, improving their income, is in consonance with the observation of the International year of fruits & vegetables across the globe. The initiative has further reinforced the commitment of the nation to attain sustainable development goals by 2030 with rest of the world. The proposed action plan accordingly has been drawn up to imbibe the spirit of the UN and FAO for observance of the International year of fruits and vegetables as mentioned in the above agendas.

1.2 India is the second largest producer of Fruits and Vegetables in the world with a production of 289 Mn MT. According to the 3rd advance estimates 2019-20 of Department of Agriculture, Govt. of India, the country produced 100 Mn MT of fruits (with an area of 6.7 Mn Ha) and 189 Mn MT of vegetables (with an area of 10.4 Mn Ha). India ranks 1st in the world in production of bananas, mangoes, guava, papaya, ginger, and okra. India ranks 2nd in the world in production of green peas, potatoes, tomatoes, sesame seed and many other key commodities.

However, processing levels for perishables in India is considerably low, despite being a leading producer, the processing levels for fruits & vegetables in India are at a meagre 2% with a 5-16% wastage loss across different crops.

1.3 The National Center for Cold Chain Development (NCCD) has identified a gap of 3.2 Mn MT in cold storage capacity, more than 69,000 pack houses, more than 50,000 reefer vehicles and a gap of around 8,000 ripening chambers in India.

1.4 According to the working group report under NITI Aayog on demand and supply projections for 2033, submitted in February 2018, the demand for horticultural products including fruits and vegetables will increase from 128 million tons in the base year of 2011-12 to around 190 million tons by 2020-21 and further to 327 million tons by 2032-33 in the baseline scenario. In the high growth scenario, demand will increase up to 215 million tons in 2020-21 and cross 430 million tons by 2032-33.

1.5 Horticultural crops in the NE region accounts for 5.1% in fruits and 4.5% in vegetables to national horticulture basket. As per the projections made on the basis of ICMR norms, in 2030, demand for Fruits will be 25.14 lakh tons and vegetables will be 62.53 lakh tons. However, there is immense potential for vertical and horizontal growth in horticulture sector in NE region. At present horticultural crops account for only 27.41% of cultivated area, on an average. The region's comparative advantages in producing fruits, vegetables and other horticulture products can be tapped by setting small-scale processing units for the local market, which will also create rural employment.

2.0 In line with the Prime Minister's vision expressed in the 65th Plenary Meeting of NEC towards development of North East, a review meeting was held at the Prime Minister's Office (PMO) on 22nd September' 2020. In this meeting, the PMO had advocated adoption of a holistic development approach towards the following identified focus sectors in NER – a) Bamboo, b) Oil Palm, c) Horticulture, d) Organic Farming, e) Spices and f) Handicrafts & Handloom.

Accordingly, NEDFi in association with the North Eastern Council (NEC) has been entrusted by the Ministry of DoNER, Govt. of India with the task of preparation of a five-year plan for value chain development of horticultural crops with focus on fruits and vegetables of North Eastern Region to tap the emerging potentials of north eastern region for empowering the farmers of the region by improving their income.

The detail Terms of Reference (TOR) along with the methodology is outlined in **Chapter-II** and in **Annexure-1** of the report. The proposed Action plan according to the TOR includes the following:

- The current status of horticulture sectors of NER with special reference to fruits and vegetables
- Identification of State wise priority crops of horticulture in the region for development of value chain
- Preparation of a five-year holistic value chain development plan for priority crops in horticulture sectors for North eastern states with sub-plan for individual states, implementing agencies etc.

The contents of the report include the following, in addition to the above items:

- Issues & suggestions of the stakeholders.
- Concept of Agribusiness and Value Chain & Value chain components.
- Value chain profiles of few important crops.
- Suggestions for resolutions of the issues and challenges in horticulture sector.
- Suggested Implementation plan, process& architecture.
- Indicated sources of funding of the plan.
- Broad outline for redesigning NERAMAC as an anchor organisation.
- Value chain financing model for banks.
- IOT in agriculture value chain.
- Best practices for replication–Entrepreneurship led cluster development plan in NER & Largest Value chain in India established & managed by FPC-Sahyadri Farms. Placed at **Annexure-XVI**(at page**- 84 -**)

3.0 Current status of horticulture sector in the North East has been elaborated in **Chapter-III** of the report, few highlights are as below:

3.1 The North East region of India, comprising of the states Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura, and Sikkim is a reservoir of rich natural resources. All the north-eastern states have distinct advantages and provide immense economic and trade opportunities to domestic and international players. The NE region shares borders with China in the

north, Bangladesh in the south-West, Bhutan in the north-West and Myanmar in the East. This makes the North-East a prospective hub of international trade and commerce.

3.2 The 3rd advance estimates for the year 2019-20 by the department of Agriculture, Co-operation & Farmers' Welfare, Govt. of India has indicated total area under fruit crops as 474.77 thousand ha and Vegetables are estimated to be grown in 564.11 thousand ha in the NE region. In terms of production, fruit production is estimated at 4887.49 thousand MT and vegetable production at 6276.91 thousand MT.

Table-A: State-wise Area and Production estimates for 2019-20

(area in '000 ha and production in '000 MT)

States	Fruits		Vegetables	
	Area	Production	Area	Production
Arunachal Pradesh	48.14	125.84	2.62	17.39
Assam	168.87	2562.3	312.97	3673.88
Manipur	47.9	527.97	36.84	391.35
Meghalaya	37.6	393.51	49.12	515.87
Mizoram	63.77	344.91	36.49	181.7
Nagaland	34.23	315.05	40.85	453.65
Sikkim	19.54	55.45	38.8	231.4
Tripura	54.72	562.46	46.42	811.67
NER	**474.77**	**4887.49**	**564.11**	**6276.91**

(Source: Department of Agriculture, Co-operation &Farmers Welfare, Govt. of India)

State-wise data of crop-wise Area and production of different fruits and vegetables grown in different states in the region as of 2017-18, was compiled from different sources and is placed in **Annexure-XV** (at page**- 79 -**) of the report.

3.3 Horticultural crops grown in NE region accounts for about 5.1% in fruits and 4.5% for vegetables in the national horticulture basket of India. Major fruit crops grown in the NE region having commercial value are Pineapple, Citrus, Banana, Kiwi, Passion fruit, Mango, Guava, Litchi, Papaya, Lemon, Orange, Jackfruit, etc. Among vegetables, Mushroom, Potato, Tomato, Cauliflower, Cabbage, Brinjal, Beans etc. are major crops grown in the region. These fruits and vegetable crops of the region possess huge opportunities for increasing the area under cultivation of the crops, productivity of the produce, value addition through developing food processing industries based on these crops.

3.4 Regarding the availability of existing infrastructure and facilities for post-harvest management of fruits & vegetables in the region, the status was found to be as follows:

- According to the Annual report of MOFPI, 2018-19, the Ministry has approved 6 Mega Food Parks, 7 Cold Chain projects, and 3 projects under the scheme for Creation of Infrastructure for Agro Processing Clusters in Assam.
- The Ministry has approved 14 food processing units under CEFPPC Scheme, 2 projects approved in year 2019-20 in NER under the scheme Backward & Forward Linkage. 10 Food Testing Labs have been assisted to create infrastructure for food safety and quality testing in the region.
- Total 1357 Nos. of Integrated Pack House created under MIDH upto 31.03.2018 in the region, out of which 1347 pack houses were on farm pack houses, whereas 10 pack houses were integrated pack houses.
- 69 cold storages with aggregate capacity of 243456 MT have been assisted in this region as on 31.03.2018. Detailed status is placed at **Annexure- XX** (at page **- 103 -**)
- 6 projects for North Eastern states, under the CEFPPC Scheme of MOFPI with project costs of Rs. 48.87 crore and with grant of Rs. 20.35 crore, were approved by the Ministry on 21stNov 2020.

- APART has approved setting up of three Common Facility Centres at Sonitpur, Morigaon and Lakhimpur districts in Assam. In addition to one processing centre for Fruits, vegetables and spices at Morigaon in Assam on 4th Dec 2020.

3.5 International Collaboration with Govt. of Israel

- North Eastern Region's first Regional Centre with Israeli collaboration was inaugurated in Mizoram on 7th March 2018. It was set up with a cost of Rs10crore.
- Foundation stone of Indo-Israel Centre of Excellence for Vegetables Protected Cultivation in Assam was laid on 3rd November' 2020, to be built at an area of 8 hectares, at a cost of Rs 10.33 crores, and will have facilities like hi-tech greenhouse, automated irrigation system, insect-proof net house, sale counter, weather station, etc.
- The government of Meghalaya will set up two Centres of Excellence (CoE) in the state, in collaboration with Israel, to improve and promote the livelihood of farmers. The first one will be set up for vegetables at Jongksha village in East Khasi Hills, and the second one will be set up for citrus fruits at Dawagre in East Garo Hills.
- Deliberations were held regarding setting up of a 'Centre of Excellence' (CoE) in Tripura with World-class expertise of Israel for the benefit of the farmers in the State.

A brief note on the details of the above collaborations is placed in the **Annexure-XIX** (at page no. **- 101 -**).

3.6 Indian Institute of Food Processing Technology (IIFPT) has set up a liaison office at Guwahati in July 2010. The unit has Food Processing Training Centre cum Incubation Centre, Training Classrooms and Office. Skill Training programs are organized for farmers

However, despite these distinct advantages and having tremendous potential for development of horticulture in the region as a major contributor to the region's economy, the sector is yet to grow up to its full potential.

3.7 Key observations in NER Vision 2020 relevant to the horticulture sector:

- ► productivity is lower than the national average
- ► creation of cold storages, market infrastructure, mini processing units are essential
- ► Transport of the produce is hampered due to poor connectivity and shortage of specialized means of transportation
- ► Establishment of cold chain in PPP model along arterial highways is critical to exploit markets in the rest of the country.
- ► Requirement of last mile connectivity to reach farm output to markets
- ► Road, rail, air & inland waterways connectivity need improvement
- ► Cyber, telecom & power facilities need upgradation

The above observations are still relevant in the present context though some progress have been made in terms of both physical and social infrastructures.

Due to inadequate post-harvest infrastructure in the region, the post-harvest losses are high, and farmers are dependent on intermediaries for marketing of their produce. There exists large scope for development of post-harvest infrastructure and marketing network through Private-Public-Partnership model, presence, and involvement of regional agriculture marketing agency in facilitating collection, aggregation, processing, marketing etc. In addition, the COVID-19 pandemic

has highlighted that we now have an opportunity to rethink the way in which we produce, handle, and waste our food.

4.0 The action plan is prepared largely on the basis of the concerns of the stakeholders dealing with fruits and vegetables grown in the region and prospects in this sector which are captured in **Chapter-IV** of the report. Eight stakeholders' virtual interaction meets were held during the process of preparation of the plan with active participations and presentations of 64 value chain players across the whole spectrum of value chain in horticulture. The participants in the interactions included:

- State Govts, MOFPI, NHB, SFAC, APEDA, NAFED, NERAMAC, APART, AAI, AIDC.
- FPOs, FPCs, entrepreneurs from the region.
- Large buyers including processing units, cold storage units, suppliers of agro machineries.
- Representative of ASEAN chamber of commerce, Bangkok.
- Representatives from CFTRI, IIP, IIFPT.
- NABARD, Public sector & Private sector banks.
- Academics from universities, horticulture colleges in the region.

4.1 The interactions provided ground level feedback and suggestions for developing effective value chain for horticulture in the region. The list of the value chain players interacted during the process is placed in **Annexure-XIII** (at page **- 69 -**).

4.2 Number of critical gaps were identified by different stakeholders in the areas of Production, Post-harvest management, and Marketing of horticultural products in the region and suggestions to improve the situation. The stakeholders, in addition, also highlighted that:

- Growers find it difficult to complete all the formalities of the Central Govt. schemes as the ground situation in north east does not match with the required parameters of the schemes
- Exclusion of few crops important for the State under MIDH scheme for some States,
- Facilities under 'Krishi Udaan' needs to be reviewed for making it more beneficial for the farmers of the region like inclusion of road transport subsidy for short distances and in smaller vehicles.
- Entrepreneurs find difficulty in availing bank credit needed for availing credit link subsidy schemes of the Government and offer land as collateral due to existing land tenure system
- Absence of an Anchor Marketing Organization within the region to create the linkages from farm to bigger markets outside the region and abroad.

5.0 **Chapter-V** of the report deals with the process of selection of priority crops in the region. The action plan was prepared after selection of priority crops from the list of fruits and vegetable crops grown in the region. For the purpose, the fruits and vegetables grown or available in the region were classified in three major categories as below:

Category-I: **Existing potential crops**, Crops which are grown by the farmers for its commercial value, adequate volume of production is available, there is scope of increasing the area, productivity and production exists for these crops, or are available in abundance in the natural way, GI tag is available and value addition of the crops are economically feasible and have good market demand both within and outside the region and abroad.

Category-II: **Emerging potential crops**, which have definite potential, but the volume of production is yet to reach to an economic scale, farmers are yet to adopt the same crops for commercial cultivation in large scale, value addition activities may not be economic proposition at this stage. GI tag for the crop is under process.

Category-III: **Indigenous crops or Crops of future**, the crops or varieties of the crops which are indigenous and are grown by the villagers traditionally or are grown in the wild but have the scope for value addition, increasing production and upgrade to commercial scale.

Selection of the crops were made after due consideration of the stake holders views, techno commercial viability, farmer empowerment, rural livelihood development and export development. Attention was given on the guiding principles of 'vocal for local', import substitution, ATMA NIRBHAR, and Operation Total Schemes. Growing functional and Nutraceutical Food Market, quality requirements, G.I. tag and other USPs of North East Region and Next decade global food market developments are other important aspects which were considered while identifying the priority crops for NE region and for development of the Five-year action plan.

The State-wise short-listed fruits and vegetables for the purpose of preparation of the action plan for value chain development is available in **Chapter-V** of the report.

6.0 Understanding the concept of Agribusiness is a prerequisite to freeze the concept of Value chain for fruits and vegetables. Components of Agribusiness and Value Chain are incorporated in **Chapter-VI**. The concept of Agribusiness and value chain has also been detailed in **Annexure-II** (at page **- 3 -**) of the report.

Agribusiness is the business sector encompassing farming and farming-related commercial activities. The business involves all the steps required to send an agricultural produce to market: production, processing, and distribution. It is an important component of the economy in countries with arable land since agricultural products can be exported.

Whereas Value chain in Agriculture is the invisible part of AGRIBUSINESS concept and is interconnected from FARMER to CONSUMER with number of steps, stages and connecting number of stake holders adding value to basic agro produce.

Importance of Value Chain

- Locally grown fruits and vegetables with the help of technology high value-added product/ ingredient can be manufactured through value addition in different steps.
- All stake holders in the value chain can expect higher returns for the produce.
- First stake holders' finished product can be the raw material for next stake holders.
- The value-added products can be marketed globally through the value chain to earn higher profits.
- Redeployment of profits for rural and farmer empowerment is possible to increase the yield and improve the quality of raw material.

Components and stakeholders of value chains are:

For Raw Material – Vegetables & Fruits production	Individual farmers, FPOs and FPCs
For Post-Harvest Sector	Government agencies, SPVs, entrepreneurs, and FPCs/FPOs, investors
Food Processing sector	Entrepreneurs, research community, food safety agencies, logistics agencies,
Forward Integration	Organized supply chain, distributors, online portals, e commerce portals, shops, MLM companies, government agencies, exporters

7.0 **Chapter-VII** of the report deals in details with the five-year holistic value chain development plan for priority crops in horticulture sectors for North Eastern States with sub plan for individual States, implementing agencies etc.

The plan has been developed with the following components:

a. Profile of few important crops are prepared individually and are available in **Annexure-III** (at page **- 5 -**).
b. Value chain process, components and infrastructure requirements for individual crops were identified and enumerated.
c. Based on the above, and production data of the crop the investment required for each component of value chain for every state has been computed and compiled in State-wise sub-plans with year-wise requirements.
d. The aggregated physical and financial outlays were mapped for each state and aggregated to draw up the five-year development of value chain plan for the region.
e. The total fund requirement for investment for implementation of the plan, which included investment for infrastructure, backward linkages, support organisations, capacity building etc. were assessed and different sources of fund e.g. different Schemes of Govt. of India, Bank credit, Individual contribution etc. has been mapped and suggested in **Chapter-VIII** of the report.

8.0 It is estimated that implementation of the proposed plan for value chain development would require **Rs.6138.87 Crore** over the next five years for the NE region. A summary of detail break-up is available in the next page.

Table-B: State-wise break up of investment required under the plan

Head of expenditure	State-wise break up of investment required under the plan (*Rs. in Crore*)									Existing scheme
	Arunachal	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura	Total	
A. Investment in Value chain components										
i) Investment for Infrastructure post-harvest & processing	182.18	351.05	124.73	135.75	116.89	128.65	103.14	117.99	**1260.38**	**MIDH, KISAN SAMPADA**
ii) Investment in infrastructure for backward linkage	6.50	37.00	9.00	9.00	5.50	9.00	4.50	4.50	**85.00**	**MIDH, S&T -BT**
iii) Investment for marketing, branding & quality monitoring	21.86	42.13	14.97	16.29	14.03	15.44	12.37	14.16	**151.25**	**New Scheme**
Sub Total	**210.54**	**430.18**	**148.7**	**161.04**	**136.42**	**153.09**	**120.01**	**136.65**	**1496.63**	
B. New area expansion	925	1221	592	407	407	407	148	296	**4403**	**RKVY/MIDH**
Sub Total	**1135.54**	**1651.18**	**740.70**	**568.04**	**543.42**	**560.09**	**268.01**	**432.65**	**5899.63**	
C. Capacity building of farmers and FPOs	4	8	4	4	4	4	2	2	**32**	**SFAC, NABARD, EDI**
D. Credit Guarantee fund for NER									**100**	
E. Preparatory investment for survey/studies for NER									**2.50**	**New scheme**
F. Monitoring & review of implementation @2% of total investment "A"	4.21	8.6	2.97	3.22	2.73	3.06	2.40	2.73	**29.92**	**New scheme**
G. Administrative expenses including DPR preparation @5% of total investment in "A"	10.53	21.51	7.43	8.05	6.82	7.65	6.00	6.83	**74.82**	**New scheme**
Total									**6138.87**	

Table-C: Year wise break up of Total investments

(Rs. In Crore)

Investment Head	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Preparatory Investment Survey/Studies (4 Nos.)*	2.50						2.50
Post-harvest infrastructure		184.20	616.08	269.38	62.34	128.37	1260.38
Marketing & Branding		30.25	30.25	30.25	30.25	30.25	151.25
Backward linkage infrastructure		20.00	41.50	20.50	3.00	0.00	85.00
Capacity Building of farmers/FPOs/FPCs**		6.40	6.40	6.40	6.40	6.40	32.00
Monitoring & Review @2% of Total Infrastructure cost		4.69	13.76	6.40	1.91	3.16	29.92
Administrative expenses @5% of Total Infrastructure cost		11.72	34.39	16.01	4.78	7.93	74.83
Creating a credit Guarantee fund		50.00	50.00	0.00	0.00	0.00	100.00
Sub-Total	**2.50**	**307.26**	**792.37**	**348.94**	**108.68**	**176.11**	**1735.88**
New area expansion		**1100.75**	**1100.75**	**1100.75**	**1100.75**	**-**	**4403.00**
Total	**2.50**	**1408.01**	**1893.12**	**1449.69**	**1209.43**	**176.12**	**6138.88**

Notes: *Supporting agencies for 'Preparatory Investment Survey/Studies'- Government: State department of horticulture, APEDA; **Institutes:** AAU, ICAR; **Trade bodies:** CII, FINER, ICC, state chamber of commerce.
**Per Centre Capacity building of 40 farmers /day X 20 Days X 10 months= 8000 participants x 500.00 /day= 40 lakhs/ year. Cost calculated against No. of Training Centre.

Table-D: Year wise break up of Total Fund allocation

(Rs. in Crore)

Head of expenditures	Share / Sources	Year-0	Year-1	Year-2	Year-3	Year-4	Year-5	Total
Preparatory Investment Survey/Studies	100% Govt.	2.50						2.50
Investment for marketing, branding & quality monitoring	100% Govt.		30.25	30.25	30.25	30.25	30.25	151.25
Capacity Building of farmers/FPOs/FPCs	100% Govt.		6.40	6.40	6.40	6.40	6.40	32.00
Monitoring & Review @2% of Total Infrastructure cost	100% Govt.		4.69	13.76	6.40	1.91	3.16	29.92
Administrative expenses @5% of Total Infrastructure cost	100% Govt.		11.72	34.39	16.01	4.78	7.93	74.83
Creating a credit Guarantee fund	100% Govt.		50.00	50.00	0.00	0.00	0.00	100.00
Sub-Total A	100% Govt.	**2.50**	**103.06**	**134.80**	**59.06**	**43.34**	**47.74**	**390.50**
Post-harvest infrastructure			184.20	616.08	269.38	62.34	128.37	1260.38
Backward linkage infrastructure			20.00	41.50	20.50	3.00	0.00	85.00
New Area Expansion*			1100.75	1100.75	1100.75	1100.75	-	4403.00
Total			**1304.95**	**1758.30**	**1390.63**	**1166.09**	**128.37**	**5748.38**
	50% Govt.		652.48	879.16	695.32	583.05	64.19	2874.19
	40% Bank credit		521.98	703.33	556.25	466.44	51.35	2299.35
	10% Owner contribution		130.50	175.83	139.06	116.61	12.84	574.84
Govt. sources	**Bank Credit**		**Owner contribution**			**Total investment**		
3264.69	**2299.35**		**574.84**			**6138.88**		

*Budget for investment under New Area Expansion may be provisioned under RKVY/ NHB

9.0 The implementation process, architecture, phases in details has been laid out in **Chapter-IX** of the report.

Implementation process: Considering the practical parameters and to make the proposed value chain completely doable and self-sustainable, the following key drivers are recommended,

1. Single window implementation through an independent agency which will be either SPV or Mission (e.g. NERLM or proposed NE AHED scheme). This will simplify the project implantation process by following the 'Ease of Doing Business'. Ranking of NER states in all India for 'Ease of Doing Business' is provided in **Annexure-XXI** at page no. **- 105 -**.
2. Marketing of the products and services to be created from the proposed value chain project. The main success of the project will be the repeat sale over the country and Globe for which an umbrella brand for North East need to be established and the product promotion strategy and sales network to be established solely by an Anchor Marketing Organization. NERAMAC may be restructured and identified as the 'Anchor Marketing Organization' for implementation of the plan
3. A special cell of agribusiness incubation and mentoring to be established at each Training Centre that will strengthen the business plans and capacity building of the potential agripreneurs in the region.

NEC may be entrusted with the responsibility of oversight of the implementation of the plan and review the progress every month with the States. Ministry of DONER may review the progress every quarter to ensure that the implementation process is on track and desired outcome of the plan is achieved

Phases of implementation:

- **Short term implementation of the plan (Preparatory work): Timeline 6 Months to 1 Year**
  - Approval of the plan, preparation and approval of the DPR by the appropriate authorities and share the same with the State Governments.
  - Completion of all baseline surveys to compile field level data on area, production, and locations of different crops, identify clusters of growers, linking with existing FPOs, building relationship between FPOs and the growers.
  - Complete the study to Restructure NERAMAC as an anchor organisation, according to the broad outlines suggested in **Annexure-X** (at page **- 58 -**). Identify NERAMAC as the Anchor Marketing organisation. The Anchor Marketing Organization to create a common brand for the NE Region and plan for publicity of the brand.
  - Establish protocols with the banks and financial institutions in NE region by State Governments, as suggested in the note for financing the value chains and placed in **Annexure-XI**(at page **- 60 -**), for financing the FPOs, Post-harvest management facilities by entrepreneurs.

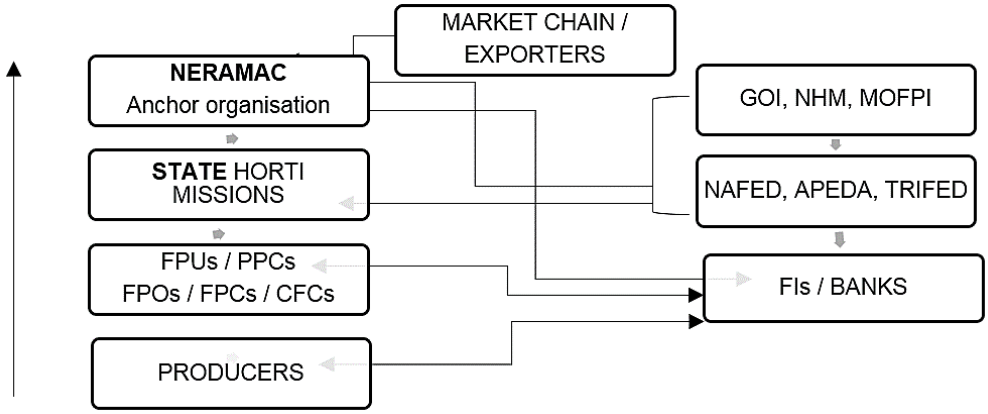
- **Mid-term implementation of the plan: Timeline 1 Year to 2 Years**
  - Making provisions for fund required for implementation of the plan.
  - Start capacity building exercises for the growers and FPOs.
  - Begin investment for creation of infrastructures and facilities for developing the value chain according to the plan.
  - Activate the process for aggregation, sorting, grading, packaging facilities at FPO level and bulk marketing through an Anchor Marketing Organization. Provide transport facilities like Reefer vans, transport subsidy etc. to FPOs for collection of produce from the farms.
  - Activate all Primary Processing Centers across the region.
  - Encourage technology interventions through Agri tech startups.
  - Create a common technology platform to be hosted by the 'Anchor Marketing Organisation' linking all infrastructures, facilities in the region and host all current database of the region.

➢ **Long term implementation of the plan: Final stage: Timeline 3 years to 5 years**

- Completion and commissioning of all infrastructure and facilities for post-harvest management under the plan.
- Operationalize complete value chain process for fruits and vegetables of NE Region.

Implementation architecture:

Figure-A: Implementation Architecture



10.0 Chapter-X of the report deals with the outputs &outcomes of this plan, which shall be the game changer in development of horticulture sector in the region. The gist of outcomes envisaged are listed below:

Major Outcomes of the Plan

- **Area Expansion:** Total 1,19,000 Ha proposed for development of new Farm area with increase in productivity. Provision of high-tech nurseries and tissue culture labs in the plan will ensure supply of adequate quantity of improved quality of planting materials to help in higher productivity and production in the region. Israel's technology for increasing productivity can be introduced in the New Farm Development for increasing yield.
- **Annual reduction of Post-Harvest losses:** Value addition of Horticulture Products through creation of Value Chain Infrastructure (both post-harvest as well as backward infrastructure and Value Chain support infrastructure) which will give satisfactory returns to all stakeholders involved in the Value Chain. Post-harvest handling and processing will reduce about 10% of Post-Harvest losses caused due to absence of Value-Chain. Approximately Rs. 42.80 Crores per annum is estimated to be saved due to annual reduction in Post-Harvest losses.

  It is assumed that 25%-30% of the production of the crops shall be routed through the value addition process of the value chain in NE, after meeting the local demand for consumption as fresh fruits and vegetables. Value addition process shall help the farmers in better price discovery at every stages of the chain.
- **Brand Building:** A common brand for North East region can be created and established with the USPs like traceability, safety, quality, natural or organic production etc.
- **Employment Generation:** An important outcome of this plan is generation of employment in rural area. There will be the provision of generation of both direct and indirect employment from the value chain activities. In Value chain, Post-harvest & support activities 8,486 nos. of direct employment will be generated in total. Besides, in farm sector, altogether total of 4,87,900 nos. of employment both direct & indirect will be generated.
- **Income Generation:** Doubling farmers' income by increasing the yield, value addition and entering into global market. All the proposed units can export fresh and processed vegetables all over the Globe. Products from Value added Units can also be exported 100% by which the nation will earn foreign currency.

- **Capacity Building of Farmers:** Addressing the Pre & Post Harvest handling needs of the farmers; approx. 476000 nos. of farmers per year will be trained within the proposed 5 years Plan.
- **Revenue return to the Government:** Approx. Rs. 1797.20 Lakhs/annum of revenue will be generated in the form of GST (on Job Work basis). The Quality Analysis Lab and Certification Agency will also collect GST on their services by 18%.

Other outcomes of the Plan

- Higher production of Fruits & Vegetables in NER to meet the 'vocal for local 'campaign.
- Increase in bulk export facilities.
- Increase interest of the farmers in agriculture and also reduce migration from agriculture sector with improvement in Growers'/Farmers' income.

Socio-Economic Impact

Table-E (1): Employment Generation

States / Parameters	Arunachal Pradesh	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Sikkim	Tripura	Total
Employment Generation In Value Chain Post Harvest & Support Activities (in nos.)	957	2273	968	782	956	1018	652	880	**8486**
Employment Generation In Farm sector Direct and Indirect (in nos.)	102500	135300	45100	45100	65600	45100	16400	32800	**487900**

Table-E (2): Capacity Building of Growers/ Farmers

States / Parameters	Arunachal Pradesh	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Sikkim	Tripura	Total
No. of Farmers to be trained (in Nos./ Yr)	16000	32000	16000	16000	16000	16000	8000	8000	**476000**

Table-E (3): Savings due to reduction in Post-Harvest losses

States / Parameters	Arunachal Pradesh	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Sikkim	Tripura	Total
Total Volume Handled by Value Chain – (MT/year)	32000	81000	59000	40000	56000	64000	32000	64000	**428000**
Annual reduction @10% in post-harvest losses of perishable due to Collection at Farm Gate and Handling & Processing Scientifically (MT/year)	3200	8100	5900	4000	5600	6400	3200	6400	**42800**
Considering Avg. value of F&V @ INR 10.00/kg Total Savings (INR in Lakhs/ annum)	320.00	810.00	590.00	400.00	560.00	640.00	320.00	640.00	**4280.00**

Table-E (4): Return to the Government

States / Parameters	Arunachal Pradesh	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Sikkim	Tripura	Total
Total GST Collection only on Job Work (INR Lakhs/year)	301.20	602.40	153.10	148.10	148.10	148.10	148.10	148.10	**1797.20**

Chapter-I: Introduction

The **UN General Assembly** has designated 2021 as the International Year of Fruits and Vegetables (IYFV).The International Year of Fruits and Vegetables 2021 falls within the UN Decade of Action on Nutrition (2016-2025) and the UN Decade of Family Farming (UNDFF 2019-2028). These observances reinforce each other while providing greater visibility to small-scale producers and raise awareness on food security and nutrition. The IYFV 2021 can act as a springboard towards achieving the **Sustainable Development Goals (SDG)** by 2030.

The agenda of the FAO for the International Year of Fruits and Vegetables (IYFV) includes among others the following agendas:

- Improved sustainability of storage, transport, trade, processing, transformation, retail, waste reduction and recycling, as well as interactions among these processes.
- Integration of smallholders including family farmers into local, regional, and global production, value/supply chains for sustainable production and consumption of fruits and vegetables, recognizing the contributions of fruits and vegetables, including farmers' varieties/landraces, to their food security, nutrition, livelihoods, and incomes.
- To empower stakeholders, especially women and youth, through knowledge-building and skills development in the production and post-harvest handling, processing, preparation, marketing and consumption of fruits and vegetables.

The decision of the Ministry of DONER, Government of India to undertake an exercise to prepare a detailed Action plan for next 5 years for value chain development Horticulture sector with focus on Fruits and vegetables of NER to tap the emerging potentials of North Eastern region for empowering the farmers of the region, improving their income, is in consonance with the observation of the International year of fruits & vegetables across the globe. The initiative has further reinforced the commitment of the nation to attain sustainable development goals by 2030 with rest of the world. The proposed action plan accordingly has been drawn up to imbibe the spirit of the UN and FAO for observance of the International year of fruits and vegetables as mentioned in the above agendas.

1.1 All India scenario

India is the second largest producer of Fruits and Vegetables in the world and according to the 3rd advance estimates 2019-20 of Department of Agriculture, Govt. of India, the country has produced 100 Mn MT of fruits in an area of 6.7 Mn Ha and 189 Mn MT of vegetables in an area of 10.4 Mn Ha.

India ranks 1st in the world in production of bananas, mangoes, guava, papaya, ginger and okra. India ranks 2nd in the world in production of green peas, potatoes, tea, tomatoes, sesame seed and many other key commodities. However, processing levels for perishables in India is considerably low i.e., at 2% only.

India exported fresh Fruits and Vegetables worth USD 1.46 Bn during the year 2017-18. Exports of processed Fruits and Vegetables from India were around USD 4.23 Bn in 2017-18, which mainly included Mango Pulp, Dried and Preserved Vegetables and Other Processed Fruits and Vegetables.

Vegetables contributed around 55% of the total Fruits & Vegetables export basket while the remaining 45% consisted of fruits. Mangoes, Grapes, Bananas and Pomegranates account for bulk of the fruits exported from the country while Onion, Okra, Bitter Gourd, Green Chillies, Mushrooms and Potatoes contribute largely to the vegetable export basket. The major destinations for Indian

fruits and vegetables are UAE, Sri Lanka, Netherland, Bangladesh, Malaysia, Nepal, UK, Saudi Arabia and Qatar.

Despite being a leading producer, the processing levels for fruits & vegetables in India are at 2% with a 5-16% wastage loss across different crops. Such high level of wastage is primarily due to inefficient storage, inadequate logistics and poor post-harvest management. Of the 2% processing, about 40-50% is carried out through the organised segment, which in turn is dominated by small scale industries (around 85%). This offers an opportunity to invest in initiatives that help increase processing levels, reduce wastages, R&D for development of processable varieties, packaging, innovative on farm preservation systems and skill development.

The National Center for Cold Chain Development (NCCD) which has identified a gap of 3.2 Mn MT in cold storage capacity, more than 69,000 pack houses, more than 50,000 reefer vehicles and a gap of around 8,000 ripening chambers in India.

1.2 Measures for Governance and Administrative Reforms for Agriculture Sector

Amendments to Essential Commodities Act to enable better price realization for farmers. Agriculture food stuffs including cereals, edible oils, oilseeds, pulses, onions and potato shall be deregulated. Stock limit will be imposed under very exceptional circumstances like national calamities, famine with surge in prices. Further, no stock limit shall apply to processors or value chain participant, subject to their installed capacity or to any exporter subject to the export demand.

Agriculture Marketing Reforms to provide marketing choices to farmers to provide - adequate choices to the farmer to sell their produce at remunerative price; barrier free Inter-State Trade; a framework for e-trading of agriculture produce.

Agriculture Produce Price and Quality Assurance, a facilitative legal framework to enable farmers to engage with processors, aggregators, large retailers, exporters etc. in a fair and transparent manner. Risk mitigation for farmers, assured return and quality standardization shall form integral part of the framework.

Rs 1 lakh crore Agri Infrastructure Fund for farm-gate infrastructure for farmers financing facility of Rs. 1,00,000 crore will be provided for funding Agriculture Infrastructure Projects at farm-gate & aggregation points (Primary Agricultural Cooperative Societies, Farmers Producer Organizations, Agriculture entrepreneurs, Start-ups, etc.). Impetus for development of farm-gate & aggregation point, affordable and financially viable Post-Harvest Management infrastructure. Fund will be created immediately.

Rs 10,000 crore scheme for Formalization of Micro Food Enterprises (MFE) is launched to help 2 lakh MFEs who need technical up gradation to attain FSSAI food standards, build brands and marketing. Existing micro food enterprises, Farmer Producer Organizations, Self Help Groups and Cooperatives to be supported. The focus will be on women and SC/ST owned units and those in Aspirational districts and a Cluster based approach will be followed.

From 'TOP' to TOTAL - Rs 500 crore "Operation Greens" run by Ministry of Food Processing Industries (MOFPI) will be extended from tomatoes, onion and potatoes to ALL fruit and vegetables. The Scheme would provide 50% subsidy on transportation from surplus to deficient markets, 50% subsidy on storage, including cold storages and will be launched as pilot for the next 6 months and will be extended and expanded. This will lead to better price realization to farmers, reduced wastages, affordability of products for consumers.

1.2.1 Focus interventions by the Government

Mission for Integrated Development of Horticulture (MIDH): Several ongoing schemes on horticultural development have been subsumed under Mission for Integrated Development of

Horticulture (MIDH), with greater flexibility to States for achieving envisaged growth of 5 percent in horticulture during Twelfth Plan.

The Vegetable Clusters Programme started as a sub-scheme of RKVY has proved effective in linking small farmers to value chain. The specific areas like accreditation of nurseries and quality planting material, higher productivity along with quality enhancement should get priority beside creation of infrastructure for reducing post-harvest losses.

The National Horticulture Mission (NHM) has been co-terminus with the 12th Plan, hence institutional strengthening should be the core agenda to carry forward the horticultural development by the States.

1.2.2 Integration of small farmers with value chain

During 12th Plan renewed emphasis was laid on encouraging formation of Farmers' Producers Organization (FPOs) to create enabling environment to successfully deal with a range of challenges that small and marginal farmers confront today. Small Farmers' Agribusiness Consortium (SFAC) was mandated to lead a national pilot project, to promote FPOs as a demonstration of the benefits of building institutions of producers and their integration in agri-value chains. Since inception in 2011, the FPO project has helped to mobilize approximately 8.98 lakh farmers in about 927 FPOs by September 2015.

At present, 78 FPOs have been launched by SFAC in NE states (Arunachal-5, Assam -25, Manipur -8, Meghalya-4, Mizoram-1, Nagaland-7, Sikkim-30 and Tripura-4). NABARD has promoted 65 FPOs in NE States (Assam-28, Meghalaya-9, Manipur-8, Mizoram-16 and Sikkim-4).

Along with SFAC, NABARD, Ministry of Agriculture, Rural Development, Livelihood development departments are working since last decade in NER and with help of local NGOs, accelerated the moment of FPO, FPC and SHGs to empower farmers.

NERAMAC has also been assigned with the responsibility to promote 500 FPOs in NE region.

1.2.3 Interest subvention and Agricultural credit

A number of initiatives for enhancing flow of credit to agricultural sector have been put in place, including target of doubling of the flow of agricultural credit. The Kissan Credit Card Scheme has been made broad-based to include term credit and consumption needs, besides some risk cover against accidental death. The interest subvention scheme for short-term crop loans up to Rs. 3 lakh, has been continued and a farmer who repays the loan on time, becomes eligible to get crop loan at 4 percent rate of interest. Post-harvest loans are also being granted against Negotiable Warehouse Receipts (NWRs) with benefit of interest subvention. However, investment in horticulture must be provided necessary impetus to meet the future requirements and also enhance and double the farmers' income.

A separate note is furnished in **Annexure-XI** (at page no. **- 60 -**) with a suggested model for financing value chain activities and value chain players by the banks in NE region and the role of implementing agencies in credit linkage of the value chains.

1.3 Demand &Supply projections of Fruits & Vegetables in India

According to the working group report under NITI Aayog on demand and supply projections for 2033, submitted in February 2018, a shift in consumer preferences and increasing numbers of the middle-income class have altered the domestic demand for agricultural commodities and globalization has connected Indian farmer as well as consumer to international markets. As a result, the demand for fruits and vegetables and their processed products is growing fast and will continue to do so in the future. To meet this growing demand and maintain competitiveness, more

investments in the entire food chain is required that involves collection, grading, storage, packaging, and transport to help in taking the produce from farms to markets and factories, is the key to the future growth of the agricultural sectors.

Estimated demand for Fruits, Vegetables for household consumption based on Calorie Requirement (ICMR) as per Normative Approach.

Table-1.1: Estimated demand for consumption of Fruits, Vegetables for household consumption based on Calorie Requirement (ICMR) as per Normative Approach

Items	Per Capita Per Day Consumption (in Grams)	Per Capita Per Annum Consumption (in kg)	Consumption in 2020-21 (million tons)	Consumption in 2032-33 (million tons)
Vegetables	300	109.5	150	173
Fruits	100	36.5	50	58

The group has also observed that with the growth trends of last one decade in area and yield, India will increase horticultural production from the present level of around 300 million tons to above 635 million tons in 2032-33 in which fruits will grow from present level of 94 million tons to around 195 million tons and vegetable will grow from around 176 million tons of present level to above 365 million tons in 2032-33. On the other hand, if the growth period of 15 years is considered for area and yield, the fruits production will increase up to 227 million tons, vegetable production will touch above 390 million tons and aggregate horticultural production will advance to above 680 million tons in 2032-33.

The working group has further observed that demand for horticultural products including fruits and vegetables will increase from 128 million tons in the base year of 2011-12 to around 190 million tons by 2020-21 and further to 327 million tons by 2032-33 in the baseline scenario. In the high growth scenario, demand will increase up to 215 million tons in 2020-21 and cross 430 million tons by 2032-33. The growth in demand for these high value commodities for household consumption will be slightly less than 5 percent per annum in the baseline scenario that would exceed 6 percent per annum in the high growth scenario.

According to the working group report mentioned above, based on growth trends, the demand & supply estimates of only fruits & vegetables are expected to be as below:

1.3.1 Demand Estimates

Table-1.2: Demand Estimate

Million MT

Commodity	2011-12	2012-13	2016-17	2017-18	2021-22	2028-29	2029-30	2032-33
Vegetables	152.14	155.51	182.35	214.82	224.27	302.93	316.33	360.77
Fruits	88.13	80.73	101.51	121.38	126.72	171.20	178.74	203.55

1.3.2 Supply Estimates

Table-1.3: Supply Estimate

Million MT

Commodity	2015-16	2016-17	2017-18	2020-21	2021-22	2028-29	2029-30	2032-33
Fruit	90.18	93.71	100.15	115.25	120.79	167.83	175.92	202.66
Vegetables	169.06	176.18	184.63	211.29	221.02	302.95	316.92	362.86
Total Horticulture	**286.19**	**299.85**	**314.98**	**365.10**	**383.53**	**541.42**	**568.76**	**659.38**

1.4 North East scenario

The North East Region of India, comprising of the States- Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura, and Sikkim have distinct advantages and provide immense economic and trade opportunities to domestic and international players. The NE region shares borders with China in the North, Bangladesh in the South-West, Bhutan in the North-West and Myanmar in the East. This makes the North-East India a prospective hub of international trade and commerce.

Horticultural crops in the NE region accounts for contribution to national horticulture basket of about 5.1% in fruits and 4.5% for vegetables. Major horticultural crops grown in the NE region having high commercial value are Pineapple, Citrus, Banana, Kiwi, Passion Fruits, Mango, Guava, Litchi, Cashew Nut, Papaya, Lemon, Strawberry, Dragon Fruit, Orange, Walnut, Apple, Jack fruit, etc. .Among Vegetables- Mushroom, Potato, Onion, Tomato, Cauliflower, Cabbage, Brinjal, Beans and among Spices- Cardamom, Ginger, Turmeric, Bird Eye Chilli, King Chilli etc. possess huge opportunities for developing food processing industries of these crops.

However, one major area of concern is that the low productivity of many of the horticultural crops in entire NE region. The productivity and production levels may be increased significantly to meet the ever-growing demand for horticulture produce. Since horticulture provides higher return per unit of land and generates higher employment, development of horticulture also helps in alleviating the economic condition of people below the poverty line. The focus of the region needs to be on value added quality horticultural products instead of bulk quantity for better price discovery by the farmers.

There is immense potential for vertical and horizontal growth in horticulture sector in NE region. At present, horticultural crops account for only 27.41% of cultivated area, on average. This share is highest in Sikkim followed by Manipur, Arunachal Pradesh, Meghalaya, Tripura, Mizoram, Assam, and Nagaland. There is need to expand area under horticultural crops particularly in Assam, Mizoram and Nagaland where at present it is less than 20% of the cultivated area.

1.4.1 Production and requirement of Fruits & Vegetables in NER for 2030

Table-1.4: Production and requirement of Fruits & Vegetables in NER for 2030

North East Hill region	Demand (lakh tons)	Supply (lakh tons)	Deficit/Surplus (lakh tons)
Fruits	**25.14**	**52.86**	**+27.72**
Vegetables	**62.53**	**73.90**	**+11.37**

Source: Source: ICMR RDA 2010

As per the projections made on the basis of ICMR norms, in 2030, demand for Fruits will be 25.14 lakh tons and vegetables will be 62.53 lakh tons. The region's comparative advantages in producing fruits, vegetables and other horticulture products can be tapped by setting small-scale processing units for the local market, which will also create rural employment.

1.4.2 Major Policy Support for the region

The region also has been at the center of several policy initiatives specifically designed to suit to the needs and issues of the region. The focus of the look east policy has since been realigned to give advent to "Act East Policy". Facilitating NER to assume a role of bridging the space between mainland India and Southeast Asian Nations. As a result, there has been an increased emphasis on development of infrastructure in the region, development of roads, expansion of air connectivity, opening of new trade routes with the neighboring countries etc.

Chapter-II: Background, Objectives & Methodology

2.1 Background

In line with the Prime Minister's vision expressed in the 65th Plenary Meeting of NEC towards development of North East, a review meeting was held at the Prime Minister's Office (PMO) on 22nd September' 2020. In this meeting, the PMO had advocated adoption of a holistic development approach towards the following identified focus sectors in NER – a) Bamboo, b) Oil Palm, c) Horticulture, d) Organic Farming, e) Spices and f) Handicrafts & Handloom.

Accordingly, NEDFi in association with the North Eastern Council (NEC) has been entrusted by the Ministry of DoNER, Govt. of India with the task of preparation of a five-year plan for value chain development of horticultural crops with focus on fruits and vegetables of North Eastern Region to tap the emerging potentials of north eastern region for empowering the farmers of the region by improving their income.

The scenario of horticulture sector in North Eastern Region of India is equally diversified as the science of horticulture itself. The area under NER is 2,62,179 Sq.km. of which 90,573 Sq.km. are plains and 69,672 Sq.km. are at an altitude over 1200 m. Around 56% of the area is under low altitude, 33% under mid altitude and 11% under high altitude. This altitudinal variation along with five orders of soils from Alfisols to Ultisols has made the region a hot – spot of global biodiversity. Consequently, the region enjoys wide range of climates which varies from tropical, sub-tropical to temperate character. This unique situation has endowed the eight constituting states with big baskets of diverse horticultural crops amalgamated with their ethnicity characterising them as traditionally horticultural states. This natural horticultural wealth of the states gives a provocative exposure for venturing in different ways with aesthetic, economic and commercial outlook and in fact, this is the need of the hour.

However, despite these distinct advantages, the region's horticultural potential (usually referred as sleeping giant) has not been tapped primarily due to lack of market-oriented approach / practices, poor commercial understanding of farmers, in-adequate infrastructures like road, communication, transport and above all, lack of scientific post-harvest infrastructure. Thus, there is need to evolve strategic plan for comprehensive development of horticulture with end to end approach, fruits and vegetables sectors in particular to minimize post-harvest losses, to provide processing marketing linkages, to incorporate value-chain systems for potential horticultural crops with the overall objective of economic upliftment of farmers. In this era of change and innovation, time has come to bring vibrancy in the horticultural sector of NER with required intervention.

Key observations in NER Vision 2020 relevant to the horticulture sector:

- productivity is lower than the national average
- creation of cold storages, market infrastructure, mini processing units are essential
- Transport of the produce is hampered due to poor connectivity and shortage of specialized means of transportation
- Establishment of cold chain in PPP model along arterial highways is critical to exploit markets in the rest of the country.
- Requirement of last mile connectivity to reach farm output to markets
- Road, rail, air & inland waterways connectivity needs improvement
- Cyber, telecom & power facilities need upgradation

The above observations are still relevant in the present context though some progress have been made in terms of both physical & social infrastructures.

2.2 Objectives for Designing Action Plan Value Chain

The post pandemic focus of the customers is on safe food, quality food, transparency in source of the produce, certification etc. are to be addressed. As profitability, environment and social relations need to be continually monitored with the use of technology to improve the system. To create a sustainable horticulture and vegetable value chain would also require promotion of indigenous crops, preservation of seeds and germ plasm, a closer relationship between horticultural research and producers. Rural resource based organic horticulture, keeping soil health, sustainability and productivity of agriculture as prime focus should be promoted.

North Eastern region states are still lagging in comparison to horticulture growth in main land states, despite having the strengths, favourable climatic zones, and the capacity to produce large horticulture produce. The sluggish rate of development could be due to the reasons, as below:

- Lack of synergy among the government departments engaged in developing agribusiness in the region.
- The schemes designed are not fully disseminated or understood by the farmers or beneficiaries.
- The existing schemes and the agencies are focused on a single or small component of agribusiness or value chain.
- Absence of any long-term regional level policy or plan for integration of all the components of agribusiness and value chain in NE Region.
- Absence of any anchoring organisation to drive the whole value chain process of different crops.
- Lack of single window approach for Agribusiness development program.
- Lack of promotional schemes and incentives for Agri-preneurship in the region.

2.2.1 Terms of Reference (ToR)

To overcome the current weakness, and to grab the opportunities, to empower North Eastern Region farmers and agribusiness, NEC under the Ministry of DONER, has entrusted NEDFi, to prepare an Action Plan on value chain development of Horticulture- fruits and vegetables in NER.

The proposed Terms of Reference of the study are as below-

a) To assess the current status of the Horticulture sector of NER with reference to Fruits & Vegetables through stakeholders' consultation on challenges, prospects and recommendations for development and promotion of the sector in NER.
b) To identify state wise priority crops for development of complete Value Chain.
c) To prepare a 5-year developmental Action Plan including state(s) specific sub-plans, with resource requirement and role of stakeholders.

To develop the agribusiness and consequently the region, 'value chain' is the most effective tool, which includes the components from cultivation to value added product at consumer table.

The main objectives to design the action plan for value chain development for next five years are as follows:

1. To understand the current scenario of Horticulture sector particularly vegetables and fruits
2. Mapping the resources
3. Understanding the state action plan

4. To understand the various stake holders working in the same area in the region and outside NER.
5. Short listing important fruits and vegetables for each state
6. Short listing the technologies for value addition
7. To design the estimates for value chain state level and regional level
8. Fund allocation for various components state and regional level
9. Integration of various value chain at regional level with regional level brand and monitoring and handholding program with various stake holders
10. Integrated approach for the current schemes and the under-utilized & unutilized facilities at state and regional level
11. Designing the milestones and evaluation methods for execution and targeted outcome of the action plan.

2.3 Methodology to Design the Action Plan

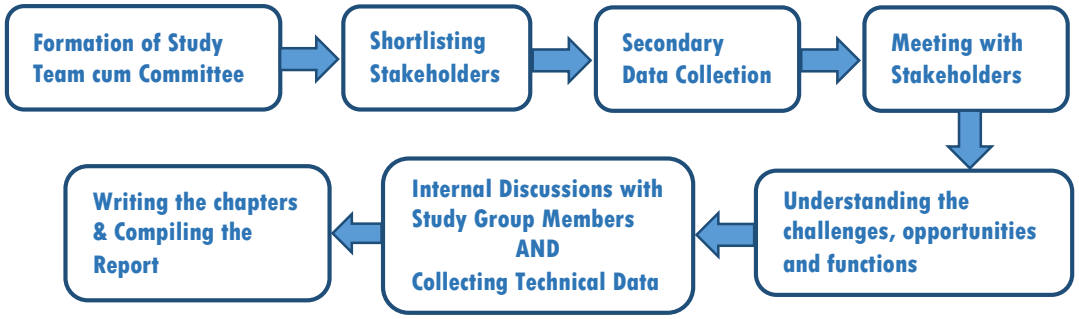


Figure-2.1: Flowchart of Methodology for designing the Action Plan

Detail terms of reference and methodologies adopted for preparation of the plan is placed in **Annexure-I** (at page **- 1 -**).

The proposed Action plan includes the following:

- Concept of Agribusiness and Value Chain in NER & Value chain components
- The current status of Horticulture sectors of NER with special reference to fruits and vegetables. Challenges and Opportunities
- Identify state wise priority crops for development of complete value chain
- The existing status & initiatives of Govt. of India/ State Govt. in value chain development of the sector and to identify the factors impeding the growth of value chain development.
- Crop wise value chain
- Investment details of the Value chain with assumptions
- A five-year holistic value chain development plan for priority crops in horticulture sectors for North eastern states
- Implementing agencies, phases of implementation, implementation process, Single Window Implementation system etc.
- Mapping of the possible sources of funding and new schemes that can be formulated for the purpose.
- Suggestions / interventions for resolutions of the challenges in the sector in NE Region.
- Indicating output and outcome of implementation of the plan.

Chapter-III: Current status of Horticulture sectors of NER with special reference to Fruits & Vegetables

3.1 Current Scenario of Horticulture sector in NER

The 3rdadvance estimates for the year 2019-20 by the Department of Agriculture, Co-operation & Farmers Welfare, Govt. of India, has indicated total area under fruit crops as 474.77 thousand ha and Vegetables are estimated to be grown in 564.11 thousand ha in the NE region. In terms of production, fruit production is estimated at 4887.49 thousand MT and vegetable production at 6276.91 thousand MT in NE region.

Table-3.1: State-wise Area and Production estimates for 2019-20

(Area in '000 ha and Production in '000 MT)

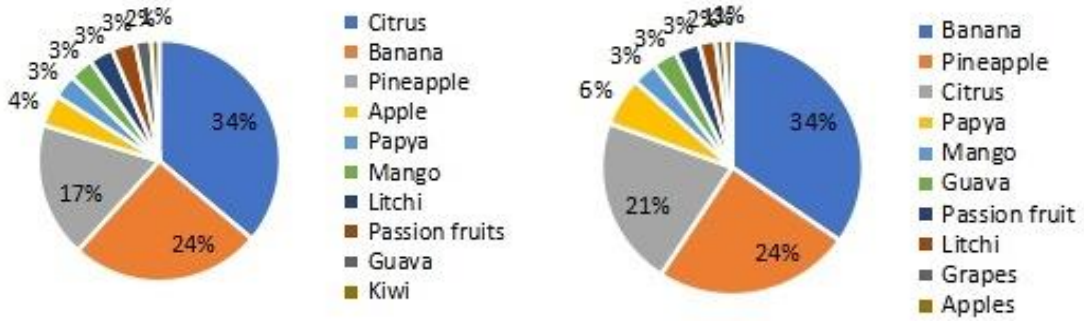
States	Fruits		Vegetables	
	Area	Production	Area	Production
Arunachal Pradesh	48.14	125.84	2.62	17.39
Assam	168.87	2562.3	312.97	3673.88
Manipur	47.9	527.97	36.84	391.35
Meghalaya	37.6	393.51	49.12	515.87
Mizoram	63.77	344.91	36.49	181.7
Nagaland	34.23	315.05	40.85	453.65
Sikkim	19.54	55.45	38.8	231.4
Tripura	54.72	562.46	46.42	811.67
N E Region	**474.77**	**4887.49**	**564.11**	**6276.91**

(Source: Department of Agriculture, Co-operation &Farmers Welfare, Govt. of India)

3.1.1 Area under cultivation and share of Production-Fruit crops:

Among the Fruits, Citrus has the largest area under cultivation (34%), followed by Banana (24%), Pineapple (17%), Apple (4%), Papaya, Mango, Litchi, Passion fruit (3% each), Guava (2%) and Kiwi (1%). Other fruits have 6% of the total horticulture area under cultivation.

In terms of production, Banana has the largest share (34%), followed by Pineapple (24%), Citrus (21%), Papaya (6%), Mango, Guava, Passion fruit (3% each), Litchi (2%), Grapes and Apple (1% each).

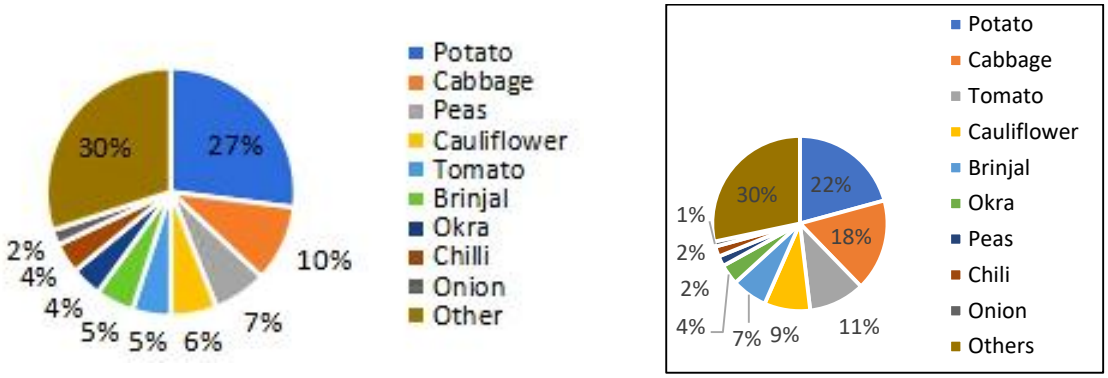


Share of production **Share of Area under cultivation**

Figure-3.1: Share of Production & Area under cultivation – Fruit crops

3.1.2 Area under cultivation and share of Production-Vegetable crops:

Among Vegetables, Potato has the maximum area (27%) under cultivation followed by Cabbage (10%), Peas (7%), Cauliflower (6%), Tomato and Brinjal (5%), Okra and Chilli (4%), Onion (2%) while other vegetables have 30% of the total area under vegetable cultivation. In terms of production, potato has the highest production and contributes 22% to vegetable production in NER followed by other Vegetables (22%), Cabbage (18%), Tomato (11%), Cauliflower (9%), Brinjal (7%), Okra (4%), Peas and Chilli (2% each) and Onion (1%).



Share of Production **Share of Area under cultivation**

Figure-3.2: Share of Production & Area under cultivation – Vegetable crops

The State-wise crop wise data for fruits and vegetables grown are placed in**Annexure-XV**(at page **- 79 -**).

3.2 Existing and Ongoing Post-Harvest Infrastructure Projects

3.2.1 Existing Infrastructure under Ministry of MOFPI:

For giving impetus to the development of Food Processing industry in NER, the Ministry of MOFPI is providing higher levels of subsidy in all the schemes. According to the data available in Chapter-6 of the Annual report of 2018-19 of MOFPI, the following facilities have been created in NE Region through financial assistance of the MOFPI :(Status of projects under fruits and vegetables sector are placed at **Annexure-XX** (at page **- 103 -**)

- 6 Mega Food Parks in NER, one each in Assam, Manipur, Mizoram, Arunachal Pradesh, Nagaland and Tripura. Out of these 6 projects, 2 projects (Assam & Tripura) are operational, 3 projects (Mizoram, Nagaland & Arunachal Pradesh) are under various stages of implementation and remaining one is in the process of final approval.
- 7 Cold Chain projects have been approved in NER, two each in Assam & Mizoram and one project each in Arunachal Pradesh, Manipur and Nagaland. Out of these, 6 projects have become operational.
- 3 projects under the scheme for Creation of Infrastructure for Agro Processing Clusters in Assam.
- 14 food processing units under CEFPPC Scheme for Grant-in-Aid in NER, four each in Assam and Nagaland, one each in Arunachal Pradesh, Meghalaya, Mizoram and Sikkim and two in Tripura. Out of these, two food processing units in Assam and one unit in Meghalaya have become operational.
- 2 projects approved in year 2019-20 in NER under the scheme Backward & Forward Linkage. One each in Manipur and Assam. Both are under implementation.

- 10 Food Testing Labs, five in Assam (one in Tezpur and four in Guwahati), one each in Manipur (Nambol), Nagaland (Kohima), two in Sikkim (Gangtok) and Tripura (Agartala) have been assisted to create infrastructure for food safety and quality testing.

Indian Institute of Food Processing Technology (IIFPT) has set up a liaison office at Guwahati in July, 2010. The unit has Food Processing Training Centre cum Incubation Centre, Training Classrooms and Office. Skill training programs are organized for farmers, an amount of ₹14.21 crore was released in 2016-17 for upgradation & strengthening of liaison office of IIFPT in Guwahati for establishing Food Processing Business Incubation, Testing and Training Center.

3.2.2 Infrastructures availability in the region:

According to the data available in the websites of National Horticulture Board (NHB), National Horticulture Mission (NHM), MIDH an APEDA the following infrastructures were created in the region under respective schemes:

- Integrated cold chain facilities including Cold storages: total 42 cold chain facilities with aggregate capacity of 23279 MT in different States.
- 69 cold storages with aggregate capacity of 243456 MT have been assisted in this region as on 31.03.2018.
- Total 1357 Nos. of Integrated Pack House created under MIDH upto 31.03.2018, out of which 1347 pack houses were on farm pack houses, whereas 10 pack houses were integrated pack houses.
- 6 projects in fruit processing sector in north Eastern states with project costs of ₹48.87 crore has been approved by MOFPI with a grant of ₹20.35 crore on 21st November 2020.
- APART has recently approved (on 4thDecember' 2020) setting up of three Common Facility Centers (CFCs) at Sonitpur, Morigaon and Lakhimpur districts in Assam. In addition to one Fruits, Vegetables and Spices Processing Centers at Morigaon, Assam.

3.2.3. International Collaboration with Govt. of Israel

- North Eastern Region's first Regional Centre with Israeli collaboration was inaugurated in Mizoram on 7th March 2018. It was set up with a cost of Rs10 crore.
- Foundation stone of Indo-Israel Centre of Excellence for Protected Cultivation of Vegetables in Assam was laid on November 3rd, 2020, to be built at an area of 8 hectares, at a cost of Rs 10.33 crores, and will have facilities like hi-tech greenhouse, automated irrigation system, insect-proof net house, sale counter, weather station, etc.
- The government of Meghalaya will set up two Centres of Excellence (CoE) in the state, in collaboration with Israel, to improve and promote the livelihood of farmers. The first one will be set up for vegetables at Jongksha village in East Khasi Hills, and the second one will be set up for citrus fruits at Dawagre in East Garo Hills.
- Deliberations were held regarding setting up a 'Centre of Excellence' (CoE) in Tripura with World-class expertise of Israel for the benefit of the farmers in the State.

A brief note on the details of the above collaborations is placed in the **Annexure-XIX** (at page **- 101 -**).

Chapter-IV: Prospects and recommendations for development and promotion of the horticulture sector in NER based on stake-holders' interactions

4.1 Stakeholders Interactions

During the process of preparation of the action plan eight stake holders' interactions were undertaken with the value chain players across the spectrum of value chain in horticulture. Total 64 participants participated and made presentations during various interaction meets, which included representatives from

- State Govts., MOFPI, NHB, SFAC, APEDA, NAFED, NERAMAC, APART, AAI, AIDC,
- FPOs, FPCs, entrepreneurs from the region
- large buyers including processing units, cold storage units, suppliers of agro machineries,
- Representative of ASEAN chamber of commerce, Bangkok,
- Representatives from CFTRI, IIP, IIFPT,
- NABARD, Public sector & Private sector banks.
- Academics from universities, horticulture colleges in the region

The interactions provided ground level feedbacks and suggestions for developing effective value chain for horticulture in the region. The list of the value chain players interacted during the process is placed in **Annexure-XIII** (at page **- 69 -**). The critical gaps are placed below while the suggestions are incorporated in the **Chapter-IX** containing suggestions for implementation of the plan in later part of the report.

4.2 Critical Gaps

Critical gaps as perceived by different stakeholders and value chain players in the region have been clubbed under major heads for ease of comprehension:

Production process	Post-harvest management	Marketing
Not so efficient mechanism for input supply, development of skill, & knowledge for the producers.	Lack of infrastructure availability.	Challenges in the region for accessing markets within the region and outside the region or abroad.
Lack of Availability of quality seeds and planting materials.	Poor or absence of road connectivity from the growing areas to the nearest market or aggregation point.	Challenges in easy availability of authentic data related to market demand, volume of production and available location in the region.
Lack of high yielding variety of planting materials, Tissue culture for Banana.	Absence of post-harvest infrastructure e.g. Pack houses, facilities for grading, sorting, drying, cold chain, primary processing centers and Refrigerated Van.	Absence of logistics support to reach the market due to poor or no road connectivity.
Lack of knowledge about modern method of cultivation practices, protected cultivation,	Absence of fruit& vegetable processing centers.	Low volume of production affecting viability and sustainability of the production.

Production process	Post-harvest management	Marketing
Growing off-season vegetables etc.		
Lack of awareness about better harvesting techniques and post-harvest management practices, e.g. sorting, grading, packaging etc.	Absence of bulk cold storage facilities for fruits & vegetables near the production clusters.	Non-availability of suitable Packaging material in the region.
Lack of training facilities for skill up gradation.	Absence of quality certification facility in the region.	High transportation cost for carrying fresh or processed fruits & vegetables to nearest market or delivery to customers.
Low understanding of benefits of participating in value chain process over the existing methods of selling the produce.	Inability to avail the facilities of credit link subsidy schemes due to non-availability of bank loans without collaterals.	Non-availability of export facilities at nearby airports within the region except partial facilities at Guwahati International airport.
Lack of bank loans for production and maintenance.		Lack of funding for marketing, branding, publicity.

4.3 Few other issues

- Growers find it difficult to complete all the formalities of the Central Govt. schemes as the ground situation in north east does not match with the required parameters of the schemes
- Exclusion of few crops under MIDH scheme for some States,
- Required capacity for availing facilities under 'Krishi Udaan' is still high for the farmers of the region
- Due to existing land tenure system of hilly states of the region, land cannot be offered as collaterals to Banks, therefore the entrepreneurs find difficulty in availing credit link subsidy schemes of the Government.
- Absence of an Anchor Marketing Organization to create the linkages from farm to bigger markets.

FPOs are important part of Agri-Value Chain, which starts from the farm and goes on till processing and the far-away markets. The FPOs may need to include services like emergency credit, consumption credit, production credit, retail services of inputs for agriculture and other agricultural production services required by the small and marginal farmers. In addition, the producer organization can take up services also related to facilitating linkages with the bank and line departments for ensuring the infrastructure access for the business.

Chapter-V: Selection of Priority crops for Value Chain Development in North East Region

To begin with, it will be in order to examine the G.I. tags of the horticultural crops (fruits & vegetables) in the region, which may help building a special brand of **"Naturally or Organically grown Fruits & Vegetables having GI tag of North-East".**

5.1 The Horticultural Products having G.I. tag of North East

Table-5.1: Horticulture crops with respective G.I. tag of North East

Horticultural crops	State
Naga Mircha (Chili)	Nagaland
Naga Tree Tomato	Nagaland
Arunachal Orange	Arunachal Pradesh
Large Cardamom	Sikkim
Mizo Chilli	Mizoram
Assam KarbiAnglong Ginger	Assam
Tripura Queen Pineapple	Tripura
Tezpur Litchi	Assam
Khasi Mandarin	Meghalaya
Kachai Lemon	Manipur
Memong Narang	Meghalaya

5.2 Horticultural crops under Examination for GIs from North East India

Table-5.2: Horticulture crops under Examination for G.I.s from North East India

Name of the Crops	Location	Special characteristic	Reference
Mizo Banana	Mizoram	Attractive size, shape, and taste	GI Registry,2019
Assam Lemon	Assam	Cluster bearing habit, seedless fruits	GI Registry,2019
Naga Cucumber	Nagaland	Low in calories, high in potassium and contain high level of water.	GI Registry,2019
Manipur Black Cherry	Manipur	Natural edible colour high moisture content	NERAMAC,2017
Assam Elephant Apple	Assam	Used in curries, traditional medicine	NERAMAC,2017
Leteku	Assam	High potassium content Rich source of pectin	NERAMAC,2017
Dalle Khorsani	Sikkim	Unique flavour and high pungency	GI Registry,2018
Mizo Chow Chow	Mizoram	Low caloric value Wide adaptability	GI Registry,2018
Passion fruit	Mizoram	Small in size, its flavour is excellent and less acidic	GI Registry,2018
Rahre	Arunachal Pradesh	Rich source of essential oil adapted to biotic &abiotic stress	GI Registry,2017
Tamenglong Orange	Manipur	Sweet- sour taste and high juice content	GI Registry, 2017

5.3 Some horticultural crops of North East India with potential for GI

Table-5.3: Horticulture crops of North East India with potential GI

Name of the Crops	Location	Special character
Longai brinjal	Karimganj, Assam	Soft, very less seed, more flesh with unique aroma
Maroinapakpi	Manipur	Associated with traditional recipes and also with the ethnotherapy of certain diseases
Tree bean	Manipur/ Mizoram	Flowers, tender pods and seeds edible &a good source of proteins, fats, carbohydrates, vitamins and minerals
Bhimkol	Assam	Good infant food, source of bio antacid.
Darjeeling banana	Manipur	Pseudostems green, tinged with brownish colour,leaf sheath bases not enclosing pseudostems,blotched with black-brown spots, waxy when young, devoid of wax on maturity
Moran Ada	Assam	Moran Ada is very rich in oil and has medicinal properties
Assamiya Paan Gaan Paan	Assam	Have high leaf pungency Profuse branching habit

(**Source:** Geographical Indications in Horticulture: North East India Perspective -*By Himadri Shekhar Datta, Gargi Sharma, Sarat Sekhar Bora*)

5.4 Categorizing of crops based on potential

The fruit and vegetables crops grown in different states in the region also can be segregated in three different categories, as follows:

Category-I: **Existing potential crops**, Crops which are grown by the farmers for its good commercial value, adequate volume of production is available, there is scope of increasing the area, productivity and production from the current level for these crops, or are available in abundance in the natural way, GI tag is available and value addition of the crops are economically feasible and have good market demand both within and outside the region and abroad.

Category-II: **Emerging potential crops**, which have definite potential, but the volume of production is yet to reach to an economic scale, farmers are yet to adopt the same crops for commercial cultivation in large scale, value addition activities may not be economic proposition at this stage. GI tag is under process.

Category-III: **Indigenous crops or Crops of future**, the crops or varieties of the crops which are indigenous and are grown by the villagers traditionally or are grown in the wild but have the scope for value addition, increasing production and upgrade to commercial scale.

Accordingly, the crops available in different states in the region can be classified in the above categories as below and prioritise accordingly for developing value chains:

5.4.1 Category-I: Existing potential crops

Table-5.4: State-wise list of Horticulture crops (Category-I)

States	Fruits	Vegetables
Arunachal	Kiwi, Orange, pineapple	Nil
Assam	Assam lemon, Pineapple, banana, Litchi, orange, Jackfruit	Tomato, Potato, Peas, Carrot, Okra, Brinjal, Broccoli, Pumpkin
Manipur	Banana, Passion fruit, orange, pineapple, Kachai lemon	Cauliflower, Cabbage, Peas, Tomato
Meghalaya	Khasi Mandarin, pineapple, Jackfruit, Banana	Potato, Carrot, Cabbage, Cauliflower, Radish, French beans
Mizoram	Passion fruit, oranges, Grapes	Tomato, Cabbage,
Nagaland	Passion fruit, Pineapple, Orange	Tomato, Cabbage
Sikkim	Mandarin, Banana, Papaya, Guava	Tomato, Cauliflower
Tripura	Pineapple, jackfruit, oranges	Cabbage, Cauliflower, Brinjal, Radish,

5.4.2 Category-II: Emerging potential crops

Table-5.5: State-wise list of Horticulture crops (Category-II)

States	Fruits	Vegetables
Arunachal	Apple, Walnut	Cabbage, Cauliflower
Assam	Guava, Papaya, Mango, Dragon fruit, Strawberry,	Gourds, Cabbage, Cauliflower, Radish
Manipur	Nil	Brinjal, Potato
Meghalaya	Cashewnut, Strawberry	Squash, Sweet potato, Yam,
Mizoram	Hathkora, Dragon fruit	Chayote, Pumpkin,
Nagaland	Watermelon, Banana, Dragon fruit	Cabbage, cauliflower, sweet potato, beans, Peas
Sikkim	Avocado, Kiwi	Broccoli, Iskus
Tripura	Lemon	All types of gourds

5.4.3 Category-III: Indigenous crops or Crops of future

Table-5.6: State-wise list of Horticulture crops (Category-III)

States	Fruits	Vegetables
Arunachal	Local Varieties of Banana, passion fruit	Berries, leafy vegetables
Assam	Elephant apple (Outenga), Garcinia, Gooseberry, Jalpai, paniala, Star fruit, Wild mango, wood apple, Pomelo, Jamun, Hatkora	Green leafy vegetables, local cucumber
Manipur	Nil	Tree beans
Meghalaya	Carambola,Sohiong, Sohmymdong, Sho-shur, Soh-phie, Soh-shang(in Khasi)	Green leafy vegetables
Mizoram	Mizo mandarin, Chenkek, Star Gooseberry,	Green leafy vegetables
Nagaland	Nil	Naga cucumber, Leafy vegetables
Sikkim	Nil	Nil
Tripura	Elaichi Nimbu	Nil

The team accordingly short listed the following vegetables and fruits for different states in NER after due consideration of stake holders' views, techno commercial viability, farmer empowerment, rural livelihood development and export development. Focus is kept on the guiding principles of 'vocal for local', import substitution, ATMA NIRBHAR, and Operation Green Schemes. Growing functional and Nutraceutical Food Market, Market quality requirements, G.I. and other USPs of North East Region and Next decade global food market developments – international study reports are other important aspects were considered while identifying the priority crops for NE region and to develop the Five-year action plan. Drone technology can be used for identification of area for priority crops which has been recently permitted by the Govt. of India.

5.5 Short Listed Fruits and Vegetables State wise:

Table-5.7: State-wise shortlisted Fruits and Vegetables

States / Parameters	Arunachal Pradesh	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Tripura	Sikkim
A.	**Short Listed Fruits and Vegetables**							
Short Listed Fruits	Kiwi, Pineapple, Banana, Citrus, Papaya	Citrus, Pineapple, Banana, Jack Fruit , Papaya, Guava, Mango	Citrus, Pineapple, Banana, Jackfruit,	Citrus, Pineapple, Banana, Passion Fruit, Mango	Citrus, Pineapple, Banana, KIWI, Passion Fruit, Mango	Citrus, Pineapple , Banana, KIWI, Papaya, Passion fruit	Citrus, Pineapple, Banana, Jackfruit, Mango	Citrus, Guava, Banana, Papaya, Passion Fruits, KIWI
Short Listed Vegetable	Mushroom, Carrot, Cabbage, Tomato , Broccoli, Pumpkin, Cucurbits , Sweet Potato	Mushroom, Carrot, Cabbage, Tomato, Capsicum , Pumpkin, Cucurbits, Sweet Potato, Gourd	Carrot, Cabbage, Tomato ,Pumpkin, Cucurbits, Sweet Potato, Broccoli , gourds	Cabbage, Tomato, Pumpkin, Cucurbits, Capsicum	Carrot, Cabbage, Tomato, Gourd, Broccoli, Cucurbits, Capsicum, Sweet Potato	Mushroom, Carrot, Cabbage, Tomato, Pumpkins. Broccoli, Cucurbits, Capsicum , Sweet Potato	Mushroom, Carrot, Cabbage, Tomato, Pumpkins, Cucurbits, Sweet Potato, Gourd	Mushroom, Carrot, Cabbage, Tomato , Pumpkins, Cucurbits, Sweet Potato

Basic crop profile of few important crops are placed in **Annexure-III** (at page**- 5 -**)

Drones

Drones in agriculture represent a new way to collect information about crops in a field. Drones in agriculture can be used for field analysis, crop spraying and crop yield management. An important benefit of drones is that they are affordable and can be deployed easily.
High precision cameras are used in drones which can be used for real time monitoring of crops and fields. The cameras in drones collect precision field images to identify the area of fields that require water or has stressed crops that need remedy. High precision cameras in drones could detect the disease in crops before it is visible to human eyes. Due to early detection of disease, it reduces crop loss and also the requirement of pesticides. By using IoT, drones can be connected to farmer's mobile and can send him the alert in case of identification of any disease or unusual condition. So, the farmer can remotely monitor his crops and need not be present in the farm. It also saves significant amount of time of the farmer.

Chapter-VI: Components of Agribusiness and Value Chain

6.1 Components of Agribusiness

Agribusiness is an important aspect and the base to design value chains.

Component-I:

Backward linkage development	Stake Holders
• Seedlings- cultivation • Agri inputs • Harvesting	• Farmers/ Growers • Farm equipment • Agri input suppliers • Government Agencies • Financial Institutions • Researchers & Expert community

Component-II:

Post-Harvest	Stake Holders
• Handling • Storage • Processing	• Investors • Technology providers • Machine suppliers • Regulatory authorities • Government Agencies • Financial Institutions • Logistics Agencies • Distribution channels

Component –III:

Food Processing	Stake Holders
• Secondary Processing • All types of Processed Food Business including ▶ High Value Addition Products like Extracts and Nutraceutical and Functional Food	• Investors • Technology providers • Machine suppliers • Raw material suppliers • Regulatory authorities • Government Agencies • Financial Institutions • Logistics Agencies • Distribution channels

Component-IV:

Forward Linkage	Stake Holders
• Branding • Quality Certification ▶ Supply chain ▶ Distribution channel ▶ Reach to Consumer table	• Organized Supply Chain • Distribution Agencies • Quality Certification Agencies • Logistics Agencies • Regulatory Agencies • Financial Institutions

Figure 6.1: Components of Agribusiness

6.2 Components and Stakeholders of Value Chain

For Raw Material – Vegetables &Fruits production	Individual farmers, FPOs and FPCs
For Post-Harvest Sector	Government agencies, SPVs, entrepreneurs, and FPCs/FPOs , investors
Food Processing	Entrepreneurs, research community, food safety agencies, logistics agencies ,
Forward Integration	Organized supply chain, distributors, online portals, e commerce portals, shops, MLM companies, government agencies , exporters

6.3 Infrastructure in Value Chain

6.3.1 Backward Linkage in Value Chain: Hi-Tech Nursery &Tissue Culture Laboratory

Availability of quality planting materials is one of the most important aspects in Value Chain Development. Hi-Tech Nursery and Tissue Culture Laboratory will be the inherent part of value chain, especially key component of backward linkage is to supply quality planting materials for successful development of value chain. The main advantages of tissue culture lab are as follows:

a. Rapid Multiplication
b. Uniform or True to type plants
c. Germplasm Storage
d. Disease free planting material
e. Round year production
f. Old species can be preserved and rapid propagation possible
g. Time required will be shorter than complete seed cycle

Hi-Tech Nursery will include the facilities of Mist Chamber, Poly House, Shed Net Area, Mother Plant Area, and Nursery Root Stock Seed Beds.

6.3.2 Post-Harvest & Processing sector:

Collection Centre, Refrigerated Container Vehicle Primary Processing, Common Facility Centre (CFC) /Central Processing Centre (CPU), Value added Unit.

The major problems for agribusiness in NER are distance from points of cultivation to market (more than 500 km), short shelf life of horticultural produce, need to supply horticultural produce to food producing companies situated in the vicinity of 2000 km lack of Controlled Atmospheric Logistics and processing infrastructure.

To overcome the above problems value chain components in post-harvest and processing sector is very important. Post-Harvest handling, processing and value addition are the main components of the value chain. These facilities help in reduction of post-harvest losses, provide satisfactory returns to all stake holders in the value chain and to get more profit by entering into the global market. Detailed profile of the value chain infrastructure are placed in **Annexure-VI (**at page **- 26 -**)

6.3.3 Support Value Chain Components:

Entrepreneurs training cum incubation Centre, Quality Analysis Laboratory (NABL Accredited), Certification Body, Anchor Marketing Organization for Marketing, brand building & quality Monitoring.

Support Value Chain Components are particularly important components to make the value chain successful. Entrepreneurship Development Training Center with Incubation center will be the main requirement to address the Pre- and post-harvest training needs of the farmers. Quality Analysis laboratory will be one of the basic needs considering the need of the farmers, food industries, and exporters to make the value chain grand success. Certification body will be one of the important support components in value chain. This body is an Institute who follows the rules, process and SOP for certifications –e.g. Organic, HACCP, ISO 22000, FSSC 22000, EMS, BRC, US FDA etc. This institute will start as per the norms of APEDA, CODEX & as per National Accreditation Board for Certification Bodies (https://nabcb.qci.org.in). There is a need for establishing one certification body in every state in North Eastern Region.

The main limitation in ongoing schemes in agricultural and post-harvest processing sector including marketing is lack of linkages among components of all schemes. Each component and scheme is separated for backward linkage or Post-harvest component. Absence of ANCHOR Marketing Organization is one of the main limitation in marketing and sustainability of the value chain. Branding and promotional activities will be the inherent part of the value chain. There is a need of an ANCHOR Marketing Organization that will take care of monitoring and coordination for brand building & marketing. For branding and marketing activities, 12% of the total value chain infrastructure cost per state is earmarked for the activities of the ANCHOR Marketing Organization in this plan.

Considering the function and vision of DONER and its institutes, the study group recommends NERAMAC – North East Regional Agricultural Marketing Corporation Limited as the Anchor Marketing Organization for marketing, brand building & quality monitoring. NERAMAC is the regional marketing agency working in the region and will be the ANCHOR Marketing Organization for implementation, branding, and self-sustainability of the proposed value chain with the following aims and objectives:

a. To Play the role of Anchor or nodal agency to execute proposed Value Chain plan
b. Mapping all activities related to the project
c. Developing Regional Umbrella Brand
d. Design the Promotion Program
e. Survey of domestic and international demand for Value Chain Products
f. Export Assistance
g. Capacity Building of the Foodpreneurs
h. Represent Value Chain Project other Government Bodies and Agencies
i. Hand Holding, Monitoring and Mentoring the activities

6.4 Main Post Harvest Technologies in Value Chain

Understanding post-harvest technology is one of the most important aspects while considering the Value Chain development in Horticulture sector.

Different post-harvest technologies adopted for different stages of Value Chain development such as: Post-Harvest Handling and Storage, Shelf-life Enhancement Activity, Secondary Processing (Food Processing) and Organized Supply Chain along with crop-wise various Value-Added products are provided in **Annexure-V** (at page **- 14 -**).

All these technologies & plants are compatible for multi commodity processing.

6.5 Example of Value Chain for Mandarin Orange Fruits

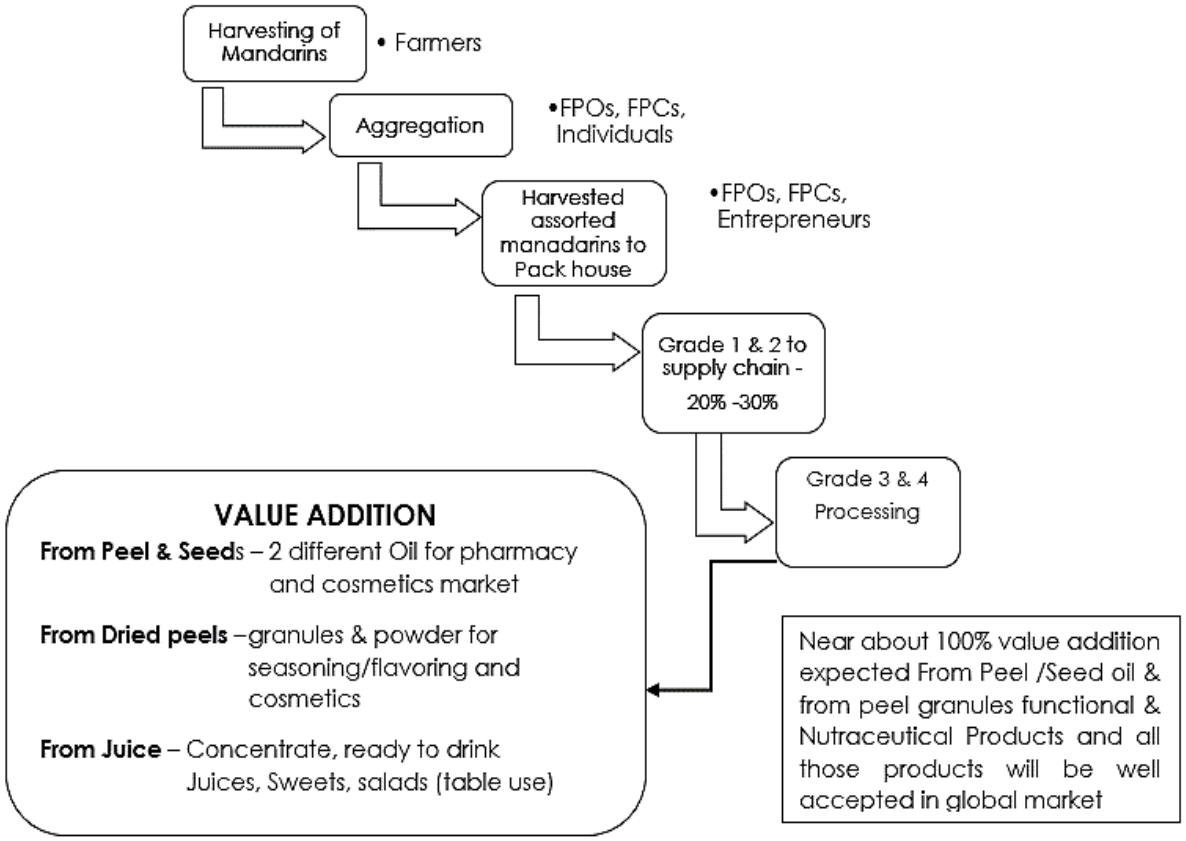


Figure 6.2: Example of Value Chain (Mandarin Orange Fruits)

Chapter-VII: Investment Details for Value Chain Development & State-wise Action Plan

7.1 Assumptions for Value Chain Components for the NER States

The basis to arrive at the number of value chain components and the locations, the following criteria were used:

- Connectivity with road, rail air, water ways.
- For Collection centers – Vegetables and fruits will be collected within 50 km radius.
- For PPC collection of Vegetables and Fruits will be from 100 km radius.
- Normally for two PPC one CFC shall be established within 300 km radius.
- One Value added Processing Center for three CFC will be set up.
- Considering the population and the density of the population Training Center will be decided. Normally for every 10 districts one training center may be considered.
- Quality Analysis Lab will be planned one per state in next five years.
- One Certification Agency per state as SPV is recommended.
- NERAMAC is recommended as ANCHOR Marketing Organization for Brand development, promotion and coordination, monitoring.
- Backward linkage development, including increasing yield and farming practices are placed in a separate **Annexure-VII** (at page**- 39 -**).
- The current productivity or per Hectare yield is low so three-year plan for increasing the yield will be planned and including controlled farming practices. That will give strong backward linkage, and availability of market surplus for processing.

Basic data of NER for Value Chain Investment to finalize PPC & CFC/CPU are placed in **Annexure-IV** (at page**- 13 -**).

7.2 Assumptions for Backward Linkage Calculations

- Backward linkage will be the first part of value chain.
- In next decade main importance will be for traceability of agro produce which will be processed as food product or ingredient.
- Private Investment in this sector is very poor as the sector is not proven sector in the region for return on investment, thus government of India may first invest and encourage the private entrepreneurs and investors to come and invest in this sector.
- As per the market zero facts, there will be existing post-harvest handling, value addition system apart from government APMC or similar system, due to this reason we consider only 25-50 percent of total horticulture produce will come to this proposed value chain.
- Government initiatives to invest in the post-harvest value chain development project will attract& develop the interest of the private sector to come and explore the opportunities, on this background the proposed value chain project will consume 25-30% of agro produce per state, rest will be consumed by existing system and new entrepreneurs & ventures.
- Additional Hectares/land/area is recommended in the report – as the domestic and global consumption will be increased by 4-10 % annually, also increasing the yield/productivity per Hectare program will be accelerating as a main drive, and thus the extra requirement of Horticulture produce will be the need of future.

- Post COVID-19, the global market is under restricting stage, opportunities for Indian agripreneurs will be more preparative, in that NER region due to the Locational and climatic uniqueness will grab more share.
- In next five years some private entrepreneurs and multi-national players with FDI will be expected including global organized supply chain to the NER region.
- Taking into consideration of all these points, the extra area for horticultural development will be considered.
- RKVY, MIDH, MOVCD schemes are already working the NER, but the main missing link is integrated value chain for vegetables and Fruit, for which this action plan is designed. So backward linkage components like Hi tech and normal nurseries, Tissue culture lab, modern irrigation and fertilizer systems will be connected to all main schemes.
- This report is recommending anchor organization to monitor the value chain – to provide single window solutions to farmers, FPOs, FPCs, and SHGs.
- The collection centers, PPCs & Training Center will be installed and operated by FPOs, FPCs and SHGs.
- The CFC, Value added processing, quality analysis lab, certification body will be established and operated by either SPV or by private entrepreneurs.
- Tissue culture labs, Hi-tech & normal nursery, Weather stations will be established and managed by private investors, FPCs, FPOs, SHGs, and individual progressive farmers.

7.3 New Farm Development

Uninterrupted raw material supply to the value chain is the key factor to make the Value Chain self-sustainable. Additional Hectares/land/area 250 ha per district per state per year is recommended for development of new farm area as the domestic and global consumption will be increased by 4-10 % annually. That will give strong backward linkage, and availability of market surplus for processing.

Assumptions for New Farm Development:

- To run the Value Chain with uninterrupted raw material supply – which will be the key factor, 250 Ha new farm to be developed per district per year for four years.
- Average cost of Horticulture Farm development is considered INR 1.50 Lakhs/Acre and INR 3.70 Lakhs/Ha as benchmark (Reference NHB guidelines).
- With all initiatives of Government of India for the proposed value chain, private sector will also enter into the field and considering infrastructure projects – Trans Asia Railway, International Highways connecting India and other Asian countries, water ways, new Air Cargos, the domestic consumption and the international consumption of the North Eastern India vegetables, fruits and processed value added products from this area will show straight growth. Thus additional area under Horticulture with productivity should be required and the provisions for this additional area provided in **Annexure-IX** (at page**- 54 -**).

7.4 Proposed Capacities of Post-Harvest Infrastructure assumed for Value Chain for Vegetables and Fruits in NER

Table-7.1: Proposed Capacities of Post-Harvest Infrastructure assumed for Value Chain

Units → / Parameters ↓	CollectionCenter	Reefer Van	Primary Processing Centers (PPC)	Central Processing Center (CPC)	Value Added Unit (VAU)	Training Center	Quality Analysis Lab	Certification Body	Marketing& Monitoring Agency
Processing Capacity MT/hr input	10 MT / 4 MT per trip	7 MT/15 MT per trip	4 MT/hr	4.5 MT/hr	200 kg/hr				
RM Required Per Shift MT/shift	Per Trip Basis Minimum 2 trips/day	Required to transport perishables items/frozen	32 MT/Shift	36 MT/hr	1600 kg/shift				
RM Required Per Day MT/Shift	20 MT/ day Or and 8 MT/ shift		80 MT/day	90MT/day	4 MT/day	NA			
V &F requirement per annum /shift basis 280 days/annum	5600 MT/CC		8960 MT	10080	448 MT	NA	NA	NA	NA
V & F Required p.a. per day 20 hrs basis	5600 MT		22400 MT	25200 MT	1120 MT	NA	NA	NA	NA
Capital Investment INR Lakhs	**26.95 (10 MT) 20 (4 MT)**	**25 (7 MT) 58 (15 MT)**	**287.30**	**5831**	**1175**	**974**	**1120**	**770**	

7.5 Summary of State-wise Post-Harvest & Processing Value Chain Components &Investment:

Table 7.2: State-wise Summary of Post-Harvest & Processing Value Chain Components & Investment

Investment= INR in Lakhs

State	VC Component → / Details ↓	Collection Centers Mobile 4 MT	Collection Centers 10 MT	Reefer Van (7 MT)	Reefer Van (15 MT)	PPC	CFC/CPU	Value Added Processing Facility	Training Center	Lab	Certification	NERAMAC Center@12%
	Investment per unit	**20.00**	**26.95**	**25.00**	**58.00**	**287.30**	**5831.00**	**1175.00**	**974.00**	**1120.00**	**770.00**	
Arunachal	Quantity	6	4	2	2	4	2	1	2	1	1	1
	Investment	120	107.80	50	116	1149.20	11662	1175	1948	1120	770	2186.16
Assam	Quantity	18	9	9	4	9	4	2	4	1	1	1
	Investment	360	242.55	225	262	2585.70	23324	2350	3896	1120	770	4212.60
Manipur	Quantity	28	0	7	1	7	1	0	2	1	1	1
	Investment	560	0.00	175	58	2011.10	5831	0	1948	1120	770	1496.77
Meghalaya	Quantity	12	7	7	2	7	1	1	2	1	1	1
	Investment	240	188.65	175	116	2011.10	5831	1175	1948	1120	770	1628.70
Mizoram	Quantity	20	0	5	1	5	1	0	2	1	1	1
	Investment	400	0	125	58	1436	5831	0	1948	1120	770	1402.60
Nagaland	Quantity	32	0	8	1	8	01	0	2	1	1	1
	Investment	640	0	200	58	2298.40	5831	0	1948	1120	770	1543.85
Sikkim	Quantity	16	0	6	0	4	1	0	1	1	1	1
	Investment	320	0	150	0	1149.20	5831	0	974	1120	770	1237.70
Tripura	Quantity	22	4	8	1	8	1	0	1	1	1	1
	Investment	440	107.80	200	58	2298.40	5831	0	974	1120	770	1415.90
TOTAL	**Quantity**	**154**	**24**	**52**	**12**	**52**	**12**	**4**	**16**	**8**	**8**	**8**
	Investment	**3080**	**646.80**	**1300**	**726**	**14939**	**69972**	**4700**	**15584**	**8960**	**6160**	**15124.28**

The Location of Value Chain Components (State wise) and details of which are placed in **Annexure-VIII** (at page**- 51 -**) of the report.

7.6 Summary of State-wise Backward Linkage Infrastructure& Investment:

Table 7.3: State-wise Summary of Backward Linkage Infrastructure & Investment

Investment= INR in Lakhs

State	VC Component → / Details ↓	Hi-Tech Nursery (in Nos.)	Tissue Culture Lab (in Nos.)	Hi Tech Farm (in ha)	Total (INR in Lakh)
	Investment per unit	**100**	**250**	**Rs.3.70Lakh /ha**	
Arunachal	Quantity	4	1	25000 ha	
	Investment	400	250	92500	**93150**
Assam	Quantity	17	8	33000 ha	
	Investment	1700	2000	122100	**125800**
Manipur	Quantity	4	2	16000ha	
	Investment	400	500	59200	**60100**
Meghalaya	Quantity	4	2	11000 ha	
	Investment	400	500	40700	**41600**
Mizoram	Quantity	3	1	11000 ha	
	Investment	300	250	40700	**41250**
Nagaland	Quantity	4	2	11000 ha	
	Investment	400	500	40700	**41600**
Sikkim	Quantity	2	1	4000 ha	
	Investment	200	250	14800	**15250**
Tripura	Quantity	2	1	8000 ha	
	Investment	200	250	29600	**30050**
Total	**Quantity**	**40**	**18**	**119000 ha**	
	Investment	**4000**	**4500**	**440300**	**448800**

Detail profile of Common Facility Center cum Central Processing Unit, Plant and Machinery for all Lines and Balance Value Added Processing Lines are placed in **Annexure-VI** (at page**- 26 -**) of the report.

7.7 Summary of State-wise Infrastructure for Value Chain development

Table 7.4: State-wise Summary of Value Chain Infrastructure

States	Arunachal Pradesh		Assam		Meghalaya		Mizoram		Manipur		Nagaland		Tripura		Sikkim	
Parameters																
A.	**Post-Harvest Processing Components**															
Mobile Collection	4MT	10MT	4MT	10MT	4MT	10MT	4MT	10MT	4MT	10MT	4MT	10MT	4MT	10MT	4MT	10MT
(in Nos.)	6	4	18	9	12	7	20	0	28	0	32.	0	22.	4	16	0
Investment In Mobile CC Vans		227.80		602.55		428.65		400		560		640		547.80		320
Reefer Van Quantity	7 MT	15 MT	7 MT	15 MT	7 MT	15 MT	7 MT	15 MT	7 MT	15 MT	7 MT	15 MT	7 MT	15 MT	7 MT	15 MT
(in Nos.)	2	2	9	4	7	2	5	1	7	1	8	1	8	1	6	
Investment In Reefer Van		166		457		291		183		233		258		258		150
V & F Handled per Shift by CC/ Yr	32000 MT		81000 MT		59000 MT		40000 MT		56000 MT		64000 MT		64000 MT		32000 MT	
PPC	4 Nos.		9 Nos.		7 Nos.		5 Nos.		7 Nos.		8 Nos.		8 Nos.		4 Nos.	
		1149.20		2585.70		2011.10		1436.50		2011.10		2298.40		2298.40		1149.20
CFC	2 Nos.		4 Nos.		1 No.		1 No.		1 No.		1 No.		1 No.		1 No.	
		11662		23324		5831		5831		5831		5831		5831		5831
Value Addition Unit	1 no.		2 nos.		1 no.		0		0		0		0		0	
		1175		2350		1175		0		0		0		0		0
Training Centre Students/ annum	2 nos.		4 nos.		2 nos.		2 nos.		2 nos.		2 nos.		1 no.		1no.	
		1948		3896		1948		1948		1948		1948		974		974
	16000 Student		32000 Students		16000 students		16000 students		16000 students		16000 Students		8000 students		8000 students	
QC Lab	1 no.		1 no.		1 no.		1 no.		1 no.		1no.		1 no.		1 no.	
		1120		1120		1120		1120		1120		1120		1120		1120
Certification Agency	1 no.		1 no.		1 no.		1 no.		1 no.		1 no.		1 no.		1.	
		770		770		770		770		770		770		770		770
Sub-total of A		**18218**		**35105.25**		**13574.70**		**11688.50**		**12473.10**		**12865.40**		**11799.20**		**10314.20**
B.	**Backward Linkage Components**															
Hi Tech Nursery	4 nos.		17 nos.		4 nos.		3 nos.		4 nos.		4 nos.		2 nos.		2 nos.	
		400.00		1700		400		300		400		400		200		200
Tissue Culture Lab	1 no.		8 nos.		2 nos.		1 no.		2 nos.		2 nos.		1 no.		1 no.	
		250.00		2000		500		250		500		500		250		250
New Farm Development Area	25000 Ha		33000 Ha		11000 Ha		11000 Ha		16000 Ha		11000 Ha		8000 Ha		4000 Ha	
		92500.00		122100		40700		40700		59200		40700		29600		14800
Total of B		**93150.00**		**125800**		**41600**		**41250**		**60100**		**41600**		**30050**		**15250**
C.	**Marketing , Branding and Monitoring Services**															
Marketing, Branding, & Monitoring		**2186.16**		**4212.63**		**1628.70**		**1402.60**		**1496.77**		**1543.85**		**1415.90**		**1237.70**
TOTAL (A+B+C)		**113554.16**		**165117.88**		**56803.4**		**54341.1**		**74069.87**		**56009.25**		**43265.1**		**26801.9**

7.8 Summary of Investment in Common Facility Centre& Central Processing Unit

No	Particulars	Amount INR in Lakhs	
1.	Infrastructure Cost	Non-Core Infra Investment	1272
		Core Infrastructure	1740
		Subtotal	3012
2.	Processing and Value Added Product Manufacturing	Dehydration Plant	302
		IQF Plant	594
		Canning Line (2 section)	78
		Ready to Serve Juice Plant	409
		Ready To Cook Plant	64
		Cold store	360
		Tera Pack Plant	1012
		Subtotal	2819
	Total Investment in CFC Or CPU	1+2	5831

7.9 Socio Economic Impact

No.	Particulars	Details
1.	Direct Employment Creation In CFU /CFC	More than 500 nos.
2.	Daily Raw Material Requirement	110 MT
3.	Annual Vegetables and Fruits Required	33000 MT
4.	Multi Commodity Activity All Short Listed Fruits and Vegetables Can Be Processed In the Proposed Set UP	Reduce V&F wastage , Add value , Enhance shelf life
5.	Expected Production of 3 MT per Acre	11000 Acre land crops can be directly connected with CFC/CFU
6.	Expected Employment Generation per Acre as 4 Nos.	44000 employment generated at Farm Level

7.10 State-wise Value Chain Investment details - Arunachal Pradesh:

7.10.1 Short Listed Fruits and Vegetables in Arunachal Pradesh

Seasons / Fruits	Jan		Feb		Mar		Apr		May		June		July		Aug		Sep		Oct		Nov		Dec	
a) Kiwi																								
b) Pineapple																								
c) Banana																								
d) Citrus																								
e) Papaya																								

Seasons / Vegetables	Jan		Feb		Mar		Apr		May		Jun e		July		Aug		Sep		Oct		Nov		Dec	
a) Mushroom																								
b) Carrot																								
c) Cabbage																								
d) Tomato																								
e) Broccoli																								
f) Pumpkin																								
g) Cucurbits (Cucumber)																								
h) Sweet Potato																								

7.10.2 Value Chain Components – Post Harvest Processing (Arunachal Pradesh)

7.10.2.1 Mobile Collection Centers (Established & Managed by FPC, FPOs, SHGs)

Vehicle & Capacity	4 MT	10 MT	Reefer Van 7 MT	Reefer Van 15 MT
Quantity	6 Nos.	4 Nos.	2 Nos.	2 Nos.
Price Per Vehicle (INR Lakh)	20	26.95	25	58
Subtotal (INR Lakh)	120	107.80	50	116
Total Investment for Mobile Collection Centers	INR 227.80 Lakhs			
Total Investment For Reefer Vehicles	INR 166 Lakhs			
Fruits and Vegetables Collection By Mobile Collection Centers	32000 MT			

7.10.2.2 Primary Processing Centers (Established& Managed By FPC, FPOs, SHGs)

No	Total PPCs	Capacity Per PPC	Total Capacity in the State for PPCs	Investment Per PPC INR In Lakhs	Total Investment in the state for PPC INR in Lakhs
1.	4 Nos.	8000 MT/annum /shift	32000 MT	287.30	1149.20

7.10.2.3 Central Processing Unit or Common Facility Centre (Established and Managed By SPV or Private Entrepreneur)

No	No. in the State	F & V Handled by CPC per annum/shift	Total F & V Handled /Processed by CFC/annum/shift	Investment in CPU/CFC INR In Lakhs	Total Investment in CPU/CFC In the state INR Lakhs
1.	2	9000 MT	18000 MT	5831	11662

7.10.2.4 Value Added Processing Unit (Established and Managed By SPV or Private Entrepreneur)

No	No. in the State	F & V Handled by VAPU per annum/shift	Total F & V Handled/Processed by VAPU/annum/shift	Investment in VAPU INR In Lakhs	Total Investment in VAPU unit In the state INR Lakhs
1.	1	400 MT	400 MT	1175	1175

7.10.1.5 Farmer Training Centre (Established & Managed FPCs, FPOs, or and SHGs)

No	No. in the State	No. of farmers Trained per annum /center	No. of farmers Trained per annum /center	Investment in Farmer Training Centre INR In Lakhs	Total Investment in FTC In the state INR Lakhs
1.	2	8000 Nos.	16000 Nos.	974	1948

7.10.2.6 Quality Assurance Lab (Established & Managed By SPV)

No	No. in the State	Accreditation	Services for Quality Assurance	Investment in QAL INR In Lakhs	Total Investment in QAL In the state INR Lakhs
1.	1	By NABL	All Related to Value Chain	1120	1120

7.10.2.7 Certification Agency (Established by SPV)-Arunachal Pradesh

No	No. in the State	Accreditation	Services for Quality Assurance	Investment in CA INR In Lakhs	Total Investment in CA In the state INR Lakhs
1.	1	APEDA National Accreditation Board For Certification Bodies - NABCB	All Related to Value Chain	770	770

7.10.3 Summary of Investment & Financial Components for Post-Harvest Processing Part (Arunachal Pradesh)

Activity → / Details ↓	Mobile Collection Centers	Reefer Van	PPC	CFC	VA Unit	Training Centre	Lab	Certification Agency	Total (INR In Lakhs)
In INR Lakhs	227.80	166	1149.20	11662	1175	1948	1120	770	18218
Promoter	FPC/FPO	FPC/FPO	FPC/FPO	SPV/Private Entrepreneur	SPV/ Private Entrepreneur	FPC/FPO	SPV/ Private Entrepreneur	SPV/State Govt.	NIL
Financial Pattern									
75% Subsidy for FPC/FPO & 40 % for Private Entrepreneurs & SPV	170.85	124.50	861.90	4664.80	470	1461	448	308	8509.05
Grant form other Institute S&T/BT15%	NIL	NIL	NIL	NIL	NIL	NIL	168	NIL	168
Department of Agriculture Marketing 15%/APEDA	NIL	NIL	NIL	NIL	NIL	NIL	NIL	115.50	115.50
FI Loan 15%	34.17	24.90	172.38	NIL	NIL	292.20	NIL	NIL	523.65
FI Loan 25%	NIL	NIL	NIL	NIL	NIL	NIL	280	192.50	472.50
FI Loan 40%	NIL	NIL	NIL	4664.80	470	NIL	NIL	NIL	5134.80
Owner Contribution 10%	22.78	16.60	114.92	NIL	NIL	194.80	NIL	NIL	349.10
Owner Contribution 20%	NIL	NIL	NIL	2332.40	235	NIL	224	154	2945.40
Total	**227.82**	**166**	**1149.20**	**11662**	**1175**	**1948**	**1120**	**770**	**18218**

Refer **Annexure-IX** for details.

7.10.4 Marketing, Branding and Monitoring Component –Role of NERAMAC

The investment for marketing will be as follows:

No	Particulars	Investment in Post-Harvest Sector INR in Lakhs	12 % of Total Investment for Marketing, Branding and Monitoring INR in Lakhs
1.	Post-Harvest Infrastructure Investment in Arunachal Pradesh	18218	2186.16 – This investment will be 100% grant from GOI – DONER

7.10.5 Backward Linkage Infrastructure and Investment Summary

Assumptions:

a. For backward linkage development there are ongoing schemes like RKVY, MOVCD.

b. The main challenges are: Low yield and lack of modern technology (technology intervention).

c. Poor Planting Material.

d. To overcome these challenges Arunachal Pradesh require 4 Hi-tech Nurseries and one Tissue culture lab.

e. Drip Irrigation, Farm Pond other facilities are already covered in existing schemes and in the proposed action plan no need for separate provision of fund.

f. Considering the next five years market requirement and establishing modern farm, this action plan recommends 5000 Ha farms with modern technology and intervention of ISRAEL concepts. The provision of funds to develop new farms will be made under RKVY and MOVCD.

7.10.5.1 Investment in Backward Linkage for Arunachal Pradesh

Activity → / **Details ↓**	**Hi-Tech Nursery**	**Tissue Culture Lab**	**Hi-Tech Farm**	**Total INR In Lakhs**
Quantity	4 Nos.	1 No.	25000 Ha	NIL
Promoter	FPC/FPO/Private Entrepreneur/SPV	FPC/FPO/Private Entrepreneur/SPV	Farmers/FPC /FPOs, SHGs	NIL
Per Unit Investment INR in Lakhs	100	250	3.7 Lakh/ Ha	NA
Total Investment In INR Lakhs	400	250	92500	93150
Financial Pattern				
75% Subsidy for FPC/FPO&	300 OR	187.50 OR	69375 OR	487.50
40 % for Private Entrepreneurs & SPV	160	100	37000	260
Grant form other Institute S&T/BT15% For Private Entrepreneurs and SPVs Only	60	37.50	NIL	97.50
FI Loan 15% For FPC/FPO	60	37.50	13875	97.50
FI Loan 25% For private Entrepreneurs	100	62.50	NIL	162.50
Owner Contribution 10% For FPCs/FPOs/SHGs	40	25	NIL	65
Owner Contribution 20%	80	50	NIL	130
Total	**400**	**250**	**92500**	**93150**

7.10.6 Five Years Action Plan for Post-Harvest Infrastructure (Arunachal Pradesh)

No	Particulars	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
A.	**Post-Harvest Infrastructure**						
1.	Collection Centers (4 MT)	6	NIL	NIL	NIL	NIL	6
2.	Collection Centers (10MT)	NIL	4	NIL	NIL	NIL	4
3.	Reefer Van (7MT)	2	NIL	NIL	NIL	NIL	2
4.	Reefer Van (15 MT)	NIL	1	1	NIL	NIL	2
5.	PPC	1	1	1	1	NIL	4
6.	CFC	NIL	Process Activation	1	Process Activation	1	2
7.	VA Unit	NIL	Process Activation	1	NIL	NIL	1
8.	Training Centre	1	NIL	1	NIL	NIL	2
9.	Lab	Process Activation	1	NIL	NIL	NIL	1
10.	Certification Body	Process Activation	1	NIL	NIL	NIL	1
11.	Branding Marketing	20%	20%	20%	20%	20%	100%

7.10.7 Five Year Action Plan Backward Linkage Infrastructure for Arunachal Pradesh

No	Particulars	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
B.	**Backward Linkage Infrastructure**						
1.	Hi Tech Nursery	1	2	1	NIL	NIL	4
2.	Tissue Culture	NIL	1	NIL	NIL	NIL	1
3.	New Farm Development (in Ha)	6250	6250	6250	6250	NIL	25000

7.11 Value Chain Investment details - Assam:

7.11.1 Short Listed Fruits and Vegetables in Assam

Seasons / Fruits	Jan		Feb		Mar		Apr		May		June		July		Aug		Sep		Oct		Nov		Dec	
a) Citrus			■	■	■	■															■	■	■	■
b) Pineapple																					■	■	■	■
c) Banana	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
d) Jackfruit													■	■	■	■	■	■						
e) Papaya	■	■					■	■	■	■							■	■					■	■
f) Guava					■	■	■	■							■	■					■	■	■	■

Seasons / Vegetables	Jan		Feb		Mar		Apr		May		June		July		Aug		Sep		Oct		Nov		Dec	
a) Mushroom							■	■	■	■	■	■	■	■	■	■	■	■						
b) Carrot	■	■							■	■	■	■											■	■
c) Cabbage					■	■							■	■	■	■								
d) Tomato	■	■							■	■	■	■			■	■	■	■						
e) Capsicum	■	■	■	■							■	■	■	■									■	■
f) Pumpkin							■	■	■	■	■	■			■	■	■	■	■	■				
g) Cucurbits (Cucumber)					■	■	■	■			■	■	■	■	■	■								
h) Sweet Potato	■	■	■	■													■	■	■	■	■	■	■	■

7.11.2 Value Chain Components – Post Harvest Processing (Assam)

7.11.2.1 Mobile Collection Centers (Established & Managed by FPC, FPOs, SHGs)

Vehicle & Capacity	4 MT	10 MT	Reefer Van 7 MT	Reefer Van 15 MT
Quantity	18 nos.	9 nos.	9 nos.	4 nos.
Price Per Vehicle (INR Lakh)	20	26.95	25	58
Subtotal (INR Lakh)	360	242.55	225	232
Total Investment for Mobile Collection Centers	INR 602.55 Lakhs			
Total Investment For Reefer Vehicles	INR 457 Lakhs			
Fruits and Vegetables Collection By Mobile Collection Centers	81000 MT			

7.11.2.2 Primary Processing Centers (Established& Managed by FPC, FPOs, SHGs)

No	Total PPCs	Capacity Per PPC	Total Capacity in the State for PPCs	Investment Per PPC INR In Lakhs	Total Investment in the state for PPC INR in Lakhs
1.	9nos.	8000 MT/annum /shift	72000 MT	287.30	2585.70

7.11.2.3 Central Processing Unit or Common Facility Centre (Established and Managed by SPV or Private Entrepreneur)

No	No. in the State	F & V Handled by CPU/CFC per annum/shift	Total F & V Handled /Processed by CFC/annum/shift	Investment in CFC/CPC INR In Lakhs	Total Investment in CFC/CPU in the state INR Lakhs
1.	4	9000 MT	36000 MT	5831	23324

7.11.2.4 Value Added Processing Unit (Established and Managed by SPV or Private Entrepreneur)

No	No. in the State	F & V Handled by VAPU per annum/shift	Total F & V Handled /Processed by VAPU/annum/shift	Investment in VAPU INR In Lakhs	Total Investment in VAPU In the state INR Lakhs
1.	2	400 MT	800 MT	1175	2350

7.11.2.5 Farmer Training Centre (Established & Managed FPCs, FPOs, or and SHGs)

No	No. in the State	No. of farmers Trained per annum /center	No. of farmers Trained per annum /center	Investment in Farmer Training Centre INR In Lakhs	Total Investment in FTC In the state INR Lakhs
1.	4	8000 nos.	32000 nos.	974	3896

7.11.2.6 Quality Assurance Lab (Established & Managed by SPV)

No	No. in the State	Accreditation	Services for Quality Assurance	Investment in QAL INR In Lakhs	Total Investment in QAL In the state INR Lakhs
1.	1	By NABL	All Related to Value Chain	1120	1120

7.11.2.7 Certification Agency (Established by SPV)

No	No. in the State	Accreditation	Services for Quality Assurance	Investment in CA INR In Lakhs	Total Investment in CA In the state INR Lakhs
1.	1	APEDA National Accreditation Board For Certification Bodies - NABCB	All Related to Value Chain	770	770

7.11.3 Summary of Investment & Financial Components for Post-Harvest Processing Part (Assam)

Activity ⇨ **Details ⇩**	**Mobile Collection Centers**	**Reefer Van**	**PPC**	**CFC**	**VA Unit**	**Training Centre**	**Lab**	**Certification Agency**	**Total INR In Lakhs**	
In INR Lakhs	602.55	457	2585.70	23324	2350	3896	1120	770	35105.25	
Promoter	FPC/FPO	FPC/FPO	FPC/FPO	SPV/Private Entrepreneur	SPV/ Private Entrepreneur	FPC/FPO	SPV/ Private Entrepreneur	SPV/State Government	NIL	
Financial Pattern										
75% Subsidy for FPC/FPO & 40 % for Private Entrepreneurs & SPV	451.92	342.75	1939.30	NIL	NIL	2922	NIL	NIL	5655.97	16681.57
	NIL	NIL	NIL	9329.60	940	NIL	448	308	11025.60	
Grant form other Institute S&T/BT15%	NIL	NIL	NIL	NIL	NIL	NIL	168	NIL	168	
Department of Agriculture Marketing 15%/APEDA	NIL	NIL	NIL	NIL	NIL	NIL	NIL	115.50	115.50	
FI Loan 15%	90.38	68.55	387.85	NIL	NIL	584.40	NIL	NIL	1131.18	
FI Loan 25%	NIL	NIL	NIL	NIL	NIL	NIL	280	192.50	472.50	
FI Loan 40%	NIL	NIL	NIL	9329.60	940	NIL	NIL	NIL	10269.60	
Owner Contribution 10%	60.25	45.70	258.55	NIL	NIL	389.60	NIL	NIL	754.13	
Owner Contribution 20%	NIL	NIL	NIL	4664.80	470	NIL	224	154	5512.80	
Total	**602.55**	**457.00**	**2585.70**	**23324**	**2350**	**3896**	**1120**	**770**	**35105.25**	

Refer **Annexure-IX** for details.

7.11.4 Marketing, Branding and Monitoring Component – Role of NERAMAC

The investment for marketing will be as follows,

No	Particulars	Investment in Post-Harvest Sector INR in Lakhs	12 % of Total Investment for Marketing, Branding and Monitoring INR in Lakhs
1.	Post-Harvest Infrastructure Investment in Assam	35105.25	**4212.60–** This investment will be 100% grant from GOI – DONER

7.11.5 Backward Linkage Infrastructure and Invest Summary

Assumptions:

a. For backward linkage development there are ongoing schemes like RKVY, MOVCD

b. The main challenges are: Low yield and lack of modern technology (technology intervention)

c. Poor Planting Material

d. To overcome these challenges Assam require 17 Hi-tech Nurseries and 8 Tissue culture lab

e. Drip Irrigation, Farm Pond other facilities are already covered in existing schemes and in the proposed action plan no need for separate provision of fund

f. Considering the next five years market requirement and establishing modern farm, this action plan recommends 10000 Ha farms with modern technology and intervention of ISRAEL concepts. The provision of funds to develop new farms will be made under RKVY and MOVCD.

7.11.5.1 Investment in Backward Linkage for Assam

⇨Activity ⇩Details	Hi Tech Nursery	Tissue Culture Lab	Hi tech Farm	Total INR In Lakhs
Quantity	17 nos	8 no	33000 Ha	NIL
Promoter	FPC/FPO/Private Entrepreneur/SPV	FPC/FPO/Private Entrepreneur/SPV	Farmers/FPC/FPOs, SHGs	NIL
Per Unit Investment INR in Lakhs	100	250	3.7 Lakh/Ha	NA
Total Investment In INR Lakhs	1700	2000	122100	125800
Financial Pattern				
75% Subsidy for FPC/FPO	1275 OR	1500 OR		2775
& 40 % for Private Entrepreneurs & SPV	680	800		1480
Grant form other Institute S&T/BT15% For Private Entrepreneurs and SPVs Only	NIL	300		300.
FI Loan 15% For FPC/FPO	255	300		555
FI Loan 25% For private Entrepreneurs	NIL	500		500
FI Loan 40% For Private Entrepreneurs	680	NIL		680
Owner Contribution 10% For FPCs/FPOs/SHGs	170	200		370
Owner Contribution 20%	340	400		740
Total	**17000**	**2000**	**122100**	**125800**

7.11.5.2 Five Years Action Plan for Post-Harvest Infrastructure (Assam)

No	Particulars	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
A.	**Post-Harvest Infrastructure**						
1.	Collection Centers - 4 MT	18	0	NIL	NIL	NIL	18
2.	Collection Centers - 10MT	NIL	5	4	NIL	NIL	9
3.	Reefer Van - 7MT	4	4	1	NIL	NIL	9
4.	Reefer Van - 15 MT	NIL	2	NIL	2	NIL	4
5.	PPC	9	NIL	NIL	NIL	NIL	9
6.	CFC	Process Activation	1 Process Activation	1 Process Activation	1 Process Activation	1	4
7.	VA Unit	NIL	Process Activation	1	Process Activation	1	2
8.	Training Centre	1	2	1	1	NIL	4
9.	Lab	Process Activation	1	NIL	NIL	NIL	1
10.	Certification Body	Process Activation	1	NIL	NIL	NIL	1
11.	Branding Marketing	20%	20%	20%	20%	20%	100%

7.11.5.3 Backward Linkage Infrastructure for Assam

No	Particulars	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
B.	**Backward Linkage Infrastructure**						
1.	Hi Tech Nursery	4	4	6	3	NIL	17
2.	Tissue Culture	2	4	2	NIL	NIL	8
3.	New Farm (in Ha)	8250	8250	8250	8250	NIL	33000

7.12 Value Chain Investment details - Meghalaya:

7.12.1 Short Listed Fruits and Vegetables in Meghalaya

Seasons / Fruits	Jan		Feb		Mar		Apr		May		June		July		Aug		Sep		Oct		Nov		Dec	
a) Citrus			■	■	■	■					■	■									■	■	■	■
b) Pineapple									■	■	■	■	■	■										
c) Banana							■	■	■	■	■	■												
d) Jackfruit													■	■	■	■	■	■						

Seasons / Vegetables	Jan		Feb		Mar		Apr		May		June		July		Aug		Sep		Oct		Nov		Dec	
a) Carrot	■	■	■	■	■	■			■	■	■	■									■	■	■	■
b) Cabbage	■	■	■	■									■	■	■	■	■	■	■	■	■	■	■	■
c) Tomato	■	■							■	■	■	■			■	■	■	■						
d) Pumpkin							■	■	■	■	■	■			■	■	■	■	■	■				
e) Cucurbit					■	■	■	■			■	■	■	■	■	■								
f) Sweet Potato	■	■	■	■													■	■	■	■	■	■	■	■
g) Broccoli	■	■	■	■																	■	■	■	■

7.12.2 Value Chain Components – Post Harvest Processing (Meghalaya)

7.12.2.1 Mobile Collection Centers (Established & Managed by FPC, FPOs, SHGs)

Vehicle & Capacity	4 MT	10 MT	Reefer Van 7 MT	Reefer Van 15 MT
Quantity	12 nos.	7 nos.	7 nos.	2 nos.
Price Per Vehicle (INR Lakh)	20	26.95	25	58
Subtotal (INR Lakh)	240	188.65	175	116
Total Investment for Mobile Collection Centers	INR 428.65 Lakhs			
Total Investment For Reefer Vehicles	INR 291Lakhs			
Fruits and Vegetables Collection By Mobile Collection Centers	59000 MT			

7.12.2.2 Primary Processing Centers (Established& Managed by FPC, FPOs, SHGs)

No	Total PPCs	Capacity Per PPC	Total Capacity in the State for PPCs	Investment Per PPC INR In Lakhs	Total Investment in the state for PPC INR in Lakhs
1.	7 nos.	8000 MT/annum /shift	56000 MT	287.30	2011.10

7.12.2.3 Central Processing Unit or Common Facility Centre (Established and Managed by SPV or Private Entrepreneur)

No	No. in the State	F & V Handled by CPC per annum/shift	Total F & V Handled /Processed by CFC/annum/shift	Investment in CPC INR In Lakhs	Total Investment in CFC In the state INR Lakhs
1.	1	9000 MT	9000 MT	5831	5831

7.12.2.4 Value Added Processing Unit (Established and Managed by SPV or Private Entrepreneur)

No	No. in the State	F & V Handled by VAPU per annum/shift	Total F & V Handled /Processed by VAPU/annum/shift	Investment in VAPU INR In Lakhs	Total Investment in VAPU In the state INR Lakhs
1.	1	400 MT	400 MT	1175	1175

7.12.2.5 Farmer Training Centre (Established & Managed FPCs, FPOs, or and SHGs)

No	No. in the State	No. of farmers Trained per annum /center	No. of farmers Trained per annum /center	Investment in Farmer Training Centre INR In Lakhs	Total Investment in FTC In the state INR Lakhs
1.	2	8000 nos	16000 nos	974	1948

7.12.2.6 Quality Assurance Lab (Established & Managed by SPV)

No	No. in the State	Accreditation	Services for Quality Assurance	Investment in QAL INR In Lakhs	Total Investment in QAL In the state INR Lakhs
1.	1	By NABL	All Related to Value Chain	1120	1120

7.12.2.7 Certification Agency (Established by SPV)

No	No. in the State	Accreditation	Services for Quality Assurance	Investment in CA INR In Lakhs	Total Investment in CA In the state INR Lakhs
1.	1	APEDA National Accreditation Board For Certification Bodies - NABCB	All Related to Value Chain	770	770

7.12.3 Summary of Investment & Financial Components for Post-Harvest Processing Part (Meghalaya)

⇨Activity / ⇩Details	Mobile Collection Centers	Reefer Van	PPC	CFC	VA Unit	Training Centre	Lab	Certification Agency	Total (INR In Lakhs)	
In INR Lakhs	428.70	291	2011.10	5831	1175	1948	1120	770	13574.70	
Promoter	FPC/FPO	FPC/FPO	FPC/FPO	SPV/Private Entrepreneur	SPV/ Private Entrepreneur	FPC/FPO	SPV/ Private Entrepreneur	SPV/State Govt.	NIL	
Financial Pattern										
75% Subsidy for FPC/FPO & 40 % for Private Entrepreneurs & SPV	321.50	218.25	1508.30	NIL	NIL	1461	NIL	NIL	3509	7067.40
	NIL	NIL	NIL	2332.40	470	NIL	448	308	3558.40	
Grant form other Institute S&T/BT15%	NIL	NIL	NIL	NIL	NIL	NIL	168	NIL	168	
Department of Agriculture Marketing 15%/APEDA	NIL	NIL	NIL	NIL	NIL	NIL	NIL	115.50	115.50	
FI Loan 15%	64.30	43.65	301.70	NIL	NIL	292.20	NIL	NIL	701.85	
FI Loan 25%	NIL	NIL	NIL	NIL	NIL	NIL	280	192.50	472.50	
FI Loan 40%	NIL	NIL	NIL	2332.40	470	NIL	NIL	NIL	2802.40	
Owner Contribution 10%	42.90	29.10	201.10	NIL	NIL	194.80	NIL	NIL	467.90	
Owner Contribution 20%	NIL	NIL	NIL	1166.20	235	NIL	224	154	1779.20	
Total	**428.70**	**291**	**2011.10**	**5831**	**1175**	**1948**	**1120**	**770**	**13574.70**	

Refer **Annexure-IX** for details.

7.12.4 Marketing, Branding and Monitoring Component – Role of NERAMAC

The investment for marketing will be as follows:

No	Particulars	Investment in Post-Harvest Sector INR in Lakhs	12 % of Total Investment for Marketing, Branding and Monitoring INR in Lakhs
1.	Post-Harvest Infrastructure Investment in Meghalaya	13574.70	**1628.70–** This investment will be 100% grant from GOI – DONER

7.12.5 Backward Linkage Infrastructure and Invest Summary

Assumptions:

a. For backward linkage development there are ongoing schemes like RKVY, MOVCD

b. The main challenges are: Low yield and lack of modern technology (technology intervention)

c. Poor Planting Material

d. To overcome these challenges Meghalaya require 4 Hi-tech Nurseries and Two Tissue culture lab

e. Drip Irrigation, Farm Pond other facilities are already covered in existing schemes and in the proposed action plan no need for separate provision of fund

f. Considering the next five years market requirement and establishing modern farm, this action plan recommends 5000 Ha farms with modern technology and intervention of ISRAEL concepts. The provision of funds to develop new farms will be made under RKVY and MOVCD.

7.12.5.1 Investment in Backward Linkage for Meghalaya

Activity ⇨ / Details ⇩	Hi Tech Nursery	Tissue Culture Lab	Hi tech Farm	Total INR In Lakhs
Quantity	4 nos.	2 nos.	11000 Ha	NIL
Promoter	FPC/FPO/Private Entrepreneur/SPV	FPC/FPO/Private Entrepreneur /SPV	Farmers/FPC /FPOs, SHGs	NIL
Per Unit Investment INR in Lakhs	100	250	3.7 Lakh/Ha	NA
Total Investment In INR Lakhs	400	500	40700	41600
Financial Pattern				
75% Subsidy for FPC/FPO	300 OR	375 OR		675
& 40 % for Private Entrepreneurs & SPV	160	200		360
Grant form other Institute S&T/BT15% For Private Entrepreneurs and SPVs Only	NIL	75		75
FI Loan 15% For FPC/FPO	60	75		130
FI Loan 25% For private Entrepreneurs	NIL	125		125
FI Loan 40%	160	NIL		160
Owner Contribution 10% For FPCs/FPOs/SHGs	40	50		90
Owner Contribution 20%	80	100		180
Total	**400**	**500**	**40700**	**41600**

7.12.5.2 Five Years Action Plan for Post-Harvest Infrastructure (Meghalaya)

No	Particulars	1st Year	2ndYear	3rd Year	4thYear	5thYear	Total
A.	**Post-Harvest Infrastructure**						
1.	Collection Centers-4 MT	12	NIL	NIL	NIL	NIL	12
2.	Collection Centers-10MT	2	5	NIL	NIL	NIL	7
3.	Reefer Van 7MT	2	5	NIL	NIL	NIL	7
4.	Reefer Van 15 MT	NIL	1	1	NIL	NIL	2
5.	PPC	5	2	NIL	NIL	NIL	7
6.	CFC	Process Activation	1	NIL	NIL	NIL	1
7.	VA Unit	NIL	Process Activation	1	NIL	NIL	1
8.	Training Centre	1	NIL	1	NIL	NIL	2
9.	Lab	Process Activation	1	NIL	NIL	NIL	1
10.	Certification Body	Process Activation	1	NIL	NIL	NIL	1
11.	Branding Marketing	20%	20%	20%	20%	20%	100%

7.12.5.3 Backward Linkage Infrastructure for Meghalaya

No	Particulars	1st Year	2ndYear	3rd Year	4thYear	5thYear	Total
B.	**Backward Linkage Infrastructure**						
1.	Hi Tech Nursery	1	2	1	NIL	NIL	4
2.	Tissue Culture	NIL	1	1	NIL	NIL	2
3.	New Farm (in Ha)	2750	2750	2750	2750	NIL	11000

7.13 Value Chain Investment details - Mizoram:

7.13.1 Short Listed Fruits and Vegetables in Mizoram

Seasons / Fruits	Jan		Feb		Mar		Apr		May		June		July		Aug		Sep		Oct		Nov		Dec	
a) Citrus																								
b) Pineapple																								
c) Banana																								
d) Passion fruit																								

Seasons / Vegetables	Jan		Feb		Mar		Apr		May		June		July		Aug		Sep		Oct		Nov		Dec	
a) Cabbage																								
b) Tomato																								
c) Pumpkin																								
d) Capsicum																								

7.13.2 Value Chain Components – Post Harvest Processing (Mizoram)

7.13.2.1 Mobile Collection Centers (Established & Managed by FPC, FPOs, SHGs)

Vehicle & Capacity	4 MT	10 MT	Reefer Van 7 MT	Reefer Van 15 MT
Quantity	20 nos.	0	5 nos.	1 no.
Price Per Vehicle (INR Lakh)	20	26.95	25	58
Subtotal (INR Lakh)	400	0	125	58
Total Investment for Mobile Collection Centers	INR 400 Lakhs			
Total Investment For Reefer Vehicles	INR 183 Lakhs			
Fruits and Vegetables Collection By Mobile Collection Centers	40000 MT			

7.13.2.2 Primary Processing Centers (Established& Managed By FPC, FPOs, SHGs)

No	Total PPCs	Capacity Per PPC	Total Capacity in the State for PPCs	Investment Per PPC INR In Lakhs	Total Investment in the state for PPC INR in Lakhs
1.	5 nos.	8000 MT/annum /shift	40000 MT	287.30	1436.50

7.13.2.3 Central Processing Unit or Common Facility Centre (Established and Managed By SPV or Private Entrepreneur)

No	No. in the State	F & V Handled by CPC per annum/shift	Total F & V Handled /Processed by CFC/annum/shift	Investment in CPC INR In Lakhs	Total Investment in CFC In the state INR in Lakhs
1.	1	9000 MT	9000 MT	5831	5831

7.13.2.4 Value Added Processing Unit (Established and Managed By SPV or Private Entrepreneur)

No	No. in the State	F & V Handled by VAPU per annum/shift	Total F & V Handled /Processed by CFC/annum/shift	Investment in VAPU INR In Lakhs	Total Investment in VAPU In the state INR Lakhs
1.	0	0	0	0	0

7.13.2.5 Farmer Training Centre (Established & Managed FPCs, FPOs, or and SHGs)

No	No. in the State	No. of farmers Trained per annum /center	No. of farmers Trained per annum /center	Investment in Farmer Training Centre INR In Lakhs	Total Investment in FTC In the state INR Lakhs
1.	2	8000 nos.	16000 nos.	974	1948

7.13.2.6 Quality Assurance Lab (Established & Managed By SPV)

No	No in the State	Accreditation	Services for Quality Assurance	Investment in QAL INR In Lakhs	Total Investment in QAL In the state INR Lakhs
1.	1	By NABL	All Related to Value Chain	1120	1120

7.13.2.7 Certification Agency (Established by SPV)

No	No in the State	Accreditation	Services for Quality Assurance	Investment in CA INR In Lakhs	Total Investment in CA In the state INR Lakhs
1.	1	APEDA National Accreditation Board For Certification Bodies - NABCB	All Related to Value Chain	770	770

7.13.3 Summary of Investment & Financial Components for Post-Harvest Processing Part (Mizoram)

⇨Activity / ⇩Details	Mobile Collection Centers	Reefer Van	PPC	CFC	VA Unit	Training Centre	Lab	Certification Agency	Total INR In Lakhs	
In INR Lakhs	400	183	1436.50	5831	0	1948	1120	770	11688.50	
Promoter	FPC/FPO	FPC/FPO	FPC/FPO	SPV/Private Entrepreneur	SPV/ Private Entrepreneur	FPC/FPO	SPV/ Private Entrepreneur	SPV/State Government	NIL	
Financial Pattern										
75% Subsidy for FPC/FPO & 40 % for Private Entrepreneurs & SPV	300	137.25	1077.40	NIL	NIL	1461	NIL	NIL	2975.65	6064.05
	NIL	NIL	NIL	2332.40	0	NIL	448	308	3088.40	
Grant form other Institute S&T/BT15%	NIL	NIL	NIL	NIL	NIL	NIL	168	NIL	168	
Department of Agriculture Marketing 15%/APEDA	NIL	NIL	NIL	NIL	NIL	NIL	NIL	115.50	115.50	
FI Loan 15%	60	27.45	215.50	NIL	NIL	292.20	NIL	NIL	595.15	
FI Loan 25%	NIL	NIL	NIL	NIL	NIL	NIL	280	192.50	472.50	
FI Loan 40%	NIL	NIL	NIL	2332.40	NIL	NIL	NIL	NIL	2332.40	
Owner Contribution 10%	40	18.30	143.60	NIL	NIL	194.80	NIL	NIL	396.70	
Owner Contribution 20%	NIL	NIL	NIL	1166.20	NIL	NIL	224	154	1544.20	
Total	**400**	**183**	**1436.50**	**5831**	**NIL**	**1948**	**1120**	**770**	**11688.50**	

Refer **Annexure-IX** for details.

7.13.4 Marketing, Branding and Monitoring Component – Role of NERAMAC

The investment for marketing will be as follows,

No	Particulars	Investment in Post-Harvest Sector INR in Lakhs	12 % of Total Investment for Marketing, Branding and Monitoring INR in Lakhs
1.	Post-Harvest Infrastructure Investment in Mizoram	11688.55	**1402.60** This investment will be 100% grant from GOI – DONER

7.13.5 Backward Linkage Infrastructure and Invest Summary

Assumptions:

a. For backward linkage development there are ongoing schemes like RKVY, MOVCD

b. The main challenges are: Low yield and lack of modern technology (technology intervention)

c. Poor Planting Material

d. To overcome these challenges Mizoram require 3 Hi tech Nurseries and one Tissue culture lab

e. Drip Irrigation, Farm Pond other facilities are already covered in existing schemes and in the proposed action plan no need for separate provision of fund

f. Considering the next five years market requirement and establishing modern farm, this action plan recommends 5000 Ha farms with modern technology and intervention of ISRAEL concepts. The provision of funds to develop new farms will be made under RKVY and MOVCD.

7.13.5.1 Investment in Backward Linkage for Mizoram

⇨Activity / ⇩Details	Hi Tech Nursery	Tissue Culture Lab	Hi tech Farm	Total INR In Lakhs
Quantity	3 nos	1 no	11000 Ha	NIL
Promoter	FPC/FPO/Private Entrepreneur/SPV	FPC/FPO/Private Entrepreneur /SPV	Farmers/FPC/FPOs, SHGs	NIL
Per Unit Investment INR in Lakhs	100	250	3.7 Lakh/Ha	NA
Total Investment In INR Lakhs	300	250	40700	41250
Financial Pattern				
75% Subsidy for FPC/FPO	225	187.50		412.50
& 40 % for Private Entrepreneurs & SPV	120	100		220
Grant form other Institute S&T/BT15% For Private Entrepreneurs and SPVs Only	NIL	37.50		37.50
FI Loan 15% For FPC/FPO	45	37.50		82.50
FI Loan 25% For private Entrepreneurs	NIL	62.50		62.50
Owner Contribution 10% For FPCs/FPOs/SHGs	30	25		55
Owner Contribution 20%	60	50		110
Total	**300**	**250**	**40700**	**41250**

7.13.6 Five Years Action Plan for Post-Harvest Infrastructure (Mizoram)

No	Particulars	1st Year	2nd Year	3rd Year	4thYear	5thYear	Total
A.	**Post-Harvest Infrastructure**						
1.	Collection Centers-4 MT	10	10	NIL	NIL	NIL	20
2.	Collection Centers 10MT	NIL	NIL	NIL	NIL	NIL	NIL
3.	Reefer Van 7MT	2	2	1	NIL	NIL	5
4.	Reefer Van 15 MT	NIL	NIL	1	NIL	NIL	1
5.	PPC	1	2	2	NIL	NIL	5
6.	CFC	NIL	Process Activation	1	NIL	NIL	1
7.	VA Unit	NIL	NIL	NIL	NIL	NIL	NIL
8.	Training Centre	1	1	NIL	NIL	NIL	2
9.	Lab	Process Activation	1	NIL	NIL	NIL	1
10.	Certification Body	Process Activation	1	NIL	NIL	NIL	1
11.	Branding Marketing	20%	20%	20%	20%	20%	100%

7.13.7 Backward Linkage Infrastructure for Mizoram

No	Particulars	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
B.	**Backward Linkage Infrastructure**						
1.	Hi Tech Nursery	1	2	NIL	NIL	NIL	3
2.	Tissue Culture	NIL	1	NIL	NIL	NIL	1
3.	New Farm (in Ha)	2750	2750	2750	2750	NIL	11000

7.14 Value Chain Investment details - Manipur:

7.14.1 Short Listed Fruits and Vegetables in Manipur

Seasons / Fruits	Jan		Feb		Mar		Apr		May		June		July		Aug		Sep		Oct		Nov		Dec	
a) Citrus			■	■	■	■					■	■									■	■	■	■
b) Pineapple													■	■	■	■	■	■						
c) Banana							■	■	■	■	■	■	■	■	■	■								
d) Passion fruit					■	■	■	■	■	■					■	■	■	■	■	■	■	■	■	■

Seasons / Vegetables	Jan		Feb		Mar		Apr		May		June		July		Aug		Sep		Oct		Nov		Dec	
a) Cabbage	■	■	■	■									■	■	■	■	■	■	■	■	■	■	■	■
b) Tomato	■	■	■	■					■	■	■	■			■	■	■	■						
c) Broccoli	■	■	■	■																	■	■	■	■
d) Cucurbits					■	■	■	■			■	■	■	■	■	■								
e) Capsicum	■	■	■	■	■	■					■	■	■	■							■	■	■	■

7.14.2 Value Chain Components – Post Harvest Processing

7.14.2.1 Mobile Collection Centers (Established & Managed By FPC, FPOs, SHGs)

Vehicle & Capacity	4 MT	10 MT	Refer Van 7 MT	Refer Van 15 MT
Quantity	28 nos.	0.	7 nos.	1 no.
Price Per Vehicle (INR Lakh)	20	26.95	25	58
Subtotal (INR Lakh)	560	0	175.	58
Total Investment for Mobile Collection Centers	INR 560 Lakhs			
Total Investment For Reefer Vehicles	INR 233 Lakhs			
Fruits and Vegetables Collection By Mobile Collection Centers	56000 MT			

7.14.2.2 Primary Processing Centers (Established& Managed By FPC, FPOs, SHGs)

No	Total PPCs	Capacity Per PPC	Total Capacity in the State for PPCs	Investment Per PPC INR In Lakhs	Total Investment in the state for PPC INR in Lakhs
1.	7 nos	8000 MT/annum /shift	56000 MT	287.30	2011.10

7.14.2.3 Central Processing Unit or Common Facility Centre (Established and Managed by SPV or Private Entrepreneur)

No	No. in the State	F & V Handled by CPC per annum/shift	Total F & V Handled /Processed by CFC/annum/shift	Investment in CPC INR In Lakhs	Total Investment in CFC In the state INR Lakhs
1.	1	9000 MT	9000 MT	5831	5831

7.14.2.4 Value Added Processing Unit (Established and Managed By SPV or Private Entrepreneur)

No	No. in the State	F & V Handled by VAPU per annum/shift	Total F & V Handled /Processed by VAPU/annum/shift	Investment in VAPU INR In Lakhs	Total Investment in VAPU In the state INR Lakhs
1.	0	0	0	0	0

7.14.2.4 Farmer Training Centre (Established & Managed FPCs, FPOs, or and SHGs)

No	No. in the State	No. of farmers Trained per annum /center	No. of farmers Trained per annum /center	Investment in Farmer Training Centre INR In Lakhs	Total Investment in FTC In the state INR Lakhs
1.	002	8000 nos.	16000 nos.	974	1948

7.14.2.5 Quality Assurance Lab (Established & Managed by SPV)

No	No. in the State	Accreditation	Services for Quality Assurance	Investment in QAL INR In Lakhs	Total Investment in QAL In the state INR Lakhs
1.	1	By NABL	All Related to Value Chain	1120	1120

7.14.2.6 Certification Agency (Established by SPV)

No	No. in the State	Accreditation	Services for Quality Assurance	Investment in CA INR In Lakhs	Total Investment in CA In the state INR Lakhs
1.	1	APEDA National Accreditation Board For Certification Bodies - NABCB	All Related to Value Chain	770	770

7.14.3 Summary of Investment & Financial Components forPost-Harvest Processing Part (Manipur)

Activity / Details	Mobile Collection Centers	Reefer Van	PPC	CFC	VA Unit	Training Centre	Lab	Certification Agency	Total INR In Lakhs	
In INR Lakhs	560	233	2011.10	5831	0	1948	1120	770	12473.10	
Promoter	FPC/FPO	FPC/FPO	FPC/FPO	SPV/Private Entrepreneur	SPV/ Private Entrepreneur	FPC/FPO	SPV/ Private Entrepreneur	SPV/State Govt	NIL	
Financial Pattern										
75% Subsidy for FPC/FPO & 40 % for Private Entrepreneurs & SPV	420	174.75	1508.33	NIL	NIL	1461	NIL	NIL	3564.08	6652.48
	NIL	NIL	NIL	2332.40	0	NIL	448	308	3088.40	
Grant form other Institute S&T/BT15%	NIL	NIL	NIL	NIL	NIL	NIL	168	NIL	168	
Department of Agriculture Marketing 15%/APEDA	NIL	NIL	NIL	NIL	NIL	NIL	NIL	115.50	115.50	
FI Loan 15%	84	34.95	301.66	NIL	NIL	292.20	NIL	NIL	712.81	
FI Loan 25%	NIL	NIL	NIL	NIL	NIL	NIL	280	192.50	472.50	
FI Loan 40%	NIL	NIL	NIL	2332.40	NIL	NIL	NIL	NIL	2332.40	
Owner Contribution 10%	56	23.30	201.11	NIL	NIL	194.80	NIL	NIL	475.21	
Owner Contribution 20%	NIL	NIL	NIL	1166.20	NIL	NIL	224	154	1544.20	
Total	**560**	**233**	**2011.10**	**5831**	**NIL**	**1948**	**1120**	**770**	**12473.10**	

Refer **Annexure-IX** for details.

7.14.4 Marketing, Branding and Monitoring Component – Role of NERAMAC

The investment for marketing will be as follows,

No	Particulars	Investment in Post-Harvest Sector INR in Lakhs	12 % of Total Investment for Marketing, Branding and Monitoring INR in Lakhs
1.	Post-Harvest Infrastructure Investment in Manipur	12473.10	**1496.77** This investment will be 100% grant from GOI – DONER

7.14.5 Backward Linkage Infrastructure and Invest Summary

Assumptions:

a. For backward linkage development there are ongoing schemes like RKVY, MOVCD
b. The main challenges are: Low yield and lack of modern technology (technology intervention)
c. Poor Planting Material
d. To overcome these challenges Manipur require 4 Hi tech Nurseries and 2 Tissue culture lab
e. Drip Irrigation, Farm Pond other facilities are already covered in existing schemes and in the proposed action plan no need for separate provision of fund
f. Considering the next five years market requirement and establishing modern farm, this action plan recommends 5000 Ha farms with modern technology and intervention of ISRAEL concepts. The provision of funds to develop new farms will be made under RKVY and MOVCD.

7.14.6 Investment in Backward Linkage for Manipur

Activity ⇨ / Details ⇩	**Hi Tech Nursery**	**Tissue Culture Lab**	**Hi tech Farm**	**Total INR In Lakhs**
Quantity	4 nos.	2 nos.	16000 Ha	NIL
Promoter	FPC/FPO/Private Entrepreneur/SPV	FPC/FPO/Private Entrepreneur /SPV	Farmers/FPC/ FPOs, SHGs	NIL
Per Unit Investment INR in Lakhs	100	250	3.7 Lakh/Ha	NA
Total Investment In INR Lakhs	400	500	59200	60100
Financial Pattern				
75% Subsidy for FPC/FPO	300	375		675
& 40 % for Private Entrepreneurs & SPV	160	200		360
Grant form other Institute S&T/BT15% For Private Entrepreneurs and SPVs Only	NIL	75		75
FI Loan 15% For FPC/FPO	60	75		135
FI Loan 25% For private Entrepreneurs	NIL	125		125
FI Loan 40%	160	NIL		160
Owner Contribution 10% For FPCs/FPOs/SHGs	40	50		90
Owner Contribution 20%	80	100		180
Total	**400**	**500**	**59200**	**60100**

7.14.7 Five Years Action Plan for Post-Harvest Infrastructure (Manipur)

No	Particulars	1st Year	2nd Year	3rdYear	4thYear	5thYear	Total
A.	**Post-Harvest Infrastructure**						
1.	Collection Centers 4 MT	12	12	4	NIL	NIL	28
2.	Collection Centers 10MT	NIL	NIL	NIL	NIL	NIL	NIL
3.	Reefer Van 7MT	4	2	1	NIL	NIL	7
4.	Reefer Van 15 MT	NIL	1	NIL	NIL	NIL	1
5.	PPC	3	2	2	NIL	NIL	7
6.	CFC	Process Activation	1	NIL	NIL	NIL	1
7.	VA Unit	NIL	NIL	NIL	NIL	NIL	NIL
8.	Training Centre	1	1	NIL	NIL	NIL	2
9.	Lab	Process Activation	1	NIL	NIL	NIL	1
10.	Certification Body	Process Activation	1	NIL	NIL	NIL	1
11.	Branding Marketing	20%	20%	20%	20%	20%	100%

7.14.8 Backward Linkage Infrastructure for Manipur

No	Particulars	1st Year	2nd Year	3rdYear	4thYear	5thYear	Total
B.	**Backward Linkage Infrastructure**						
1.	Hi Tech Nursery	2	2	NIL	NIL	NIL	4
2.	Tissue Culture	NIL	1	1	NIL	NIL	2
3.	New Farm (in Ha)	4000	4000	4000	4000	NIL	16000

7.15 Value Chain Investment details - Nagaland:

7.15.1 Short Listed Fruits and Vegetables in Nagaland

Seasons / Fruits	Jan		Feb		Mar		Apr		May		June		July		Aug		Sep		Oct		Nov		Dec	
a) Citrus																								
b) Pineapple																								
c) Banana																								
d) Kiwi																								

Seasons / Vegetables	Jan		Feb		Mar		Apr		May		Jun e		July		Aug		Sep		Oct		Nov		Dec	
a) Mushroom																								
b) Carrot																								
c) Cabbage																								
d) Tomato																								
e) Pumpkin																								
f) Sweet Potato																								

7.15.2 Value Chain Components – Post Harvest Processing (Nagaland)

7.15.2.1 Mobile Collection Centers (Established & Managed By FPC, FPOs, SHGs)

Vehicle & Capacity	4 MT	10 MT	Refer Van 7 MT	Refer Van 15 MT
Quantity	32 nos.	0	8 nos.	1no.
Price Per Vehicle (INR Lakh)	20	26.95	25	58
Subtotal (INR Lakh)	640	0	200	58
Total Investment for Mobile Collection Centers	INR : 640 Lakhs			
Total Investment For Refer Vehicles	INR 258 Lakhs			
Fruits and Vegetables Collection By Mobile Collection Centers	64000 MT			

7.15.2.2 Primary Processing Centers (Established& Managed By FPC, FPOs, SHGs)

No	Total PPCs	Capacity Per PPC	Total Capacity in the State for PPCs	Investment Per PPC INR In Lakhs	Total Investment in the state for PPC INR in Lakhs
1.	8 nos.	8000 MT/annum /shift	64000 MT	287.30	2298.40

7.15.2.3 Central Processing Unit or Common Facility Centre (Established and Managed By SPV or Private Entrepreneur)

No	No. in the State	F & V Handled by CPC per annum/shift	Total F & V Handled /Processed by CFC/annum/shift	Investment in CPC INR In Lakhs	Total Investment in CFC In the state INR Lakhs
1.	1	9000 MT	9000 MT	5831	5831

7.15.2.4 Value Added Processing Unit (Established and Managed By SPV or Private Entrepreneur)

No	No. in the State	F & V Handled by VAPU per annum/shift	Total F & V Handled /Processed by VAPU/annum/shift	Investment in VAPU INR In Lakhs	Total Investment in VAPU In the state INR Lakhs
1.	0	0	0	0	0

7.15.2.5 Farmer Training Centre (Established & Managed FPCs, FPOs, or and SHGs)

No	No. in the State	No. of farmers Trained per annum /center	No. of farmers Trained per annum /center	Investment in Farmer Training Centre INR In Lakhs	Total Investment in FTC In the state INR Lakhs
1.	2	8000 nos.	16000 nos.	974	1948

7.15.2.6 Quality Assurance Lab (Established & Managed By SPV)

No	No. in the State	Accreditation	Services for Quality Assurance	Investment in QAL INR In Lakhs	Total Investment in QAL In the state INR Lakhs
1.	1	By NABL	All Related to Value Chain	1120	1120

7.15.2.7 Certification Agency (Established by SPV)

No	No. in the State	Accreditation	Services for Quality Assurance	Investment in CA INR In Lakhs	Total Investment in CA In the state INR Lakhs
1.	1	APEDA National Accreditation Board For Certification Bodies - NABCB	All Related to Value Chain	770	770

7.15.3 Summary of Investment & Financial Components or Post-Harvest Processing Part (Nagaland)

Activity ⇨ / Details ⇩	Mobile Collection Centers	Reefer Van	PPC	CFC	VA Unit	Training Centre	Lab	Certification Agency	Total INR In Lakhs	
In INR Lakhs	640	258	2298.40	5831	0	1948	1120	770	12865.40	
Promoter	FPC/FPO	FPC/FPO	FPC/FPO	SPV/Private Entrepreneur	SPV/ Private Entrepreneur	FPC/FPO	SPV/ Private Entrepreneur	SPV/State Govt	NIL	
Financial Pattern										
75% Subsidy for FPC/FPO & 40 % for Private Entrepreneurs & SPV	480	193.50	1723.80	NIL	NIL	1461	NIL	NIL	3858.30	6946.70
	NIL	NIL	NIL	2332.40	0	NIL	448	308	3088.40	
Grant form other Institute S&T/BT15%	NIL	NIL	NIL	NIL	NIL	NIL	168	NIL	168	
Department of Agriculture Marketing 15%/APEDA	NIL	NIL	NIL	NIL	NIL	NIL	NIL	115.50	115.50	
FI Loan 15%	96	38.70	344.70	NIL	NIL	292.20	NIL	NIL	771.60	
FI Loan 25%	NIL	NIL	NIL	NIL	NIL	NIL	280	192.50	472.50	
FI Loan 40%	NIL	NIL	NIL	2332.40	NIL	NIL	NIL	NIL	2332.40	
Owner Contribution 10%	64	25.80	229.80	NIL	NIL	194.80	NIL	NIL	514.40	
Owner Contribution 20%	NIL	NIL	NIL	1166.30	NIL	NIL	224	154	1544.30	
Total	**640**	**258**	**2298.30**	**5831**	**NIL**	**1948**	**1120**	**770**	**12865.40**	

Refer **Annexure-IX** for details.

7.15.4 Marketing, Branding and Monitoring Component – Role of NERAMAC

The investment for marketing will be as follows,

No	Particulars	Investment in Post-Harvest Sector INR in Lakhs	12 % of Total Investment for Marketing, Branding and Monitoring INR in Lakhs
1.	Post-Harvest Infrastructure Investment in Nagaland	12865.40	**1543.85** This investment will be 100% grant from GOI – DONER

7.15.5 Backward Linkage Infrastructure and Invest Summary

Assumptions:

a. For backward linkage development there are ongoing schemes like RKVY, MOVCD

b. The main challenges are: Low yield and lack of modern technology (technology intervention)

c. Poor Planting Material

d. To overcome these challenges Nagaland require 4 Hi tech Nurseries and Two Tissue culture lab

e. Drip Irrigation, Farm Pond other facilities are already covered in existing schemes and in the proposed action plan no need for separate provision of fund

f. Considering the next five years market requirement and establishing modern farm, this action plan recommends 5000 Ha farms with modern technology and intervention of ISRAEL concepts. The provision of funds to develop new farms will be made under RKVY and MOVCD.

7.15.6 Investment in Backward Linkage for Nagaland

Activity ⇨ / Details ⇩	Hi Tech Nursery	Tissue Culture Lab	Hi tech Farm	Total INR In Lakhs
Quantity	4 nos.	2 nos.	11000 Ha	NIL
Promoter	FPC/FPO/Private Entrepreneur/SPV	FPC/FPO/Private Entrepreneur /SPV	Farmers/FPC/FPOs, SHGs	NIL
Per Unit Investment INR in Lakhs	100	250	3.7 Lakh/ Ha	NA
Total Investment In INR Lakhs	400	500	40700	41600
Financial Pattern				
75% Subsidy for FPC/FPO	300	375		675
& 40 % for Private Entrepreneurs & SPV	160	200		360
Grant form other Institute S&T/BT15% For Private Entrepreneurs and SPVs Only	NIL	75		75
FI Loan 15% For FPC/FPO	60	75		135
FI Loan 25% For private Entrepreneurs	NIL	125		125
FI Loan 40%	160	NIL		160
Owner Contribution 10% For FPCs/FPOs/SHGs	40	50		90
Owner Contribution 20%	80	100		180
Total	**400**	**500**	**40700**	**41600**

7.15.7 Five Years Action Plan for Post-Harvest Infrastructure (Nagaland)

No	Particulars	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
A.	**Post-Harvest Infrastructure**						
1.	Collection Centers 4 MT	12	12	8	NIL	NIL	32
2.	Collection Centers 10MT	NIL	NIL	NIL	NIL	NIL	NIL
3.	Reefer Van 7MT	4	2	2	NIL	NIL	8
4.	Reefer Van 15 MT	NIL	1	NIL	NIL	NIL	1
5.	PPC	3	3	2	NIL	NIL	8
6.	CFC	Process Activation	1	NIL	NIL	NIL	1
7.	VA Unit	NIL	NIL	NIL	NIL	NIL	NIL
8.	Training Centre	1	1	NIL	NIL	NIL	2
9.	Lab	Process Activation	1	NIL	NIL	NIL	1
10.	Certification Body	Process Activation	1	NIL	NIL	NIL	1
11.	Branding Marketing	20%	20%	20%	20%	20%	100%

7.15.8 Backward Linkage Infrastructure for Nagaland

No	Particulars	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
B.	**Backward Linkage Infrastructure**						
1.	Hi Tech Nursery	2	2	NIL	NIL	NIL	4
2.	Tissue Culture	NIL	1	1	NIL	NIL	2
3.	New Farm (in Ha.)	2750	2750	2750	2750	NIL	11000

7.16 Value Chain Investment details - Sikkim:

7.16.1 Short Listed Fruits and Vegetables in Sikkim

Seasons / Fruits	Jan		Feb		Mar		Apr		May		June		July		Aug		Sep		Oct		Nov		Dec	
a) Citrus			■	■	■	■					■	■									■	■	■	■
b) Guava					■	■	■	■							■	■					■	■	■	■
c) Banana							■	■	■	■	■	■	■	■	■	■								
d) Kiwi																	■	■	■	■	■	■		
e) Papaya	■	■	■	■	■	■	■	■	■	■	■	■	■	■			■	■	■	■	■	■	■	■

Seasons / Vegetables	Jan		Feb		Mar		Apr		May		June		July		Aug		Sep		Oct		Nov		Dec	
a) Mushroom							■	■	■	■	■	■	■	■	■	■	■	■						
b) Broccoli	■	■	■	■																	■	■	■	■
c) Cabbage	■	■	■	■									■	■	■	■	■	■	■	■	■	■	■	■
d) Tomato	■	■							■	■	■	■			■	■	■	■						
e) Sweet Potato	■	■	■	■													■	■	■	■	■	■	■	■

7.16.2 Value Chain Components – Post Harvest Processing (Sikkim)

7.16.2.1 Mobile Collection Centers (Established & Managed By FPC, FPOs, SHGs)

Vehicle & Capacity	4 MT	10 MT	Refer Van 7 MT	Refer Van 15 MT
Quantity	16nos.	0	6 nos.	0
Price Per Vehicle (INR Lakh)	20	26.95	25.00	58
Subtotal (INR Lakh)	320	0	150.00	0
Total Investment for Mobile Collection Centers	INR : 320 Lakhs			
Total Investment For Reefer Vehicles	INR 150 Lakhs			
Fruits and Vegetables Collection By Mobile Collection Centers	32000 MT			

7.16.2.2 Primary Processing Centers (Established& Managed By FPC, FPOs, SHGs)

No	Total PPCs	Capacity Per PPC	Total Capacity in the State for PPCs	Investment Per PPC INR In Lakhs	Total Investment in the state for PPC INR in Lakhs
1.	4 nos.	8000 MT/annum /shift	32000 MT	287.30	1149.20

7.16.2.3 Central Processing Unit or Common Facility Centre (Established and Managed By SPV or Private Entrepreneur)

No	No. in the State	F & V Handled by CPC per annum/shift	Total F & V Handled /Processed by CFC/annum/shift	Investment in CPC INR In Lakhs	Total Investment in CFC In the state INR Lakhs
1.	1	9000 MT	9000 MT	5831	5831

7.16.2.4 Value Added Processing Unit (Established and Managed By SPV or Private Entrepreneur)

No	No. in the State	F & V Handled by VAPU per annum/shift	Total F & V Handled /Processed by VAPU/annum/shift	Investment in VAPU INR In Lakhs	Total Investment in VAPU In the state INR Lakhs
1.	0	0	0	0	0

7.16.2.5 Farmer Training Centre (Established & Managed FPCs, FPOs, or and SHGs)

No	No. in the State	No. of farmers Trained per annum /center	No. of farmers Trained per annum /center	Investment in Farmer Training Centre INR In Lakhs	Total Investment in FTC In the state INR Lakhs
1.	1	8000 nos.	8000 nos.	974	974

7.16.2.6 Quality Assurance Lab (Established & Managed By SPV)

No	No. in the State	Accreditation	Services for Quality Assurance	Investment in QAL INR In Lakhs	Total Investment in QAL In the state INR Lakhs
1.	1	By NABL	All Related to Value Chain	1120	1120

7.16.2.7 Certification Agency (Established by SPV) – Already Agency Exists – With this grant The Agency Scope will be Widened

No	No. in the State	Accreditation	Services for Quality Assurance	Investment in CA INR In Lakhs	Total Investment in CA In the state INR Lakhs
1.	1	APEDA National Accreditation Board For Certification Bodies - NABCB	All Related to Value Chain	770	770

7.16.3 Summary of Investment & Financial Components forPost-Harvest Processing Part (Sikkim)

Activity ⇨ Details ⇩	**Mobile Collection Centers**	**Reefer Van**	**PPC**	**CFC**	**VA Unit**	**Training Centre**	**Lab**	**Certification Agency**	**Total INR In Lakhs**	
In INR Lakhs	320	150	1149.20	5831	0	974	1120	770	10314.20	
Promoter	FPC/FPO	FPC/FPO	FPC/FPO	SPV/ Private Entrepreneur	SPV/ Private Entrepreneur	FPC/FPO	SPV/ Private Entrepreneur	SPV/State Government	NIL	
Financial Pattern										
75% Subsidy for FPC/FPO & 40 % for Private Entrepreneurs & SPV	240	112.50	861.90	NIL	NIL	730.50	NIL	NIL	1944.90	5033.30
	NIL	NIL	NIL	2332.40	0	NIL	448	308	3088.40	
Grant form other Institute S&T/BT15%	NIL	NIL	NIL	NIL	NIL	NIL	168	NIL	168	
Department of Agriculture Marketing 15%/APEDA	NIL	NIL	NIL	NIL	NIL	NIL	NIL	115.50	115.50	
FI Loan 15%	48	22.50	172.38	NIL	NIL	146.10	NIL	NIL	388.98	
FI Loan 25%	NIL	NIL	NIL	NIL	NIL	NIL	280	192.50	472.50	
FI Loan 40%	NIL	NIL	NIL	2332.40	NIL	NIL	NIL	NIL	2332.40	
Owner Contribution 10%	32.00	15	114.92	NIL	NIL	97.40	NIL	NIL	259.32	
Owner Contribution 20%	NIL	NIL	NIL	1166.20	NIL	NIL	224	154	1544.20	
Total	**320**	**150**	**1149.20**	**5831**	**NIL**	**974**	**1120**	**770**	**10314.20**	

Refer **Annexure-IX** for details.

7.16.4 Marketing, Branding and Monitoring Component – Role of NERAMAC

The investment for marketing will be as follows,

No	Particulars	Investment in Post-Harvest Sector INR in Lakhs	12 % of Total Investment for Marketing, Branding and Monitoring INR in Lakhs
1.	Post-Harvest Infrastructure Investment in Sikkim	10314.20	**1237.70** This investment will be 100% grant from GOI – DONER

7.16.5 Backward Linkage Infrastructure and Invest Summary

Assumptions:

a. For backward linkage development there are ongoing schemes like RKVY, MOVCD.

b. The main challenges are: Low yield and lack of modern technology (technology intervention).

c. Poor Planting Material.

d. To overcome these challenges Sikkim requires 2 Hi tech Nurseries and 1 Tissue culture lab.

e. Drip Irrigation, Farm Pond other facilities are already covered in existing schemes and in the proposed action plan no need for separate provision of fund.

f. Considering the next five years market requirement and establishing modern farm, this action plan recommends 5000 Ha farms with modern technology and intervention of ISRAEL concepts. The provision of funds to develop new farms will be made under RKVY and MOVCD.

7.16.5.1 Investment in Backward Linkage for Sikkim

Activity ⇨ / Details ⇩	Hi Tech Nursery	Tissue Culture Lab	Hi tech Farm	Total INR In Lakhs
Quantity	2 nos.	1 no.	4000 Ha	NIL
Promoter	FPC/FPO/Private Entrepreneur/SPV	FPC/FPO/Private Entrepreneur /SPV	Farmers/FPC/FPOs, SHGs	NIL
Per Unit Investment INR in Lakhs	100	250	3.7 Lakh/Ha	NA
Total Investment In INR Lakhs	200	250	14800	15250
Financial Pattern				
75% Subsidy for FPC/FPO & 40 % for Private Entrepreneurs & SPV	150	187.50		337.50
	80	100		180
Grant form other Institute S&T/BT15% For Private Entrepreneurs and SPVs Only	NIL	37.50		37.50
FI Loan 15% For FPC/FPO	30	37.50		67.50
FI Loan 25% For private Entrepreneurs	NIL	62.50		62.50
FI Loan 40%	80	NIL		80
Owner Contribution 10% For FPCs/FPOs/SHGs	20	25		45
Owner Contribution 20%	40	50		90
Total	**200**	**250**	**14800**	**15250.00**

7.16.5.2 Five Years Action Plan for Post-Harvest Infrastructure (Sikkim)

No	Particulars	1st Year	2nd Year	3rd Year	4thYear	5thYear	Total
A.	**Post-Harvest Infrastructure**						
1.	Collection Centers 4 MT	12	4	NIL	NIL	NIL	16
2.	Collection Centers 10MT	NIL	NIL	NIL	NIL	NIL	NIL
3.	Reefer Van 7MT	4	2	NIL	NIL	NIL	6
4.	Reefer Van 15 MT	NIL	NIL	NIL	NIL	NIL	NIL
5.	PPC	2	2	NIL	NIL	NIL	4
6.	CFC	Process Activation	1	NIL	NIL	NIL	1
7.	VA Unit	NIL	NIL	NIL	NIL	NIL	NIL
8.	Training Centre	1	NIL	NIL	NIL	NIL	1
9.	Lab	Process Activation	1	NIL	NIL	NIL	1
10.	Certification Body	Process Activation	1	NIL	NIL	NIL	1
11.	Branding Marketing	20%	20%	20%	20%	20%	100%

7.16.5.3 Backward Linkage Infrastructure for Sikkim

No	Particulars	1st Year	2nd Year	3rd Year	4thYear	5thYear	Total
B.	**Backward Linkage Infrastructure**						
1.	Hi Tech Nursery	2	NIL	NIL	NIL	NIL	2
2.	Tissue Culture	NIL	1	NIL	NIL	NIL	1
3.	New Farm (in Ha)	1000	1000	1000	1000	NIL	4000 Ha

7.17 Value Chain Investment details - Tripura:

7.17.1 Short Listed Fruits and Vegetables in Tripura

Seasons / Fruits	Jan		Feb		Mar		Apr		May		June		July		Aug		Sep		Oct		Nov		Dec	
a) Citrus			■	■	■	■					■	■									■	■	■	■
b) Guava					■	■	■	■							■	■					■	■	■	■
c) Pineapple									■	■	■	■	■	■										
d) Banana	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
e) Jackfruit											■	■	■	■	■	■	■	■	■	■	■	■	■	■
f) Mango											■	■	■	■										

Seasons / Vegetables	Jan		Feb		Mar		Apr		May		Jun e		July		Aug		Sep		Oct		Nov		Dec	
a) Mushroom							■	■	■	■	■	■	■	■	■	■	■	■						
b) Carrot	■	■	■	■	■	■			■	■	■	■									■	■	■	■
c) Cabbage	■	■	■	■									■	■	■	■	■	■	■	■	■	■	■	■
d) Tomato	■	■							■	■	■	■			■	■	■	■						
e) Pumpkin							■	■	■	■	■	■			■	■	■	■	■	■				
f) Cucurbits					■	■	■	■			■	■	■	■	■	■								

7.17.2 Value Chain Components – Post Harvest Processing (Tripura)

7.17.2.1 Mobile Collection Centers (Established & Managed By FPC, FPOs, SHGs)

Vehicle & Capacity	4 MT	10 MT	Refer Van 7 MT	Refer Van 15 MT
Quantity	22 nos.	4nos.	8	1
Price Per Vehicle (INR Lakh)	20	26.95	25	58
Subtotal (INR Lakh)	440	107.80	200	58
Total Investment for Mobile Collection Centers	INR 547.80 Lakhs			
Total Investment For Refer Vehicles	INR 258 Lakhs			
Fruits and Vegetables Collection By Mobile Collection Centers	64000 MT			

7.17.2.2 Primary Processing Centers (Established& Managed By FPC, FPOs, SHGs)

No	**Total PPCs**	**Capacity Per PPC**	**Total Capacity in the State for PPCs**	**Investment Per PPC INR In Lakhs**	**Total Investment in the state for PPC INR in Lakhs**
1.	8 nos.	8000 MT/annum /shift	64000 MT	287.30	2298.40

7.17.2.3 Central Processing Unit or Common Facility Centre (Established and Managed By SPV or Private Entrepreneur)

No	**No. in the State**	**F & V Handled by CPC per annum/shift**	**Total F & V Handled /Processed by CFC/annum/shift**	**Investment in CPC INR In Lakhs**	**Total Investment in CFC In the state INR Lakhs**
1.	1	9000 MT	9000 MT	5831	5831

7.17.2.4 Value Added Processing Unit (Established and Managed By SPV or Private Entrepreneur)

No	**No. in the State**	**F & V Handled by VAPU per annum/shift**	**Total F & V Handled /Processed by VAPU annum/shift**	**Investment in VAPU INR In Lakhs**	**Total Investment in VAPU In the state INR Lakhs**
1.	0	0	0	0	0

7.17.2.5 Farmer Training Centre (Established & Managed FPCs, FPOs, or and SHGs)

No	**No. in the State**	**No. of farmers Trained per annum /center**	**No. of farmers Trained per annum /center**	**Investment in Farmer Training Centre INR In Lakhs**	**Total Investment in FTC In the state INR Lakhs**
1.	1	8000 nos.	8000 nos.	974	974

7.17.2.6 Quality Assurance Lab (Established & Managed By SPV)

No	**No. in the State**	**Accreditation**	**Services for Quality Assurance**	**Investment in QAL INR In Lakhs**	**Total Investment in QAL In the state INR Lakhs**
1.	1	By NABL	All Related to Value Chain	1120	1120

7.17.2.7 Certification Agency (Established by SPV)

No	**No. in the State**	**Accreditation**	**Services for Quality Assurance**	**Investment in CA INR In Lakhs**	**Total Investment in CA In the state INR Lakhs**
1.	1	APEDA National Accreditation Board For Certification Bodies - NABCB	All Related to Value Chain	770	770

7.17.3 Summary of Investment & Financial Components for Post-Harvest Processing Part (Tripura)

Activity ⇨ Details ⇩	**Mobile Collection Centers**	**Reefer Van**	**PPC**	**CFC**	**VA Unit**	**Training Centre**	**Lab**	**Certification Agency**	**Total INR In Lakhs**	
In INR Lakhs	547.80	258	2298.40	5831	0	974	1120	770	11799.20	
Promoter	FPC/FPO	FPC/FPO	FPC/FPO	SPV/Private Entrepreneur	SPV/ Private Entrepreneur	FPC/FPO	SPV/ Private Entrepreneur	SPV/State Government	NIL	
Financial Pattern										
75% Subsidy for FPC/FPO & 40 % for Private Entrepreneurs & SPV	410.85	193.50	1723.80	NIL	NIL	730.50	NIL	NIL	3058.65	6147.05
	NIL	NIL	NIL	2332.40	0	NIL	448	308	3088.40	
Grant form other Institute S&T/BT15%	NIL	NIL	NIL	NIL	NIL	NIL	168	NIL	168	
Department of Agriculture Marketing 15%/APEDA	NIL	NIL	NIL	NIL	NIL	NIL	NIL	115.50	115.50	
FI Loan 15%	82.17	38.70	344.76	NIL	NIL	146.10	NIL	NIL	611.73	
FI Loan 25%	NIL	NIL	NIL	NIL	NIL	NIL	280	192.50	472.50	
FI Loan 40%	NIL	NIL	NIL	2332.40	NIL	NIL	NIL	NIL	2332.40	
Owner Contribution 10%	54.78	25.80	229.84	NIL	NIL	97.40	NIL	NIL	407.82	
Owner Contribution 20%	NIL	NIL	NIL	1166.20	NIL	NIL	224	154	1544.20	
Total	**547.80**	**258**	**2298.40**	**5831**	**NIL**	**974**	**1120**	**770**	**11799.20**	

Refer **Annexure-IX** for details.

7.17.4 Marketing, Branding and Monitoring Component – Role of NERAMAC

The investment for marketing will be as follows,

No	Particulars	Investment in Post-Harvest Sector INR in Lakhs	12% of Total Investment for Marketing, Branding and Monitoring INR in Lakhs
1.	Post-Harvest Infrastructure Investment in Tripura	11799.20	**1415.90** This investment will be 100% grant from GOI – DONER

7.17.5 Backward Linkage Infrastructure and Invest Summary

Assumptions:

a. For backward linkage development there are ongoing schemes like RKVY, MOVCD

b. The main challenges are: Low yield and lack of modern technology (technology intervention)

c. Poor Planting Material

d. To overcome these challenges Tripura require 2 Hi tech Nurseries and 1 Tissue culture lab

e. Drip Irrigation, Farm Pond other facilities are already covered in existing schemes and in the proposed action plan no need for separate provision of fund

f. Considering the next five years market requirement and establishing modern farm, this action plan recommends 5000 Ha farms with modern technology and intervention of ISRAEL concepts. The provision of funds to develop new farms will be made under RKVY and MOVCD.

7.17.6. Investment in Backward Linkage for Tripura

Activity ⇨ / Details ⇩	**Hi Tech Nursery**	**Tissue Culture Lab**	**Hi tech Farm**	**Total INR In Lakhs**
Quantity	2 nos.	1 no.	8000 Ha	NIL
Promoter	FPC/FPO/Private Entrepreneur/SPV	FPC/FPO/Private Entrepreneur /SPV	Farmers/FPC/FPOs, SHGs	NIL
Per Unit Investment INR in Lakhs	100	250	3.7 Lakh/Ha	NA
Total Investment In INR Lakhs	200	250	29600	30050
Financial Pattern				
75% Subsidy for FPC/FPO	150	187.50		337.50
& 40 % for Private Entrepreneurs & SPV	80	100		180
Grant form other Institute S&T/BT15% For Private Entrepreneurs and SPVs Only	NIL	37.50		37.50
FI Loan 15% For FPC/FPO	30	37.50		67.50
FI Loan 25% For private Entrepreneurs	NIL	62.50		62.50
FI Loan 40%	80	NIL		80
Owner Contribution 10% For FPCs/FPOs/SHGs	20	25		45
Owner Contribution 20%	40	50		90
Total	**200**	**250**	**29600**	**30050**

7.17.7 Five Years Action Plan for Post-Harvest Infrastructure (Tripura)

No	Particulars	1st Year	2nd Year	3rdYear	4thYear	5thYear	Total
A.	**Post-Harvest Infrastructure**						
1.	Collection Centers 4 MT	12	10	NIL	NIL	NIL	22
2.	Collection Centers 10MT	NIL	2	2	NIL	NIL	4
3.	Reefer Van 7MT	4	4	NIL	NIL	NIL	8
4.	Reefer Van 15 MT	NIL	1	NIL	NIL	NIL	1
5.	PPC	4	3	1	NIL	NIL	8
6.	CFC	Process Activation	1	NIL	NIL	NIL	1
7.	VA Unit	NIL	NIL	NIL	NIL	NIL	NIL
8.	Training Centre	1	NIL	NIL	NIL	NIL	1
9.	Lab	Process Activation	1	NIL	NIL	NIL	1
10.	Certification Body	Process Activation	1	NIL	NIL	NIL	1
11.	Branding Marketing	20%	20%	20%	20%	20%	100%

7.17.8 Backward Linkage Infrastructure for Tripura

No	Particulars	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
B.	**Backward Linkage Infrastructure**						
1.	Hi Tech Nursery	2	NIL	NIL	NIL	NIL	2
2.	Tissue Culture	NIL	1	NIL	NIL	NIL	1
3.	New Farm (in Ha)	2000	2000	2000	2000	NIL	8000 Ha

Chapter-VIII: Fund requirement and Sources of Funds

8.1 Regional Summary of Investment

Table-8.1: State-wise Summary of investment break up

Head of expenditure	State-wise break up of investment required under the plan (*Rs. in Crore*)									Existing scheme
	Arunachal	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura	Total	
A. Investment in Value chain components										
i) Investment for Infrastructure post-harvest & processing	182.18	351.05	124.73	135.75	116.89	128.65	103.14	117.99	**1260.38**	**MIDH, KISAN SAMPADA**
ii) Investment in infrastructure for backward linkage	6.50	37.00	9.00	9.00	5.50	9.00	4.50	4.50	**85.00**	**MIDH, S&T - BT**
iii) Investment for marketing, branding & quality monitoring	21.86	42.13	14.97	16.29	14.03	15.44	12.37	14.16	**151.25**	**New Scheme**
Sub Total	**210.54**	**430.18**	**148.7**	**161.04**	**136.42**	**153.09**	**120.01**	**136.65**	**1496.63**	
B. New area expansion	925.00	1221.00	592.00	407.00	407.00	407.00	148.00	296.00	**4403.00**	**RKVY/MIDH**
Sub Total	**1135.54**	**1651.18**	**740.70**	**568.04**	**543.42**	**560.09**	**268.01**	**432.65**	**5899.63**	
C. Capacity building of farmers and FPOs	4.00	8.00	4.00	4.00	4.00	4.00	2.00	2.00	**32.00**	**SFAC, NABARD, EDI**
D. Credit Guarantee fund for NER									**100.00**	
E. Preparatory investment for survey/studies for NER									**2.50**	**New scheme**
F. Monitoring & review of implementation @2% of total investment "A"	4.21	8.6	2.97	3.22	2.73	3.06	2.40	2.73	**29.92**	**New scheme**
G. Administrative expenses including DPR preparation @5% of total investment in "A"	10.53	21.51	7.43	8.05	6.82	7.65	6.00	6.83	**74.82**	**New scheme**
Total									**6138.87**	

8.2 Year wise break up of total investment

Table-8.2: Year wise break up of total investment

(Rs. In Crore)

Investment Head	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Preparatory Investment Survey/Studies (4 Nos.)*	2.50						2.50
Post-harvest infrastructure		184.20	616.08	269.38	62.34	128.37	1260.38
Marketing & Branding		30.25	30.25	30.25	30.25	30.25	151.245
Backward linkage infrastructure		20.00	41.50	20.50	3.00	0.00	85.00
Capacity Building of farmers/FPOs/FPCs*		6.40	6.40	6.40	6.40	6.40	32.00
Monitoring & Review @2% of Total Infrastructure cost		4.69	13.76	6.40	1.91	3.16	29.92
Administrative expenses @5% of Total Infrastructure cost		11.72	34.39	16.01	4.78	7.93	74.83
Creating a credit Guarantee fund		50.00	50.00	0.00	0.00	0.00	100.00
Sub-Total	**2.50**	**307.26**	**792.37**	**348.94**	**108.68**	**176.11**	**1735.88**
New area expansion		**1100.75**	**1100.75**	**1100.75**	**1100.75**	**-**	**4403.00**
Total	**2.50**	**1408.01**	**1893.12**	**1449.69**	**1209.43**	**176.11**	**6138.88**

***Supporting agencies for 'Preparatory Investment Survey/Studies'- Government:** State department of horticulture, APEDA; **Institutes:** AAU, ICAR; **Trade bodies:** CII, FINER, ICC, state chamber of commerce.

8.3 Consolidated sources of Total Fund allocation

Table-8.3: Consolidated sources of Total Fund allocation

(Rs. in Crore)

Head of expenditures	Share / Sources	Year-0	Year-1	Year-2	Year-3	Year-4	Year-5	Total
Preparatory Investment Survey/Studies	100% Govt	2.50						2.50
Investment for marketing, branding & quality monitoring	100% Govt		30.25	30.25	30.25	30.25	30.25	151.25
Capacity Building of farmers/FPOs/FPCs*	100% Govt.		6.40	6.40	6.40	6.40	6.40	32.00
Monitoring & Review @2% of Total Infrastructure cost	100% Govt.		4.69	13.76	6.40	1.91	3.16	29.92
Administrative expenses @5% of Total Infrastructure cost	100% Govt.		11.72	34.39	16.01	4.78	7.93	74.83
Creating a credit Guarantee fund	100% Govt.		50.00	50.00	0.00	0.00	0.00	100.00
Sub-Total A	100% Govt.	**2.50**	**103.06**	**134.80**	**59.06**	**43.34**	**47.74**	**390.50**
Post-harvest infrastructure			184.20	616.08	269.38	62.34	128.37	1260.38
Backward linkage infrastructure			20.00	41.50	20.50	3.00	0.00	85.00
New Area Expansion*			1100.75	1100.75	1100.75	1100.75	-	4403.00
	Total		**1304.95**	**1758.30**	**1390.63**	**1166.09**	**128.37**	**5748.38**
	50% Govt.		652.48	879.16	695.32	583.05	64.19	2874.19
	40% Bank credit		521.98	703.33	556.25	466.44	51.35	2299.35
	10% Owner contribution		130.50	175.83	139.06	116.61	12.84	574.84
Govt. sources	**Bank Credit**		**Owner contribution**			**Total investment**		
3264.69	**2299.35**		**574.84**			**6138.88**		

8.4 State-wise Year-wise breakup of Financial Outlay

8.4.1 Five year breakup of Financial Outlay-Arunachal Pradesh

(Rs. In Lakh)

State	Arunachal Pradesh					
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Post-harvest infrastructure	1431.30	2343.10	8325.30	287.30	5831.00	18218.00
Marketing & Branding	437.23	437.23	437.23	437.23	437.23	2186.15
Backward linkage infrastructure	100.00	450.00	100.00	0.00	0.00	650.00
Sub-total of Infrastructure cost	**1968.53**	**3230.33**	**8862.53**	**724.53**	**6268.23**	**21054.15**
New Farm Development	23125.00	23125.00	23125.00	23125.00	-	92500.00
Capacity Building of farmers/FPOs/FPCs	80.00	80.00	80.00	80.00	80.00	400.00
Monitoring & Review @2% of Total Infrastructure cost	39.37	64.61	177.25	14.49	125.36	421.08
Administrative expenses @5% of Total Infrastructure cost	98.43	161.52	443.13	36.23	313.41	1052.71
Total	**25311.33**	**26661.46**	**32687.91**	**23980.25**	**6787.00**	**115427.94**

8.4.2 Five year breakup of Financial Outlay-Assam

(Rs. In Lakh)

State	Assam					
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Post-harvest infrastructure	4019.70	10019.75	8112.80	5947.00	7006.00	35105.25
Marketing & Branding	842.52	842.52	842.52	842.52	842.52	4212.60
Backward linkage infrastructure	900.00	1400.00	1100.00	300.00	0.00	3700.00
Sub-total of Infrastructure cost	**5762.22**	**12262.27**	**10055.32**	**7089.52**	**7848.52**	**43017.85**
New Farm Development	30525	30525	30525	30525	-	122100
Capacity Building of farmers/FPOs/FPCs	160	160	160	160	160	800.
Monitoring & Review @2% of Total Infrastructure cost	115.24	245.25	201.11	141.79	156.97	860.36
Administrative expenses @5% of Total Infrastructure cost	288.11	613.11	502.77	354.48	392.43	2150.89
Total	**36850.57**	**43805.63**	**41444.20**	**38270.79**	**8557.92**	**168929.10**

8.4.3 Five year breakup of Financial Outlay-Manipur

(Rs. In Lakh)

State	Manipur					
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Post-harvest infrastructure	2175.90	9617.60	679.60	0.00	0.00	12473.10
Marketing & Branding	299.35	299.35	299.35	299.35	299.35	1496.75
Backward linkage infrastructure	200.00	450.00	250.00	0.00	0.00	900.00
Sub-total of Infrastructure cost	**2675.25**	**10366.95**	**1228.95**	**299.35**	**299.35**	**14869.85**
New Farm Development	14800	14800	14800	14800	-	59200
Capacity Building of farmers/FPOs/FPCs	80	80	80	80	80	400
Monitoring & Review @2% of Total Infrastructure cost	53.51	207.34	24.58	5.99	5.99	297.40
Administrative expenses @5% of Total Infrastructure cost	133.76	518.35	61.45	14.97	14.97	743.49
Total	**17742.52**	**25972.64**	**16194.98**	**15200.31**	**400.31**	**75510.74**

8.4.4 Five year breakup of Financial Outlay-Meghalaya

(Rs. In Lakh)

State	Meghalaya					
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Post-harvest infrastructure	2754.00	8613.35	2207.00	0.00	0.00	13574.35
Marketing & Branding	325.74	325.74	325.74	325.74	325.74	1628.70
Backward linkage infrastructure	100.00	450.00	350.00	0.00	0.00	900.00
Sub-total of Infrastructure cost	**3179.74**	**9389.09**	**2882.74**	**325.74**	**325.74**	**16103.05**
New Farm Development	10175	10175	10175	10175	-	40700
Capacity Building of farmers/FPOs/FPCs	80	80	80	80	80	400
Monitoring & Review @2% of Total Infrastructure cost	63.59	187.78	57.65	6.51	6.51	322.06
Administrative expenses @5% of Total Infrastructure cost	158.99	469.45	144.14	16.29	16.29	805.15
Total	**13657.32**	**20301.32**	**13339.53**	**10603.54**	**428.54**	**58330.26**

8.4.5 Five year breakup of Financial Outlay-Mizoram

(Rs. In Lakh)

State	Mizoram					
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Post-harvest infrastructure	1511.30	3688.60	6488.60	0.00	0.00	11688.50
Marketing & Branding	280.52	280.52	280.52	280.52	280.52	1402.60
Backward linkage infrastructure	100.00	450.00	0.00	0.00	0.00	550.00
Sub-total of Infrastructure cost	**1891.82**	**4419.12**	**6769.12**	**280.52**	**280.52**	**13641.10**
New Farm Development	10175	10175	10175	10175	-	40700
Capacity Building of farmers/FPOs/FPCs	80.	80	80	80	80	400
Monitoring & Review @2% of Total Infrastructure cost	37.84	88.38	135.38	5.61	5.61	272.82
Administrative expenses @5% of Total Infrastructure cost	94.59	220.96	338.46	14.03	14.03	682.06
Total	**12279.25**	**14983.46**	**17497.96**	**10555.16**	**380.16**	**55695.98**

8.4.6 Five year breakup of Financial Outlay-Nagaland

(Rs. In Lakh)

State	Nagaland					
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Post-harvest infrastructure	2175.90	9904.90	784.60	0.00	0.00	12865.40
Marketing & Branding	308.77	308.77	308.77	308.77	308.77	1543.85
Backward linkage infrastructure	200.00	450.00	250.00	0.00	0.00	900.00
Sub-total of Infrastructure cost	**2684.67**	**10663.67**	**1343.37**	**308.77**	**308.77**	**15309.25**
New Farm Development	10175	10175	10175	10175	-	40700
Capacity Building of farmers/FPOs/FPCs	80	80	800	80	80	400
Monitoring & Review @2% of Total Infrastructure cost	53.69	213.27	26.87	6.18	6.18	306.19
Administrative expenses @5% of Total Infrastructure cost	134.23	533.18	67.17	15.44	15.44	765.46
Total	**13127.59**	**21665.12**	**11692.41**	**10585.39**	**410.39**	**57480.90**

8.4.7 Five year breakup of Financial Outlay-Sikkim

(Rs. In Lakh)

State	Sikkim					
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Post-harvest infrastructure	1888.60	8425.60	0.00	0.00	0.00	10314.20
Marketing & Branding	247.54	247.54	247.54	247.54	247.54	1237.70
Backward linkage infrastructure	200.00	250.00	0.00	0.00	0.00	450.00
Sub-total of Infrastructure cost	**2336.14**	**8923.14**	**247.54**	**247.54**	**247.54**	**12001.90**
New Farm Development	3700	3700	3700	3700	-	14800
Capacity Building of farmers/FPOs/FPCs	40	40	40	40	40	200
Monitoring & Review @2% of Total Infrastructure cost	46.72	178.46	4.95	4.95	4.95	240.04
Administrative expenses @5% of Total Infrastructure cost	116.81	446.16	12.38	12.38	12.38	600.10
Total	**6239.67**	**13287.76**	**4004.87**	**4004.87**	**304.87**	**27842.04**

8.4.8 Five year breakup of Financial Outlay-Tripura

(Rs. In Lakh)

State	Tripura					
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Post-harvest infrastructure	2463.20	8994.80	341.20	0.00	0.00	11799.20
Marketing & Branding	283.18	283.18	283.18	283.18	283.18	1415.90
Backward linkage infrastructure	200.00	250.00	0.00	0.00	0.00	450.00
Sub-total of Infrastructure cost	**2946.38**	**9527.98**	**624.38**	**283.18**	**283.18**	**13665.10**
New Farm Development	7400	7400	7400	7400	-	29600
Capacity Building of farmers/FPOs/FPCs	40	40	40	40	40	200
Monitoring & Review @2% of Total Infrastructure cost	58.93	190.56	12.49	5.66	5.66	273.30
Administrative expenses @5% of Total Infrastructure cost	147.32	476.40	31.22	14.16	14.16	683.26
Total	**10592.63**	**17634.94**	**8108.09**	**7743.00**	**343.00**	**44421.66**

Chapter-IX: Summary of Issues, challenges, & resolutions and Suggestions for implementation of the value chain development plan

Prior to discussion on the implementation process, architecture and interventions suggested for implementation, it is important to look at the issues, challenges in horticulture sector in North East and suggested resolutions of the same. Accordingly, a summary of issues & challenges and possible solutions are placed below:

9.1 Issues & Challenges in NE Region	9.2 Possible Resolutions & Suggestions
1. **Logistics** a. Poor road connectivity between growing areas and the nearby market	a. The respective State Governments need to map the rural connecting roads and shall avail facilities under RIDF from NABARD for construction, repairing and renovation of the rural roads to improve the connectivity and reducing cost and time of transportation.
b. High cost of transportation to nearby market or to urban centres within the State, Region, outside or abroad impacting profit margin and access to market by the farmers	b. under the Krishi Udan and Operation Greens scheme for air transportation from eligible airports, all consignment of notified fruits and vegetables irrespective of quantity and price would be eligible for 50 per cent freight subsidy. The transportation subsidy @ 50% of freight charges is extended under Operation Greens Scheme for Kisan Rail Scheme with effect from 12.10.2020 for notified fruits and vegetables. However, only 1%-2% is transported by air and most of the transportation of fruits and vegetables in the region is by road in smaller capacity and by smaller vehicles and railways. Therefore, subvention of the high cost of rural transport by road for carrying all fruits & vegetables for shorter distances to the nearby market, Urban centres, Railway stations and airport also may be examined for farmers in NE.
c. Absence of suitable well-equipped vehicles for transporting fruits and vegetables without wastage	c. Provision of small reefer vans has been included in the investment plan for the States
d. The airports in the region are not well equipped to handle export of F&V	The DGM, Cargo, AAI during stakeholders meeting has confirmed that all required facilities for export of F &V are now made available at Guwahati airport. Cargo facilities are now also available in Imphal, Agartala, Dibrugarh, Jorhat, Tezpur and Dimapur also. However, no direct flights are still available to export destinations. During the covid pandemic period AAI has facilitated export of F & V of 117 mt from Guwahati Airport, 244 mt from Agartala, 89 mt from Imphal and 1 mt from Jorhat airports.
2. **Infrastructure** Due to inadequate infrastructure availability for Post-harvest management	a. In the present Action plan for development of value chain requirement of post-harvest management facilities from farm gate level to Regional level and investment for the same has been assessed and incorporated.
3. **Quality inputs for production** Lack of availability of adequate quality of seed & planting materials for different fruits and vegetables and tissue culture planting materials for banana etc.	In the plan for backward linkages provision of nurseries, tissue culture labs have been incorporated to ensure smooth flow of quality input materials in adequate quantity commensurate with the production estimate.
4. **Improvement of knowledge and skill of the farmers**, as also benefits of value chain process	Provision of a residential farmers training centre in the region has been incorporated in the plan itself, for training of the farmers in different aspects of modern farming to improve the skill and knowledge of the

9.1 Issues & Challenges in NE Region	9.2 Possible Resolutions & Suggestions
	farmers of the region. The trainers may also visit different locations for on-site trainings. The State Governments may also utilize the facilities in Indian Institute of entrepreneurship (IIE), Indian Institute of Food Processing Technology (IIFPT) at Guwahati and different Agricultural universities, horticulture colleges, KVKs and the proposed COEs for training of the farmers.
5. **Low volume of production** The area under cultivation and productivity of the crops needs improvement in the region Low volume of production impacts the economy of scale and capacity utilization of the post-harvest management facilities	Improvement of skill, knowledge and improved quality of planting materials shall improve the productivity of the crops. The increase in area under cultivation for different crops to utilize full capacity of the facilities proposed under this plan has been indicated. The State machinery need to gear up for promotion of cultivation of different fruits and vegetables having commercial value.
6. **High cost and low availability of packing materials in the region**. Prescribed Packing materials for long haul transport, air transport or for export presently are to be procured from other states or even nearby countries in S E Asia.	The present demand for packaging products is still not adequate to justify setting up of any production unit in the region. CFTRI and Indian Packaging institutes have already designed low-cost packing materials to meet the specifications for transport of different fruits and vegetables. Therefore, entrepreneurs from the region may be motivated to take up such enterprise. The government may consider adequate subsidy and viability gap funding (VGF) for such industry for a period of 5 years.
7. **Issues related to proper Implementation of the schemes** of NHB, MIDH of GOI by the farmers and the concerned state departments. The small and marginal farmers and the entrepreneurs find it difficult to complete all required information in the forms for application for availing the facilities under the schemes During the stakeholders meeting and in subsequent communications that a) The State Government departments indicated difficulty to adjust funds earmarked for different activities due to higher cost structure in the region. b) The State Governments have less discretion to select crops important for the State	A small committee of the concerned departments of all the States in the Region along with the concerned departments of GOI, under leadership of the NEC may deliberate in detail on the issues which are impacting successful implementation of the schemes, full utilization of funds etc. The committee may review and suggest changes in the eligibility criteria, application forms, discretion in selection of crops & cost structure and any other changes relevant to North East to ensure the schemes can yield more benefit to the farmers of the region.
8. **(a). Absence of any Anchor Marketing Organistaion** in the region for horticulture value chain for guidance and facilitation (b). **Absence of any common branding** for the products from the region and lack of fund available for band promotions by entrepreneurs and the States.	The plan has incorporated suggestion to expand the role of NERAMAC with adequate financial assistance from the GOI to function as the anchor organisation for implementation of this plan and similar plans for the region. NERAMAC may develop a common brand for the products from the region and promote the same through road shows, exhibition, films and social media etc. NERAMAC also can play a role in creating awareness of different facilities available for the farmers in the region.

9.1 Issues & Challenges in NE Region	9.2 Possible Resolutions & Suggestions
	A note containing broad outline of the proposed role, structure, and systems of NERAMAC and requirement of fund is placed in appendix-2 of the report.
9. **Low uptake of credit linked subsidy schemes under NHB, MOFPI in the region.** a. All credit linked subsidy schemes envisages availing of bank credit by the entrepreneurs to avail the subsidy. On the other hand, the banks insist on creation of mortgage of land for lending to such enterprises. However, due to unique land tenure systems in the region, land in most of the areas cannot be mortgaged for loans. This paradoxical situation has led to low presence of cold storages and fruit processing units particularly in the hilly regions by private sector	The GOI has signed MOUs with all public sector banks in the country for financing of units under Agriculture Infrastructure fund of GOI. The scheme envisages credit guarantee cover of upto 2 cr of credit, interest subvention of 3% upto 2 cr and moratorium from 6 months to 2 years. The State Government machinery need to leverage the scheme for developing enterprises in fruit processing sector in the region, to avail the credit linked subsidy schemes of GOI, since no collateral is required under the scheme for credit upto 2 cr.
b. **Low credit flow for horticulture** plantation for new plantation, rejuvenation, and maintenance of plantation in the region. The horticultural plantation is a high investment activity with long gestation period. Since the requirement of fund is higher than available collateral free loan amounts, the Banks insist on collateral in the form of land etc. On the other hand, as mentioned above, the farmers are not able to offer land as collateral and thus reducing the scope of extension of plantation and proper maintenance or replacement of senile fruit trees.	However, for financing of cultivation and maintenance of plantation crops, the collateral free loans are available only upto Rs 3.0 lakhs with tie-up for recovery. Therefore, a similar scheme of credit guarantee covers of individual loans upto 50 lakhs for plantation crops and crop insurance facility for such crops in the region may be initiated. A separate note on financing of value chains in agriculture sector by banks is placed in Appendix-3 of the report.
10. Lack of availability of accurate and current production data and location of different products.	a. The State Government websites should provide current data and recent information b. A baseline field survey for all the States may be conducted by NEDFi to map the GPS locations and production data of different crops and uploaded in the websites

9.3 Implementation Process:

Considering the practical parameters and to make the proposed Value Chain completely doable and self-sustainable, the following key drivers are recommended:

1. Single window implementation through an independent agency which will be either SPV or Mission (e.g. NERLM or proposed NE-AHED). This will simplify the project implantation process by following easy to do business.
2. Marketing of the products and services to be created from the proposed value chain project. The main success of the project will be the repeat sale over the country and Globe for which an umbrella brand for North East needs to be established and the product promotion strategy and sales network to be established solely by an Anchor Marketing Organization. NERAMAC may be identified as the 'Anchor Marketing Organization' for implementation of the plan. The States may identify Brand Ambassadors for promoting their produce/products.
3. A special cell of agribusiness incubation and mentoring to be established at each Training Centre. That will strengthen the business plans and capacity building of the potential agripreneurs in the region.

Monitoring & Review: NEC may be entrusted with the responsibility of oversight of the implementation of the plan and review the progress every month with the States. Ministry of DONER

may review the progress every quarter to ensure that the implementation process is on track and desired outcome of the plan is achieved.

9.4 Plan Approach

- Create adequate top of the line infrastructure in the region and interlink the facilities for optimum capacity utilization and map the existing infrastructure and upgrade the facilities to operationalize.
- Through aggregation, collaboration, and increased production & productivity, reach to a critical mass for sell Capacity building through improved knowledge and skill of the Growers and producers.
- Create a unique common brand for N E region products.
- Approach the markets in mainland and abroad through an 'Anchor organisation' as a single window facility.

9.5 The value chain

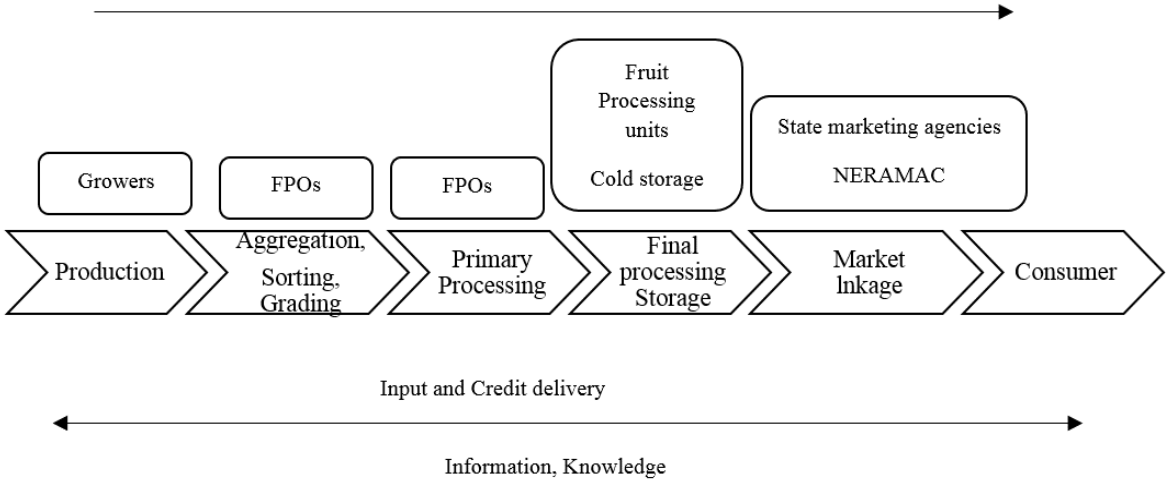


Figure-9.1: Value Chain Flowchart

9.6 Process Flow of Implementation mechanism

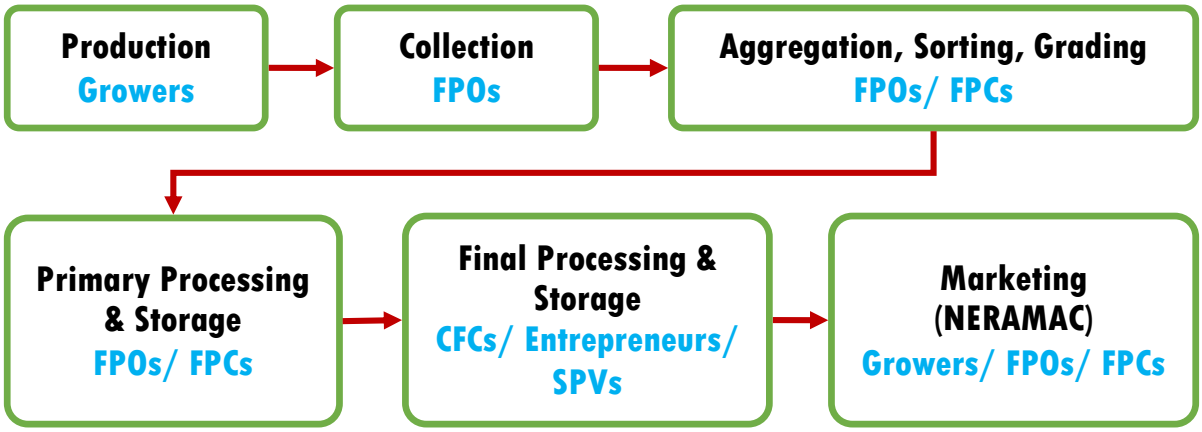


Figure-9.2: Implementation mechanism process flow

The implementation mechanism is recommended for implementation of the proposed Action Plan on Value Chain Development of Horticulture – Fruits & Vegetables in NER based on the experience & measurable outcome of the following successful model of value chain projects -

a) Maharashtra Agricultural Competitiveness Project (MACP) – World Bank Project

b) Agribusiness Infrastructure Development Investment Program (AIDIP) funded by Asian Development Bank

Both the projects are implemented in the state of Maharashtra. The outcome of both projects are found to be very positive.

9.7 Value Chain Implementation System

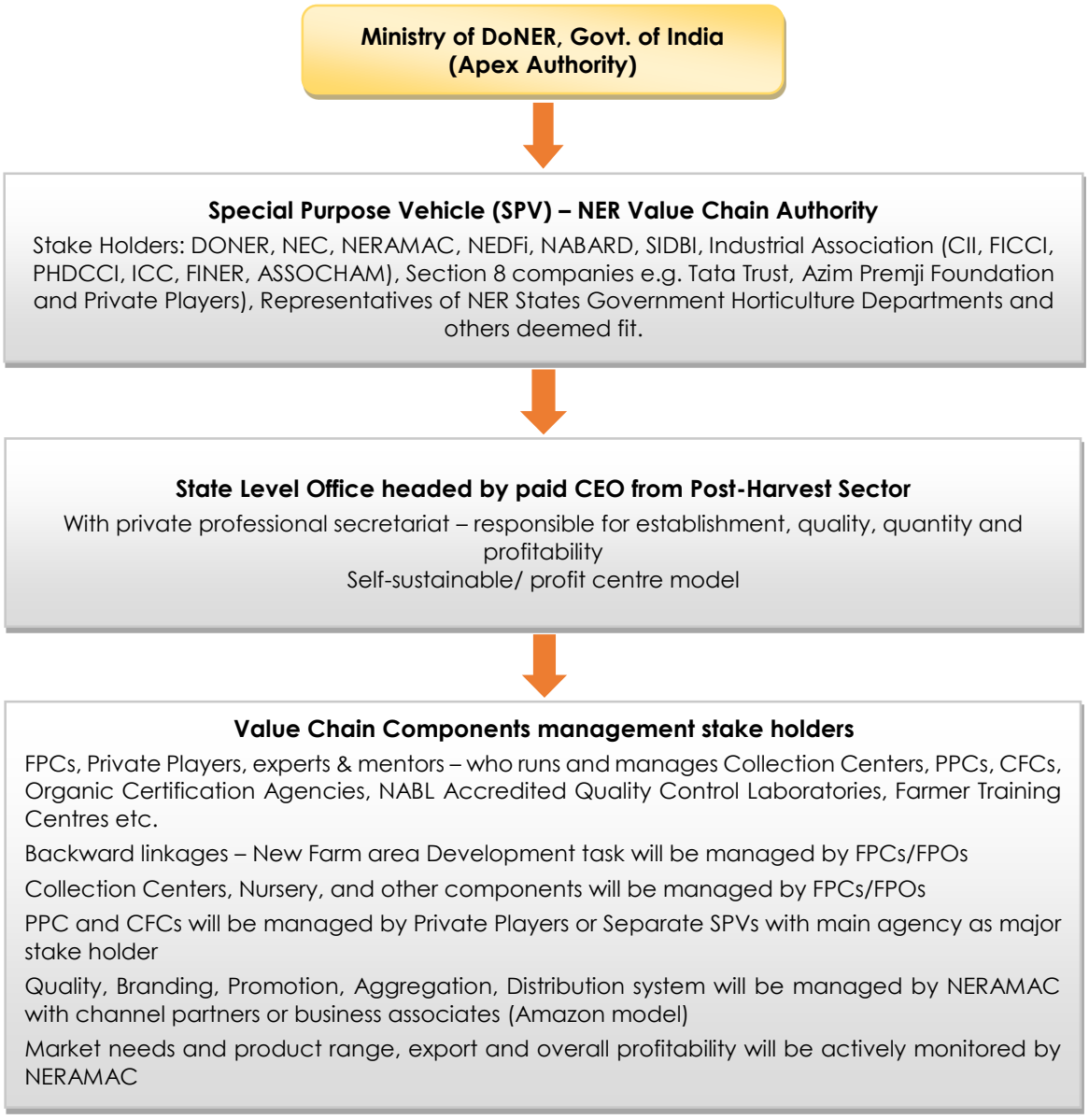


Figure-9.3: Value Chain implementation system

9.8 Phases of implementation Plan

9.8.1 Short term implementation Plan: Timeline 6 months to 1 year

Preparatory work:

a) Approval of the plan, preparation of DPR and approval by the appropriate authorities and share the same with the State Governments.

b) A baseline survey to identify and Geotag the locations of clusters of different crops and estimate production level of such crops growing in different parts of the NE region. For this purpose, use of drone survey and also collaboration with North Eastern Space Applications Centre near Shillong may be explored for authentic report and creating a proper database. The database once created can be hosted in the webpages of different State Governments, NERAMAC, NEC and NEDFi etc. and made available for public information for business decision.

c) A study is also urgently needed to assess the demand and supply of fruits and vegetables during the whole year in the urban agglomerations of the region to develop an effective marketing plan and assess the marketable surplus of different products. MIDH has already suggested few States to undertake such studies. However, to have a regional perspective the study is suggested to be undertaken by NEDFi. The fund allotted to different states for the purpose may be handed over to NEDFi with the approval of the concerned department.

d) Create NERAMAC as an Anchor Marketing Organisation for professionally driving the implementation process through technology interventions, brand creation and interlinking the facilities & organisations in the region engaged in horticulture value chain and to create a single point of contact for the buyers, exporters, and bulk sellers.

e) Creation of a common brand for North East region and establish the brand with the USPs like traceability, safety, quality, natural or organic production etc.

f) Identify the areas for increasing production of different crops and begin the process.

g) Map the growing clusters, linking with existing FPOs promoted by SFAC, NABARD, Other departments and organisations.

h) FPOs to start aggregation arrangements, tie-up with the farmers.

i) State Governments to establish the protocols with the banks as suggested in the note for financing of value chains by the respective State Governments to facilitate flow of funds in horticulture and fruit processing sector in the region.

j) Review and monitoring of developments.

9.8.2 Mid-term implementation plan: Timeline 1 year to 2 years

a) Start making provisions for funds for funding implementation of the plan under different schemes by the concerned departments of GOI, State Governments, include the credit component in Annual action plan of State level bankers committee of the respective state.

b) Start training and awareness programmes of the farmers and FPOs in the existing training facilities.

c) Start investment for creation of infrastructures and facilities for developing the value chain according to the plan.

d) Provide transport facilities like Reefer vans, transport subsidy etc. to FPOs for collection of produce from the farms.

e) Activate the process for aggregation, sorting, grading, packaging facilities at FPO level and bulk marketing through an Anchor Marketing Organization.

f) Activate all primary processing centres across the region.

g) Establish the brand and continue promotion of the brand.

h) Encourage technology interventions through Agri tech startups and creating a common technology platform to be hosted by the 'Anchor Marketing organisation'.

i) Review and monitoring of implementation of the action plan for mid-term evaluation.

9.8.3 Long term implementation plan Timeline 3 years to 5 years

a) Activate all large infrastructures proposed under the plan, e.g. CFC, Central multi-facility Fruit Processing Units, activities and the players in the respective value chain in each state.

b) The complete value chain to be made fully operational, all investments are to complete

c) Ongoing review and monitoring to continue.

9.8.4 Process interventions:

a) Institution building and Capacity building exercises to be undertaken for each identified FPOs in the identified clusters for formation of Sub committees in the executive committee for different roles of FPO. Capacity building of the executive members for financial management, logistic management, marketing etc. Local organisations with similar experiences may be engaged (a reference can be made to NRLM implementation process).

b) Upgrading knowledge and up-skilling of the producers need to be done for creating awareness and benefits of value chain process, adopting modern cultivation practices, post-harvest management, Use of digital technology in cultivation and post-harvest process. Suitable organisations may be empaneled by the States to deliver the requirements in collaboration with KVK, State Departments, University, research organisations etc. till training centres proposed under the plan are made operational.

c) The governments may earmark funds for training and exposure visits to successful farming and agro ventures, outside NER so that people of the region could learn most advances techniques and practices and replicate the same with suitable modifications.

9.8.5 Organisational interventions:

a) The FPOs are expected to play the key role in the value chain process and would require capacity building in Management. Marketing, Accounting, Production process, logistics etc. Therefore, the FPO promoting agencies or the concerned State Governments may consider engaging competent and experienced agencies to assist the FPOs in their capacity building process.

b) NERAMAC may be identified as the Anchor Marketing Organization for implementation of the plan. A broad outline of restructuring of NERAMAC to meet the extended role is suggested and is placed in Appendix-2 of the report, with suggestion to infuse one time capital to revamp the organisation and equip the organistion to handle the extended role.

9.8.6 Regulatory interventions:

a) A committee of members drawn from the State Governments and other stakeholders may have a quick review of the existing parameters of all central Government schemes in horticultural sector including 'Krishi Udaan' and make recommendations to the concerned departments through NEC / DONER ministry to facilitate better implementation and participation by the State governments and entrepreneurs, within next one month.

   The areas of focus could be discretion of the State Govts. to include or exclude crops, add, or remove the infrastructures, revise cost estimates based on states data, revise the minimum sizes and capacities of infrastructures and vehicles etc., revise the minimum eligible quantity for availing transport subsidy under Krishi Udaan scheme for the region, feasibility of extending concessionary power tariffs for all agri-horti related activities / infrastructures as applicable for farm use.

b) Land cannot be offered as collateral to banks in the hill states, including the hill districts and tribal belts in Assam, Manipur and Tripura. This has been the biggest reason for low participation of entrepreneurs of the region to avail the credit linked subsidy schemes of MOFPI, NHM etc. and loans for horticulture plantations. The DONER Ministry may consider creating a '**Credit Guarantee fund' of Rs. 100 Crores during the first two years** of the implementation for loans sanctioned for post-harvest management facilities to individuals and organisations by the banks and other financial institutions in the region. This will facilitate the banks / FIs to sanction loans in NE region and the entrepreneurs / growers to avail credit linked subsidy scheme under this sector.

c) To enhance credit linkage of the projects related to post-harvest infrastructures including processing, a bank wise target, based on the action plan, may be drawn up by each State at the beginning of the year and shared with the conveyor of the State level bankers committee to be included and monitored as a separate agenda in the meeting with participation of the nodal officers in the department.

d) MOU may be signed with Nabkisan finance, a financial organisation promoted by NABARD, by DAC&FW, Govt. of India, for financing the FPOs in NE region, as the main FPO promoting agencies in the region are NABARD, SFAC and now also entrusted to NERAMAC.

9.8.7 Product interventions

a) The responsibility of creating a brand for all agri-horti products of the region, promotion of the products under the brand with its unique features may be entrusted to NERAMAC. All State Govt. Marketing Agencies may collaborate with NERAMAC for executing the bulk orders within or outside the country. Separate fund needs to be earmarked for brand creation and promotional activities.

b) Development of fortified products, health food, traditional Indian ethnic foods, convenience food, processed organic food, especially baby food items have an increasing domestic and global demand. Also development of new products in beverages viz. flavored tea, juice variants, health drinks, energy drinks, sports drinks as well as Packaged local drinks like nimbu pani, jaljeera, coconut water etc. may be promoted

c) New packaging technologies for enhanced shelf life, retaining taste and texture, attractive, easy to handle and space efficient should be promoted and the used.

d) To promote and establish the processing industry in the region, quality needs to be ascertained, the region needs to have more incubation centers for developing and testing of technologies and testing labs to ensure the food and produce quality. One quality testing lab in Guwahati initially and later on one in each state and four incubation centers for the region may be set up. Public private partnership model for the same may also be considered.

9.8.8 Technology interventions

The State departments and NERAMAC may operate internet portal and mobile application to disseminate information on the available products, quantity, locations, market prices, recommended practices for various crops etc. A special technical cell shall update the information on the portal on a daily basis, such an interactive portal will greatly enhance the relevance of technical advice to individual farmers and information to buyers and sellers of different produce. Such a portal and mobile application may be hosted by NERAMAC in a technology cell to be created for the purpose.

Up skill the farmers, State Government officials to extensively use the IOT (Internet of things) based technologies to improve cultural practices, prediction of weather, spread and control of pests and diseases to prevent losses and for better price realization by the farmers of the region.

9.8.9 Few Other areas of interventions:

E-commerce: Provide common ground (such as standards) to enable interconnection among regional actors. Form business partnerships to enhance international competitiveness. Strengthen logistical and transport systems.

Adoption of international and phytosanitary standards: Can ensure consistency with international standards and cooperation and training for the fulfillment of health and safety obligations. Can help put in place sampling and prevention techniques aimed at avoidance or early detection of risks in the production chain, thus forestalling large-scale health emergencies.

Chapter-X: Expected Output, Outcome & Socio Economic Impact of the Plan

10.1 Summary of expected Output, Outcome & Socio Economic Impact

- **Area Expansion:** Total 1,19,000 Ha proposed for development of new Farm area with increase in productivity. Provision of high-tech nurseries and tissue culture labs in the plan will ensure supply of adequate quantity of improved quality of planting materials to help in higher productivity and production in the region. Israel's technology for increasing productivity can be introduced in the New Farm Development for increasing yield.
- **Annual reduction of Post-Harvest losses:** Value addition of Horticulture Products through creation of Value Chain Infrastructure (both post-harvest as well as backward infrastructure and Value Chain support infrastructure) which will give satisfactory returns to all stakeholders involved in the Value Chain. Post-harvest handling and processing will reduce about 10% of Post-Harvest losses caused due to absence of Value-Chain. Approximately Rs. 42.80 Crores per annum is estimated to be saved due to annual reduction in Post-Harvest losses.

  It is assumed that 25%-30% of the production of the crops shall be routed through the value addition process of the value chain in NE, after meeting the local demand for consumption as fresh fruits and vegetables. Value addition process shall help the farmers in better price discovery at every stages of the chain.
- **Brand Building:** A common brand for North East region can be created and established with the USPs like traceability, safety, quality, natural or organic production etc.
- **Employment Generation:** An important outcome of this plan is generation of employment in rural area. There will be the provision of generation of both direct and indirect employment from the value chain activities. In Value chain Post-harvest & support activities total 8,486 nos. of direct employment will be generated. Besides, in farm sector, altogether total 4,87,900 nos. of employment both direct & indirect will be generated.
- **Income Generation:** Doubling farmers' income by increase in yield, value addition and entering into global market. All the proposed units can export fresh and processed vegetables all over the Globe. Products from Value added Units can also be exported 100% by which the nation will earn foreign currency.
- **Capacity Building of Farmers:** Addressing the Pre & Post-Harvest handling needs of the farmers; approx. 4,76,000 nos. of farmers will be trained within the proposed 5 years Plan.
- **Revenue return to the Government:** Approx. Rs. 17.97 Crore /annum of revenue will be generated in the form of GST (on Job Work basis). The Quality Analysis Lab and Certification Agency will also collect GST on their services by 18%.

10.2 Other outcomes of the Plan

- Higher production of Fruits & Vegetables in NER to meet the 'vocal for local 'campaign.
- Increase in bulk export facilities.
- Increase interest of the farmers in agriculture and also reduce migration from agriculture sector with improvement in Growers'/Farmers' income.

10.3 Revenue per Facility (Job Working Basis)

No.	Particulars	Primary Processing Centre	Central Processing Unit						Value Addition Unit	Remark
			Dehydration Unit	IQF Unit	Canning Unit	RTD Juices Unit	RTC Unit	Cold Storage		
1.	Input Capacity in MT	4 MT/hr	1 MT/hr	2 MT/hr	500 kg/hr	1 MT/hr	500 kg/hr	1000 MT	1600kg/shift	NA
2.	Output /Shift	28.80 MT	560 kg	14.40 MT	1600 kg	4000 lit	4000 kg	1000 MT	80 kg	NA
3.	Average Price of Job Work	2/kg	60/kg	12 /kg	20 /kg	25/lit	40/kg	0.60/kg /month	500/kg	NA
4.	Income Per Shift on FG	57600	33600	172000	32000	100000	160000	600000	40000	
5.	Revenue Per Annum INR in Lakhs	144	84	430	80	250	400	60	100	
			Subtotal : INR 1304 Lakhs							
6.	Income from GST	NIL	5% Or12%	5%	12%	12%	18%	18%	5%	153.10
			4.20	21.50	9.60	30	72	10.80	5	
			Subtotal INR 148.10							

Proposed Assumptions:

1. The revenue Model is Designed for only Labour Charge Basis for calculation Purpose.
2. The main revenue to Government will be coming in the form of GST. Actual GST calculation will be available at the time of DPR.
3. With Material Sales Prices GST can be calculated at the time of DPR.
4. The rate for job work are based on current prices.

10.4 Total Income Generation in North Eastern Region

States / Parameters		Arunachal Pradesh	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Tripura	Sikkim	Total
PPC	Quantity	4 nos.	9 nos.	7 nos.	5 nos.	7 nos.	8 nos.	8 nos.	4 nos.	52 nos.
	144 Per PPC Income INR Lakhs	576	1296	1008	720	1008	1152	1152	576	6336
CPU	Quantity	2 nos.	4 nos.	1no.	1 no.	1 no.	1 nos.	1 no.	1 no.	12 nos.
	INR 1304 Lakhs	2608	5216	1304	1304	1304	1304	1304	1304.00	15648
	GST collection (INR in Lakhs) @ Rs.148.10 Lakh /CPC	296.20	592.40	148.10	148.10	148.10	148.10	148.10	148.10	1777.20
Value Addition Unit	Quantity	1	2	1	0	0	0	0	0	4
	INR 100Lakhs	100	200	100						400
	GST INR 5 Lakhs	5	10	5						20

10.5 Socio Economic Impact

Table-10.1: Employment Generation

States / Parameters	Arunachal Pradesh	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Sikkim	Tripura	Total
Employment Generation In Value Chain Post-Harvest & Support Activities (in nos.)	957	2273	968	782	956	1018	652	880	**8486**
Employment Generation In Farm sector Direct and Indirect (in nos.)	102500	135300	45100	45100	65600	45100	16400	32800	**487900**

Table-10.2: Capacity Building of Growers/ Farmers

States / Parameters	Arunachal Pradesh	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Sikkim	Tripura	Total
No. of Farmers to be trained (in Nos./ year)	16000	32000	16000	16000	16000	16000	8000	8000	**476000**

Table-10.3: Savings due to reduction in Post-Harvest losses

States / Parameters	Arunachal Pradesh	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Sikkim	Tripura	Total
Total Volume Handled by Value Chain – (MT/year)	32000	81000	59000	40000	56000	64000	32000	64000	**428000**
Annual reduction @10% in post-harvest losses of perishable due to Collection at Farm Gate and Handling & Processing Scientifically (MT/year)	3200	8100	5900	4000	5600	6400	3200	6400	**42800**
Considering Avg. value of F&V @ INR 10.00/kg Total Savings (INR in Lakhs/ annum)	320	810	590	400	560	640	320	640	**4280**

Table-10.4: Return to the Government

States / Parameters	Arunachal Pradesh	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Sikkim	Tripura	Total
Total GST Collection only on Job Work (INR Lakhs)	**301.20**	**602.40**	**153.10**	**148.10**	**148.10**	**148.10**	**148.10**	**148.10**	**1797.20**

APPENDICES

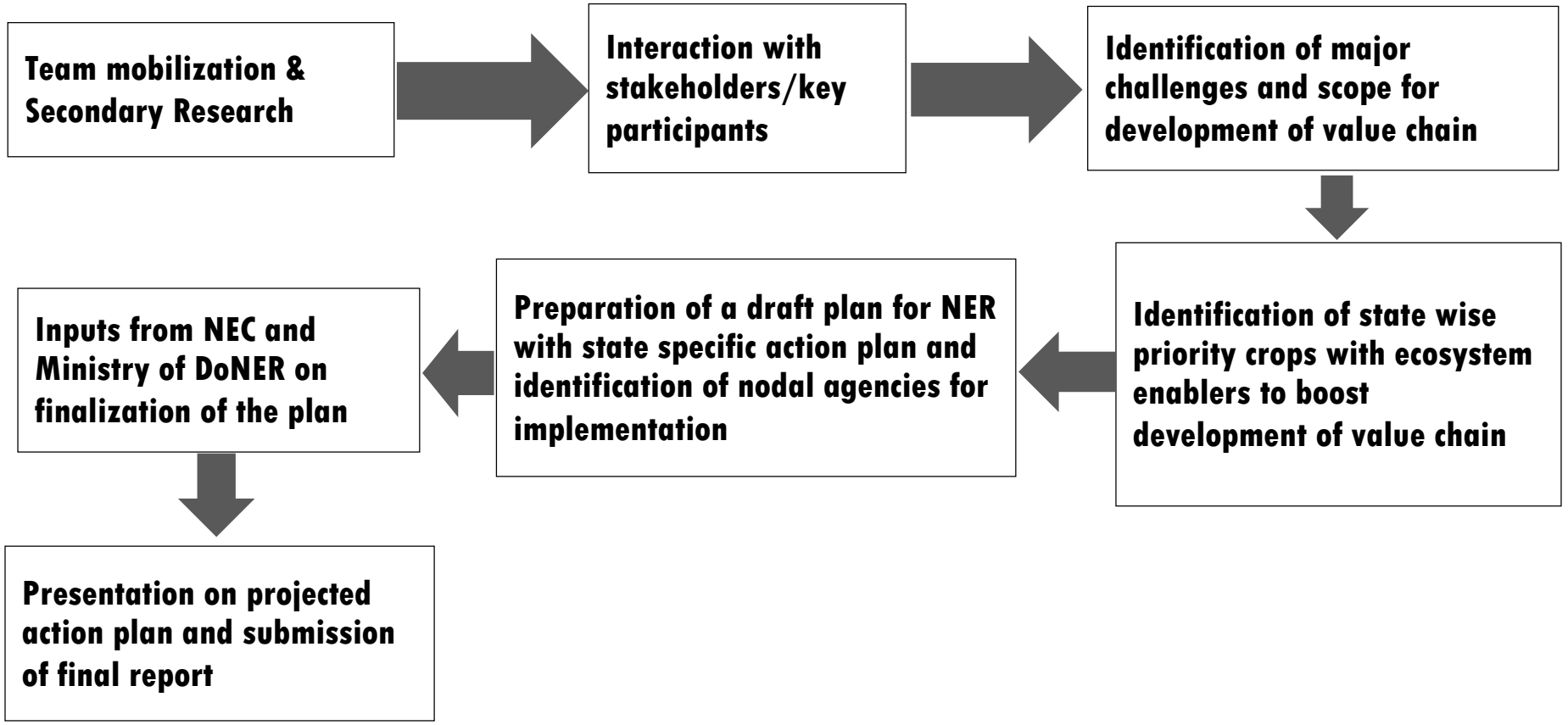
List of Appendices

Annexure-I: Terms of Reference (ToR)

Broad scope of work under each Terms of Reference are mentioned below-

S.N.	Terms of Reference	Broad Scope of Work
1	To assess the current status of the Horticulture sector of NER with reference to Fruits & Vegetables through stakeholders' consultation on challenges, prospects and recommendations for development and promotion of the sector in NER	Stakeholders discussion with- • Ministry of Agriculture & Farmers Welfare, GoI and Ministry of Food Processing Industries, GoI with regard to policies implemented vis-a-vis challenges, if any and on their future strategy. • State Horticulture/Agriculture Departments, Central Institute of Horticulture, Department of Industries & Commerce and other Line departments & relevant stakeholders of 8 State Governments of NER etc. to assess current status of production, production clusters, cluster based organizations FPO/FPCs, processing clusters, infrastructure, marketing networks, exports, government support etc. of the potential crops and future prospects and challenges associated with development of value chain in the sector. • Nodal implementing agencies and Project management agency of Central & State Govt. schemes that support in creation of value chain infrastructure with regards to policies implemented vis-a-vis challenges, if any and their future strategy to meet the challenges. • Inputs from National Horticulture Board (NHB), APEDA, NABARD, NERAMAC, ASFAC, IIFPT, NCCD, NABCONS, NAFED, NEDFi, APART, SIMFED etc on scope for value chain development of the sector and their recommendation. • Discussion with key participants of the sectors such as industry personnel, FPO/FPCs, SHGs/JLGs, private entrepreneurs, marketing agencies, processors, trade bodies, credit institutions etc. on issues & challenges faced in the sector with regard to development of value chain.
2	To identify state wise priority crops for Development of complete Value Chain.	• Identification of priority crops and their market potential for Value Chain Development based on suggestions received from various stakeholders/key participants of the eco system. • Preparation of implementation strategy, assessment of resource requirement and role of stakeholders for development of complete value chain of the identified priority crops.
3	To prepare a 5 year developmental Action Plan including state(s) specific sub-plans, with resource requirement and role of stakeholders.	• Preparation of state specific Action Plan for a period of 5 years. • Formulate implementation model with clearly laid out responsibility of different stakeholders at centre, state and other agencies • Estimation of resource requirement and sources of funding. • Preparation of state specific sub-plans with identification of implementation agencies.

PROPOSED FRAMEWORK



Annexure-II: Concept of Agribusiness and Value Chain for Fruits and Vegetables

Understanding the concept of Agribusiness is a prerequisite to freeze the concept of Value chain for fruits and vegetables.

A-II.1 What is Agribusiness?

Agribusiness is the business sector encompassing farming and farming-related commercial activities. The business involves all the steps required to send an agricultural good to market: production, processing and distribution. It is an important component of the economy in countries with arable land, since agricultural products can be exported.

A-II.1.1 Understanding Agribusiness

Agribusiness treats the different aspects of raising agricultural products as an integrated system. Farmers raise animals and harvest fruits and vegetables with the help of sophisticated harvesting techniques, including the use of GPS to direct harvesting operations. Manufacturers develop increasingly efficient machines that can drive themselves. Processing plants determine the best way to clean and package livestock for shipping. While each subset of the industry is unlikely to interact directly with the consumer, each is focused on operating efficiently in order to keep prices reasonable.

Market forces have a significant impact on the agribusiness sector. Changes in consumer taste alter what products are grown and raised. For example, a shift in consumer taste away from red meat may cause demand — and therefore prices — for beef to fall, while increased demand for produce may shift the mix of fruits and vegetables that farmers raise. Businesses unable to rapidly change in accordance with domestic demand may look to export their products abroad, but if that fails they may not be able to compete and remain in business.

A-II.1.2 The driving forces for Agribusiness concept are

a. Future needs of the domestic and global market
b. Changing life-style and diet/food habits
c. Safe food
d. Traceability
e. Nutritional Profile

Agribusiness is an important aspect and the base to design value chains.

A-II.2 What is Value Chain?

As per the researchers a "Value Chain" is not an object that you can see. Rather, a value chain is simply a useful way of understanding how the world of producing, buying, and selling works. We are all a part of value chain in one way or the other - as producers, consumers of goods and services, processors, retailers, finance providers, etc. As consumers, we all eat and we all wear clothes and so we are linked to many value chains – chains of grain crops, roots and tubers, fruits and vegetables, legumes, oils, and textiles. These chains stretch from growers to our kitchens, eating tables, clothing and beyond. At one end of the agricultural value chain, are the producers – the farmers who grow crops and raise animals. At the other end, are the consumers who eat, drink, wear and use the final products. And in the middle are many thousands of men and women, and small and large businesses. Each person and each business perform one small step in the chain, and each adds value along the way – by growing, buying, selling, processing, transporting, storing, checking, and packaging. Other people and other businesses have important roles supporting the

chain. Banks provide loans; governments establish laws and policies, and agricultural research organizations develop ways for farmers to participate in value chains more successfully.

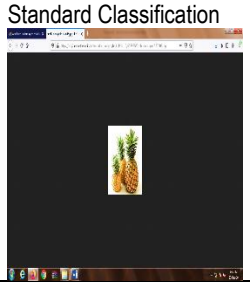
Value chain in Agriculture is the invisible part of AGRIBUSINESS concept and is interconnected from FARMER to CONSUMER with number of steps, stages and is connecting number of stake holders adding value to basic agro produce.

A-II.3 Importance of Value Chain

1. From a common fruit and vegetable with the help of technology we can process/ manufacture high value-added product or an ingredient step by step with higher value addition.
2. All stake holders in the value chain will get satisfactory returns.
3. First stake holders' finished product will be the raw material for next stake holder.
4. Local raw material (fruits and vegetables) can be converted into extremely high value-added products.
5. The value-added products can be marketed globally and can earn good profits, as there will be a value chain.
6. Redeployment of profits for rural and farmer empowerment can be easily possible, which will increase the yield and improve the quality of raw material also.

Annexure-III: Basic Profile of few important Crops

A-III.1 Pineapple

No	Particulars	Details		Remark
A.	**Basic Information**			
1.	Name of Fruit	Pineapple		
2.	Botanical Classification	Kingdom	Plantae	Standard Classification 
		Orders	Poales	
		Family	Bromeliaceae	
		Genus	Ananas	
		Species	A. Comosus	
		Binomial Name	Ananas comosus	
3.	Species In NER	Kew		Main Varieties from North East India
		Queen		
		Mauritius		
		Jaldhup		
B.	**Cultivation Practice**			
1.	Sowing Season	May – June		(plant population 40400 / ha)
2.	Harvesting Season	July – Dec		May – June is main harvesting time
3.	Life of Plant/commercial Life	2 Harvesting cycles:1st in 14-18 months and 2nd in 13 months and as then; Up to total 5 years		Economical time is 5 years
4.	Agri Inputs	As per MOVCD Guidelines		NPOP Compliance
5.	Per Year Production	Average yield is 50-80 MT/Hectare, but in NE may vary from 10 MT to 80 MT/Hectare		High Density Farming
6.	Cost of Cultivation per Acre	INR 130000 to 150000		Ref NEC & MHB KVK in Meghalaya
7.	Special Instructions and Comments	Dense Farming		Dense Farming Practice
8.	Modern Trends	Farming by Farmer Producer Companies		Easy for Farmer to sale the product with all support
C.	**Information For Value Addition**			
1.	Nutrition Profile	Calories	82.50	As Per USDA 165 g (1 Cup) fresh Pineapple chunks Very low Fats Pineapple is having medium Glycemic Index (GI)
		Fat	0.2 g	
		Sodium	1.7 mg	
		Carbohydrates	22 g	
		Fiber	2.3g	
		Sugars	16.3 g	
		Protein	0.9 g	
		Vitamin C	79 mg	
		Copper	181 mg	
2.	Major Health Benefits	1. Loaded with Nutrients – vitamin C, Manganese, Vitamin B6, Potassium and minerals. 2. Contains disease fitting Antioxidants. 3. Contains enzyme Bromelain – which helps easy digestion. 4. Reduces risk of cancer due to Bromelain. 5. Pineapples have anti-inflammatory properties that may boost the immune system. 6. The anti-inflammatory properties of pineapple may provide short-term symptom relief for people with common types of arthritis. 7. The bromelain in pineapples may reduce the inflammation, swelling, bruising and pain that occurs after surgery. Bromelain's anti-inflammatory		With All these health benefits – Value added products from functional and Nutraceutical sector can be developed which will strengthen the value chain concept.

No	Particulars	Details	Remark
		properties may also aid recovery after strenuous exercise by reducing tissue inflammation. 8. Pineapples are delicious, accessible and easy to add to the diet. As salad, fruit dish, fresh juice, frozen dices, ready to drink beverage etc.	
3.	Parts to be Used For Value Chain	1. Fruit – Flesh 2. Crown	Fruit will be suitable for table use and processing From crown bromelain can be extracted.
4.	Post-Harvest Activities	1. Inspection and size& weight wise grading 2. If required wax coating to enhance shelf life in transit 3. Processing – frozen, dehydration, pulp, caning etc. 4. Bromelain extraction	High value added products can be manufactured.
5.	Secondary Processing	1. Processing – frozen , dehydration, pulp, caning etc.	Main products to be manufactured – canned slices, tit bits, candies, dehydrated chunks, powder, juice, ready to drink beverages, IQF slices.
6.	High Value Addition Processing	1. Bromelain extraction	This powder will be used as one of the main ingredient in Functional and Nutraceutical formulations.
7.	International Market Scenario	▪ The pineapple market seems to be quiet at the moment. Apart from some reports about delays, nothing out of the ordinary is reported in Europe. The supply is good and prices are stable in many countries. Italy has seen prices drop slightly in recent weeks, especially for the fruit imported by sea freight. The pineapples shipped by air do well in the summer months. French traders are facing rising competition from summer fruits, causing the demand to collapse. In the US, importers complain about the cheap pineapples that are still on the market. The price fell sharply due to bad weather and the impact of a cold front in December. Why the price does not pick up now that the weather is better remains unclear. In the production areas, the mood is generally positive. Costa Rica remains the market leader, but other countries in the region are paving their way to increasing their market share. ▪ In wholesale prices, the global pineapple market grew to $ 14.9 billion in 2016. This figure includes the turnover of growers and importers and was revealed by a recent survey carried out by Index box. ▪ Brazilians are the biggest pineapple consumers worldwide. Around 11% of the worldwide volume is consumed in this South American country. Next in the ranking are the Philippines and Indonesia, which both account for 8% of consumption, followed by India (7%) and China (6%). ▪ On the production side, Costa Rica is undoubtedly number one, with exports totaling 3.2 million tons, or 12% of the total volume in 2016. Next in the top 3 are Brazil (10%) and the Philippines (10%). These are followed by Indonesia (8%), India (7%), China (6%), Nigeria (6%), Thailand (5%), Mexico (3%) and Angola (3%). Between 13 and 14% of the total volume, about 3.6 million tons in 2016, is traded internationally. Costa Rica was by far the largest exporter, with a market share of 56%, followed by the Philippines (16%). The	North East Region will export Pineapple to UAE, Saudi Arabia, Nepal, Bangladesh, Singapore, Baharain, Australia, Maldives (May refer APEDA Data).

No	Particulars	Details	Remark
		fourth and fifth largest exporters are re-exporters: the Netherlands (7%) and Belgium (3%). ▪ 1 of 26.4 million tons are marketed. Over the past nine years, the market has grown on average by 3.3% per year. ▪ The consumption of pineapples continues to grow, in part due to the rising income and growing population, but also to marketing campaigns focused on healthy eating. The largest growth market is Asia, especially countries like China, Indonesia, Vietnam and the Philippines. A second growth market is Latin America, especially the Dominican Republic and Costa Rica.	
8.	Domestic Market Scenario	India ranked sixth with a share of about 8 % of the world production of pineapples. The total area under pineapple cultivation in India is 84000 hectares with a production of about 1341000 t. It is grown in Karnataka, Meghalaya, West Bengal, Kerala, Assam, Manipur, Tripura, Arunachal Pradesh, Mizoram, and Nagaland. Though Assam has the largest area under pineapple West Bengal is the largest producer. Karnataka, West Bengal and Bihar are the three states reporting high productivity. Overall, Indian productivity of 16.00 t/ha poorly compares with the world average of 22.58 t/ha.	Tripura variety is having G.I. Tag.
9.	Points for forward Integration	To develop value chain for pineapple –in North Eastern Sates – Following model should be considered: 1. Backward linkage development with the Farmer Producer Companies. 2. Collection centers by FPCs. 3. Pack House and sort duration storage by FPCs & the Primary Processing Centers (PPC) by FPCs. 4. Central Processing Centre or Common Facility Centre for branding and forward integration by SPVs.	HUB and SPOKE MODEL Recommended. Traceability and Safe Food Manufacturing practices along with Organic Certification will boost the sale in domestic and global market.

A-III.1.1 Export Statistics: APEDA Products PAN India Data

2016-17		2017-18		2018-2019		2019-2020	
QTY in MT	Values in INR Lakh	QTY in MT	Values in INR Lakh	QTY in MT	Values in INR Lakh	QTY in MT	Values in INR Lakh
5204.55	2615.41	8339.79	3501.44	6942.12	3199.60	6682.93	2710.26

A-III.1.2 Pineapple Production Data (Fig 2017-18)

State / Particulars	Arunachal Pradesh	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Tripura	Sikkim
Area (in Hectares)	3090	16300	12183	2933	8880	8895.5	8728	NA
Production (in MT)	23110	296520	138463	16830	96810	117460	126995	NA
Productivity (MT/Hectare)	7.49	18.19	11.70	5.50	9.47	13.93	14.55	NA

A-III.1.3 Grading Protocols

No	Particulars	Remark/Observations			
1.	Inspection Parameters	a. Superior Quality b. Free Defects c. Crown if present should be simple and straight, shall be between 50-150%of length of fruit d. Brix degrees – minimum 12			
2.	Grading Guidelines (Ref APEDA Norms) Minimum Weight 700 g and above with crown	**No**	**Grade**	**Weight with Crown (in Grams)**	**Weight Without Crown (in Grams)**
		1	A	2750	2280
		2.	B	2300	1910
		3.	C	1900	1580
		4	D	1600	1330
		5.	E	1400	1160

A-III.1.4 Packaging Protocols

No	Particulars	Details				
1.	For Domestic Market	Packing in Creates or Gunny Bags with Crown				
2.	For Export By Sea Corrugated boxes or Solid fiber board boxes & one ventilation hole each side Crown Reduced	**Grade**	**No. of Fruits**	**Packing Pattern**	**InternalDimension (in mm)**	**Partitions**
		A	8	4X2	535 LX290WX280 H	Corrugated fiber board
		B	12	4X3	535LX395WX250 H	Corrugated fiber board
		C	12	4X3	535LX395WX250 H	Corrugated fiber board
		D	20	5X4	535LX430WX195H	Corrugated fiber board
3.	By AIR	Large 1.75-2 kg	6	3X2	415 LX275WX375 H	Corrugated fiber board
4.	HS Code For Fresh Pineapple Export From India	HS Code: 08043000				

A-III.1.4 Storage Protocols

No	Parameters /Particulars	Details
1.	Temperature	7-10 degree Celsius for semi ripe or full ripe pineapple
		10-13 degree Celsius for green pineapple
2.	Relative Humidity	85-95%
3.	Storage Period	3-5 Weeks depends on ripening stage
4.	Freezing Point	1 degree Celsius

A-III.2 Banana

No	Particulars	Details		Remark
A.	**Basic Information**			
1.	Name of Fruit	Banana		
2.	Botanical Classification	Kingdom	Plantae	Standard Classification 
		Orders	Zingiberales	
		Family	Musaceae	
		Genus	Musa	
		Species	A. Comosus	
		Binomial Name	Musa	
3.	Species In NER	Musa nagalandiana - Nagaland		Main Varieties from North East India
		Musa cylindrica – Meghalaya and Arunachal Pradesh		
		Jahaji (AAA) , Cheeni Champa (AAB), Governor AAA) – Assam		
		Musa markkui		
B.	**Cultivation Practice**			
1.	Sowing Season	Throughout the year		(plant population 5000 / ha)
2.	Harvesting Season	Throughout the year		April – June Main Season
3.	Life of Plant/commercial Life	14-15 month harvesting start		Economical time is 30-32 months
4.	Agri Inputs	As per MOVCD Guidelines		NPOP Compliance
5.	Per Year Production	30 MT /Ha		High Density Farming
6.	Cost of Cultivation per Acre	INR 130000 to 150000		Ref NEC & MHB KVK in Meghalaya ,NHB
7.	Special Instructions and Comments	Dense Farming		Dense Farming Practice
8.	Modern Trends	Farming by Farmer Producer Companies		Easy for Farmer to sale the product with all support.

No	Particulars	Details		Remark
C.	**Information For Value Addition**			
1.	Nutrition Profile Raw Per 100 g	Calories	371 KJ	
		Fat	0.33 g	
		Protein	1.09 g	
		Carbohydrates	22.84 g	
		Fiber	2.6 g	
		Sugars	12.23 g	
		Minerals	Potassium – 358 mg	
			Magnesium -27 mg	
			Phosphorus – 22 mg	
		Vitamin	C- 8.7 mg	
			Choline – 9.8 mg	
			B3 – 0.665 mg	
			B 6 – 0.4 mg	
			B9- 20micro g	
2.	Major Health Benefits	1. Heart health -Bananas are good for heart. 2.Depression and mood Bananas can be helpful in overcoming depression "due to high levels of tryptophan 3. Digestion and weight loss. Banana contains high amount of dietary fibre which helps in maintaining body weight. 4. Regulate blood pressure		With All these health benefits – Value added products from functional and Nutraceutical sector can be developed which will strengthen the value chain concept.
3.	Parts to be Used For Value Chain	1. Fruit – Flesh 2. Stem 3. Flowers 4. Leaves		Fruit will be suitable for table use and processing. From Banana stem we can extract fibers, - and can manufacture various value added products.
4.	Post-Harvest Activities	1. Inspection and size& weight wise grading 2.Easy for transportation 3. Ripening (Near Market Place)		Post-Harvest Processing will generate huge employment & value addition.
5.	Secondary Processing	1.Pulp & Puree 2. Chips 3. Powder 4. Flower – pickles 5. Stem powder		Process Technology used: Canning, dehydration , IQF , Vacuum frying
6.	High Value Addition Processing	1. Extract of stem for pharma products 2. Baby food formulation s		Banana powder will be used as one of the main ingredient in Functional and Nutraceutical formulations.

A-III.2.1 Grading Protocols

No	Particulars	Remark/Observations			
1.	Inspection Parameters	a. Superior Quality b. Free Defects c. Crown if present should be simple and straight, shall be between 18-25 cm in length (KPulp-Tip)min d. Brix degrees – minimum 7.8Brix			
2.	Grading Guidelines (Ref APEDA Norms) The quality standards for grading are as per AGMARK	**No**	**Extra Class**	**Class II**	**Class II**
		1	Tolerance by number and weight 5%not satisfying the requirement.	Tolerance by number and weight 10% not satisfying the requirement.	Tolerance by number and weight 10% not satisfying the requirement, but meeting the minimum requirements.

A-III.2.2 Packaging Protocols

No	Particulars	Remark/Observations
1.	Packaging Protocols	Per Box weight – 13-13.5 kg Gross Weight – 14.1 kg
2.	Type of Box	Corrugated Box – Bottom 5 Ply and top 5 ply (Telescopic Card board Fabre Boxes) Top – 48.5 cm X31.5 cmX20.25cm Bottom – 47.50 cm X31.25 cmX19.75 cm Gap Plate – 3 ply Foam Sheet or Pad = 20 mm thick , 38X25 cm with 10 mm holes weight of final packed box is approx. 14.1 Kg

A-III.2.3 Export Statistics: APEDA Products

HS Code: 08043000 Pineapple fresh and or Dried to All Countries

2016-17		2017-18		2018-2019		2019-2020	
QTY in MT	Values in INR Lakhs	QTY in MT	Values in INR Lakhs	QTY in MT	Values in INR Lakhs	QTY in MT	Values in INR Lakhs
5204.55	2615.41	8339.79	3501.44	6942.12	3199.60	6682.93	2710.26

(Source: PAN India Data)

A-III.2.4 Banana Production Data (Fig 2017-18)

State ⇨ Particulars	Arunachal	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Tripura	Sikkim
Area in Hectares	2210	53080	7370	11210	6930	8340	10290	1280
Production MT	14080	913270	96900	143840	93480	117040	109400	3710
Productivity MT/Ha	6.37%	17.20	13.15	12.83	13.48	14.03	10.63	2900

A-III.2.5 Storage Protocols

No	Parameters /Particulars	Details
1.	Temperature	13.3- 14.4 degree Celsius
2.	Relative Humidity	90-95%
3.	Storage Period	4-6Weeks
4.	Freezing Point	-0.8 degree centigrade

A-III.3 Mandarin Orange

No	Particulars	Details		Remark
A.	**Basic Information**			
1.	Name of Fruit	Mandarin Orange		
2.	Botanical Classification	Kingdom	Plantae	Standard Classification 
		Orders	Sapindales	
		Family	Rutaceae	
		Genus	*Citrus*	
		Species	A. Comosus	
		Binomial Name	C. reticulata	
3.	Main Varieties in NER	Khasi Mandarin, CRS-4,		Refer Citrus Research Station
B.	**Cultivation Practice**			
1.	Sowing Season	June to Aug		(plant population 277 / ha)
2.	Harvesting Season	Jan Feb June Nov Dec		2 seasons
3.	Life of Plant/commercial Life	6-7 Years month harvesting start, 40 years		Economical time is 08months
4.	Agri Inputs	As per MOVCD Guidelines		NPOP Compliance
5.	Per Year Production	13.62 MT/Ha		High Density Farming
6.	Cost of Cultivation per Acre	INR 175000/Acre		Ref NEC & MHB KVK in Meghalaya ,NHB
7.	Special Instructions and Comments	Dense Farming		Dense Farming Practice
8.	Modern Trends	Farming by Farmer Producer Companies		Easy for Farmer to sale the product with all support
C.	**Information For Value Addition**			
1.	Nutrition Profile Raw Per 100 g	Calories	223 KJ	As per USDA Data
		Fat	0.31 g	
		Protein	0.81 g	
		Carbohydrates	13.34 g	
		Fiber	1.8 g	
		Sugars	10.58g	
		Minerals	Calcium – 37 mg/4%	
			Magnesium -12 mg	

No	Particulars	Details		Remark
			Phosphorus – 20 mg	
			Potassium 166 mg	
		Vitamin	C- 26.7 mg	
			Choline – 10.2 mg	
			Beta carotene 155 micro gram	
			E – 0.2mg	
			A 34micro g	
2.	Major Health Benefits	1. Rich in antioxidants. 2. Increase immune system. 3. Boosts gut health. 4. Reduces risks of kidney stone formation.		With All these health benefits – Value added products from functional and Nutraceutical sector can be developed which will strengthen the value chain concept.
3.	Parts to be Used For Value Chain	1. Fruit – Flesh 2. Peel 3. Seeds 4. Leaves		Fruit will be suitable for table use and processing. From Peel and seeds we can extract oil and leaves are having health benefits.
4.	Post-Harvest Activities	1. Inspection and size& weight wise grading 2.Easy for transportation 3. Wax costing for long shelf life		Post-Harvest Processing will generate huge employment & value addition
5.	Secondary Processing	1.Juice and Juice concentrate 2. Peel Powder and Granules 3. Ready to dink beverage 4.Frozen slices 5. Dehydrated slices		Process Technology used: Canning, dehydration, IQF, Freeze drying
6.	High Value Addition Processing	1. Peel Oil 2.Seed Oil		Peel and seed oil will be used for Nutraceutical formulations.

A-III.3.1 Grading Protocols

No	Particulars	Remark/Observations			
1.	Inspection Parameters	a. Intact, clean, fresh b. Free from Defects c. Light Orange colour d. Brix degrees – minimum 10 Brix e. Minimum juice contents 25% weight of fruit			
2.	Grading Guidelines (Ref APEDA Norms) The quality standards for grading are as per AGMARK	**No**	**Extra Class**	**Class II**	**Class II**
		1	Tolerance by number and weight 5%not satisfying the requirement.	Tolerance by number and weight 10% not satisfying the requirement.	Tolerance by number and weight 10% not satisfying the requirement, but meeting the minimum requirements.

A-III.3.2 Size wise Grading

No	Size Code	Diameter (In mm)
1.	A	54-61
2.	B	62-69
3.	C	70-77
4.	D	78-85
5.	E	Above 85

A-III.3.3 Packaging Protocols

No	Particulars	Remark/Observations
1.	Packaging Protocols	Per Box weight – 7 kg and 2.5 kg Gross Weight – NA
2.	Type of Box	Corrugated Box – Bottom 5 Ply and top 5 ply (Telescopic Card board Fabre Boxes) 65mm – 7 kg 40 mm – 2.5 kg

A-III.3.4 Export Statistics: APEDA Products

HS Code: 08043000 Pineapple fresh and or Dried to All Countries

2016-17		2017-18		2018-2019		2019-2020	
QTY in MT	Values in INR Lakhs	QTY in MT	Values in INR Lakhs	QTY in MT	Values in INR Lakhs	QTY in MT	Values in INR Lakhs
2527	1015	NA	NA	NA	NA	NA	NA

(Source: PAN India Data)

A-II.3.5 Mandarin Orange Production Data (Fig 2017-18)

State ⇨ Particulars	Arunachal	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Tripura	Sikkim
Area in Hectares	32730	14950	9280	16370	4460	6520	5620	13080
Production MT	69740	203720	45240	44020	39890	47330	25330	18990
Productivity MT/Ha	2.13	13.62	4.87	2.68	8.94	7.26	4.51	1.45

A-II.3.6 Storage Protocols

No	Parameters /Particulars	Details
1.	Temperature	Pre cooling 5-7 degree centigrade
2.	Relative Humidity	90-95%
3.	Storage Period	3-5Weeks
4.	Freezing Point	-0.8 degree centigrade

Annexure-IV: NER Basic data for Value Chain Investment to Finalize PPC & CFC/CPU

NO.	States → / Parameters ↓	Arunachal	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Tripura	Sikkim
1.	Capital	Itanagar	Dispur	Shillong	Aizawl	Imphal	Kohima	Agartala	Gangtok
2.	Population As per 2011 Census	1382611	31169272	2966889	1091014	2721756	1980602	3671032	607688
3.	Area sq.km	83743.59	78438	22419	21081	22327	16579	104861	7096
4.	No of Districts	25	33	11	11	16	11	8	4
8.	Blocks	109	219	46	26	70	74	58	32
9.	Gross Cropped land	31.64 Lakhs Ha	40.99 Lakhs Ha	3.09 Lakhs Ha	1.38Lakhs Ha	3.64Lakhs Ha	384180 Ha	474498 Ha	78056Ha
10.	Irrigated Land	25%	6.75%	36.60%	1.79	Not Available	83500 Ha	127000Ha	14421 Ha
11.	Cropping Intensity	136%	146%	120%	112%	155.87%	129%	186%	117%
12.	Area under Horti Cultivation 2017-18 Ha	69401.39	563891	96043.77	119730	49200	73548.75	30240	61623
	Production (MT)	387841.13	5451269	802672.80	684468	500420	728324.8	524733	211790
13.	GSDP Base year 2011-12	INR19473 Cr In 2015-16	INR 20280 Cr In 2015-16	INR21872 Cr In 22012-13	INR9634 Cr In 2015-16	INR19530.67Cr In 2015-16	INR14115Cr In 2015-16	INR249340Cr In 2015-16	INR16637Cro res
14.	Total Road Length Km s	20408	309131	1976	8518	2461	1847	20930	1010
15.	Rail Length (Km)	11.67	2442.57	9.46	1.5	111	12.85	192.54	NIL
16.	Airports	0	6	1	1	1	1	1	1
17.	Existing Industrial Estate	17 in 345 Ha 1 cold chain	5 industrial park 1 Agri Export Zone 1 Mega food park	6 Industrial Estates 1 Growth Center 2 Export Promotion Industrial Park	13 Industrial Area 1 Mega Food Park	8 Industrial Estates 9 Business Incubator 9 Training centers 8 Cluster Training Centers 3clusters 1 Food Park	15 Industrial Area 1 Export Promotion Investment Park 1 Mega Food Park	3 Industrial Area 5 Industrial Estates 2 Food Park 2 Integrated Infrastructure Centers	2 Agri Export Zones
18.	Ports	NIL	4	1 Land Port	NIL	2	NIL	NIL	NIL
19.	In Land Container Deport	NIL	13	NIL	NIL	2	NIL	01	NIL

Annexure-V: Post-Harvest Technologies in Value Chain Development & various Value-Added products

No	Particulars	Details	To be Used in
A.	**Post-Harvest Handling and Storage**	a. Hot Water Treatment b. Vapour Treatment c. Wax coating d. Emulsification e. Ethylene application f. Bar coding	In Integrated Pack House
		a. Cold Storage – Multi Temperature, b. Precooling c. Controlled Atmosphere storage d. modified atmospheric cold store	Short Duration Cold Store in Pack House Or and Post-Harvest Common Facility Centre, Cold Storage, clusters Good for non-season V & F
B.	**Shelf-life Enhancement Activity** – with help of which we can enhance the shelf life of vegetables and fruits from few days to several months	a. Frozen, IQF b. Dehydration c. Canning	SPV Cluster's / Central processing centers Food Parks Individual units Food Hubs
c.	**Secondary Processing (Food Processing**)	a. Mixing b. Roasting c. Extraction d. Hot Filling e. Extrusion f. Osmosis g. Size Reduction h. Size Separation i. Centrifuge j. Ultra-Sonic k. Microwave l. Baking m. Encapsulation n. Retort	Food Processing Industries Food Park Common Facility Centers Cluster Common core infrastructures SEZ units
		Products • Ready to eat • Ready to cook • Spices and seasoning • Beverages • Wines • Brews • Bakery and Biscuits • Confectionary • Traditional Products • Extruded snacks	

No	Particulars	Details	To be Used in
		• Papad, chatanis • Break Fast Cereals • Puffed products • Ingredients • Flavours • Functional and Nutraceutical formulations	
D.	**Organized Supply Chain**	• Branding • Packaging • Distribution • Logistics • Bar coding • Displays • Promotion • Reaching to consumers • Market research • Finish Goods warehouse • Maintaining the inventories • Suggesting requirements and modifications • Sales • Customer satisfaction	Domestic Retail Chains Distribution channels International supply chains Corner shops Dealers and Distributors Government Purchase program UN purchase program

A-V.1 Value Added Products in Value Chain of Short Listed Fruits

No	Particulars ⇨ V.C. Components Crops ⇩	Backward Linkage At Farm Level & Hand over to Collection Center	Post-Harvest Primary Process & Products Pack Houses	Secondary Processing- Product Manufacturing Processing in CFC/CPU	Organized Supply Chain
A.	**Fruits**				
1.	**Citrus Fruits**				
	Orange/Mandarin **Lemon / Lime** **Sweet lime**	• Organic Certification program • Healthy Seedlings • Integrated Pest Management • Plant care & flowering program • Climate forecast • Harvesting program	• Harvesting • Collection by Collection Centers • Aggregation By FPCs / FPOs / SHGs • Harvested material received by Pack House • Grading • Cleaning • Hot Water / Waxing • Short duration storage • Grade 1& 2 transported to organized supply chain and or to APMCs/Private Mandies /Export • Grade 3 & 4 for processing	**Fruits:** **Juice extraction** • By Cold process and or by extraction process • Fresh Chilled juice • Making Juice Concentrate • Ready to Drink Juice **Orange Sweet** • Dehydrated Orange candy • Freeze Dried Orange Slices • Spray Dried powders	B2B Supply Own Brand products for FMCG and Industrial OEs Private Level Contracts

No	Particulars ⇨ V.C. Components / Crops ⇩	Backward Linkage At Farm Level & Hand over to Collection Center	Post-Harvest Primary Process & Products Pack Houses	Secondary Processing- Product Manufacturing Processing in CFC/CPU	Organized Supply Chain
				Peel : • Peel Oil Manufacturing • Peel Oil Products – Cosmetics & skin care creams • Dehydrated Peel Powder – for cosmetics, animal feed, seasoning and flavoring • Peel granules for diet bars and flavoring **Seed:** • Seed oil & seed oil base pharma products **Orange Leaves**: • Leaves powder for pharma and • flavoring application & • value added products	
2.	**Pineapple**	• Soil Preparation • Cultivation • Nursery & Good Agricultural Practices • Organic Certification Process • Integrated Pest Control • Flowering / Fruit catch time decision • Climate forecast • Harvesting Program	• Harvesting • Collection by Collection Centers • Aggregation By FPCs / FPOs / SHGs • Harvested material received by Pack House • Grading • Cleaning • Hot Water /Waxing • Short duration storage • Grade 1& 2 transported to organized supply chain & open market/Mandies – Export • Grade 3 &4 for processing	**Fruit:** • Ripening • Juice Extraction • Fresh Chilled Juice • Juice Concentrate • Ready to drink Juice • Pineapple candy • Canned Pineapple slices • Tit Bits • Dehydrated Pineapple cubes • Freeze Dried Pineapple bits • Spray Dried powder • Ready to serve Pineapple base products • Ice Creams • Functional and Nutraceutical Formulations • Wine **Crown** : • Dried Powder • & Bromelain extraction	• Branding • Packing • Wax coating • Domestic Supply Chains • Local Fruit Suppliers • Organized supply chain for export
3.	**Jack Fruit**	• Natural Orchards • Planned Orchards	• Harvesting • Collection by Collection Centers	**Raw fruit** • Vegan Meat	As Above

No	Particulars ⇨ V.C. Components Crops ⇩	Backward Linkage At Farm Level & Hand over to Collection Center	Post-Harvest Primary Process & Products Pack Houses	Secondary Processing- Product Manufacturing Processing in CFC/CPU	Organized Supply Chain
		• Good Agricultural Practices • Organic Certification • Quality Observations • Documentations • Climate forecast • Harvesting calendar	• Aggregation By FPCs / FPOs / SHGs • Harvested material received by Pack House • Grading • Cleaning • Hot Water /Waxing • Short duration storage • Grade 1 & 2 transported to organized supply chain & open market/Mandies – Export • Grade 3 & 4 for processing	• Ready Eat and Cook Vegetables & curries **Ripe Fruit :** • Nectar • Ready to drink beverage /Juice • Chips • Canned Jack Fruit • Fruit Bar • Ice cream • Peda /Sweet • Jam & Squash • Pickles • Spray Dried Powders • Freeze Dried Jackfruit • Functional and Nutraceutical formulations and products • Wine • Flavor extraction **Peels:** • Rich In Pectin, Pectin • manufacturing Jelly **Seeds** : • Dried powder • Ready to cook	
4.	**Banana**	• Organic Certification program • Healthy Seedlings • Integrated Pest Management • Plant care & flowering program • Climate forecast • Harvesting program	• Harvesting • Collection by Collection Centers • Aggregation • By FPCs/FPOs/SHGs • Harvested material received by Pack House • Grading • Cleaning • Hot Water /Waxing • Short duration storage • Grade 1& 2 transported to organized supply chain & open market/Mandies – Export • Grade 3 &4 for processing	**Fruit :** • Ripening • Pulp • Ready to Drink Juice/Beverage • Chips • Powder • Baby Food ingredient • Canned Banana • Powder for Hydroponic plant diet • Pickles • Ready to serve Raita (Traditional dish) • Banana Flour • Wine	As Above

No	Particulars ⇨ V.C. Components Crops ⇩	Backward Linkage At Farm Level & Hand over to Collection Center	Post-Harvest Primary Process & Products Pack Houses	Secondary Processing- Product Manufacturing Processing in CFC/CPU	Organized Supply Chain
				• Functional &Nutraceutical Formulation **Leaves :** • For Traditional Lunch & snacks serving • Disposal Plates and Bowls (Eco friendly) • Organic packing material **Stem** : • Fiber extraction • Garments, Eco friendly sanitary pads • Stem powder for pharma application • Ready to eat food	
5.	**Papaya**	As Above	As Above	**Raw fruit** • Vegetable • Pectin extraction **Ripe Fruit :** • Table Use • Ripening • Pulp • Nectar • Ready to Drink Beverage • Tuti Fruti • Spray Dried Powder • Freeze Dried Papaya Cubes • Canned Papaya • Functional Formulation • Candies , Jam , Squash **Leaves :** • Extract for pharma and Nutraceutical application	As Above
6.	**Guava**	As Above	As Above	**Fruit :** • Ripening • Table Use • Pulp & Nectar • Ready to Drink Juice& Beverage • Concentrate • Candies	As Above

No	Particulars ⇨ V.C. Components Crops ⇩	Backward Linkage At Farm Level & Hand over to Collection Center	Post-Harvest Primary Process & Products Pack Houses	Secondary Processing- Product Manufacturing Processing in CFC/CPU	Organized Supply Chain
				• Freeze Dried Fruit cubes , Spray Dried Powder • Candies , Jam , Squash • Functional Formulation **Leaves** : • Dried powder and Extract for pharma applications & Nutraceutical applications	
7.	**Passion Fruit**	As Above	As Above	**Fruit:** • Ripening • Pulp • Nectar • Concentrate • Ready to Drink Beverages • Spray Dried Powder • Starch Jell • Freeze Dried Slices • Functional Formulation • Extracts • Jam , Squash , Puree • Table Use • Wine **Rind and Peel** • Pectin Extraction **Seeds** • Protein Extraction & • Oil Extraction	
8.	**Mango**	As above	As Above	**Raw fruit** • Mango Bits & Powder • Amachur (Seasoning) • Pickles **Fruit :** • Ripening • Pulp • Concentrate • Ready to drink Juice and Beverages • Table Use • Dehydrated Slices • Freeze Died fruit Snacks	As Above

No	Particulars ⇨ V.C. Components Crops ⇩	Backward Linkage At Farm Level & Hand over to Collection Center	Post-Harvest Primary Process & Products Pack Houses	Secondary Processing- Product Manufacturing Processing in CFC/CPU	Organized Supply Chain
				• Spray Dried • Wine **Stone :** • Mango Butter & Oil and • for making pallets as boiler fuel **Peel :** • As Fuel **Leaves** : • Dried leaves powder • Extracts for pharma and Nutraceutical Applications **Wood** • Fuel, • Holy Application	
9.	**Kiwi**	As Above	As Above	**Fruit :** • Ripening • Table Use • Dried Slices • Nutraceutical Application • Freeze Dried Snacks • Spray Dried Powder **Extracts** • Wine • Jam, Jelly, • Pectin , • Leather, • Candy , Toffee	As Above

A-V.2 Value Added Products in Value Chain for Short Listed Vegetables:

No	Particulars ⇨ V.C. Components	Backward Linkage At Farm Level & Hand over to Collection Center	Post-Harvest Primary Process & Products Pack House	Secondary Processing- Product Manufactured Processing in CFC/CPU	Organized Supply Chain
1.	**Mushroom**	• Healthy Seeds • Farm Preparation • Organic Certification • Good Agricultural Practices • Documentation system • Harvesting Calendar • Controlled Atmosphere Farming for commercial crops	• Harvesting • Grading • Cleaning • Inspection • Grade 1 & 2 for organized supply chain • Packing • Grade 3 & 4 Processing	• Freeze Drying Bits & Powder • Vacuum Dehydrated bits and Powder • Soup premix • Ready to Eat and Cook vegetables and curries • Salad boxes • Extracts • Health Food Preparations	• B2B Supply • B2C supply • Private Label working • Branding • Labeling • Customer Awareness Program • Events Promotion • Export • Air Logistics • Other Logistics Management
2.	**Carrot**	• Land Preparation • Healthy Seeds • Organic Certification • Good Agricultural Practices • Integrated Pest Management • Flowering Calendar • Documentation System • Harvesting Calendar	• Harvested material Collected by Collection Centers Steps by FPCs, FPOs, SHGs & NGOs • Aggregation • Harvested and Aggregated raw material will go to pack house • Pre-Cleaning • Grading • Washing • Wax Coating/Hot Water Treatment • Short Duration Storage • Pre cooling • Grade 1 & 2 for organized supply chain and corporate buyers • Grade 3 &4 for processing	**Table Use** • Salads • Vegetables • Curries **Dehydrated** • Flakes, • Cubes, powder • Premix /Ready to eat /cook – Soup, **Sweets** • (Halwa), **Juice** • (Chilled) Ready to drink juice and beverage **Extract** • Beta Carotene • Pharma Application • Nutraceutical & Functional Formulations	Same As Above
3.	**Pumpkins**	As Above	As Above	**Table Use** • Vegetables • Curries **Dehydrated** • Flakes, cubes, powder • Premix /Ready to eat /cook – Soup,	As Above

No	Particulars ⇨ V.C. Components	Backward Linkage At Farm Level & Hand over to Collection Center	Post-Harvest Primary Process & Products Pack House	Secondary Processing- Product Manufactured Processing in CFC/CPU	Organized Supply Chain
				Sweets • (Halwa), vegetables,Pulao(Pilaf)/Biryani etc. **Juice** (Chilled), • Ready to drink juice and beverage **Extract** • Beta Carotene, A, C, E and B12 vitamins • Lutein and • Zeaxanthin • Pharma Application • Nutraceutical & Functional Formulations **Processed** • Canned Slices • Smoothies **Seeds** • Seed butter, Salad, Bread, Pasta, Soups, Cookies	
4.	**Gourds**	As Above	As Above	**Table Use** • Salads • Vegetables • Curries **Dehydrated** • Flakes, Cubes, powder • Premix /Ready to eat /cook – Soup, **Juice** (Chilled), • Ready to drink juice and beverage **Processed** • Canned Gourds • Gourds in Brine Solution	As Above

No	Particulars ⇨ V.C. Components	Backward Linkage At Farm Level & Hand over to Collection Center	Post-Harvest Primary Process & Products Pack House	Secondary Processing- Product Manufactured Processing in CFC/CPU	Organized Supply Chain
				• Smoothies • Vacuum Fried Chips **Extracts** • Functional and Nutraceutical Formulations ingredients	
5.	**Tomato**	As Above	As Above	**Table use** • Salads • Tomato Meal • Seasonings • Vegetables • Chatneys **Juice** (Chilled) • Ready to drink Beverage and Juice • Smoothies **Processed** • Puree • Paste • Jam, Jelly • Sauce, Ketchup • Freeze Dried • Spray Dried Powders • Dehydrated Slices, Powders, bits • Taste Makers • Ready to cook and eat vegetables and curries • Powder • Tomatoes in brine • Vacuum dried chips **Extracts** • Lycopene etc.	As Above
6.	**Broccoli**	As Above	As Above	**Table Use** • Salads • Vegetables • Smoothies **Dehydrated** • Powder & Flakes **Processed**	NA

No	Particulars⇨ V.C. Components	Backward Linkage At Farm Level & Hand over to Collection Center	Post-Harvest Primary Process & Products Pack House	Secondary Processing- Product Manufactured Processing in CFC/CPU	Organized Supply Chain
				• Freeze dried broccoli • Broccoli in brine • Canned Broccoli • Ready to cook and eat curries and vegetables **Extracts** • Nutraceutical and Functional Formulations • extract Vitamins A, B, C, E, K and Folic Acid	
7.	**Cabbage**	As Above	As Above	**Table Use** • Salads • Vegetables and curries, soup etc. **Dehydrated** • Cabbage powder and flakes • Ready to eat /cook **Processed** • Frozen Cabbage • Canned Cabbage • Cabbage in Brine • Freeze dried Cabbage Flakes	As Above
8.	**Cucurbits**	As above	As Above	**Table Use** • Salads • Vegetables, curries, soup etc. **Processed** • Frozen Cucurbits • Freeze dried cucurbits • Cucurbits in brine • Canned Cucurbits • Ready to eat/cook **Extracts** • Nutraceutical and functional Products formulations	As Above
9.	**Sweet Potato**	As above	As Above	**Table Use** • Salads • Vegetables • bread spread	As Above

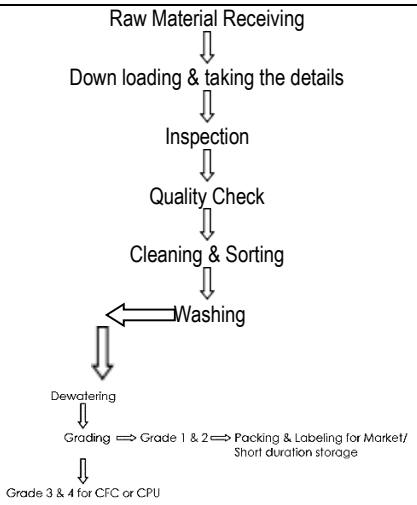
No	Particulars ⇨ V.C. Components	Backward Linkage At Farm Level & Hand over to Collection Center	Post-Harvest Primary Process & Products Pack House	Secondary Processing- Product Manufactured Processing in CFC/CPU	Organized Supply Chain
				Juice • Health Drink • Smoothies **Dehydrated** • powder • Starch **Processed** • Freeze Dried meal • Vacuum fried chips • Canned Slices • Slices in Brine • Health food • Ready to eat and cook formulations	
10.	**Capsicum**	As Above	As Above	**Table use** • Salads • Vegetables **Processing** • Pickles • Ready to eat and cook formulations • Seasoning applications **Extraction** • Flavoring • Capsaicin & Oil • Pharma applications • Natural colour	As Above

Annexure-VI: Value Chain Component Profiles

A-VI.1 Mobile Collection Center with 10 MT/ 4MT Capacity per trip

No	Particulars	Details	Remark
A.	**About the activity**	a. To collect the raw material from farm gate to Primary Processing Centers. b. Material Handling will be done in crates to minimize wastage. c. The main function expected will be receiving the raw material from farmers, weighing, recording the material quantity and basic sensory parameters to data center & transfer the money to farmer account.	The mobile collection center will be designed on a heavy duty truck suitable to travel in hilly area and plan roads – well equipped with sensory handy equipment and staff.
B.	**The Project Details**		
1.	Process Flow Chart	Receive the Call from farmer ⇩ Collect the data about the area and photo of raw material ready for harvest & Google location ⇩ Plan the collection call ⇩ Inform the farmer ⇩ Reach the site ⇩ Collect the Raw Vegetables/Fruits as decided ⇩ Go for Sensory of the collected V or F as per the random sampling SOP ⇩ Refer the price chart and finalize the price ⇩ Give the QR code to the collected material ⇩ Complete the deal by transfer instruction ⇩ Go for next farm ⇩ Repeat the process till the vehicle is not fully loaded ⇩ Go the Primary Processing Center ⇩ Hand over the material to the respective inward section & accounts to the purchase section ⇩ Follow the CIP SOP of the vehicle and the material handling equipment ⇩ Be Ready for Next Collection Trip and Route	Please follow the FSSAI and ISO 22000 norms.
2.	Investment Profile (Budgetary)	**Particulars** / **Price in (INR in Lakhs)** 10 MT Vehicle: 20 9 Suitable Body: 3 20 Weighing scale: 0.60 Quality Equipment: 0.25 Payment Gateway: 1 Material Handling Equipment: 2 Misc.: 0.10 Subtotal: 26.95	Number mobile collection centers will be finalized as per the crop availability and area /districts and PPCs. Each Collection center will cover minimum 50 -75 km radius area.
3.	Direct Manpower Per Collection Center	Supervisor: 1 Driver: 1 Helper: 1	The salary will be as per minimum wages act.

A-VI.2 Primary Processing Center (PPC) - Multi Commodity

No	Particulars	Details				Remark
A.	**About the activity**	a. Primary Processing Center will work as aggregation place for the agro produce. b. PPC will receive the collection from various Collection centers. c. Main activities will be cleaning, grading, washing, any special treatment required for shelf life enhancement (Hot water, vapor treatment etc.) and packing with short duration storage. d. The output of the PPC will be either organized supply chain or Central Processing Unit or Common Facility Center.				PPC will act as Pack House and follow FSSAI and APEDA quality norms. ISO 22000 will be the statutory.
B.	**The Project Details**					
1.	Process Flow Chart					Packing standard, grading standards will be as per the standard guidelines. Hot water treatment – vapor treatment- wax coating will be decided as per the buyers specifications or feasibility study.
2.	Investment Profile (Budgetary) Capacity 2000 kg X2 Lines minimum (If required add 2 lines)	**Particulars**	**Details**	**Amount in INR Lakhs**		
		Plot Area	20000 sq. ft.	As per Government Rate or Long leased		
		Building PEB structure	10000 sq. ft.@1500.00	**150**		
		Cold Store Machinery	50 MT @30000/MT	**15**		
		Pack House Machinery	Inspection Conveyor for 2000 kg/hr	2 nos /4 nos	10/pc	
					20	
			Side Tables	6 per conveyor	0.25	
					3	
			Washer	1 no per line	10	
					20	
			Vibrator	1 no per line	5	
					10	
			Mechanical Grader	1 no per line	10	
					20	
			Weighing and Packing Machine	1 no per line	5	
					10	
			Material Handling Equipment	2000 creates & 125 pallets & 4 pallet trucks per line	15.65	
					31.30	
			Lab Set Up	For QA & QC tests	**3**	
			FSMS Equipment	Fly Catchers, Air curtains, Plastic Strips, Hand dryers etc.	**5**	
			Total	**287.30**		
3.	Utilities Required	Power	100 KW	Actual investment will be calculated during DPR preparation work.		
		Generator Backup with Stabilizer	100 KW			
		Water (R.O.)	4000 liter/hr			
		Compressed Air	2 Bar			
4.	Special Comment	For progressive states PPC will be established per district and for developing states the locations will be finalized by the crop statistics		Important Component of Value Chain – can export the commodities directly.		
5.	Direct Manpower Requirement	Factory Manager	1	The facility will be managed by FPC.		
		Production In charge	1			
		Supervisors	3			
		Operators	4			
		Quality In charge	1			

No	Particulars	Details		Remark
		Qc Assistance	2	
		Maintenance In charge	1	
		Sales In charge	1	
		Filed Officer (Purchase)	4	
		Drivers	2	
		Helpers	20	
		Back office Assistant	2	
		Store Keeper	2	
		Security Gourd	4	
		Total	48	

A-VI.3 Common Facility Center cum Central Processing Unit

No	Particulars	Details		Remark
A.	**Introduction**			
1.	About the Activity	a) District/ Regional Level Activity b) Multi Commodity Processing Capacity c) Multiple technologies and processing lines will be installed for various value addition activities d) This unit will be directly connected with Organized supply chains and marketing companies e) The short listed activities will be Dehydration, IQF, Juice Manufacturing, Caning f) The packaging will be for B2B, FMCG, Private Label Markets g) The unit will be bridge for FPCs and Market		The activity will be compatible to FSSAI, ISO22000, GMP. Food Park CFC model.
2.	The End Products	a) Dehydrated Fruit & Vegetables Dices, Chunks, Flakes, Powder, etc. b) Frozen vegetables and Fruits Dices c) Fruit Pulp and Vegetable Juices d) Canned Vegetables & fruits e) Ready to Cook Products f) Functional Food Formulations		Some products will be designed as per the customers requirement. All processing facilities will be made available Food park CFC model.
3.	Processing Capacity	Dehydration	1 MT/hr	For Bigger states One CFC per district and for small states one CFC covering 2-3 districts. Total Raw Materials required for processing 5 MT/hr considering 5% wastage in handling and process loss the complex can handle 5.5 MT fruits and vegetables per hour. *Initially the plant will operate single shift but in next two to three years it will operate 20 hours a day and six days a week, so raw material required = 110 MT/day.*
		IQF	2 MT/hr	
		Canning Line	500 kg/hr	
		Ready to Drink Juices	1 MT/hr	
		Ready to cook Product Line	500 kg/hr	
		Cold Store With Pre cooling 5 MT/batch	1000 MT	
4.	Raw Material Requirement	Considering all Processing lines will work with full capacities the CFC will require 5.5 MT Raw Material Mix Varieties /hour and 110 MT/day The raw material requirement for one year , 250 days working per annum = 27500 MT /annum		This will be the main project in Value Chain concept working to add value and bridging the gap between raw material production and market requirements /consumer demands.
5.	Fruits and Vegetables to be Processed	Fruits	Vegetables	Some Special Purpose Machines (SPMs) Required as per the short listed fruits/Vegetables to be processed for the facility. Overall the set up will be same. For Entire North Eastern Region one CFC will be with Tetra Pack /Aseptic Packing System.
		All Citrus	Mushroom	
		Pineapple	Carrot	
		Jack Fruit	Pumpkins	
		Banana	Gourds	
		Papaya	Tomato	
		Guava	Broccoli	
		Passion fruit	Cabbage	
		Mango	Sweet Potato	
		Kiwi	Capsicum	

B.	**About Processing Activity**				
1.	Process Standard Operating Procedure 1 (The SOPs are general SOPs can be refined at the time of DPR and Actual Production Planning)	**Dehydration**	**IQF**	**Canning 1**	**Canning 2**
		Raw Material ⇩ Inspection ⇩ Washing ⇩ Dewatering ⇩ Cutting/Dicing	Raw Material ⇩ Inspection ⇩ Washing ⇩ Dewatering ⇩ Cutting/Dicing	Raw Material ⇩ Inspection ⇩ Washing ⇩ Dewatering ⇩ Cutting/Dicing/	Raw Material ⇩ Inspection ⇩ Washing ⇩ Dewatering ⇩ Pulping

<table>
<tr><th>No</th><th>Particulars</th><th colspan="3">Details</th><th>Remark</th></tr>
<tr><td></td><td></td><td>⇩
Blanching
(Optional)
⇩
Dehydration
⇩
Fine Drying
⇩
Quality Check
⇩
Size Reduction
⇩
Quality
Analysis
⇩
Weighing & Packing
⇩
Ready for Dispatch
or Store</td><td>⇩
Blanching
⇩
IQF Process
⇩
Packing
⇩
Quality Analysis
⇩
Store in Cold Store
⇩
Transport in Cold
Chain</td><td>⇩
Tin Filling
⇩
Canning Process
⇩
Cooling & QC
⇩
Labeling /batch coding
⇩
Ready for dispatch
Or For store</td><td>⇩
Homogenizing
⇩
Sugar Syrup Mixing
⇩
Bottling or Caning
⇩
Labeling /Batch coding
⇩
Ready for dispatch or
Store</td></tr>
<tr><td>1.1</td><td>Process SOPs 2
(The SOPs are general SOPs can be refined at the time of DPR and Actual Production Planning)</td><td>Ready to Drink Juices</td><td>Ready to Eat Products</td><td colspan="2">Cold Store
(Multi Temperature Multi Chamber)</td></tr>
<tr><td></td><td></td><td>Raw Material
⇩
Inspection
⇩
Washing
⇩
Dewatering
⇩
Pulping
⇩
Homogenizing
⇩
Pasteurizing
⇩
Sugar Syrup& Tastemaker Addition
⇩
Quality Analysis
⇩
Bottle /Can/Packets Filling
⇩
Batch Coding
⇩
Ready For dispatch or Store</td><td>Product to be Manufactured
(Work Order)
⇩
Study the SOP & Ingredient List
⇩
Ingredient Processing
⇩
Formulation
⇩
Mixing /Blending
⇩
Post Mixing Process
⇩
Quality Analysis
⇩
Packing & Batch Coding
⇩
Ready for dispatch or store</td><td colspan="2">Product Inward
⇩
Sensory Analysis
⇩
Study the Need to store the product – time, duration and Storage SOP
⇩
Coding the product
⇩
Follow the Storage SOP
⇩
Fix the storage location /Chamber
⇩
Set the Storage Parameters
Monitor and record the parameters
⇩
Follow the system till outward</td></tr>
<tr><td>2.</td><td>Final Products and Packing</td><td>For Dehydrated vegetables and fruits</td><td>For IQF Products</td><td>Canning 1</td><td>Canning 2</td></tr>
<tr><td></td><td></td><td>Bulk Packaging of 10 kg and 20 kg in 220 GSMinner liner and HDPE woven sack or seven ply corrugated box</td><td>Three layer Laminated pouch of 500 g, 1000 g and 5000 g and outer Skin packing</td><td>450 g tin
850 g tin
3.1 kg tin</td><td>850 g tin
5 lit aseptic
10 lit aseptic and 20 lit aseptic</td></tr>
<tr><td>2.1</td><td>Final Products and Packing</td><td colspan="2">Ready to Drink Juices</td><td colspan="2">Ready to Cook Products</td></tr>
<tr><td></td><td></td><td colspan="2">200 ml & 1 Lit aseptic or Tetra pack
200 ml, 500 ml , 1 lit and 2 lit PET bottles</td><td colspan="2">Single serving for 1 person and single serving for 2 persons pouches (inside three layer laminated pouches and outer duplex board boxes.
For bulk B2B order 1 kg and 2 kg & 5 kg Packs three layer laminated pouches inside and outer Duplex board laminated boxes.</td></tr>
<tr><td>C.</td><td colspan="5">Infrastructure Required</td></tr>
<tr><td>1.</td><td>Assumptions</td><td colspan="2">1. The common facility center or Central Processing unit location and whether its Regional level unit or District level unit
2. Green Project
3. FSSAI, US FDA compliance set up
4. Computable to B2B and Private label assignments with own brand development (NER Level)</td><td colspan="2">Entire value chain should be self-sustainable within four years – Refer AMUL or SAHYADRI Model.</td></tr>
</table>

<table>
<tr><th>No</th><th>Particulars</th><th colspan="4">Details</th><th>Remark</th></tr>
<tr><td></td><td></td><td colspan="4">5. All the CFCs and or CFUs will be mapped with Regional SPV for consistent orders, brand development & marketing strategies
6. Some heavy investment facilities will be made available at Regional Level units e.g. Tetra Pack, High Pressure Processing (HPP), Spray Drying etc.
7. Targeting North East as Post Harvest Processing Hub
8. Traceability will be key issue
9. All units will be the part of North Eastern Regional Value Chain connectivity and membership for consistent supply of raw material and sales order</td><td></td></tr>
<tr><td>2.</td><td>Infrastructure Required For all the Above activities plus core and non-coreactivities
SPV will start this CFC
500'X800'</td><td>No</td><td>Particulars</td><td>Details</td><td>Investment Provision INR in Lakhs</td><td></td></tr>
<tr><td></td><td></td><td>A</td><td>Non-Core Infrastructure</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>1.</td><td>Internal Road</td><td>20000 running feet @1000 /RF</td><td>200</td><td></td></tr>
<tr><td></td><td></td><td>2.</td><td>ETP /STP</td><td>600000 liter/day</td><td>200</td><td></td></tr>
<tr><td></td><td></td><td>3.</td><td>Water Tanks Under Ground /Over head</td><td>10000000 lit-underground
600000 liters overhead</td><td>200</td><td></td></tr>
<tr><td></td><td></td><td>4.</td><td>Generator&Stabilizer</td><td>150 KVA</td><td>100</td><td></td></tr>
<tr><td></td><td></td><td>5.</td><td>Parking</td><td>5000 sq. ft.@400/sq.ft.</td><td>20</td><td></td></tr>
<tr><td></td><td></td><td>6.</td><td>Quarters</td><td>10000 sq. ft.@800s/q.ft.</td><td>80</td><td></td></tr>
<tr><td></td><td></td><td>7.</td><td>Canteen</td><td>2000 sq. ft. /500sq. ft.</td><td>10</td><td></td></tr>
<tr><td></td><td></td><td>8.</td><td>Fire Station</td><td>2000 sq. ft.</td><td>40</td><td></td></tr>
<tr><td></td><td></td><td>9.</td><td>Security Cabins</td><td>100 sq. ft.X4 nos @400/sq ft</td><td>1.60</td><td></td></tr>
<tr><td></td><td></td><td>10.</td><td>Conference Room</td><td>800 sq. ft.@600/sq.ft</td><td>4.80</td><td></td></tr>
<tr><td></td><td></td><td>11.</td><td>Training Room</td><td>600 sq. ft.@600/sq.ft.</td><td>3.60</td><td></td></tr>
<tr><td></td><td></td><td>12.</td><td>Recreation Area</td><td>1000 sq. ft. @600 /sq.ft.</td><td>6</td><td></td></tr>
<tr><td></td><td></td><td>13.</td><td>Baby Sitting</td><td>1000sq.ft.@600/sq.ft</td><td>6</td><td></td></tr>
<tr><td></td><td></td><td>14</td><td>Standard Design Factory Area 40000 sq. ft. (G+1)Reserved for ancillary Industries from packaging sector</td><td>40000 sq. ft.@INR1000/ sq. ft</td><td>400</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Subtotal</td><td></td><td>1272</td><td></td></tr>
<tr><td></td><td></td><td>B.</td><td>Core Infrastructure</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>1.</td><td>Factory Building</td><td>100000 sq. ft. @INR1200/sq.ft</td><td>1200</td><td></td></tr>
<tr><td></td><td></td><td>1.</td><td>Analysis Lab</td><td>All Parameters As Per FSSAI & NABL Accredated 2000 sq. ft.</td><td>200</td><td></td></tr>
<tr><td></td><td></td><td>2.</td><td>Ripening Chambers</td><td>10 MTX4 nos @INR 10/chamber</td><td>40</td><td></td></tr>
<tr><td></td><td></td><td>3.</td><td>Product Development Centre</td><td>2000 sq. ft . @2000/sq/ft.</td><td>40</td><td></td></tr>
<tr><td></td><td></td><td>4.</td><td>Compound and Land Development</td><td>Lump Sum</td><td>200</td><td></td></tr>
<tr><td></td><td></td><td>5.</td><td>Boiler& Ducting</td><td>Lump Sum</td><td>60</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Subtotal</td><td></td><td>1740</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Non-Core and Core Infra structure investment</td><td></td><td>3012</td><td></td></tr>
</table>

A-VI.4 Plant and Machinery For all Lines

Dehydration -1 MT/hr		IQF 2 MT/hr		Canning 1 & 2 500 kg/hr		Ready to Drink Juices 1MT/hr	
Machinery	**Amount In INR**	**Machinery**	**Amount In INR**	**Machinery**	**Amount In INR**	**Machinery**	**Amount In INR**
Inspection Conveyor	7	Inspection Conveyor	14	Inspection Conveyor	5	Inspection Conveyor	7
Washing Machine	10	Washing Machine	20	Washing Machines	5	Washing	10
Peeling Machine	10	Peeling Machine	20	NIL	NIL	NIL	NIL
Blanching	15	Washing Machine	40	NIL	NIL	NIL	NIL
Dicer	10	Dicer	30	Pulper	7	Juice Extractor	75
Cutting/ Slicing Machine	6	NIL	NIL	Slicer	6	Juice Extractor Type-II	30
Dewatering	10	Dewatering	20	Pulper II	8	Concentrator	30
Dryer Unit	170	IQF	400	Can Filler	10	Sugar Syrup Plant	10
Cooling Unit	10	Packing Unit	20	Homogenizer	5	Homogenizer	20
Size Reduction	30	Conveyor	8	Sterilizer	10	Mixer & Tanks	40
Size Separation	5	NIL	NIL	Can Seaming machine	10	Aseptic Packing Plant	125
Metal Detector	7	Metal Detector	10	Labeling Machine	5	Bottling Machine with metal detector	40
Packing Machine	6	NIL	NIL	Box Packing Machine	2	Box Packing Machine	10
Handling Fork Lift	6	Palletizing and Fork Lift	12	Handling Fork Lift	5	Palletizing and Fork Lift	12
Sub Total	**302**	**Subtotal**	**594**	**Subtotal**	**78**	**Subtotal**	**409**

A-VI.5 Balance Value Added Processing Lines

Ready to Eat Products 500 kg /hr		Cold Store Multi Chamber & Multi Temperature 1000 MT		Tetra Pack Line for 200 ml and 1000 ml (One Plant in NER)	
Machinery	**Value INR in Lakhs**	**Machinery**	**Value INR in Lakhs**	**Machinery**	**Value INR in Lakhs**
Ingredient Storage	5	PUFF PANEL Modular Type Multi Storage	300	Full Auto Plant by Tetra Pack and Material	1000
Fine Dryer	15	Racking System	50	NIL	NIL
Blenders	10	NIL	NIL	NIL	NIL
Utensils	3	NIL	NIL	NIL	NIL
Packing Machine	25	NIL	NIL	NIL	NIL
Palletizing and Hydraulic Truck	6	Hydraulic Fork Lift Truck	10	Palletizing and Hydraulic Fork Lift	12
Subtotal	**64**	**Subtotal**	**360**	**Subtotal**	**1012**

A-VI.6 Summary of Investment in CFU or CPU

No	Particulars	Amount INR in Lakhs	
1.	Infrastructure Cost	Non-Core Infra Investment	1272
		Core Infrastructure	1740
		Subtotal	**3012**
2.	Processing and Value Added Product Manufacturing	Dehydration Plant	302
		IQF Plant	594
		Canning Line (2 section)	78
		Ready to Serve Juice Plant	409
		Ready To Cook Plant	64
		Cold store	360
		Tetra Pack Plant	1012
		Subtotal	**2819**
	Total Investment in CFC Or CPU	**1+2**	**5831**

A-VI.7 Socio Economic Impact

No.	Particulars	Details
1.	Direct Employment Creation In CFU /CFC	More than 500 nos.
2.	Daily Raw Material Requirement	110 MT
3.	Annual Vegetables and Fruits Required	33000 MT
4.	Multi Commodity Activity All Short Listed Fruits and Vegetables Can Be Processed In the Proposed Set UP	Reduce V&F wastage , Add value, Enhance shelf life
5.	After all data for production if we analyzed per acre yield to be considered 3 MT/p.a.	11000 Acre land crops can be directly connected with CFC/CFU
6.	Per Acre if we consider employment generation 4 nos.	44000 employment generated at Farm Level

A-VI.8 High Value Added Ingredients Manufacturing (Top End Products in Value Chain)

<table>
<tr><th>No</th><th>Particulars</th><th colspan="4">Details</th><th>Remark</th></tr>
<tr><td>A.</td><td>About the activity</td><td colspan="4">a) Primary Processing Center will work as aggregation place for the agro produce High Value added ingredient manufacturing section in the value chain is nothing but super critical extraction by CO2.
b) For entire North East – This type of manufacturing activity will be planned /recommended in CFC /CPU at Guwahati.
c) Considering the short list of Vegetables and Fruits for NER, state wise, the special ingredients will be extracted for pharma, Nutraceutical market and for own functional products from this facility.
d) Super Critical Extraction by CO2 will be the process technology, with the help of this technology we can extract any ingredient, natural colour, vitamin, fibers etc. from any vegetable, fruit, spice and plant.
e) The plant will be multi commodity plant, we can process any fruit, vegetable, spice, herbs in the plant.</td><td>Very high end manufacturing set up.

This is project in the value chain will increase the gross margins and possibility to grab the export market.</td></tr>
<tr><td>B.</td><td colspan="6">The Project Details</td></tr>
<tr><td>1.</td><td>Process Flow Chart</td><td colspan="4">Raw Material Receiving
⇩
Raw Material Analysis and sensory
⇩
Finalizing the ingredients to be extracted
⇩
Check the plant & safety checks
⇩
Set the process parameters as per SOP
⇩
Fill up the in raw material into the cylinder
⇩
Set the parameters
⇩
Start the process cycle
⇩
Collect the outputs (Ingredients) at different parameters at different stages
⇩
Purify our puts and start Quality analysis
⇩
Packing and go storage or dispatch</td><td>Well-equipped analysis lab and qualified, Experienced technicians will be the main asset of this set up.</td></tr>
<tr><td>2.</td><td>End Products</td><td colspan="4">a) Lycopene from Tomato
b) Chlorophyll from Leafy Vegetables
c) Green food color
d) Oil from Citrus peel and seed
e) Bromelain from Pineapple crown
f) Fibers from bottle gourd</td><td>Multi commodity plant.</td></tr>
<tr><td rowspan="10">2.</td><td rowspan="10">Investment Profile (Budgetary) Capacity (100 Lit X2 nos.)minimum & 10 liters pilot R & D Plant Project can be installed in CFC /CPU</td><td>Particulars</td><td colspan="2">Details</td><td colspan="2">Amount in INR Lakhs</td></tr>
<tr><td>Plot Area</td><td colspan="2">10000 sq. ft.</td><td colspan="2">As per Government Rate or Long leased</td></tr>
<tr><td>Building PEB structure</td><td colspan="2">4000 sq. ft.@1500</td><td colspan="2">60</td></tr>
<tr><td>Super Critical Skied Mounted Plant</td><td colspan="2">100 lit X2 no +10 Lit 1 no</td><td colspan="2">500</td></tr>
<tr><td rowspan="2">Purification System</td><td rowspan="2">100 liter/hr</td><td rowspan="2">2 sets</td><td>25/set</td></tr>
<tr><td>50</td></tr>
<tr><td rowspan="2">Filling System</td><td rowspan="2">60 bottles /min</td><td rowspan="2">1 set</td><td>35</td></tr>
<tr><td>35</td></tr>
<tr><td rowspan="2">Analysis Set Up</td><td rowspan="2">All Necessary Parameters</td><td rowspan="2">1 set</td><td>200</td></tr>
<tr><td>200</td></tr>
<tr><td rowspan="2">Encapsulation Plant</td><td rowspan="2">100 kg/hr</td><td rowspan="2">1 set</td><td>300</td></tr>
<tr><td>300</td></tr>
</table>

No	Particulars	Details		Remark	
		Packaging System	60 pouches /min	1 set	30
					30
			Total	**1175.00**	
3.	Utilities Required	Power	100 KW	Actual investment will be calculated while DPR work.	
		Generator Backup with Stabilizer	100 KW		
		Water (R.O.)	1000 liter/hr		
		Compressed Air	2 Bar		
4.	Special Comment	This set up will ensure high value addition and good profits. The products will be most computable to nutraceutical and functional sector. Major products can be exported to EU, US and Japan.		State level one project should be established either at Guwahati or Dibrugarh.	
5.	Direct Manpower Requirement	Factory Manager	1	The facility will be managed by SPV.	
		Production In charge	2		
		Supervisors	3		
		Operators	2		
		Quality In charge	1		
		Qc Assistance	2		
		R&D Team	2		
		Maintenance In charge	1		
		Sales In charge	2		
		Filed Officer (Purchase)	2		
		Drivers	1		
		Helpers	10		
		Back office Assistant	2		
		Store Keeper	2		
		Security Gourd	4		
		Total	**37**		

A-VI.9 Investment Profile for Entrepreneurship Development Training cum Incubation Center

Entrepreneurship Development Training cum Incubation center will be the basic requirement to make the Value Chain successful. It is the basic need for entrepreneurs or farmers to understand the concept and technology in agriculture. This Training cum Incubation Centre is required to address the Pre and post-harvest training needs of the farmers.

A blue print or concept note of Entrepreneurship Development Training cum Incubation Institute is prepared by considering the model from Maharashtra under the guidance of Entrepreneurship Development Institute and MANAGE.

Aim and Objectives

a) To design and conduct various Entrepreneurship Development Programs (EDP) – Short duration (2 to 4 days, and medium duration 10-15 days).
b) To design and conduct Skill and Technology Base Training Programs (STBTP) – 15-30 days duration.
c) To design and conduct Trainer Training Programs (TTP 5 -10 days).
d) Incubation center – where all pilot scale post-harvest processing plants available as per FSSAI norms, and first generation entrepreneurs, farmers, youths can come and process their raw material, and can sale the products to learn business model/plan.
e) Offering hand holding services for entrepreneurs.
f) Establishing data center.

A-VI.10 List of Training Programs (Indicative)

No	Name of Training Program	Duration/Days	Number of Participants	Expenses Per Participants (in INR)	Total INR	Monthly Number
1.	Entrepreneurship Awareness Program	1	50	500	25000	2
2.	Business Opportunity Guidance Program	1	50	500	25000	2
3.	Food Processing Base Entrepreneurship Development Program	10	25	5000	125000	1
4.	Good Agricultural Practices	2	50	900	45000	2
5.	Nursery - Self Employment	15	25	7500	187500	1
6.	Primary Processing Training Program	5	25	2500	62500	1
7.	Food Processing EDP	10	25	5000	125000	1
8.	Marketing Management	2	30	1000	30000	2

No	Name of Training Program	Duration/Days	Number of Participants	Expenses Per Participants (in INR)	Total INR	Monthly Number
9.	Organic Framing	5	30	2500	75000	1
10.	Export Marketing	1	30	500	15000	2
11.	Supply Chain Development	2	30	1000	30000	1
12.	Internal Food Safety Auditor	3	20	3000	60000	1
13.	Food and Agri Logistics	1	30	500	15000	1
14.	Organic Manure Manufacturing	5	30	2500	75000	1
15.	Labeling and Nutrition Requirement	1	30	500	15000	1
16.	Food Business Documentation	1	30	500	15000	1

A-VI.11 Infrastructure Required

A-VI.11.1 Assumptions for finalized infrastructure required for Entrepreneurship Development Training cum Incubation Center

a) Training Center will be one of the major tool to develop the entrepreneurs.
b) 50 Gents and 50 Ladies Hostel and mess capacity required (Twin Sharing) 200 sq. ft. each room.
c) Faculty Rooms 10 nos. required (Residential) Twin Sharing 200 sq. ft. each room.
d) Two Executive Rooms with 200 Sq. ft. Single sharing.
e) Data Center – 300 sq. ft.
f) Library of 1000 sq. ft.
g) Training Halls 50 seats capacity 2 nos. (1000 sq. ft.) and 30 seats capacity 1 no (600 sq. ft.)
h) Faculty Rooms 2 nos. (200 sq. ft. each)
i) Counseling Rooms 5 nos. (80 sq. ft. each)
j) Auditorium for 200 seat capacity 3000 sq. ft.
k) Post-Harvest Training cum incubation section 5000 sq. ft.
l) Food Processing Training cum incubation section 10000 sq. ft.
m) Nursery – Shed Net 5000 sq. ft. & Poly House 5000 sq. ft.
n) Organic Manure Shed 5000 sq. ft.
o) Admin Block 1000 sq. ft.
p) Utility Area 2000 sq. ft.
q) Garden, Parking and security cabin 10000 sq. ft.
r) Staff Quarter 2000 sq. ft.

A-VI.11.2 Investment in Infrastructure - Entrepreneurship Development Training cum Incubation Center

No.	Particulars	Area /Details	Rate INR/Sq. ft.	Total INR in Lakhs	Remark
1.	Land Requirement	80000 sq. ft.	Leased	NIL	NIL
2.	Institute Building	25000sq. ft.	1000	250	ISO compliance
3.	Hostel Building	15000 sq. ft.	0800	120	ISO compliance
4.	Staff Quarters	2000 sq. ft.	0800	16.	ISO Compliance
5.	Agri Training and Open area development	400.00	22000	88	NIL
6.	Plant And Machinery Provision For Post-Harvest Training and Incubation	One Set For all target Crops	10000000	100	NIL
7.	Food Processing Incubation	For all over target crops	15000000	150	NIL
8.	Software and Hardware	For entire premises	5000000	50	NIL
9.	Furniture For entire campus	1 set	500000	50	NIL
10.	Utilities , Compound and Lighting , generator misc.	1 set	15000000	150	NIL
	Total			**974**	**Budgetary Amount**
	Number Participants Benefited per month			750 to 800	
	Number of Participants Benefited per annum 10 months per annum			**8000 nos. minimum**	**Model Institute**
	Manpower Requirement			**50 nos.**	

A-VI.12 Investment Profile for Quality Analysis Laboratory (NABL Accredited)

Quality Analysis laboratory will be one of the basic needs considering the need of the farmers, food industries, exporters to make the value chain grand success.

Aim and Objectives

a. To provide quality analysis and reports to the agribusiness and value chain stake holders
b. To undertake quality analysis assignment for soil, water, air, food, grains, vegetables, fruits, spices and related products.
c. Following all standard analysis method as per FSSAI, ASTA, AOAC (Association of Official Analytical Chemists) etc.
d. Undertake physical, chemical, nutritional and microbiological analysis.
e. Updating the stake holders for safe food manufacturing practices and good agricultural practices.
f. Undertake Product Development and Shelf Life Analysis Project.

Assumptions:

a. Set Up Capacity: as a state level laboratory each section can handle min.50 samples per day.
b. The set up and the analysis SOP will be certified by National Accreditation Board For Testing & Calibration Laboratories (NABL), Food Safety Standard Authority of India (FSSAI), Association of Official Analytical Chemists (AOAC)and American Spice Trade Association (ASTA).
c. In phase two same set can be expanded to calibration laboratory also.
d. Enterprise resource planning software should be must.
e. Solid waste and bio medical waste should be disposed as per the standard norms.
f. Nutritional analysis will be done as per National Institute of Nutrition (NIN).
g. Sample collection, sample preservation, analysis, record, staff meeting, conference room, discussion rooms will be planned.
h. Steam generator (Baby Boiler), dry air, compressed air provision should be expected.
i. Soil testing lab, organic manure analysis, lab require 1500 sq. ft. area each (3000 sq. ft.).
j. Physical, chemical analysis requires 1000 sq. ft. area each (2000 sq. ft.).
k. Microbiology analysis and shelf life analysis require 2000 sq. ft. area each (4000 sq. ft.).
l. Product Development section require 3000 sq. ft. area.
m. Staff area 300 X2 = 600 sq. ft., discussions room (80 sq. ft. X5= 400 sq. ft.), Director cabin (500 sq. ft.), Conference room 300 sq. ft. and training hall 500 sq. ft. and admin area 1000 sq. ft. expected (Total 3500 -4000 sq. ft).
n. Other Common facilities, security cabins, parking, guest rooms 2000 sq. ft.

A-VI.12.1 Infrastructure Required and Investment Budget

No.	Particulars	Area /Details	Rate INR/Sq. ft.	Total INR in Lakhs	Remark
1.	Plot area	40000 sq. ft.	Leased	NIL	NIL
2.	Admin and Lab Building	20000 sq. ft.	1200.00	240	NIL
3.	Amenities , Parking and Compound	Lump Sum	Lump Sum	030	NIL
4.	Power, water, generator , stabilizer	Lump Sum	Lump Sum	100	NIL
5.	Baby Boiler, Compressor etc.	1 set	1 set	50	NIL
6.	Lab Equipment	1 set	1 set	400	NIL
7.	Software and Hardware	1 set	1 set	100	NIL
8.	Furniture	1 set	1 set	100	NIL
9.	Certification Fees	Basic	Basic	50	NIL
10.	Miscellaneous	Lump Sum	Lump Sum	50	NIL
	Total			**1120**	**Budgetary Amount**
	Manpower Required			**30 nos.**	

A-VI.13 Investment Profile for Certification Body

Certification body will be one of the very important support components in value chain. This body is nothing but an Institute who follows the rules, process and SOP for certifications –e.g. Organic, HACCP, ISO 22000, FSSC 22000, EMS, BRC, US FDA etc. This institute will start as per the norms of APEDA, CODEX & as per National Accreditation Board for Certification Bodies (https://nabcb.qci.org.in). There is a need for establishing one certification body in every state in North Eastern Region.

Certification Body will conduct the audit for all necessary sectors for value chain for V&F in NER.

The basic Assumptions are

a. The body will be as per all International Guidelines and Standards.
b. The body will be member of all related International Institutes.
c. Body should follow all protocols.
d. Body should design and develop won certification process.
e. The certification body will make Agribusiness units/industries computable and empower to grab global market.
f. Enterprise resource planning, IT facilities, International Server, membership of various international bodies /association will be the main strengths.
g. Resource persons, filed staff, back office, MIS will be very professional.
h. Considering the future growth 10000 sq. ft. building and 20000 sq. ft. plot recommended.

A-VI.13.1 Infrastructure Required and Investment Budget

No.	Particulars	Area /Details	Rate INR/Sq. ft.	Total INR in Lakhs	Remark
1.	Plot	20000 sq. ft.	Leased	NIL	NIL
2.	Building	10000 sq. ft.	1200.00	120	Computable to green building
3.	ERP, IT , Server	1Set	1Set	250	International Safety standards
4.	Furniture	Lump Sum	Lump Sum	100	NIL
5.	Membership Fees	Lump Sum	Lump Sum	200	NIL
6.	Utilities	Lump Sum	Lump Sum	100	NIL
	Total			**770**	**Budgetary Amount**
	Manpower			**50 nos.**	

A-VI.14 Marketing, Monitoring and Executing Agency (ANCHOR Marketing Organization):

The main limitation in ongoing schemes in agricultural and post-harvest processing sector including marketing is lack of linkages among components of all schemes. Each component and scheme is separate and either for backward linkage or Post-harvest component. Absence of Anchor Marketing Organization is the main limitation is marketing and sustainability of the value chain. Branding and promotional activities will be the inherent part of the value chain. There is a need of an ANCHOR agency that will take care of monitoring and coordination for brand building &marketing. For branding and marketing activities, 12% of the total value chain infrastructure cost per state will be reserved for the ANCHORE agency in this plan.

Considering the function and vision of DONER and its institution the study group recommends NERAMAC – North East Regional Agricultural Marketing Corporation Limited as the ANCHOR Marketing Organization for marketing, brand building & quality monitoring. NERAMAC is the regional marketing agency working in the region will be the ANCHOR Marketing Organization for implementation, branding, and self-sustainability of the proposed value chain.

Aim and Objectives

a. To Play the role of Anchor or nodal Marketing Organization to execute proposed Value Chain project.
b. Mapping all activities related project.
c. Developing Regional Umbrella Brand.
d. Design the Promotion Program.
e. Market Survey domestic and international for Value Chain Products.
f. Export Assistance.
g. Capacity Building of the Foodpreneurs.
h. Represent Value Chain Project to DONER and other Government Bodies and Agencies.

i. Hand Holding, Monitoring and Mentoring the activities.

Funds Required

NERAMAC to include this new portfolio /domain require funds for following purpose

a. IT and ERP/SAP investment.
b. Brand Development & Promotion.
c. Basic Infrastructure Up gradation.
d. Manpower Cost.
e. Participation in International and National Trade shows.
f. Participating the brand in all major trade associations.
g. As per the standard cost norms 12% of the total project cost should be allocated for NERAMAC.
h. Plus corpus Fund of INR 100.00 Crores will be recommended for next five years, for packaging, designing, G.I. registrations, KIOS on major air ports & some metros, ecommerce platform. NERAMAC can charge 3-5% on the invoice value to the entrepreneurs to make the activity self-sustainable.
i. A dedicated team of 10 professionals will be planned for this division.

A-VI.15 Investment Profile for Hi-Tech Nursery

To design the Hi Tech Nursery Investment profile model report of NABARD, NHB and Some leading Agriculture University can be considered. The financial assistance and subsidy component is as per HMNEH/RKVY.

Project Components

- Mist Chamber
- Poly House
- Shed Net Area
- Mother Plant Area
- Nursery Root Stock Seed Beds
- Area Required: 2-4 Ha
- Capacity: 100000 plants per annum
- Investment INR 20 Lakhs per Acre or INR 50/Ha
- Per Unit Investment INR 100 /Ha. Back ended subsidy is 100% of Project Cost for Public Sector and 40% of Project Cost for Private sector.

A-VI.16 Investment Profile for Refrigerated Vehicles

Type of Controlled Atmospheric Logistics

1. Refrigerated Container Vehicle
2. Eutectic mobile container
3. Dry Insulated container
4. Bunk House

Need of Controlled Atmospheric Logistics

Entire NER region is having various horticultural produce. The major problems for agribusiness in NER are:

- Distance from points of cultivation to market (more than 500 km).
- Short shelf life of horticulture produce.
- Need to supply horticultural produce to food producing companies situated in the vicinity of 2000 km.
- Lack Controlled Atmospheric Logistics and processing infrastructure.

Selection Criteria

a. MIDH guidelines
b. Heavy, safe and fuel efficient vehicles
c. Low power consumption refrigeration technologies

Proposed Vehicle Capacities

a. 2 MT – 4 MT

b. 15 MT

Budgetary Price with tracking system

No	Particulars	Capacity	Price of Chassis	Refrigerated Container Price	Total INR in Lakhs
1.	Refrigerated Van	7 MT	15	10	25
2.	Refrigerated vehicle	15 MT	40	18	58

A-VI.17 Investment Profile for Tissue Culture Lab

Tissue culture lab is the important component of value chain. The main advantages of tissue culture lab are as follows,

a. Rapid Multiplication
b. Uniform or True to type plants
c. Germplasm Storage
d. Disease free planting material
e. Round the year production
f. Old species can be preserved and rapid propagation possible
g. Time required will be short than complete seed cycle

Guidelines

To design the Tissue Culture Lab Investment profile the model report of NABARD, NHB and Some leading Agriculture University can be referred. The financial assistance and subsidy component is as per HMNEH/RKVY.

Project Components

- Storage Room for chemicals
- Washing and media preparation room
- Inoculation Room
- Growth Room
- Shed House
- Plant and Machinery
- Area Required: 2 Ha
- Capacity: 2 million plants per annum
- Investment INR 250.00 Lakhs /unit
- Subsidy: 100% for public sector unit & for private sector 40%subsidy of project cost.

Annexure-VII: State-wise Calculation for Backward Linkage in Value Chain Development in NER

A-VII.1 Backward Linkage Calculation for Arunachal Pradesh

A-VII.1.1 Value Chain Components and Capacities

Facility / Details	4 MT Mobile Collection Centers	10 MT Mobile Collection Centers	Primary Processing Centers (PPC)	Central Processing Unit (CPU)	Value Added Unit	Remark
Capacity	4MT/Trip (2 Trips/shift)	10 MT/Trip (2 Trips/shift)	4 MT/hr	4.5 /hr	200 kg/hr	NIL
RM Requirement/shift/Unit	8 MT	20 MT	32 MT/Shift	36 MT/shift	1.6 MT/shift	NIL
RM Per Annam/Unit 250 days/shift wise	2000 MT	5000 MT	8000 MT	9000 MT	400 MT	NIL
Number of Units	6	4	4	2	1	NIL
Total Raw Material to be consumed p.a.	12000 MT	20000 MT	32000 MT	18000 MT	400 MT	32000 MT to be collected at farm gate & will be input for PPC. 50% will be sold for table consumption; balance will be input for CPU /CFC & Value Added Unit. The % of agro produce handled by value chain will be 28% w.r.t. total production.

A-VII.1.2 Short Listed Crops - Fruits

Fruit / Details	Kiwi	Pineapple	Banana	Citrus	Papaya	Total
Season	OCT-NOV-DEC	MAY – JUNE-Peak JULY – DEC Lean	April May June July AUG	JAN FEB	FEB MARCH APRIL MAY	NIL
Production Area	3379 Hectare	3090 Hectare	2210 Hectare	32890 Hectare	230 Hectare	41799 Hectare
Production	6047 MT	23110 MT	14080 MT	69850 MT	730 MT	113817 MT
Per Hectare Yield /Productivity	1.78	7.47 MT	6.37 MT	2.12 MT	3.17 MT	NIL
Yield In Progressive States	1.84 MT/Ha India	50 MT/Ha India	50 MT/Ha India	8.80 MT/Ha	38 MT/Ha	NIL
	37.8 MT/Ha New Zeeland	105 MT/Ha Costa Rica	30 MT/Ha Philippines	25 MT/Ha	25 MT/Ha	NIL
Farming Cost (Dense Farming)	INR 250000/Acre	INR 150000/Acre	INR 150000/Acre	INR175000/Acre	INR125000/Acre	NIL
Fruiting Time	4 years	18 months	12-15 Months	4 years	9-14 months	NIL
Tree Life	10-12 years	32-46 months	28-32 months	20 Years	3-4 years	

A-VII.1.3 Short Listed Crops - Vegetables

Vegetables / Details	Mushroom	Carrot	Pumpkin	Cabbage	Tomato	Broccoli	Cucurbits Cucumber	Sweet Potato
Season	April to Oct	Jan Feb March May June Nov Dec	AUG SEPT OCT	Feb March	Jan May June Aug Sept	Jan Feb Nov Dec	Mar Apr May June July Aug	Jan Feb Sept Oct Nov Dec
Production Area	Un organized Not Available	60 Hectare	Not Available	430 Hectare	250 Hectare	Not Available	100 Hectare	30 Hectare
Production	NA	490 MT	Not Available	5600 MT	2150 MT/Hectare	Not Available	430 MT	50 MT
Per Hectare Yield /Productivity	95-100 MT Fresh Oyster/Acre CA	8.16 MT/Hectare	Not Available	13.02 MT/Hectare	8.64 MT/Hectare	Not Available	4.30 MT/Hectare	1.67 MT/Hectare

Vegetables / Details	Mushroom	Carrot	Pumpkin	Cabbage	Tomato	Broccoli	Cucurbits Cucumber	Sweet Potato
Farming Cost Dense Farming	INR 125000/MT	INR 100000/Ha	INR 70000/Ha	INR55000/Ha	INR30000/Ha	INR 70000/Ha	INR 125000 /Ha	INR 55000/ha
Fruiting Time	100 day	100-120 days	90-100 days	90 days	70-80 days	100 days	80-90 days	120 days
Tree Life	Single season	Single season	Single season	Single season	Single season	Single season	Single season	Single season
Yield In Progressive States	2-3 times than Arunachal Pradesh Yield							
Budget For the Farming Project to increase the yield and Area	To increase the yield following action is planned a) Capacity Building Program for farmer b) Ideal Demo Farm Model c) Hi Tech Nurseries - 04 nos. in the state d) Tissue Culture Lab -01 no in the state e) Water Management - Drip Irrigation, Farm Pond f) Scientific Integrated Pest Management g) Technology intervention Program (Israel)				All these components are covered in HMNEH – only need is to synchronize all those scheme components with Value Chain Project and Single window operations recommended. Also the outcome from HMNEH can be clubbed with proposed value chain project. Refer Investment funding pattern and MIDH Operational Guide Document & RKVY document.			

A-VII.2 Backward Linkage Calculation for Assam

A-VII.2.1 Value Chain Components and Capacities

Facility / Details	4 MT Mobile Collection Centers	10 MT Mobile Collection Centers	Primary Processing Centers (PPC)	Central Processing Unit (CPU)	Value Added Unit	Remark
Capacity	4MT/Trip (2 Trips/shift)	10 MT/Trip (2 Trips/shift)	4 MT/hr	4.5 /hr	200 kg/hr	NIL
RM Requirement /shift/Unit	8 MT	20 MT	32 MT/Shift	36 MT/shift	1.6 MT/shift	NIL
RM Per Annam /Unit 250 days/shift wise	2000 MT	5000 MT	8000 MT	9000 MT	0400 MT	NIL
Number of Units	18	15	9	2	1	NIL
Total Raw Material to be consumed p.a.	36000 MT	75000MT	72000 MT	18000 MT	400 MT	111000 MT to be collected at farm gate & will be input for PPC. 50% will be sold for table consumption; balance will be input for CPU /CFC & Value Added Unit. The % of agro produce handled by value chain will be 6 % w.r.t. total production.

A-VII.2.2 Short Listed Crops - Fruits

Fruits / Details	Citrus	Pineapple	Banana	Jackfruit	Papaya	Guava	Total
Season	Feb March Nov Dec	Nov Dec	12 months – though out the year	July Aug Sept	Jan April May Sept Dec	March April Aug Nov Dec	NIL
Production Area	28250 Ha	16300 Ha	53080 Ha	Around 20000 no official data available	7210 Ha	4430 Ha	129270 Ha
Production	316120 MT	296520 MT	913270 MT	250000 MT	147400 MT	96690 MT	2020000 MT
Per Hectare Yield /Productivity	11.10 MT/Ha	18.19 MT/Ha	17.20 MT/Ha	12.50 MT/Ha	20.44 MT/Ha	21.84 MT/Ha	NIL
Yield In Progressive States	8.80 MT/Ha India	50 MT/Ha India	50 MT/Ha India	Data Not Available	38 MT/Ha	15.30 MT/Ha	NIL
	25 MT/Ha Globally	105 MT/Ha Costa Rica	30 MT/Ha Philippines	70 MT/Ha	25 MT/Ha	11 MT/Ha	NIL
Farming Cost Dense Farming	NR175000/Acre	INR 150000/Acre	INR 150000/Acre	Not Available	INR125000/Acre	INR 210000 /Ha	NIL

Fruits / Details	Citrus	Pineapple	Banana	Jackfruit	Papaya	Guava	Total
Fruiting Time	4 years	18 months	12-15 Months	4 years	9-14 months	9-15 months	NIL
Tree Life	10-12 years	32-46 months	28-32 months	20 Years	3-4 years	8-10 years	

A-VII.2.3 Short Listed Crops - Vegetables

Vegetables / Details	Mushroom	Carrot	Pumpkin	Cabbage	Tomato	Capsicum	Cucurbits Cucumber	Sweet Potato	Total
Season	April to Sept	Jan May June Dec	April May June AUG September Oct	March July AUG	Jan May June Aug Sept	Jan Feb June July Dec	Mar Apr June July Aug	Jan Feb Sept Oct Nov Dec	NIL
Production Area	Un organized Not Available	4450 Ha	Not Available	2980 Ha	18280 Ha	440 Ha	6900 Ha	5300 Ha	38350 Ha
Production	NA	63770 MT	Not Available	51560 MT	396240 MT	3090 MT	71300 MT	29200 MT	615160 MT
Per Hectare Yield /Productivity	95-100 MT Fresh Oyster/Acre CA	8.16 MT/Hectare	Not Available	13.02 MT/Hectare	8.64 MT/Hectare	Not Available	4.30 MT/Hectare	1.67 MT/Hectare	NIL
Farming Cost Dense Farming	INR 125000/MT	INR 100000/Ha	INR 70000/Ha	INR 55000/Ha	INR 30000/Ha	INR 70000/Ha	INR 125000/Ha	INR 55000/ha	NIL
Fruiting Time	100 day	100-120 days	90-100 days	90 days	70-80 days	100 days	80-90 days	120 days	NIL
Tree Life	Single season	Single season	Single season	Single season	Single season	Single season	Single season	Single season	
Yield In Progressive States	Per Ha. Yield in Assam is higher in NER but still lot of scope to increase the yield.								
Budget For the Farming Project to increase the yield and Area	To increase the yield following action is planned a) Capacity Building Program for farmer b) Ideal Demo Farm Model c) Hi Tech Nurseries 17 nos d) Tissue Culture Lab 08 e) Water Management f) Scientific Integrated Pest Management g) Technology intervention Program (Israel)			All these components are covered in HMNEH – only need is to synchronize all those scheme components with Value Chain Project and Single window operations recommended. Also the outcome from HMNEH can be clubbed with proposed value chain project. Refer MIDH Operational Guide Document.					

A-VII.3 Backward Linkage Calculation for Manipur

A-VII.3.1 Value Chain Components and Capacities

Facility / Details	4 MT Mobile Collection Centers	10 MT Mobile Collection Centers	Primary Processing Centers (PPC)	Central Processing Unit (CPU)	Value Added Unit	Remark
Capacity	4MT/Trip (2 Trips/shift)	10 MT/Trip (2 Trips/shift)	4 MT/hr	4.5 /hr	200 kg/hr	NIL
RM Requirement /shift/Unit	8 MT	20 MT	32 MT/Shift	36 MT/shift	1.6 MT/shift	NIL
RM Per Annam /Unit 250 days/shift wise	2000 MT	5000 MT	8000 MT	9000 MT	400 MT	NIL
Number of Units	28	0	07	1	NA	NIL

Facility / Details	4 MT Mobile Collection Centers	10 MT Mobile Collection Centers	Primary Processing Centers (PPC)	Central Processing Unit (CPU)	Value Added Unit	Remark
Total Raw Material to be consumed p.a.	56000 MT	0	56000 MT	9000 MT	0	65000 MT to be collected at farm gate & will be input for PPC. 50% will be sold for table consumption, balance will be input in CPU /CFC & Value Added Unit. The % of agro produce handled by value chain will be 17.13 % w.r.t. total production of short listed Fruits.

A-VII.3.2 Short Listed Crops - Fruits

Fruits / Details	Citrus	Pineapple	Banana	Passion Fruit	KIWI	Total
Season	Feb March JuneNov Dec	July Aug Sept	April May JuneJuly Aug	March April MayAug –Dec	NIL	NIL
Production Area	10700 Ha	14160 Ha	6930 Ha	3952 Ha	NIL	35742 Ha
Production	106840 MT	134110MT	93480 MT	44850 MT	NIL	379280 MT
Per Hectare Yield /Productivity	3 MT/Ha	5.50 MT/Ha	12.82 MT/ha	11.34 MT/Ha	NIL	NIL
Yield In Progressive States	8.80 MT/Ha India	50 MT/Ha India	50 MT/Ha India	10MT/Ha	NIL	NIL
	25 MT/Ha Globally	105 MT/Ha Costa Rica	30 MT/Ha Philippines	14 MT/Ha	NIL	NIL
Farming Cost (Dense Farming)	NR175000/Acre	INR 150000/Acre	INR 150000 /Acre	INR 150000/Ha	NIL	NIL
Fruiting Time	4 years	18 months	12-15 Months	24 months		NIL
Tree Life	10-12 years	32-46 months	28-32 months	4-5 Years		

A-VII.3.3 Short Listed Crops - Vegetables

Vegetables / Details	Mushroom	Carrot	Pumpkin	Cabbage	Tomato	Broccoli	Cucurbits Cucumber	Sweet Potato	Capsicum	Total
Season	NIL	NIL	NIL	Jan Feb July - Dec	Jan Feb May Jun Aug Sept	Jan Feb Nov Dec	March April June July Aug	NIL	Jan FebMarch Jun JulNov Dec	NIL
Production Area	NIL	NIL	NIL	8510 Ha	3150 Ha	NIL	10 Ha	NIL	10 Ha	11680 Ha
Production	NIL	NIL	NIL	101630 MT	33720 MT	NIL	120 MT	NIL	90 MT	135560 MT
Per Hectare Yield /Productivity	NIL	NIL	NIL	11.94 MT/Hectare	10.72 MT/Hectare	Not Available	12 MT/Ha	NIL	9MT/Ha	NIL
Farming Cost Dense Farming	NIL	INR 100000/Ha	INR 70000/Ha	INR 55000/Ha	INR 30000/Ha	INR 70000/Ha	INR 125000/Ha	INR 55000/Ha	INR 75000/Ha	NIL
Fruiting Time	NIL	100-120 days	90-100 days	90 days	70-80 days	100 days	80-90 days	120 days	90 days	NIL
Tree Life	NIL	Single season	Single season	Single season	Single season	Single season	Single season	Single season	Single season	
Yield In Progressive States	Per Ha. Yield in Mizoram is very low in NER but still lot of scope to increase the yield.									
Budget For the Farming Project to increase the yield and Area	To increase the yield following action is planned a) Capacity Building Program for farmer b) Ideal Demo Farm Model c) Hi Tech Nurseries 4 nos. d) Tissue Culture Lab 2 e) Water Management f) Scientific Integrated Pest Management g) Technology intervention Program (Israel)			All these components are covered in HMNEH – only need is to synchronize all those scheme components with Value Chain Project and Single window operations recommended. Also the outcome from HMNEH can be clubbed with proposed value chain project. Refer MIDH Operational Guide Document.						

A-VII.4 Backward Linkage Calculation for Meghalaya

A-VII.4.1 Value Chain Components and Capacities

Facility Details	4 MT MobileCollection Centers	10 MT Mobile Collection Centers	Primary Processing Centers (PPC)	Central Processing Unit (CPU)	Value Added Unit	Remark
Capacity	4MT/Trip (2 Trips/shift)	10 MT/Trip (2 Trips/shift)	4 MT/hr	4.5 /hr	200 kg/hr	NIL
RM Requirement /shift/Unit	8 MT	20 MT	32 MT/Shift	36 MT/shift	1.6 MT/shift	NIL
RM Per Annam /Unit 250 days/shift wise	2000 MT	5000 MT	8000 MT	9000 MT	400 MT	NIL
Number of Units	12	6	7	1	1	NIL
Total Raw Material to be consumed p.a.	24000 MT	30000MT	56000 MT	9000 MT	400 MT	54000 MT to be collected at farm gate & will be input for PPC. 27000 will be sold for table consumption; balance will be input in CPU /CFC & Value Added Unit. The % of agro produce handled by value chain will be15.5 % w.r.t. total production.

A-VII.4.2 Short Listed Crops - Fruits

Fruit Details	Citrus	Pineapple	Banana	Jackfruit	Total
Season	Feb March JuneNov Dec	May June July	April May June	July Aug Sept	NIL
Production Area	10470 Ha	12370 Ha	7370 MT	Around 3000 Ha no official data available	33210 Ha
Production	50180 MT	144730 MT	96900 MT	56250 MT	348060 MT
Per Ha Yield /Productivity	4.70 MT/Ha	11.70 MT/Ha	13.15 MT/Ha	18.75 MT/Ha	NIL
Yield In Progressive States	8.80 MT/Ha India	50 MT/Ha India	50 MT/Ha India	Data Not Available	NIL
	25 MT/Ha Globally	105 MT/Ha Costa Rica	30 MT/Ha Philippines	70 MT/Ha	NIL
Farming Cost (Dense Farming)	NR175000/Acre	INR 150000/Acre	INR 150000/Acre	Not Available	NIL
Fruiting Time	4 years	18 months	12-15 Months	4 years	NIL
Tree Life	10-12 years	32-46 months	28-32 months	20 Years	

A-VII.4.3 Short Listed Crops - Vegetables

Vegetables / Details	Mushroom	Carrot	Pumpkin	Cabbage	Tomato	Broccoli	Cucurbits Cucumber	Sweet Potato	Total
Season	NIL	Jan Feb March May June Nov Dec	April May June Aug Sept Oct	Jan Feb July - Dec	Jan May June Aug Sept	Jan Feb Nov Dec	Mar Apr June July Aug	Jan Feb Sept Oct Nov Dec	NIL
Production Area	NIL	1280 Ha	Not Available	1960 Ha	2200 Ha	Data Not Available	600 Ha	4750 Ha	10790 Ha
Production	NIL	24240 MT	Not Available	43580 MT	35510 MT	Data Not Available	5030 MT	15970 MT	124330 MT
Per Ha Yield /Productivity	NIL	18.93MT/Ha	Not Available	22.25 MT/Ha	16.15MT/Ha	Not Available	8.38MT/Ha	3.62MT/Ha	NIL
Farming Cost Dense Farming	NIL	INR 100000/Ha	INR 70000/Ha	INR 55000/Ha	INR 30000/Ha	INR 70000/Ha	INR 125000 /Ha	INR 55000/ha	NIL
Fruiting Time	NIL	100-120 days	90-100 days	90 days	70-80 days	100 days	80-90 days	120 days	NIL
Tree Life	NIL	Single season	Single season	Single season	Single season	Single season	Single season	Single season	
Yield In Progressive States	Per Ha. Yield in Meghalaya is higher in NER but still lot of scope to increase the yield.								
Budget For the Farming Project to increase the yield and Area	To increase the yield following action is planned a) Capacity Building Program for farmer b) Ideal Demo Farm Model c) Hi Tech Nurseries 4 nos. d) Tissue Culture Lab 2 e) Water Management f) Scientific Integrated Pest Management g) Technology intervention Program (Israel)				All these components are covered in HMNEH – only need is to synchronize all those scheme components with Value Chain Project and Single window operations recommended. Also the outcome from HMNEH can be clubbed with proposed value chain project. Refer MIDH Operational Guide Document.				

A-VII.5 Backward Linkage Calculation for Mizoram

A-VII.5.1 Value Chain Components and Capacities

Facility / Details	4 MT MobileCollection Centers	10 MT Mobile Collection Centers	Primary Processing Centers (PPC)	Central Processing Unit (CPU)	Value Added Unit	Remark
Capacity	4MT/Trip (2 Trips/shift)	10 MT/Trip (2 Trips/shift)	4 MT/hr	4.5 /hr	200 kg/hr	NIL
RM Requirement /shift/Unit	8 MT	20 MT	32 MT/Shift	36 MT/shift	1.6 MT/shift	NIL
RM Per Annam /Unit 250 days/shift wise	2000 MT	5000 MT	8000 MT	9000 MT	400 MT	NIL
Number of Units	20	0	5	1	NA	NIL
Total Raw Material to be consumed p.a.	40000 MT	0	40000 MT	9000 MT	0	49000 MT to be collected at farm gate & will be input for PPC, 50% will be sold for table consumption, balance will be input in CPU /CFC & Value Added Unit. The % of agro produce handled by value chain will be 6% w.r.t. total production.

A-VII.5.2 Short Listed Crops - Fruits

Fruit / Details	Citrus	Pineapple	Banana	Passion Fruit	Total
Season	Feb March JuneNov Dec	Nov Dec	Feb	March April MayAug –Dec	NIL
Production Area	26060 Ha	5030 Ha	11210 Ha	700 Ha	43000 Ha
Production	74870 MT	27640 MT	143840 MT	3458 MT	249808 MT
Per Ha Yield /Productivity	3MT/Ha	5.50 MT/Ha	12.82 mT/ha	4.94 MT/Ha	NIL
Yield In Progressive States	8.80 MT/Ha India	50 MT/Ha India	50 MT/Ha India	Data Not Available	NIL
	25 MT/Ha Globally	105 MT/Ha Costa Rica	30 MT/Ha Philippines	70 MT/Ha	NIL
Farming Cost (Dense Farming)	NR175000 /Acre	INR 150000/Acre	INR 150000/Acre	INR 150000/Ha	NIL
Fruiting Time	4 years	18 months	12-15 Months	24 months	NIL
Tree Life	10-12 years	32-46 months	28-32 months	4-5 Years	

A-VII.5.3 Short Listed Crops - Vegetables

Vegetables / Details	Mushroom	Carrot	Pumpkin	Cabbage	Tomato	Broccoli	Cucurbits Cucumber	Sweet Potato	Capsicum	Total
Season	NIL	NIL	April May June AUG September Oct	Jan Feb July - Dec	Jan May June Aug Sept	NIL	NIL	NIL	Jan FebMarch June July Nov Dec	NIL
Production Area	NIL	NIL	Not Available	3710 Ha	1470 Ha	NIL	NIL	NIL	340 Ha	5520 Ha
Production	NIL	NIL	Not Available	49720 MT	11870 MT	NIL	NIL	NIL	3670 MT	65260 MT
Per Ha Yield /Productivity	NIL	NIL	Not Available	13.40MT/Ha	8.06 MT/Ha	Not Available	NIL	NIL	10.79 MT/ha	NIL
Farming Cost Dense Farming	NIL	INR 100000/Ha	INR 70000/Ha	INR 55000/Ha	INR 30000/Ha	INR 70000/Ha	INR 125000/Ha	INR 55000/ Ha	INR 75000/Ha	NIL
Fruiting Time	NIL	100-120 days	90-100 days	90 days	70-80 days	100 days	80-90 days	120 days	90 days	NIL
Tree Life	NIL	Single season	Single season	Single season	Single season	Single season	Single season	Single season	Single season	
Yield In Progressive States	Per Ha. Yield in Mizoram is very low in NER but still lot of scope to increase the yield.									
Budget For the Farming Project to increase the yield and Area	To increase the yield following action is planned a) Capacity Building Program for farmers b) Ideal Demo Farm Model c) Hi Tech Nurseries 03 nos. d) Tissue Culture Lab 01 e) Water Management f) Scientific Integrated Pest Management g) Technology intervention Program (Israel)			All these components are covered in HMNEH – only need is to synchronize all those scheme components with Value Chain Project and Single window operations recommended. Also the outcome from HMNEH can be clubbed with proposed value chain project. Refer MIDH Operational Guide Document.						

A-VII.6 Backward Linkage Calculation for Nagaland

A-VII.6.1 Value Chain Components and Capacities

Facility / Details	4 MT Mobile Collection Centers	10 MT Mobile Collection Centers	Primary Processing Centers (PPC)	Central Processing Unit (CPU)	Value Added Unit	Remark
Capacity	4MT/Trip (2 Trips/shift)	10 MT/Trip (2 Trips/shift)	4 MT/hr	4.5 /hr	200 kg/hr	NIL
RM Requirement /shift/Unit	08 MT	20 MT	32 MT/Shift	36 MT/shift	1.6 MT/shift	NIL
RM Per Annam /Unit 250 days/shift wise	2000 MT	5000 MT	8000 MT	9000 MT	400 MT	NIL
Number of Units	32	0	8	1	NA	NIL
Total Raw Material to be consumed p.a.	64000 MT	0	64000 MT	9000 MT	0	64000 MT to be collected at farm gate & will be input for PPC. 50% will be sold for table consumption, balance will be input CPU /CFC & Value Added Unit. The % of agro produce handled by value chain will be 19.63 % w.r.t. total production of short listed Fruits.

A-VII.6.2 Short Listed Crops - Fruits

Fruit / Details	Citrus	Pineapple	Banana	Passion Fruit	Kiwi	Papaya	Total
Season	Feb March JuneNov Dec	Mar April July Aug Sept	12 Months	NIL	Sept Oct Nov		NIL
Production Area	7700 Ha	9530 Ha	8340 Ha	NIL	200 Ha	1410 Ha	27180 Ha
Production	56490 MT	132830 MT	117040 MT	NIL	2400 MT	17180 MT	325940 MT
Per Ha Yield /Productivity	7.55 MT/Ha	13.93 MT/Ha	14.03 MT/ha	NIL	12 MT/Ha	12.75 MT/Ha	NIL
Yield In Progressive States	8.80 MT/Ha India	50 MT/Ha India	50 MT/Ha India	Data Not Available	1.84 MT/Ha	38 MT/Ha	NIL
	25 MT/Ha Globally	105 MT/Ha Costa Rica	30 MT/Ha Philippines	70 MT/Ha	37.8 MT/Ha	25 MT/Ha	NIL
Farming Cost Dense Farming	NR175000/Acre	INR 150000/Acre	INR 150000	INR 150000/Ha	INR 250000/Acre	INR 125000	NIL
Fruiting Time	4 years	18 months	12-15 Months	24 months	4 Years	9-14 months	NIL
Tree Life	10-12 years	32-46 months	28-32 months	4-5 Years	10-12 years	3-4 years	

A-VII.6.3 Short Listed Crops - Vegetables

Vegetables / Details	Mushroom	Carrot	Pumpkin	Cabbage	Tomato	Broccoli	Cucurbits Cucumber	Sweet Potato	Capsicum	Total
Season	April – Sept	Jan Feb March May JuneNov Dec	April May June AUG SepOct	Jan Feb July - Dec	Jan May June Aug Sept	NIL	Not Available	Jan Feb Sept Dec	NIL	NIL
Production Area	Not Available	510 MT	Not Available	3710 Ha	3120 Ha	NIL	830 Ha	1100	NIL	9270 Ha
Production	Not Available	6040 MT	Not Available	49720 MT	22470 MT	NIL	27460 MT	14090 MT	NIL	119780 MT
Per Ha Yield /Productivity	Not Available	11.84 MT/Ha	Not Available	18.86MT/Ha	07.20MT/Ha	Not Available	33.08 MT/Ha	12.80 MT/Ha	NIL	NIL
Farming Cost	NIL	INR	INR 70000/Ha	INR	INR	INR	INR	INR	INR 75000/Ha	NIL

Vegetables / Details	Mushroom	Carrot	Pumpkin	Cabbage	Tomato	Broccoli	Cucurbits Cucumber	Sweet Potato	Capsicum	Total
Dense Farming		100000/Ha		55000/Ha	30000/Ha	70000/Ha	125000/Ha	55000/Ha		
Fruiting Time	NIL	100-120 days	90-100 days	90 days	70-80 days	100 days	80-90 days	120 days	90 days	NIL
Tree Life	NIL	Single season	Single season	Single season	Single season	Single season	Single season	Single season	Single season	
Yield In Progressive States	Per Ha. Yield in Mizoram is very low in NER but still lot of scope to increase the yield.									
Budget For the Farming Project to increase the yield and Area	To increase the yield following action is planned a) Capacity Building Program for farmers b) Ideal Demo Farm Model c) Hi Tech Nurseries 4 nos. d) Tissue Culture Lab 2 e) Water Management f) Scientific Integrated Pest Management g) Technology intervention Program (Israel)			All these components are covered in HMNEH – only need is to synchronize all those scheme components with Value Chain Project and Single window operations recommended. Also the outcome from HMNEH can be clubbed with proposed value chain project. Refer MIDH Operational Guide Document.						

A-VII.7 Backward Linkage Calculation for Sikkim

A-VII.7.1 Value Chain Components and Capacities

Facility / Details	4 MT Mobile Collection Centers	10 MT Mobile Collection Centers	Primary Processing Centers (PPC)	Central Processing Unit (CPU)	Value Added Unit	Remark
Capacity	4MT/Trip (2 Trips/shift)	10 MT/Trip (2 Trips/shift)	4 MT/hr	4.5 /hr	200 kg/hr	NIL
RM Requirement /shift/Unit	8 MT	20 MT	32 MT/Shift	36 MT/shift	1.6 MT/shift	NIL
RM Per Annam /Unit 250 days/shift wise	2000 MT	5000 MT	8000 MT	9000 MT	400 MT	NIL
Number of Units (in Nos.)	16	0	4	1	NA	NIL
Total Raw Material to be consumed p.a.	32000 MT	0	32000 MT	9000 MT	0	32000 MT to be collected at farm gate & will be input for PPC. 50% will be sold for table consumption; balance will be input in CPU /CFC & Value Added Unit. The % of agro produce handled by value chain will be 19.63 % w.r.t. total production of short listed Fruits.

A-VII.7.2 Short Listed Crops - Fruits

Fruit / Details	Citrus	Guava	Pineapple	Banana	Passion Fruit	Kiwi	Papaya	Jack Fruit	Mango	Total
Season	Feb March June Nov Dec	March April Aug Nov Dec	NIL	April -Aug	NIL	Sept OctNov	Jan Feb March April May June July Sept Oct Nov Dec	June – AugSept	NIL	NIL
Production Area	13080 Ha	1210 Ha	NIL	1280 Ha	NIL	440 MT	760 Ha	Not Available	NIL	52705 Ha
Production	18990 MT	17600 MT	NIL	3710 MT	NIL	790 MT	570 MT	Not Available	NIL	351990 MT
Per Ha Yield /Productivity	1.45 MT/Ha	14.53 MT/ha	NIL	2.90 MT/ha	NIL	1.79 MT/Ha	0.74 MT/Ha	29.64 MT/Ha	NIL	NIL

Fruit Details	Citrus	Guava	Pineapple	Banana	Passion Fruit	Kiwi	Papaya	Jack Fruit	Mango	Total
Yield In Progressive States	8.80 MT/Ha India	24.12 /He	50 MT/Ha India	50 MT/Ha India	Data Not Available	1.84 MT/Ha	38 MT/Ha	70MT/Ha	17.14 MT/Ha	NIL
Globally	25 MT/Ha Globally	20MT/ha	105 MT/Ha Costa Rica	30 MT/Ha Philippines	70.00 MT/Ha	37.8 MT/Ha	25 MT/Ha	NA	08.65MT/Ha	NIL
Farming Cost Dense Farming	NR175000/Acre	INR 210000 /Ha	INR 150000/Acre	INR 150000	INR 150000/Ha	INR 250000/Acre	INR 125000	Not Available	INR 270000	NIL
Fruiting Time	4 years	9-15 months	18 months	12-15 Months	24 months	4 Years	9-14 months	4 years	3 years	NIL
Tree Life	10-12 years	8-10 years	32-46 months	28-32 months	4-5 Years	10-12 years	3-4 years	20 Years	70 years	

A-VII.7.3 Short Listed Crops - Vegetables

Vegetables Details	Mushroom	Carrot	Pumpkin	Cabbage	Tomato	Broccoli	Cucurbits Cucumber	Sweet Potato	Capsicum	Total
Season	April – Sept	NIL	NIL	Jan Feb July - Dec	Jan May June Aug Sept	Jan Feb Nov Dec	NIL	Jan Feb Sept – Dec	NIL	NIL
Production Area	Not Available	NIL	NIL	1290 Ha	980Ha	NIL	1660 Ha	NIL	NIL	3930Ha
Production	Not Available	NIL	NIL	7180 MT	8030 MT	NIL	18190 MT	NIL	NIL	33400MT
Per Ha Yield /Productivity	Not Available	NIL	NIL	25.64 MT/Ha	31.08 MT/Ha	Not Available	33.08 MT/Ha	NIL	NIL	NIL
Farming Cost Dense Farming	NIL	INR 100000/Ha	INR 70000/Ha	INR 55000/Ha	INR 30000/Ha	INR 70000/Ha	INR 125000/Ha	INR 55000/Ha	INR 75000/Ha	NIL
Fruiting Time	NIL	100-120 days	90-100 days	90 days	70-80 days	100 days	80-90 days	120 days	90 days	NIL
Tree Life	NIL	Single season	Single season	Single season	Single season	Single season	Single season	Single season	Single season	
Yield In Progressive States	Per Ha. Yield in Mizoram is very low in NER but still lot of scope to increase the yield.									
Budget For the Farming Project to increase the yield and Area	To increase the yield following action is planned a) Capacity Building Program for farmers b) Ideal Demo Farm Model c) Hi Tech Nurseries 2 nos. d) Tissue Culture Lab 1 e) Water Management f) Scientific Integrated Pest Management g) Technology intervention Program (Israel)			All these components are covered in HMNEH – only need is to synchronize all those scheme components with Value Chain Project and Single window operations recommended. Also the outcome from HMNEH can be clubbed with proposed value chain project. Refer MIDH Operational Guide Document.						

A-VII.8 Backward Linkage Calculation for Tripura

A-VII.8.1 Value Chain Components and Capacities

Facility / Details	4 MT Mobile Collection Centers	10 MT Mobile Collection Centers	Primary Processing Centers (PPC)	Central Processing Unit (CPU)	Value Added Unit	Remark
Capacity	4MT/Trip (2 Trips/shift)	10 MT/Trip (2 Trips/shift)	4 MT/hr	4.5 /hr	200 kg/hr	NIL
RM Requirement /shift/Unit	8 MT	20 MT	32 MT/Shift	36 MT/shift	1.6 MT/shift	NIL
RM Per Annam /Unit 250 days/shift wise	2000 MT	5000 MT	8000 MT	9000 MT	400 MT	NIL
Number of Units	22 nos	4	8	1	NA	NIL
Total Raw Material to be consumed p.a.	44000 MT	20000 MT	64000 MT	9000 MT	0	64000 MT to be collected at farm gate & will be input for PPC 50% will be sold for table consumption, balance will be input in CPU /CFC & Value Added Unit. The % of agro produce handled by value chain will be 19.63 % w.r.t. total production of short listed Fruits.

A-VII.8.2 Short Listed Crops - Fruits

Fruit / Details	Citrus	Guava	Pineapple	Banana	Passion Fruit	Kiwi	Papaya	Jack Fruit	Mango	Total
Season	Feb March June Nov Dec	MarchApril AugNov Dec	May June July	12 Months	NIL	NIL	NIL	June –Aug Sept - Dec	June July	NIL
Production Area	11510 Ha	700 Ha	8730 Ha	10290 Ha	NIL	NIL	2610 Ha	8645 Ha	10220 Ha	52705 Ha
Production	52130 MT	3400 MT	127000 MT	109400 MT	NIL	NIL	26350 MT	256280MT	54930 MT	351990 MT
Per Ha Yield /Productivity	3.97 MT/Ha	4.85 MT/ha	14.55MT/Ha	10.63 MT/ha	NIL	NIL	10.08 MT/Ha	29.64 MT/Ha	5.32 MT/Ha	NIL
Yield In Progressive States	08.80 MT/Ha India	24.12 /He	50 MT/Ha India	50 MT/Ha India	Data Not Available	1.84 MT/Ha	38 MT/Ha	70MT/Ha	17.14 MT/Ha	NIL
Globally	25 MT/Ha Globally	20MT/ha	105 MT/Ha Costa Rica	30 MT/Ha Philippines	70.00 MT/Ha	37.8 MT/Ha	25 MT/Ha	NA	8.65MT/Ha	NIL
Farming Cost Dense Farming	NR175000 /Acre	210000 MT/Ha	INR 150000/Acre	INR 150000	INR 150000/Ha	INR 250000/ Acre	INR 125000	Not Available	INR 270000	NIL
Fruiting Time	4 years	9-15 months	18 months	12-15 Months	24 months	4 Years	9-14 months	4 years	3 years	NIL
Tree Life	10-12 years	8-10 years	32-46 months	28-32 months	04-05 Years	10-12 years	3-4 years	20 Years	70 years	

A-VII.8.3 Short Listed Crops - Vegetables

Vegetables / Details	Mushroom	Carrot	Pumpkin	Cabbage	Tomato	Broccoli	Cucurbits Cucumber	Sweet Potato	Capsicum	Total
Season	April – Sept	Jan Feb March May June Nov Dec	April May June AUG September Oct	Jan Feb July - Dec	Jan May June Aug Sept	NIL	March April June July Aug	NIL	NIL	NIL
Production Area	Not Available	400 Ha	2030 Ha	3050 Ha	1820 Ha	NIL	1660 Ha	NIL	NIL	8960 Ha
Production	Not Available	4800 MT	39440 MT	78170 MT	56500 MT	NIL	18190 MT	NIL	NIL	197100 MT
Per Ha Yield /Productivity	Not Available	12.00 MT/Ha	19.42 MT/Ha	25.64 MT/Ha	31.08 MT/Ha	Not Available	33.08 MT/Ha	NIL	NIL	NIL
Farming Cost Dense Farming	NIL	INR 100000/Ha	INR 70000/Ha	INR 55000/Ha	INR 30000/Ha	INR 70000/Ha	INR 125000/Ha	INR 55000/Ha	INR 75000/Ha	NIL
Fruiting Time	NIL	100-120 days	90-100 days	90 days	70-80 days	100 days	80-90 days	120 days	90 days	NIL
Tree Life	NIL	Single season	Single season	Single season	Single season	Single season	Single season	Single season	Single season	
Yield In Progressive States	Per Ha. Yield in Mizoram is very low in NER but still lot of scope to increase the yield.									
Budget For the Farming Project to increase the yield and Area	To increase the yield following action is planned a) Capacity Building Program for farmers b) Ideal Demo Farm Model c) Hi Tech Nurseries 2 nos. d) Tissue Culture Lab 1 e) Water Management f) Scientific Integrated Pest Management g) Technology intervention Program (Israel)				All these components are covered in HMNEH – only need is to synchronize all those scheme components with Value Chain Project and Single window operations recommended. Also the outcome from HMNEH can be clubbed with proposed value chain project. Refer MIDH Operational Guide Document.					

Annexure-VIII: Location of Value Chain components (State-wise)

A-VIII.1 Location of Value Chain Components (State wise)

A-VIII.1.1 Arunachal Pradesh

VC Component / Location	Mobile Collection Centers 4 MT	Mobile Collection Centers 10 MT	PPC	CFC/CPU	Value AddedProcessing Facility	Training Center	Lab	Certification	NERAMACCenter
Location	Ruksin(East Siang)	Tezu(Lohit)	Roing	Tezu	Namsai	Pasighat	Namsai	Pasighat	Itanagar
	Likbali(Lower Siang)	Roing(L. Dibang Valley)	Papumpare						
	Balukpung(West Kameng)	Kimin(Papum Pare)	Changlang			Changlang			
	Changlang (Changlang)	Mahadevpur (Namsai)	Namsai	Ziro					
	Khonsa (Tirap)	NA							
	Koloriang (Kurung Kumey)								
Total	**6**	**4**	**4**	**2**	**1**	**2**	**1**	**1**	**01**

A-VIII.1.2 Assam

VC Component / Location	Mobile CollectionCenters 4 MT	Mobile CollectionCenters 10 MT	PPC	CFC/CPU	ValueAddedProcessingFacility	Training Center	Lab	Certification	NERAMAC Center
1] Location	2	1	Silchar (Cachar Dist)	Nagaon	Tinsukia	Jorhat	Dibrugarh	Amingaon Kamrup	Dispur
	2	1	Goalpara(Goalpara)	Golaghat	Haflong Dima Hasao	Kokrajhar	NA	NA	NA
	2	1	Amingaon (Kamrup)	Silchar	NA	Dhemaji	NA	NA	NA
	2	1	Tezpur(Sonitpur)	Golapara	NA	Baksa	NA	NA	NA
	2	1	BihpuriaNarayanpur(Lakhimpur)	NA	NA	NA	NA	NA	NA
	2	1	Dhansiri(Golaghat)	NA	NA	NA	NA	NA	NA
	2	1	Sadiya(Tinsukia)	NA	NA	NA	NA	NA	NA
	2	1	Kaliabor(Nagaon)	NA	NA	NA	NA	NA	NA
	2	1	Maibong(Dima Hasao)	NA	NA	NA	NA	NA	NA
Total	**18**	**9**	**9**	**4**	**2**	**4**	**1**	**1**	**01**

A-VIII.1.3 Meghalaya

VC Component / Location	Mobile Collection Centers 4 MT	Mobile Collection Centers 10 MT	PPC	CFC/CPU	Value Added Processing Facility	Training Center	Lab	Certification	NERAMAC Center
1] Location	1	1	Nongpoh (Ri Bhoi District)	Nongpoh (West Khasi Hills)	Jowai (West Jaintia)1	Khilehriat (East Jaintia)	Shillong (East Khasi Hills)1	Tura (West Garo Hills)	Shillong (East Khasi Hills)
	2	1	Nongthymmai (East Khasi Hills)	NA	NA	Resubelpara (North Garo Hills)	NA	NA	NA
	1	1	Mawkyrwat	NA	NA	NA	NA	NA	NA

VC Component / Location	Mobile Collection Centers 4 MT	Mobile Collection Centers 10 MT	PPC	CFC/CPU	Value Added Processing Facility	Training Center	Lab	Certification	NERAMAC Center
			(South West Khasi Hills)						
	2	1	Williamnagar (East Garo Hills)	NA	NA	NA	NA	NA	NA
	2	1	Tura (West Garo Hills)	NA	NA	NA	NA	NA	NA
	2	1	Baghmara (South Garo Hills)	NA	NA	NA	NA	NA	NA
	2	1	Ampati (South West Garo Hills)	NA	NA	NA	NA	NA	NA
Total	**12**	**7**	**7**	**1**	**1**	**2**	**1**	**1**	**1**

A-VIII.1.4 Mizoram

VC Component / Location	Mobile CollectionCenters 4 MT	Mobile CollectionCenters 10 MT	PPC	CFC/CPU Can be shared with adjacent states	ValueAddedProcessingFacility	Training Center	Lab	Certification	NERAMAC Center
Locations	4	0	Lungalei (Lungalei)	Aizawl	NA	Kolasib	Lunglei	Champhai	Aizawl
	4	0	Champhai (Champhai)	NA		Saiha			
	4	0	Lawngtlai lawngtlai)	NA	NA	NA	NA	NA	NA
	4	0	Mamit(Mamit)	NA	NA	NA	NA	NA	NA
	4	0	Aizawl (Aizawl)	NA	NA	NA	NA	NA	NA
Total	**20**	**0**	**5**	**1**	**NA**	**2**	**1**	**1**	**1**

A-VIII.1.5 Manipur

VC Component / Location	Mobile CollectionCenters Mobile 4 MT	Mobile CollectionCenters 10 MT	PPC	CFC/CPU Can be shared with adjacent states	ValueAddedProcessingFacility	Training Center	Lab	Certification	NERAMAC Center
	4	0	Bishnupur(Bishnupur)	West Imphal	NA	Kamjong (Kamjong)	East Imphal	Thoubal	East Imphal
	4	0	Thoubal(Thoubal)	NA	NA	Tamenglog(Tamenglog)	NA	NA	NA
	4	0	Senapati(Senapati)	NA	NA	NA	NA	NA	NA
	4	0	Ukhrul(Ukhrul)	NA	NA	NA	NA	NA	NA
	4	0	Chandel (Chandel)	NA	NA	NA	NA	NA	NA
	4	0	Churachandpur (Churachandpur)	NA	NA	NA	NA	NA	NA
	4	0	Tengnoupal (Tengnoupal)	NA	NA	NA	NA	NA	NA
Total	**28**	**0**	**7**	**1**	**NA**	**2**	**1**	**1**	**1**

A-VIII.1.6 Nagaland

VC Component / Location	Mobile CollectionCenters 4 MT	Mobile CollectionCenters 10 MT	PPC	CFC/CPU Can be shared with adjacent states	ValueAddedProcessingFacility	Training Center	Lab	Certification	NERAMAC Center
Locations	2	0	Wokha(Wokha)	NA	NA	Kiphire(Kiphire)	MON(Mon)1	Kohima	Dimapur (Dimapur)
	2	0	Tuensang(Tuensang)	NA	NA	NA	NA	NA	NA
	4	0	Pehek(Pehek)	NA	NA	NA	NA	NA	NA
	4	0	Peren (Peren)	NA	NA	NA	NA	NA	NA
	4	0	MON(MON)	NA	NA	NA	NA	NA	NA
	4	0	Mokokchung(Mokokchung)	NA	NA	NA	NA	NA	NA
	4	0	Kohima(Kohima)	NA	NA	NA	NA		
	4	0	Dimapur (Dimapur)	Dimapur	NA	NA	NA		
Total	**32**	**0**	**8**	**1**	**NA**	**1**	**1**	**1**	**1**

A-VIII.1.7 Sikkim

VC Component / Location	Mobile Collection Centers 4 MT	Mobile Collection Centers 10 MT	PPC	CFC/CPU Can be shared with adjacent states	ValueAddedProcessingFacility	Training Center	Lab	Certification	NERAMAC Center
Locations	4	0	Namchi(South Sikkim)	Gangtok (East Sikkim)	NA	Mangan(North Sikkim)	Namchi(South Sikkim)	Already Exist	Gangtok (East Sikkim)
	4	0	Geyzing(West Sikkim)	NA	NA	NA	NA	NA	NA
	4	0	Gangtok(East Sikkim)	NA	NA	NA	NA	NA	NA
	4	0	Mangan(North Sikkim)	NA	NA	NA	NA	NA	NA
Total	**16**	**0**	**4**	**1**	**NA**	**1**	**1**	**NA**	**1**

A-VIII.1.8 Tripura

VC Component / Location	Mobile Collection Centers 4 MT	Mobile Collection Centers 10 MT	PPC	CFC/CPU Can be shared with adjacent states	Value Added Processing Facility	Training Center	Lab	Certification	NERAMAC Center
Locations	3	0	Dharmanagar (North Tripura)	Agartala (West Tripura)	NA	Udaipur (Gomati)	Ambassa (Dhalai)	Khowai (Khowai)	Agartala (West Tripura)
	3	1	Kaliashahar(Unakoti)	NA	NA	NA	NA	NA	NA
	2	0	Ambassa(Dhalai)	NA	NA	NA	NA	NA	NA
	3	1	Khowai(Khowai)	NA	NA	NA	NA	NA	NA
	2	1	Agartala(West Tripura)	NA	NA	NA	NA	NA	NA
	3	0	Udaipur(Gomati)	NA	NA	NA	NA	NA	NA
	3	0	Bishramgamj (Sepahija)	NA	NA	NA	NA	NA	NA
	3	1	Beloni(South Tripura)	NA	NA	NA	NA		
Total	**22**	**4**	**8**	**1**	**NA**	**1**	**1**	**1**	**1**

Annexure-IX: Summary of State wise Value Chain component wise Investment, Employment generation, Fruits & vegetables collection and area expansion

A-IX.1 Post-Harvest & processing sector infrastructure

A-IX.1.1 Summary for Mobile Collection Centers

States / Parameters	Arunachal Pradesh	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Tripura	Sikkim	Total
Total Mobile Collection Centers (in Nos.)	10	27	19	20	28	32	26	16	**178**
Total Investment in Mobile Collection Centers (INR in Lakh)	227.80	602.55	428.65	400	560	640	547.80	320	**3726.80**
Employment Generation Direct (in nos.) • Per CC 3 nos.	30	81	57	60	84	96	78	48	**534**
Vegetables and Fruits Collected (in MT)	32000	81000	59000	40000	56000	64000	64000	32000	**428000**

A-IX.1.2 Summary for Primary Processing Centers (PPCs)

States / Parameters	Arunachal Pradesh	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Tripura	Sikkim	Total
No of PPCs (in Nos.)	4	9	7	5	7	8	8	0	**52**
Total Investment in PPCs(INR in Lakh) • Rs. 287.30 Lakh/PPC	1149.20	2585.70	2011.10	1436.50	2011.10	2298.40	2298.40	1149.20	**14939.60**
Employment Generation (in Nos.) • Per PPC 48 nos.	192	432	336	240	336	384	384	192	**2496**
Vegetables and Fruits Collected (in MT)	32000	81000	59000	40000	56000	64000	64000	32000	**428000** **Direct linkage to Value Chain**

A-IX.1.3 Summary for Central Processing Unit (CPUs)

States / Parameters	Arunachal Pradesh	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Tripura	Sikkim	Total
No of CPUs (in Nos.)	2	4	1	1	1	1	1	1	**12**
Total Investment in CPUs (INR in Lakhs) • Rs. 5831.00 Lakh/PPC	11662	23324	5831	5831	5831	5831	5831	5831	**69972**
Employment Generation (in Nos.) • Per CPU 200 nos.	400	800	200	200	200	200	200	200	**2400**
Vegetables and Fruits processed /shift /annum(in MT)	18000	36000	9000	9000	9000	9000	9000	9000	**108000** **Direct linkage to Value Chain**

A-IX.1.4 Summary of Reefer Vans for Forward Integration

States / Parameters	Arunachal Pradesh	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Tripura	Sikkim	Total
Reefer Van 7 MT (in Nos.)	2	9	7	5	7	8	8	6	**52**
Reefer Van 15 MT (in Nos.)	2	4	2	1	1	1	1	0	**12**
Total Investment (INR in Lakhs)	166	457	291	183	233	258	258	150	**1996**
Employment Generation (in Nos.) • Per van 2 nos.	8	26	18	12	16	18	18	12	**128**
Frozen /Processed products Handled (in MT) • 15 trip/monthX12 months	7920	22140	14220	9000	11520	12780	12780	7560	**97920**

A-IX.1.5 Summary for Value Added Unit

States / Parameters		Arunachal Pradesh	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Tripura	Sikkim	Total
Value Added Unit	Nos.	1	2	1	0	0	0	0	0	52 nos
Total Investment	INR in Lakhs	1175	23500	11750	0	0	0	0	0	4700.00
Employment Generation	Nos.	37	74	37	0	0	0	0	0	148 nos
RM required	MT	400	800	400	0	0	0	0	0	1600 MT (Processed /Dried Material Required)

A-IX.2 Support Value Chain Infrastructure:

A-IX.2.1 Framer Training Cum Entrepreneurship Training Centre

States / Parameters		Arunachal Pradesh	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Tripura	Sikkim	Total
Training Centre	Nos.	2	4	2	2	2	2	1	1	18 nos.
Total Investment	INR in Lakhs	1948	3896	1948	1948	1948	1948	974	974	15584
Employment Generation	Nos.	100	200	100	100	100	100	50	50	800 nos.
No. of Participants Trained	Nos.	16000	32000	16000	16000	16000	16000	8000	8000	128000 nos.

A-IX.2.2 Quality Analysis Lab

States / Parameters		Arunachal Pradesh	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Tripura	Sikkim	Total
QC Lab	Nos.	1	1	1	1	1	1	1	1	8 nos.
Total Investment	INR in Lakhs	1120	1120	1120	1120	1120	1120	1120	1120	INR 8960Lakh
Employment Generation	Nos.	30	30	30	30	30	30	30	30	240 nos.

A-IX.2.3 Certification Agency

States / Parameters		Arunachal Pradesh	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Tripura	Sikkim	Total
Certification Agency	Nos.	1	1	1	1	1	1	1	1	8 nos.
Total Investment	INR in Lakhs	770	770	770	770	770	770	770	770	6160
Employment Generation	Nos.	50	50	50	50	50	50	50	50	400 nos.

A-IX.3 Backward Linkage Support Infrastructure

A-IX.3.1 Hi Tech Nursery

States / Parameters		Arunachal Pradesh	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Tripura	Sikkim	Total
Hi Tech Nursery	Nos.	4	17	4	3	4	4	2	2	40 nos.
Total Investment	INR in Lakhs	400	1700	400	300	400	400	200	200	INR 4000 Lakh
Employment Generation	Nos.	80	340	80	60	80	80	40	40	800 nos.

A-IX.3.2 Tissue Culture Lab

States / Parameters		Arunachal Pradesh	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Tripura	Sikkim	Total
Tissue Culture	Nos.	1	8	2	1	2	2	1	1	18nos.
Total Investment	INR in Lakhs	250	2000	500	250	500	500	250	250	INR 4500 Lakh
Employment Generation	Nos.	30	240	60	30	60	60	30	30	540 nos.

A-IX.4 New Farm Development

States / Parameters		Arunachal Pradesh	Assam	Meghalaya	Mizoram	Manipur	Nagaland	Tripura	Sikkim	Total
No of Districts	No	25	33	11	11	16	11	8	4	119
Existing Horticulture Farm Area For our Value Chain	Ha	50760	481840	86720	100260	84740	75080	101140	58340	1038880
Additional Area 250 Ha per District per state in First years	Total Area First Year Ha	6250	8250	2750	2750	4000	2750	2000	1000	29750
Provision to develop the new farm area	INR 3.70 Lakhs/Ha	23125	30525	10175	10175	14800	10175	7400	3700	110075
2nd Year 250 Ha, per district Productivity	Ha	6250	8250	2750	2750	4000	2750	2000	1000	29750
Provision to develop the new farm area Amount	INR 3.70 Lakhs/Ha	23125	30525	10175	10175	14800	10175	7400	3700	110075
3rd Year 250 Ha per District	Ha	6250	8250	2750	2750	4000	2750	2000	1000	29750
Provision to develop the new farm area	INR 3.70 Lakhs /Ha	23125	30525	10175	10175	14800	10175	7400	3700	110075
4th Year 250 Ha per district	Ha	6250	8250	2750	2750	4000	2750	2000	1000	29750
Provision to develop the new farm area	INR 3.70 Lakhs /Ha	23125	30525	10175	10175	14800	10175	7400	3700	110075
Employment Generation Per Ha 4 nos.	Nos.	250000	330000	110000	110000	160000	110000	80000	40000	1190000
Indirect Employment Generation 100 Ha 10 nos.	Nos.	2500	3300	1100	1100	1600	1100	800	400	11900

Annexure-X: Note on NERAMAC as Anchor Marketing Organization

A broad outline is placed below for NERAMAC to undertake a business process restructuring of the goals, roles & responsibilities with enabling policies, processes, people, structure for NERAMAC to be the anchor organisation for successful implementation of the proposed value chain development action plan and all such similar plans being drawn up for development of agri-horticultural sectors of the region.

Suggested Goal: To be the single largest professional marketing organisation to promote agro based products of NE region

Suggested Role expansion:

- It will be the apex marketing organization for marketing of all agricultural fresh and processed food produced in the region.
- Set up a SPV in collaboration with NEDFi/NEC/Private enterprise for establishing a Common Facility Centre in Guwahati and take control of the facilities located in and around Guwahati for centralized operation.
- NERAMAC shall have business connections in all potential markets within and outside the country on strategic partnership model.
- Be the single point contact and interaction source for the buyers from within the region, outside the region and the country and the producers of all agricultural produce in the region both in fresh and processed forms.
- To be in constant touch with State horticultural missions for tracking the developments in the states and meet their requirement in respect of forward linkages.
- To create one brand for the products of the region, promote the same, organise road shows, publicity campaigns across the country and abroad.
- Host both an interactive website and Android App based technology to connect all State horticultural missions in the region, FPOs / FPCs, Primary / final processing centres, Cold storages / warehouses and producers on a real time basis. To process and compile data with extensive use of artificial intelligence and machine learning technologies to provide all information and data on real time basis to the users, mainly the producers, processors, and buyers.
- NERAMAC will be the central registry for maintaining the data of all infrastructures already created and to be created for use of agricultural produce in the region, including cold storages, cold chains, pack houses, processing units etc. For this purpose, all concerned State Govt., Central Govt. departments and agencies like APEDA, SFAC etc. may submit the updated status of all infrastructures financed, assisted and created out Govt. funds in the region to NERAMAC and henceforth all such information may be shared with NERAMAC.
- NERAMAC shall also be the registry of GPS based information of all FPOs, clusters of growers dealing in different products across the region and make the data available in website.
- All data collected and maintained by NERAMMAC may be made available for public viewing at a single point in NERAMAC website.
- Also be a party of tri-partite agreements to facilitate credit linkage of FPOs / entrepreneurs based on inter-se agreement between the parties as the prime Anchor Marketing Organisation in the region for additional comfort of the lenders.

Suggested Organisation development:

- The Board of Directors may consist of:
  a) Nominee directors from NEDFi in addition to existing director from NEC and;
  b) Three independent directors who are professionals with adequate experience in agricultural business, successful entrepreneurs etc.
  c) Board shall nominate one independent director to function as an ex-officio chairman of the board to guide the CMD/ CEO on policy matters of the organization.

- Appoint a full time CMD/ CEO of the organisation.

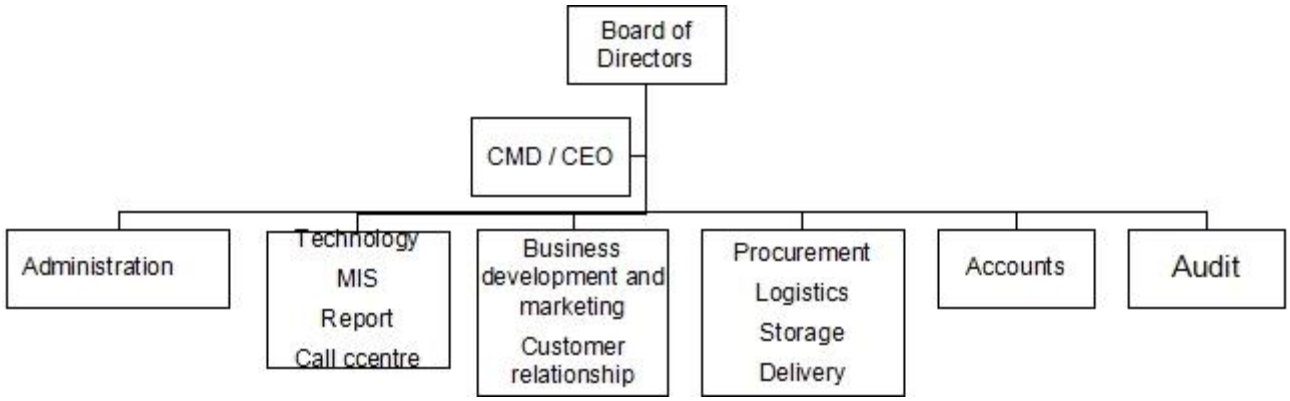
Capital:

- An additional capital to the tune of Rs. 151.25 Crore may be initially infused by the Ministry of DoNER and in subsequent years provide assistance based on performance and actual requirement to make the organisation self-reliant and independent to deliver the expected outcomes efficiently.
- The whole amount or part of it may be supported as investment in capital or long term loan or Grant as the case may be.

Human Resources:

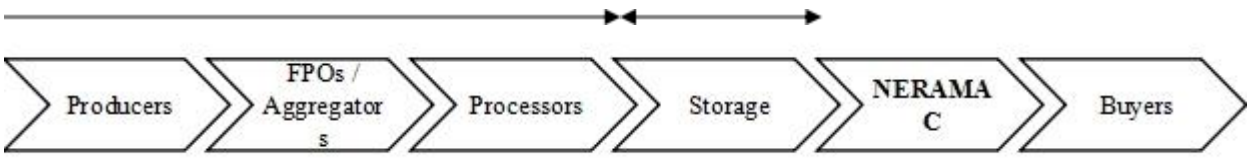
- Relook at the existing manpower, based on the suggested role requirements and placements.
- Professional people may be hired on contract basis with appropriate experience and background to fill in the suggested positions.
- Performance linked incentives may be introduced for contractual employees.

Suggested organizational structure could be as below:



Suggested Process and role of NERAMAC:

- The produces may travel through aggregators at FPO or cluster level to NERAMAC either processed or fresh and directly from FPOs as aggregators, through processing mode or through cold storages.



A detail study may be commissioned for designing and suggesting the implementation process of the redesigned structure, as suggested above.

Annexure-XI: Financing Value Chain in NER by Banks and Financial Institutions

The agro-food sector has undergone changes that have influenced new models of production and marketing involving a focus on demand rather than on producer-defined agricultural goods; a global, liberalized and fragmented marketplace with little seasonality and high product diversity; food safety and traceability requirements; and higher quality standards in conjunction with the enforcement of basic environmental regulations. This evolution requires a better understanding of the whole set of transactions within each value chain and that of the agricultural sector within which it operates.

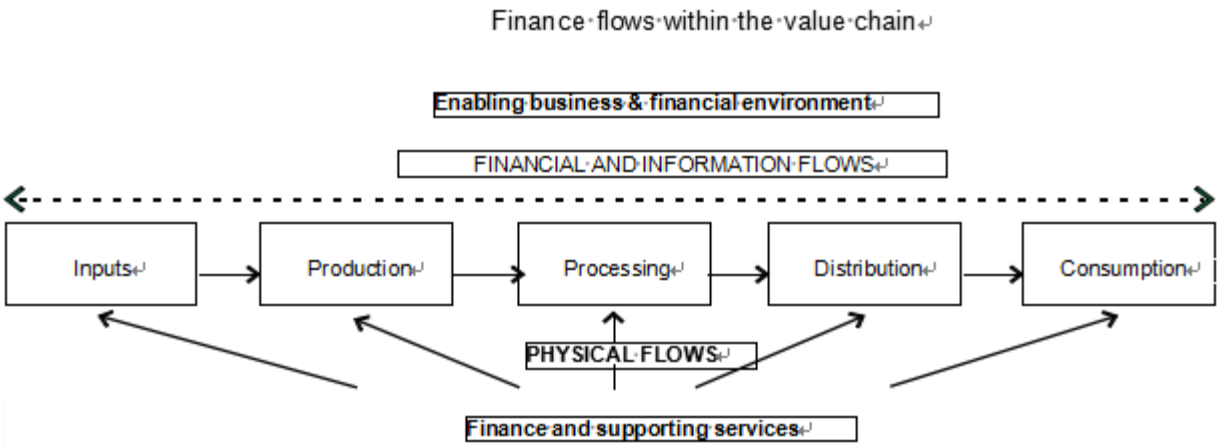
Despite the changes in agriculture and agribusiness, the typical offer for financial products and services for agricultural and rural production has been deficient and not particularly innovative; financial intermediaries still lack much depth in rural areas, and producers, especially smallholders, are still underserved. Conventional thinking is that the agricultural sector is too costly and risky for lending.

This risk stems from both price volatility as well as from changeable weather patterns, natural calamities like flood, droughts, land erosion and landslips that can affect whole regions at a time, making repayment uncertain. In conventional lending, collateral is used to mitigate risks to the lenders, but the typical mortgage type of collateral commonly required by the banks is often not available or feasible in Hilly and rural areas of North East. This is largely due to land tenure restrictions and/or other requirements that are often designed to protect the livelihood assets of the community, but in doing so effectively limit their use as collateral. Hence, collateral is a major constraint to access to higher amount of finance in agriculture from banks in North East. The banks have been slow to innovate. The cost of directly lending to farmers, especially smaller ones, in hard-to-reach rural areas with less-educated and low-income populations is in fact generally prohibitive to most formal financial institutions. Microfinance institutions do reach some of these low-income households but at a high cost, with short-term loan products that are generally not able to address the full range of agricultural needs.

The financial institutions are also having many challenges in lending to this sector for some of the following reasons:

1. Majority of the farmers belong to Marginal Farmers and Small Farmers categories.
2. Large size commercial orchards are yet to be established in the region.
3. Vegetables are grown as supplementary crop in small part of the farmland.
4. Available market linkages are not established in an organized manner.
5. Communication between the production farm and the nearby market is poor or non-existing.
6. Logistics support is very erratic and unreliable.
7. Facilities for sorting, grading, storage and processing either are not available are not functioning properly.
8. Land or other collaterals are mostly not available in the hilly areas and in rural areas of plains.

The above reasons even more necessitate organizing of value chains for fruits and vegetables in horticulture sector for NE. *The concept of 'agricultural value chain' includes the full range of activities and participants involved in moving agricultural products from input suppliers to farmers' fields, and ultimately, to consumers' tables. Each stakeholder or process in the chain has a link to the next for the processes to form a viable chain. At each stage, some additional transformation or enhancement is made to the product – ranging from simply moving the product from point 'a' to point 'b' (a common value addition of traders for example) to complex processing and packaging. Hence, a value chain is often defined as the sequence of value-adding activities, from production to consumption, through processing and commercialization. Each segment of a chain has one or more backward and forward linkages.*



The key issues for consideration in value chain finance are: 1) the strength of the value chain and its opportunities and challenges; 2) the risks; 3) the technical, business, financial services and support, and 4) the business model for value chain finance. In essence, the process involves a combination of value chain assessment, financial assessment and securing agreements.

It is now increasingly recognised that some of the constraints that farmers face in their transition towards commercial agriculture can be alleviated through the value chain approach that brings together different chain actors (including farmers, aggregators, traders, processors and financial institutions) to gain control over the processes of production, marketing, processing and distribution in order to realise scale economies, reduce transaction costs, and minimize uncertainties in supplies and quality of inputs, outputs and services.

However, since more finance for agriculture is critical in meeting the challenges in developing value chain in horticulture, the financial institutions need to learn from and engage more with value chain actors in order to develop new products and to reach new markets.

Demand and Supply of finance in agriculture value chains

Value Chain players	Demand side	Supply side (value chain finance)	
	Value chain activity	Financial institutions	Non-financial intermediaries
Input Suppliers	To stock pesticides, Farm equipment Seeds, fertilizers	Commercial Banks, Regional Rural Banks, MFIs	Input marketing companies, farm equipment suppliers
Primary producers	To produce Crops	Commercial Banks, RRBs, Co-op banks	Input and equipment suppliers, marketing companies
Local Aggregators	Primary storage of local produces and payment to producers	Microfinance Institutions,	Large traders, wholesalers, processors, exporters
Large Aggregators	Large amount of produces, and payment to the small aggregators	Commercial Banks, venture capital, Insurance companies	Large traders, lead firms, wholesalers, processors, exporters
Storage & Warehouse	To create Storage facilities, for grains, fruits, vegetables, Cold chains & logistics	Commercial Banks, Insurance companies	Processors, exporters, producers; companies
Primary Processors	Creating primary processing facilities at the local level for supply to the end processors	Commercial Banks	Farmers' organization, Large processors, trading and marketing companies
Final Processors	Creating large facilities for processing plants, packaging facilities etc.	Commercial Banks, Insurance companies	Wholesalers, exporters

Value Chain players	Demand side	Supply side (value chain finance)	
	Value chain activity	Financial institutions	Non-financial intermediaries
Wholesalers	Trading and branding	Commercial Banks, venture capital funds	Exporters, Corporate
Exporters	Pre-shipment and post-shipment credit facilities	Commercial Banks, Venture capital funds, Private equity funds	Corporate sector
Retailers	Retailing of produces	Microfinance Institutions, commercial Banks	Family and friends

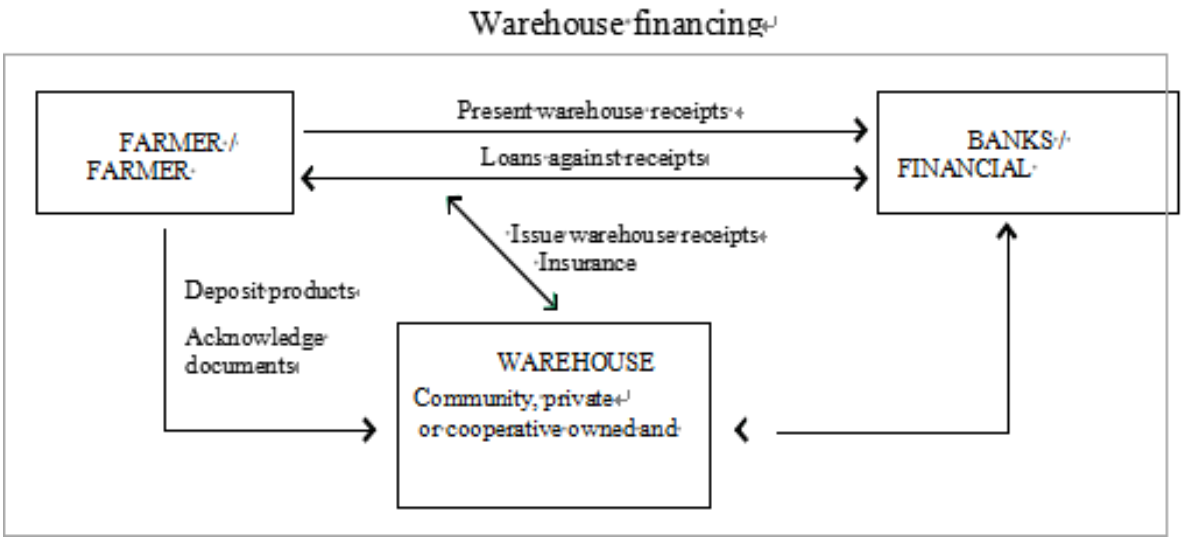
(Source: Value Chain Financing in Agriculture: Case Studies Yes bank)

Types of financing in the Value Chain financing model for financial institutions:

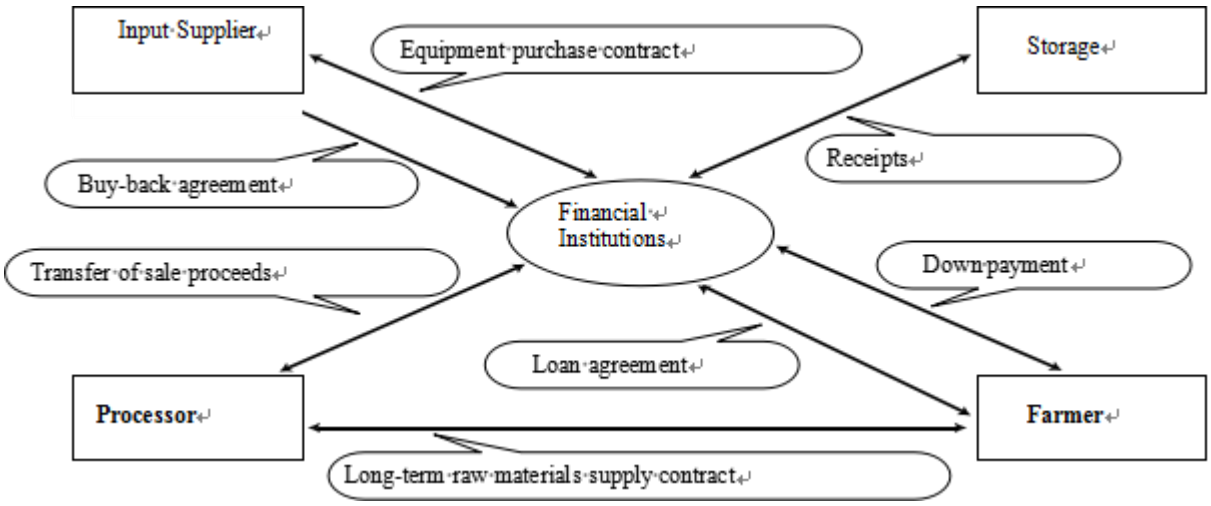
Value chain activity	Demand for Financial services by Value chain actors	Demand for Types / products of Financial services	Existing facilities / incentives available for financing under this segment
Supply of Input, Machineries, Knowledge	a) Agri entrepreneurs under ACABC Scheme b) Small business	Term credit & Working capital	a) ACABC - "Composite Subsidy" a back-ended in nature, will be 44% of project cost for women, SC/ST & all categories of candidates from NE. ACABC qualify for financing under MUDRA scheme for loans upto Rs 10.00 lakhs, without any collaterals and credit guarantee under CGTSME. b) Eligible under MUDRA loan and normal SME lending.
Production	Producers & Growers	Term credit & Working capital	a) Credit for production of vegetables and maintenance of orchard under KCC. Collateral free Loans upto Rs 3.00 lakhs in case of tie-up for recovery and upto Rs. 1.6 Lakhs for others. Interest subvention @ 3%. b) Plantation loans without collateral upto Rs. 1.6 Lakhs. c) Loans against cold storage/ warehouse receipts without collateral upto Rs. 1.0 Lakhs. d) Crop Insurance under PMFBY for selected crops.
Aggregating, sorting, grading, storage, Pre-cooling, logistics & primary processing (PPCs)	FPGs, FPOs, FPCs	Term credit, Working capital, & composite loan	a) FPOs- Equity Grant in the form of matching grant upto Rs. 2,000 per farmer member of FPO subject to maximum limit of Rs. 15.00 lakh fixed per FPO. b) Credit guarantee cover of Rs 2.0 cr per FPO is available for the project loans to FPOs. c) NHB provides subsidy @ of 50 % of project cost limited to Rs. 72.50 lakh per project in NE Region Pack House, Ripening Chamber, Refer Van, Retail Outlets, Pre-cooling unit, Primary processing etc. d) Loans available also under MUDRA scheme upto 10.0 lakhs without collaterals.
Processing/ Fruit ripening Chamber	Food processing facilities	Term Credit & working capital	a) NHB provides subsidy @ of 50 % of project cost limited to Rs. 72.50 lakh per project in NE Region for Ripening Chamber, processing etc.

Value chain activity	Demand for Financial services by Value chain actors	Demand for Types / products of Financial services	Existing facilities / incentives available for financing under this segment
			b) Loans available up to Rs.1. crore for MSEs without collaterals.
Storage	FPCs / Cold storage owners/ Entrepreneurs		NHB provides subsidy @ of 50 % of project cost limited to Rs. 72.50 lakh per project in NE Region for cold room, mobile pre-cooling vans.
Post-harvest facilities			MOFPI PRADHAN MANTRI KISAN SAMPADA YOJANA. (a) For storage infrastructure including Pack House and Pre cooling unit, ripening chamber and transport infrastructure, grant-in-aid @ 50% for North East States, of the total cost of plant & machinery and technical civil works (b) For value addition and processing infrastructure including frozen storage/ deep freezers associated and integral to the processing, grant-in-aid @ 75% for North East States, (c) For irradiation facilities grant-in-aid will be provided @ 75% for North East States, Note: (i) Maximum grant-in-aid would be Rs.10 crore per project will be provided. Loans available up to Rs.1. crore for MSEs without collaterals.
Marketing	a) Wholesalers, Market chains, b) Retail outlets, c) online marketing platforms d) Exporters	Term loan, Working capital, equity grant, working capital Export credit	a) & b) Loans available under MUDRA scheme upto Rs 10.0 lakhs without collaterals. Loans available up to Rs.1. crore for MSEs without collaterals. c) Equity assistance under Start up India, Stand up India, NEDFi, VCF, AAU VCF etc. d) Export credit, Packing credit from Exim bank, Commercial banks. EXIM bank provides 90% loan guarantee to lenders for working capital loans for export.

Conventional financing relies heavily on the creditworthiness of the client and business, value chain financing focuses more on the payments to be received from activities, such as production and value-added transactions. This allows for increased access to finance for those without sufficient collateral but with predictable flows of goods, and strong partners in the chain. Moreover, in many cases, the transactions can be structured such that the repayment of a loan is automatically made via the transaction proceeds. This direct form of loan repayment reduces both repayment risk as well as transaction costs of loan repayment. Each participant in a value chain has a different capacity to obtain financing and the conditions vary accordingly. Their common interest is in obtaining finance easily under favourable conditions; whether it comes from a bank, supplier or trader is not important. If, for example, a major buyer can obtain financing and advance funds to others in the chain at less overall cost, everyone benefits. Following a value chain finance approach, the loan analysis for a specific borrower comprehensively considers the many aspects and processes of the value chain, including who within the chain is best placed to be the borrower(s), and what are the flows of funds and from whom.



Tie -up arrangements model under value chain finance



Role of implementing agencies

a) Sharper focus on ensuring credit linkage of enterprises, entrepreneurs, producers & growers, and all players in value chain.
b) Creating awareness about value chain process and benefits of joining the value chain in a transparent manner. Handholding support, preparation of project report, direct interactions with FPOs / growers to guide them to different facilities available under various schemes and credit linkage, if necessary, by engaging professional support in the field.
c) Support from **Nabkisan Finance** Limited: For catering to the credit requirement of various POs/FPOs promoted under various programmes, Nabkisan, a subsidiary of NABARD, has designed three types of loan products, details of which are asunder.
    - Loans to FPOs eligible for credit guarantee Assistance of SFAC.
    - Loans to FPOs/POs not covered under Credit Guarantee Assistance of SFAC.
    - Loans to Promoting Institutions for on-lending to FPOs/POs.
d) Leveraging the MOUs signed by the DAC&FW department of Govt. of India with individual banks for financing facility under **'Agriculture Infrastructure Fund'**. The scheme will be operational from the year 2020-21 to 2029-30. Disbursement in four years starting with sanction of Rs. 10,000 crore in the first year and Rs. 30,000 crore each in next three financial years. The subvention/ credit guarantee facilities will be available in the subsequent years

up to 2029-30. All loans under this financing facility will have interest subvention of 3% per annum up to a limit of Rs. 2 crore. This subvention will be available for a maximum period of 7 years.

Eligible projects under the scheme will facilitate

- Setting up and modernization of key elements of the value chain including Post-Harvest Management Projects including Supply chain services.
- e-marketing platforms.
- Warehouses, Silos, Pack houses, assaying units, Sorting & Grading units, Cold chain, Logistics facilities, Primary processing centers, Ripening Chambers etc.
- Viable projects for building community farming assets including — Organic Inputs production units, Bio stimulant production units, Infrastructure for smart and precision agriculture.
- Projects identified for providing supply chain infrastructure for clusters of crops including export clusters and Projects promoted by Central/State/Local Governments or their agencies under PPP for building community farming assets or post-harvest management projects.
- Eligible beneficiaries will be Primary Agricultural Credit Societies (PACS), Marketing Cooperative Societies, Farmer Producers Organizations (FPOs), Self Help Group (SHG), Farmers, Joint Liability Groups (JLG), Multipurpose Cooperative Societies, Agri-entrepreneurs, Startups, Aggregation Infrastructure Providers and Central/State agency or Local Body sponsored Public Private Partnership Projects.

e) The physical and financial targets of loans from the banks under different categories in this plan need to be drawn up by the State horticulture missions and shared with the conveyor of the respective State Level Bankers committee (SLBC) for incorporation in the Annual Action Plan (AAP) in the State.

f) Target may be allocated to the NABKISAN finance, major banks involved in agricultural lending in the State, based on the above MOUs signed by the DAC&FW department of Govt. of India with individual banks in the AAP.

g) A separate sub head may be created under the head of Agriculture finance in AAP in the reports for proper monitoring of the progress of horticulture and financing under agri infrastructure scheme.

h) Head of State Horticulture department / Mission may attend the quarterly SLBC meetings to take up the agenda for discussion and monitoring.

Annexure-XII: Use of IOT in Agriculture & Horticulture Value Chain Model

IoT combines the concepts "Internet" and "Thing" and can therefore semantically be defined as "a world-wide network of interconnected objects uniquely addressable, based on standard communication protocols. The Internet is the global system of interconnected computer networks that use the Internet protocol suite (TCP/IP) to link billions of devices worldwide.

Agriculture is supporting the livelihood of large population of India and so is considered as the backbone of India. There is rise in demand of food grains but farmland and water resources are stressed, acute dependency of agriculture is on rainfall. In addition to that there is unavailability of labours for agriculture as people are moving from rural to urban areas. Indian crop yield is significantly lower than the Asian average, therefore, to meet the projected food demand of 2050, India will have to increase the crop yields.

11% of global agriculture products are produced in India, but the food supply chain of India is inefficient which leads to large quantity of food loss. Approximately, 18% to 25% of food loss in India happens during supply chain i.e. between the field and consumer.

As far as smart farming in India is concerned, Microsoft is working with 175 farmers in Andhra Pradesh as a result of which there is an increase of 30% crop yield (per ha).

IOT in agriculture provides

- Better sensing and monitoring of production, including farmers source use, crop development and food processing;
- Better understanding of the specific farming conditions, such as weather and environmental conditions, emergence of pests, weeds and diseases;
- More sophisticated and remote control of farm, processing and logistics operations, precise application of pesticides and fertilizers, robots for automatic weeding; improvingfoodqualitymonitoringandtraceabilitybyremotelycontrollingthelocationandconditionsof shipments and products;
- Increasing consumer awareness of sustainability and health issues by personalised nutrition.

In **food safety and quality management** systems, temperature sensors for cold chain monitoring are common practice. IoT transforms food safety and quality management from a defensive, reactive approach towards a proactive approach, in which food chains can be monitored, controlled, planned, and optimized remotely based on real-time information of a broad range of relevant parameters.

The majority of **consumers** currently have access to a wealth of food-related smartphone apps. Most applications related to food focus on specific functionalities and specific data, while the information exchange with other systems is limited. IoT leverages this by realizing applications for personalised food intake advices that combine food-related information from different stakeholders in the food chain.

Smart farming practices supported by the IOT in agriculture sector may include the following processes:

Precision Farming

Precision farming is the application of information and communication technology in agriculture to identify, analyze and manage variability within fields. It focuses on improving the quality and quantity of yield using precise amount of water, fertilizers and pesticides. Precision farming is a new concept designed to identify the specific condition of every part of the field and to take corrective actions on right time and right way to provide better yields in more energy efficient way. Wider applications of precision technology will improve productivity, reduce production cost and conserve resources.

Drones

Drones in agriculture represent a new way to collect information about crops in a field. Drones in agriculture can be used for field analysis, crop spraying and crop yield management. An important benefit of drones is that they are affordable and can be deployed easily.

High precision cameras are used in drones which can be used for real time monitoring of crops and fields. The cameras in drones collect precision field images to identify the area of fields that require water or has stressed crops that need remedy. High precision cameras in drones could detect the disease in crops before it is visible to human eyes. Due to early detection of disease, it reduces crop loss and also the requirement of pesticides. By using IoT, drones can be connected to farmer's mobile and can send him the alert in case of identification of any disease or unusual condition. So, the farmer can remotely monitor his crops and need not be present in the farm. It also saves significant amount of time of the farmer.

Smart Irrigation

Climate smart irrigation is the need of the hour. With IoT, irrigation is managed more accurately and saves the overall consumption of water. In smart irrigation, sensors are used in the soil to identify the moisture level of the soil. With IoT, sensors inform the farmer about how much minimum level of irrigation is required for the crop. Optimal irrigation reduces water wastage and also reduces the stress level of crops. With sensors, machines analyse the historical weather patterns, soil quality and recommends the farmers the kind of crop to be grown and when and how much irrigation is required for that particular crop in a particular weather condition. This automation helps for better yields and also to conserve the water.

Drones for Smart Irrigation

Drones can also be used to avoid the wastage of water in irrigation. Drones with special monitoring equipment can be used to monitor the field and to identify the area facing hydric stress, so that irrigation can be done to that specific area and avoid the wastage of water. With smart irrigation farmers are able to control the irrigation from remote location using mobile app.

Remote Soil Monitoring

Sensors can be used in the soil for real time monitoring of soil quality. These sensors send the farmers updated information about the acidity, air pressure, water content and temperature of the soil. Sensors provides information about soil with centimeter level accuracy.

Weather Monitoring and Forecasting

Weather plays vital role in farming. Improper knowledge of weather deteriorates the crop quality and quantity. In smart farming, sensors are used to get the real time weather information. By knowing the real time information, farmers are able to identify the crop that will sustain in that particular weather conditions.

Data Analysis and Future Predictions

When we use sensors for consistent monitoring of soil, weather, crops and fields, lots of data is generated. Large amount of data collected from the farmland can be analysed and used for yield prediction and future decision making for better yield production.

Smart Supply Chain - Smart warehouses and logistics

Food items are perishable; there is a strict need to maintain specified temperature and moisture from Farm to Retail. Supply chain is a complex task to be performed precisely as planned to avoid any food loss. IoT plays vital role in supply chain by providing end-to-end visibility. Sensors are used to monitor the quality of food during storage and transportation to ensure that food safety standards are maintained. Advanced sensors are used to monitor and control humidity and temperature and allow shippers to consistently monitor food containers. It allows shippers to fix the problem on time and to remove spoilage before reaching the customer. IoT has the potential to eliminate the food loss during supply chain with its proactive and timely decision-making capabilities.

IoT is also used to locate the locations of the food items during transit. Radio Frequency Identification (RFID) tags are mounted in the trucks, so that shippers can anytime locate the location of the truck. To avoid any delay in transportations of products, Global Positioning System (GPS) can be used by trucks to identify the best route based on weather conditions and traffic.

Enabling technologies

IoT architecture can be subdivided into a device layer, network layer, and application layer. The **device layer** provides capabilities for (i) automatic identification (AutoID), (ii) sensing and (iii) actuating physical objects *i.e.* the real-life things that are to be virtualised (e.g. plant, parcel, animal, stable, box, pallet, truck).Object sensing is also supported by mobile devices such as barcode/RFID readers and smartphones, which enable humans to perform additional actions such as visual quality inspections. The review shows that agricultural applications that utilize smartphone built-in sensors are mainly based on GPS and cameras. Furthermore, remote sensing by satellites, aerial vehicles, and ground based platforms is an important topic in the precision farming literature. Small unmanned aerial systems (*i.e.* drones) are increasingly used to realize a high spatial and temporal resolution and a high flexibility in image acquisition.

Actuators are used to remotely operate objects such as tractor implements, climate control, irrigation, coolers, lights, aquaculture control systems and food processing machines.

The **network layer** provides functionality for networking, connectivity and transport capabilities to communicate object information in an efficient and secure way. The data are first sent to intermediary platforms (internet gateways or cloud proxy machines) using technologies such as networked RFID, near- field communication and wireless (sensor) networks, including Zigbee, Bluetooth, Wi-Fi, and GPRS/3G/4G. The intermediary platforms are local computers that are usually located at proximity of the devices to be connected. The remaining communication in the supply chain is done via electronic EDI or XML messages, usually in a service-oriented approach.

Finally, the **application layer** provides the intelligence for specific control tasks based on virtual objects.

It includes services for tracking and tracing, monitoring of an object's dynamic state, event management, optimization and autonomous objects. Existing IoT in the agriculture and food domain mostly focus on basic functionalities, including tracking, tracing, monitoring and event management.

Use of IoT in agriculture will push the farming to next level and help in better managing food supply chain from crop management to retailers. Smart farming not only reduces the manpower involvement but also reduces the excessive use of water, fertilizers, chemicals and pesticides and at the same time improves the yield quality and quantity. With smart farming, farmers will be connected to their fields like never before.

(Ref: Farm to Fork: IOT for Food Supply Chain, Shalini Vermani, Application of IOT in the Supply Chain of the Fresh Agricultural Products, Liheng Zhang)

Annexure-XIII: Stakeholders' virtual meets in connection with preparation of Action Plan on Value Chain Development of Horticulture – Fruits & Vegetables sector in NER

Sl. No.	Meeting Details	Organisation	Name of Persons contacted/ attended	Designation	Contact Details	
					Phone No.	E Mail ID
1	1st Stakeholders' Meeting Date: 23rd Oct. 2020	Agricultural and Processed Food Products Export Development Authority (APEDA)	Shri Bidyut Kumar Baruah	Assistant General Manager	8588864661	bbaruah@apeda.gov.in
		Assam Agribusiness and Rural Transformation Project (APART)	Shri Gautam Goswami	Agri Business Specialist	9435552556	gautamgoswami@arias.in
		National Agricultural Cooperative Marketing Federation of India Ltd. (NAFED)	Shri Pankaj Prasad	Additional MD, NAFED	9818616688	pankajprasad@nafed-india.com
		North Eastern Regional Agricultural Marketing Corporation Limited (NERAMAC)	Shri Manoj Kumar Das	Managing Director	9854021845	mdneramac@gmail.com
2	2ndStakeholders' Meeting Date: 28th Oct. 2020	Department of Horticulture, Nagaland University	Dr. Akali Sema*	Professor	9436262348	akali_chishi@yahoo.co.in
		Department of Horticulture, Assam Agricultural University, Jorhat.	Shri Sanjib Sarma*	Jr. Scientist & PI, MIDH	9435164647	sanjib.sharma@aau.ac.in
			Shri Bhabesh Deka	Jr. Scientist &PI, ICAR-	7086462046	bhabesh.deka@aau.ac.in
			Shri Soumitra Goswami	Assistant Professor	7086303265	soumitra.goswami@aau.ac.in
		College of Horticulture & Forestry, Central Agricultural University, Pasighat, Arunachal Pradesh.	Prof. B.N. Hazarika	Dean	+91 368 2224887(O)	bnhazarika13@yahoo.co.in
			Dr. Lakshmi Dhar Hatai	Associate Professor,	9089984842	lakshmidharhatai@gmail.com
		Horticulture Research Station, Kahikuchi, under Assam Agricultural University	Dr. Sarat Saikia*	Chief Scientist	7086604923	sarat.saikia17@gmail.com
		Department of Horticulture, College of Agriculture, *Central Agricultural University*, Imphal	Dr. U Chaoba Singh	Professor	9612168375	uchsingh@yahoo.co.in
3	3rdStakeholders' Meeting (Machinery manufacturer & supplier)	T&I Global Ltd	Shri Viraj Bagaria	Director	9874045634	viraj@tiglobal.com
			Shri Sangeet Bagaria	Director		sangeet@tiglobal.com
		Bajaj Process Pack Ltd.	Shri Subhas Bhattacharjee	Sr. Advisor	7217630993	subhasbh1@hotmail.com

Sl. No.	Meeting Details	Organisation	Name of Persons contacted/ attended	Designation	Contact Details	
					Phone No.	E Mail ID
	Date: 3rd Nov. 2020		Shri Anupam Chowdhury	DGM- North East India	9560444476	bottling@bajajmachines.com &northeast @bajajmachines.com
			Shri Sanjib Kumar	Vice President	-	-
		RINAC India Ltd.	Shri Himanka Talukdar	Engineer – sales	9830143818	himanka@rinac.com
			Shri Dipendu Debnath	Sr. Manager –	9903889879	dependu@rinac.com
		Weilai Machinary LLP, Kolkata	Shri Vikramjit Das*	Partner	8420105368	vikramjit.das@gmail.com
		Optytech Engineers, Jamnagar, Gujrat.	Shri. Amarish Chhatbar*	Director Sales	9227733535	optimy@rediffmail.com, sales@optytechdryers.com
4	4th Stakeholders' Meeting (Cold Chain/Logistics services/companies/ Trade &Investment consultants/ individuals in NER) Date:4th Nov. 2020	Assam Food & Civil Supplier corporation Ltd.	Shri Prafulla Kumar Saikia	Special Executive Officer	9435015207	prafullakrsaikia@gmail.com
		AAI Cargo Logistics & Allied Service Company Limited	Shri Nazeer Badshah	Deputy General Manager	9830039486	cargoguwahati@aai.aero, nazeerbasha@aai.aero
		M/s. Global Entrade - Integrated Cold Chain Project, Assam	Shri Ravi Gulgulia	Managing Partner	9859911120	ravi@rggindia.in
		Northeast India- Asean Chamber of Commerce, Assam	Shri S. M. Farid	Director	9864028318	shahfarid90@gmail.com, neiaseancc@gmail.com
		Assam Industrial Development Corporation Limited (AIDC), Guwahati, Assam.	Shri Jitu Talukdar*	Vice Chairman	9435185401	jitu201684@gmail.com
		Air Cargo Transit Storage Facility (Cold Warehouse) of DS Group, Guwahati, Assam	Shri Jayanta Goswami	Senior Manager	9864507538	jayanta.goswami@dsgroup.com
5	5th Stakeholders' Meeting (Entrepreneurs'/ Enterprises/ individuals in NER) Date:5th Nov. 2020	Northeast Flavours India Pvt. Ltd.	Smt. Manjusha Baruah	Director	9810914894	manjushaene@gmail.com
		Shoten Group, Sikkim	Shri Abhimanyu Dhakal	Proprietor	9641793246	shotengroup@gmail.com
		"Naara Aaba" – Lambu Subu Food & Beverages, Arunachal Pradesh	Smt. Tage Rita	Proprietor	8794259001	lambusubu123@gmail.com, tagerita123@gmail.com
		Thangjam Agro Industries Pvt. Ltd, Manipur	Shri Joy Kr. Thangjam	Managing Director	8974009452	thangjamjksingh@gmail.com
		M/s Meira Foods, Manipur	Smt. Hanjabam Shubhra Devi	Proprietor	7005044368	meirafoods01@gmail.com
		M/s. Imchen Tea Products: Cold Mountain Organic Products, Nagalan	Shri. Lanuakum Imchen,	Proprietor	8974760745	coldmountain777@yahoo.com
		M/s Ghandhipara-Betasing Farmers Producer Company Limited - Cashew Processing unit at Meghalaya	Shri. Hari Das Koch*	Chief Executive Officer	8787761394	harikoch12345@gmail.com, haridas12345@gmail.com

Sl. No.	Meeting Details	Organisation	Name of Persons contacted/ attended	Designation	Contact Details	
					Phone No.	E Mail ID
		North East Farm Sales Promotion, Guwahati, Assam	Shri. Bhanu Pratap Singh	Chief Operating Officer	9711984426	ednortheastsales@gmail.com
		Entrepreneur from Tinsukia, Assam	Shri. Soumyadipta Roy	Proprietor	9891399918	lunaragrochemicals@gmail.com
		Chilli Processing Industry, Mizoram	Smt. PB. Lalrinfela*	Proprietor	7630013822/ 9615293301	lalrinfela25@gmail.com
6	6th Stakeholders' Meeting Date:11th Nov. 2020	Amlighat Farmer Producer Company Ltd., Amlighat, Marigaon, Assam. (FPC dealing with Banana)	Shri Apurba Bhagawati	CEO	6001687797	apurbabagabatifpc@gmail.com
		Loulhoumi Organic Producer Company Ltd., Manipur (FPC dealing with pineapple, King Chilli, Turmeric & Ginger)	Shri K. Khaibiaklian*	Chairman	9911902114	micklian@yahoo.co.in
		Panbari Bodofa Agro Organic Producer Company Limited., Panbari, Chirang, Assam (FPC dealing with banana, turmeric & ginger)	Shri Madan Basumatary	President	6000652070	madanchirang@gmail.com
		Padumpathar Agro Organic Producer Company Limited, Golaghat, Assam. (FPC dealing with Papaya, Turmeric & Ginger)	Shri Anjal Limbu	Chairman	7005622035	paopcl.info@gmail.com
			Shri Sanjit Kumar Biswakarma	Director	9854808313	krlimboo@gmail.com
		Chokhreng Organic Producer Company Ltd., Tripura. (FPC dealing with Pineapple)	Shri Rajesh Debbarma	CEO	9366965236	rdebbarma98@gmail.com
		Molsang Organic Pineapples Producer Company Ltd., Dimapur, Nagaland (FPC dealing with Pineapple)	Shri Seiminlal Chongloi	CEO	8787499178	seiminlalchongloi880@gmail.com
		Kiwi Growers from Zero, Arunachal Pradesh(FPC dealing with Kiwi)	Shri Tage Obing*	Kiwi growers	8119892763	-
7	7th Stakeholders' Meeting Date: 17th Nov. 2020	Indian Institute of Packaging (IIP), Kolkata Centre.	Shri Bidhan Das	Deputy Director	8017019939	Bidhan_das76@yahoo.com, iipkolkata@iip-in.com
		Indian Institute of Food Processing Technology (IIFPT), Guwahati Regional Centre.	Dr. Sandeep Janghu	Assistant Professor	921536389	sandeep@iifpt.edu.in
		North East Mega Food Park, Assam	Shri Rajib Biswas*	CEO	9435111675	info@nefoodpark.com
		National Horticulture Board (NHB)	Smt. Nabanita B. Mahanta*	Senior Horticulture Officer	9864261389	assam.nhb@gov.in

Sl. No.	Meeting Details	Organisation	Name of Persons contacted/ attended	Designation	Contact Details	
					Phone No.	E Mail ID
		North East Organic, Assam (NGO)	Shri Sanjay Changkakati	Secretary	7896035212	Neoassam17@gmail.com
		Sikkim State Co-operative Supply and Marketing Federation ltd. (SIMFED)	Shri Ranjan Baruah*	Coordinator SIMFED	7002983371	Ranjanbaruah38@gmail.com md@simfed.in
		CSIR-Central Food Technological Research Institute (CFTRI), Mysore.	Shri Subhas Bhattacharjee	Consultant for North East Region	8721939015, 9127390934	Subhasbh1@gmail.com
8	8th Stakeholders' Meeting Date: 19th Nov. 2020	UCO Bank	Shri A. K Machari*	Zonal Head	8876122484 / 8133053555	zo.guwahati@ucobank.co.in
		State Bank of India, Local Head Office, Guwahati	Smt. Seema Dixit	Deputy General Manager (Agri Business Unit)	8130954599	dgmrb.lhoguw@sbi.co.in
			Shri Prithwijit Das	Deputy General Manager(SME)	0361 2237582	--
		NABARD, Assam Regional Office Farm Sector Development Department, Guwahati	Sri. S. K. Mishra	Deputy General Manager	9918314267	guwahati@nabard.org, sk.mishra@nabard.org
		Yes Bank	Shri Partha Goswami	Regional Head	9954018359	partha.goswami@yesbank.in
			Smt. Antara Roy	Assistant Vice President,	9810836387	Antara.roy@yesbank.in
			Shri Sunil Gupta	Regional Business Leader-Priority Sector Lending	9836153123	Sunil.gupta@yesbank.in
		North East Small Finance Bank (NESFB)	Shri Arnab Goswami*	Manager	8638451120	arnab.goswami@nesfb.com
		North Eastern Development Finance Corporation Ltd. (NEDFi)	Smt. Olee Bora	General Manager	9854028200	olee@nedfi.com
		Canara Bank	Shri Shaik Nazeer Ahmed*	General Manager	7099051121	coguw@canarabank.com
		Asaam Gramin Vikash Bank (AGVP)	Shri Upendra Sabar*	Chairman	9435305081	chairmanagvb@agvb.co.in

Note: **Invited for the stakeholders meeting but unable to attend because of preoccupation.*

Annexure-XIV: Existing support schemes of Govt.

No	Scheme Promoting & Implementing Department	Sector	List of Schemes	Web Site
1.	National Horticultural Board	Backward Linkage and Post-Harvest Handling , Storage and Processing	1. Commercial Horticultural Development in open field –Project Mode 1.1 Commercial Horticultural Development in protected cover – Project Mode 2. Market Information Service For Horticulture Crops 3. Technology Development & Transfer Scheme 4. Horticulture Promotion Scheme 5. Reorganization of Horticulture nurseries 6. NHB approved training institutes	http://www.nhb.gov.in/
2.	Mission of Integrated Development of Horticulture	Post-Harvest Sector – Handling, Storage and Processing Backward linkage	1. NHM -National Horticulture Mission (NHM) is one of the sub schemes of Mission for Integrated Development of Horticulture (MIDH) which is being implemented by State Horticulture Missions (SHM). 2. HMNEH - Horticulture Mission for North East & Himalayan States (HMNEH) is one of the sub schemes of Mission for Integrated Development of Horticulture (MIDH) which is being implemented by State Horticulture Missions (SHM) in the North Eastern States. 3. CDB - Coconut Development Board (CDB) is implementing various schemes under Mission for Integrated Development of Horticulture (MIDH) in all Coconut growing states in the country. 4. CIH - Central Institute for Horticulture (CIH) was established at Medizipehima, Nagaland in 2006-07 for providing technical back stopping through capacity building and training of farmers and Field functionaries in the North Eastern Region.CIH is now one of the sub schemes of MIDH.	www.midh.gov.in & www.coconutboard.gov.in
3.	Ministry of Food Processing	Food Processing Primary and Secondary processing	I. PMKSY – Prime Minister Kisan SAMPADA Scheme 1. Food Parks 2. Integrated Cold Chain and value addition Infrastructure scheme 3. Infrastructure for Agro Processing Cluster 4. Creation and Expansion of Food Processing and Preservation Capacities 5. Creation of backward and forward linkages 6. Food safety and quality assurance infrastructure 7. Human resources & Institutes 8. Operation Greens	www.mofpin.nic.in
4.	Mission Organic Value Chain Development for North Eastern Region (MOVCDNER)	Value Chain development with Organic agro produce	1. Value Chain Production 1.1Developing crop specific organic production clusters 1.1.1Clusters development and formation of Farmer Producer Organizations/ Companies 1.2Assistance for on-farm input production unit and off-farm inputs 1.2.1 Off-farm inputs such as bio fertilizers, bio-pesticides and neem cake etc. 1.3 Assistance for quality seed and planting material	www.agricoop.nic.in

No	Scheme Promoting & Implementing Department	Sector	List of Schemes	Web Site
			2. Support for extension services, input facilitation, training handholding and certification at production stage 2.1 Assistance for setting up of input delivery, distribution centers, and agri machinery custom hiring centre. 2.2 Training, handholding, ICS management, documentation, and certification of crop production through service providers. 3.Value Chain Processing. 3.1 Value Chain Post Harvest. 3.2 Financial assistance for setting up of functional infrastructure for collection units, grading units and North East organic bazaar (NE organic Bazaar). 3.3 Value Chain Processing. 3.3.1 Financial assistance for setting up of integrated processing units. 3.3.2 Value Chain Packaging, Storage and Transportation. 3.3.3 Integrated pack house. 3.3.3.1 Transportation/ 4 wheeler up to TFO of Rs. 12 lakh (50%). 3.3.3.2Cold Chain Component. Pre-cooling/ cold stores/ ripening chambers Refrigerated transport vehicle 3.3.3.3 post-harvest infrastructure – Primary processing and value addition.	
5.	National Institute of Agricultural Extension Management – MANAGE	State Holders Trainings from Agribusiness sector	1. Developing linkages between prominent state, regional, national and international institutions concerned with agricultural extension management. 2. Gaining insight into agricultural extension management systems and policies. 3. Forging collaborative linkages with national and international institutions for sharing faculty resource. 4. Developing and promoting application of modern management tools for improving the effectiveness of agricultural extension organizations. 5. Organizing need based training for senior and middle level agricultural extension functionaries. 6. Conducting problem oriented studies on agricultural extension management. 7. Serving as an international documentation center for collecting, storing, processing and disseminating information on subjects related to agricultural management.	www.manage.gov.in
6.	National Bank for Agriculture & Rural Development – NABARD	Rural Development and Agricultural Developments	**A] Farm Sector** 1.Dairy Entrepreneurship Development Scheme 2. Commercial production units of organic inputs 3. Agriclinic and Agribusiness Centers Scheme 4. National Livestock Mission 5. GSS – Ensuring End Use of Subsidy Released 6. Interest subvention Scheme 7. Formulation of Special Long Term Refinance Schemes **B] Off Farm Sector**	www.nabard.org

No	Scheme Promoting & Implementing Department	Sector	List of Schemes	Web Site
			1. Credit Linked Capital Subsidy Scheme 2.Deendayal Antyodaya Yojana – National Rural Livelihoods Mission (DAY-NRLM) 3. Weavers Package **C]FINANCIAL FUNCTIONS** 1.Refinance - Short Term Loans 2. Long Term Loans 3. Rural Infrastructure Development Fund 4.Long-Term Irrigation Fund 5. Pradhan Mantri Awaas Yojana - Grameen (PMAY-G) 6.Swachh Bharat Mission-Gramin (SBM-G) 7. Micro Irrigation Fund (MIF) 8.NABARD Infrastructure Development Assistance(INIDA) 9.Direct Refinance Assistance to DCCBs for Short-Term Multipurpose Credit (DRA) 10. Credit Facility to Federations (CFF) 11. Dairy Processing and Infrastructure Development Fund (DIDF) 12.Fisheries and Aquaculture Infrastructure Development Fund (FIDF) 13.Warehouse Infrastructure Fund 14.Food Processing Fund **D] SUPERVISORY FUNCTIONS** 1.Watershed Development 2. Tribal Development 3. Climate Change Adaptation Projects 4.Umbrella Programme on Natural Resource Management 5. Financial Inclusion 6. Microfinance Sector 7. E-Shakti 8.Skill Development 9.Producer Organisation Promoting Institution -OFPO 10.Marketing Initiatives 11. Rural Haats 12. Rural Marts 13. Exhibitions/Melas 14. Agri Business Incubation Centers(ABICs) 15. Setting up of Catalytic Capital Fund 16. Promotion of GI Products 17. Credit Linked Capital Subsidy Scheme (CLCSS) 18. Stand Up India Scheme	

No	Scheme Promoting & Implementing Department	Sector	List of Schemes	Web Site
7.	Rashtriya Krishi Vikas Yojana – RKVY	Rashtriya Krishi Vikas Yojana was initiated in 2007 as an umbrella scheme for ensuring holistic development of agriculture and allied sectors by allowing states to choose their own agriculture and allied sector development activities as per the district/state agriculture plan.	RKVY – RAFTAAR - Remunerative Approaches for Agriculture and Allied sector Rejuvenation to enhance efficiency, efficacy and inclusiveness of the programme for the remaining period of the Fourteenth Finance Commission. 1. Infrastructure and assets- 50% (of 70%) of regular RKVY-RAFTAAR outlaypre-harvest infrastructure- 20%, post-harvest infrastructure- 30%. 2. Value addition linked production projects (agribusiness models) that provide assured/ additional income to farmers including Public Private Partnership for Integrated Agriculture Development (PPPIAD) projects- 3. Flexi funds- 20% (of 70%) of regular RKVY-RAFTAAR outlay. States can use this fund for supporting any projects as per their local needs preferably for innovative activities in agriculture and allied sectors. 4. Innovation and agri-entrepreneur development. 5. Promotion of Farmer Producer Organizations (FPOs). 6. District Agriculture Plans and State Agriculture Plans (DAP/SAP). 7. State Agriculture Infrastructure Development Programme (SAIDP).	http://rkvy.nic.in
8.	Agricultural Processed Food Products Export Development Authority (APEDA)	Development of industries relating to the scheduled products for export by way of providing financial assistance or otherwise for undertaking surveys and feasibility studies, participation in enquiry capital through joint ventures and other reliefs and subsidy schemes; Registration of persons as exporters of the scheduled products on payment of such fees as may be prescribed; Fixing of standards and specifications for the scheduled products for the purpose of exports; Carrying out inspection of meat and meat products in slaughter houses, processing plants, storage premises, conveyances or other places where such products are kept or handled for the purpose of ensuring the quality of such products; Improving of packaging of the Scheduled products; Improving of marketing of the Scheduled products outside India; Promotion of export oriented production and development of the Scheduled products; Collection of statistics from the owners of factories or establishments engaged in the production, processing, packaging, marketing or export of the scheduled products or from such other persons as	1. Development of Export Infrastructure 2.Quality Development 3.Market Development 4.Certification of quality and Food Safety Management Systems *Special Initiatives* *1.I-TRACK SYSTEM* *2. TRACEABILITY*	www.apeda.gov.in

No	Scheme Promoting & Implementing Department	Sector	List of Schemes	Web Site
		may be prescribed on any matter relating to the scheduled products and publication of the statistics so collected or of any portions thereof or extracts there from; Training in various aspects of the industries connected with the scheduled products; Such other matters as may be prescribed.		
9.	Director General of Foreign Trade (DGFT)	1. Import Export code profile management 2. Import Management system 3. Export Management system 4. Registration cum Membership Certificate (RCMC) 5. Certificate of Origin 6. Quality Complaints &Trade Disputes	1.Export Promotion Capital Goods (EPCG) 2. Merchandise Exports from India Scheme(MEIS) 3. Service Export from India Scheme (SEIS) 4. Rebate of State and Central Levies & Taxes Schemes (RoSCTL) 5. Transport and marketing assistance 6. Export Credit Insurance Scheme (ECIS)	www.dgft.gov.in
10.	Department of Science and Technology (DST)	1. Formulation of policies relating to Science and Technology (S&T). 2. Promotion of new areas of S&T with special emphasis on emerging areas 3. Coordination and integration of areas of S&T having cross-sectoral linkages in which a number of institutions and departments have interest and capabilities.	Technology Development Program 1.Technical Research Centres Programme 2. Technology Development and Transfer 3. National Good Laboratory Practice Compliance Monitoring Authority (NGCMA) 4.Natural Resources Data Management System (NRDMS) 5.Climate Change Programme 6. Joint progra6.me on Electric Mobility and Technology Foresighting 7.Interdisciplinary Cyber Physical Systems (ICPS) Division Patent Facilitation Programme (PFP) 8.Clean Energy Research & Water Technology Initiative 9.Water Technology Initiative Programme 10.Clean Energy Research Initiative 11.Nano Science & Technology Mission 12.National Super Computing Mission	www.dst.gov.in
11.	National Cooperative Development Corporation (NCDC)	Planning, promoting and financing programmes for production, processing, marketing, storage, export and import of agricultural produce, food stuffs, certain other notified commodities e.g. fertilisers, insecticides, agricultural machinery, lac, soap, kerosene oil, textile, rubber etc., supply of consumer goods and collection, processing, marketing, storage and export of minor forest produce through cooperatives, besides income generating stream of activities such as poultry, dairy, fishery, sericulture, handloom	1. Financial assistance to Cooperatives for Tourism, Hospitality, Transport, Electricity (New / Non - Conventional) and Rural Housing programmes – Guidelines 2. Financial assistance to Cooperatives for Hospital, Healthcare and Education – Guidelines 3. Yuva Sahakar Scheme - Ayushman Sahakar 4. Scheme for Strengthening Monitoring and Evaluation Functions of the Corporation by utilising Professional Expertise of Retired Officers 5. Scheme for extending Short Term Loan to Agricultural Credit Cooperatives towards Working Capital.	www.ncdc.in

No	Scheme Promoting & Implementing Department	Sector	List of Schemes	Web Site
12.	National Agricultural Cooperative Marketing Federation of India Ltd.(NAFED)	NAFED shall organize, promote and develop marketing, processing and storage of agricultural, horticultural and forest produce, distribution of agricultural machinery, implements and other inputs, undertake inter-state, import and export trade, wholesale or retail as the case may be and to act and assist for technical advice in agricultural, production for the promotion and the working of its members, partners, associates and cooperative marketing, processing and supply societies in Indiato facilitate, coordinate and promote the marketing and trading activities of the cooperative institutions, partners and associates in agricultural, other commodities, articles and goods;	1. Procurement of Oilseeds and Pulses under Price Support Scheme 2.Doemstic Trade Domestic Operations Domestic operations of NAFED mainly comprise of Outright business, Joint Venture business with member federations/societies, Agency & Consignment business and implementation of Price Support Scheme, PSF Scheme, Market Intervention Scheme of the Government of India. NAFED helps farmers by procuring their produce like Food grains, Pulses, Oilseeds, Spices, Cotton, Tribal produce, Jute & Jute products, Eggs, Fresh Fruits & Vegetables through the established cooperative network all over the country with active involvement of marketing societies at mandi level. 3. International Trade During the visit of VVIPs of Govt. of India to different developing/under developed countries, humanitarian assistance of various food/house hold goods is announced. Similarly, in the event of natural calamity, Government of India sends emergency relief materials to the particular country. Reposing trust in NAFED's abilities for supply of such items as per quality & time parameters, during FY 2018-19, Ministry of External Affairs, Govt. of India has entrusted NAFED for supply of various agri-commodities / house hold items to different countries as humanitarian AID/ emergency relief material. 4.Retail Business Started retail sale of daily needs of the consumers from food and glossary sector 5. Co-Branding with other organization 6. Procurement program for onion, cotton and other commodities	www.nafed-india.com
13.	Ministry of Development of North Eastern Region (DoNER)	MDoNER is responsible for the mattersrelating to the planning, execution andmonitoring of development schemes andprojects in the NE Region.	1. North East Special Infrastructure Development Scheme – NESIDS 2. Non Lapsable Central Pool of Resources (NLCPR) 3. ADB Project – North Eastern States Roads Investment Programme (NESRIP) 4. World Bank funded – North East Rural Livelihood Project (NERRLP) 5. Hon. Finance Minister Sanctioned – Package for North Eastern Region for Social & Infrastructure Development Fund (SIDF).	www.mdoner.gov.in
14.	Entrepreneurship Development Institute of India (EDI)	1. To retain global leadership in fostering &developing entrepreneurship 2. Promote Entrepreneurship through education , training, applied research & institutional building	1. National Implementing & Monitoring Agency for Training (NIMAT) 2. Entrepreneurship Awareness Camp 3.Entrepreneurship Development Programme / Women Entrepreneurship Development Programme 4.Technology based Entrepreneurship Development Programme 5. Faculty Development Programme 6. Village Entrepreneurship Programme (SVEP) 7. Women Entrepreneurship Development Programme (WEDP)	www.ediindia.org

Annexure-XV: Statistical Data (Area & Production) for Fruits & Vegetables in NER

Area & Production of Major Fruits of Assam in the Year 2017-18

Sl. No.	Fruits	Area (in Hectare)	Production (in mt.)
1	Orange	14952	203716
2	Papaya	7212	147395
3	Banana	53082	913272
4	Guava	4427	96690
5	Mango	4682	48435
6	Litchi	5567	50242
7	Jackfruit	22145	199194
8	Pineapple	16304	296524
9	Assam Lemon	13302	112402
10	Arecanut	66800	49687
11	Cashewnut	3658	5029
12	Aonla	910	17760

Area & Production of Major Vegetables of Assam in the Year 2017-18

Sl. No.	Vegetables	Area (in Hectare)	Production (in mt.)
1	Sweet Potato	5303	29199
2	Chilli	20242	18994
3	Ginger	18105	161604
4	Garlic	10450	62334
5	Onion	8338	80374
6	Turmeric	16871	20787
7	Potato	102868	720968
8	Tapioca	3117	28868
9	Beans	1940	27470
10	Bottle gourd	2980	51560
11	Brinjal	1776	28635
12	Cabbage	33240	640130
13	Capsicum	440	3090
14	Carrot	4450	63770
15	Cauliflower	22930	418690
16	Cucumber	6900	71300
17	Okra	12140	163110
18	Onion	8340	80370
19	Peas	30970	28870
20	Radish	21170	214560
21	Tomato	18280	396240

***Source:** Statistical Handbook of Assam 2019, Published by the Directorate of Economics & Statistics, Govt. of Assam, Guwahati.*

Area & Production of Major Fruits of Arunachal Pradesh in the Year 2016-17

Sl. No.	Fruits	Area (in Hectare)	Production (in mt.)
1	Apple	6179.38	11665.67
2	Orange	32850.45	79212.50
3	Lemon	160.00	110.00
4	Banana	2346.56	14650.96
5	Pineapple	2918.77	22952.23
6	Kiwi	4022.63	9428.57
7	Walnut	1523.60	511.23
8	Guava*	120.00	220.00
9	Papaya*	230.00	730.00

***Source:** Statistical Abstract of Arunachal Pradesh 2017, Published by the Directorate of Economics & Statistics, Govt. of Arunachal Pradesh.*

Area & Production of Major Fruits of Meghalaya for the Year 2017-18

Sl. No.	Fruits	Area (in Hectare)	Production (in mt.)
1	Papaya	846	6757
2	Banana	7273	94721
3	Pineapple	12192	38578
4	Jackfruit	1663	17163
5	Cashewnut	10461	14815
6	Strawberry	101	863
7	Khasi Mandarin	9137	44076

Area & Production of Major Vegetables of Arunachal Pradesh in the Year 2017-18

Sl. No.	Vegetables	Area (in Hectare)	Production (in mt.)
1	Cabbage	2740	58590
2	Cauliflower	250	1500
3	Tomato	250	2150
4	Beans	12020	139320
5	Brinjal	320	1820
6	Capsicum	30	110
7	Carrot	60	490
8	Cucumber	100	430
10	Okra	100	370
11	Peas	70	140
12	Radish	70	390
13	Sweet Potato	2230	37320
14	Tapioca	50	80
15	Potato*	760	5650

***Source*: "Horticultural Statistics at a Glance 2018", Published by Govt. of India, Ministry of Agriculture & Farmers' Welfare, Department of Agriculture, Cooperation & Farmers' Welfare**

Area & Production of Major Vegetables of Meghalaya for the Year 2017-18

Sl. No.	Vegetables	Area (in Hectare)	Production (in mt.)
1	Potato(Summer & Winter)	18913	187047
2	Tapioca	5408	35528
3	Biskot (Squash)	1012.77	55591.8
4	Turmeric	2649	16497
5	Chillies	2320	2346
6	Sweet Potato	4712	15751
7	Beetroot	584	9465
8	Cabbage	1947	42781
9	Cauliflower	1255	21095
10	Radish	1563	30166
11	Tomato	2181	34912
12	Carrot	1274	23744
13	Cucumber	604	5020
14	Capsicum	620	5041
15	Beans	992	7168
16	Brinjal	1071	14959
17	Ladies Finger	504	3862
18	Turnip	686	8519
19	Bottle gourd	749	9231
20	Knol Khol	384	6031
21	Lettuce	427	2183
22	Pumpkin	1397	18537
23	Mustard Leaves	470	2796
24	Onion	551	4939
25	Bitter gourd	624	6127
26	Teasle Gourd	513	5170
27	Ridge Gourd	740	9015

Sl. No.	Vegetables	Area (in Hectare)	Production (in mt.)
28	Broccoli	220	2178

Area & Production of Major Fruits of Nagaland for the Year 2017-18

Sl. No.	Fruits	Area (in Hectare)	Production (in mt.)
1	Apple	1821	N/A
2	Pear	231.50	2120.50
3	Plum	N/A	2944.50
4	Peach	274.50	1934.30
5	Orange	5865	46948
6	Lemon	869.50	6468.50
7	Pomegranate	79.50	471
8	Papaya	1323	12400.50
9	Banana	7443.50	91616.50
10	Guava	553.25	4520
11	Mango	585.75	3764.75
12	Litchi	582.75	3406.35
13	Jackfruit	111.50	1219.60
15	Grapes	159	300
16	Passion Fruit	6783	16433
17	Kiwi	256	1767
18	Ber	18	122
19	Aonla	270	2880

***Source*: Nagaland Statistical Handbook 2019, Published by the Directorate of Economics & Statistics, Govt. of Nagaland**

Area & Production of Major Vegetables of Nagaland of the Year 2016-17

Sl. No.	Vegetables	Area (in Hectare)	Production (in mt.)
1	Sweet Potato	960	14106
2	Cabbage	7975	150162
3	Cauliflower	666	5396
4	Brinjal	463	3696.20
5	Chilli	5884	43537
6	Peas	1658	10254
7	Beans	2426	19866.40
8	Bhindi	214	1707
9	Tomato	3080	22061
10	Ginger	4862	43605
11	Garlic	292	2975
12	Radish	567	5685
13	Colacasia	3179	36684
14	Taloca	5226	77032
15	Carrot	533	6223
16	Onion	730	7363
17	Naga Cucumber	714	21617
18	Mushroom	1033	6528
19	Leafy Vegetables	4461	33940
20	Pumpkin	568	5806
21	Watermelon	122	1191
22	Turmeric	709	9573.70

***Source*: Nagaland Statistical Handbook 2019, Published by the Directorate of Economics & Statistics, Govt. of Nagaland**

Area & Production of Major Fruits of Manipur for the Year 2017-18

Sl. No.	Fruits	Area (in Hectare)	Production (in mt.)
1	Orange	4460	39890
2	Lemon	6240	66950
3	Banana	6930	93480
4	Pineapple	14160	134110
5	Cashewnut	900	320

***Source*: Horticultural Statistics at a Glance 2018, Published by the Ministry of Agriculture & Farmers' Welfare, Department of Agriculture, Cooperation & Farmers' Welfare**

Area & Production of Major Vegetables of Manipur for the Year 2017-18

Sl. No.	Vegetables	Area (in Hectare)	Production (in mt.)
1	Cabbage	8510	101630
2	Cauliflower	3080	34260
3	Chilli	560	3700
4	Ginger	2400	3840
5	Onion	560	6840
6	Turmeric	1400	15400

***Source*: Horticultural Statistics at a Glance 2018, Published by the Ministry of Agriculture & Farmers' Welfare, Department of Agriculture, Cooperation & Farmers' Welfare**

Area & Production of Major Fruits of Mizoram for the Year 2017-18

Sl. No.	Fruits	Area (in Hectare)	Production (in mt.)
1	Orange	16370	44020
2	Zo Banana	8704	111850
3	Grapes	2450	18000
4	Passion Fruit	201	520
5	Aonla	300	1320
6	Lime/Lemon	8100	25900
7	Mandarin Orange	16370	44020
8	Sweet Orange	1590	4940
9	Grapes	1574	10680
10	Guava	420	2550
11	Mango	201	980
12	Papaya	2500	25000
13	Pineapple	2933	16830
14	Strawberry	170	1080
15	Mizo Mandarine	13905	49470
16	Dragon Fruit	1670	807

***Source*: Horticultural Statistics at a Glance 2018, Published by the Ministry of Agriculture & Farmers' Welfare, Department of Agriculture, Cooperation & Farmers' Welfare, and The Director of Horticulture, Govt. of Mizoram, Aizawl**

Area & Production of Major Vegetables of Mizoram for the Year 2017-18

Sl. No.	Vegetables	Area (in Hectare)	Production (in mt.)
1	Cabbage	3029	48880
2	Chilli	2797	6377
3	Tomato	1367	17010
4	Ginger	8553	60130
5	Turmeric	7738	29820
6	Chow Chow (Squash)	4805	82350
7	Broccoli	863	6374
8	Beans	2520	6210
9	Brinjal	2390	19330
10	Capsicum	340	3670
11	Carrot	180	1850
12	Cauliflower	130	1090
13	Cucumber	320	3290
14	Muskmelon	120	260

Area & Production of Major Vegetables of Mizoram for the Year 2017-18

Sl. No.	Vegetables	Area (in Hectare)	Production (in mt.)
15	Okra	3630	25020
16	Onion	2090	7930
17	Peas	500	2290
18	Potato	90	930
19	Radish	320	1720
20	Sweet Potato	170	1030
21	Watermelon	320	940

Source: 1) Horticultural Statistics at a Glance 2018, Published by the Ministry of Agriculture & Farmers' Welfare, Department of Agriculture, Cooperation & Farmers' Welfare,
2) Statistical Handbook of Mizoram 2018, Published by the Directorate of Economics & Statistics, Govt. of Mizoram, Aizawl.
3) Letter Dated 18th Nov. 2020, from The Director of Horticulture, Govt. of Mizoram, Aizawl.

Area & Production of Major Summer Vegetables of Tripura for the Year 2017-18

Sl. No.	Vegetables	Area (in Hectare)	Production (in mt.)
1	Brinjal	1633	29773
2	Spine Gourd	844	14632
3	Pointed Gourd	461	5196
4	Ridge Gourd	1114	19763
5	Bitter Gourd	857	8280
6	Bottle Gourd	781	13827
7	Sweet Gourd	814	16290
8	Ash Gourd	573	8936
9	Snake Gourd	146	1719
10	Colacasia	1162	18446
11	E. F. Yam	96	2003
12	Jal Kachu	626	11404
13	Cucumber	921	11637
14	Amaranthes	1449	23086
15	Radish	498	7117
16	Cowpea	1144	18493
17	Summer Cabbage	240	3011
18	Summer Cauliflower	211	1970
19	Summer Tomato	86	1278
20	Chilli (Green)	987	8941
21	Leafy Veg.	525	5262
22	Water Melon	779	20072

Source: NEDFi Data Bank.Link: https://databank.nedfi.com/content/fruits-nuts-0

Area & Production of Major Winter Vegetables of Tripura for the Year 2017-18

Sl. No.	Vegetables	Area (in Hectare)	Production (in mt.)
1	Cauliflower	2357	61696
2	Brinjal	1983	48105
3	Radish	2522	49202
4	Tomato	1732	55221
5	Garden pea	618	2460
6	Cucumber	734	6552
7	Knolkhol	262	2747
8	French Bean	588	3514
9	Carrot	402	4802
10	Capsicum	125	1082
11	Broccoli	77	503
12	Chilli	1504	10551
13	Bottle Gourd	1252	26854
14	Beet	137	308

Source: NEDFi Data Bank. Link: https://databank.nedfi.com/content/fruits-nuts-0

Annexure-XVI: Best Practices

A-XVI.1. Entrepreneurs lead Cluster Development Initiative in NER

Molvom and Bunsang Village of Nagaland are two adjoining pineapple producing village of Nagaland with approximate population of 3000, which are situated 25 km away from Dimapur towards Dimapur-Kohima highway. The combined cluster is considered to be the biggest organic pineapple cluster of Nagaland and the pineapples are known for its sweetness. The primary occupation of the villagers from these two villages are pineapple cultivation. The cluster mainly produces the Giant Kew variety of pineapple with some amount of Queen Variety as well. The pineapple is harvested mainly in two seasons in North Eastern region- June to September (peak season) and November to December (lean season). In Molvom and Bunsang pineapple cluster, the peak season starts from Mid-August end and remains till September which sometimes varies with onset of monsoon.

The current production of the cluster is estimated at 4500 MT at peak season and 2000 MT at lean season. The average weight of Giant Kew variety produced in the cluster is 1.2 kg per fruit without the crown and 1.5 kg to 1.8 kg with the crown.

Pre-Intervention status of the cluster and Need of Interventions

The traditional marketing channel of the cluster is mostly unorganized, where traders and middle man play the role of connector between the producers and the market for fresh pineapple. In addition, the producers also sell fresh pineapples directly at the roadside stalls. The post-harvest management practices is nil amongst the producers with no post-harvest management infrastructure at farm level or nearby.

Pineapple being a highly perishable crop, has limitation in storing in its fresh form. This leads to distress sale of the fresh pineapples and wastage.

Cluster Development Initiative NEDFi

NEDFi has received several requests from the cluster at various platforms for capacity building to provide better market linkage of their produces. This is to be mentioned that Directorate of Horticulture, Government of Nagaland has formed a Farmer Producer Company (FPC) titled Molsang Organic Pineapple Farmer Producer Company under Mission Organic Value Chain Development (MOVCDNER), Ministry of Agriculture, Govt. of India. Under the FPC, there are more than 500 nos. of farmers and 500 Ha of land. The cluster adopted certified organic farming practices under the mission. This has developed a strong platform for development of the cluster in an organized manner.

Accordingly, NEDFi conceptualized a cluster development initiative adopting an innovative model of mentoring the producers by entrepreneurs with the aim to create a symbiotic relationship. The project team included officials of NEDFi's Business Facilitation Centre (BFC) and Dr. Akali Sema, Professor, Central Institute of Horticulture, School of Agricultural Sciences and Rural Development (SASRD), Nagaland University.

Prior to developing the model, NEDFi team visited the cluster, organized series of discussion with board members of the FPC and other villagers and to understand the issues and challenges of the cluster. Similar discussion session was also organized with Advisor of Horticulture, Govt. of Nagaland and other officials of Department of Agriculture and Department of Horticulture, Govt., of Nagaland.

With several rounds of brain storming, the cluster development project was prepared with following objectives-

1. Marketing linkage of the produces through value addition
2. Capacity building of the Molsang FPC in required sector for sustainability
3. Promotion of the Molvom pineapple cluster as agri-tourism destination

The project was launched in March, 2019 for 6 man months and initial activities included selection of mentor, development of capacity development programme and selection of trainees from the cluster.

Project Implementation

Selection of Mentor

NEDFi has engaged Shri Lanuakum Imchen as mentor of the project. Shri Lanuakhum Imchen is the proprietor of Cold Mountain Organic Tea based at Dimapur Nagaland. The 27 years old entrepreneur had developed Nagaland's first organic premium Silver Needle White Tea, Yellow Tea, Oolong Tea, Fermented Tea, Orthodox Black Tea which are purely handcrafted and naturally processed. For value addition of his white tea products, Shri Imchen has also been processing horticulture and spices of Nagaland which are incorporated in various tea blends. Currently his products are exported to 7 countries including USA, UK, Russia, China, Malaysia, Spain and Bhutan.

Taking his social business model to the next level, he is actively involved in training the local youths in organic farming, post-harvest management as per EU and USDA guidelines, marketing etc. Today, more than 100 youths are engaged at Cold Mountain Organic Tea on full-time as well as part time basis. Shri Imchen is also a founder member of Nagaland Organic Konnect, a think tank for organic farming movement in Nagaland and also represented his states in various national and international platforms.

Training and Capacity Building:

Practical on Value Addition of Pineapple
Dept. of Horti, NU:SASRD

Post-Harvest Management and Marketing: For capacity building of the farmers of the cluster, three-day training programme on "Post-Harvest management and Marketing of Pineapple" was organized at STINER, SASRD-Medziphema, which was jointly sponsored by NEDFi and STINER TFC, SASRD. The Training Centre of the SASRD is located nearby to the cluster and the trainers already had a detailed understanding of the cluster. The training programme included both class room and practical training of farmers on various aspects of post-harvest management, value addition, and marketing of pineapple products.

Pineapple cutting and plating competition

Field Visit (Molvom Organic Pineapple Farm)

Mr. Lovito V. Achumi
P.A., STINER-TFC

Mr. Prabin Das
Marketing Specialist, CIH, Medziphema

Training on Homestay Tourism: The Molvom and Bunsang pineapple cluster has immense potential for farm tourism and adventure tourism. The cluster is ideally located in terms of accessibility and communication. The primary occupation of farming can be supported by creation of additional livelihood, where youths of the cluster can participate. To explore this potential, NEDFi proposed a hand on training programme, instead of class room training, in the form of exposure trip cum training to homestay cluster of South Sikkim, where homestay has created a successful model of rural livelihood. The training session was conducted by Smt. Manisha Sarma, promoter of renowned homestay Tag Along, Sikkim and homestay trainer from 5th to 8th June, 2019.

Dhoni Homestay ay South Sikkim

Farm Tourism training

Training on Food Serving

Training on Farm Visit

After completion of the training, the mentor provided guidance to customize the learnings as per the strength and challenges of the Molvom and Bunsang cluster. Similarly, capacity building was under progress in terms of documentation with the aim to obtain credit linkage. The present Covid Crisis has slowed down the prospect of tourism, however, it is expected that, with shifting of preference of the tourists from crowded destination to "off the grid" destinations, farm tourism at Molvom have significant growth potential.

Market Linkage of Fresh Produces:

As a part of providing market linkage to the FPC for its fresh produces, under the initiative of NEDFi, Shri Letthang Misao, Chairman and Shri Seiminlal Chingloi, CEO of Molsang Organic Pineapple FPC has participated in the Export Promotion Conference cum International Buyer Seller meet on NER Agri Products held at Hotel Taj Vivanta, Guwahati from 5th to 6th March, 2018.

In addition to this, NEDFi also facilitated visit of Guwahati based export firm to the cluster to explore possible collaboration.

Setting up of Post-Harvest Infrastructure:

The crucial missing link in the cluster was unavailability of post-harvest management infrastructure i.e. processing unit. The cluster development initiative addressed this long standing issue of the cluster by facilitating establishment of a multi fruit processing unit, with pineapple as key crop. This was achieved through Shri Lanuakum Imchen, the mentor of the cluster. He established the unit with capital investment subsidy under Mission Organic Value Chain Development for North Eastern Region (MOVCDNER) under the Ministry of Agriculture and Farmers Welfare, Govt. of India and credit linkage in the form of term loan from NEDFi.

The unit was established at Burma Camp, United North Block-B, Dimapur at total cost of Rs.109.25 Lakh. The unit was sanctioned an amounting to Rs. 54,62,000 /- (Rupees Fifty Four Lakh Sixty Two Thousand only) subsidy under Mission Organic Value Chain Development for North Eastern Region (MOVCDNER). NEDFi had extended a financial assistance of Rs.36. Lakhs in the form of term loan.

Installed capacity of the unit is 600 MT per annum and have the facility for processing of Pineapple, Passion Fruit, Kiwi, Ginger, Turmeric, Large Cardamom, Roselle, Lemon Grass and Mint to get the dried products. Shri Imchen has executed a Tripartite Agreement among the Molsang Organic Pineapple Producer Company Limited and Directorate of Horticulture, Government of Nagaland (State Lead Agency of MOVCDNER) for the supply of pineapple and turmeric to the unit.

The unit has also planned to employ youth from the cluster so that, they can be developed towards primary processing of pineapple at field level and subsequent processing can be done at the unit.

The unit was inaugurated in Burma Camp, Dimapur on 27th January, 2020. MOVCDNER and the inaugural function was graced by Shri B Paul Muktieh, Chairman and Managing Director of NEDFi, as Chief Guest, Dr. R Elithung Lotha, Director, Directorate of Horticulture, Govt. of Nagaland as Guest of Honour; Shri S Kivikhu Achumi, Additional Director, Department of Agriculture, Govt. of Nagaland as keynote speaker, Dr. Akali Sema, School of Agricultural Science and Rural Development, Nagaland University, members of Molsang Organic Farmer Producer Company and other young entrepreneurs of the state. Some photograph of the unit are given below-

Inauguration of the unit by Shri B. P. Muktieh, CMD, NEDFi

Speech by Shri Lanuakum Imchen during the inauguration

Drier

Dried Pineapple

Pineapple Slicing

Value Added Product

This is also to be mentioned that the Department of Horticulture, Govt. of Nagaland has also sanctioned a truck under MOVCDNER to the cluster for transportation of their raw material.

Present Status

The peak season of the pineapple has started from 2nd week of August, and the processing unit of Shri Imchen has already stepped up amidst lockdown. 4 MTs of pineapple has been already procured. The unit is expected to procure 100 MT of pineapple during the peak season considering the current situation. The key products to be manufactured are pineapple candy, dried pineapple and jam etc. The waste product produced during the processing are also used for preparation of homemade wine. From the third week of August, 2020, under the initiative of Shri Imchen, farm level primary processing will be undertaken by group of 6 youths.

The Multiplier Effect of Cluster Mentoring

The Covid-19 crisis has brought out the multiplier effect of NEDFi mentoring initiative. The experience of working with grass root level farmers have helped Shri Imchen to increase his outreach to nearly 8000 farmers during the lockdown period. In partnership with Nagaland Organic Konnect, Business Association of Nagas, Self Help Groups and Vendors, he was able to market over 60 MT of fruits and vegetables in the month of June 2020 alone. The Processing unit has acted as hub of distribution. The fresh produces were delivered at doorstep of customers and wastage were used for making homemade wine. Some photographs are attached below-

A-XVI.2. SAHYADRI FARMS - Largest Value Chain in India established & managed by Farmer Producer Company-

This is also how Sahyadri Farms was formed in 2010

With efficient management, scale, and technology, a farmer collective can become the heart of the value chain.

Formation of a Farmer-Producer Company (FPC)

A farmer collective begins formation of crop-specific integrated value chains. Sahyadri farms already has more than 10 crop-specific collectives

Sahyadri Farmers Producer Co. Ltd. ("Sahyadri" or the "Company"), established in 2011 in Nasik, India, is a farmer owned Farmer Producing Organization ("FPO"). Sahyadri procures, processes and markets fruits & vegetables from its farmer members; approx. 7.000 small and marginal farmers. The Company exports various fresh and processed products, mainly table grapes, to Europe, USA, Middle East and Asia, and sells fruits & vegetables to the domestic market.

Farmers reach directly to consumers and end product reaching to the ultimate consumer via e-Commerce, retail stores and export

Building crop-specific integrated value chains

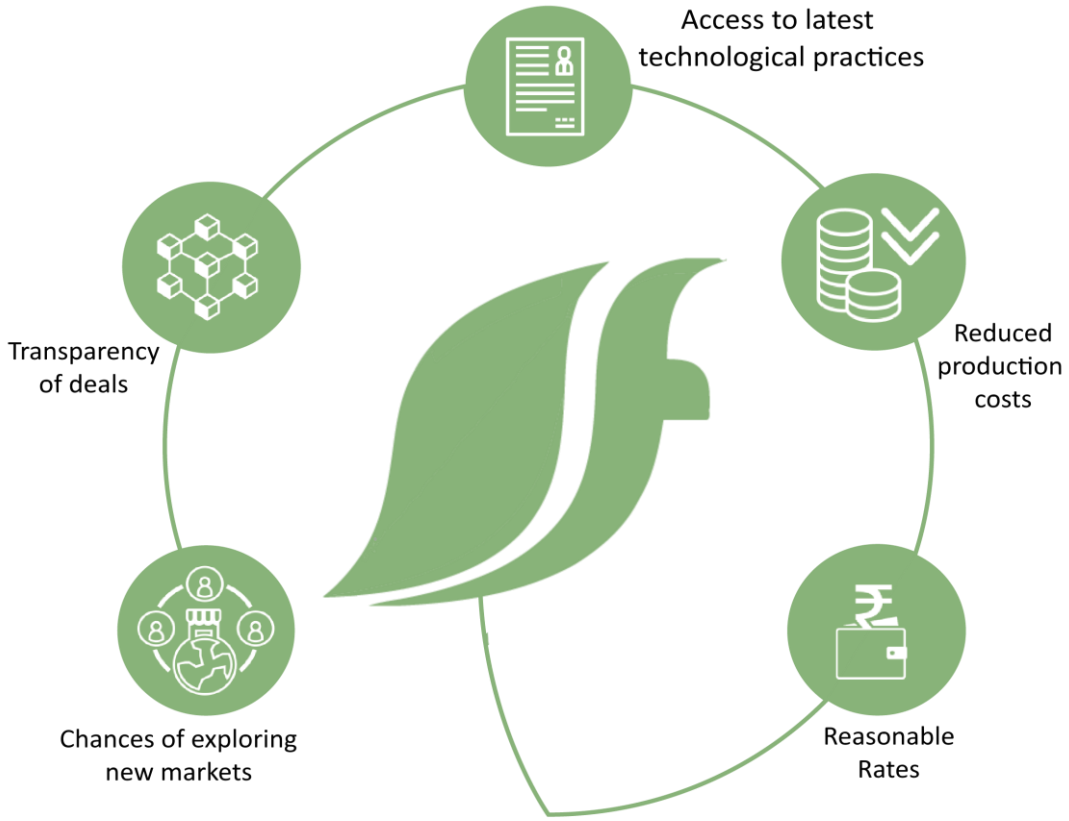
The model of a small landholding farmer being independent and self-sufficient is very difficult to achieve. **Climate change and overuse of fertilizers over the past few decades have made this worse.** Also, the entire value chain is disparate, it's broken, fragmented, into something that resembles a spider's web.

With this in mind, Sahyadri Farms was registered in 2010 as a Farmer Producer Company, in order to solve the issue of scalability, farmer sustainability, and consumer benefit. It's 100% owned by farmers alone who have equal voting rights regardless of their holding size.

It's possible to ensure a sustainable income to the small and marginal farmers of the developing world which is sufficient for a life of dignity for them and their family. And the farm intends to do this without putting burden on end consumers. By removing unnecessary middlemen, better logistics, reduction in post-harvest losses, and providing trust and transparency to consumers, we can achieve sustainability to the farmers and provide quality and assurance to consumers.

Sahyadri Farms is on the path for creating crop-specific integrated value chains empowered by technology and efficient management.

Farmers of Sahyadri Farms benefit due to



The Promoter and Man behind the Sahyadri (Mr. Vilas Shinde)

Chairman's Message

The vision of Sahyadri Farms began with a challenge: Can we ensure a sustainable model of farming to our small-landholding farmers while also providing safe and quality food to the customers? Can we have a farmer living a life of dignity who is able to provide well to his family, along with having a consumer who is ensured of getting safe and healthy food? Further, we have all witnessed how the rural communities are forced to migrate to urban localities but they fail to find a life of dignity even there as well. So the question is can we imagine a self-sufficient scenario for the rural communities and linking it organically with urban communities and bridging that gap?

It's this singular vision that has been driving me since I completed my education in Agriculture, and gained first-hand experience of the pitfalls and obstacles of farming and rural development over the initial 10 years post-2000. The work began to take a definitive shape in 2010 with the formation of 'Sahyadri Farmers Producers Company Limited' or just 'Sahyadri Farms' as it's widely known. We have seen many organisations talk about CSR as one of their activities, but we at Sahyadri Farms, converted the entire organization into a CSR initiative and it became a movement that led us into becoming India's largest farmer collective!

At Sahyadri Farms, we have built world-class infrastructure and processing facilities that ensure we can work on a sufficiently large scale which is beneficial to both farmers and our consumers. We work hard to ensure that our farmers receive fair equity for their produce by building our entire effort around the values of Trust and Transparency.

The movement was to also develop a first of its kind - branded, traceable product-mix that would promote sustainable growth. It would cater the best quality food products to our Indian Consumers at fair prices by achieving economies of scale and costs. This movement was driven by a Farmer - Producer model that plays an ever increasing role in the rural economy today, providing gainful employment to a large numbers of farmers and allied resources. **The idea is to build crop-specific integrated value chains enabled by technology and efficient management.**

It was the formation of a structure, owned by farmers, and with the passage of time has become the farmers 'best friend'. We live by our motto of 'Seeding Goodness' by ensuring that everyone (from our farmers to our consumers) gets their fairly deserved returns and food products.

How it works:

Agri inputs:

Supplying all the required agricultural inputs to the farmers at optimum prices with an aim to:

- Bring knowledge and awareness to the farmers regarding crop protection and crop nutrition.
- Provide supplies of bio-pesticides and fertilizers.
- Make available farming implements and machinery, irrigation facilities, solar equipment, pumps, etc.

Provide a tie up with the supplier companies and an exclusive tie up with companies that supply plant growth regulators and imported farming products.

Nursery:

Providing seedling facility for vegetables, fruits & special variety of grapes like AARA, etc., and to help to:

- Optimize seedling cost.
- Provide quality planting material.
- Improve quality of seed for increased yield.
- Truly implement the seed to plate concept.

Lab:

Providing a lab set up & technical support for testing and programming services. The lab services are supported by world renowned scientist, Mr. Graeme Sait.

The lab helps to:

- Analyze produce to enhance nutrition value.
- Analyze soil, water, leaf and petiole.
- Optimize input cost.

Bio-fertilizers and pesticides manufacturing

Producing and supplying bio fertilizers for crop cultivation and encourage:

- Residue free farm produce.
- Increased sustainability and growth.

Insurance and banking services

Taking care of all the financial needs of the farmers by providing:

- Crop insurance to farmers to recover from losses due to natural calamities.
- Loans at affordable interest rates to farmers to procure required inputs.
- Loan guarantee to farmers in the name of Sahyadri Farms.

Weather Conditions

Helping accurately predict weather and give early warnings to farmers and avoid losses. There are currently 9 weather stations functioning and there is a plan to install 100 more shortly. These stations function to:

Provide accurate weather forecasts like rainfall, humidity, temperature, evaporation, etc.

Achieve better disease and pest control based on weather predictions.

Consumer Mall

Providing day-to-day supplies to farmers like clothing, footwear, kitchenware, FMCG, mobile items, etc. so that the farmers can:

- Procure all their personal need items at a reasonable price.
- Enjoy the convenience of supply of quality items at their doorstep.

Agro Advisory Services & Farmers Guidance:

Educating farmers and preparing them for global competition by:

- Providing them with basic, timely and accurate information of different climates, weather conditions and different crops.
- Providing expert advice on various aspects to enhance productivity of crops, soil health, usage of nutrients, etc.

Kisanhub Platform

Farmer registration for providing them necessary inputs on agronomy

- Distributing data and information around the crop production and distribution cycle.
- Providing assistance to the farmer in production stages.

Farmers Connect

Our farmer who provides us with the food we eat needs to gets everything that he requires for his farming and personal needs with ease. Moreover, they need to reach him at the right time, at the right price and should be of the right quality.

What's new at Sahyadri Farms?

Successfully became first farmer collective to implement SAP S4/HANA 1809 solution

- We began our Pectin plant creation.
- Launched B2C app for our consumers in Mumbai, Pune, and Nashik where they can directly order from the app.
- Successfully piloted our traceability and transparency solution and will launch it on a full-scale soon.
- Program for incubation of 50 Farmer Collectives (FPOs) to be launched soon.

Sahyadri Dealing in Following Crops

No	Agro Commodities	Quantity	Remark
1.	Grapes	Not Available	For Export
2.	Tomatoes	55000 Plus MT (5000 Plus Acres)	Though out the year
3.	Banana	5000 Plus MT (500 Plus Acres)	Thought out the year
4.	Pomegranate	3000 Plus MT (500 plus Acres)	Though out the season
5.	Papaya	3000 Plus MT (150 Plus Acres)	Though out the year
6.	Sweet Corn	5000 Plus MT (1000 Plus Acres)	Only in Season
7.	Water Melon	1000 Plus MT (100 Plus Acres)	Only In Season
8.	Musk Melon	1000 Plus MT (100 Plus Acres)	Only In Season
9.	Mango	5000 Plus MT (1500 Acres)	Only In Season
10.	Vegetables	60000 Plus MT (6000 Plus Acres)	Through Out The Year

Sahyadri Farms have

- 10000 Plus Farmers-stakeholders
- Processed Fruits and Vegetables facilities
  a. Frozen (IQF) Fruits and Vegetables B2B sale
  b. Frozen cut vegetables B2B Sale & Private Label Contracts
  c. Fruit Pulp in Aseptic Packing
  d. Frozen Fruit Pulp
  e. Fruit Drinks, Jam, Ketchup
- 65 Acres Post Harvest Processing Area
- 1459 container ,
- India's largest grape exporter to various countries

Address:

Factory : Gat No. 314/1 & 314/2, A/P Mohadi,Tal. Dindori, Nashik - 422207, Maharashtra, India.
Registered Office : Sr. No. 1102 /08, Behind Police Head Quarter, Adgaon, Nashik 422003, Maharashtra, India.
CIN : U01403MH2010PTC211392
www.sahyadrifarms.com

Annexure-XVII: Productivity, Value Addition and Innovation in NER

A-17.1 Agricultural Productivity

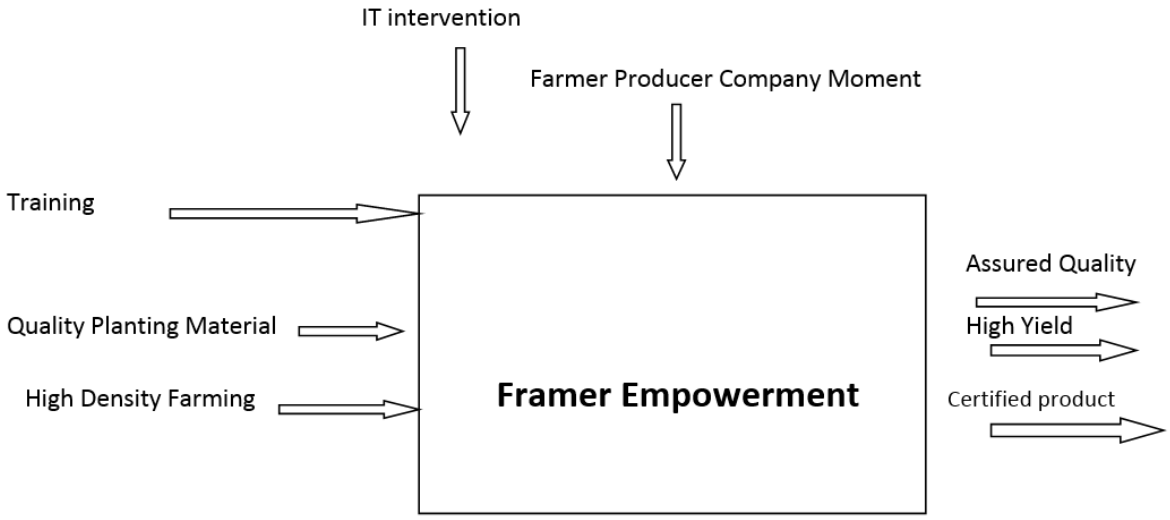
The followings key issues are related to the agricultural productivity while designing the value chain in NER–

a) Very low yield per Ha or acre
b) Lack of new Agricultural Technologies: North East farmers are still fitting for resources and technologies. Yield per acre with comparison to PAN India, is low due to many reasons.

Some of the major reasons are:

a) Low quality planting material
b) Lack of scientific SOPs for cultivation and good agricultural practices.
c) Flowering /fruiting calendar SOP
d) Weather forecasts

To overcome all these bottle necks, this report strongly recommend promoting Hi Tech Nurseries and Tissue culture lab and the Information Technology Intervention. Increasing productivity will lead to the increasing yield per acre and ultimately the farmers will receive more income and get benefitted.



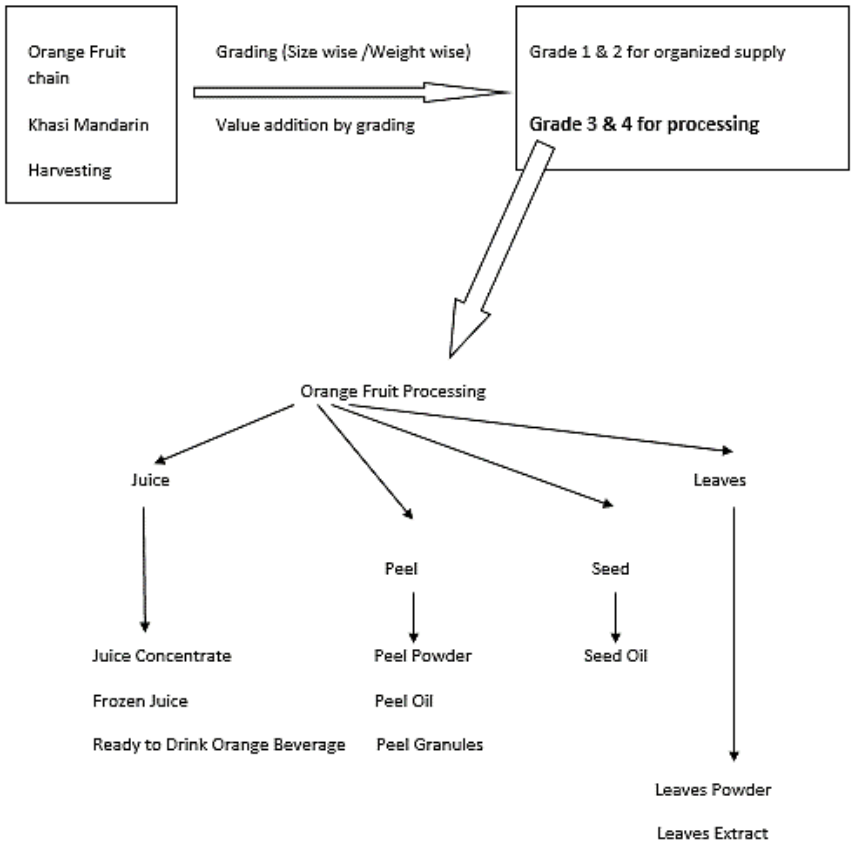
Various advantages in collective cultivation by the Farmer Groups forming FPOs/FPCs in Agriculture. Advantages of FPC/FPO Farming Culture are-

1. Controlled Seedlings
2. Controlled inputs
3. Pre Designed crop calendar
4. Central Harvesting process/ method
5. Assured buyer
6. Purchasing the harvested crop at farm gate
7. The farmer efforts are synchronized and productive time will be increased
8. Centrally available mentoring system
9. High productivity can be easily possible

A-17.2 Value Addition:

Instead of selling the fresh harvested products – fruits and vegetables, the main advantage of Value Chain is that we can add value sequentially and develop new products with high value addition.

Example:



At each step value will be added, and for integrated value chain – we can assure the rates to farmers, increase the productivity and offer best farming practices to the farmers.

A-17.3 Innovations

Each fruit and vegetable from North East - will have one or more functional or health benefits, and contain many vitamins and minerals, metals etc.

To develop the products for functional, Nutraceutical sector & application and selling the fruit or vegetables not as a common fruit but with functional value, will be the creative and innovative concept – which will add more value and go beyond common competition.

In the above example of Orange - dried orange peel application will be to prevent the Salmonellae in milking animal stomach, so if introduce orange peel as milking animal food, that will be an innovative concept and can attract more value addition.

Annexure-XVIII: Packaging of Fruit & Vegetables-Necessity and Modern Trends

Packaging fresh fruits and vegetables is one of the most important steps in the long and complicated journey from grower to consumer. Bags, crates, hampers, baskets, cartons, bulk bins, and palletized containers are convenient containers for handling, transporting, and marketing fresh produce.

Basic functions of packaging:

a. To protect the fruit and vegetables while handling, transit and on shelf, till consumer table.
b. To avoid contamination: from farm to fork journey there will be many chances of contamination in the fruit or vegetables. Packaging the most effective tool to avoid contamination.
c. To identify the correct product: Packaging assist and help each stake holder in the value chain to identify the authentic cargo /product /fruit and vegetable consignment.

Type of Packaging & Packaging Material

The main packaging types are as follows:

1. Wooden Pallet: literally form the base on which freshest produce is delivered to the consumer.

2.Pallet Bins: Substantial wooden pallet bins of milled lumber or plywood are primarily used to move produce from the field or orchard to the packing house.

3.Wire-Bound Crates: Although alternatives are available, wooden wire-bound crates are used extensively for snap beans, sweet corn and several other commodities that require hydro-cooling. Wire-bound crates are sturdy, rigid and have very high stacking strength that is essentially unaffected by water.

4. Wooden Crates and Lugs: Wooden crates, once extensively used for apples, stone fruit, and potatoes have been almost totally replaced by other types of containers.

5. Corrugated Fiberboard: Corrugated fiberboard (often mistakenly called cardboard or pasteboard) is manufactured in many different styles and weights. Printed, laminated, specially treated boxes are also available for various fruits and vegetable storage and transportation.

6.Pulp Containers: these are made from recycled paper pulp and a starch binder are mainly used for small consumer packages of fresh produce. Pulp containers are available in a large variety of shapes and sizes and are relatively inexpensive in standard sizes.

7. Paper and Mesh Bags. Consumer packs of potatoes and onions are almost the only produce items now packed in paper bags.

8. Plastic Bags: Plastic bags (polyethylene film) are the predominant material for fruit and vegetable consumer packaging.

9.Shrink Wrap: One of the newest trends in produce packaging is the shrink wrapping of individual produce items.

10. Rigid Plastic Packages: Packages with a top and bottom that are heat formed from one or two pieces of plastic are known as clamshells. Clamshells are gaining popularity because they are inexpensive, versatile, provide excellent protection to the produce, and present a very pleasing consumer package.

Indian Institute of Packaging is acting as the main agency to develop standards in packaging of all fruits & vegetables.

Some images:


Dried fruit
Dried fruit
Dried fruit
POMEGRANATE
POMEGRANATE


Keogh's
ATLANTIC SEA SALT
VINEGAR
COMBER
POTATOES
BRITISH COOKING ONIONS


100
100


DRINK
DRINK
DRINK


SYTAI


TRIVENI CHEMICALS
OLEORESIN
135, Pancharatna, Char Rasta,G.I.D.C.,
Vapi-396-195.Gujarat, INDIA.

Annexure-XIX: Emerging Scenario in North East: International Collaboration

Israel wants to share technology for development of India's northeast region. India in collaboration with Israel is implementing agriculture projects like setting up of Centers of Excellence (CoE) in various parts of the country for speedy transfer of technology to the farmers aiming to increase their productivity and improving the quality of produce.

DoNER Minister, Dr. Jitendra Singh, said that this is a beginning of the larger collaboration between the two countries. The Ministry of Development of North Eastern Region will coordinate in the areas wherever required. It would benefit the farmers of the North Eastern Region in the long run and would also encourage the farmers from other regions. It would serve as a model of learning for other countries in the Indian sub-continent, he added. The Minister also said that the Government has given priority to the development of North Eastern region of the country. It will benefit the people of North East in the area of innovation, especially for start-ups.

In Picture: Minister for Development of North Eastern Region (DoNER), Dr. Jitendra Singh (R) with Israeli Ambassador to India, Daniel Carmon (L)

The present Israeli Ambassador to India, Ron Malka, has said that Israel would collaborate and work together in the agricultural sector in a bigger way with the northeastern states. Israel is a strong strategic partner of India and wants to share technology with the northeastern region for using untapped resources for development. He stated that, People of the region want collaboration and Israel is also keen to collaborate and share technology, expertise and achievements with the northeastern states. Besides this, Israel wants to increase its presence in the northeastern region by bringing in experts and technology in various fields to help the region grow, create new kinds of crops and cultivation through the CoE.

Israel is keen to extend the country's technologies to boost the agriculture and horticulture sectors as well as the information technology (IT) segment of the northeastern states,

Israel is implementing and running 29 centers of excellence in India and have trained 1.47 lakh farmers in one year about the latest agricultural technologies of Israel. "Israel has been extending its agricultural technology across the world, but the best successful projects are in India." Malka said.

He also stated that, there is a need to work on the value chains from the farmers to the end consumers, to achieve Prime Minister's vision of doubling the income of the farmers of the region.

Centre for Agriculture-Mizoram

North Eastern Region's first Regional Centre with Israeli collaboration was inaugurated in Mizoram on 7th March 2018. It was set up with a cost of Rs.10 Crore.

This Centre will be used exclusively for processing of citrus fruits and cater to the whole of North East. It has been set up with tripartite collaboration of Union Ministry of Agriculture and Farmers Welfare, Government of Israel and Mizoram Government. Israel will provide expertise knowledge and professional support to the Centre.

It will benefit the farmers of the north eastern region in the long run and will also encourage the farmers from other regions. It will serve as a model of learning for other countries in Indian sub-continent. It will benefit the people of North East in the area of innovation, especially for start-ups. Though located in Mizoram, this Centre will cater to the whole north east.

The Centre-of-Excellence is part of India-Israel Agriculture Project (IIAP) under which there are 29 such operational centers in India in different states. MASHAV, Israel's Agency for International Development Cooperation wants to establish one such center in each Indian state.

Assam

In Picture: Israeli Ambassador Ron Malka (L) meets Assam Chief Minister Shri Sarbananda Sonowal (R).

Assam Govt. has also tied up with Israel for cooperation in agri sector. Assam Chief Minister, Shri Sarbanada Sonowal and Ambassador of Israel to India, Ron Malka laid the foundation stone of the Indo-Israel Centre of Excellence for Vegetables Protected Cultivation at Khetri in Kamrup (Metro) district on November 3rd, 2020. The Centre will be built under the Indo-Israel Agricultural co-operation. The Centre is to be built at an area of 8 hectares, at a cost of Rs 10.33 crores, and will have facilities like hi-tech greenhouse, automated irrigation system, insect-proof net house, sale counter, weather station, etc. The farmers also will be provided training at the Centre round the year.

Meghalaya

In Picture: The Chief Minister of Meghalaya, Mr. Conrad Sangma(R) with the Ambassador of Israel (L)

The Chief Minister of Meghalaya, Mr. Conrad Sangma, said that the support and collaboration of the Israel Government, which has been a leader in agriculture technology in the world, will go a long way in enhancing productivity and earnings of all farmers in the state. Partnership with the Israel government would be a 'game changer' for Meghalaya and its farmers".

Mr. Sangma said, adding that technology always plays a significant role in the growth of agriculture and horticulture

The government of Meghalaya will set up two Centers of Excellence (CoE) in the state, in collaboration with Israel, to improve and promote the livelihood of farmers. The first one will be set up for vegetables at Jongksha village in East Khasi Hils, and the second one will be set up for citrus fruits at Dawagre in East Garo Hills.

The Meghalaya Government entered in a partnership with the Government of Israel to establish these CoEs in the state to improve and promote the livelihood of farmers. Centre has a rough estimate of Rs. 10 crore for setting up of each CoE.

The centers would be important assets for tapping the diverse biodiversity and resources in the state in terms of its soil and Agro-climatic condition.

Tripura

In Picture: The Chief Minister of Tripura, Shri Biplab Kumar Deb(L) with the Ambassador of Israel (R), in Agartala

A Tripura government official said that the state officials during the meeting with the Ambassador of Israel during his visit to Tripura was apprised of the various potential aspects of the state's agriculture and horticulture sectors and the visiting envoy from Israel showed keen interest towards the development of the farming sectors. Specific deliberations were held regarding setting up a 'Centre of Excellence' (CoE) in Tripura. World-class expertise of Israel shall greatly benefit the farmers in the State.

Annexure-XX: State Wise Existing Facilities /Infrastructure in NER (Fruits & Vegetables processing sector)

State wise Infrastructure in NER Assisted by MOFPI- Fruits & Vegetables sector

Mega Food Park Projects as of 24.11.2020

Sl. No.	State	SPV/ IA Name	Project Cost (INR in Cr)	Amount of grant approved (INR in Cr)	Status
1	Arunachal Pradesh	Rongoge Mega Food Park, Pvt. Ltd, Papum Pare	73.02	43.25	Under Implementation
2	Assam	North East Mega Food Park Ltd., Nalbari	84.96	48.84	Operational
3	Manipur	Manipur Food Industries Corporation Ltd., Kakching, Manipur	81.83	43.254	Under Implementation
4	Mizoram	Zoram Mega Food Park Pvt. Ltd., Kolasib	75.2	50	Operational
5	Nagaland	DoysAgri Resources Pvt Ltd, Dimapur, Nagaland	71.79	50	Under Implementation
6	Tripura (1 Project)	Sikaria Mega Food Park Pvt. Ltd., West Tripura	77.79	48.39	Operational

Cold Chain Projects as on 30.11.2020

Sl. No.	State	Project	Sector	District	Project Cost (INR in Cr)	Approved amount of grant-in-aid (INR in Cr)	Physical Progress
1	Assam	Global Entrade	F&V	Guwahati	24.28	9.09	Commercial Production Started
2	Assam	E-appliances	F&V	Guwahati	14	8.28	Commercial Production Started
3	Manipur	Associate Action for Progressive Dev. Society	F&V	Senapati	18.49	9.96	Commercial Production Started
4	Nagaland	Nagaland Integrated Cold Chain	Mixed (F&V, Meat & Fishery)	Dimapur	18.59	6.98	Commercial production started

Food processing units under CEFPPC Scheme as on 16.10.2020 (Fruits & Vegetables Processing Sector)

Sl. No.	State	Name of the Unit	Location	District	Sector	Project Cost (INR in Cr)	Approved Grant (INR in Cr)	Status
1	Arunachal Pradesh	M/s Lambu Subu Food and Beverages	Village Hong, Centre, Old Ziro	Lower Subansiri	F&V processing	13.98	5.00	Under Implementation
2	Assam	M/s Hygen Beverages Pvt Ltd	North East Mega Food Park, Tihu	Nalbari	F&V processing	15.48	5.00	Under Implementation
3		M/s HAR HAR Foods & Beverages	North East Mega Food Park, Tihu	Nalbari	F&V processing	10.93	4.97	Under Implementation
4	Manipur	M/s PL Fruit and Veg Processing Industry	L Semoul, Churachandp	Churachandpur	F&V processing	2.17	0.76	Under Implementation
5	Mizoram	M/s Champhai Grape Growers Society	Tiangsam, Champhai	Champhai	F&V processing	9.35	3.55	Under Implementation
6	Tripura	M/s Shree Ganesh Frozen Foods Pvt. Ltd	Village Rural Tripura, Kumarghat	Unakoti	F&V Processing	12.5	5.00	Under Implementation
7		M/s Shyamagree Food Products	Jirania, West Tripura District,	West Tripura	F&V Processing	2.01	0.54	Under Implementation

Food Testing Laboratories Established with Assistance of MOFPI

Sl. No.	State	Name of Laboratory	Grant Approved (Rs. in lakh)	Total Grant Released (Rs. in lakh)	NABL Accreditation Status		FSSAI Notification Status
					Biological (valid up to)	Chemical (valid up to)	
1	Assam	Department of Food Processing Technology, Tezpur University, Nappam, Tezpur - 784028, Assam.	202.70	200.36	NA	11.07.2019	NO
2	Manipur	S.Kula Women's College, Konghampat, Nambol, Manipur.	179.93	179.93	NA	NA	NO
3	Nagaland	State Public Health Laboratory, Kohima, Nagaland.	151.46	151.29	NA	NA	NO

Note: Completed Projects till 02.11.2018

Annexure-XXI: Ease of doing Business Ranking

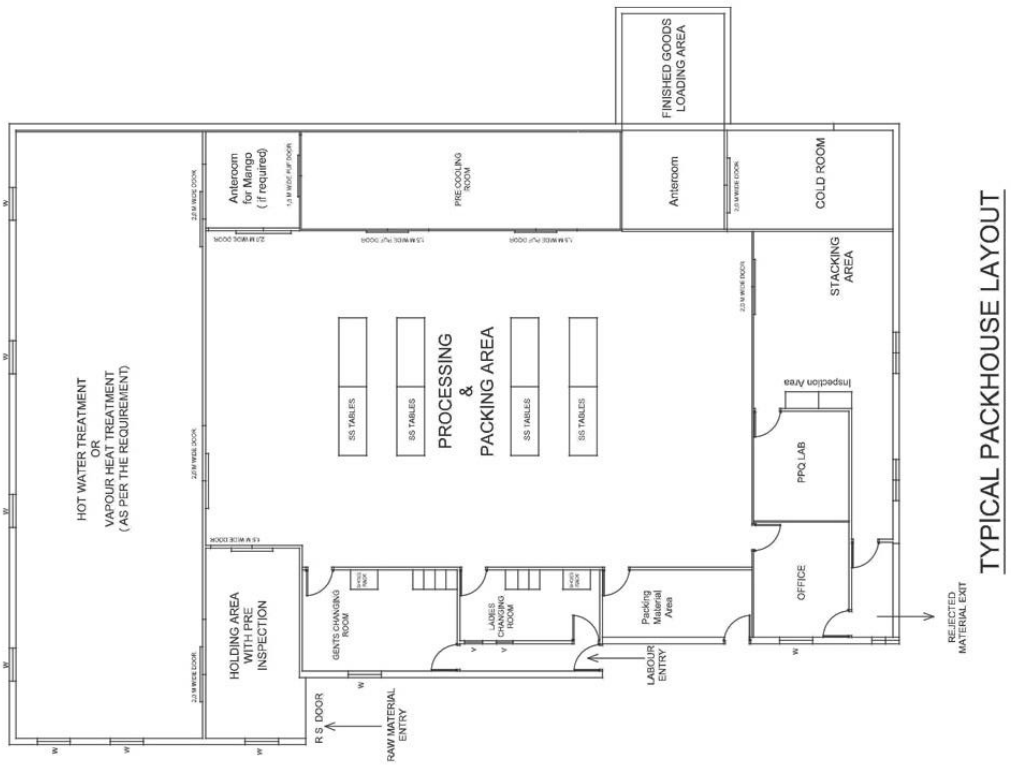
State/Union Territory	2015		2016		2017		2019
	Score	Rank	Score	Rank	Score	Rank	Rank
Andhra Pradesh	70.12	2	98.78	1	98.3	1	1
Arunachal Pradesh	1.23	32	0.30	31	-	34	29
Assam	14.48	22	14.29	24	84.75	17	20
Bihar	16.41	21	75.82	16	81.91	18	26
Chhattisgarh	62.45	4	97.32	4	97.31	6	6
Goa	21.74	19	18.15	21	57.34	19	24
Gujarat	71.14	1	98.21	3	97.99	5	10
Haryana	40.66	14	96.95	6	98.06	3	16
Himachal Pradesh	23.95	17	65.48	17	87.9	16	7
Jammu and Kashmir	5.93	29	0.30	31	32.76	22	21
Jharkhand	63.09	3	96.57	7	98.05	4	5
Karnataka	48.50	9	88.39	13	96.42	8	17
Kerala	22.87	18	26.97	20	44.82	21	28
Madhya Pradesh	62.00	5	97.01	5	97.3	7	4
Maharashtra	49.43	8	92.86	10	92.88	13	13
Manipur	-	-	1.19	28	0.27	32	29
Meghalaya	4.38	30	0.30	31	-	34	29
Mizoram	6.37	28	0.89	29	3.66	30	25
Nagaland	3.41	31	1.49	26	14.16	28	29
Odisha	52.12	7	92.73	11	92.08	14	29
Punjab	36.73	16	91.07	12	54.36	20	19
Rajasthan	61.04	6	96.43	8	95.7	9	8
Sikkim	7.23	27	0.60	30	0.14	33	29
Tamil Nadu	44.58	12	62.80	18	90.68	15	14
Tripura	9.29	26	16.67	22	22.45	25	29
Telangana	42.45	13	98.78	1	98.28	2	3
Uttarakhand	13.36	23	96.13	9	94.24	11	11
Uttar Pradesh	47.37	10	84.52	14	92.89	12	2
West Bengal	46.90	11	84.23	15	94.59	10	9
Andaman and Nicobar Islands	9.73	25	0.30	31	1.25	31	22
Chandigarh	10.04	24	0.30	31	11.54	29	29
Dadra & Nagar Haveli	-	-	1.79	25	21.88	26	23
Delhi	37.35	15	47.62	19	31.69	23	12
Daman & Diu	-	-	14.58	23	28.69	24	18
Lakshadweep	-	-	0.30	31	-	34	15
Puducherry	17.72	20	1.49	26	15.65	27	27

Notes: 1. Scores are in per cent.
2. State-wise score for 2019 has not been published so far.
3. Ease of Doing Business Index is based on the implementation of the Business Reform Action Plan (BRAP) recommended by the Department of Industrial Policy and Promotion (DIPP) to all States and UTs.
Source: Department of Industrial Policy and Promotion, Government of India.

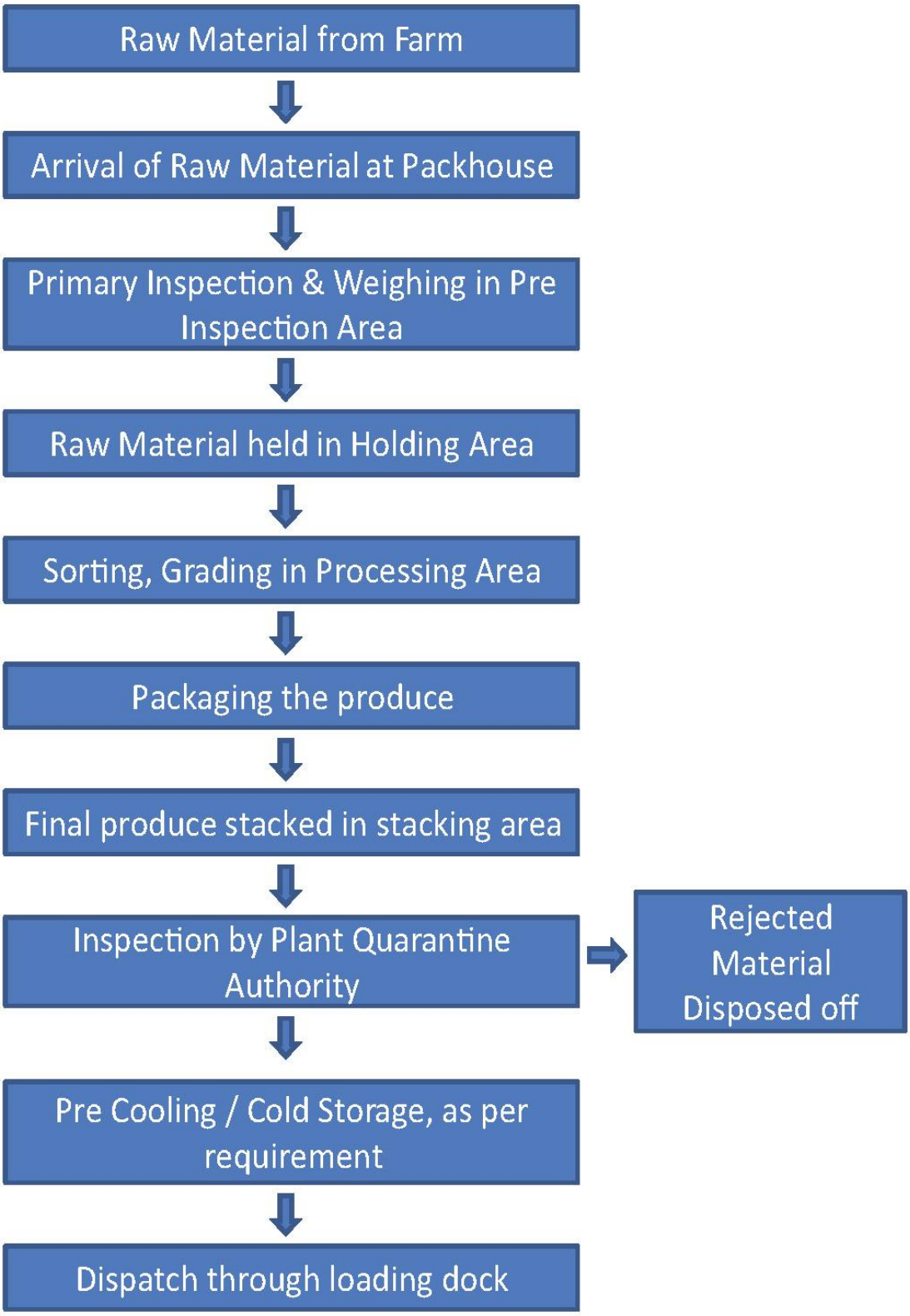
Annexure-XXII: Photo Gallery

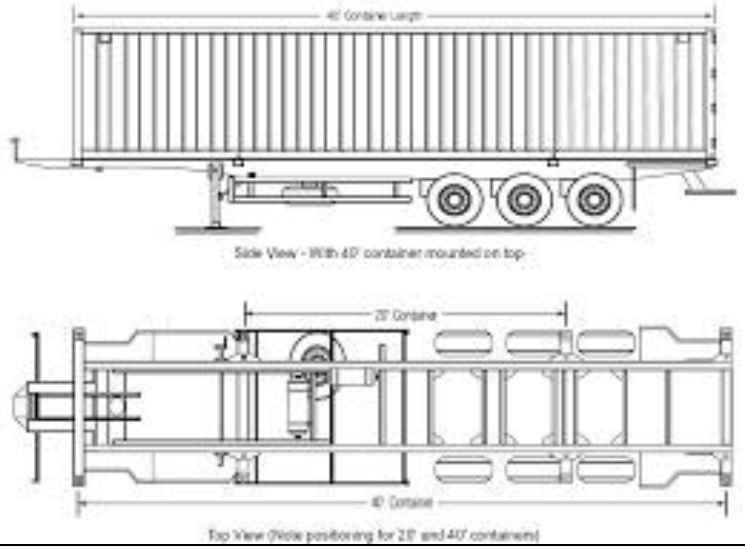
Refrigerated Vehicle

A-22.1 Pack house Layout



A-22.2 Product Flow Chart



<table>
<tr><td>  </td><td> 
</td></tr>
<tr><td colspan="2">Mobile Post-Harvest Processing Unit (Multi Commodity)</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Racking System Cold Storeage</td><td>Multi Chamber and Multi temperature Cold Storage</td></tr>
</table>

Stages of Cold Chain project

Ripening Chamber

Pre Cooling

Solar Powered Cold Room

Solar Tunnel Dryer

Bibliography & Sources

No	Sources & Reference	No.	Sources & Reference
1.	www.agricoop.nic.in	27.	www.mca.gov.in
2.	www.jiprc.org	28.	www.nerlp.gov.in
3.	www.icfa.org.in	29.	www.projects.worldbank.org
4.	www.apeda.gov.in	30.	www.startupindia.org
5.	www.mdoner.gov.in	31.	www.rural.nic.in
6.	www.ishs.org	32.	www.icar.gov.in
7.	www.pineappleindia.com	33.	www.nabard.org
8.	www.vikaspedia.in	34.	www.commerce.gov.in
9.	www.nhb.gov.in	35.	www.dipp.gov.in
10.	www.ccari.res.in	36.	www.ncdc.in
11.	www.agrifarming.in	37.	www.nafed-inda.com
12.	www.jaivikbharat.fssai.gov.in	38.	www.nsic.co.in
13.	www.tripuraicar.nic.in	39.	www.eximindia.in
14.	www.healthline.com	40.	www.yesbank.in
15.	www.reader.elsevier.com	41.	www.msme.gov.in
16.	www.prsvkm.kau.in	42.	www.sfacindia.com
17.	www.diragriassam.gov.in	43.	www.facci.in
18.	www.mofpi.nic.in	44.	www.ediidnia.org
19.	www.fssai.gov.in	45.	www.manage.gov.in
20.	www.nedfi.com	46.	www.iitg.ac.in
21.	www.dgft.gov.in	47.	www.aau.ac.in
22.	www.fieo.org	48.	www.nabcons.com
23.	www.mospi.gov.in	49.	www.fao.org
24.	www.investindia.gov.in	50.	www.imf.org
25.	www.udyogprerana.net	51.	www.horti.tripura.org
26.	www.indianrailways.gov.in	52.	www.sikkim.gov.in
No	**Sources & Reference**	**No.**	**Sources & Reference**
53.	www.arunhorticulture.nic.in	54.	www.dirhorti.assam.gov.in
55.	www.megaagriculture.gov.in	56.	www.horticulture.mizoram.gov.in
57.	www.horticulture.mn.gov.in	58.	www.hortidept.nagaland.gov.in
59.	www.ciphet.in	60.	www.tiglobal.com
61.	www.optytechdryers.com	62.	www.bajajmachines.com
63.	www.dodiamachines.com	64.	www.bkfoodprocessingmachinery.com
65.	www.bryair.com	66.	www.vibroscreen.com
67.	www.icemakeindia,com	68.	www.sonarome.com
69.	www.durvamachinery.com	70.	www.mtsfoods.com
71.	www.technodrysystems.com	72.	www.jbtc.com
73.	www.chemtronscience.com	74.	www.gomaco.in
75.	www.buhlergroup.com	76.	www.alfalaval.com
77.	www.teplindia.com	78.	www.urschel.com
79.	www.rinac.com	80.	www.amway.in
81.	www.avon.co.in	82.	www.herballife.co.in
83.	www.mickinsey.com	84.	www.2.deloitte.com
85.	www.tatatrusts.org	86.	www.gatesfoundation.org
87.	www.sbi.co.in	88.	www.sidbi.in
89.	www.assets.kpmg	90.	www.researchgate.net
91.	www.niti.gov.in	92.	www.rabank.com