

# *Market Linkage of High Value Horticulture Produce of North Eastern Region*

A CASE FOR **EXTENDING TRANSPORT SUBSIDY**



**SFAC**  
लघु कृषक  
कृषि व्यापार संघ



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## PROJECT BACKGROUND

The North Eastern Region (NER) of the country comprising of eight states, Arunachal Pradesh, Assam, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. The NER is bounded by four countries, like Bangladesh, Bhutan, China and Myanmar. The region occupies about 5.6 per cent of the total geographical area of the country. The varied climate, altitude, edaphic conditions etc. leads to enrich biodiversity in the region.

A large number of horticultural crops are grown in the north eastern region; like banana, mango, various varieties citrus, flowers, etc. Among the states of the NER, in terms of fruit production and area, Assam occupies maximum followed by Arunachal Pradesh and Tripura. Similarly in vegetable production Assam has occupied maximum in production and covered area under the crop. After implementation of the Technology Mission (a project under Ministry of agriculture Govt. of India ) on horticultural crops for the north eastern region made a significant contribution in the field of area expansion, crop production, productivity, marketing, value addition and post harvest management. All the states of the north eastern states are availing the advantage of the project and developing all the sphere of horticulture. Special mention may be made like introduction and cultivation of tissue culture

banana plants, improved varieties of apple, kiwi and other temperate fruits in higher elevation, commercial cultivation of flowers like orchids, anthurium, roses, gerbera, liliium etc. Under Technology Mission (Horticulture) area expanded under horticultural crops are highly encouraging. These crops are the specialty crops which are grown only in this part of the country and have tremendous domestic and international potential which is yet to be exploited.

However, difficult geographical condition, lack of primary processing facilities (sorting, grading), poor accessibility, high logistics cost and poor marketing linkages are the major constraints which hinder the flow of this ethnic produce from North Eastern region to the rest of the country. The cost of transporting the produce adds on to the cost of the produce and makes it uncompetitive in the distant markets.

To meet the logistic challenge, air transportation can be an option which will not only reduce the transportation time but will also help in retaining the quality. However high freight cost is detrimental to introduce North-eastern horticultural produce into the distant markets.

Considering the logistic challenge in term of distance and price-competitiveness, Ministry of Agriculture, Government of India has decided to

examine proposal for extending transportation subsidy to high value horticultural produce of NER for air transportation of selected horticulture products from the Region to major consumption markets of the country.

## SCOPE AND OBJECTIVES

Assistance in logistics for high value perishable crops will not only open new vistas but also make substantial impact on the market led production in the Region among the producers. Study of the existing logistics and supply chain of selected horticulture crop will be helpful to make an assessment for financial support required for transportation from North-Eastern States to major metros.

The major objectives of the study are as below:

- Mapping of supply chain of selected high value horticultural crops qualifying for air transportation along with end markets, transportation costs and logistic issues of linking production belts of these crops to markets.
- Identifying nearest air evacuation points for identified products and selected production cluster and mapping road distances between production clusters to the nearest air port.
- Cost benchmarking of identified products in distant markets (Kolkata & Delhi).
- Mapping competitive cost – differentiation in distant markets and identifying transportation-cost gap to make selected products competitive.
- Broad estimation of financial assistance for the “transport subsidy”:
  - Per unit support
  - Annual financial implication.

## EXISTING SCENARIO AND PRACTICES

Although, NER is endowed with horticultural produce, which is having inherited capacity to

compete in distance market provided level playing field in comparison to other horticulture production belts of the country or even with imports.

However, despite of all constraints, produce like orchids, anthurium, roses are being airlifted from the region and being marketed in major metros in the country, but volumes are not noticeable and fail to induce organized producer/entrepreneurs to go for intensive cultivation of these produces. Though, flowers are grown and traded from all eight states but Sikkim, Assam and Nagaland are the leading states in floriculture trade from NER. After consolidation and packaging at farm gates or pack-houses flowers are transported by road to nearby airport where the cargo transport facility is available. Due to lack of direct connectivity of airports from NER to other cities, products are first brought either to Guwahati airports (by road or air), and from there the products through air moves to major cities such as Delhi, Mumbai, Kolkata, Bengalure and Hyderabad etc. Bagdogra in West Bengal is another major airport (the nearest airport for Sikkim) which has direct connectivity with Delhi, Mumbai, Kolkata and major airports in North East region. Except Guwahati and Kolkata airports, none of the airports has facilities for handling perishable cargo.

In addition to flowers, there could be other horticultural products from North-Eastern regions which may have market demand and potential





in distant markets, these products are not able to make it to market because of following reasons:

- a. Production area is far from the air exit points thus time consuming (effecting the quality adversely) along with high transportation cost.
- b. Very high cost of air transportation.

## OPPORTUNITIES FOR HORT-PRODUCTS FROM NORTH-EAST REGION

The opportunities for horticultural products of North-Eastern region in major markets can be analyzed from three perspective, namely from Demand Side, Supply Side and Logistic Sides.

### Demand Side

In the recent time, the consumption of exotic fruits & vegetables and flowers has leaped many folds in the country. Major markets of India are witnessing high demand of high value horticultural produce, despite of continuous price rise of these products, which are being brought in either from distant production zone or from import. Ever increasing imports of fresh fruits in India in recent past is again evidence of this growth. Total fresh fruit import in India has

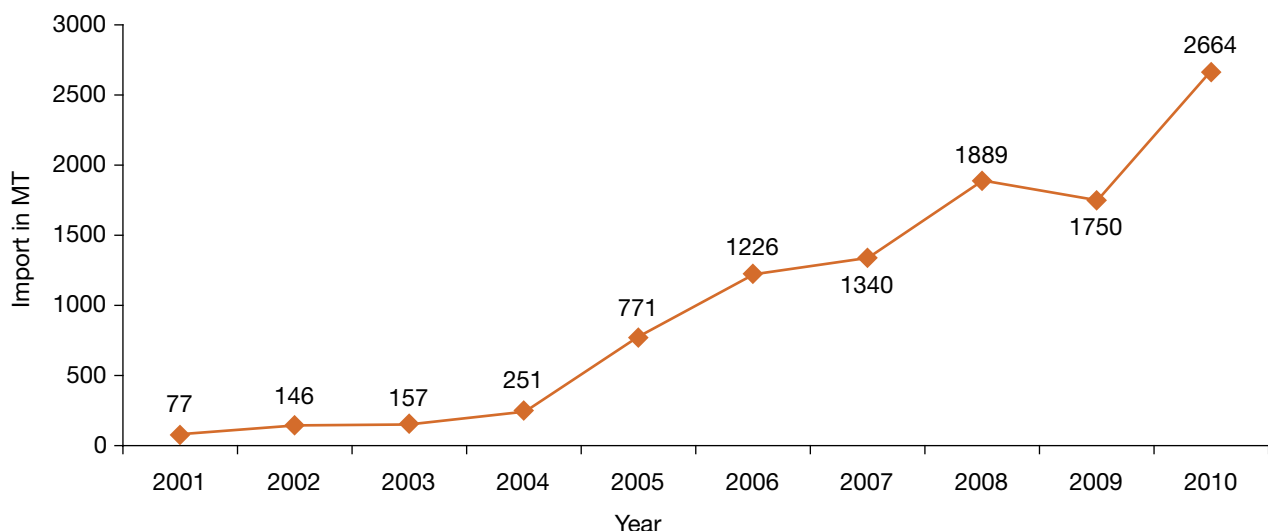
increased from approximately 20,000 MT in year 2001 to 168000 MT in year 2010. Major fruits in list of import are apple, pear, orange, grapes and kiwi. Import of fruit such as Kiwi, which is available in abundant in Arunachal Pradesh in India has increased from 77 MT in year 2001 to 2664 MT in year 2010.

In terms of consumption of premium horticulture produces, such as Orchids, Anthurium, Bird of Paradise, which are exclusive from NER, Mumbai, National Capital Region (NCR), Bengalure, Kolkata, Chennai and Hyderabad, are the major cities. Looking to the growing demand in the major cities of the country, selected horticulture produce of NER can be easily promoted and marketed in these cities with proper supply chain, logistics and marketing linkage.

### Supply Side

North-Eastern region is seeing surge of area under horticultural crops under Horticulture Mission for North-East & Himalayan States (HMNEH). If, targets and achievements of the Mission is any indication, approximately 4.5 lakh hectare of area has been brought under horticulture crops in NER during last one decade. As per government data, Arunachal Pradesh is producing 4000 MT of Kiwi, per annum. Almost all states in NER have good supply of orchids and flowers.

IMPORT OF KIWI IN INDIA (DURING 2001-2010), IN MT



## Logistics Side

All the North-Eastern States, except Meghalaya have direct air connectivity to major consumption centres in India. This is a big advantage, if high-value horticultural products, which can afford air transportation, are targeted for the marketing in major consumption centres.

## KEY ISSUES

Lack of adequate connectivity of production clusters with the markets is one of the major reasons for low level of commercial horticulture activity in the North-Eastern region. There are a number of National Highways in the region connecting the state capitals as well as district headquarters; however the quality of the roads

is quite poor, especially in states of Manipur, Nagaland, Mizoram, Arunachal Pradesh and Tripura. The rail network in the region is mainly concentrated in the state of Assam. Poor transport facilities, terrible road conditions and farm level linkages are the major issues. Due to these issues logistics costs are very high which directly impact the physical quality of product adversely.

Generally it is argued that product from NER will not stand against high quality imported products, but one of the reasons is non-availability of these products in market to be compared with the imported/other production zone products. Once, if supply chain can get established and products get introduced and market pull is established, producer and other supply chain players will start focusing on market led production.





# Identification of High Value Crops and Clusters

## 2

### CHAPTER

## PRODUCT BASKET

North Eastern Region of the country is one of the most diversified agro-climatic regions in the country. The region has wide varieties of fruits and vegetables ranging from tropical to temperate fruits. Major fruits being grown in the region are Banana, Citrus, Papaya, Pineapple, Guava, Apple, Grapes, Kiwi, Passion fruits and many more. Region is also known as the key flower/orchid growing area. Although the Region produces approximately 30.00 lakhs MT of different fruits, majority of these fruits can't be brought to distant

market as discussed in the previous chapter. However, there are some high value fruits, which can stand high air transportation cost due to high demand and high price realization at consumer end and can be targeted for transporting through air. For identification of these suitable potential crops, selection criteria has been worked out and defined below:

- Exclusive window of production/niche product.
- Off season availability (From market perspective).



*Cymbidium Orchid grown in the poly-house of Mr. Lakshmi Rai*



*Mr. Lakshmi Rai, a progressive Orchid grower at Assam-Lingzey, East Sikkim*

- Demand in distant market.
- High price opportunity able to absorb high logistic cost.
- Price competitiveness at production end providing buffer for high logistic cost.

Based on selection criteria, wide range of horticulture crops have been shortlisted for qualification. For the selected crops, the comparison in prices has been worked out at the production or farm gate end

and distant markets. Larger the price difference depicts more suitability of crop for marketing in the distant markets and affordability of produce to bear air transportation cost from NER to major cities. As most of the shortlisted products of falls in exotic category and no price data is available in the public domain, so prices of few crops are obtained from various stakeholders like farmers, traders, officials etc. in the local (NER) and distant markets and depicted in the table below:

Product	Wholesale Purchase Price at Production End	Wholesale Selling Price at Market End						Price Difference
		Delhi	Mumbai	Kolkata	Bengalure	Hyderabad	Chennai	
Flowers	80	250	200	200	180	250	200	100-170
Kiwi	65	150-200						95-135
Passion Fruit	15	Exclusive product of NER, hence can be promoted						-
Plum	50	60						10
Peach	35	55						20
Pears	18	40						22
Grapes	35	70	55	54	58		62	19-35
King Chilli/ Cherry Pepper	100-150	Mainly dry chilli is sold due to very high level of perishability						-
Pineapple	15	31	15	14	14	21	21	(-)1-16
Ginger	15	27.5	22	25	23	42	26	7-27
Banana	18	13.5	8.5	13.5	14.5	22	13	(-)9.5-4
Mandarin	40	45	18	32	32	45		(-)22-5



Packhouse and office of Sikkim Himalayan Orchid Limited at Assam Lingzey village of East Sikkim

Price of banana, ginger, pineapple and mandarin has been sourced from AGMARKNET. These prices may vary as per month, season, product availability, demand and supply.

From the table above, it can be observed that flowers kiwi are the most competitive products and other produces such as passion fruit, peach, pear, plum, king chilli and grapes are also relatively competitive crops in the major markets due to very high to reasonable price difference or exclusivity in production or due to off-season production. Other crops such as pineapple, ginger, banana or mandarin are not competitive due to less or negative price difference and these cannot qualify for air transportation. List of selected crops fulfilling the selection criteria and as per market competitiveness is as below:



Flowers are already being air transported from NER to Delhi, Mumbai, Kolkata etc. Though NER has good production volumes (Oct-Dec) of Kiwi but due to long distance and high transportation cost unable to reach distant markets of the country like Delhi, Mumbai, Chennai, Hyderabad and demand is being met by imported Kiwi from New Zealand, Italy and Chile. King chilli and Passion fruits are grown exclusively in NER, grapes (Bengalure Blue) comes in May-June in Mizoram when supply ends from Maharashtra and colour seeded varieties are imported from the California, USA. Plum, Peach and Pear are grown at commercial level in Northern part of India and now these are being grown in NER also. Though it may not be price competitive in Delhi market but can be promoted in Kolkata market which is nearest Metro city to NER.

State wise list of selected crop from where it can be promoted are as below:

Sl. No.	Product	Qualifying Criteria (Based on Differential Price at Purchase and Sell Point)
1	Flowers	100-170
2	Kiwi	95-135
3	King Chilli	Exclusive Product
4	Passion Fruit	Exclusive Product
5	Grapes	40
6	Plum	10
7	Peach	22
8	Pears	20
9	Banana	(-) <sup>4</sup>
10	Mandarin	(-) <sup>10</sup> to 5
11	Ginger	7 to 12

States	Flowers	King Chilli/ Cherry Pepper	Passion Fruit	Plum	Peach	Pears	Kiwi	Grapes
Arunachal Pradesh	√		√	√	√		√	
Assam	√	√		√	√	√		
Manipur	√		√			√		
Meghalaya	√			√	√	√		
Mizoram	√		√	√	√			√
Nagaland	√	√	√					
Sikkim	√	√		√	√	√		
Tripura			√					

After a comparative study of horticulture produce in NER above crops have been shortlisted as potential horticulture produce which can qualify for air transport. These are high in value and have advantage over crops like mango, guava, papaya, banana, orange, lemon and vegetables etc. for promotion in major metros through air logistic.

Strawberry cultivation has also started in NER but commercial production level is yet to be achieved. If promoted at commercial level, strawberry from

North-eastern regions can also be introduced in distant markets in the country.

## IDENTIFIED PRODUCTS & CLUSTERS/REGION

Identification of major production belts from where the produce can be evacuated through nearby airport will be helpful in mapping the supply chain and planning for backward linkages. Major flower production belts identified in NER are as below:

States	Potential Area	Flowers
Arunachal Pradesh	Ziro-Hapoli	Cymbidium, Gladiolus, Lilium
	Itanagar	Dendrobium, Anthurium, Foliage Plants
	Bomdilla	Cymbidium, Gladiolus, Lilium
	Tawang/Dirang	Cymbidium
	Namsai	Cymbidium, Gladiolus
	Pasighat	Anthurium, Gladiolus, Dendrobium, Foliage Plant
Assam	Kamrup	Gladiolus, Anthurium, Tuberoses, Rose
	Nagaon/Sonitpur	Rose, Gladiolus, Gerbera
	Jorhat	Rose
	Silchar	Gladiolus, Chrysanthemum
	Dibrugarh	Rose
	Tezpur	Rose, Gladiolus, Tuberoses
Manipur	Imphal	Gladiolus, Dendrobium, Carnation
	Thobal	Gladiolus, Anthurium
	Senapati	Gladiolus, Anthurium
Meghalaya	Upper Shillong/Shillong	Cymbidium, Carnation
	Barapani/Umiam	Carnation, Gladiolus, Lilium
Mizoram	Aizawl	Rose, Anthurium, Gladiolus
	Lunglei	Rose, Anthurium
	Kolasib	Anthurium, Gladiolus
Nagaland	Kohima	Cymbidium, Gladiolus
	Wokha	Cymbidium, Gladiolus
	Mokokchung	Cymbidium, Gladiolus
	Dimapur	Gerbera, Gladiolus
Sikkim	East District	Cymbidium, Rose, Anthurium, Lilium, Gerbera, Gladiolus
	West District	Cymbidium, Rose, Anthurium, Lilium, Gerbera, Gladiolus
	South District	Rose, Gerbera, Lilium, Cymbidium, Alstroemeria

Rose and Cymbidium (Orchid) are the largest among the flowers which are traded from NER in national markets.



*Packaging of Cymbidium orchid stems at Sikkim Himalayan Orchid Limited in East Sikkim*

Major production clusters for other horticulture crops are as below:

Crop	State	Clusters
Passion Fruit	Manipur	Senapati, Ukhrul, Chudachandpur
	Mizoram	Champai, Aizawl
	Nagaland	Kohima, Wokha, Mokokchung
	Tripura	
Plum	Selected pockets of NER mainly Arunachal Pradesh, Sikkim and Assam	
Peach		
Pears		
Kiwi	Arunachal Pradesh	West Kameng, Lower Subansiri, Tawang, Dibang Valley and Anjaw
Grapes	Mizoram	Champai (Hnahlan village)
King Chilli/Cherry Pepper*	Nagaland, Sikkim, Assam	Peren, Kohima, Dimapur (Nagaland); Sivasagar, Golaghat (Assam); East and South District (Sikkim)

*\*Naga Chilli in Nagaland, Bhut Jholokia in Assam and Cherry Pepper in Sikkim.*

## SEASONALITY

Below is the seasonal availability of the selected crops in North Eastern states,

Flowers, mainly orchids are available from October to March, king chilli from May to August; Passion fruit from May to December (Sept.-Dec. main

season), plum from May to July, Peach from April to July, Pear in July and August, Kiwi from August to October and grapes are available in the months of May and June.

Varied agro-climatic conditions and height makes it possible to grow some of the crops off-season and provides natural advantage to the region.

Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Flowers												
King Chilli/Cherry Pepper												
Passion Fruit												
Plum												
Peach												
Pear												
Kiwi												
Grapes												







# Supply Chain and Transportation of Selected Crops: Current Scenario

CHAPTER

## 3

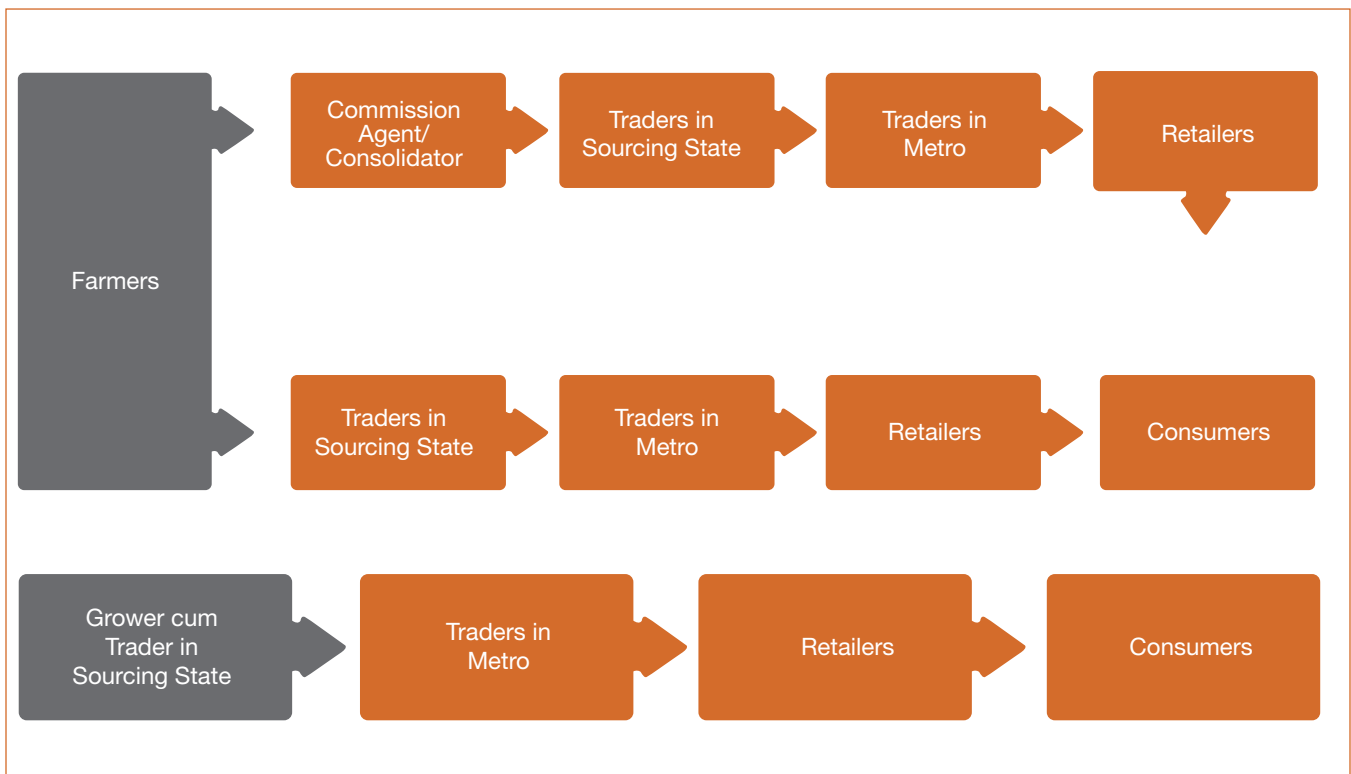
### SUPPLY CHAIN

Current supply chain of all horticulture crops in NER is very complex. There is involvement of many stakeholders between farmers and consumers. This is the main concern which causes the price rise and value degradation. Poor road conditions, non-availability of

vehicles and high logistic cost are also major hurdles in promotion of horticulture from the region.

### MARKET CHANNELS

Major existing market channels through which the trade is occurring are:



Consolidators, aggregators and commission agents play major role at the production end in aggregating the product and making it available in the market.

In case of flower, trade from NER to metros is as below:

1. Farmers → Commission Agents/Consolidators → Traders in Sourcing State → Traders in Metros → Retailers → Consumers
2. Farmers → Traders in sourcing state → Traders in Metros → Retailers → Consumers
3. Grower cum Traders in Sourcing State → Traders in Metros → Retailers → Consumers

## COST BUILD-UP

**Orchid:** Small farmers in Sikkim receive the lesser price compared to large scale farmers or farmers' group. Large farmers and farmers' group can sell directly to the traders, pack-house or to Silliguri Market however small farmers sell to middlemen/consolidators and it moves further. Cost build-up for a single orchid stem is as below:

Particular	Amount (in ₹)	Cost Mark-up (₹ per stem)
Average selling of small farmers	50.00	50.00
Aggregator charges (20%)	10.00	60.00
Transport to pack-house	2.00	62.00
Packaging cost	10.00	72.00
Pack-house/Trader's margin (40%)	29.00	101.00
Road transportation (Sikkim to Bagdogra)	5.00	106.00
Air transportation (Bagdogra to Delhi)	15.00	121.00
Handling charges in Delhi	10.00	<b>131.00 (Landing Price)</b>

**Source:** STPL Analysis & Discussion with farmers and pack-house owner

**Kiwi:** Kiwi grown in Arunachal Pradesh is sold mainly in the NER only or at some extent it reaches to Kolkata via Guwahati. West Kameng and Tawang is the major production hub of Kiwi in the Arunachal Pradesh, the location of these two production zones is extreme hills and accessibility from these two zones to plain area (Tezpur, Assam) is very difficult involving very high road transportation cost and time.

Cost build-up from farm gate to consumer in Itanagar for one kg is as below:

Particulars	Amount (in ₹)	Cost Mark-up (₹ per kg)
Farm gate price	65.00	65.00
Grading & Packaging cost	10.00	75.00
Road transportation cost (farm gate to Guwahati Airport)	15.00	90.00
Air transportation (Guwahati to Delhi)	50.00	140.00
Handling charges	5.00	<b>145.00 (Landing Price)</b>

**Source:** STPL Analysis of SFAC Study Report of Value Chain Analysis of Select Crops in North Eastern States



## PROJECTED PLAN TO INTRODUCE KIVI FROM ARUNACHAL PRADESH TO DELHI MARKET



Kiwi farm in Arunachal Pradesh



Kiwi Pack house



Transportation from Arunachal Pradesh to Guwahati Airport



Cargo loading at Guwahati Airport



Kiwi in Delhi Market



**Passion Fruit:** Manipur, Nagaland and Mizoram are major producers of passion fruit in the country. Though passion fruit is rich source of vitamins and minerals however fruit is yet to make its presence at significant level in metros as a fresh fruit and currently major demand of fruit is in juice industry as blending material. However Cost build-up of passion fruit is as below:

Particular	Amount (in ₹)	Cost Mark-up (₹ per kg)
Farm gate price	15.00	15.00
Grading & Packaging cost	2.00	17.00
Road transportation cost (farm gate to Dimapur Airport)	2.00	19.00
Air transportation (Dimapur to Delhi)	60.00	79.00
Handling charges	1.00	80.00 (Landing Price)

**Source:** STPL Analysis of SFAC Study Report of Value Chain Analysis of Select Crops in North Eastern States

**King Chilli:** Fresh King chilli can be transported from NE to other parts of the country where population of NE community is more or growing like Delhi, Bengalure, Mumbai, Kolkata due to its preference by the NE community who are ready to pay premium prices for the product. Cost build-up of king chilli from Nagaland to Delhi is as below:

Particular	Amount (in ₹)	Cost Mark-up (₹ per kg)
Farm gate price	100.00	100.00
Grading & Packaging cost	5.00	105.00
Road transportation cost (farm gate to Dimapur Airport)	2.00	107.00
Air transportation (Dimapur to Delhi)	60.00	167.00
Handling charges	3.00	170.00 (Landing Price)

**Source:** STPL Analysis of SFAC Study Report of Value Chain Analysis of Select Crops in North Eastern States

**Grapes:** In the country, only Maharashtra, Karnataka and Punjab states are known for grapes cultivation but for Mizoram in NE, which also produces grapes being harvested in May and June (off season) when fresh grapes are not available from any other part of the country. Good opportunity exists for Mizoram grapes in the Delhi and Kolkata market due to its off season availability. Cost build up for Mizoram grapes has been depicted as below:

### Aizawl to Kolkata

Particular	Amount (in ₹)	Cost Mark-up (₹ per kg)
Farm gate price	35.00	35.00
Grading & Packaging cost	5.00	40.00
Road transportation cost (farm gate to Aizawl Airport)	5.00	45.00
Air transportation (Aizawl to Kolkata)	25.00	70.00
Handling charges	3.00	73.00 (Landing Price)

**Source:** STPL Analysis

### Aizawl to Kolkata, Kolkata to Delhi

Particular	Amount (in ₹)	Cost Mark-up (₹ per kg)
Farm gate price	35.00	35.00
Grading & Packaging cost	5.00	40.00
Road transportation cost (farm gate to Aizawl Airport)	5.00	45.00
Air transportation (Aizawl to Kolkata)	25.00	70.00
Loading/Unloading at airport	2.00	72.00
Air transportation (Kolkata airport to Delhi)	30.00	102.00
Handling charges	3.00	105.00 (Landing Price)

## MARGINS

**Flowers:** In case of cymbidium orchid, landing cost in Delhi from Sikkim is approximately ₹ 130-150 per stem (including logistics, packaging and handling etc.) and the average price at flower market in Connaught Place, near Rajiv Gandhi Handicraft Bhavan is approximately ₹ 200-250 per stem which depends on demand and supply. This price goes beyond ₹ 300 at the retail outlets spread over the city. Thus there is a margin of ₹ 70-170.

**Kiwi:** Kiwi from Arunachal Pradesh is being marketed in Kolkata and yet to be introduced in other major markets of country (esp. Delhi). Kiwi price in Delhi is on an average ₹ 150 per kg for Himachal Pradesh and J&K variety and above ₹ 200 per kg for imported varieties. Therefore margin for kiwi is approximately over ₹ 100 per kg.

Other selected high value horticulture crops such as king chilli, passion fruit, plum, peach, pears and grapes are not promoted at significant scale in the metro markets.

## TRANSPORTATION FACILITIES

### Road Transportation

By and large there is poor connectivity from farm gate to main road and farmers have to carry horticultural produces from farm

through head-load, cart-load or small vehicles arranged by them. Road transportation system from sourcing point to the destination markets is also not in good condition. In addition to the bad road condition, availability of vehicle at the time of harvest is also a challenge and due to this, vehicle owners charge exorbitantly from producers and traders for transportation.

Horticulture produces are transported from production belts to markets through passenger vehicles, pick-up vans, jeeps, mini trucks and trucks. Transportation through passenger buses by keeping the produce on roof of the bus is also practiced widely. Poor road conditions, bundh (Strikes), insurgency, weather condition, higher rate of vehicle break-down etc. leads to longer transportation time and causes physical damages to products, which do not remain marketable. This is happening to keep road logistic cost as low as possible by allowing produce to share the space in the vehicle, which is not suitable for transportation of horticultural produces.

Current road transportation costs from some of the production belts to nearest evacuation points are discussed as under:

Crop	Production Cluster	State	Nearest Evacuation Airport	Approx Distance (in kms)	Approximate Road Transportation Cost (₹ per kg)
Kiwi	West Kameng (Arunachal Pradesh)	Arunachal Pradesh	Guwahati	400	15-20
Passion fruit	Senapati (Manipur)	Manipur	Imphal	60	3-5
Passion fruit	Mokokchung (Nagaland)	Nagaland	Dimapur	210	8-10
King chilli	Dimapur, Peren & Kohima (Nagaland)	Nagaland	Dimapur	75	3-5
Grapes	Champai (Mizoram)	Mizoram	Aizawl	170	8-10
Flowers	East Sikkim	Sikkim	Bagdogra	150	5-8
Flowers	Kamrup	Assam	Guwahati	70	3-5

Financial support for road transportation of horticultural products will encourage farmers to hire their customised vehicles which can ensure that the product reaches their destinations in good physical form and can fetch good price.

### Air Transportation

Air transportation of horticulture produce from NER is limited to flowers only. Very high air logistic cost and unavailability of infrastructure to handle perishable cargo are the major concern to promote air transportation of horticulture

produce to metros like Delhi, Mumbai, Kolkata and Bengalure etc.

At present only Guwahati airport has the facility to handle perishable cargo. Sikkim transports its flowers from Bagdogra airport which is approximately 120 km from Gangtok. Many airports in NER are not directly connected to Delhi, Mumbai and Bengalure. They are connected via Guwahati or Kolkata.

### Evacuation Points

State wise proposed evacuation points and destination airports are as below:

Sl. No.	State	Nearest Evacuation Point	Destination Airports
1	Arunachal Pradesh	Guwahati	Delhi, Mumbai, Kolkata, Bengalure, Hyderabad
2	Assam	Guwahati	Delhi, Mumbai, Kolkata, Bengalure, Hyderabad
3	Manipur	Imphal	Kolkata
4	Meghalaya	Guwahati	Delhi, Mumbai, Kolkata, Bengalure, Hyderabad
5	Mizoram	Aizawl	Kolkata
6	Nagaland	Dimapur	Delhi, Kolkata
7	Sikkim	Bagdogra	Delhi, Kolkata
8	Tripura	Agartala	Mumbai, Delhi, Kolkata, Bengalure, Hyderabad

Total cargo space available in flights originating from North-eastern regions has been depicted in the table below:

Cargo Capacity from various originating destination in North Eastern Region		
Originating Airport	Destination	Cargo Capacity (MT)
Agartala	Delhi	24
	Kolkata	92.4
Bagdogra	Delhi	67.2
	Kolkata	43.4
Dimapur	Delhi	20
	Kolkata	11.2
Guwahati	Delhi	128.8
	Kolkata	147
Imphal	Delhi	25.2
	Kolkata	40.6
Aizawl	Delhi	20
	Kolkata	5.6
Silchar	Delhi	40
	Kolkata	15.4

Looking at the available cargo capacity of flights originating from NER, there will not be any constraint of capacity for transporting horticultural products from NER to major markets of Delhi and Kolkata (either direct or through connecting flights).

Cargo charges from North-Eastern region to Kolkata and Delhi is varying from ₹ 25 to ₹ 60 per kg, depending upon origin and destination. Approximate cargo charges for different origin – destination has been given in table below:

Sl. No.	Originating Airport	Destination Port	Air Transport (₹ per kg)
1	Guwahati	Kolkata	30
2	Imphal	Kolkata	30
3	Dimapur	Kolkata	30
4	Aizawl	Kolkata	25
5	Bagdogra	Kolkata	10
6	Guwahati	Delhi	50
7	Imphal	Delhi	60
8	Dimapur	Delhi	60
9	Bagdogra	Delhi	20









# Calculation of Financial Support

## CHAPTER

# 4

For the purpose of calculation of financial support, initially two market destinations namely, Delhi and Kolkata have been considered. In previous chapters, it has been calculated that there are some products, which have very high price differential between procurement price and wholesale market price at consumption end. As the objective of this financial support is to make more and more horticultural products of NER competitive in the distant markets, calculation of percentage/amount of financial support will be determined based on calculation of threshold level landing price of a particular price in a particular market. This threshold level for already selected (in chapter 2) high value

horticultural products of NER has been calculated as below:

From above table it is clear that Flower and Kiwi are already above the threshold of minimum lending price, where trader can also earn sufficient margin in trading, even if these produces are transported through air. In case of grapes, there is negative difference is of ₹ 30 per kg for bringing it to Delhi and negative difference of ₹ 10 per kg for Kolkata. Similarly products like plum, peach and pear also have negative difference varying from ₹ 55 per kg to ₹ 23 per kg. This means, if proposed financial support/subsidy can bridge this gap and can generate some positive margin for traders,

Crop-wise Price Differential and Margin at Lending Price in Delhi and Kolkata Markets  
(₹ per kg)

Crop	Price Deferential (in Major Markets)	Margin at Market End (Delhi)	Margin at Market End (Kolkata)
Flowers*	135	110	120
Plum	10	-55	-35
Peach	20	-45	-25
Pears	22	-43	-23
Kiwi	135	70	90
Grapes	25	-30	-10

\*₹ per stem

Margin at lending price has been calculated by deducting transportation cost of product from difference between procurement price of produce at production cluster and wholesale price in the distant market.

marketing of these produces in distant markets can be made feasible.

## CALCULATION OF SUBSIDY

Based on above mentioned analysis, back calculation has been done and according to that, following support in terms of subsidy for domestic transportation of horticultural products from NER can be extended:

**Fruits:** Except Kiwi, other fruits which have been shortlisted as high value fruits, have wide negative difference. Therefore, if subsidy upto 60% of total transportation cost (air plus road transportation from production cluster to landing price in distant markets) is provided, these fruits can reach upto the threshold of just breakeven. Calculation of landing price after accessing subsidy has been described in table below. In case of fruits like plum, peach and pear, it still either shows as just breakeven or vaguely negative, but it can be expected that this incentives will create interest and generate hope amongst the producers to take-up commercial production, higher yield and over period of time can make these produces competitive by reducing production cost.

### Assumptions

- Initially only two markets have been considered i.e. Delhi and Kolkata.
- Segmental approach (flower & fruit) has been adopted to arrive at the percentage of subsidy.
- Calculation of percentage/amount of financial support has been determined based on calculation of threshold level landing price of a particular product in a particular market.
- For calculating the road transport, distance from production zones to air evacuation points have been divided into three slabs.
- Maximum of five percent of fruits production has been targeted for subsidy over period of three years.

**Flowers:** As flowers from NER are already being transported to all major markets, supply chain for flowers has already been established and trade is in process. Therefore, flowers will not required much incentives, however to make North-eastern regions flower products further competitive in the market, government can provide subsidy upto 40% of total transportation cost (including Road and Air transportation).

### Road Subsidy

For the purpose of keeping calculation simple, it has been proposed to fix the subsidy amount for road transportation, as per distance slabs, therefore distance from production belt to nearest evacuation airport. Based on this, three broad categories have been proposed, which are as under:

Distance Slab	kms	1-100	101-200	Beyond 200
Actual transportation cost	₹ per kg	4.00	8.00	12.00
Upper Subsidy amount for Fruits (at 60% of total cost)	₹ per kg	2.40	4.80	7.20
Upper Subsidy amount for Flowers (at 40% of total cost)	₹ per kg	1.60	3.20	4.80

### Proposed Recommendations

- To make level playing field at the distance market, it is proposed to have road transport subsidy and air freight subsidy.
- Road Transport:
  - According to the distance and weight/volume, subsidy will vary from ₹ 1.20 to ₹ 7.20/kg
- Air Freight:
  - For Flowers: 40% of air freight
  - For Fruits: 60% of air freight

In this manner, it will be easy to reimburse claims made by the beneficiaries of the scheme.

## Air Subsidy

For air transportation, actual transportation charges depend on various factors and unit rate varies accordingly. Therefore only upper limit for subsidy can be fixed, however claim by any beneficiary should be made as per actual cost against the bill. Upper limits for transporting products from NER to Kolkata and Delhi can be fixed as under:

Proposed upper Limit of Subsidy for Air Transportation from NER to Delhi & Kolkata (₹ per kg)		
Particular	To Kolkata	To Delhi
Upper Subsidy amount for Fruits (at 60% of total cost)	18.00	36.00
Upper Subsidy amount for Flowers (at 40% of total cost)	12.00	24.00

## ESTIMATION OF SUBSIDY AMOUNT

Based on above analysis, availability of marketable surplus and looking at the current markets of different products, possible volumes

of products has been calculated, which will qualify and claim for subsidy in coming years and accordingly budgetary requirement has been calculated.

Crop	Year	Estimated Volumes		Subsidy Amount (in ₹ lakhs)		
		Delhi	Kolkata	Delhi	Kolkata	Total
Flower/Orchids (no. of stems in lakhs)	I	1.50	1.00	40.80	15.20	56.00
	II	2.00	1.50	54.40	22.80	77.20
	III	3.00	2.00	81.60	30.40	112.00
Kiwi (in MT)	I	30	15	12.96	3.78	16.74
	II	50	30	21.60	7.56	29.16
	III	100	50	43.20	12.60	55.80
Other Fruits (in MT)	I	20	20	8.16	4.56	12.72
	II	40	50	16.32	11.40	27.72
	III	100	100	40.80	22.80	63.60
Total	Year I			61.92	23.54	85.46
	Year II			92.32	41.76	134.08
	Year III			165.60	65.80	231.40
<b>Grand Total</b>				<b>319.84</b>	<b>131.10</b>	<b>450.94</b>

For implementing the scheme, total of approximately ₹ 4.51 crore will be required for next three year. This amount may vary based on promotion, awareness and accordingly

acceptance of scheme amongst targeted beneficiaries. Total of ₹ 85.46 lakhs, ₹ 1.34 crore and ₹ 2.32 crore will be required in year first, second and third respectively.

### Crop-wise Margin at Landing Price in Kolkata and Delhi Markets after Deducting Proposed Subsidy Amount (₹ per kg)

Crop	Margin at Market End (Kolkata)	Margin at Market End (Delhi)
Flowers	120	126
Kiwi	60-100	50-100
Grapes	6	11
Pears	-1	1
Peach	-3	-1
Plum	-13	-11

## IMPACT OF THE SCHEME

In addition to various other social impact, the scheme will have direct impact on economy of producers. With the help of this scheme, the North Eastern Region will be able to generate direct income of approximately ₹ 15.00 crore by selling horticultural produces and various other activities of primary processing and local transportation etc. These economic activities in production area will also create opportunities for support activities and therefore the overall impact of scheme will be much more than generating income for direct beneficiaries of the scheme.

### Economic Impact

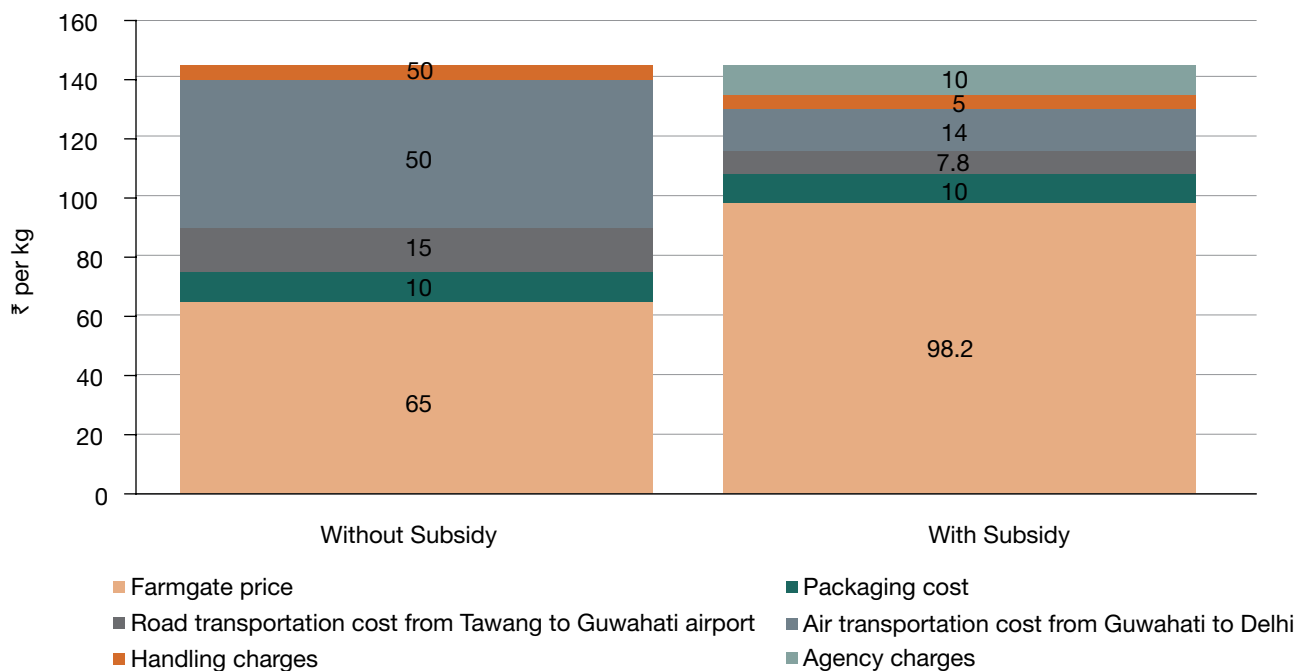
- Case Study of Kiwi.
- Individual beneficiary farmer, on an average, will realize ₹ 35-40 per kg higher than the prevailing average market price. (₹ 100 per kg compare to ₹ 65 per kg).
- Increased demand is expected to increase average market price at production zone by

10% for at-least 10% of total production in 2<sup>nd</sup> year and for 15% in 3<sup>rd</sup> year.

### Social Impact

- Proposed subsidy, by developing new supply chains will create new job opportunities at farm as well as at non-farm level.
- Introduction of scheme will create awareness and motivate farmers to produce market led horticultural products, which in long term will become sustainable source of income for producers.
- Calculation of Social Returns (for subsidy on Kiwi transportation):
  - SROI (Social Return on Investment) – 171% (NPV of Expenditure ₹ 89.36 lakh & NPV of Cash flow ₹ 152.55 lakh in three years).
  - SIRR (Social Internal Rate of Return) – 25%.

PRICE BUILT-UP FOR KIWI (WITH & WITHOUT SUBSIDY) (₹ PER KG)





# *Operational Mechanism for Financial Support*

CHAPTER

5

Prior to implementation of the scheme for logistic financial support it is essential to identify nodal agencies in the NE states to recognize the beneficiaries. To avoid the complexities and malpractices it may be suggested to provide the assistance to Farmers' Producer Organizations (FPOs) and recognized trading agencies/ organizations/Individuals farmers/NGOs engaged in the promotion of the marketing horticultural produce in the distant market. In this way the assistance will reach to the beneficiaries who are in actual need and further it will help to promote the NER produce at efficient level.

It has been emerged that to make the NER horticultural produce competitive in the distant market two sets of financial assistance needs to be given in form of Road Transport subsidy on the products which is destined for air shipment from any of the NE airport along with the air freight subsidy.

It is also suggested that transportation deals between targeted beneficiaries and road and

air cargo transportation should be done under the supervision of identified nodal agencies. All the transaction and produce transported should be examined and match with the records and bills etc.

It is recommended that the support should be limited to 500 kg per consignment. In case of flowers consignment volume should be equivalent to 500 kg weight.

Road transporting agencies and air cargo service providers can be identified in the region and it can be mentioned in the guidelines that transport activities done through identified agencies/service providers will be enable for financial assistance. However beneficiaries will always have option to use their own transport facilities in case of road transportation.

However these are the indicative criteria and detailed guidelines will be developed after in principle approval of the transport assistance for the marketing of horticultural produce from NER to Distant market by airways.







# *Airline-wise Cargo Capacity from North East Region to Delhi & Kolkata*

ANNEXURE

Originating Airport	Destination	Aircraft	Operator	Frequency	Cargo Capacity (MT)
Agartala	Delhi	B 737 800	JTL	Daily	14.0
Agartala	Delhi	A320	IND	Daily	9.8
Agartala	Kolkata	B 737 800	SPJ	Daily	14
Agartala	Kolkata	B 737 800	SPJ	Daily	14
Agartala	Kolkata	A320	IND	Daily	9.8
Agartala	Kolkata	A320	IND	146	9.8
Agartala	Kolkata	A320	IND	Daily	9.8
Agartala	Kolkata	A320	IND	2357	9.8
Agartala	Kolkata	A-319	IAC	Daily	5.6
Agartala	Kolkata	A-319	IAC	123456	5.6
Agartala	Kolkata	B 737 800	JTL	Daily	14
Bagdogra	Delhi	B 737 800	JTA	Daily	14
Bagdogra	Delhi	B 737 800	SPJ	Daily	14
Bagdogra	Delhi	B 737 900	SPJ	Daily	14
Bagdogra	Delhi	A320	GOW	246	9.8
Bagdogra	Delhi	A320	GOW	1357	9.8
Bagdogra	Delhi	A-319	IAC	Daily	5.6
Bagdogra	Kolkata	B 737 800	JTA	Daily	14
Bagdogra	Kolkata	B 737 800	SPJ	Daily	14

Originating Airport	Destination	Aircraft	Operator	Frequency	Cargo Capacity (MT)
Bagdogra	Kolkata	A-319	IAC	246	5.6
Bagdogra	Kolkata	A-320	IAC	3	9.8
Dimapur	Kolkata	A-319	IAC	37	5.6
Dimapur	Kolkata	A-319	IAC	246	5.6
Guwahati	Delhi	B 737 700	JTL	Daily	14
Guwahati	Delhi	A320	KFA	Daily	9.8
Guwahati	Delhi	B 737 800	JTA	123457	14
Guwahati	Delhi	B 737 800	SPJ	Daily	14
Guwahati	Delhi	B 737 900	SPJ	Daily	14
Guwahati	Delhi	B 737 800	SPJ	Daily	14
Guwahati	Delhi	A320	IND	Daily	9.8
Guwahati	Delhi	A320	IND	Daily	9.8
Guwahati	Delhi	A320	GOW	1357	9.8
Guwahati	Delhi	A320	GOW	246	9.8
Guwahati	Delhi	A-319	IAC	Daily	5.6
Guwahati	Delhi	CRJ 700	AAS	124567	4.2
Guwahati	Kolkata	B 737 800	JTL	Daily	14
Guwahati	Kolkata	B 737 800	JTA	123456	14
Guwahati	Kolkata	B 737 800	JTA	Daily	14
Guwahati	Kolkata	B 737 800	JTA	Daily	14
Guwahati	Kolkata	B 737 800	SPJ	Daily	14
Guwahati	Kolkata	B 737 800	SPJ	Daily	14
Guwahati	Kolkata	B 737 800	SPJ	Daily	14
Guwahati	Kolkata	B 737 800	SPJ	Daily	14
Guwahati	Kolkata	A320	IND	Daily	9.8
Guwahati	Kolkata	A320	IND	Daily	9.8
Guwahati	Kolkata	A320	IND	Daily	9.8
Guwahati	Kolkata	A-319	IAC	Daily	5.6
Imphal	Delhi	A320	IND	Daily	9.8
Imphal	Delhi	A320	IND	Daily	9.8
Imphal	Delhi	A-319	IAC	Daily	5.6
Imphal	Kolkata	B 737 800	JTL	Daily	14



Originating Airport	Destination	Aircraft	Operator	Frequency	Cargo Capacity (MT)
Imphal	Kolkata	A320	IND	Daily	9.8
Imphal	Kolkata	A-319	IAC	Daily	5.6
Imphal	Kolkata	A-319	IAC	Daily	5.6
Imphal	Kolkata	A-319	IAC	Daily	5.6
Aizawl	Kolkata	A-319	IAC	Daily	5.6
Silchar	Kolkata	A-319	IAC	137	5.6
Silchar	Kolkata	A-320	IAC	57	9.8





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## **Note for Readers**

This study has been conducted on behalf of SFAC by Synergy Technofin Pvt. Ltd. Due Diligence has been exercised by the consultant to obtain authentic secondary data and conduct field studies and interviews in a professional manner. The analysis and conclusions drawn are also made in an objective and fair manner. All original records related to the study are available with Synergy Technofin Pvt. Ltd.

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