

Rethinking Agriculture in J&K:

Towards a Knowledge-based, Technology-driven
& Sustainable Agri-economy

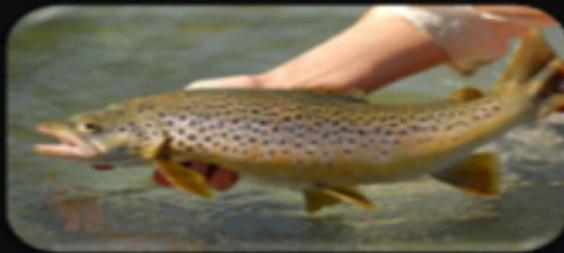


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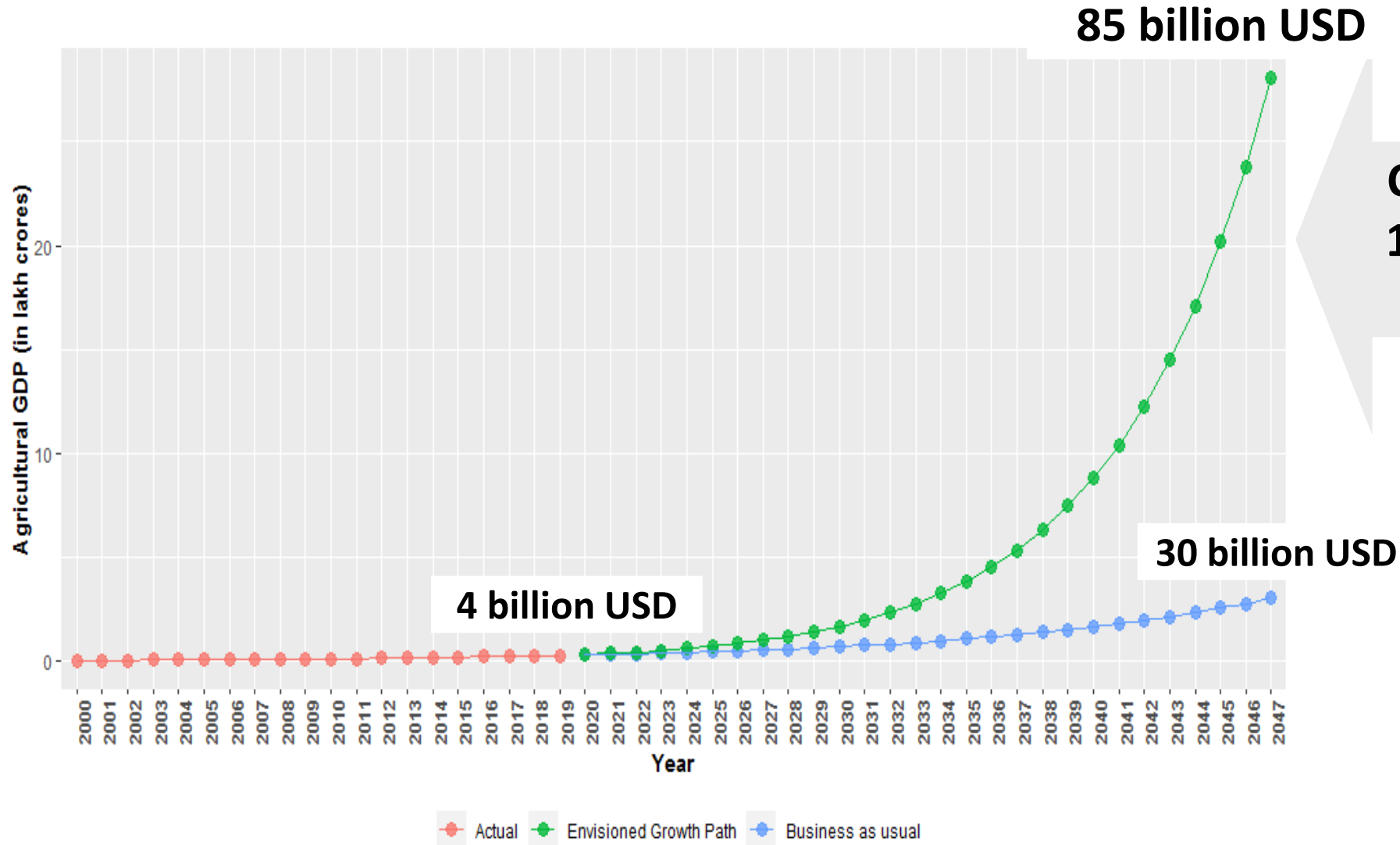
Agriculture and the Bio-economy

The future



is in our fields

Make J&K a Model Bio-economy State



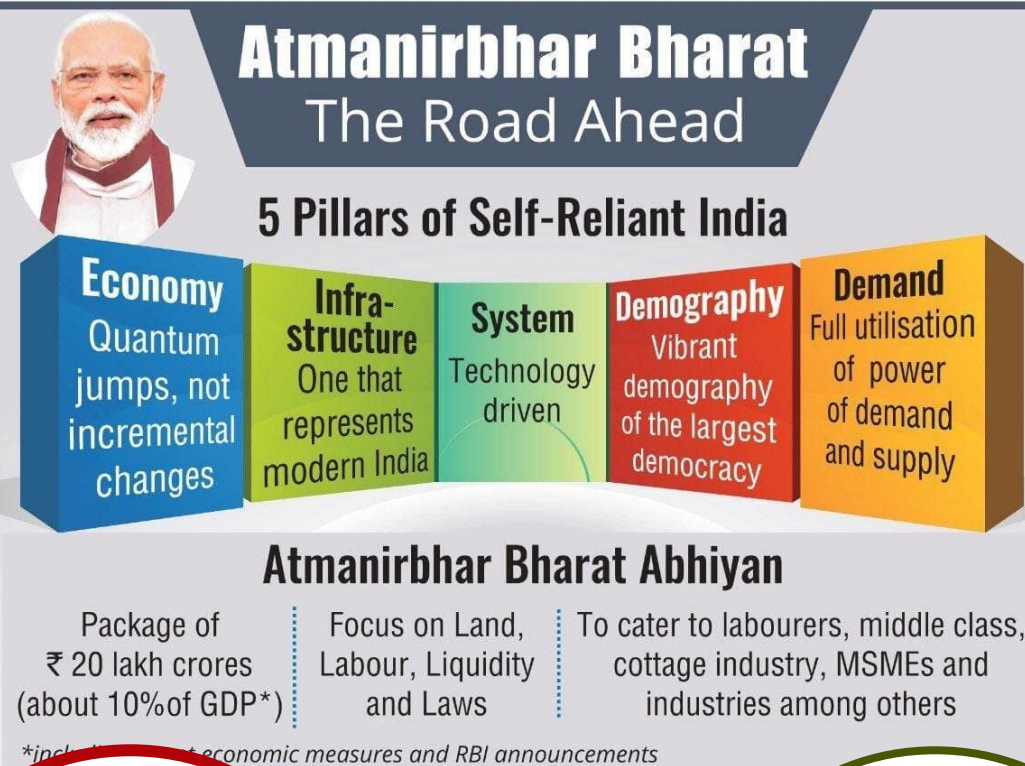
Contribute our Share to
10 Trillion USD National
Economy



Atmanirbhar J&K

&

Atmanirbhar Bharat



From

- **Output:** Rs 10,000 Crore
- **Exports:** Nil
- **Imports:** 2500 Crore

(Livestock husbandry)

To

• **Net Exporter of Agricultural Goods and Services**

Reforms in Agriculture

Reforms– Need of the H

Simple and Clear Laws

Capable Human Resource

Capable Human Resource



Join the League of Developed Nations



a. Social Development Indices

- ✓ Food Security
- ✓ Nutritional Security
- ✓ Economic Security
- ✓ Environmental Sustainability
- ✓ Increased Literacy
- ✓ Improved Health
- ✓ Reduced Mortality

b. Human Happiness Index



A need to rethink agriculture!

WHY



J & K- as Contributor to National Goals

- Make J&K a **model bio-economy** state
- Contribute significant share to national economy
- Atmanirbhar J&K & Atmanirbhar Bharat
- Net exporter of Agr. Goods & services
- **Join League of Developed Nations**

a. Social Development Indices

- Food Security
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b. Human Happiness Index

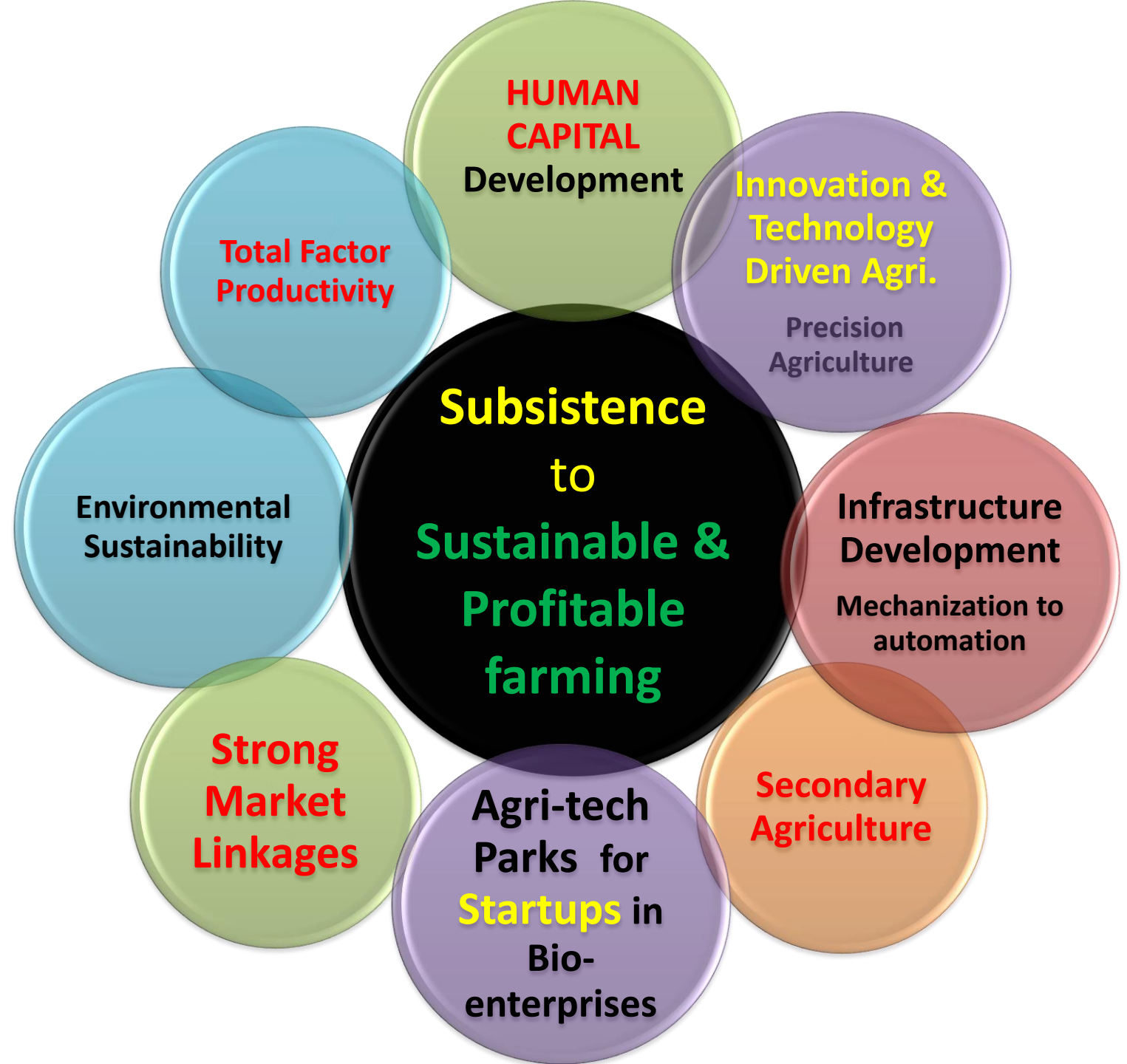
How do We get there?

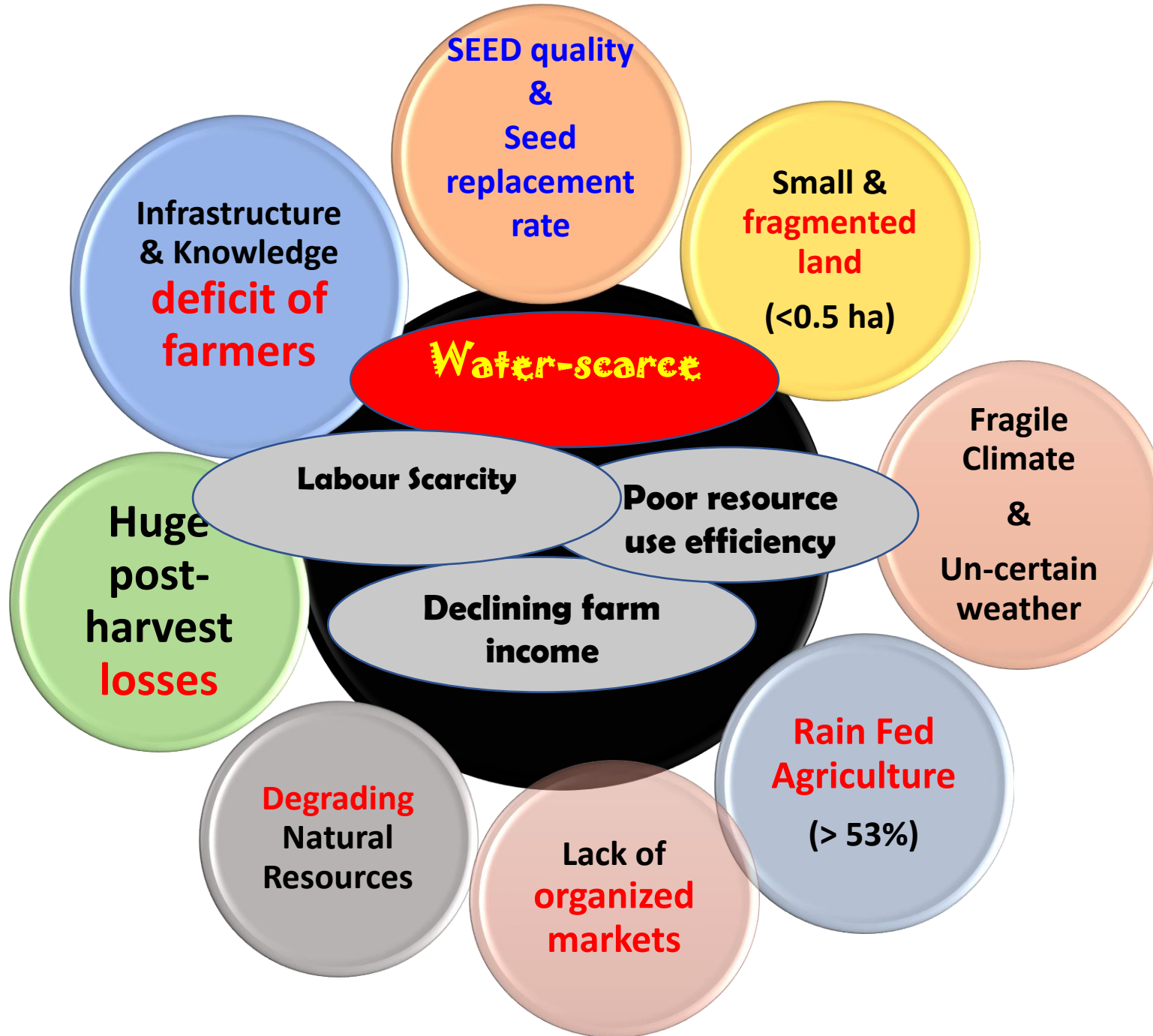
Commercialization & diversification

from **low value** to **high value crops**,

post-harvest processing and value addition,

quality standards to stand market competition





**No fantasy but
Compelling
reasons**

Taking Cue from Israel

**Unfavourable Natural
Conditions:**

**Tropical Arid Desert
Cultivated land 10 lac ha**

***Global leader in agriculture and water
management***

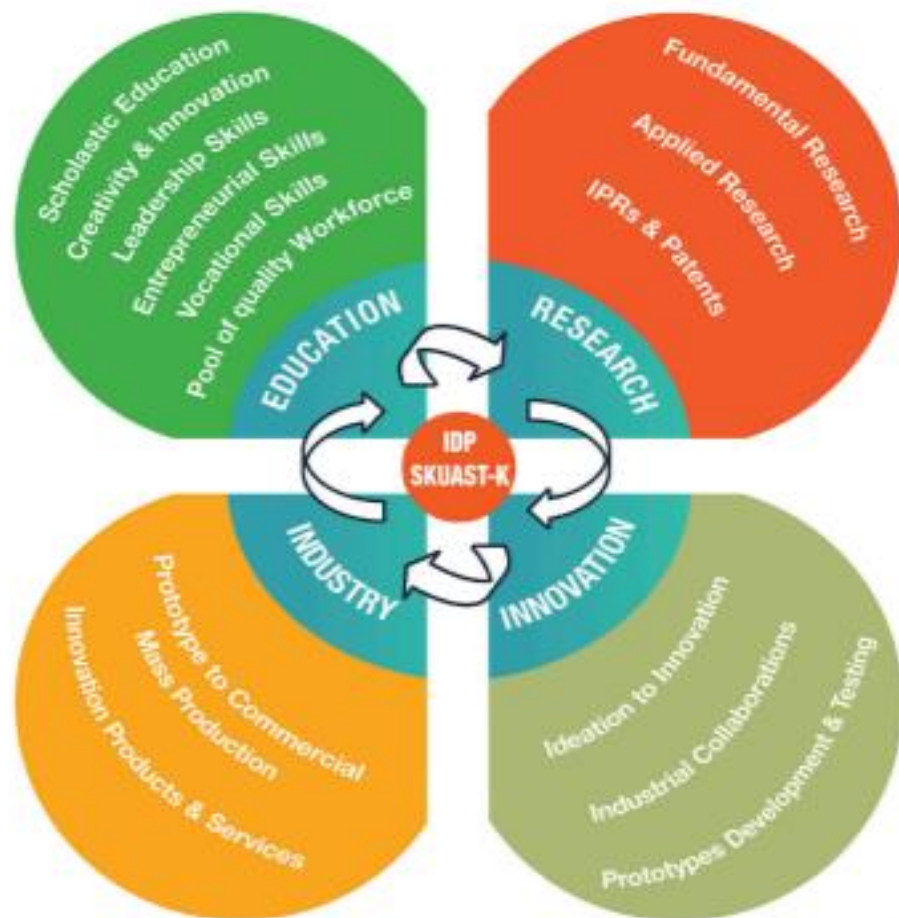
- *Agri. Growth (1948) – 16 times*
- *Citrus fruits : 262 tons / ha vs 10 ton/ha*
- *Tomatoes : 300 ton /ha vs 25 ton/ha*
- *Milk : 50 lts / cow vs 10 lts/cow*
- *Water –recycle : 95%*
- *Post harvest losses: < 2 % vs 22-30%*
- *Drip irrigation- 95% vs 3%*

Major Opportunities



1

A SPINNING WHEEL OF KNOWLEDGE



LINKING EDUCATION AND
RESEARCH WITH INNOVATION
& ENTREPRENEURSHIP

Building Human Capital

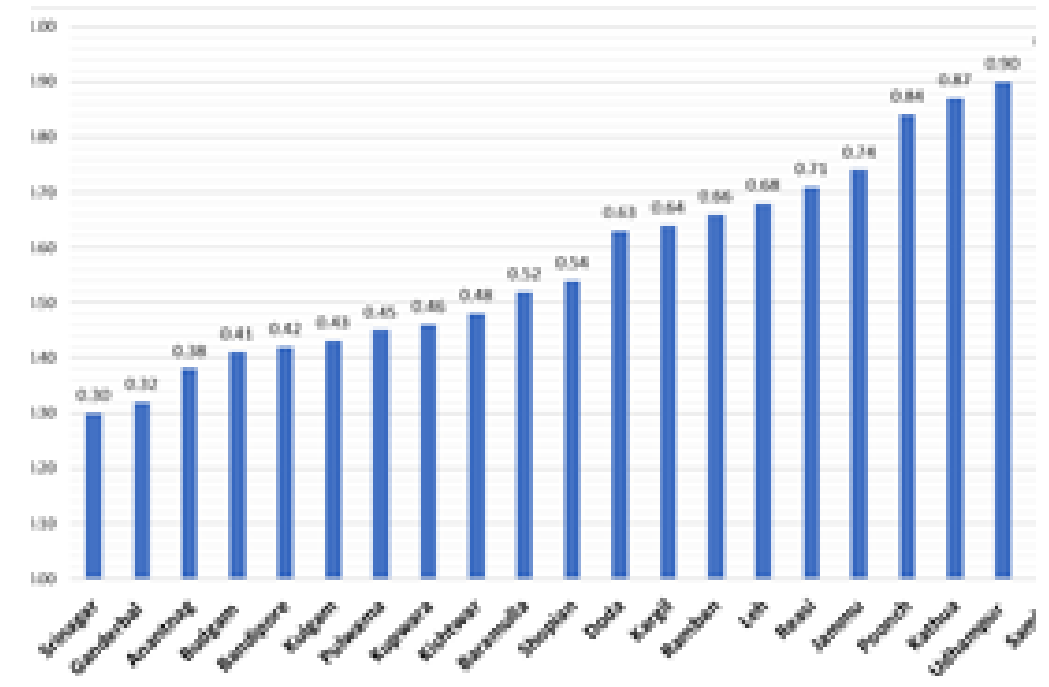
- **Niche nationally:** Model of Education adopted at National level
- **Next Moves :**
 - **Next Gen Leaders :** (innovative and entrepreneurial)
 - **Mine Grassroot Innovations:** Rural Exploration by students
 - **Vocational & skill trainings** to rural Youth
 - **Continuous education** and training of field staff.
 - **Agri-Educational Tourism** with students from across country and world
 - **Team with premier international organisations**
- **Requirements**
 - Policy
 - Infrastructure – Housing, Laboratory and classroom
 - New courses
 - Support for innovations and startups

Conserving Land

Food Security Scenario Matrix (Quantity in 000 MT)

Commodity	Region	Production	Requirement (2022)	Deficit / Surplus (2022)	Deficit / Surplus (2047)
Cereals	Jammu	1205	956	26 %	-20%
	Kashmir	478	1225	-61 %	- 80%
	J&K	1683.5	2230	-24 %	- 60%
Pulses	Jammu	5.7	91	-93 %	?
	Kashmir	3.7	117	-96 %	?
	J&K	10.1	213	-95 %	?

Un-economical holdings (<0.5 ha) 2015-16



Conserving Land Intervention NOW

Land use Planning Policy
(RS-GIS)
Soc & Envi Disas



Regulated Housing Policy

- ☐ New dwellings on Foothills and Karewa lands
- ☐ Vertical growth in housing

Promotion of Secondary Agriculture

KEY to BOOST our Agri-Economy

- Adding value to primary agriculture
- Building agricultural enterprises
- Demand for Processed Foods
- Increase processing from 3% to 25%
- Reduce waste from 30% to 5%
- 3 to 4 fold increase in value
- Job creations



4

Promotion of Secondary Agriculture

REQUIREMENTS

- Creation of the ecosystem for agri-preunership
- Promotion of Food Processing Industry
- Promotion of Packaging Industry
- Building Agri-Infrastructure
- Creating Market Linkages for proceed products

**Upgrading Directorate
of HP&M**

to

**Directorate of
Secondary &
Commercial
Agriculture**

Building Infrastructure in Agriculture

Storage Parks – Modern silos



Modern silos can **reduce waste** to **less than 1%** and reduce desperate sell

Warehouses



Warehouses can **reduce waste** to **less than 5%** and improve PHM

Integrated pack-houses



Drive exports by meeting international standards and quarantine safety

IoT/ Precision farming assets



Promote AI based smart farming solutions – **can increase yield** by **10% - 20%**

Cold chain infrastructure



Cold storages can **reduce post-harvest losses** to **less than 5%**

Community farm assets



Mechanization can help **reduce costs/acre** by **~30%**

Refrigerated transportation



Ensure long distance fresh produce transfer; **waste in transportation** **~5%**

Community drying yards



Yards in every village - **Can reduce post-harvest losses** by **5% to 10%**

Building Infrastructure in Agriculture

Fund allocation: > 1.5 trillion

Amount Claimed:

Nationally: 23,000 Crores

J & K

< 5 crores

Storage



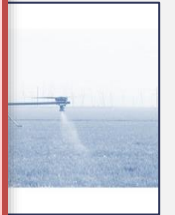
Modern silos
to less than
desperate

Cold chain



Cold storage
harvest loss

Smart farming
techniques



Smart farming
increase yield by

Drying yards



Drying - Can reduce
loss by 5% to 10%

Awareness for Building Infrastructure in Agriculture



Guidance Document **Interest Subvention Schemes of** **Agriculture & Allied Sectors**

Convergence with other Central and UT Schemes



Hand-holding

District Level Awareness & Advisory Committees (DLAAC)

Awareness about schemes

Connecting with PDU

Training & Capacity
building

Oversee execution of the
Projects

Mentoring

Project Development Unit

- Sensitization
- Ready available DPRs
- Customisation of DPRs
- Submission of DPRs



Data Science & Machine Learning in Agriculture
 Predict risks at production and post-production stages
 Data driven decisions



Precision Farming
 Efficient and sustainable use of resources
 10 tons/ha to 70 tons/ha



Water Management (IWT Commitments)
 Efficient and sustainable use of water
 Conserve water by 60%



Mechanization & Automation
 Smart farming with efficiency & timeliness
 Increase efficiency by 70%
 Reduce PH losses by 20%



High Tech Protected Cultivation
 For improving yield, quality with efficiency at low cost
 25 tons/ha to 300 tons/ha

Revamping Agriculture through Smart Technologies

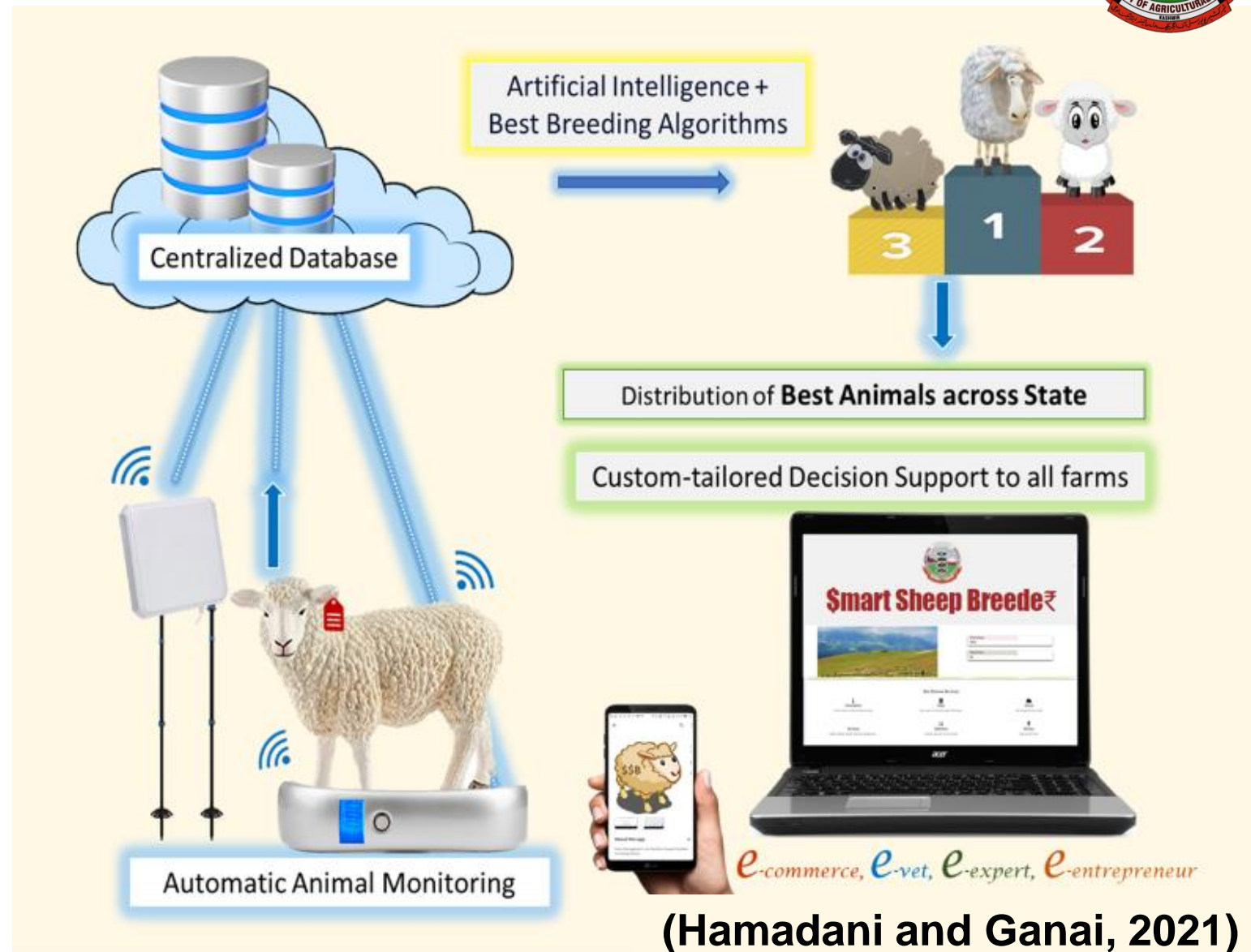
SKUAST-K's Smart Solution



\$mart Sheep Breeder[₹]®

AI and IoT based Decision Support System (*Web & Android App*) for farm automation, real time decision support, e-commerce and more

- ✓ Increases Precision
- ✓ Decreases Labour
- ✓ Increases Production

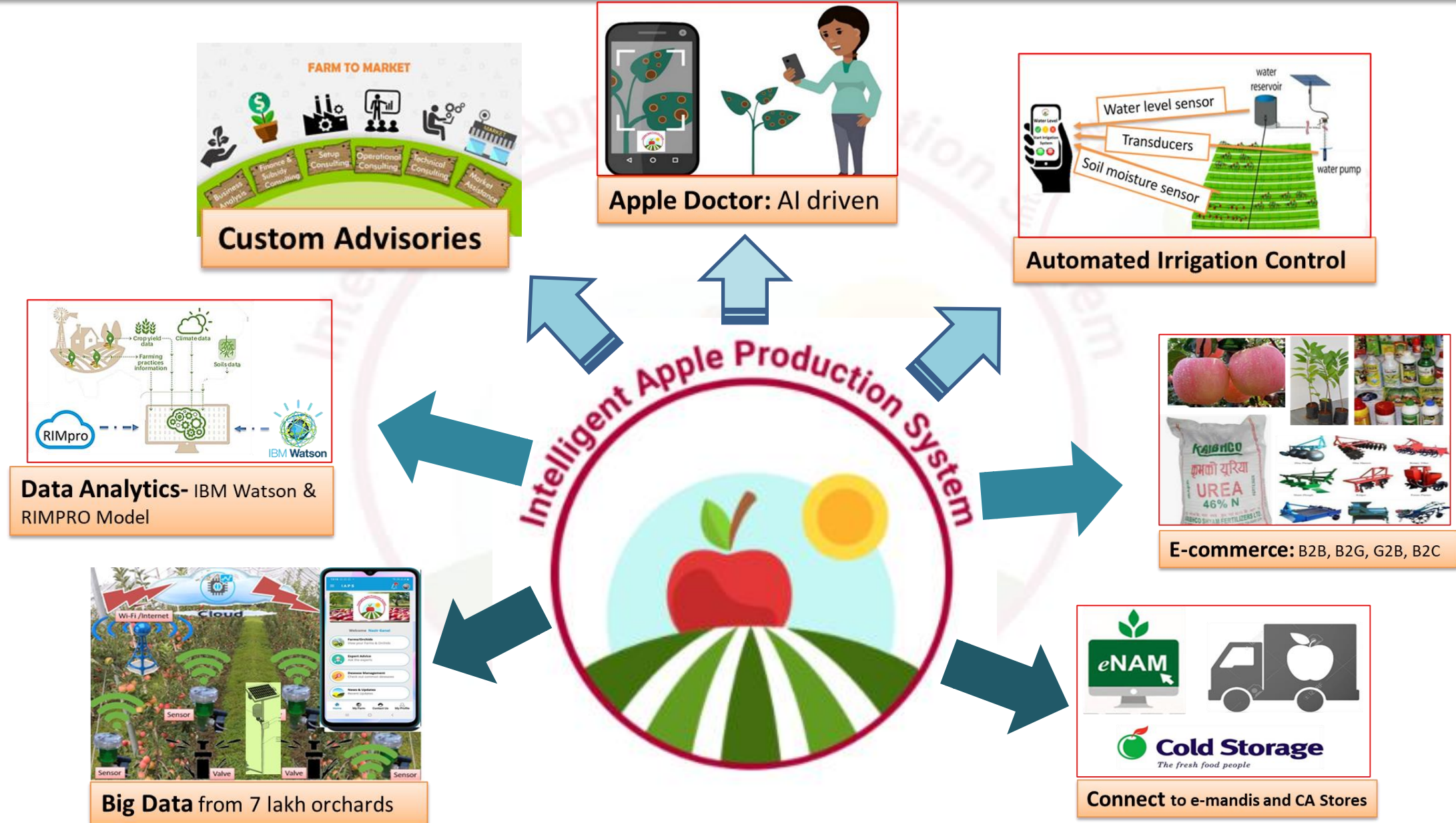


Prototype Smart Irrigation System at SKUAST-K



Fabricated model of the micro-
controller based system tested
in High Density Apple field at
SKUAST-K Shalimar
Research farm

AppleDoc – SKUASTs First launched Startup Company



How to Go about Smart Agriculture:

CoE – Collaboration with ISREAL

Special Policy for promotion of Hi-Tech Agriculture J & K

- A working Group of experts / consultants

Infrastructure Creation

- Special Scheme to support smart agriculture

Strengthen Capacity of two farm universities :

- Setting-up of CoE on AI and ML

Capacity Building of the Technical Staff of Dev. Deptts / Universities

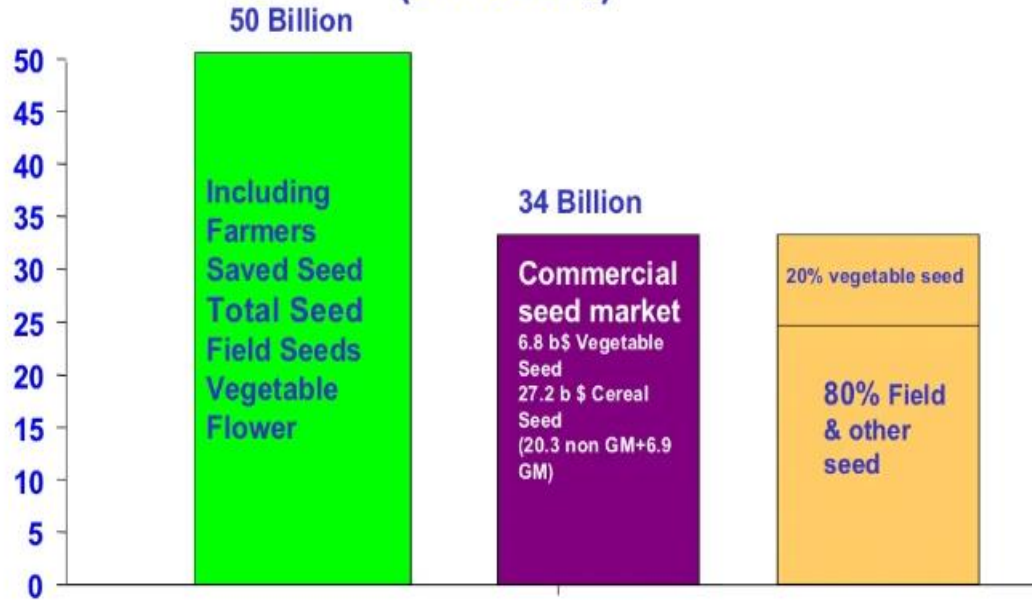
- Short trainings overseas in Israel / Netherlands



Vegetable and Seed Industry

Low volume - High value

THE WORLD SEED MARKET (billions \$)



INDIAN SEED INDUSTRY

- Total Seed Industry is worth about 7500-8000 crore
- Cereal industry is worth 6000 crore approximately
- About 1/3 rd is contributed by cotton worth 2000crores
- Rice OP and hybrids contribute about 1000crores
- Millet hybrids contribute 500 Crore
- corn contributes around 800 crore
- Vegetable seed industry is worth 1500 crore



Hydroponic Technologies Standardized by SKUAST-Kashmir for Tomato, Capsicum, Lettuce

S.No	Vegetable Crop	Net Profit (Rs. In lakhs)/ Kanal
1	Tomato Hydroponics	3.85
2	Tomato Open Field	0.39
3	Capsicum Hydroponics	2.88
6	Capsicum Open Field	0.36



Exotic Vegetables

S.No	Vegetable Crop	Net Profit (Rs.)/ Kanal/Season
1	Cherry Tomato	86,516
2	Lettuce	111,516
3	Sprouting Broccoli	136,516
6	Chinese Cabbage	58,516
4	Asparagus	136,516

8

Our Richness in Herbals: Unexplored



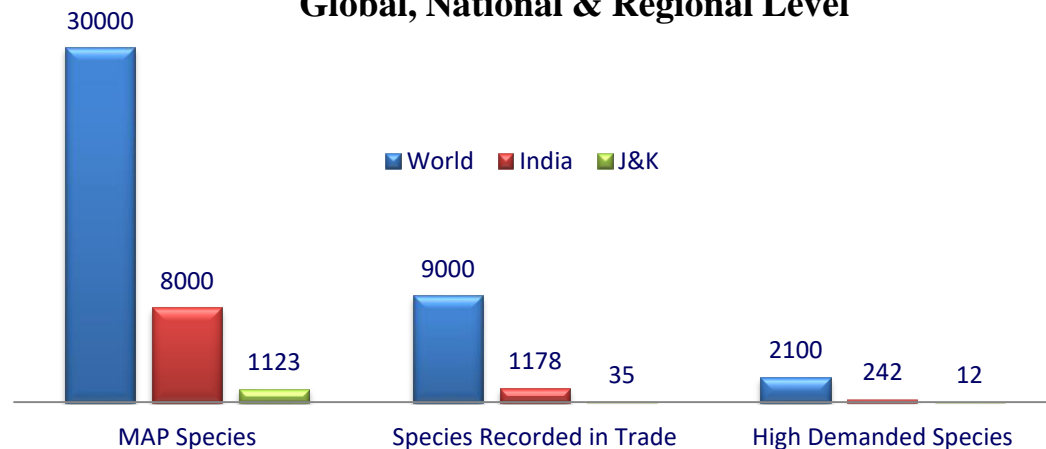


- **Global herbal market :** \$ **71.19** billion
- **Global nutraceutical,** \$ **117** billion
- **Cosmoceutical** market: \$ **42.4** billion
- **Biopesticide** market : \$ **1.3** billion

Share in Market Sectors of Herbal Products (in US\$)



Diversity of High Value Medicinal Plant Species at Global, National & Regional Level



Average Market Price of high demanded NTFPs/MAPs Growing Abundantly in JKL

S.No	Species	Part Traded	Av. Price Rs/Kg
1	<i>Morchella esculenta</i>	Fruiting body	12000
2	<i>Acomitum heterophyllum</i>	Root	7959.32
3	<i>Viola odorata</i>	Aerial Part	4825.0
4	<i>Paris polyphylla</i>	Root	3475.0
5	<i>Picrorhiza kurroa</i>	Root	2141.94
6	<i>Valeriana wallichii</i>	Root	566.11
7	<i>Saussurea costus</i>	Root	498.82
8	<i>Inula racemosa</i>	Root	323.5
9	<i>Swertia chirayita</i>	Aerial Part	309.1
10	<i>Podophyllum hexandrum</i>	Root	220.0



Source: e-Charak, NMPB, GoI

Key Challenges

Policy

Lack of Policy

Unregulated Trade System

Perceived Ban on Cultivation

Operational

Ambiguous resource availability.

Destructive Extraction & Over-exploitation

Lack of Revolving Funds for Sustenance

Technical & Institutional

Lack of Institutional Capacities and Management Inputs

Lack of Skilled Human Resource

Lack of R&D Infrastructure

Lack of Marketing Channels & Marketing Information System.



Way Forward

Approach for development of medicinal plants sector



Establishment of National Institute of Himalayan Herbal Technology (NIHHT) - to create an institutional mechanism for policy interventions

Bio resource assessment and mapping of medicinal plants

Promotion of commercial cultivation through FPOs/BMCs/JFMCs etc.

Enforcement of law and regulation on existing trade practices

Marketing: Value addition, certification, branding and marketing

Result oriented R&D with focus on chemical characterization and screening of high value drugs

Documentation and preservation of traditional knowledge & biocultural community protocols on medicinal and aromatic plants

Focus Processing & Packaging

What is It?

- Fast growing sector in agriculture (11-24 %)
- Output values at USD 535 billion
- India: 5th largest consumer in world
- Very high employment generation potential

What to DO?

- **Promotion of Food Processing Units:**
 - Capital investment subsidy for new units
 - Incentive for technology upgradation in existing units
 - Lower GST rates on food processing machineries
 - Electrical duty and land related concessions
- **Promotion of Food Packaging Units:**
- Focus on regional heritage foods



ORGANIC AREAS

Declaring areas and commodities organic with market support

GUREZ

• POTATO, RAJMASH, ZEERA

MACHILL

• WALNUT, RAJMASH, ZAG

BADERWAH

• RAJMASH

PAMPORE

• SAFFRON

HIRPORA

• POTATO

KOKERNAG

• MUSHKBUDJI

BANDIPORA

• TOP ONION

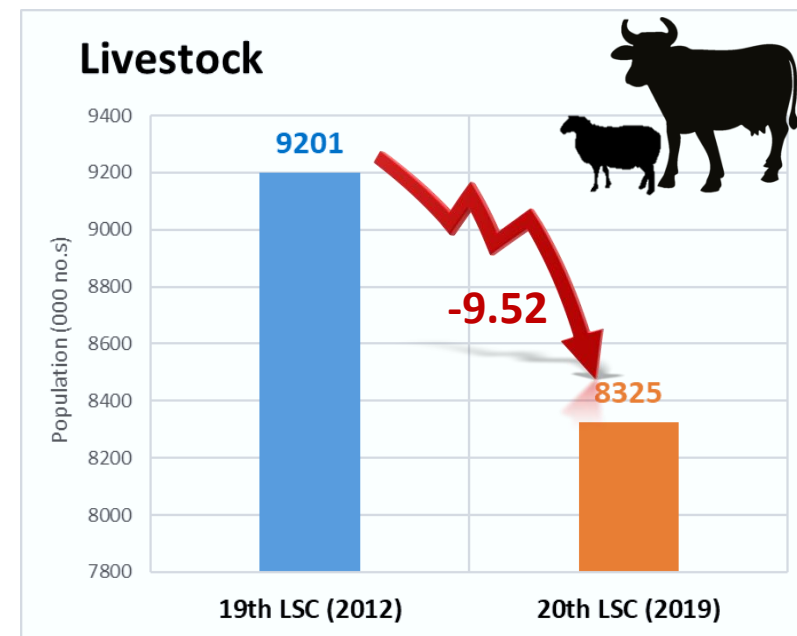




Livestock

Livestock Population Trends (J&K) (000 no's)

Species	19 th LSC (2012)	20 th LSC (2019)	Trend (% Change)
Cattle	2798.33	2539.24	-9.26 ↓
Buffalo	738.99	690.83	-6.52 ↓
Sheep	3389.49	3247.50	-4.19 ↓
Goat	2017.90	1730.22	-14.26 ↓
Pigs	2.42	1.22	-49.81 ↓
Horses & ponies	144.49	63.34	-56.17 ↓
Mules	36.50	16.72	-54.19 ↓
Donkeys	17.25	9.56	-44.55 ↓
Camel	0.93	0.47	-49.62 ↓
Yak	54.49	26.22	-51.88 ↓



(DAHD, 2019)

Way- Forward

Less number – More productive animals

How : A clue from developed world

	1951	2010
Milk productivity (Per animal)	2000 lts / lac. (6.5 lts/day)	10,500 lts/lact. (34 lts /day)
Cattle population	21 million	9 million

Total value of Livestock Products in J & K

Animal product	Production (2016-17) *	Amount (Rs)	Current Price
Milk	25.56 lac MT	70.68 billion	Rs 30 / kg
Meat	324 lac kg	12.96 billion	Rs 400 / kg
Eggs	123 lac eggs	0.06 billion	Rs 5 / egg
Poultry	230 lac birds	2.3 billion	Rs 100 / bird
Wool / fibre	72.6 lac Kg	0.72 billion	Rs 100 /kg
Pelts/skin	30 .0 lac pelts	0.6 billion	Rs 200 / pelt
Fish	200 lac kg	6.0 billion	Rs 300/ kg
Manure			
Traction power			
Total	93.32 billion (= Rs 9332 crores)		

* Data from Deptt of of animal Husbandry and Dairying, Gol

Dr Nazir Ahmed Director Planning SKUAST-K

Imports of animal products / ingredients in J & K

Animal Product	Qty imported	Amount	Unit Price
Milk	0.87 million Tons	2.7 billion	Rs 30 / kg
Meat	210 lac kg	9.3 billion	Rs 400 / kg
Eggs	6000 lac eggs	3.0 billion	Rs 5 / egg
Poultry	182 lac kgs (40,000 birds/day)	2.19 billion	Rs 120 / bird
Day old chicks	600 lac chicks	3.0 billion	Rs 50 / chick
Compound Feed	3.5 million qts	7.0 billion	Rs 20 / kg
Total Imports		27 billion	

Interventions in Dairying

Germplasm improvement and Availability

Promote Processing of Milk

De-regulate the milk pricing

Market forces & quality to determine rates of milk

Strengthen Feed & fodder Production System



Meat & Poultry

Deficiency

Mutton/Chevon = 50%

Chicken = 60%

Eggs = 90%

Annual Imports:

Sheep: 15 lakh

Chicken: 250 lakh Kg

Eggs: 9400 lakh

- Policy to Commercial Sheep Breeders
- Introduction of **mutton** breeds & High Fecundity Breeds like **FINN**
- Accelerated Breeding Programs
- Organized Slaughter houses
- Align **Pastoral Sheep/Goat Husbandry** with Agro-Tourism.
- **Strengthen Feed & fodder Production System**
- **Price De-regulation of livestock products**





Leather Industry??

➤ Positives:

- 3.5 million of sheep & goat skin
- Potential to generate 700 crore annual economy to Kashmir region
- Employment generation of 25,000 in the value chain
- Will create demand for hides and skin which otherwise goes waste



➤ Negatives:

- Environmentally not-sustainable
- One skin Consumes 3000 lts



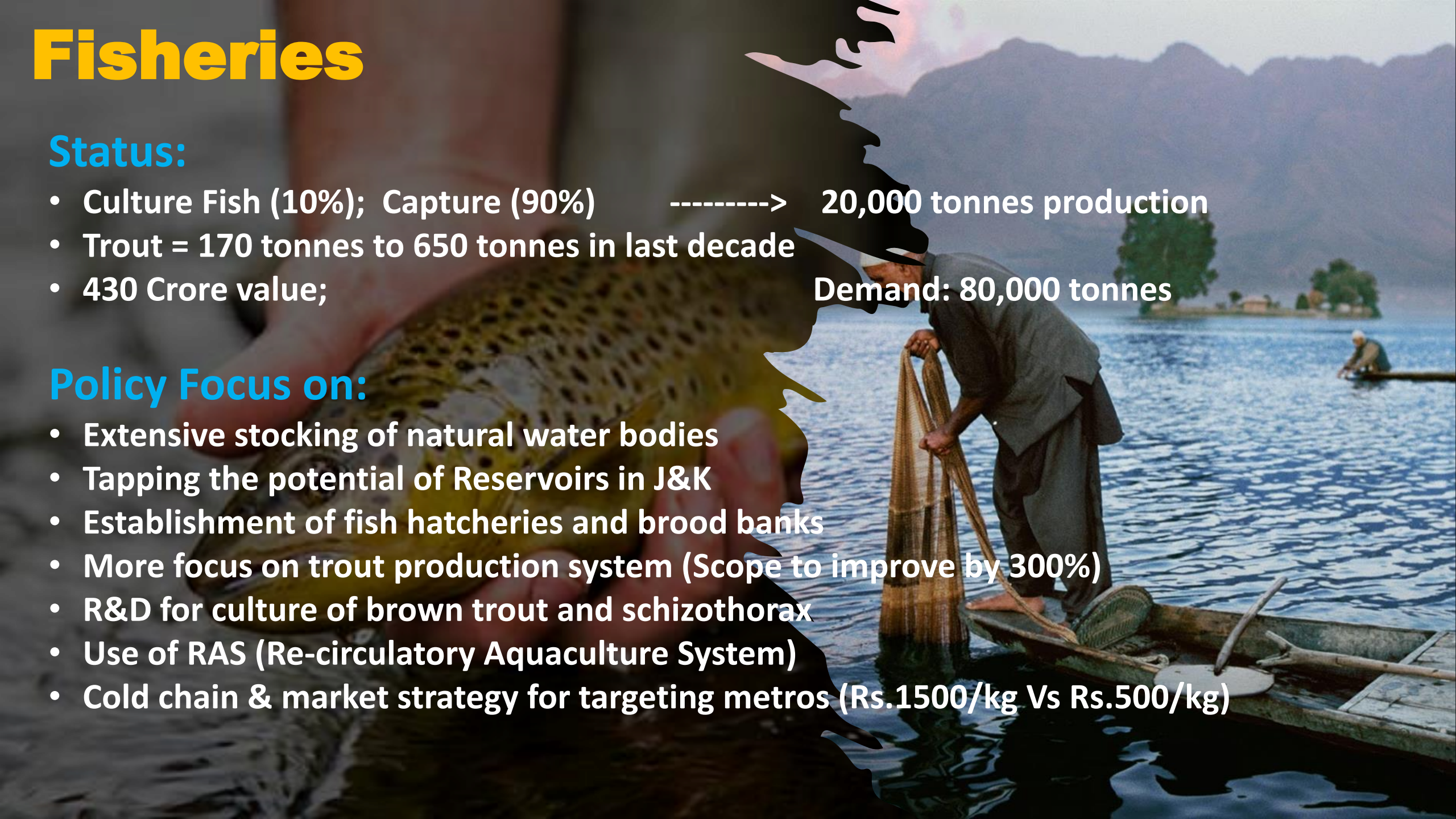
Fisheries

Status:

- Culture Fish (10%); Capture (90%) -----> 20,000 tonnes production
 - Trout = 170 tonnes to 650 tonnes in last decade
 - 430 Crore value;
- Demand: 80,000 tonnes

Policy Focus on:

- Extensive stocking of natural water bodies
- Tapping the potential of Reservoirs in J&K
- Establishment of fish hatcheries and brood banks
- More focus on trout production system (Scope to improve by 300%)
- R&D for culture of brown trout and schizothorax
- Use of RAS (Re-circulatory Aquaculture System)
- Cold chain & market strategy for targeting metros (Rs.1500/kg Vs Rs.500/kg)



Unraveling the Potential of Horticulture Crops



S. No	Fruit Crop	Area (Lakh ha)	Production (Lakh MT)	Productivity (MT/ha)	World's best Pty (Mt/ha)	Output Value Economy (Crore Rs.)	Potential (In Crore Rs.)	Value factor times to increase potential
1	Apple	1.68	24.19	14.39	70.00	10,000	55,000	5-6 times
2	Pear	0.14	0.86	6.14	37.00	400	3000	7-times
3	Apricot	0.06	0.21	3.5	21.00	100	600	6-times
4	Cherry	0.03	0.12	4.0	10.00	75	500	6-7 times
5	Mango	0.13	0.30	2.31	-----	--		---
6	Walnut	0.85	2.80	3.30	25.00	5000	15,000	3- times
7	Almond	0.06	0.11	1.83	5.00	450	3000	7 -times
8	Saffron	0.03	13.00	3.5 kg/ha	-	360	600	2 - times
						16,385	77,700	4.75 times



Interventions in Horticulture

Minimize Chemical Use

- More thrust on scientific spray schedule
- Use of efficient sprayers
- Develop disease resistant varieties
- Use of bio-control agents

Polinizers & Pollination Management

- Decline in natural pollinators ----- Deficit Pollination
- 1700 Crore loss in apple alone
- Developing migratory routes and Pollinator Gardens
- Restriction & regulation of harmful pesticides

Cold Chain Facility

- Creation of more CA store facility near production hubs
- Grading & Pack Line Facilities
- Reefer Vans
- Value addition & employment generation

Processing & Value addition

- From 3% to 25%
- Converting mandies into value chain parks (making them viable year round)
- Processed Fruit Product Diversification

Breeding for climate resilient quality varieties

- R&D interventions

Policy Strategy for FPOs

- Formation of FPOs for niche areas and niche commodities
- Technical, legal and policy support
- Huge relevance with smallholders
- Collectivities in backward and forward linkages
- Branding and Marketing of niche produce
- Better Terms of Trade
- Opportunities for Contract Farming
- FPOs in J&K will address major issues regarding application of technology, value chains, branding & marketing



Think Tank Institute for Agricultural Policy Planning

Need of the Centre

- Think tank policy centre for agricultural policy & planning in J&K
- Imperative for devising better strategies and pathways for sustainable growth & development of agriculture & allied sectors in J&K

Vision

- Policy Science for Development, Equity & Gender in Agriculture

Mandate

- Resource use efficiency & true cost of cultivation for better agricultural policy & planning
- **Optimal use of resources in sustainable & cost effective manner**
- Price forecasting of important commercial crops for better price realization to producers

Likely Impact

- Better dividends from scientific policy inputs
- Improved outcome in terms of growth & development out of scarce resources
- **Overall Welfare Implications to Economy, Society & Environment**



Policy Recommendation

Issue	Policy Recommendation
Shrinking Land for agriculture, & its improper use	<ul style="list-style-type: none"> • Policy for proper land use planning for efficient use of land resources, as well as for social and environmental outcomes. • A regulated Housing Policy – to spare the agriculture land and water bodies
Seed Quality and Seed Replacement rate	<ul style="list-style-type: none"> • Development of high quality and climate resilient varieties of seeds • Strategy for seed multiplication through PPP mode and incentivisation
Secondary Agriculture	<ul style="list-style-type: none"> • Policy for Promotion of Secondary Agriculture in J K • Upgrading the Dir.of HPM as Dir. of Secondary and Commercial Agriculture
Agri Infrastructure Development	<ul style="list-style-type: none"> • Establishment of Dist Level Awareness and Advisory Committees (DLAAC) at KVKs • Establishment of the Project Development Cells at 2 farm universities
Developing Agri-entrepreneurship	<ul style="list-style-type: none"> • Policy strategy for developing Agri-Entrepreneurial Ecosystem • Establishment of “ Innovation, Incubation and Entrepreneurship Centers in Hub-Spoke Model” in 2 farm universities • 2 Agri-Tech StartUp Parks

Issue	Policy Recommendation
Digital / Hi-Tech Agriculture	<ul style="list-style-type: none"> • Policy on Promotion of Hi-Tech Protected Cultivation (Veg / Flowers), Hydroponics for livestock fodder • Policy on Promotion of the Precision / Digital Agriculture • Setting up of CoE on AI & ML in 2 Farm Universities • Short Term overseas Training of the Technical persons of the Development Deptts / Farm Universities in Hi-Tech Agriculture
FPO and Cooperatives	<ul style="list-style-type: none"> • Policy on Promotion of FPOs and Cooperatives in J K
Human Capacity Development	<ul style="list-style-type: none"> • Policy for 2 Farm universities to go international • Policy for Continuous Learning for Field functionaries • Vocational Training for rural youth • System to Mine Grassroot Innovations by students

Issue	Policy Recommendation
Organic agriculture	<ul style="list-style-type: none"> Policy on organic farming and certification and declaration of Gurez as organic
Medicinal & Aromatic plants	<ul style="list-style-type: none"> Establishment of Institute of Himalyan Herbal Technology
Food Processing	<ul style="list-style-type: none"> Food Processing Policy to support and incentivize the Food Processing Startups
Livestock & Fish	<ul style="list-style-type: none"> Policy for Feed and Fodder Development in JK Genetic Improvement of Cattle through better A I coverage Use of Sexed Semen in Cattle Policy for promotion of Milk Processing and Product Development in Private through FPOs and Cooperatives Policy strategy for large scale culture of the Trout Fish to catch national market. Policy for promotion of Commercial Sheep Breeders

Issue	Policy Recommendation
Horti-sector	<ul style="list-style-type: none"> • Policy for promotion of Horti-nurseries in Private Sector. • Pollination Management Policy for Sustainable crop production ecosystems • Policy on reducing the pesticide load • Policy on diversification of Horticulture • Development of own varieties of Horti-Crops for international trade • Improvement of the Ambri apple as the next commercial fruit for upper class society
Sericulture	<ul style="list-style-type: none"> • Policy on Revival of Sericulture
Floriculture	<ul style="list-style-type: none"> • Policy on Promotion of Commercial Floriculture
Policy Planning in Agriculture	<ul style="list-style-type: none"> • Establishment of Center for Policy Planning in Agriculture
Working Groups	<ul style="list-style-type: none"> • Constitution of different Working Groups to formulate the policies in next 4 months for detailing the Policies. Schemes, Guidelines, Financial implications, outcomes and Impact



—
**thank
you**