Overview of Opportunities in Exotic, Indigenous and High Value Horticultural crops

For the cause of farmers always

Presented
by

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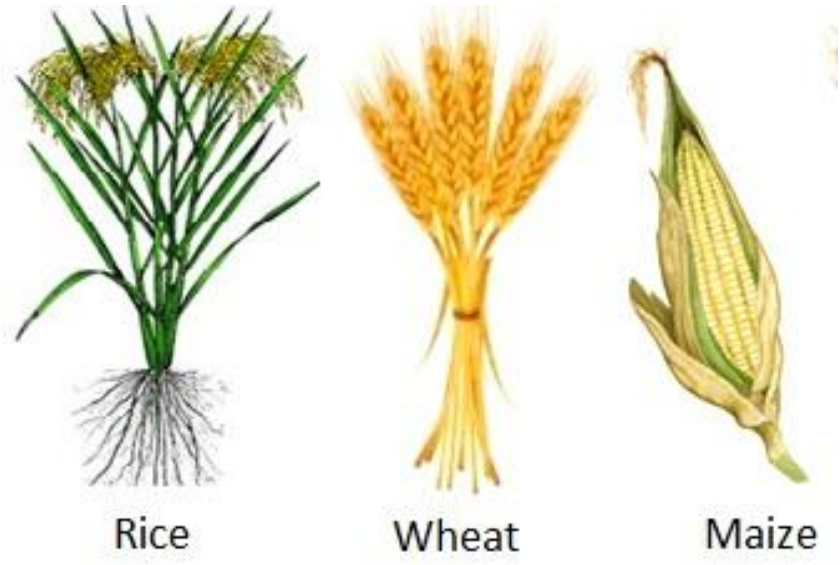
Diminishing diversity

Globally, 80% of our plant-based calorie intake comes from just 12 domesticated plant species: 8 cereals and 4 tubers.

50% of our plant-based calorie intake comes from wheat, rice and maize

Ethnobotanical studies - more than **7000 species** have been used by humans as food in prehistoric times



CROP DIVERSIFICATION

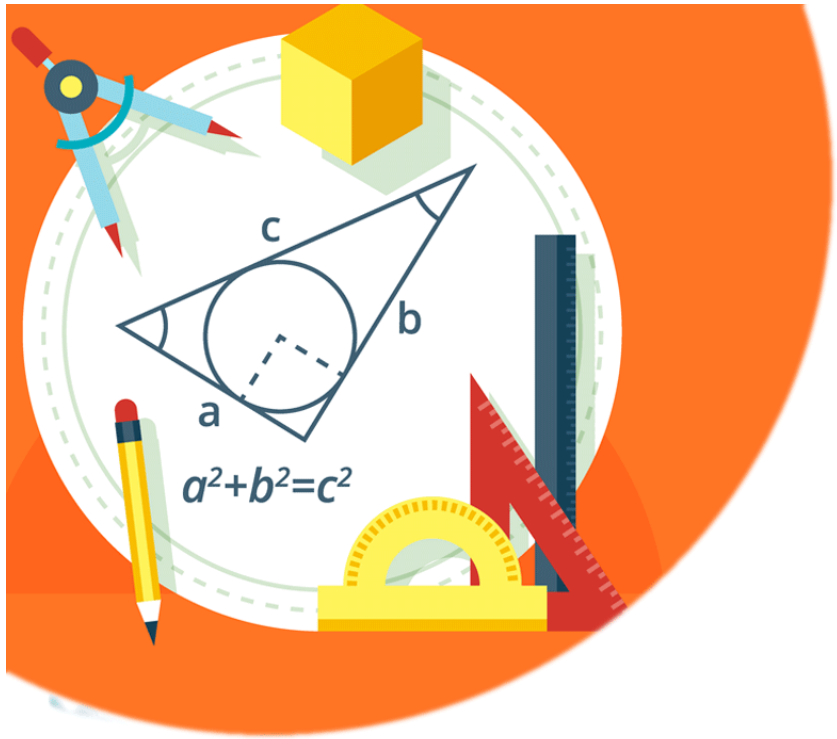
- The cropping pattern and other related changes required in agricultural production system in order to meet market challenges -CROP DIVERSIFICATION
- Diversification into horticultural crops -an avenue to poverty alleviation
- The production of fruit and vegetables has a comparative advantage
  - Under conditions where arable land is scarce
  - Markets accessible due to positive relation between income and employment
  - Gross returns per unit of area are much higher than for most of the other crop groups.
- Diversified cropping patterns have been an insurance in dry and drought prone regions where weather vagaries and other uncertainties are translated to painful income instability.
- Smallholder farmers are receiving incomes that have not existed previously
- Now we want to talk Diversification within Horticultural Crops

Horticulture Tables the Complete Basket

Focussed production | Ideal Marketing| Post Harvest Management | Credit Flow | Private Sector Investment

The Crop Geometry

Shifting little area from staple to high value in the suitable region (agro-climatic condition) can lead to a **sizable increase in the returns for farmers.**



Diversification into production of fruits and vegetables, in general, and vegetables, in particular, is **likely to benefit the small and marginal farmers**

To be clubbed with **crop planning matrix** to understand the potential location for area and crop shifting.

Recipe for success

Pre production- Planning – Area- Inputs

Production- Planting material

Post production-Market-Domestic/Global Level

Strategy for
Import Substitution of
Major High Value Horticulture Crops

Government support- Bouquet of schemes

Knowledge Partners

Major Imports of Fruits and Nuts of India

(Qty in '000 MT & Value in Rs Crore)

Sl No	HS CODE	DESCRIPTION	2017-18		2018-19		2019-20		2020-21 (Till July)	
			Qty	Value	Qty	Value	Qty	Value	Qty	Value
1	08013100	Cashew Nuts in Shell	649.37	8850.80	834.33	10876.86	936.11	8776.84	352.13	3138.00
2	08021100	Almonds Fresh Or Dried in Shell	151.21	5071.29	151.19	5324.41	166.80	5907.94	46.94	1630.62
3	08081000	Apples Fresh	257.96	1626.90	283.33	2085.13	262.23	1793.97	96.34	712.25
4	08041020	Dates (Khazur)	221.41	833.47	281.15	1021.59	232.30	1058.67	26.68	169.91
5	08062010	Raisins	20.49	574.83	23.26	727.13	26.16	779.97	2.46	46.73
6	08042090	Dried figs	12.04	627.33	10.82	621.38	13.50	758.59	0.61	18.60
7	08025100	Pistachios In Shell	9.05	463.64	9.70	592.33	10.44	649.08	2.78	162.46
8	08025200	Pistachios Shelled	4.99	425.58	5.73	529.81	6.52	581.70	1.03	85.15
9	08105000	Kiwi Fruit	29.94	232.15	41.38	346.17	44.95	333.53	7.13	78.82
10	08023100	Walnuts in Shell	19.41	354.15	13.14	246.98	16.91	311.15	4.90	96.97

Strategy for Import Substitution

- Ensuring availability of genuine quality planting material
- Increasing production through Area Expansion
- Increasing productivity through adoption of smart technologies
- Cluster Development of High Value Horticulture Crops
- Involvement of KVKs/ICAR Institutes / Centre of Excellences for Capacity Building and Outreach activities
- Branding and Promotion

Product Specific Strategy - Cashew nut

Values in Rs crore, Volume in '000' MT

	2017-18	2018-19	2019-20
Import Value	8850	10876	8776
Import Quantity	649	834	936
Domestic production	817	743	703 (3rd est)
Major Source Countries	Cote D'Ivoire, Benin, Ghana, Guinea Bissau, Nigeria, Singapore, UAE, Burkina Faso		

Strategy:

- Increase in production:
  - Increase of area – from 10 Lakh hectare to 12 Lakh hectare in next two years
  - Productivity to be increased from 850Kg/hectare to 1 tonne/hectare
  - Removal of senile plantations and replanting with HYV
  - Intensive technology transfer

- Agriculture Infrastructure Fund utilization for modernizing cashew processing and adoption of end to end holistic approach.
- The cashew imported in raw form is processed and is partly exported.
- There is 2.4 million tonne of processing capacity.
- Import related to export of processed cashew nut may be encouraged with tariff concessions.

Globally important exotic fruit crops

1. Avocado
2. Blue berry
3. Dragon fruit
4. Fig
5. Kiwi
6. Mangosteen
7. Persimmon
8. Passion fruit
9. Rambutan
10. Strawberry










Locally produced fruits with high nutritional value or other potential

1. Mango-Ratual
2. Papaya- Coorg Honey Dew
3. Phalsa- Kanpur
4. Pumelo-Devanahalli
5. Guava- Alahabad apple
6. Jackfruit- Redbulb
7. Custard Apple-Balanagar
8. Sapota-Kalipatti
9. Citrus- Medica
10. Bael-Faizabad
11. Tamarind
12. Aonla





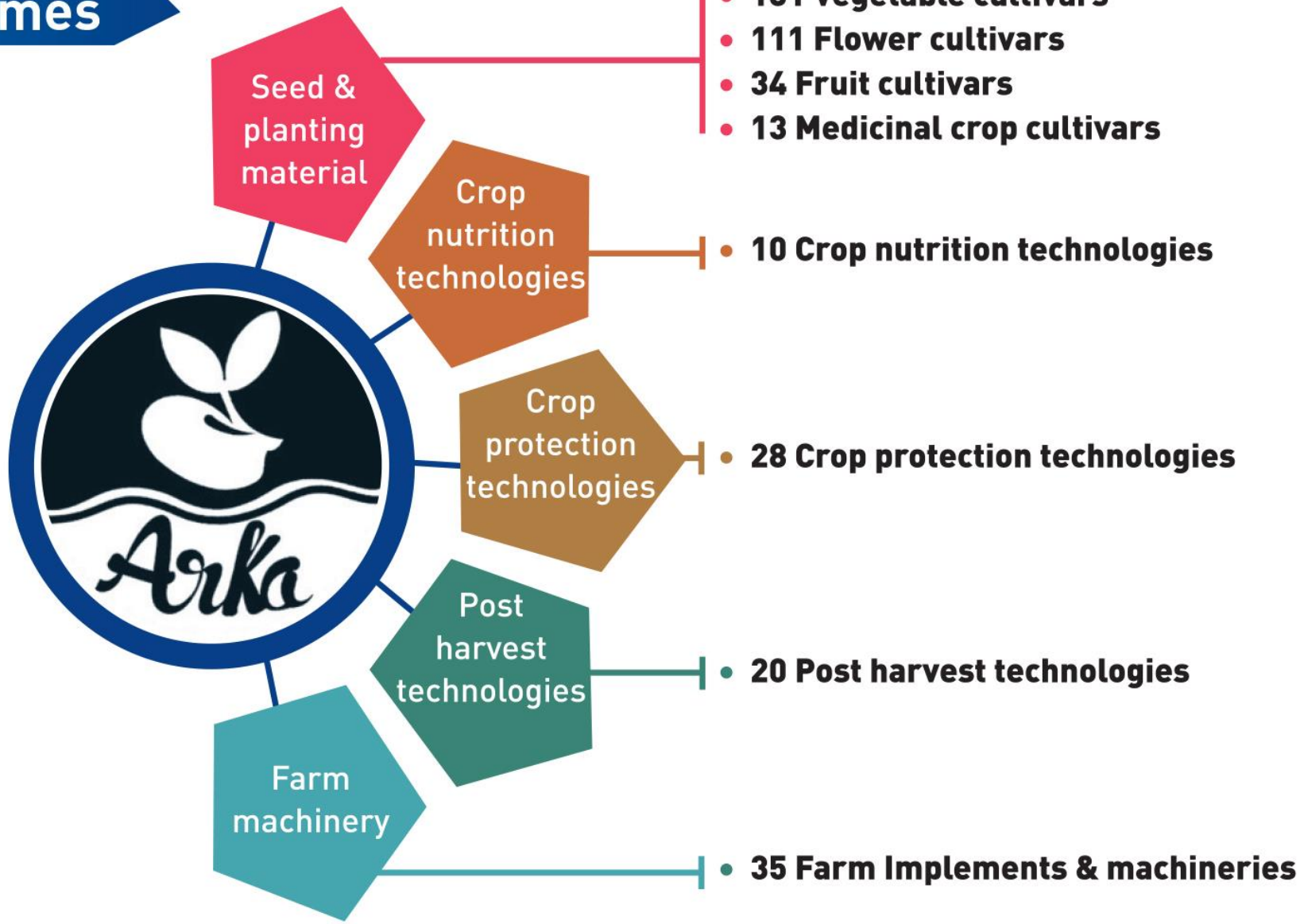







Technology

Technology themes



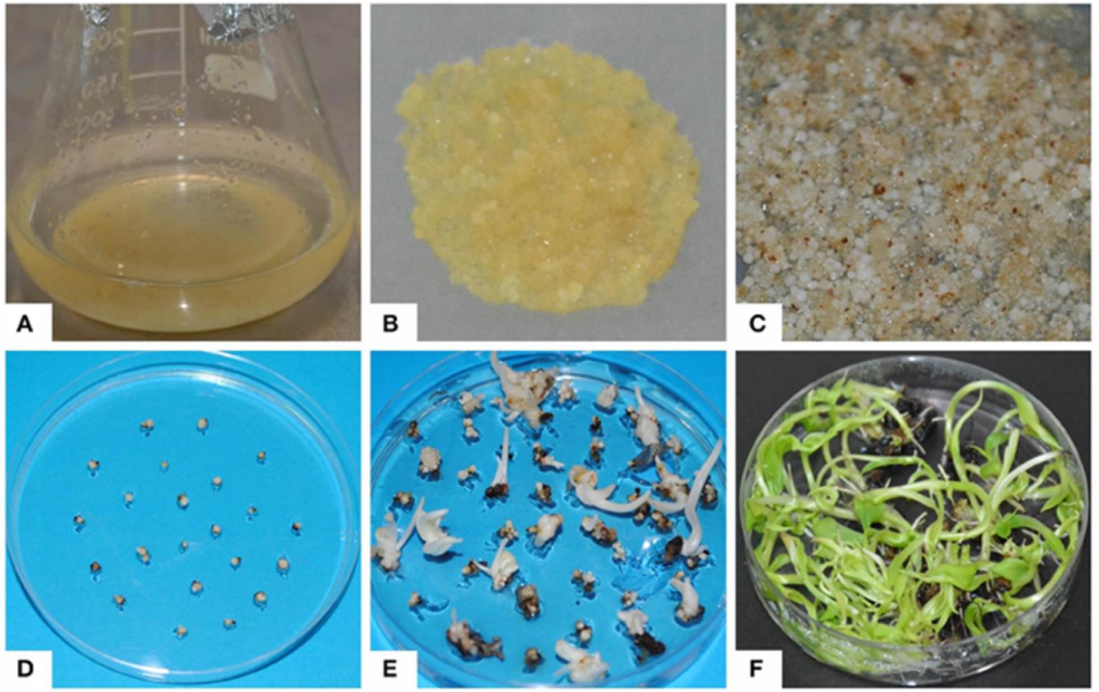
Quality plant material

ARC- Potato

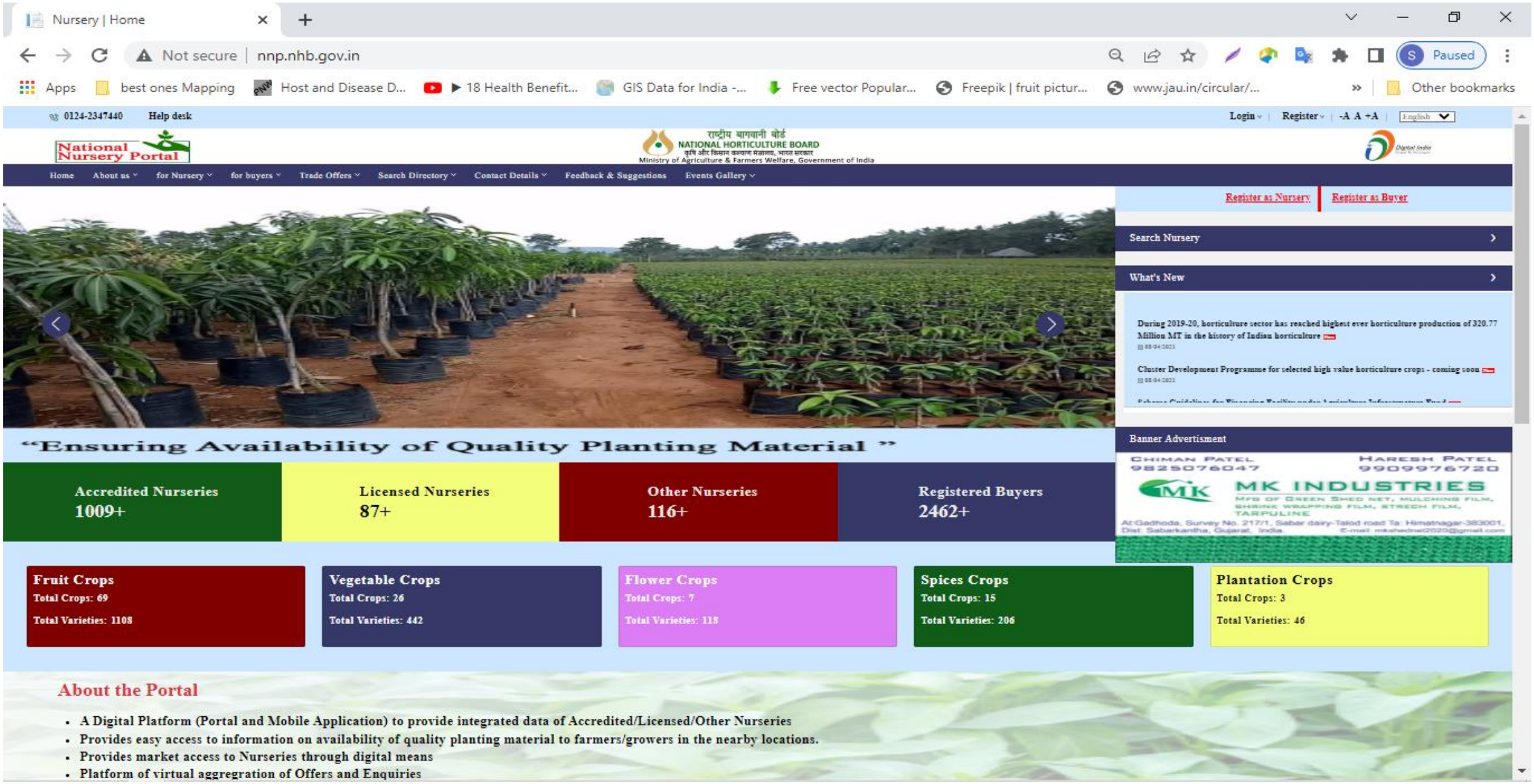
Grafting of vegetable seedlings

VERTICAL COLUMN METHOD - to harvest three type of cuttings from Black Pepper

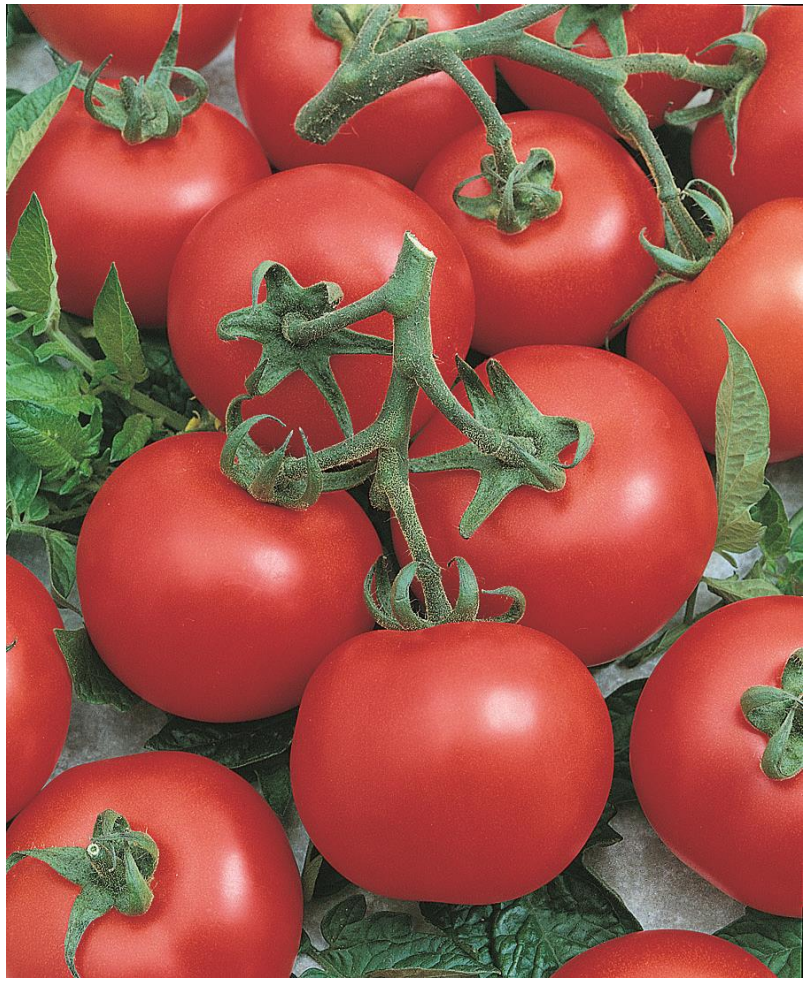
Embryogenic suspension culture- Banana



National Nursery Portal



F_1 Hybrids



Vertical Farming

Microgreens- Small but mighty

a high growth business

Microgreens are young and tender leafy greens of most vegetables, grains, herbs and flowers that are harvested when their first leaves appear.

Diversification with flower crops: Efficient flower production systems

State	Districts	Existing production systems
Assam	Kamrup Morigaon, Nagaon and Tinsukia & Cachar	Marigold, Gladioli, Tuberose, Gerbera and orchids, Anthurium and foliage
Maharashtra	Pune, Nasik Kolhapur and Sangli districts	Rose, Marigold, chrysanthemum
Rajasthan	Ajmer BundiChittor Jaipur, Jodhpur, Kota, Nagaur,Pali Udaipur	Marigold, chrysanthemum (Winter), tuberose, Jasmine, Nerium, Crossandra and Gaillardia Cut flowers (Rose, Cut chrysanthemums, gerbera, carnation, orchids and anthuriums under protected cultivation)
Madhya Pradesh	Ratlam, Chhindwara, Indore, Dhar, Ujjain	Marigold and Rose
Tamil Nadu	Krishnagiri, Coimbatore, Madurai, Kanyakumari, Dindigul, Trichy	Jasminum sambac, Rose, African marigold, Tuberose, Crossandra

Diversification with Plantation crops

Arecanut

State	Efficient and potential districts
Andaman and Nicobar Islands	Nicobars, South Andamans, North and Middle Andamans
Andhra Pradesh	Srikakulam, , West Godavari, East Godavari
Karnataka	Dakshina Kannada, Uttara Kannada, Chikmagalur, Kodagu, Tumkuru, Shimoga, Chitradurga Davangere Udupi
Kerala	Kasaragod, Kannur Alappuzha, Kozhikode, Mallapuram, Palakkad Thrissur, Waynad,
Goa	North Goa and South Goa
Meghalaya	South Garo Hills, South West Garo Hills, West Garo Hills, East Garo Hills, North Garo Hills,
Assam	Srikakulam, Vishakhapatnam, VIjayanagarm, W.G., E G,
Puducherry	Pondicherry, Mahe Karaikal
Tamil Nadu	Ooty, Coimbatore
Odisha	Cuttack, Jajpur, Ganjam, Puri, Khordha

Cashew:

State	Efficient Zones /Districts of Cashew
Andhra Pradesh	Srikakulam, West Godavari, East Godavari
Chhattisgarh	Bastar Plateau (Sukma, Bijapur, Narayanpur, Dantewada, Kondagoan, Jagdalpur, Kanker), Chhattisgarh Plains (Mahasamund, Rajnandgaon, Balod, Gariyaband, Raigarh, Korba) Northern Hill Zone (Jashpur, Koria, Balrampur)
Jharkhand	Purbi Sinnghbhum, West Singhbhum, Dumka, Pakaur
Odisha	Ganjam, Gajapati, Dhenkanal, Koraput Mayurbhanj, Khordha, Cuttack,
West Bengal	Purba Medinipore, Paschim Medinipur,Jhargram Bankura, Purulia, Birbhum
Karnataka	Uttara Kannada, Belagavi, Kolar, Gadag, Bidar, Dharwad
Kerala	Kannur, Kasargod, Palakkad
Goa	North Goa
Tamil Nadu	Cuddalore, Ariyalur, Perambalur, Nagapattinam, Thoothukudi, Villupuram
Maharashtra	Sindhudurg, Ratnagiri, Raigad, Kolhapur Nasik, Gondia, Gadchiroli, Palghar
Meghalaya	East Garo Hills, West Garo Hills
Tripura	South Tripura, West Tripura

Diversification with Spice crops

Black pepper

Most Efficient Cropping zone	Efficient Cropping Zone	Efficient production systems
Assam, Karnataka, Meghalaya and Tripura	Goa, Kerala and Andaman & Nicobar Islands	As intercrop in Tea plantations (Assam), Coconut, arecanut and tea plantations in Meghalaya and Tripura, Coffee, arecanut and monocropping systems in Karnataka.

- While promoting black pepper, zones that are from non –traditional areas can be focused for yield by introducing high yielding varieties with high quality attributes can be promoted though organic production practices.
- In traditional pepper zones like Karnataka and Kerala High yielding varieties need to be adopted for tapping the higher yield on sustainable practices.
- In zones like Sirsi, Karnataka and Idukki, Kerala where mixed varieties are popular, promotional programmes for quality based product can be implemented targeting the demand.

Turmeric

Most Efficient Cropping zone	Efficient Cropping Zone	Efficient production systems
Andhra Pradesh, Karnataka, Manipur, Meghalaya, Tamil Nadu, Telangana, Tripura and Andaman & Nicobar Islands	Arunachal Pradesh, Assam, Mizoram, Uttarakhand and West Bengal	Crop rotation with vegetables and pulses, intercropping in coconut, vegetable and fruit cropping systems or mono cropping system

- In zones like NE states and Odisha, quality of the product may be given priority and organic production programmes may be promoted.

- In high yielding traditional belts like AP, Telengana, TN and Bihar varieties with high yield and quality may be concentrated with high input technologies to reap the trade benefits.

Small cardamom

Most Efficient Cropping zone	Efficient Cropping Zone	Efficient production systems
Kerala	Karnataka and Tamil Nadu	Forest ecosystem at the elevation of > 1500 feet. Intercrop in coffee and arecanut based systems.

Tuber crops

Efficient production systems (suitable areas and ecosystems, states, districts) taking into consideration of soil degradation, availability of water and climate change.

Cassava	Kerala, Tamil Nadu, AP, Gujarat, Maharashtra, NE states
Sweet potato	Eastern India
Aroids	UP, AP, Chattisgarh, West Bengal
Taro	West Bengal, Gujarat

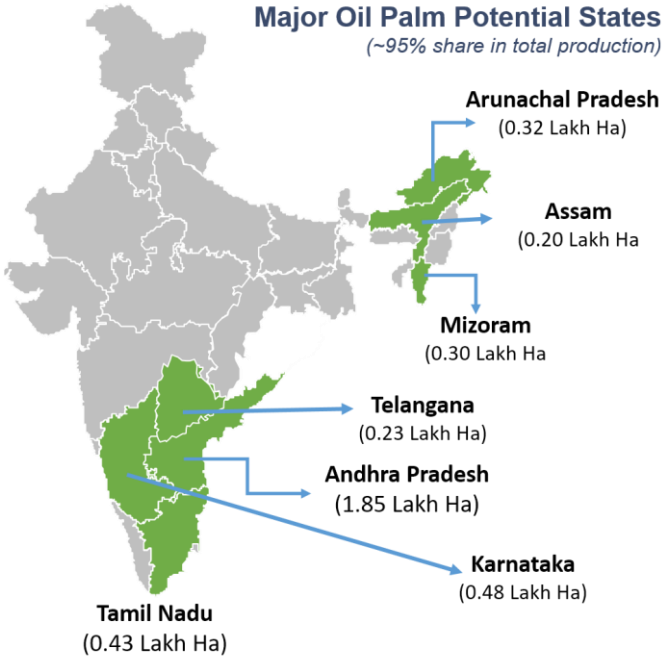
Medicinal Crops

State	Potential areas/districts
Assam	Kamrup, Barpeta, Sonitpur, Nagaon, Baksa, Golaghat, Lakhimpur and Karbi Anglong are major identified production clusters
Tamil Nadu	Virudhunagar, Dindigul, Thiruvallur, Ariyalur, Madurai, Thiruvarur,Dharmapuri, Salem, Nagapattinam and Trichy
Gujarat	Ahmedabad , Banaskantha, Junagadh, Kheda, Kutch, Mehsana, Patan, Surendranagar
Karnataka	Bellary, Kalaburgi, Vijayapura Kolar, Chamarajanagar, Gadag Mandya Dakshina Kannada, Udupi and Uttar Kannada
Uttar Pradesh	All nine agro climatic zones
Andhra Pradesh	Anathapur, Kurnool, Chittor , East Godavari, Visakhapatnam
Odisha	Puri, Ganjam , Cuttack, Jagatisinghpur, Jajpur, kendrapara, Khordha, Nayagarh
Chattisgarh	Bilaspur, Mungeli Korba Raigarh Balrampur Koria
Madhya Pradesh	Mandsour (73.58%), Neemuch (19.99%), Jabalpur (2.74%) and Ratlam (1.52%) for Isabgol. Ratlam, Indore, Chattarpur, Betul, Bhopal, Khandwa, Katni, Morena, Chindwara, Shivpuri, Tikamgarh , Dhar
Punjab	Patiala, Hoshiarpur
Bihar	Begusarai, Buxar, Munger, Vaishali, Madhepura, Madhubani, Muzaffarpur, Bhojpur
Uttarakhand	Tehri, Dehradun, Haridwar (Stevia, Rosemary, Snakeroot, Gloriosa, Shatavari, Lemon Grass, Chamomile)

Coconut and Oil Palm Crop Diversification and achieving self-sufficiency in Edible oils

- Current shortfall is 13 Mn Tons
- Production of edible oil from 1 hectare is 0.39 Ton
- Requirement of land to meet the shortfall = 33.3 Mn ha
- Assuming 30% increase in yield, additional area requirement will be 20 Mn Hectare
- Oil palm - highest yield of 4 tons /ha, therefore, the requirement to meet the edible oil requirement is only 2 Mn ha
- Oil palm, coconut are tree borne oilseeds and solvent extracted oil are the secondary source of vegetable oils that contributes about 30% (including cotton and Rice bran oil) of total domestic availability of vegetable oils.

• Expansion of Area under Coconut. • Production and Distribution of Quality Planting Materials • Integrated Farming for productivity improvement. • Technology Demonstration/Quality Testing Lab. • Technology Mission on Coconut • Replanting and Rejuvenation of Old Coconut Garden- • Coconut Palm Insurance Scheme • Kerasuraksha Insurance scheme	Launching of NMEO-OP with total approved cost of ₹ 11,040 crore focusing on Oil Palm area expansion and higher CPO production. Targeted Area expansion up to 10.00 lakh ha by 2025-26 & 18.42 lakh ha by 2030-31.




Case Studies
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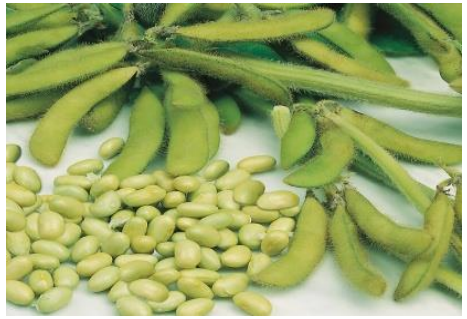
Net benefit of Rs.3.5 -4.0 lakhs from flowers/acre/ year and 2.0 – 2.50 lakhs from the bulbs after two years

Towards Doubling Farmer's Income - Diversification of Crops

Traditional crop cultivation



Cost of cultivation/Ha = Rs. 20,000-40,000

Net Returns/Ha = **Rs. 20,000-30,000**

Moringa (Drumstik) Cultivation





Cost of cultivation/Ha = Rs. 50,000-60,000

Plant Population/Ha = 2500 nos. (2 m x 2 m)

Yield/Ha = 20 tons

Avg. Selling price/Ton = Rs. 7000

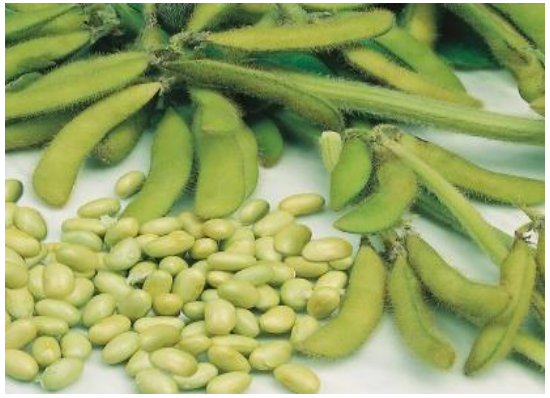
Gross returns/Ha= 1,40,000

Net Profit/Ha = Rs. 80,000 – 90,000

Towards Doubling Farmer's Income - Diversification of Crops

Traditional Crops Cultivation



Cost of cultivation/Ha = Rs. 20,000-40,000

Net Returns/Ha = Rs. 20,000-30,000

Banana Cultivation




Cost of cultivation/Ha = Rs. 2,00,000

Plant Population/Ha = 3,100 nos. (1.8 m x 1.8 m)

Yield/Ha = 40 tons

Avg. Selling price/kg = Rs. 10

Gross returns/Ha= **Rs** 4,00,000

Net Profit/Ha = Rs 2,00,000

Towards Increasing Farmer's Income - Diversification of Crops

Traditional Crops Cultivation




Cost of cultivation/Ha = Rs. 20,000-40,000

Net Returns/Ha = Rs. 20,000-30,000

Strawberry Cultivation




Cost of cultivation/Ha = Rs. 2,75,000

Plant Population/Ha = 25,000 nos. (0.9 m x 0.45 m)

Yield/Ha = 14 tons

Avg. Selling price/kg = Rs. 40

Gross returns/Ha= 5,60,000

Net Profit/Ha = Rs. 2,85,000

Success story - Grapes

Direct Benefit From Shift to New Technologies

Technologies adopted

- Dogridge - Root Stock
- Y – Trellis System
- Fertigation, PGR'S
- Crop regulation
- Canopy & Disease management

- **Year 1992**
- Area (Acres) : 30
- Varieties : AES or Dilkush
- Yield : 20 Tonnes/acre
- Cost of Cultivation : Rs. 40,000/-
- Net Profit : Rs. 80,000/-

- **Year 2012**
- Area (acres) : 140
- Varieties : Sharad Seedless, Red Globe
- Yield : 15 Tonnes/acre
- Cost Of Cultivation : Rs. 2.2 – 2.5 Lakhs
- Net Profit : Rs. 5 lacs

Harohalli Vineyards Yearly Revenue Rs 10 crore

Horticulture Technologies in farmers' fields

High Density Plantation of Apple

- Apple areas of HP, JK and Uttarakhand
- Yield increased from 9 tonne to 50 tonne/ ha

Mushroom production in Haryana

- Total production in 2018=11050 tonne
- No. of units=2120
- Income: Rs. 37 crore
- No. of families engaged: 15478

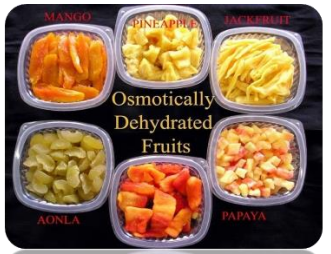
Crop diversification with pomegranate in arid zone

Narpat Singh Charan, 8 ha under pomegranate in 2014:
Net return
2016: Rs. 3.0 lakh
2017: Rs. 17.0 lakh
2018: Rs. 44.0 lakh

Genetic Diversity Fairs

Indigenous fruit crops

Post-harvest Management Strategies



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