

# Mango Market Overview and Opportunities

Study on Scope of Mango market overview and opportunities for small holders.

[Download](#)

- [Read the Report on mango market overview and opportunities by Pradan \(2011\)](#)

# Read the Report on mango market overview and opportunities by Pradan (2011)

## WORKING DRAFT

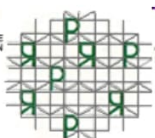
Last Modified 29/03/2011 13:31:16 India Standard Time

Printed 29/03/2011 13:31:27 India Standard Time

## Mango Market Overview and Opportunities



PROFESSIONAL ASSISTANCE  
FOR DEVELOPMENT ACTION



Discussion Document

March 2011

CONFIDENTIAL AND PROPRIETARY

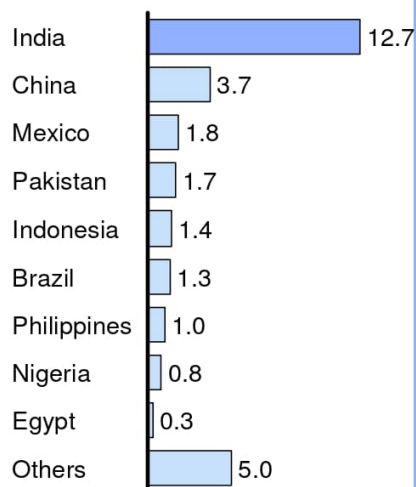
Any use of this material without specific permission of PRADAN is strictly prohibited

## Topics for discussion

## India is the largest producer of mangoes in the world

**Mango production globally, 2006**

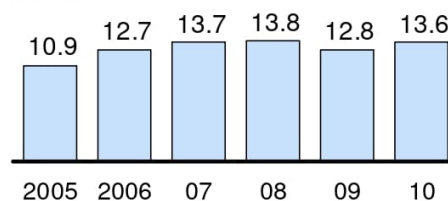
Million tonnes



India is the largest producer of Mangoes in the world accounting for ~ 40% of the world's production

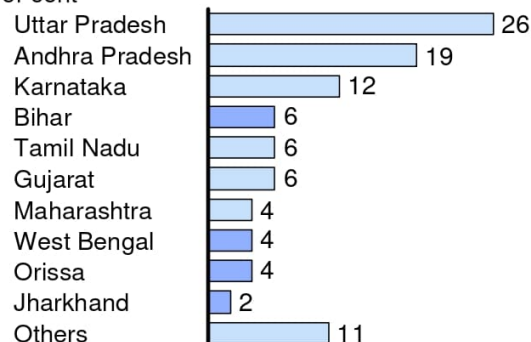
**Mango production in India**

Million tonnes



**Share of mango production by state - 2006**

Per cent



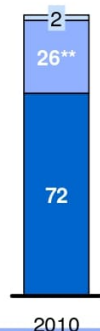
Source: APEDA, Indiastat

| 2

## Over 70% of demand for mangoes is driven by domestic consumption

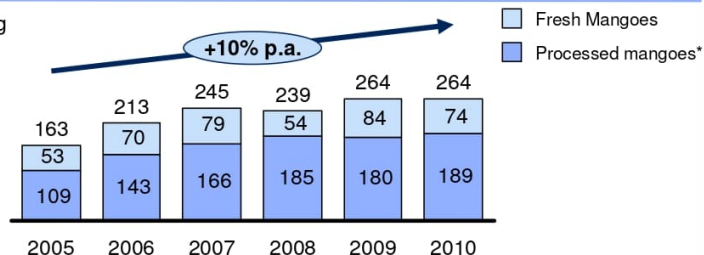
**Consumption of mangoes**

100% = 13.6 billion kg



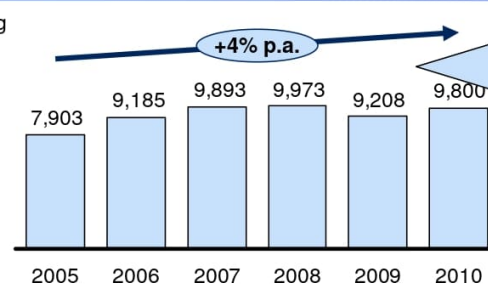
**Exports**

Million kg



**Domestic Consumption**

Million kg



Growth rate over the years ranges from 0 – 5 % depending on the time period chosen, with a 20 year (1990-91 to 2009-10) rate being 3%

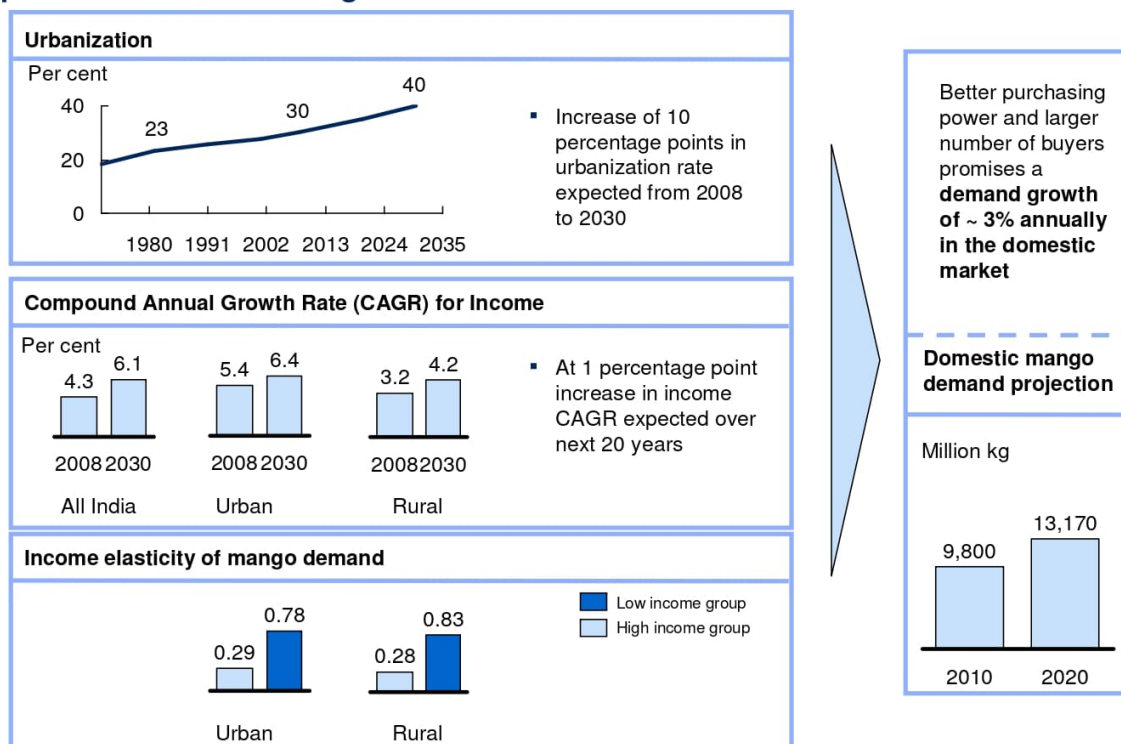
\* Includes pulp, juice, squash, mango slices in brine

\*\* Wastage at different stages of the value chain taken together. Value taken from "VALUE CHAIN ANALYSIS OF MANGO IN UTTAR PRADESH, INDIA", a paper by Deo Datt Singh of ACIDI/VOCA for World Vision

Source: DGCIS Annual Export, PRADAN Analysis

| 3

**Growing urbanization as well as income growth would increase domestic demand, however low income elasticity of mango is likely to keep demand growth modest at 3% per annum in the coming decade**



Source: Census reports and "Building Inclusive cities" – report by McKinsey and Company, FAO

| 4

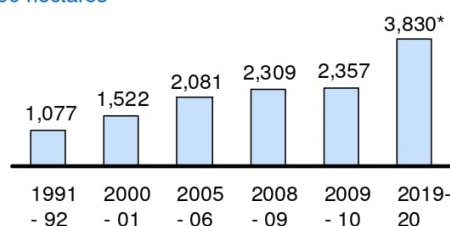
**Supply of mangoes, however, is also expected to increase dramatically on the success of the National Horticulture Mission and other production related initiatives**

#### Acreage for Mangoes is expected to increase

- Substantial increase in mango acreage due to SGSY, TWC, NHM programs as well as farmer preference for low labor / high return crops
- Agriculture budget allocation increased by 76% from 2004-05 to 2008-09; more optimistic trend promised according to 11<sup>th</sup> 5 year plan and the 2011 budget
- With growing pressure on the government due to high food inflation, multiple dialogues of private players for investment and logistical support are being contemplated

#### Mango Acreage in India

'000 hectares

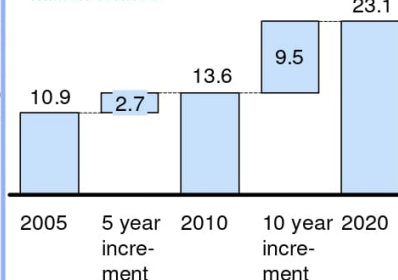


#### Assumed production profile of a mango plant

- Year 1 – 0 kg / tree
- Year 2 – 0 kg / tree
- Year 3 – 0 kg / tree
- Year 4 – 10 kg / tree
- Year 5 – 10 kg / tree
- Year 6 – 15 kg / tree
- Year 7 – 15 kg / tree
- Year 8 – 25 kg / tree
- Year 9 – 30 kg / tree
- Year 10 onwards – 50 kg / tree

#### Mango production will almost double in the coming decade

Million tonnes

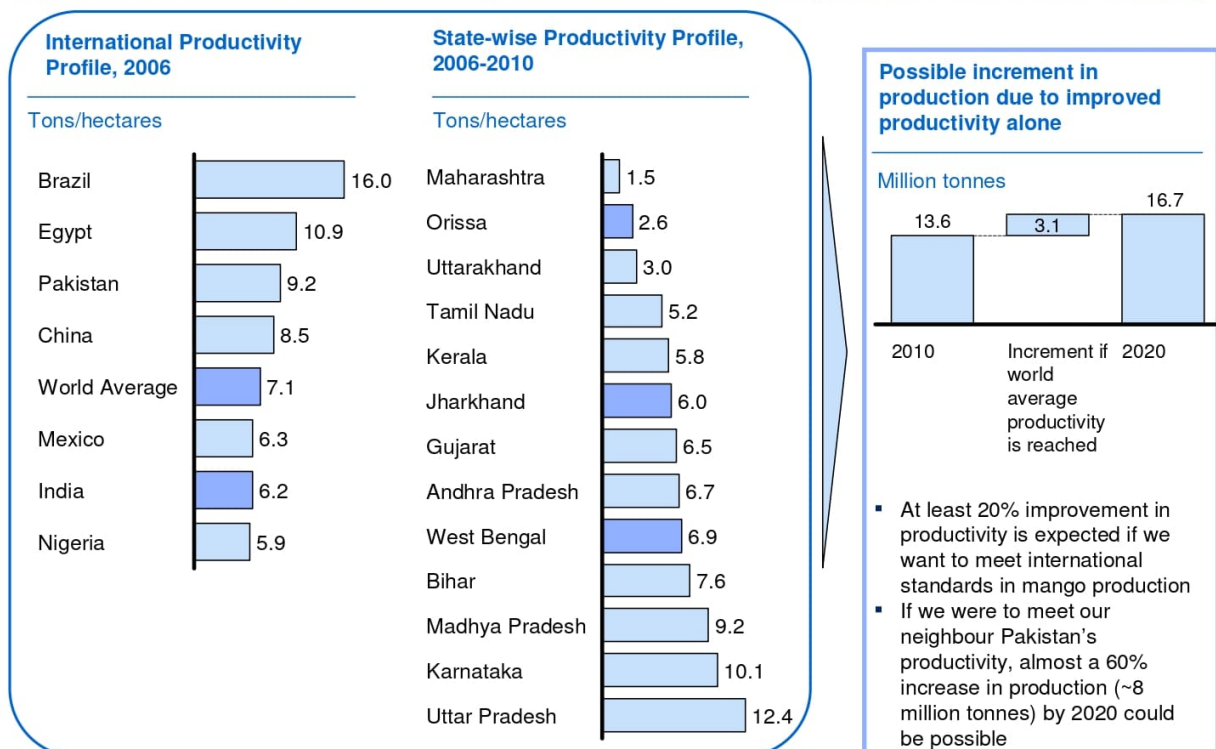


\* Projection CAGR for next 10 years taken as 5%, same as the CAGR from 2000-01 to 2009-10 for mango acreage; CAGR from 1990-91 to 2000-01 was 4%; This choice is only reinforced by budget focus on agriculture

Source: Census reports, Annual report of Ministry of Agriculture, "Building Inclusive cities" – report by McKinsey and Company

| 5

**In addition to acreage increases, there is substantial scope for productivity improvements so skill building initiatives will likely further increase supply**

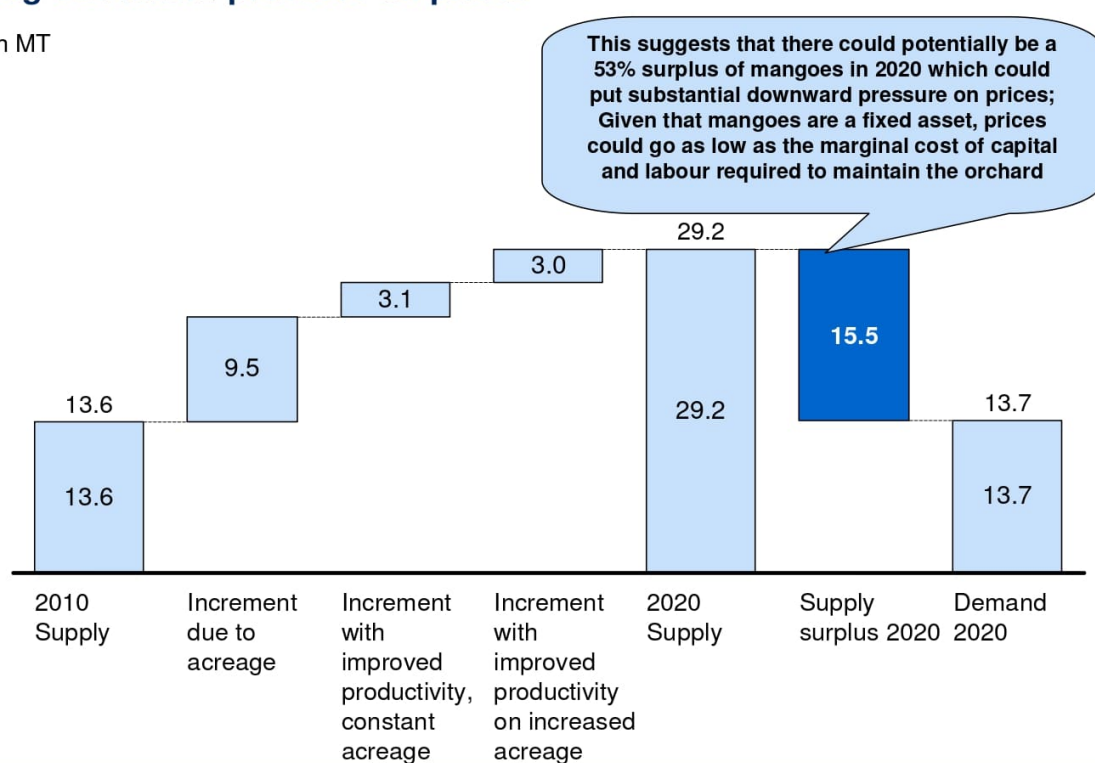


Source: Indiastat

| 6

**This highlights substantial risk that the supply may outstrip demand, putting downward pressure on prices**

Million MT



Working Draft - Last Modified 29/09/2010 16:16:30 Printed

| 7



## Some of this excess supply could be absorbed by latent demand or proactive development of new mango related products

### Some latent demand likely...

- Mangoes are a relative luxury so if prices fall, they will become more affordable
- In eastern India, per capita consumption is comparative lower relative to north and western India so this could absorb some excess supply, particularly in 3 and 4<sup>th</sup> tier cities and rural areas

### ... as well as potential for new products

- If mango production rises and / or prices fall, it may create additional processing or value addition opportunities for both the local and export markets
  - Organic fresh and pulp mangoes
  - Mango chips
  - Dried mangoes
  - Mango wine / spirits

Working Draft - Last Modified 29/09/2010 16:16:30 Printed

## It also appears that there is scope to expand the international market but linkages need to be established

**India is the largest mango exporter however prices are high relative to competitors – productivity and quality need to improve**

Top mango exporters, 2007

<b>Exports, MT</b>	<b>Price, US\$ / MT</b>
India	240,858 679
Mexico	236,004 505
Brazil	116,271 775
Peru	82,512 772
Netherlands	80,598 1,419
Pakistan	62,057 323
Thailand	61,026 561
Ecuador	41,379 479
Philippines	27,068 1,310
Guatemala	20,490 324

**If we can improve, there is a small, but ready regional export market in Asia and Middle East**

Top mango importers, 2007

<b>Imports, MT</b>
United States of America
Netherlands
United Kingdom
United Arab Emirates
Germany
Saudi Arabia
France
Belgium
Malaysia
Yemen
China, Hong Kong SAR
Singapore
Spain
Portugal
Japan
Nepal
Kuwait

Working Draft - Last Modified 29/09/2010 16:16:30 Printed

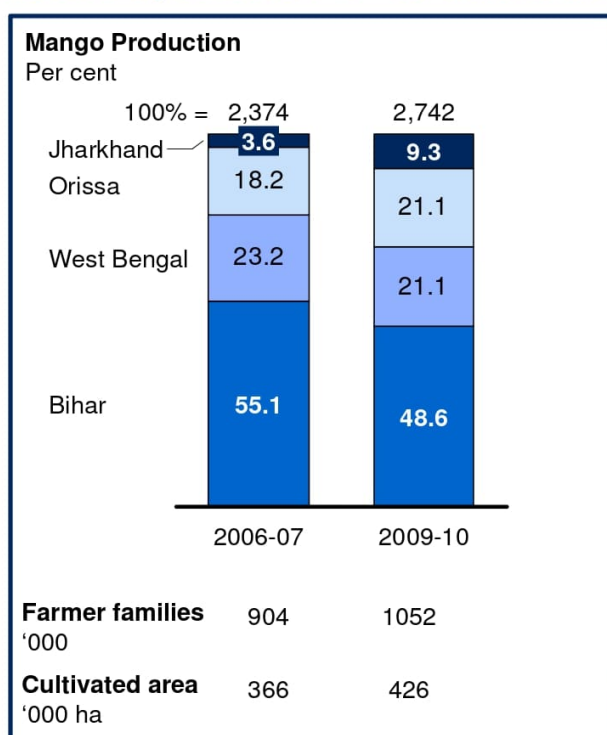
Study of trade barriers will be required if there is a vision to substantially increase exports (e.g., phyto-sanitary requirements); Even if barriers can be addressed, a substantially higher quality focus and strengthened supply chain would be required to serve this market

## Topics for discussion

- Is the mango market attractive for India?
- **Are mangos an attractive crop for smallholders?**
- What are the opportunities to create or shift value in the mango value chain?
- What interventions do we recommend for the benefit of smallholder mango farmers in Jharkhand and eastern India?

| 10

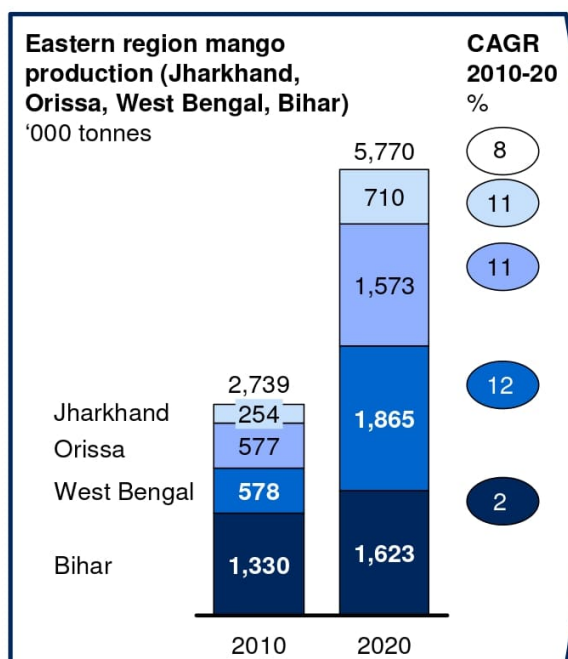
## Mango production in Jharkhand and its neighbouring states has historically been low at ~2.7 million MT / annum



- Total regional supply of mangoes is 2.7 million MT in 2008-09
  - Jharkhand had 15,000 ha of mango plantation, which produced 254,000 million tonnes of mangoes
  - Neighbouring states of Bihar, Orissa & West Bengal have much larger combined area of 411,000 ha under cultivation and account for 2.5 million tonnes of production

| 11

... and is expected to grow at an aggressive ~8% pa over the next 10 years as new horticulture acreage get added and start bearing fruit;  
2 varieties dominating growth in Jharkhand – Amrapali and Mallika

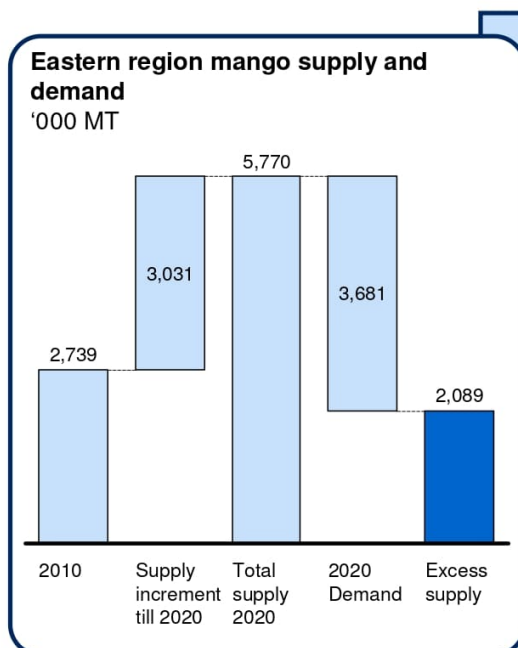


- Even without any increase in acreage in the region, an additional ~3 million tonnes of mangoes over next 10 years as new acreage get added and new plantations start bearing fruit
- For Jharkhand alone, this means:
  - ~65 times the current arrivals to Ranchi mandi (~10,800 MYT / annum) and ~25 times that to the Jamshedpur mandi (~27,000 MT/annum)
  - Increase total mango production of the state by more than 275%
- **Vast majority of this production (>75%) would be from 2 varieties – Amrapali and Mallika, both of which are promoted by scientists but have no / limited established market**

Source: PRADAN Analysis

| 12

**Demand, in contrast, is likely to grow at a much more modest pace of ~3% over the next 10 years, generating risk of lower prices and a regional glut**



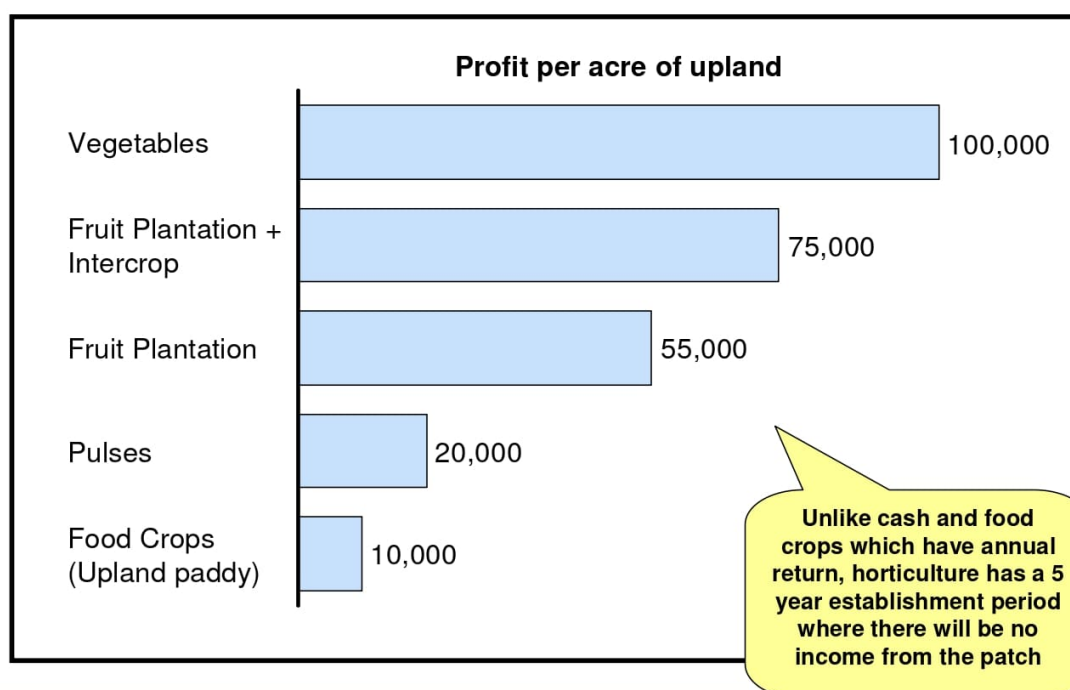
- The total size of mango market demand is unclear but could be as high as ~2.7 million tonnes from the region with the majority of consumption focused on langra, banganpalli, gulabkhas and dusseri varieties
- Growth will be driven by...
  - Increasing incomes
  - Reduced prices triggering latent demand
- Based on current estimates, this demand will increase by 3% over the next 10 years, increasing total demand by ~900,000 tonnes
- Local supply could therefore outstrip local demand by ~2 million tonnes – however different from the national market, here we have very limited understanding of the true micro-market dynamics and further study is likely required

Source: PRADAN Analysis

| 13



**In spite of these risks, both donors, NGOs, and communities continue to plant acreage due based on the assumption that returns will be greater than traditional upland paddy**



Source: PRADAN

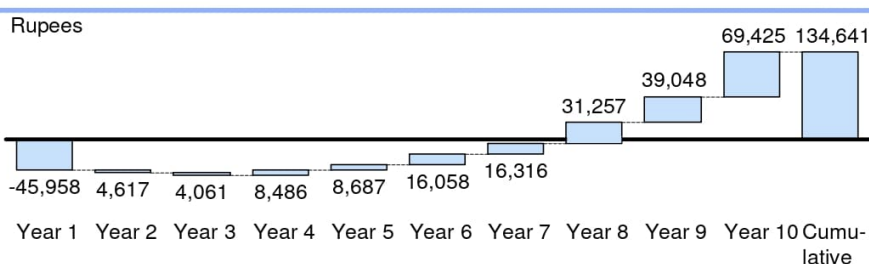
| 14

**We estimate that mangoes will still offer profits of up to ~74,000 / acre in the tenth year of plantation which would make a substantial contribution to family income if the plants can survive that long**

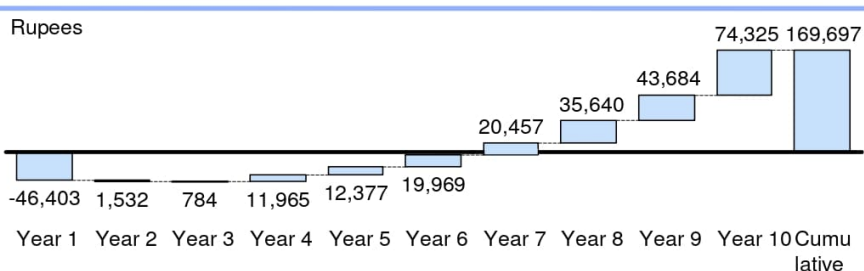
#### Key assumptions

- Fixed costs include costs for:
  - Planting including mortality
  - Pit digging
  - Fencing
  - Pit filling and planting – labour, compost, neem cakes, bone meak, protection chemicals
  - Irrigation facility installation
- Variable costs include:
  - Weekly irrigation
  - Fertiliser and protection chemicals
  - Labour
- Intercropping includes timber and vegetable plantation

#### Profit per acre per year without intercropping (including labor)



#### Profit per acre per year with intercropping (including labor)



Source: Market visits, interviews, PRADAN Analyses

| 15

## However successful engagement in mango requires a targeted family selection given the specialized resource base required to ensure success

Criteria	Ideal minimum
Land and water	<ul style="list-style-type: none"> <li>Land: &gt;2.5 acres; at least 2 acres upland</li> <li>Water: Some access to irrigation; Ideally own source that provides for kharif and rabi intercrop</li> </ul>
Labor	<ul style="list-style-type: none"> <li>Labor: 2+ members who can stretch in early years to meet labor requirement or 1 laborer</li> </ul>
Capital	<ul style="list-style-type: none"> <li>Capital: at least Rs. 1,500 in initial years for intercrop; will require Rs. 5,000 to maintain orchards once subsidy ends</li> </ul>
Livelihood	<ul style="list-style-type: none"> <li>Ideal if they have previous experience in agriculture or some other livelihood that keeps them close to the orchard</li> </ul>
Food security	<ul style="list-style-type: none"> <li>9-12 months, ideally food secure</li> </ul>

Source: PRADAN

| 16

## To make mango plantation a profitable option for smallholders, establishing market linkages, building the brand and identifying opportunities in the value chain are critical next steps

Focus of this document

### The present situation and potential future developments...

- Preference for mango horticulture among smallholders is growing given higher returns compared to traditional food crops, despite the lag in receiving these returns
- Mango production is therefore expected to grow dramatically at 8% relative to demand in the coming 5 years, leading to up almost a 60% surplus
- > 75% of this growth will be driven by 2 relatively unknown (though scientifically endorsed) varieties of *Amrapali* & *Mallika*

### ...highlight 3 main areas of focus to make mangoes a profitable and sustainable option for smallholder farmers

- Sheer magnitude of acreage and production increase (irrespective of mango variety) calls for **focus on building market linkages and infrastructure to enable absorption**
- Given the relative market unfamiliarity with the 2 new varieties, there is a pressing **need to build the variety brand, gather consumer support and explore new markets / product options**
- To ensure success of this smallholder livelihood intervention, **exploring opportunities to establish and then create / shift value in the mango value chain need focus**

| 17

## Topics for discussion

- Is the mango market attractive for India?
- Are mangoes an attractive crop for smallholders?
- **What are the opportunities to create or shift value in the mango value chain?**
- What interventions do we recommend for the benefit of smallholder mango farmers in Jharkhand and eastern India?

| 18

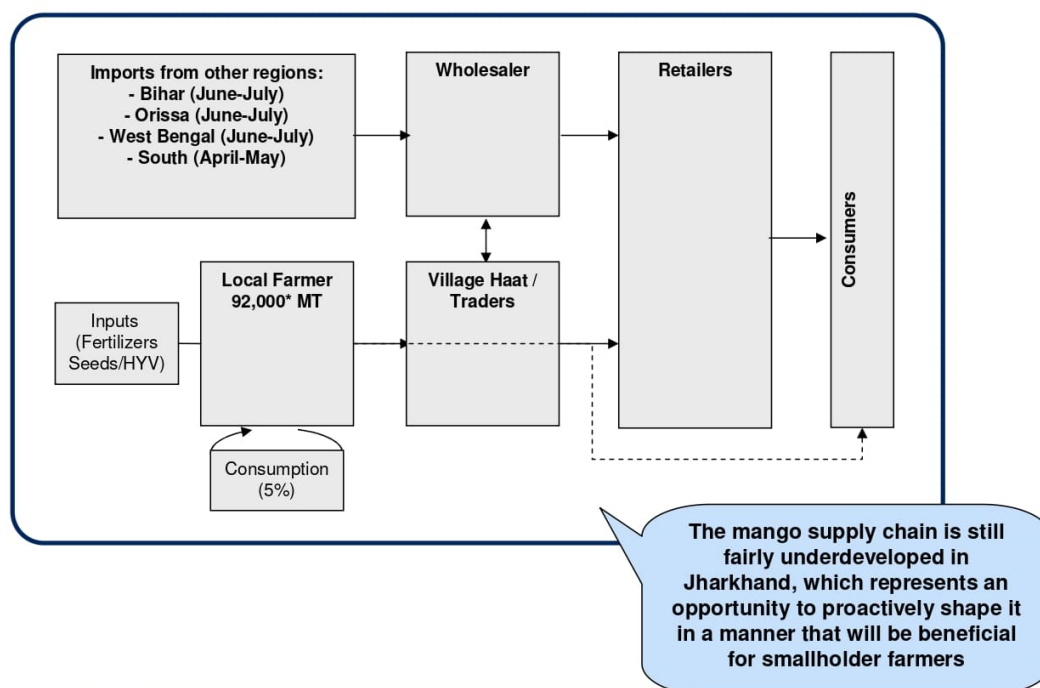
## Creating or shifting value in the mango value chain would involve two major steps

*2 steps to  
create and shift  
value in mango  
value chain*

- **First**, if smallholders are to compete and win, we need to **establish a supportive supply chain**. This would at a minimum include building credit and input / output market access
- **Once a supportive supply chain are in place, we can explore intervention opportunities which can strengthen/create/shift value** at all stages of the mango value chain to maximise smallholder returns

| 19

**The current mango value chain in Jharkhand is for fresh mangoes, and is under-developed, largely supplied through imports from other states**

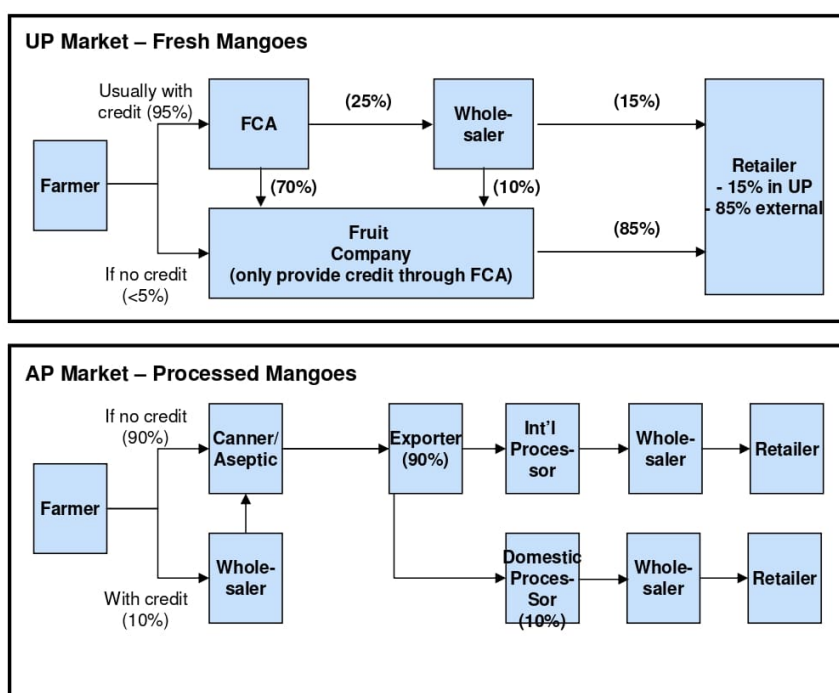


\* 2008-09 production from NHB

Source: Market visits, interviews, PRADAN

| 20

**A look at other regions draws attention to several challenges and issues that we should be aware of as the Jharkhand supply chain develops**



- Traders control market information and extract maximum rent from farmers through extension of credit
  - Buy whole orchard in advance at a substantial discount
  - Provide credit which requires farmer to sell produce to them at disadvantageous rates
- 50% of mangoes in south region are sold into fresh market; Although prices are higher, it is harder to sell and preserve price / quality
- Farmers prefer processed mangoes given assured market
- Some farmers still sell forward or are tied to wholesalers due to credit constraints; most sell direct to processors

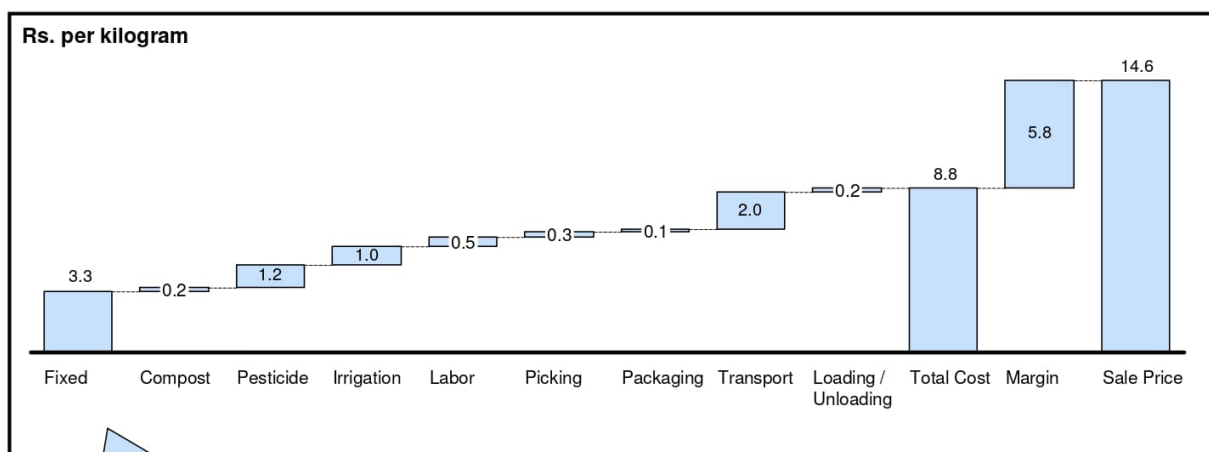
Source: Market visits, interviews, PRADAN

| 21



The current returns to mango cultivation in Jharkhand are quite high, however these will fall in line with national markets once local production increases over the next 5 years

DUSSHERI MANGOES

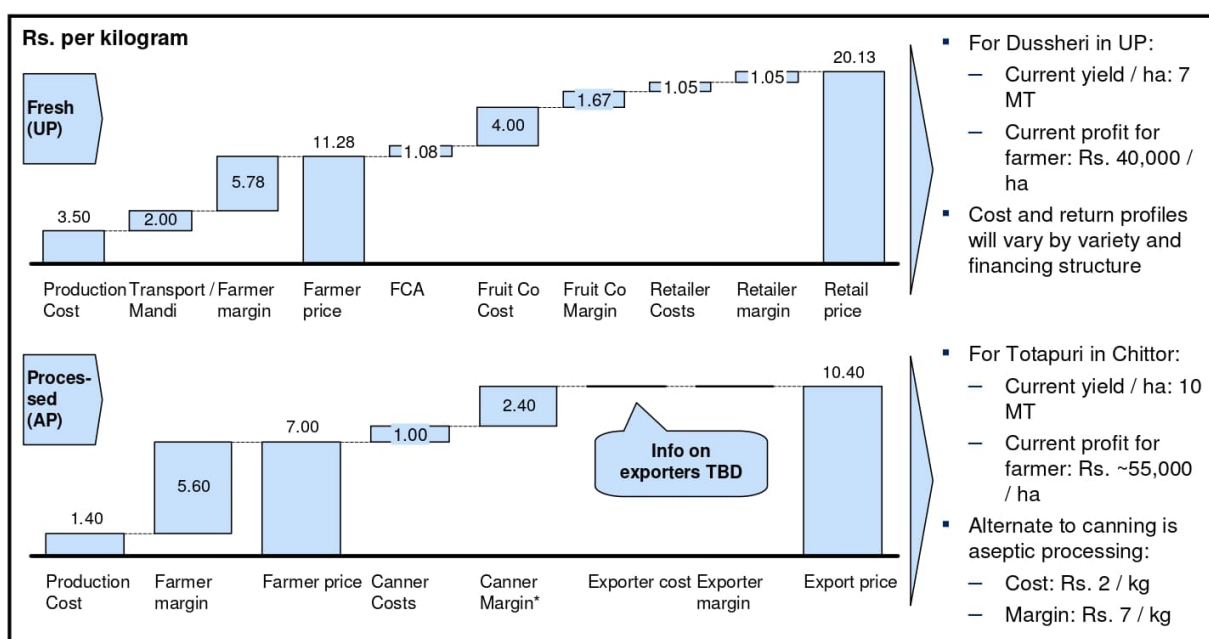


**Fixed costs per hectare: ~Rs. 23,000**  
 - Seedlings: Rs. 7,875 (Rs. 35\*225)  
 - Pit digging / filling: Rs. 10,000  
 - Fencing: Rs. 5,000

Source: Market visits, interviews, PRADAN

| 22

Analysis of the Chittor and Lucknow markets suggest that long term sustainable farmers returns will be ~Rs. 50,000 / hectare



\* Includes up to 10% losses or Rs. 1 / kg which is a potential cost  
 Source: Market visits, interviews, PRADAN

| 23

## If smallholders are to compete and win, we need to build a supportive ecosystem and supply chain that enable them to profitably engage in the market

### Our study identifies 3 focus areas to support supply chain development

- **Ensure credit access** to avoid distress selling
  - Ensure that farmers have access to enough credit to support their ongoing input needs and kharif cultivation, otherwise they will be vulnerable to traders who offer mango orchard linked credit
- **Build input and output market access** to reduce perceived risk and maximize return
  - Ensure the right input material and technology is available while planting and nurturing the crop to maximize production
  - Establish output linkages so that farmers have confidence that if they invest, they will be able to sell the produce at the prevailing market rate
- **Set realistic profitability expectations** so that smallholders can make informed decisions on investments of time and financial resources
  - Ensure farmers understand the likely productivity over the first 10 years and what types of returns they can achieve if they nurture the orchard to its full potential
  - Sensitize farmers to the fact that prices will likely fall as regional production increases and anchor their expectations around likely long term returns

| 24

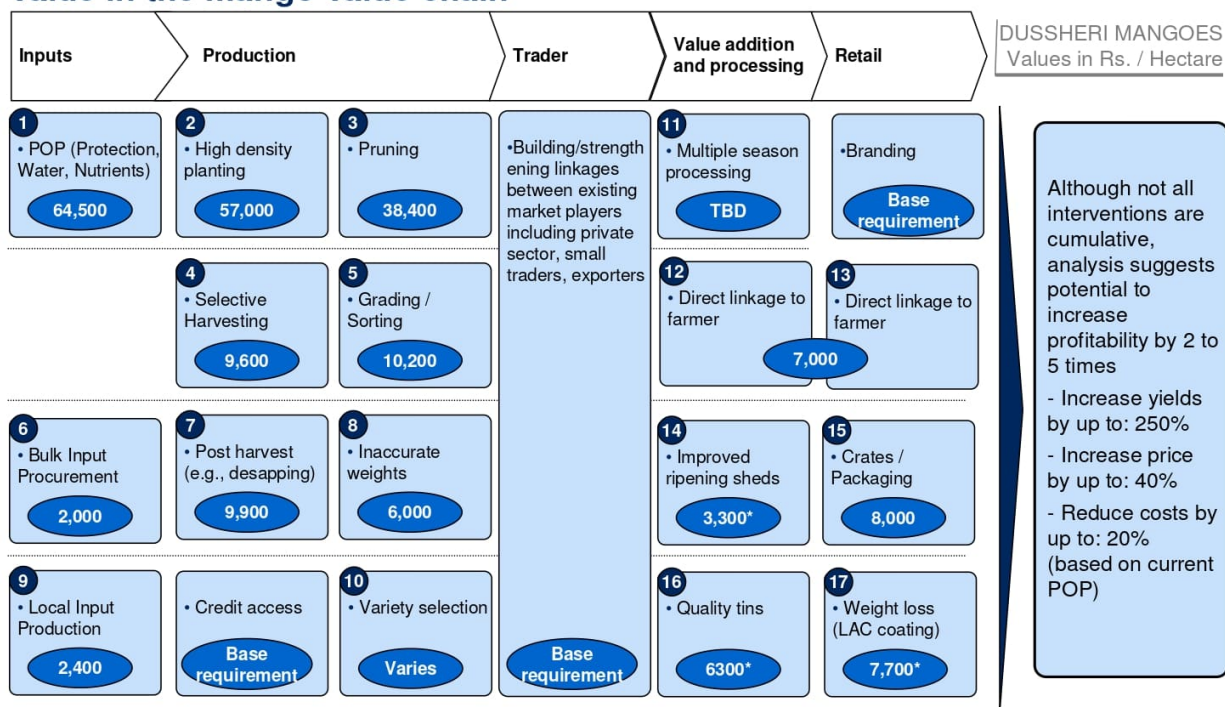
## Creating or shifting value in the mango value chain would involve two major steps

### *2 steps to create and shift value in mango value chain*

- **First**, if smallholders are to compete and win, we need to **establish a supportive supply chain**. This would at a minimum include building credit and input / output market access
- **Once a supportive supply chain are in place, we can explore intervention opportunities which can strengthen/create/shift value** at all stages of the mango value chain to maximise smallholder returns

| 25

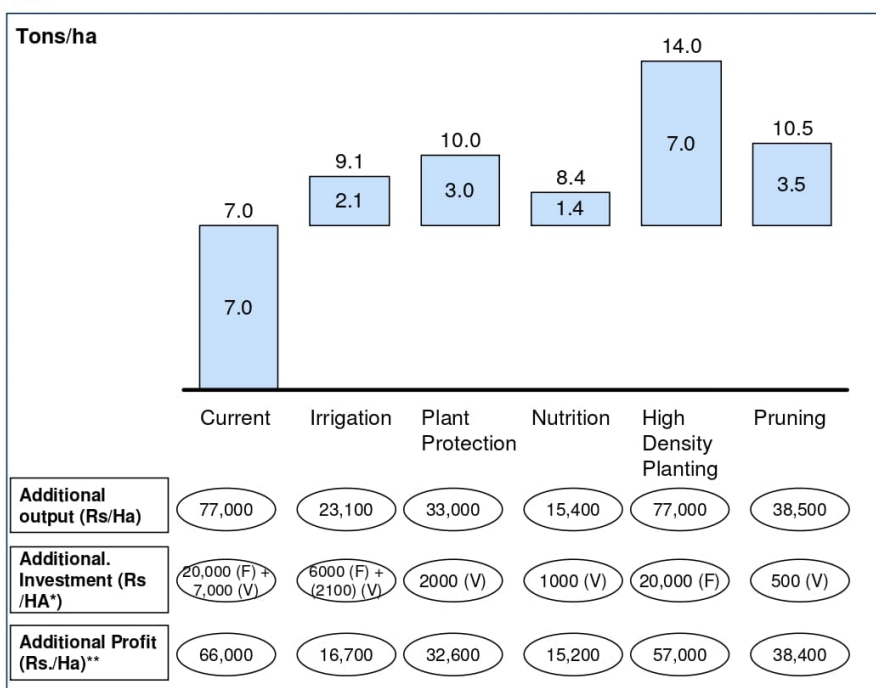
## Once the ecosystem has been created, there are 17 opportunities to create value in the mango value chain



\* Cost assumptions for these interventions have not been factored in  
Source: PRADAN Analysis

| 26

- 1 Improved input use has the potential to more than triple yield from its
- 2 present value of 7 tons/ha
- 3



- If all initiatives are taken, yields could improve from 7 MT / HA to 25 MT / HA
- Highest returning investments are:
  - Pruning (45% IRR)
  - Plant Protection (41% IRR)
- Some investments such as irrigation have important spillover benefits:
  - Enables farmers to take additional crop on non-mango land or via intercropping
  - Intensification will likely increase demand for labor putting upward pressure on prices

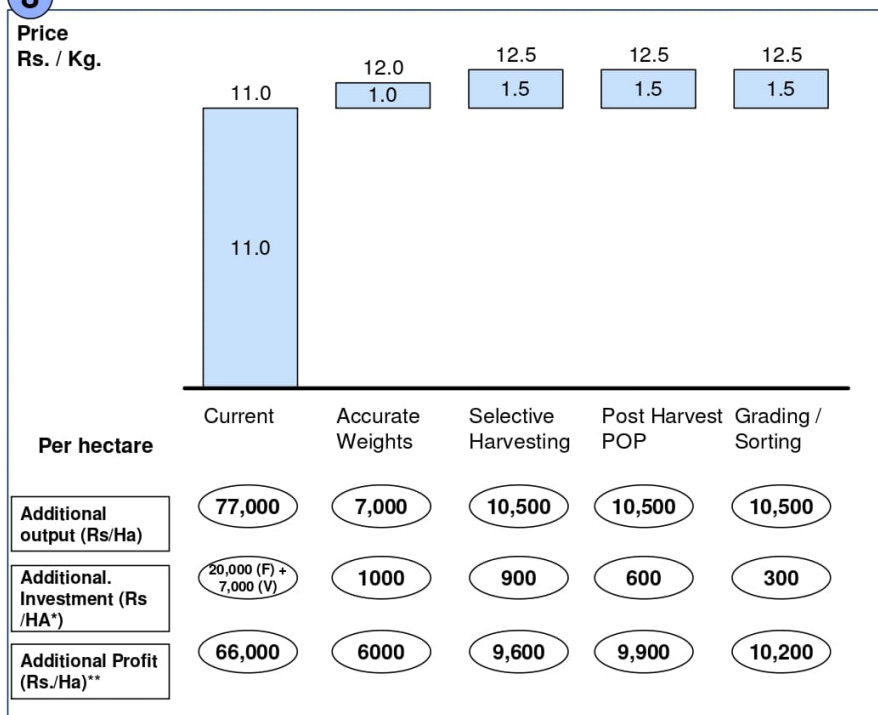
\* Fixed investments are depreciated over a 5 year time horizon given the perceived high discount rate of farmers  
\*\* Assumes current local prices of Rs. 11 / kg.

| 27



#### 4 Most of the price related initiatives can result in an increase of up to 7 Rs. 1 – 5 / KG more in price

8



- If all initiatives are taken, price could improve from 11.0 Rs. / kg to 16 Rs. / kg
- Highest returning investments are [LIST]
- Some investments such have important spillover benefits including:
  - Grading and sorting will incentivize farmers to improve the overall quality distribution of their production raising prices further over time
  - Initiatives like Post Harvest POP and Selective Harvesting results in higher quality which will help ensure that produce sells even with market glut

\* Fixed investments are depreciated over a 5 year time horizon given the perceived high discount rate of farmers

\*\* Assumes current local price of Rs. 11 / kg.

| 28

#### 5 Grading and sorting at the farm level can increase prices by 10-15% and has several spillover benefits, including improved output quality over time and ability to directly access retail markets

ALPHONSO EXAMPLE FROM MAHARASHTRA

20% of the farms in Maharashtra (and 100% of farmers in Jharkhand) do not grade their fruit, and sell primarily through traders...

	Wholesale price	Estimated quantity	Total revenue
	Rs/kg	Tons	Rs. crore
Entire produce sold at one pre-determined price	33	60,000	200

VS.

If produce was graded at the farm, farmers could capture an additional Rs 5 in price as well as spillover benefits

Grading	Wholesale price	Estimated quantity	Total revenue
	Rs/kg	Tons	Rs. crore
≤200 grams	29	18,000	52
200-250 grams	40	18,000	72
250-300 grams	43	18,000	77
300 grams+	45	6,000	27
Weighted avg. price	38		
Total			230

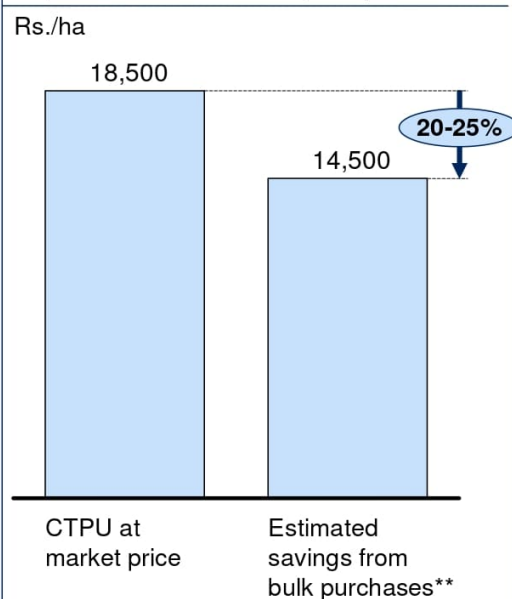
- Proper grading at the farm level increases the weighted price by 10-15%
- Currently grading standards are not well understood by Jharkhand farmers, grades would need to be established and clearly communicated
- Over time, we would also expect to see the distribution shift to higher quality mangoes



**6 Bulk input purchase can result in high transaction costs, however if it is done properly it can result in cost saving of up to 20%**

MAHA GRAPES EXAMPLE

**Expenditure on CTPU\* by Grape Farmers**



- Retailer margins of ~25% can be reduced through bulk purchase of inputs\*\*
- Example of the benefit of bulk purchases:
  - CTPU, which is a growth regulator, used in grape cultivation, is procured in bulk and sold to farmers for a discount on market price and the savings of this discount are shared between the farmers and the intermediary facilitating the bulk purchase
  - Furthermore, due to bulk purchase, inputs can be procured directly from source or from large suppliers, and hence circumvents any problems of spurious inputs
- PRADAN's Palkot cooperative has saved 10%

\* CTPU is a growth regulator used by grape farmers which increase the size of the grape. Above calculation is based on 3.5 ltrs of CTPU used per hectare, and prevailing market price of Rs. 5,000 per ltr is considered

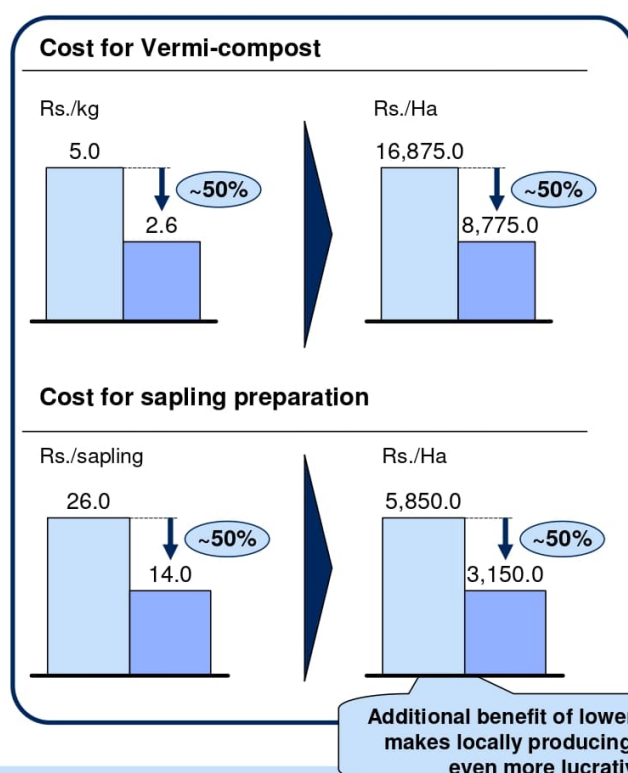
\*\* Average retailer margin of 25-30% is considered in this analysis, but depending on the product, this margin can be 40-50%

\*\* Exact price of Mahagrapes was not disclosed – estimates of 10-15% discount on market price were provided by Mahagrapes during interviews

Source: NABARD; MSAMB; Interviews

| 30

**9 Local input production can help save as much as 50% of the costs\***



Market  
Local Production

- Investment can go down by as much as 50% by locally producing manure, saplings etc.
- Examples showing the benefit of local input production
  - Vermi-compost, which is generally purchased from the market can be produced at half the price locally. This can be done if farmers simply purchase cow dung directly and put in upto half an hour of labour each day till the desired product is obtained
  - Sapling production is slightly more labour intensive, but on the whole its still almost 50% cheaper than buying them in the market. It also has an additional benefit of lower mortality

\* Cost considered here includes costs for saplings, fertilizers and insecticides

| 31

**10 There are over 200 varieties of mangoes, and we believe that farmers should focus on 2-3 balancing proven marketability and high potential**

Variety	Yield / HA (Tons/Ha)	Price (Rs/ Kg)	Harvest month	Market acceptance	Smallholder suitability
<b>Amrapalli</b>	10	15-30	June end	<ul style="list-style-type: none"> <li>•Scientist promoted, through not yet popular</li> <li>•Small size but great taste</li> </ul>	<ul style="list-style-type: none"> <li>• Regular bearing, standardized for close spacing (~1600 plants/ha)</li> </ul>
<b>Mallika</b>	10	15-25	June end	<ul style="list-style-type: none"> <li>•Scientist promoted, through not yet popular</li> </ul>	<ul style="list-style-type: none"> <li>• Regular bearing, standardized for close spacing (~1600 plants/ha)</li> </ul>
<b>Dusheri</b>	8	15-30	Mid June	<ul style="list-style-type: none"> <li>•Well accepted in market</li> </ul>	<ul style="list-style-type: none"> <li>•Alternate bearing, suitable for close spacing</li> </ul>
<b>Langra</b>	12	10-25	June	<ul style="list-style-type: none"> <li>•High demand in market</li> </ul>	<ul style="list-style-type: none"> <li>•Alternate bearing, big canopy , require very good nutrition and water supply, not yet standardized for close spacing plantation</li> </ul>
<b>Totapuri</b>	8	5-8	May	<ul style="list-style-type: none"> <li>•Only for processing market</li> <li>•Assured industry demand</li> <li>•Export dependent demand</li> </ul>	<ul style="list-style-type: none"> <li>•Not profitable in small areas</li> </ul>
<b>Himsagar</b>	8	10-20	Mid June	<ul style="list-style-type: none"> <li>•Growing popularity in WB markets</li> </ul>	<ul style="list-style-type: none"> <li>•Mostly grown in WB, alternate bearing</li> </ul>

Working Draft - Last Modified 21/03/2011 18:40:29 Printed 19/01/2011 16:44:01

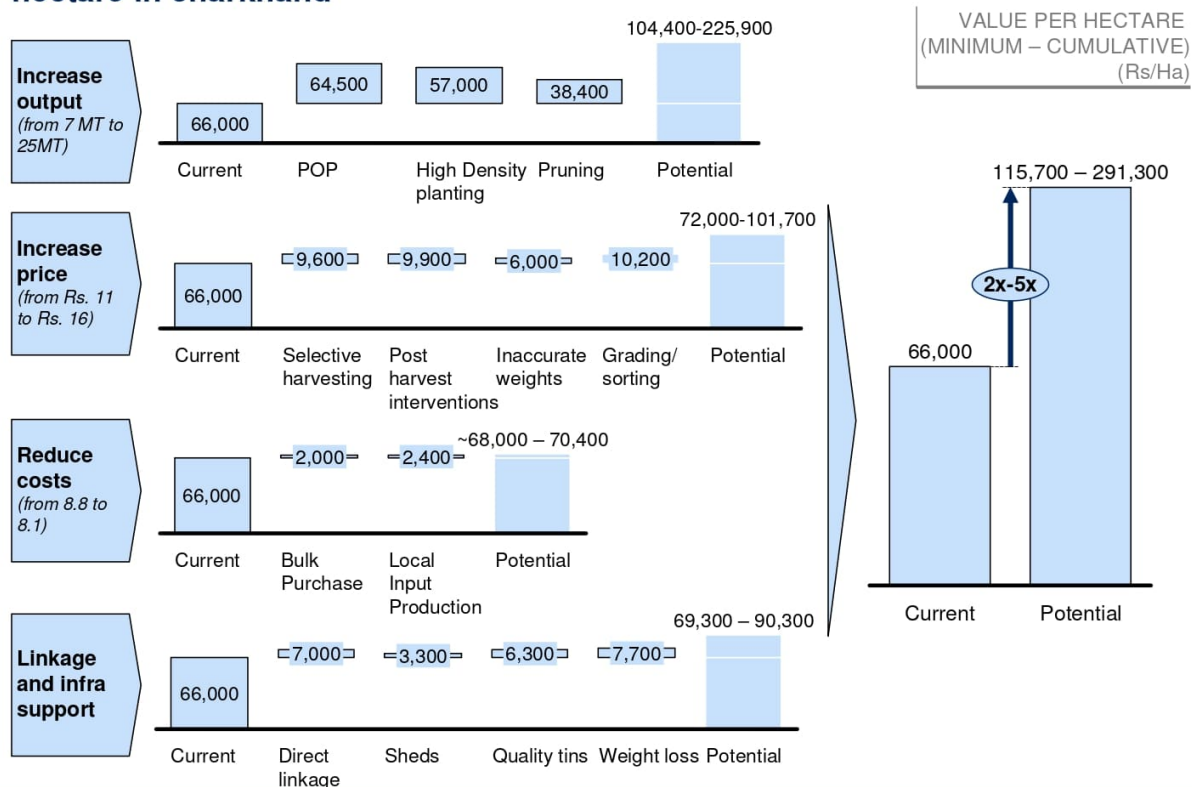
| 32

**15 Crate / Packaging**

How would it work?	What would it take to make it a success?
<ul style="list-style-type: none"> <li>▪ 90% is loose packed</li> <li>▪ 10% crates and corrugated carton               <ul style="list-style-type: none"> <li>— Cost of each crate is 120-150 Rs and holds 16-18kg / mango</li> <li>— 5 Rs for corrugated carton which holds 15 kg mangoes</li> <li>— Rs 1 /cartoon for packaging with paper, string and straw at bottom.</li> </ul> </li> <li>▪ 10-15% of mangoes arrive in processing plants at chittor is in crates and it gets 10-15% higher price than those in cardboard boxes or gunny sacks</li> <li>▪ Saves labor for unloading...</li> </ul>	<ul style="list-style-type: none"> <li>▪ In tomatoes 2 kg is deducted from 25kg in each cardboard carton (8%) to compensate wastage.</li> <li>▪ Last year mangoes were sold in corrugated cartons without any deduction as mangoes were demanded by traders.</li> <li>▪ The trader will invest in one set of crates and farmers/ producer's collective will own another set, and they exchange during trade. The tomato traders are willing to do it. Need to explore with mangoes.</li> <li>▪ customized cartons can be made to facilitate the branding of Amrapalli and Mallika mangoes produced locally.</li> <li>▪ Crates are always preferred by traders.</li> </ul>

| 33

## These 17 opportunities result in a cumulative impact of up to ~ Rs. 3 lakh per hectare in Jharkhand



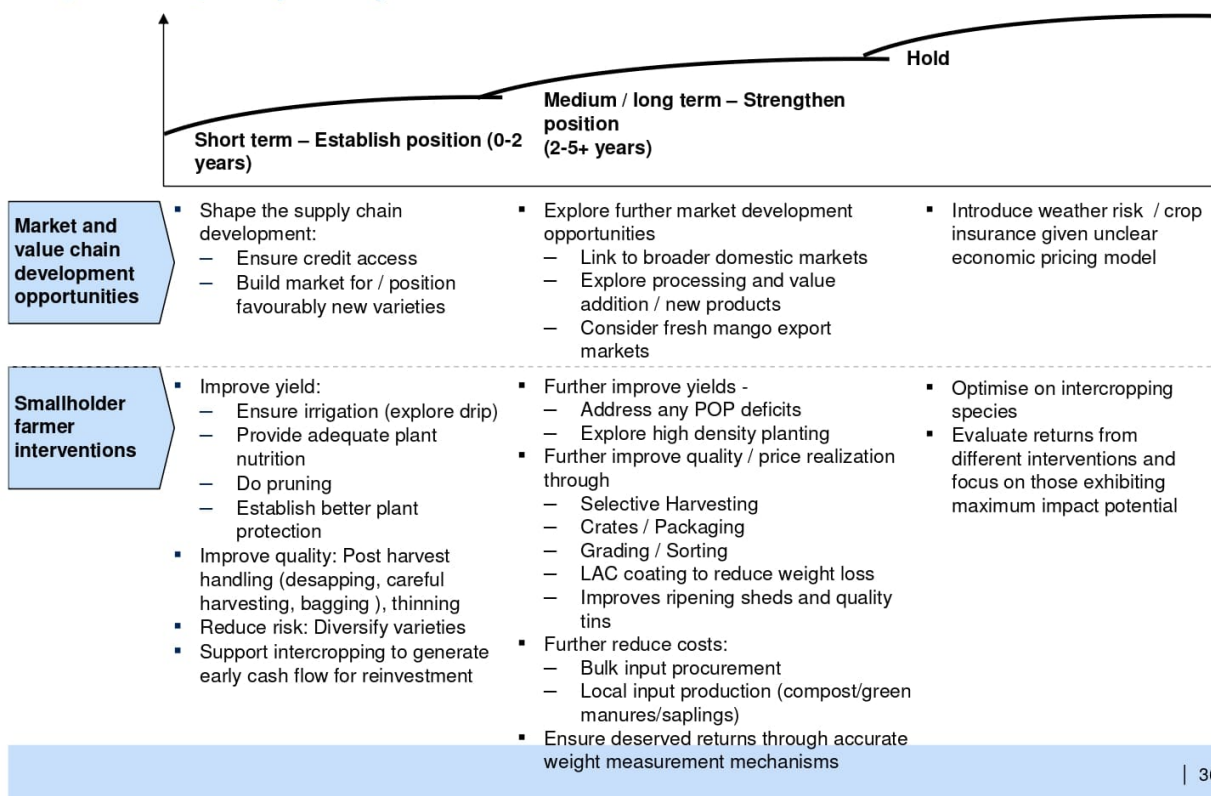
| 34

## Topics for discussion

- Is the mango market attractive for India?
- Are mangos an attractive crop for smallholders?
- What are the opportunities to create or shift value in the mango value chain?
- **What interventions do we recommend for the benefit of smallholder mango farmers in Jharkhand and eastern India?**

| 35

**Given the likely market volatility, our short term priority is to strengthen the sector against the likely supply shock and price volatility through improved quality and yield interventions**



| 36

**And have identified the following topics for further study**

- **Explore the market potential for Mallika and Amrapali varieties:**
  - Who are the highest potential customers?
  - Where are they?
  - What do they value?
  - How can we better meet their need?
- **Identify alternate varieties for eastern India if Amrapali and Mallika do not have sufficient market demand**
- **Identify mechanisms to sustain the input flow, output marketing, continue high quality production, knowledge and skill up-gradation of farmers**
- **Explore the scope of mango processing or value addition in eastern India**

| 37