VOLUME 1

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
National
Skill Development
Corporation
Transforming the skill landscape

Human Resource and Skill Requirements in the Agriculture Sector

(2013-17, 2017-22)

cutting through complexity

This report is prepared by KPMG Advisory Services Pvt Ltd (KASPL).

KPMG is a global network of professional service firms offering Audit, Tax and Advisory services with presence in 152 countries and a combined strength of nearly 145,000 people. In India, the firm provides services to Government, Indian and International companies through offices in Mumbai, Delhi, Chandigarh, Bangalore, Hyderabad, Chennai, Pune , Kolkata, Kochi and Ahmedabad.

KPMG is one of the first professional services firms to align its services and professionals along industry verticals developing an intensive understanding of different industries, providing clients with an informed view on specific issues and a tailored service response. KPMG is the first advisory firm to establish a Centre of Excellence in Education in India providing holistic support in funding, structuring and consulting solutions across strategy, process, people and technology in the sector.

Narayanan Ramaswamy
Head – Education Advisory
KPMG India
(+91) 44 3914 5208
Email: narayananr@kpmg.com

Madhavan Vilvarayanallur
Director – Education
Advisory, KPMG India
(+91) 44 39145286
Email: vmadhavan@kpmg.com

Gaurav Kumar
Associate Director – Education
Advisory, KPMG India
(+91) 124 3345203
Email: gauravkumar1@kpmg.com

Disclaimer

NSDC engaged KPMG (KPMG Advisory Services Pvt. Ltd.) to prepare this report, which is based on independent research and analysis done by KPMG. This report is not based on, or derived from, any other report or research paper. Any similarity with any other paper may purely be a coincidence.

This report is for information purposes only. While due care has been taken during the compilation of this report to ensure that the information is accurate to the best of KPMG's and NSDC's knowledge and belief, the content is not to be construed in any manner whatsoever as a substitute for professional advice.

KPMG and NSDC neither recommend nor endorse any specific products or services that may have been mentioned in this report and nor do they assume any liability or responsibility for the outcome of decisions taken as a result of any reliance placed in this report.

Neither KPMG nor NSDC shall be liable for any direct or indirect damages that may arise due to any act or omission on the part of the user due to any reliance placed or guidance taken from any portion of this report.

Acknowledgement

We are grateful to the Government of India and its various departments, State Governments, Industry Associations, Sector Skill Councils, Skill Training Institutions, Academia and NGOs, for their contribution towards the successful completion of the Sector Skill Gap study (2013-2017, 2017-2022).

We would like to thank all NSDC's industry and training partners for their active participation. The success of the study has been possible through their collaborative efforts.

In addition, we convey our gratitude to all those who have, in some way or other, contributed towards the successful completion of this study.

Executive Summary

Overview and trends

Agriculture is a critical sector of the Indian economy, with India holding the second largest agricultural land in the world. Its economic contribution to India's GDP has fallen with the country's broad-based growth, but still remains a key sector for many reasons. In terms of demographics, agriculture is the broadest sector and plays an important role in the overall socio-economic make up of India.

India is the among the world's largest producer of spices, pulses and milk. It also has the largest cattle herd as well as the largest area under wheat, rice and cotton. It is the second largest producer of rice, wheat, cotton, sugarcane, farmed fish, sheep & goat meat, fruit, vegetables and tea and is a large producer of dry fruits and agriculture-based raw materials (for textiles in particular). India ranked within the world's five largest producers of crops, livestock and poultry meat, with one of the fastest growth rates.

Demand drivers

A key demand-growth factor of the country 's agriculture sector is the large and rapidly rising population, which ensures a high demand for agricultural products. According to IBEF (August 2013), India's consumption expenditure is likely to reach USD3.6 trillion by 2020

Supply drivers

India's agricultural production quantity has increased substantially over the years due to increased irrigation potential. Another important supply-side driver of growth is the increased mechanization of farming . Usage of hybrid seeds itself has increased agricultural production

Policy drivers

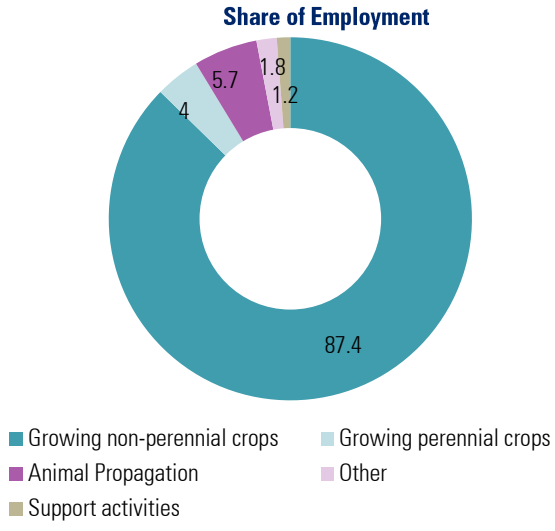
A conducive policy environment is a key driver for growth in the agriculture sector. Institutional credit to the sector has been on a rise, having increased at a CAGR of 17.4% during FY07 – 12. As a result, farmers are able to avail crop loans at an interest of 7%.

Several favorable policy initiatives have been designed to further growth of the Sector including

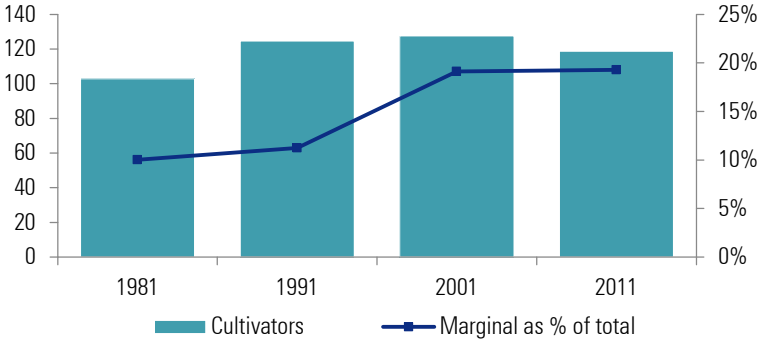
- **Minimum Support Prices (MSP) for FY13:** As per the recommendations by Commission for Agricultural Costs and Prices, the Government has set MSPs
- **100% FDI legislation:** this was made effective in 2011 and is applicable to the development and production of seeds and planting material, floriculture, horticulture, cultivation of vegetables and mushrooms and animal husbandry under controlled conditions
- **Bringing Green Revolution in Eastern India (BGREI):** A scheme that was launched in 2011 under the RKVY to enhance agricultural productivity in the Eastern states by promoting technological interventions and collaborations among farmers, and institutions.
- **Rashtriya Krishi Vikas Yojana (RKVY):** A state-plan scheme launched in 2007 as part of the 11th Five Year Plan by the Government, which aims to achieve 4% annual growth in agriculture by providing states and territories the autonomy to construct plans for increased public investment in agriculture based on local indicators and conditions.
- **Agri Export Zone (AEZ):** the Government introduced a policy in 2001 with the main objective of boosting agricultural exports from India. A total of 60 AEZs comprising about 40 agricultural commodities has been sanctioned by the central government. AEZs are spread across 20 states in the country.

Demographic characteristics of workforce

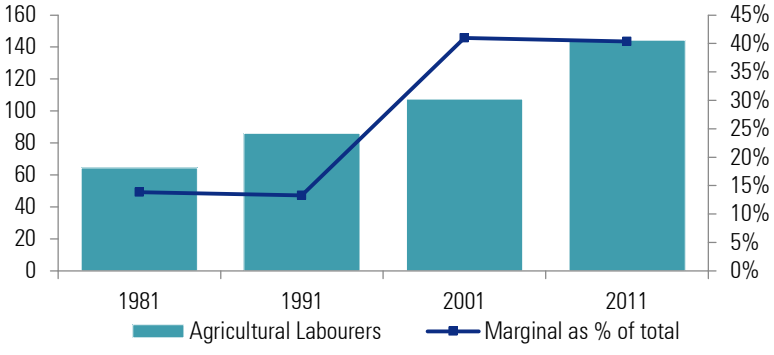
Sub segments in Agriculture Sector, with share of employment)



Trends in workforce engaged as Cultivators (Millions)



Trends in workforce engaged as Agricultural Labourers (Millions)



State wise number of workforce (per 10,000 workforce) engaged in Agriculture and Allied Activities – 2012

Andhra Pradesh	6398
Arunachal Pradesh	7111
Assam	5860
Bihar	6665
Chhattisgarh	8142
Gujarat	6992
Haryana	5050
HP	3980
J&K	3590
Jharkhand	5215
Karnataka	6592
Kerala	2818
MP	6901
Maharashtra	6947
Manipur	5594
Meghalaya	6080
Mizoram	7649
Nagaland	6872
Odisha	5926
Punjab	4354
Rajasthan	4991
Sikkim	6234
TN	5160
Tripura	3515
Uttarakhand	4196
UP	5722
West Bengal	5685
All India	5936

- The past decade has witnessed decrease in number of workforce involved in agriculture
- For the first time, the total number of cultivators has fallen behind the number of agricultural labourers
- This also ties in with the pattern of reducing size of land holdings. With a number of land holdings too small for viable cultivation, a number of the workforce are agricultural labourers

Incremental Human Resource Requirement (2013-22)

The requirement of manpower for the Agriculture sector in 2022 is estimated to be ~ 2155 lakhs…

Overview of Manpower Demand Projections

- The manpower demand estimation has been developed in consideration of
  - The sub sector growth rates in line with output demand drivers
  - Labour elasticity for each sub segment has been estimated based on historical trend and inputs from stakeholders
  - Sector level projections from the 12th Five year plan have been cross referenced with the projections at a sub sector level to validate the estimation
  - Appropriate split between skilled and unskilled, and between specific education levels within the former
  - The projections have been tested with scenarios on the overall economic growth/ sector value add to build flexibility

- The total requirement of manpower for the Agriculture sector (Division 1) in 2022 is estimated to be ~ 2156 lakh. Of this, ~ 1733 lakhs are expected to be skilled **(from a competency perspective as defined under NCO)**

- Significant demands on skill are expected in two categories
  - Higher education (graduate and above) for specialist roles
  - Diploma and short term vocational training for on ground support roles focusing on the direct farmer interface

Projected Employment for Sector and key segments - Lakhs

Group	FY13	FY17	FY22
Agriculture Net	**2404**	**2290**	**2156**
Growing of non perennial crops	2103	1991	1860
Growing of perennial crops	97.6	94.4	90.4
Animal production	139	139	139
Support activities to agriculture and post harvest crop activities	64.4	65.6	66.6

- The projections show contraction in the labour demand for cereals and pulses (staples). This is in line with the observed exodus from staple crops to other economic sectors

- Animal production, horticulture and support activities are expected to witness relatively higher growth. However, given significant scope for efficiency and yield, there is expected to be little employment additions on this count

Source: NSSO 12th Plan Commission report, IAMR Agriculture Sector Employment Assessment, market research, team analysis

Current manpower-supply infrastructure of Agriculture sector

Agricultural Extension Programs (AEP) – Government Scheme

The Agriculture Extension Service is an institution that aims to close the knowledge gap existing between agriculturalists and agriculture research scientists. By spreading information to farmers about new technologies and methods, the farmer is able to utilize the latest agricultural developments. AES does this by enhancing farmers' knowledge about crop techniques, increasing productivity and transferring latest technical know-how through training courses, on farm trials, kisan clubs and advisory bulletins.

Private Schemes:

GCS Group Venture - GCS Computer Tech Pvt Ltd

An ISO certified Group with over 11 years experience in conducting government sponsored courses. GCS has imparted quality education and training in Agriculture, amongst other areas. It is affiliated with Agriculture Sector Skill Council of India (ASCI)

Basix Academy for Building Lifelong Employability (B-ABLE)

Was set up in 2009 to be a sustainable, nation-wide model for building high quality workforce, and connecting workers with employment – both in the unorganized and the organized sectors. B-ABLE works with youth primarily from the disadvantaged sections of society. The ASCI is an associated sector skill council

Select Agricultural Universities in India

S.No	State	University
1	Andhra Pradesh	Acharya N G Ranga Agricultural University
2	Assam	Assam Agriculture University
3	Bihar	Bihar Agricultural University, Rajendra Agricultural University,
4	Gujarat	Anand Agricultural University, Junagadh Agricultural University, Navasari Agricultural University, Sardar Krushinagar Dantiwada Agricultural University
5	Haryana	Ch Charan Singh Haryana Agricultural University
6	Himachal Pradesh	Ch Sarwan Kumar Krishi Vishwa Vidyalaya
7	Karnataka	University of Agricultural Sciences – Bengaluru, Dharwad, Raichur
8	Punjab	Punjab Agricultural University
9	Madhya Pradesh	Jawaharlala Nehru Krishi Vishwa Vidyalaya, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya
10	Maharashtra	Dr. Balasahed Sawant Konkan Krishi Vidyapeeth, Marathwada Agricultural University, Mahatma Phule Krishi Vidyapeeth,
11	Rajasthan	Rajasthan Agricultural University, Maharana Pratap Agriculture &Technology Univ
12	Uttar Pradesh	Chandra Shekar Azad University of Agriculture and Technology, Narendra Dev University of Agriculture and Technology, Allahabad Agriculture University
13	West Bengal	Bidhan Chandra Krishi Vishva Vidyalaya, Uttar Banga Krishi Vishwavidyalaya

Select recommendations and implications

Recommendation	Implications
Educate cultivators on best practices for skills such as spoilage reduction, usage of machinery/mechanization for farming, trade and commercial aspects and emerging use of hybrid crops	▪ Building capacities of cultivators on aspects of mechanisation-oriented roles at a field level in subjects such as repair and maintenance, etc. ▪ Greater market integration of farmers on both inputs (procurement of crop inputs like seeds, fertilizers, pesticides etc.) and outputs (joint marketing, crop planning and scheduling etc.) ▪ Underscore the economic benefits of improved farming practices
Encourage on-the-job training and apprenticeships in relevant value chain segments	▪ Upgrade agriculture universities' curriculum ▪ Encourage greater industry-interaction with universities and training programmes
Focus on downstream market activities skilling which can enable greater consumption	▪ Focus more on skilling for downstream market activities which can enable more consumption. E.g.: Potential areas of skill building are in the roles of technicians and salesmen. They are a crucial role since they act as ambassadors for the company by providing right advice to the farmers (buyers) for the right model of tractors. (from John Deere)
Design industry-relevant training modules especially in supply chain logistics and precision farming are some of the emerging areas	▪ Upgrade agriculture universities' curriculum ▪ Encourage greater industry-interaction with universities and training programmes ▪ Vocational training institutes can be setup for field level tasks like drying, cleaning and packaging. Entrepreneurs can setup leasing service for automated machines (for cleaning / drying of produce). Operators will be needed to operate this hi tech machinery (from NCDEX)
Establish standards for certifying specialists	▪ Specialist roles (e.g. machinery operator) could witness standards in the future ▪ ISAP certified Agronomist can be a point of reference
Encourage employment of women in the industry	▪ The success of self-employment-based cooperative organisation — Shri Mahila Griha Udyog can be replicated in other sectors of agriculture and in other parts of the country ▪ The government can develop employment guarantee schemes specifically for women in this sector

Table of Contents - Detailed Report

Table of Contents - Detailed Report

Abbreviations

AEP	Agriculture Extension Programs
AEZ	Agri-Export Zone
APEDA	Agricultural and Processed Food Products Export Development Authority
APMC	Agricultural Produce Market Committee
APMC	Agricultural Produce Market Committee
ASCI	Agriculture Skill Council of India
ASI	Annual Survey of Industries
CAGR	Compounded Average Growth Rate
DG	Diesel Generator
EOU	Export Oriented Unit
F&V processing	Fruit & Vegetable Processing
FAO	Food and Agriculture Organisation of the United Nations
FAO	Food and Agriculture Organization
FDI	Foreign Direct Investment
GCF	Gross Capital Formation
GDP	Gross Domestic Produce
HE	Higher Education
ICT	Information Communication Technology
ISAP	Intensive Supervision Appearance Program
MoRD	Ministry of Rural Development
MPCE	Monthly Per Capita Expenditure
MSP	Minimum Support Price
NCO	National Classification of Occupations
NIC	National Industrial Classification
NSSO	National Sample Survey Organisation
R&M	Repair and maintenance
RBI	Reserve Bank of India
SAMETI	State Agricultural Management and Extension Training Institute
SME's	Small and medium-sized enterprises
SSC	Sector Skills Council
VET	Vocational Education and Training
VTP	Vocational Training Partner

Context and approach

Brief background	NSDC had conducted sector-wise skill gap studies for 19 high priority sectors in 2008–09 . ▪ KPMG has been engaged as a consultant to help evaluate the skill gap across 25 sectors and develop actionable recommendations for its stakeholders. ▪ Mandate includes sector and sub-sector level analysis, demand-supply projection, estimation of incremental man-power requirement between 2013-2017 and 2017-2022, identification of key-employment clusters, and SWOT analysis of each sector ▪ Study also aims to take qualitative insights from stakeholders on enablers and challenges for each sector, way forward in terms of specific policy level actionable recommendations,
Inclusions over the previous study	▪ Study led by industry – Sector Skill Councils and a panel of professionals from different sub-sectors were consulted for their inputs on industry trends, key takeaways in terms of skill requirement, qualitative insights to understand specific interventions required for each sector and to validate the quantitative results and recommendations ▪ 6 sectors were added to the list of NSDC priority sectors for studying the skill gaps Updated study also includes ▪ Identification of top 20 job-roles in each sector, case studies around good training practices, sub-sector level indicators and growth factors ▪ Study also includes understanding of existing training infrastructure, work-force characteristics and employment clusters, ▪ Macro economic factors, central and state governments policies and their envisaged impact ▪ Synchronisation of the sector wise demand from the district level skill gap studies ▪ Recommendations for key stakeholders - Industry, NSDC, Training organizations and Government ▪ Environment scans every year till 2015-16 including SWOT analysis for the sector

Industry classification

Sector and sub-sectors as per NIC classification

NIC Classification	Non perennial Crops	Perennial Crops	Animal Production	Support Activities
Revised Sub Sector	Non horticulture	Horticulture	Animal Husbandry	Support Activities
Sec/Div/Group	A/01/Group 011	A/01/Group 012	A/01/ Group 014	A/01/Group 016
Key sub groups at four digit level	Growing of Cereals, Pulses and Oilseeds (0111), rice (0112), vegetables (0113)	Growing of grapes (0121), tropical and subtropical fruits (0122), citrus (0123), stone fruits (0124)	Raising of cattle and buffaloes (0141), Raising of sheep and goats (0144), Raising of poultry (0146)	Support activities for crop production (0161), post harvest crop activities (0163), seed processing (0164)
Notes	Vegetable segment (of 011) is characteristically similar to fruits (horticulture) on account of value chain similarities.	Horticulture is key segment. Beverages (tea and coffee) sub segment is much more organized and formal in nature compared to others	Dairy and poultry are the key segments in this group	Include support activities from farm inputs (seeds, nutrient) till post harvest primary processing stage
Sub segment drivers	Driven by food security requirement. While production is largely sufficient, food security bill and insulation against monsoon shocks are key drivers for productivity enhancement	Driven by increasing demand for proteins and nutrients (milk, meat, fruits and vegetables) in the dietary mix. Has been witnessing significant demand growth and inflation, driving the need for greater organization, private sector participation to improve supply chain efficiencies and productivity		Increasing mechanization and scientific input planning are key drivers Growth of retail segment is expected to drive post harvest efficiencies

Source: NCI 2008, Ministry of Agriculture, Team analysis

Industry overview

Overview and trends

Agriculture is a critical sector of the Indian economy, with India holding the second largest agricultural land in the world. Its economic contribution to India's GDP has fallen with the country's broad-based growth, but still remains a key sector for many reasons. In terms of demographics, agriculture is the broadest sector and plays an important role in the overall socio-economic make up of India.

India is the among the world's largest producer of spices, pulses and milk. It also has the largest cattle herd as well as the largest area under wheat, rice and cotton. It is the second largest producer of rice, wheat, cotton, sugarcane, farmed fish, sheep & goat meat, fruit, vegetables and tea and is a large producer of dry fruits and agriculture-based raw materials (for textiles in particular). India ranked within the world's five largest producers of crops, livestock and poultry meat, with one of the fastest growth rates.

During the last five years, production and yields of rice and wheat increased significantly. Part of this increased production was due to India's status as a leading exporter of agricultural products, with agricultural exports having expanded over the past 5 years.

Domestic demand for agricultural and allied products has been robust and rising due to the large population being a key demand driver. Nearly half of average expenditure by households is allocated to agricultural end-products. Furthermore, rising rural and urban incomes have also facilitated demand growth . External demand has been on the rise especially from key markets such as the Middle East. This is due to India's competitive advantage Indian agriculture has also benefitted from rising external demand and the sector's wider participation in the global economy.

The consumer food segment has the top priority both in terms of foreign investment and foreign collaborations. Other attractive features of the agro industry that have incentivized foreign demand are aqua culture, milk and milk products, meat and poultry segments.

A large number of women are involved primarily in the production and processing of food within the agriculture sector. Male-dominated migration from rural areas is on the rise, resulting in women being left to take care of agricultural holdings.

In terms of agricultural infrastructure, India is one of the largest manufacturers of various farm equipments such as harvesters, tillers and tractors, manufacturing one-third of tractors around the world.

Policy

Cognizant of the importance of agricultural production for economic development, the central Government has actively promoted agricultural development. Food and price policy planning is decided by the central government. An important scheme set up by the Government is the National Food Security Mission (NFSM) to increase production of rice, wheat and pulses. It has also implemented schemes like Rashtriya Krishi Vikas Yojana (RKVY) which incentivizes states to increase private investment in agriculture and allied sectors.

The Government has a long-term vision pertaining to "ICT in the Agriculture Sector", which aims to establish a collaborative structure between farmers, scientists, researchers and administrators together through a system known as "Agriculture Online" for the exchange of ideas and information.

Structural change

Significant structural changes have occurred in the sector in terms of a movement away from the traditional agrarian economy towards a more service dominated one. Despite this, about half the total workforce is still employed in this sector. The demography (with the high pressure of population growth on agriculture) and the fragmentation of land owning have also contributed to a significant change in the structure of the industry, leading to a decrease in the availability of cultivated land area. In terms of land ownership, the average size of operational holdings has reduced progressively from 2.28 ha in FY1970 to 1.23 ha in FY05

1980

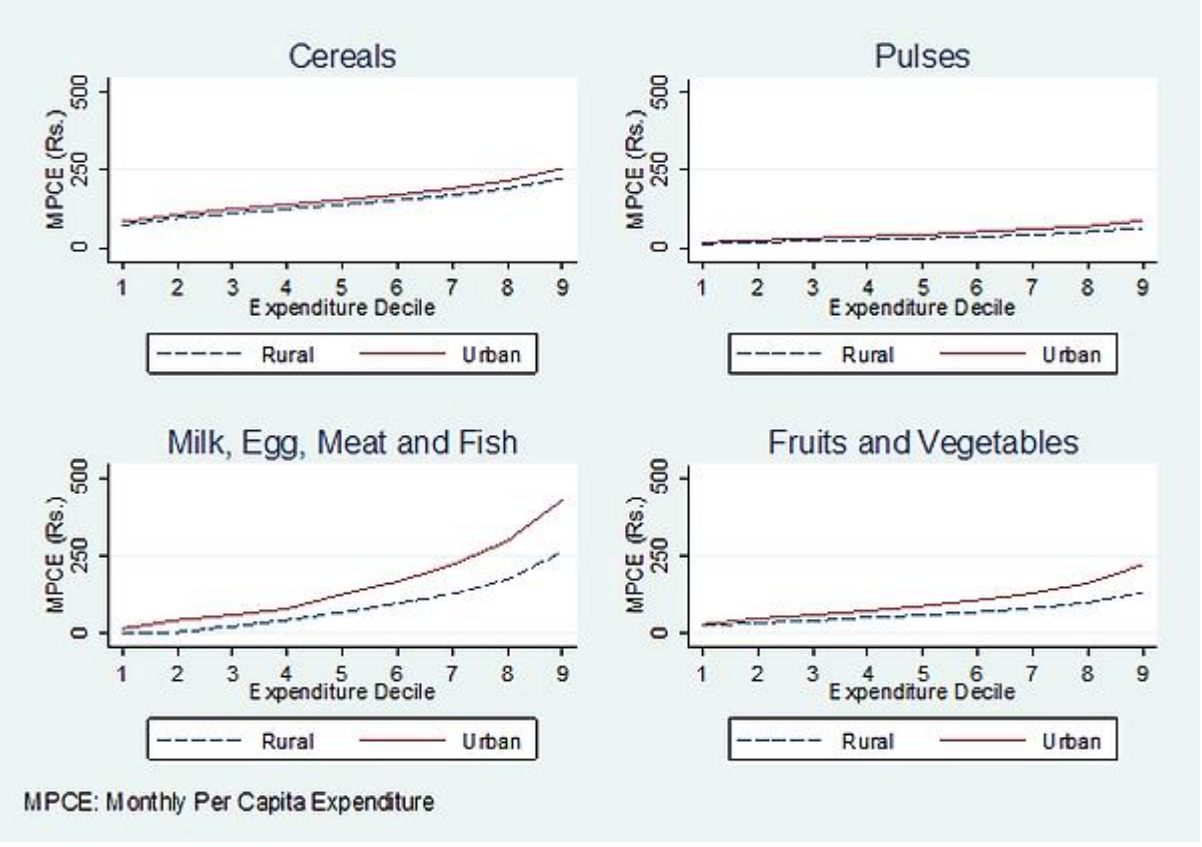
- Low historical growth in production and productivity
- Green revolution launched to improve farm inputs (seeds, fertilizers and irrigation), significant increase in production
- Self sufficiency

1980 - 2000

- Self sufficiency in cereal segment
- Emergence of agriculture commodities as an export industry
- Schemes to enhance agriculture credit penetration
- Support through MSP

Post 2000

- Value chain strategy to enhance production, supply chain and market linkages
- Model APMC act
- Increasing demand and inflationary pressures on proteins
- FDI in retail envisaged as investment channel to back end

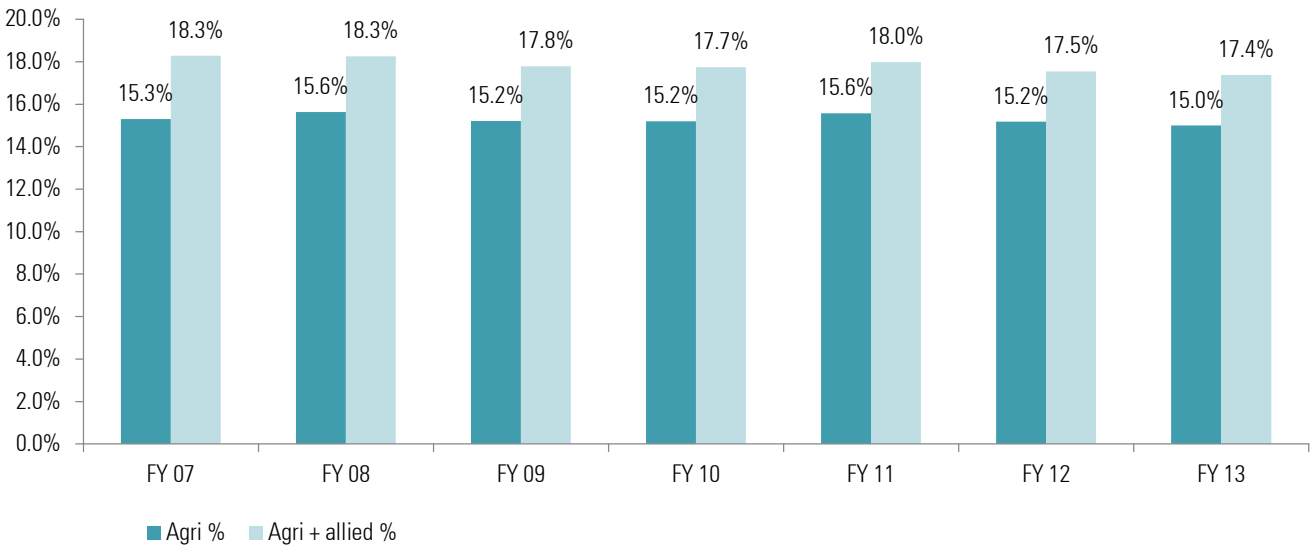


Analysis of the MPCE trends in food expenditure from 2004 – 2013 shows a flattening of expenditure towards cereals and pulses. This is also in part due to the public distribution system, which largely insulates the population from inflationary pressures on these categories of foods. Correspondingly there has been a strong increase in the expenditure on Milk, Eggs, Meat, Fish and Horticultural produce (fruits and vegetables). This has contributed to strong growth of these segments compared to core agriculture (growing of non perennial crops focused on cereals and pulses)

Source: ADB, NIPFP, RBI

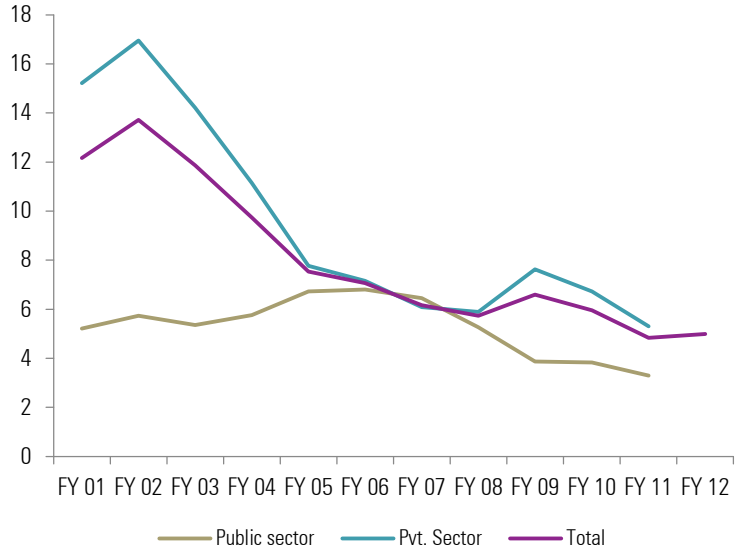
Contribution to GDP, capital investment and stocks

Trends in Agriculture and Allied Sector Share of GDP (current prices)



Source: RBI handbook of Indian Statistics – 2013 (2013 numbers are provisional)

Agriculture share of GCF as % of total GCF



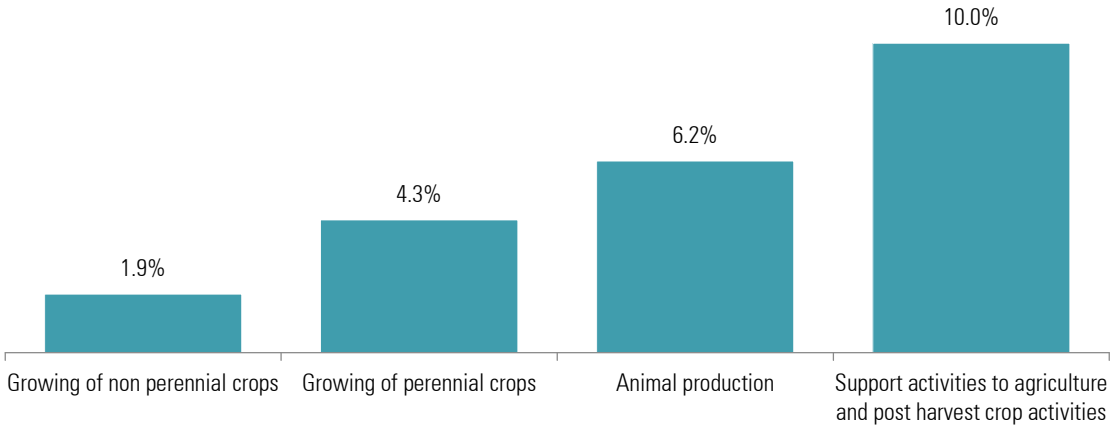
- The agriculture and allied sector has been a key contributor to both GDP and employment
- Over the years, while the contribution to GDP (sector mix) has declined, the sector still remains key on account of its access to most of the below poverty line population
- The sector is largely capable of meeting domestic demand, with significant export contribution in agri commodities
- However, the capital intensity of the sector continues to be low on account of structural (e.g. land holdings) and developmental (e.g. market distortions) factors, leading to unfavorable comparisons with global productivity levels
- Moving forward, employment, food security and nutrition diversification are expected to drive the sector

Source: RBI handbook of Indian Statistics - 2013

Sub-segment overview

Growth projections for key sub segments	
Non Perennial Crops	▪ The demand for cereals and pulses is expected to increase at around 2% - 3% CAGR. ▪ Most of this demand is expected to be focused on the pulses (6%) and oilseeds (14%) sub segments, as the consumption basket diversifies away from cereals.
Perennial Crops	▪ Fruits and vegetables are expected to witness demand growth around 6% - 11% (till FY17) ▪ Since post harvest losses are significantly higher in horticulture crops (10% - 35%), there is potential to meet a significant share of the incremental demand through loss reduction
Animal Husbandry	▪ Milk consumption is expected to witness a growth of ~ 4% till FY 17 ▪ Projected demand for poultry meat is expected to reach 3.3 million tonnes by FY16 and 4.3 million tonnes by FY20, representing a CAGR of 6.84% ▪ Projected demand for meat is expected to reach 3.7 million tonnes by FY16 and 5.0 million tonnes by FY20, representing a CAGR of 7.82% ▪ Significant productivity improvement and organized play have already come into this segment over the past decade, and is expected to intensify, with increasing per capita incomes driving dairy consumption
Support Activities	▪ Of support activities, farm machinery and equipment is expected to witness greatest growth. These range across the process chain, from soil preparation (tractors), planting and nurturing (sprayers, transplanters), harvesting and post harvest (threshers, harvesters, cleaners)

Expected Growth Rate (Output) by key sub segments (2013 – 2017 – 2022)



Source: NCI 2008, Ministry of Agriculture, DAC, Department of Animal Husbandry, Dairying and Fisheries, Team analysis

Growth Projections by product groups

No.	Group	Projected Demand (Million Tonnes)		Projected Supply FY 17	Actual Production (Million Tonnes)	
		FY 17	FY 21		FY 07	FY 12
1	Rice	110	117	98 – 106	93	104
2	Wheat	89	98	93 – 104	76	94
3	Maize	19	22		15	22
4	Coarse Cereals	36	38	42 – 48	34	42
5	Cereals	235	253	240 – 251	203	240
6	Pulses	22	25	18 – 21	14	17
7	Food grains	257	277	258 – 272	217	257
8	Oilseeds/ edible oils	59	71	33 – 41	24	30
9	Sugarcane/ Sugar	279	312	365 – 411	355	358
10	Vegetables	161	189		116	147
11	Fruits	97	124		59	75
12	Milk	141	173		103	122
13	Fish	11	14		6.9	8.3
14	Meat other than Poultry	3.7	5		2.3	2.7
15	Poultry meat	3.3	4.3			2.2

Source: 12th Five year plan – Volume II – Planning Commission, IBEF sector report

Performance and Growth Drivers

Performance

Agriculture is a critical sector of the Indian economy, holding the second largest agricultural land in the world at 179.9 million hectares as on August 2013. Its constitution of the overall GDP has fallen from approximately 30% in FY1990 to less than 15% in FY11. About 52% India's work force is engaged in agriculture (NSS, 66th round). A total of 259.32 million tonnes of food grains were produced in India in FY12, reaching an all-time high. Wheat and rice production stood at 94.9 million tonnes and 105.3 million tonnes respectively.

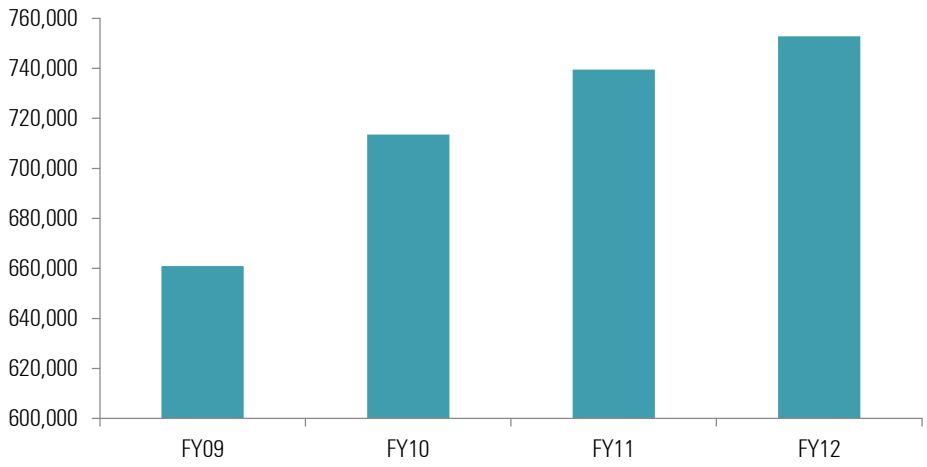
India is the world's largest producer of spices, pulses, and milk, and has the world's largest cattle herd (buffaloes), as well as the largest area under wheat, rice and cotton. It is the second largest producer of rice, wheat, cotton, sugarcane, farmed fish, sheep & goat meat, fruit, vegetables and tea. The country has some 195 m ha under cultivation of which some 63 percent are rainfed (roughly 125m ha) while 37 percent are irrigated (70m ha). In addition, forests cover some 65m ha of India's land (*Source: World Bank)*

The GDP of agriculture and allied sectors reached USD 151.8 billion in FY12, having grown at a CAGR of 3.3% between FY07 – FY12. India's horticulture production grew at a CAGR of 6.4% during FY05 – 12. During the last five years, production and yields of rice and wheat increased significantly. India ranks 2nd in the global production of fruits and vegetables and has the highest production of grapes in the world.

In terms of exports, India is one of the leading exporters of agricultural products, accounting for 2.07% of global agricultural trade in 2012. Agricultural exports expanded at a CAGR of 25.2% over FY07 – 12.

In terms of agricultural infrastructure, India is one of the largest manufacturers of various farm equipments such as harvesters, tillers and tractors, manufacturing one-third of tractors around the world.

GDP of agriculture and allied sectors (Rs. Cr.)



Demand-side drivers

A key demand-growth factor of the country 's agriculture sector is the large and rapidly rising population, which ensures a high demand for agricultural products. According to IBEF (August 2013), India's consumption expenditure is likely to reach USD3.6 trillion by 2020. Furthermore, domestic demand for agriculture has also been rising as a result of consumption by a population whose per-capita income is increasing annually. A notable increase in the incomes of urban-dwellers has also acted as a key driver for the increased demand. Indian agriculture has additionally benefited from rising external demand and the sector's increased global participation

Supply-side drivers

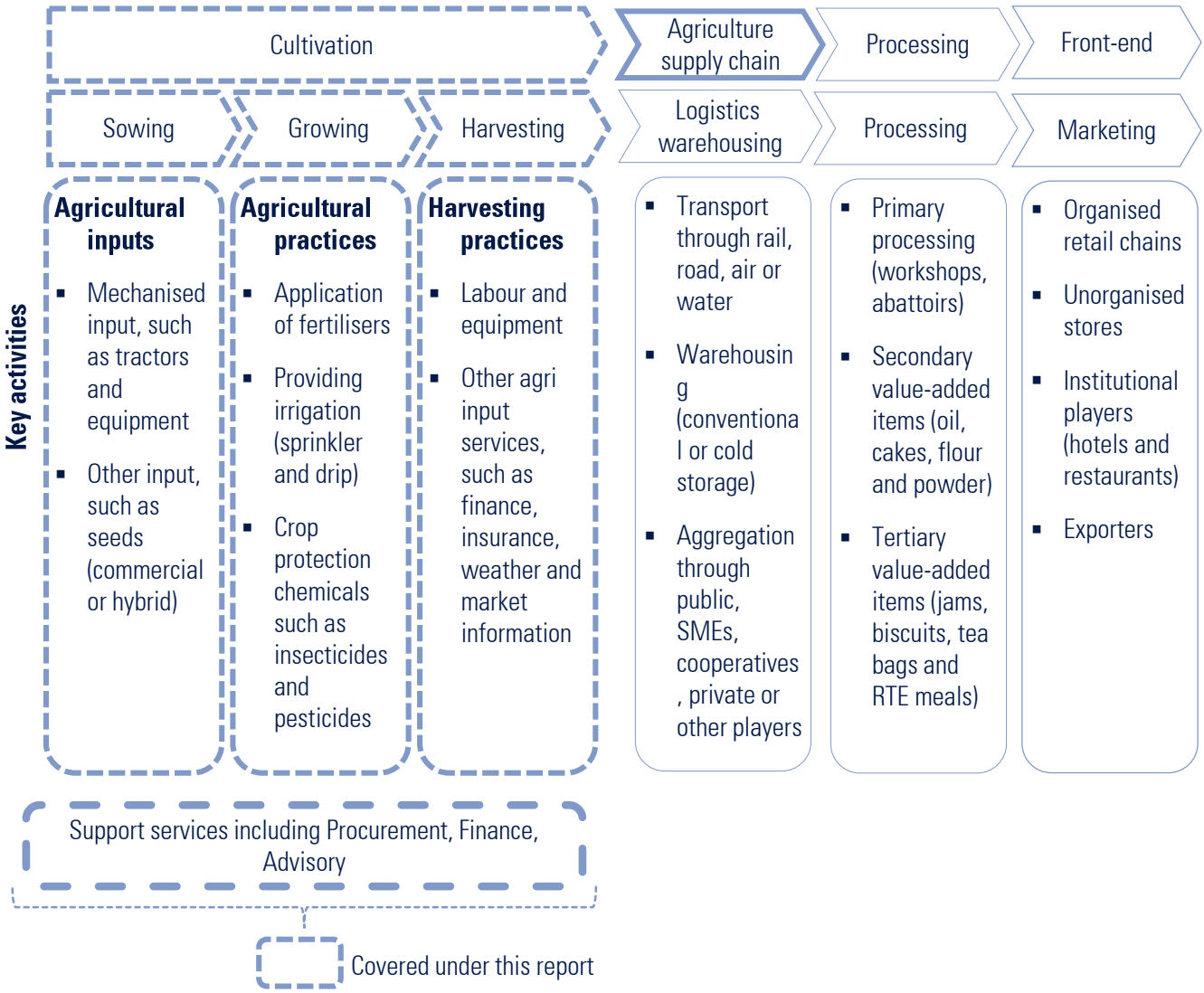
India's agricultural production quantity has increased substantially over the years due to increased irrigation potential, which had increased from 81.1 million hectares in FY92 to 108.2 million hectares in March 2010. As a result of growing investments in irrigation, the sector's dependence on monsoons has declined over the years.
Another important supply-side driver of growth is the increased mechanization of farming . Mechanization has helped by raising productivity, reducing post-harvest losses and subsequently raising farm income. Sales of tractors in India have grown at a CAGR of 11.5% over FY07-12, reflecting the increasing level of mechanization of farming processes.
Furthermore, the adoption of more advanced agricultural methods (hybrid seeds in particular) has become popular. Usage of hybrid seeds itself has increased due to their high yield and resistance . The yield of grains from 1,023 kr/hectare in FY81 to 2,059 kg/hectare in FY12 (nearly double). The production of certified seeds increased from 1.27 million tonnes in FY07 to 2.84 million tonnes in FY12, and is likely to continue rising.

Policy Support

A conducive policy environment is a key driver for growth in the agriculture sector. Institutional credit to the sector has been on a rise, having increased at a CAGR of 17.4% during FY07 – 12. As a result, farmers are able to avail crop loans at an interest of 7%. Additionally, both private and public domestic banks are required to provide around 18% of their bank credit to the agriculture sector.

- Various plans and programs have been introduced by the Department Of Agriculture and Corporation to give a boost to the sector. A sum of $4.2 billion has been finalized for spending on agriculture in the union budget of the financial year 2013.
- Additional favorable policies in place that have driven and will continue to drive agricultural growth in India are the *National Food Security Mission (NFSM) , Rajiv Krishi Vikas Yojana (RKVY).* Furthermore, the launching of the Bringing Green Revolution in Eastern India (BGREI) have promoted various technological interventions and collaborative work among institutions and farmers.
- A key area of policy support is the 100% FDI legislation pertaining the agriculture sector. This legislation is applicable for the development and production of seeds and planting material, horticulture, floriculture and cultivation of vegetables and mushrooms, animal husbandry and aquaculture under controlled conditions. This has boosted growth in the sector due to foreign investors being provided with a direct route for investing in agricultural warehousing . Furthermore, this policy offers a direct route for foreign companies specializing in seed development.

Value chain



- The agricultural value chain is one of the largest contributors to the Indian economy. Over 60% of India's population is dependent on the value chain
- The structure of the agriculture sector in India has undergone significant changes, represented by a shift from the traditional subsistence towards a market oriented one
- The degree of organization and governance of the value chain while improving continues to be a challenge.
- Recent initiatives have focused on improving production technology, processing, quality control, creating processing facilities that add value to raw produce and aggregation near farms to ensure higher share of consumer prices for the producer

Value chain

Value chain – Agriculture Sector

Sowing	Growing	Harvesting	Support Services
▪ **Agricultural inputs** ▪ Mechanized inputs such as tractors and equipments ▪ Other inputs such as seeds (commercial or hybrid)	▪ **Agricultural practices** ▪ Application of fertilizers ▪ Providing irrigation (sprinkler, drip, etc.) ▪ Crop protection chemicals such as insecticides and pesticides.	▪ **Harvesting practices** ▪ Labor and equipment ▪ Other agri input services such as finance, insurance, weather and market information. ▪ Market linkages	▪ Procurement ▪ Produce marketing ▪ Processing & Retail ▪ Machinery ▪ Finance ▪ Advisory

Sowing, growing and harvesting

It has, however in the past years experienced certain 'drags' which has resulting in key grain yields being less than half compared to China, for instance. Among the multiple value-chain related factors contributing to low yields, fertilizer imbalance, lack of correct information, antiquated agronomy practices contribute to lower-than-potential output.

Support Services

A number of post-harvesting value chain issues also emerge in agriculture. The power of middle men in output procurement areas, pricing data and lack of proper output infrastructure have contributed to hindered supplies and low earnings for farmers, ultimately affecting food security.

Forward and backward linkages of the agriculture sector with other economic sectors

Chemical Sector
- Fertilizers
- Pesticides
- Nutrients

Capital Goods sector
- Tractors and far, equipment

Utilities Sector
- Water
- Power

Logistics Sector
- Warehousing
- Cold storage
- Transport

Retail Sector
- Procurement
- Distribution

Food processing Sector
- Milling, grinding
- Advanced (pulping, extraction)

*Note: *SME refers to small and medium enterprises; **RTE refers to ready to eat*
Source: KPMG in India analysis as on 10 February 2014

Concerns and challenges

Concerns

- Lower productivity of agriculture in India as compared to global standards:

Location	Wheat yield per hectare (metric tonnes)	Rice yield per hectare (metric tonnes)
India	2.89	3.18
China	4.77	6.59
World (average)	3.01	4.25

- A similar observation exists in the case of course grains and oil seeds. This could be influenced further by the lack of awareness of good farming practices and insufficient professional education of farmers and agriculturalists, resulting in poor management practices. Poor seed quality and lack of cold storage resulting in harvest spoilage cause a large portion (over 30%) of farmers' produce to go to waste.
- Poor agricultural infrastructure: cold chain deficit is a particularly significant issue. There is a dearth of initiatives such as the golden quadrilateral to handle cold chain movements across the country , which could help boost marketing and price realisation for farmers. Furthermore, poor rural roads affect the timely supply of inputs and transfer of outputs from Indian firms.
- Small and fragmented holdings of small and marginal farmers whose land holding size is progressively declining: In terms of productivity, efficiency and viability, taking care of these small farm holdings is an issue as farming activity is exposed to the risk of becoming uneconomical.
- Despite the significant improvement of irrigation facilities and subsequent decline in dependence on rainfall, irrigation facilities and still inadequate and there continues to remain a high level of dependency on rainfall.
- The lack of an organised market limits the Indian farmer's ability to sell surplus crops, again contributing to waste and losses. Furthermore, the existence of middlemen is a key reason for the low returns experienced by farmers, who receive only 10-23% of the end-product retail price, with a large portion of the difference going to middlemen.

Challenges:

- Climate change : This is likely to have varied implications, particularly in terms of delayed and deficient rains and flash floods. Furthermore, its impact on agriculture is likely to be met by a growing inability of farmers to cope due to the small size of their holdings.
- Raising productivity per unit of land: this will need to be the main driver of agricultural growth and almost all cultivable land is being farmed. Thus with limited water and land resources, other measures of increasing productivity (such as increasing yield, developing and adhering to an organised value chain to reduce marketing costs and diversification to higher value crops) would need to be adopted. Better seeds can raise yields by nearly 40% . Despite this benefit, there is a constraint in the availability of certified seeds and the rate of adoption of existing seed technologies is lower than it should be.
- Increased competition and import threat: India's current agricultural product yields are fractions of those in other countries such as China, Vietnam and Indonesia. Agricultural growth needs to respond to food security needs

PESTEL analysis for the sector

A snapshot of Agriculture sector

Turnover: Contributes to 13.7% of the GDP (FY13 Advance estimate) with current size at ~ 7.5 lakh Crore. This is down from a level of ~ 14.6% in FY 10

Past and Future growth: Historical growth ~ 3.7% CAGR (11th plan), 4% target for the 12th plan period

Factor	Brief
Political	Agriculture is a politically sensitive sector, on account of employing a large fraction of the population, especially at lower income and education levels. The sector is expected to witness policy interventions on a regular basis in the areas of minimum support price, input subsidy, skills development and capacity building, and access to finance
Economic	Economics of the sector are heavily influenced by the level of public sector subsidy on both input and outputs. With the Food Security Act being passed, the economic drivers (demand supply) for the sector are expected to intensify leading to a strong mid – long term production and growth expectation. High value crops (cash crops, horticulture) are expected to witness increased traction because of relatively higher economic value of efficiency enhancements and lower regulatory restrictions
Social	Employment in the sector has been dynamically shifting, with a strong efflux to other sectors. This outward movement is expected to continue, powered by wage differential across primary, secondary and tertiary sectors. Enhancement of skills of remnant population is critical to ensuring production growth with declining workforce
Technological	Technology has significantly altered the labour elasticity in the sector over the past two decades, with increase in farm mechanization. Addressing aggregation/ fragmentation issues would be critical to ensuring better penetration of technology to support the envisaged labour profile, and to counter increasing wage costs
Environmental	Constraints on natural resources (land, water) are critical issues facing the sector. With decreasing area under cultivation, on account of use of farm land for other purposes, the total area of available land is a critical reagent. Even more so is availability of water resources, with large segments of key production belts coming under water pressure. Addressing judicious use and distribution of this scarce resource will be key to sustainability of the sector
Legal	Private investment in agriculture is constrained on account of a number of legal provisions. Also, the farmer – Private sector interface is governed by a number of restrictions, both based on laws and operational precedents. Easing of this interface will be vital to ensuring Private sector confidence in this space and increase capital formation

Source: KPMG in India analysis

SWOT analysis for sub-segments

	Strength	Weakness	Opportunity	Threat
Cereals and Pulses (Non perennial crops)	Large population requires high levels of cereal production for food security Pockets of excellence in yield and productivity	Currently cultivation is highly labour intensive, making the productivity uncompetitive Highly dependent on an opaque system of subsidies	Greater productivity through mechanization and improved farm practices Food Security bill guarantees greater off take for domestic consumption	Global trade restrictions on subsidies might impact viability of domestic farmers Fragmented land holdings could impede mechanization and productivity enhancement
Horticulture and Plantation Crops (Perennial)	India ranks at the top of production lists in several horticultural crops Expanding opportunities for trade on cash crops Increasing preference in food basket	Lack of seamless market mechanisms for perishables results in high losses and low income realization by farmers	Enhancements in marketing channels and supply chain can cut down losses Strong potential for global/ regional exports	Lowering trade barriers without improving the supply chain of these crops can hit domestic viability High employment of women – sensitive to social outcomes
Animal husbandry	India has one of the highest levels of livestock globally Increasing demand for animal protein	Low yield in milk, largely fragmented and unstructured market with low realization of economies of scale	Scale and bringing in best practices can sharply improve productivity and quality	Continuing low levels of organized play can lead to sharp inflation due to supply side inefficiencies
Support activities	Increasing trend of planned farming, contract farming and mechanization	Low paying power for formal and qualified support services due to fragmented holdings	Push to efficient support activities (credit, advisory, technology, information) can sharply increase productivity across board	Low career interest in the sector, lack of standardized low cost models for delivering support, limited ability to pay (short term)

Source: KPMG in India analysis

Sub-sectoral Overview

Key Crops

Rice: India is the second largest producer and consumer of rice in the world, accounting for 22.3% of global production. The production and productivity of rice has increased from 96.7 million tonnes and 2202 kg per hectare in 2007-08 to 105.31 million tonnes and 2393 kg per hectare respectively in 2011-12.
However, India's paddy yield (3.38 tonnes/ha) is much lower than that of neighbours such as China (6.55 tonnes/ha), Bangladesh (4.18), Indonesia (5.01) and Vietnam (5.32) as per FAO estimates

Wheat: The area under wheat has increased from 27.99 million hectares in 2006-07 to 29.86 million hectares in 2011-12. The production of wheat in the country has increased from 75.81 million tonnes in 2006-07 to an all time record high of 94.88 million tonnes in 2011-12. The productivity of wheat which was 2602 kg/hectare in 2004-05 has increased to 3177 kg/hectare in 2011-12. The major increase in the productivity of wheat has been observed in the states of Haryana, Punjab, Madhya Pradesh and Uttar Pradesh

Coarse Cereals comprises crops like jowar, bajra, ragi, other small millets (kudo, kutiki, sanwa, foxtail) and maize, which have traditionally been the main components of the food basket of the poor in India. These crops are grown predominantly in the rainfed regions of Karnataka, Maharashtra, Tamil Nadu, Madhya Pradesh, Rajasthan, Haryana and Gujarat. There has been a decline in the area coverage under coarse cereals from 29.03 million hectares in 2004-05 to 26.42million hectares in 2011-12. However, the productivity of coarse cereals has increased significantly from 1153 kg per hectare in 2004-05 to 1591 kg per hectare in 2011-12.

Pulses: India grows the largest varieties of pulses in the world accounting for about 32% of the area and 23% of the world production. the important pulse crops are chickpea (48%) pigeon pea (16%), urdbean (9%), mungbean (7%), lentil (6%) and field pea (4%). The major pulse producing states are Madhya Pradesh (24%), Maharashtra (15%), Uttar Pradesh (12%), Rajasthan (12%) and Andhra Pradesh (9%), which together account for 72% of the total production. The average annual growth rate of area and production of pulses has been significantly higher during 2000-01 to 2010-11 as compared to the last decade. Productivity of pulses has increased from 625 kg per hectare in 2007-08 to 699 kg per hectare in 2011-12. A major increase in the productivity of pulses has been noticed in the states of Gujarat, Maharashtra, Rajasthan, Uttar Pradesh and West Bengal. However, the average productivity of pulses in India is less than the average productivity of 890 Kg/ha in world.

Crops	Area (lakh ha)			Production (mn tonne)			Yield (Kg/ ha)		
Period	**FY 10**	**FY 11**	**FY 12**	**FY 10**	**FY11**	**FY 12**	**FY 10**	**FY 11**	**FY 12**
Rice	419	429	440	89	96	105	2125	2239	2393
Wheat	285	291	299	81	87	95	2839	2989	3177
Coarse cereals	277	283	264	34	43	42	1212	1531	1591
Pulses	233	264	245	15	18	17	630	691	699
Foodgrains net	1213	1267	1248	218	244	259	1798	1930	2079
Oilseeds	260	272	263	25	32	30	958	1193	1133
Sugarcane	42	49	50	292	342	361	70020	70091	71668
Cotton (mn bales)	101	112	122	24	33	35	403	499	491
Horticulture crops	208	218	232	223	241	257	10720	11000	11080

Note: Department of Agriculture and Cooperation

Key Crops

Oilseeds: Oilseed cultivation is undertaken across the country in about 26 million ha on marginal lands, dependent on monsoon rains, nearly 72% of area under oilseeds is rainfed and with low levels of input usage. Among the major oilseed growing States, highest yield. in 2011-12 of oilseed crops was recorded by Tamil Nadu State (2479 kg/ha) followed by Gujarat (1608 kg/ha) and Haryana (1394 kg/ha). Similarly, States which are having lower yield levels of oilseed crops are Assam (557 kg/ha), Chhattisgarh (550 kg/ha) and Odisha (661 kg/ha)

Sugarcane: Sugarcane is the most important cash crop in India, which is widely cultivated. Tropical regions in Maharashtra, Tamil Nadu, Gujarat, Karnataka, Andhra Pradesh, Orissa and part of Madhya Pradesh account for about 45% of the total area and about 55% of the total sugarcane production, with average productivity of about 83 tonnes per hectare. Other regions have productivity of about 56 tonnes per hectare. Sugarcane contributes about 4.4% of value of output from crop sector and occupies about 2.5% of India's gross cropped area. The area under sugarcane has declined from 5.06 million ha in 2007-08 to 4.17 ha in 2009-10, and has stabilized at 5.04 million ha. Increase in area under coverage of sugarcane has been observed in the States of UP, Maharashtra and Karnataka

Cotton: India is second largest cotton producer, consumer and exporter of cotton in the world. Punjab, Haryana, Rajasthan, Maharashtra, Gujarat, Madhya Pradesh, Andhra Pradesh, Tamil Nadu and Karnataka are the major cotton producing states. During the last decade the area, production and productivity of cotton have grown at 3.14%, 11.66% and 8.25% respectively. During 2011-12 a record area of 12.18 lakh hectare was sown, major increase in area were noticed in Andhra Pradesh, Maharashtra and Gujarat. Bt cotton area occupies 11.14 million hectares, 91.5% of the total area under cotton and seems to be the widely accepted technology among farmers. As per the 2nd advance estimate, cotton production during 2012-13 is estimated at 33.80 million bales (of 170 kg each) as against 35.20 million bales in 2011-12.Yield of cotton (590 kg lint/ha) in India is however, substantially below the world average of 745 kg lint/ha. Even in states like Punjab, Haryana and Rajasthan with 100% irrigation, better soil, Bt cotton hybrid seed and high input farming have not been able to boost yield comparable to international level

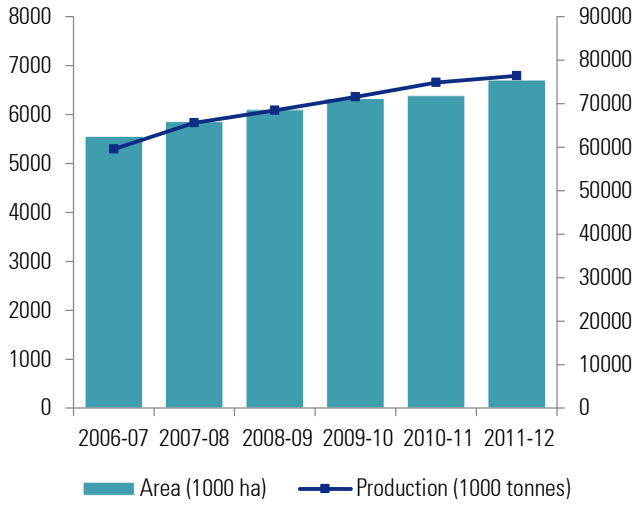
Commodity wise trends in MSP for key Group 011 crops	FY 12	Increase in MSP over FY11	FY 13	Increase in MSP over FY 12
Paddy (common)	1080	8%	1250	15.7%
Cotton (medium staple)	2800	12%	3600	28.6%
Wheat	1285	14.7%	1350	5.1%
Jute	1675	6.3%	2200	31.3%
Sugarcane	145	4.2%	170	17.2%

Note: FCI, GoM, Team analysis

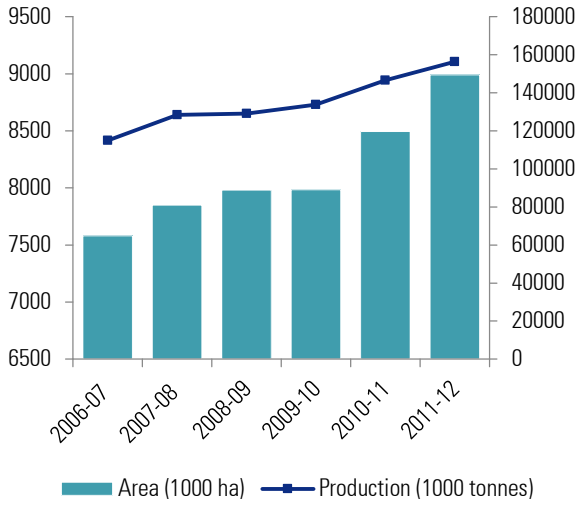
Sub-sector Overview

- India is the second largest producer of fruits in the world and holds first position in production of fruits like mango, banana, sapota, pomegranate and aonla.
- The area under fruit crops during 2011-12 was 6.7 m. ha with a total production of 76.4 m. MT. During the XI Plan, production of fruits increased by about 16.46% while the area increased by about 13.56%.
- Vegetables are an important segment in horticulture sector, occupying an area of 9.0 million ha during 2011-12 with a total production of 156.3 million tonnes and having average productivity of 17.4 tonnes/ha. Vegetables constitute about 60% of horticulture production.
- During the XI Plan, area and production of vegetables increased by 15.4% and 21.7% respectively
- India has also made noticeable advancements in production of flowers, particularly cut flowers, which have a high potential for exports.
- Floriculture during 2011-12 covered an area of 0.25 million ha with a production of 1.74 m. MT of loose flowers and 7507 million number of cut flowers.
- India is the largest producer, consumer and exporter of spices and spice products, the total production of spices during 2011-12 was 5.92 m.MT from an area of 3.21 m.ha

Production Trends of Fruits - 11th FYP



Production Trends of Vegetables- 11th FYP



Note: GoI, DAC, RBI, Team analysis

Sub-sector overview

Animal husbandry is an integral component of Indian agriculture supporting the livelihood of more than two-thirds of the rural population. Indian livestock grew at a rate of 2.5% during the 2000s. Despite deceleration of growth, the livestock sector has remained about 1.5 times larger than the crop sector.

India ranks first in the world in terms of milk production. Milk and milk products account for a significant 17 percent of India's total expenditure on food. Despite a high growth rate, the per capita availability of milk in India (229 grams per day) is lower than the world average (285 grams per day). The growth in milk production has however decelerated from 4.4% during 1990s to 3.9% during 2000s.

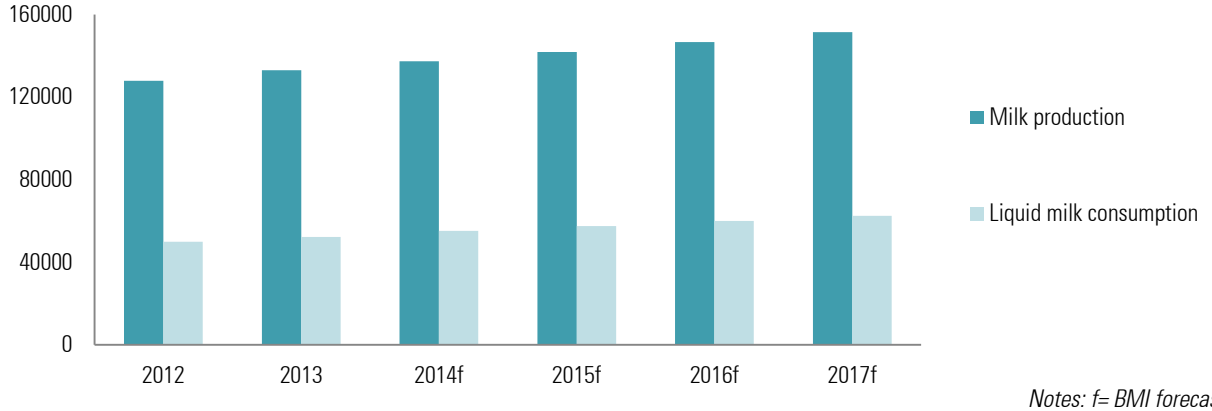
This sector is highly fragmented with the organized sector processing 13 million tones of milk and unorganized sector processing 22 million tones per annum. While private diaries exist, a large proportion of the milk is processed by dairy cooperatives in the country.

Meat production from registered slaughterhouses has grown at a growth rate of ~ 19% over the past 5 years, increasing from 2.3 mn tonnes in 2007 to 5.5 mn tonnes in 2012

Indian poultry sector has been growing at around 8-10% annually over the last decade with broiler meat volumes growing at more than 10% while table egg at 5-6% driven by increased domestic consumption. Currently egg production is at about 66.45 bn, with poultry meat production estimated at 2.47 mn tonnes. Percapita availability of eggs has increased to ~ 55 per year

Animal Proteins and Dairy	Production		
	FY 10	FY 11	FY 12
Milk (Mn tonnes)	116.4	121.8	128
Eggs (Mn numbers)	60267	63024	66449
Meat (Mn tonnes)	4.6	4.8	5.5

India Milk Production & Consumption ('000 tonnes)

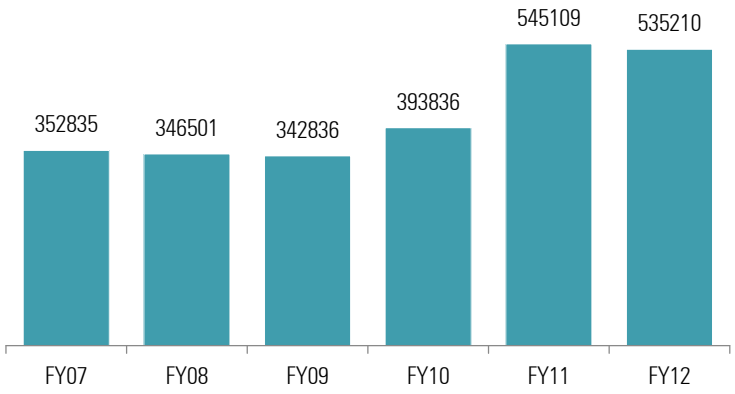


Notes: f= BMI forecasts

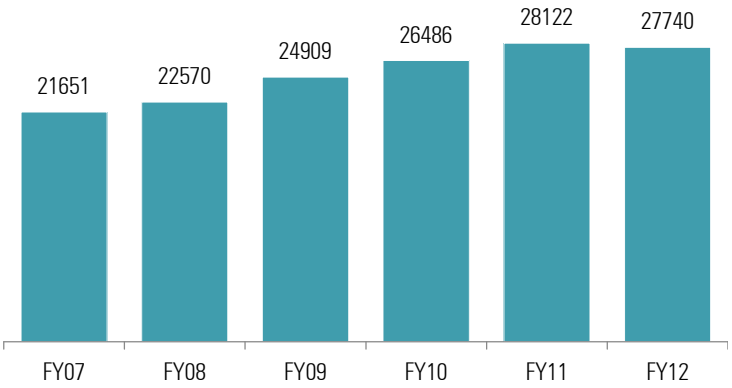
Sources: National Dairy Development Board, FAPRI, BMI; FAPRI, BMI , Dept. of Animal Husbandry

Support activities

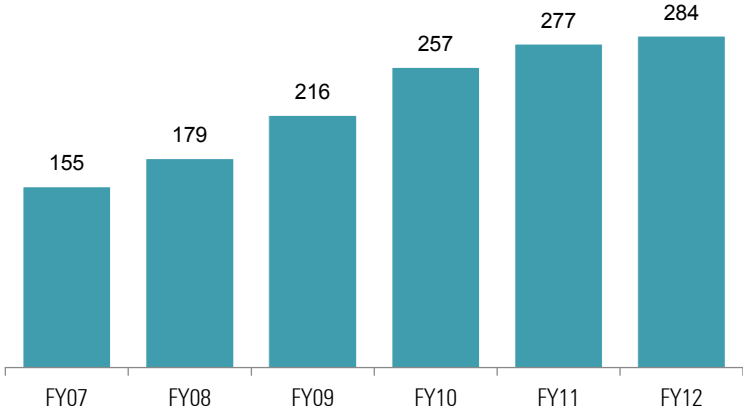
Tractor sales



Ferti 1000 tns



Dist. of certified seeds (lakh qtls)



Sub-sector overview

- Support activities to Agriculture largely include the following key groups
  - Agricultural machinery, consisting of tractors, tillers, harvesters, threshing and planting equipment
  - Key crop inputs of fertilizers, seeds and power (for farm irrigation)
  - Marketing networks, mainly Agricultural Produce Market Committees (APMCs)
- Support services have been witnessing increased level of efficiencies on account of better technology. For instance, agricultural machinery, high yield oriented farm inputs, scientific animal husbandry practices such as selective breeding, artificial insemination and better disease response, and ICT innovations in price discovery and communication have supported this transition
- In general, this segment also witnesses higher private sector participation. In particular the APMC Act reforms which have been passed in various states over the past 5 years have significantly eased barriers to private participation in areas such as direct procurement and contract farming

Source: State of Indian Agriculture 2013, KPMG in India analysis

Government policies

Policy level initiatives

Several favorable policy initiatives have been designed to further growth of the Sector
Flagship programs include

- **Minimum Support Prices (MSP) for FY13:** As per the recommendations by Commission for Agricultural Costs and Prices, the Government has set MSPs

- **100% FDI legislation:** this was made effective in 2011 and is applicable to the development and production of seeds and planting material, floriculture, horticulture, cultivation of vegetables and mushrooms and animal husbandry under controlled conditions

- **Bringing Green Revolution in Eastern India (BGREI):** A scheme that was launched in 2011 under the RKVY to enhance agricultural productivity in the Eastern states by promoting technological interventions and collaborations among farmers, and institutions.

- **Rashtriya Krishi Vikas Yojana (RKVY):** A state-plan scheme launched in 2007 as part of the 11th Five Year Plan by the Government, which aims to achieve 4% annual growth in agriculture by providing states and territories the autonomy to construct plans for increased public investment in agriculture based on local indicators and conditions.

- **Agri Export Zone (AEZ):** the Government introduced a policy in 2001 with the main objective of boosting agricultural exports from India. A total of 60 AEZs comprising about 40 agricultural commodities has been sanctioned by the central government. AEZs are spread across 20 states in the country.

- **Warehousing (Development Regulatory) Act, 2007:** This Act contains three segments relevant to agriculture sector:
    - Negotiable Warehouse Receipts (NWRs): WDRA formulated NWRs allowing farmers to get the best price for their production and help reduce the prices of commodities by eliminating the arbitrage earned by middlemen. It is currently running an awareness programme to educate farmers about the Negotiable Warehouse Receipts process.
    - Rural Godown Scheme: Launched in 2001 to provide the subsidy at 25 percent of the project cost for the construction/renovation of rural godowns to all the categories of farmers, agriculture graduates, cooperatives and Central Warehousing Corporation (CWC)/State Warehousing Corporations (SWCs) subject to a maximum ceiling of INR 46.87 lakhs.
    - Rural Infrastructure Development Fund (RIDF) Scheme: Government allocated INR 2,000 crores during 2011–12 for setting up of warehouse infrastructure in the country.

Other programs:

- Accelerated Pulses Production Programme
- Initiation of Management Information System (MIS)
- National Horticulture Mission
- Horticulture Mission for North East and Himalayan States (HMNEH)
- National Mission on Micro Irrigation (NMMI)
- Pulses and Oilseeds villages

Sources: Nodal agency websites

Relevant policies impacting agriculture initiatives

Ministry	Relevant programmes (direct or indirectly impacting Agri work force)
Ministry of Agriculture	▪ Training in agricultural extension ▪ Training in use of agricultural implements and machinery ▪ Soil conservation training centre ▪ Cooperative education and training
Ministry of Food processing industries	▪ Person power development in rural areas ▪ Entrepreneurship development program ▪ Programs for development of human resources in food processing value chain
Ministry of Rural Development	▪ National institute of Rural development ▪ SGSY ▪ NRLM
Ministry of Small and Medium enterprises	▪ Entrepreneurship development program ▪ Skill development program (SDP) ▪ Management development program
Dept. Of women and child development	▪ Support to Training and Employment for Women ▪ Swalamban ▪ Training in home scale preservation of fruits and vegetables ▪ Women empowerment program with IGNOU ▪ Kishori Shakti Yojana
MOLE and MHRD	▪ Modular Employable Skills (MES) programmes which offer modular courses and certifications for various roles in the sector ▪ ITIs, ITCs and Polytechnics providing diploma programmes

In addition to the above, several State Governments have launched specific schemes in consideration of local conditions

Snapshot of state-level policy initiatives

Over the years, some Indian states have taken independent initiatives to boost the development of agriculture and agri-business industries through various policies and proposed measures. Such initiatives have helped these states attract considerable attention of investors.

Punjab

- The Agro Industrial Policy 2009 is incentivising the food processing sector.
- State nodal agencies, such as Punjab Agro Industries Corp Ltd. (PAIC), also work to infuse fast growth by encouraging more industrial partnerships.

Rajasthan

- Rajasthan's policy for the promotion of 'Agro-processing and Agribusiness 2010' will give focus to the areas in oilseeds processing and livestock.

Gujarat

- The food processing sector gets coverage under the Agro Industrial Policy 2000.
- F&V processing units have set up their plants in this state due to industry friendly labour policies.

Maharashtra

- Part 2010–15. Further, the Maharashtra State Food Processing Mission is an extension of a national initiative managed by the state government by the Maharashtra Agro Industries Development Corporation of the Food Processing Policy

Karnataka

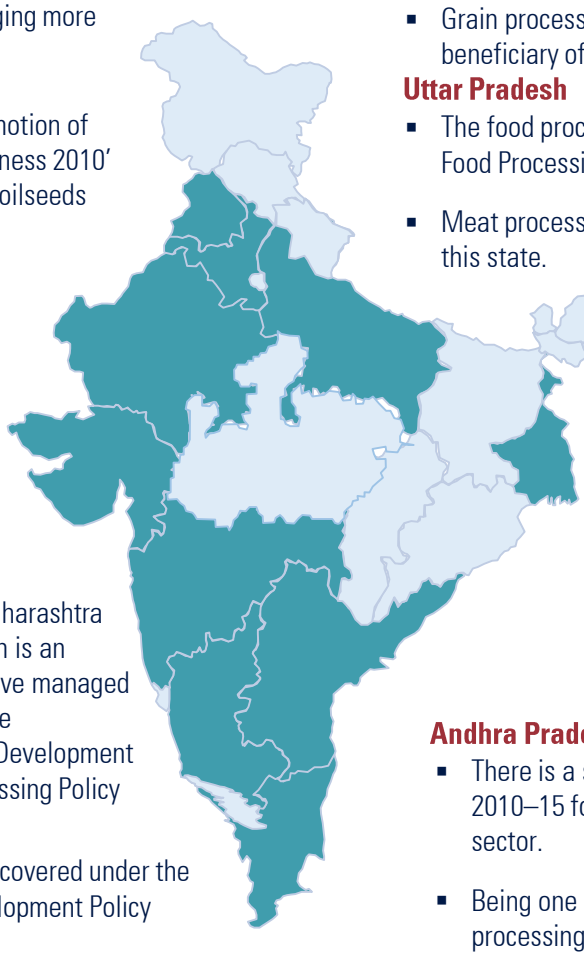
- The food processing sector is covered under the Integrated Agribusiness Development Policy 2011.
- Karnataka with its ten different agro-climatic zones and other bounteous natural advantages offers immense opportunities for high growth in agriculture and allied sectors.

Haryana

- The food processing sector is covered under the Government of Haryana's Industrial and Investment Policy 2011.
- Grain processing units will be a major beneficiary of this initiative.

Uttar Pradesh

- The food processing sector is covered under the Food Processing Policy 2012 of Uttar Pradesh.
- Meat processing units are majorly concentrated in this state.



West Bengal

- Incentives for the food processing sector are covered under the Investment and Industrial Policy of West Bengal 2013 and the West Bengal Food Processing Industrial Policy 2011.

Andhra Pradesh

- There is a separate Food Processing Policy 2010–15 for the overall development of the sector.
- Being one of the top agro producers, food processing units are setting plants close to the produce.

Tamil Nadu

- The food processing sector is covered under the Tamil Nadu Agro and Agro Processing Policy 2008.

Source: Economic Survey of India, 2008-09; State profiles by MOFPI

Geographical Clusters

Production of key Agri-commodities

Geographical Distribution – Food Grains (X1000 Tonnes)

States	2010-11	% of Production FY 11	2011-12	% of Production FY 12
Andhra Pradesh	20315	8.31	18363.1	7.08
Haryana	16629.5	6.80	17958.7	6.93
Punjab	27866.3	11.40	28389.1	10.95
Rajasthan	18832.2	7.70	19469.7	7.51
Uttar Pradesh	47247.6	19.32	50283.6	19.39
Top 5 States	130890.6	53.54	134464.2	51.85
India (FG)	244492.1	100.00	259323.1	100.00

Geographical Distribution – Horticulture Crops (X1000 Tonnes)

States/UTs	2010-11	% of Production FY 11	2011-12	% of Production FY 12
Andhra Pradesh	23324.5	9.70	24107.4	9.75
Bihar	18556.8	7.72	18556.8	7.51
Tamil Nadu	22662.9	9.43	21947.1	8.88
Uttar Pradesh	23279.5	9.68	24196.3	9.79
West Bengal	30207.6	12.56	30853	12.48
Maharashtra	17540.2	7.30	20724.2	8.38
India	**240426.2**	100.00	**247164**	100.00

Geographical Distribution – Milk (X1000 Tonnes)

States	2010-11	% of Production FY 11	2011-12	% of Production FY 12
Uttar Pradesh	21031	17.26%	22556	17.64%
Rajasthan	13234	10.86%	13512	10.56%
Andhra Pradesh	11203	9.19%	12088	9.45%
Gujarat	9321	7.65%	9817	7.68%
Punjab	9423	7.73%	9551	7.47%
Maharashtra	8044	6.60%	8469	6.62%
India	121848	100	1,27,904	100

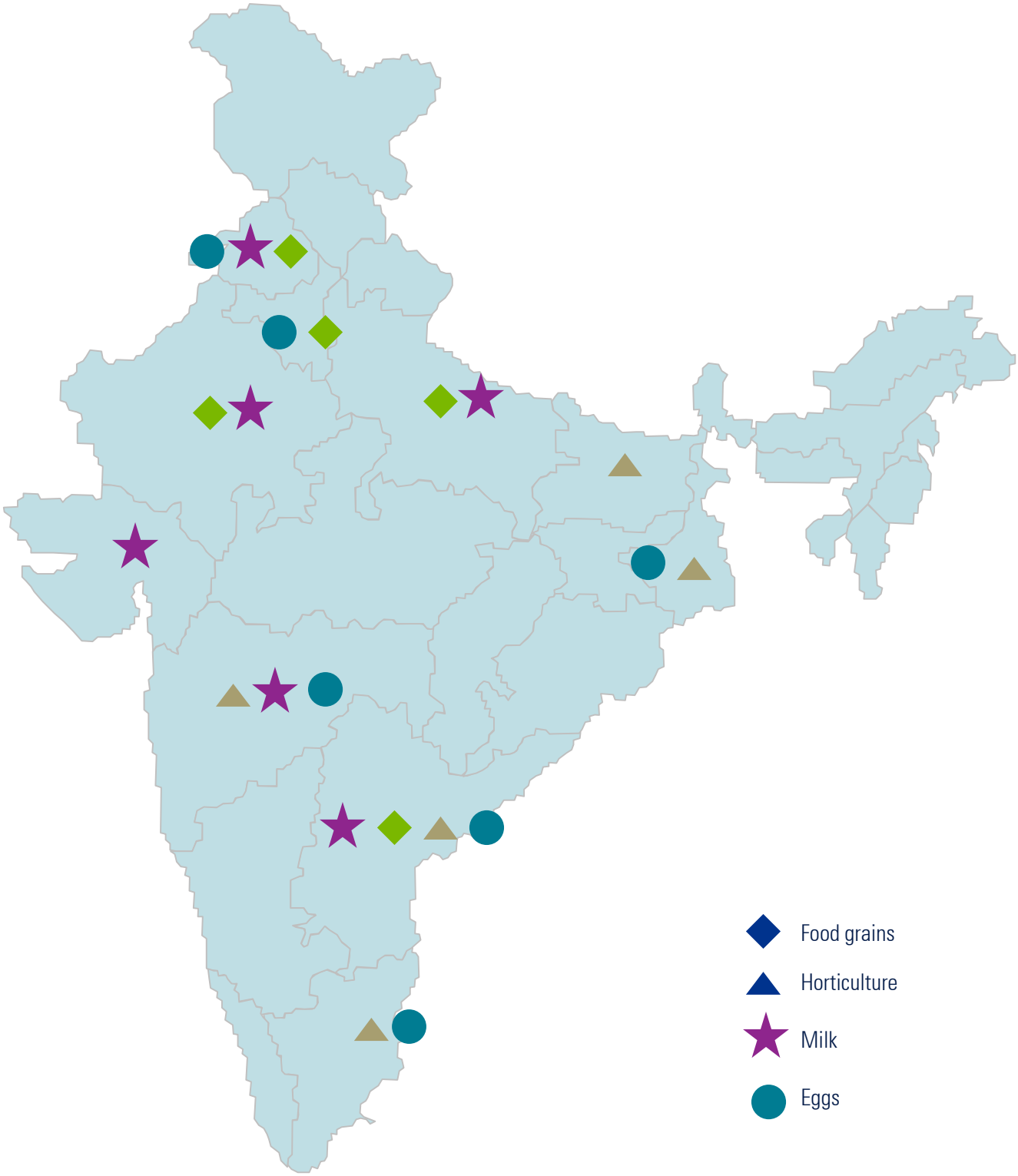
Geographical Distribution – Eggs (X10 Mn)

States/UTs	2010-11	% of Production FY 11	2011-12	% of Production FY 12
Andhra Pradesh	2012.8	32%	2121	32%
Tamil Nadu	1151.4	18%	1185.2	18%
Maharashtra	422.5	7%	438.6	7%
West Bengal	399.4	6%	434.3	7%
Haryana	396.4	6%	411.4	6%
Punjab	354.5	6%	360.3	5%
India (FG)	6302.4	100	6645	100

Sources: MOSP, RBII

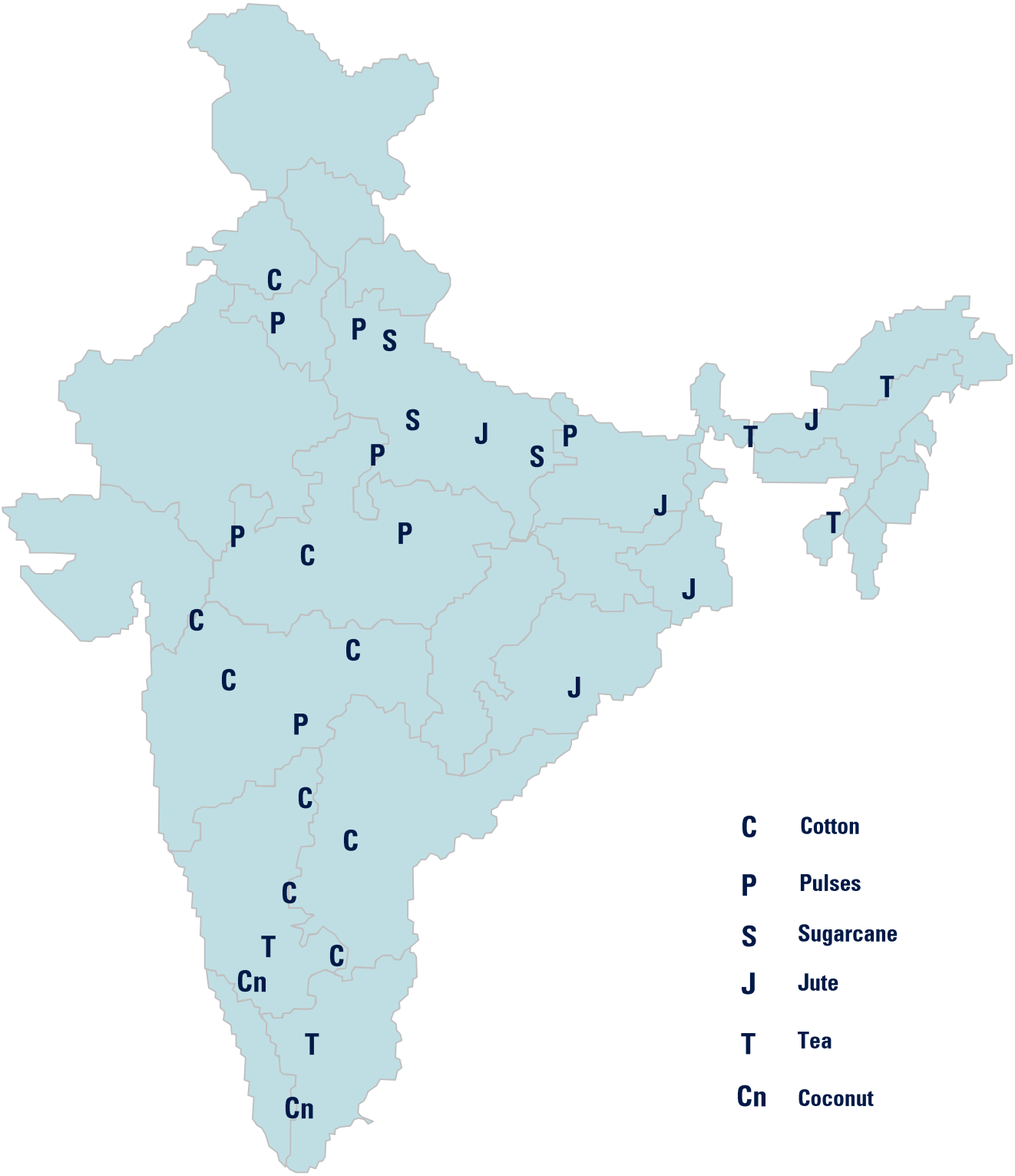
Geographical clusters

Production of key Agri-commodities



Geographical clusters

Production of key Agri-commodities

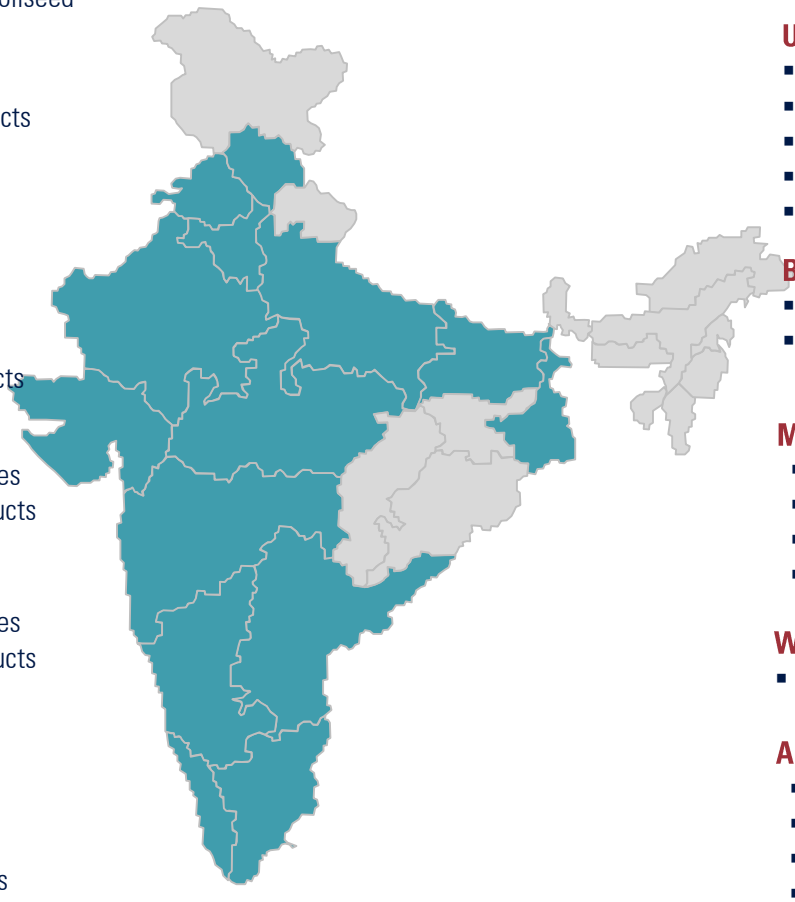


Geographical clusters

State-wise distribution of AEZs and focus products

Distribution of major processing production clusters

The food processing industry in India is fragmented. The following diagram depicts the state-wise distribution of major production and service clusters in India:



Punjab
- Milk and milk products
- Meat and marine
- Grain and oilseed

Himachal Pradesh
- Fruits and vegetables

Haryana
- Milk and milk products
- Meat and marine
- Grain and oilseed
- Packaged foods
- Beverages

Uttar Pradesh
- Fruits and vegetables
- Milk and milk products
- Meat and marine
- Grain and oilseed
- Packaged foods

Bihar
- Meat and marine
- Grain and oilseed

Rajasthan
- Milk and milk products

Gujarat
- Fruits and vegetables
- Milk and milk products
- Packaged foods

Madhya Pradesh
- Milk and milk products
- Grain and oilseed
- Packaged foods
- Beverages

Maharashtra
- Fruits and vegetables
- Milk and milk products
- Meat and marine
- Grain and oilseed
- Packaged foods
- Beverages

West Bengal
- Meat and marine

Andhra Pradesh
- Fruits and vegetables
- Milk and milk products
- Meat and marine
- Grain and oilseed
- Packaged foods
- Beverages

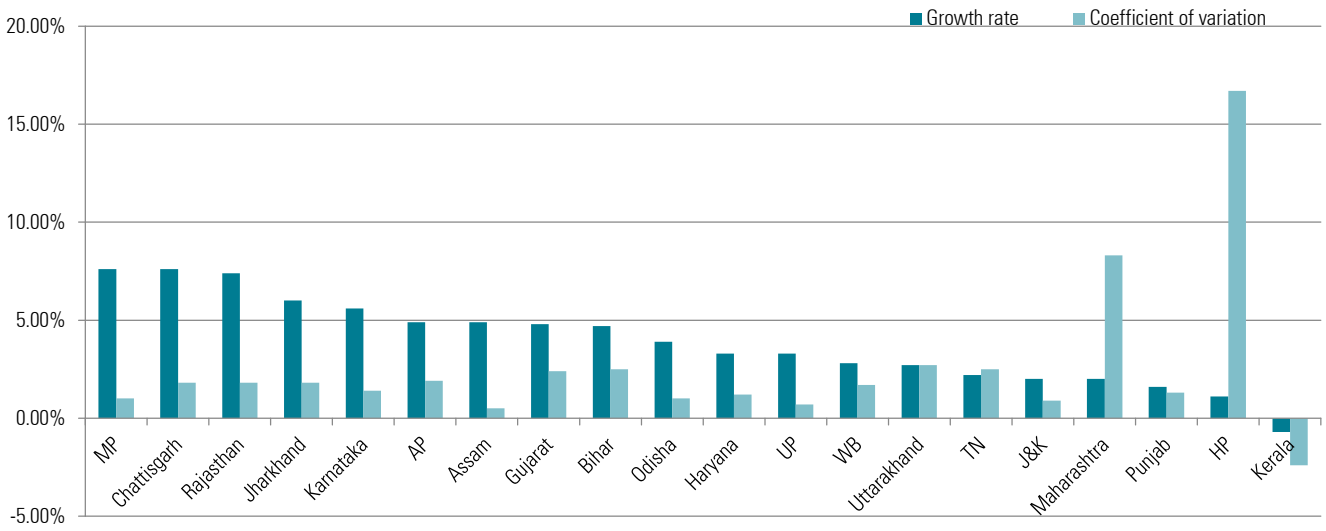
Karnataka
- Fruits and vegetables
- Milk and milk products
- Meat and marine
- Packaged foods

Tamil Nadu
- Fruits and vegetables
- Milk and milk products
- Meat and marine
- Packaged foods
- Beverages

Kerala
- Fruits and vegetables
- Meat and marine
- Grain and oilseed

State wise performance and reforms

Relative performance of States in Agriculture



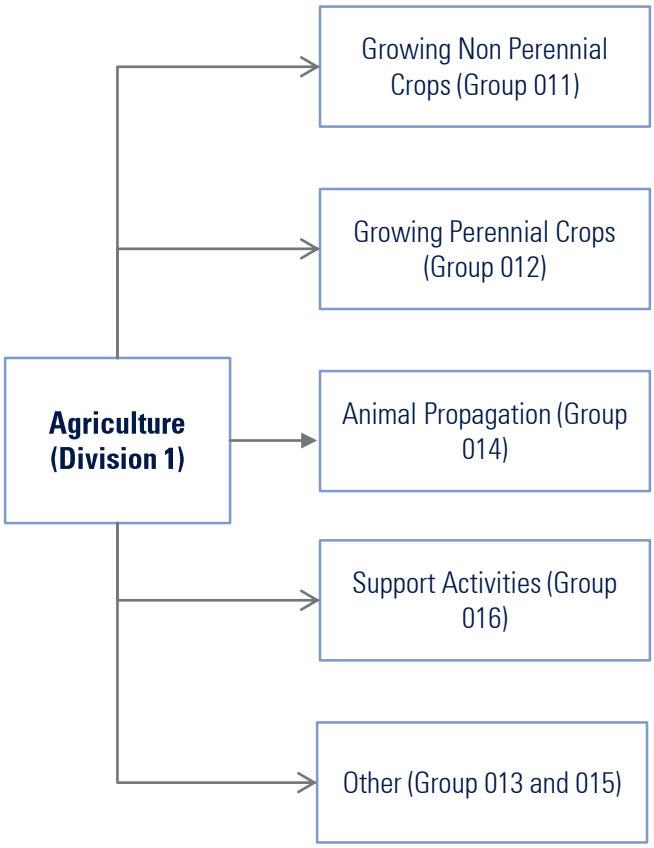
Stage of Reforms	States/ UTs
Reforms to APMC act done	Andhra Pradesh, Arunachal Pradesh, Assam, Goa, Gujarat, Himachal Pradesh, Jharkhand, Karnataka, Maharashtra, Mizoram, Nagaland, Odisha, Rajasthan, Sikkim, Tripura and Uttarakhand
Partial reforms to APMC act	Direct Marketing – NCT of Delhi, MP, Chhattisgarh Contract Farming – Chhattisgarh, Haryana, MP, Punjab and Chandigarh
No APMC act, hence no requirement for reforms	Bihar, Kerala, Manipur, Andaman and Nicobar, Dadra and Nagar Haveli, Daman and Diu, Lakshadweep
APMC act already provides for reforms	Tamil Nadu
Administrative action initiated for reforms	Meghalaya, Haryana, J&K, West Bengal, Puducherry, NCT of Delhi, UP

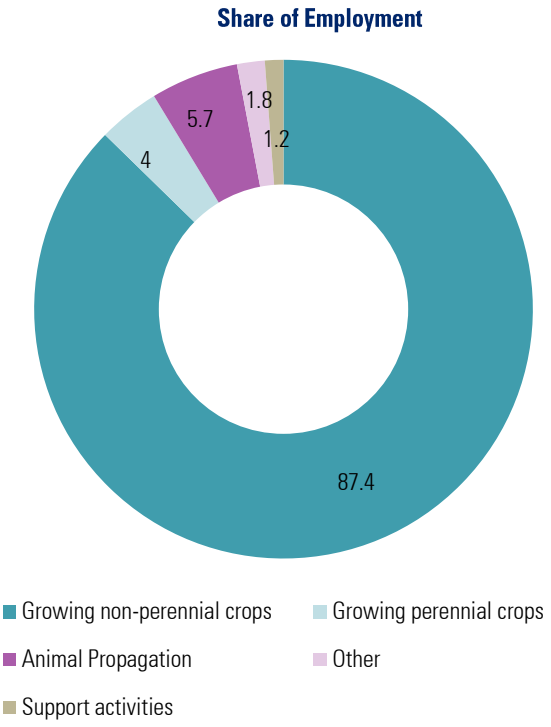
Sources: State Agri Departments, CSO, KPMG Analysis

Demographic and workforce characteristics

Sub segments, employment as per NSSO

Sub segments in Agriculture Sector, with share of employment (NSSO 68th round)





% of workforce in organized sector		
FY2000	FY 2005	FY 2010
2.3%	2.32%	1.56%

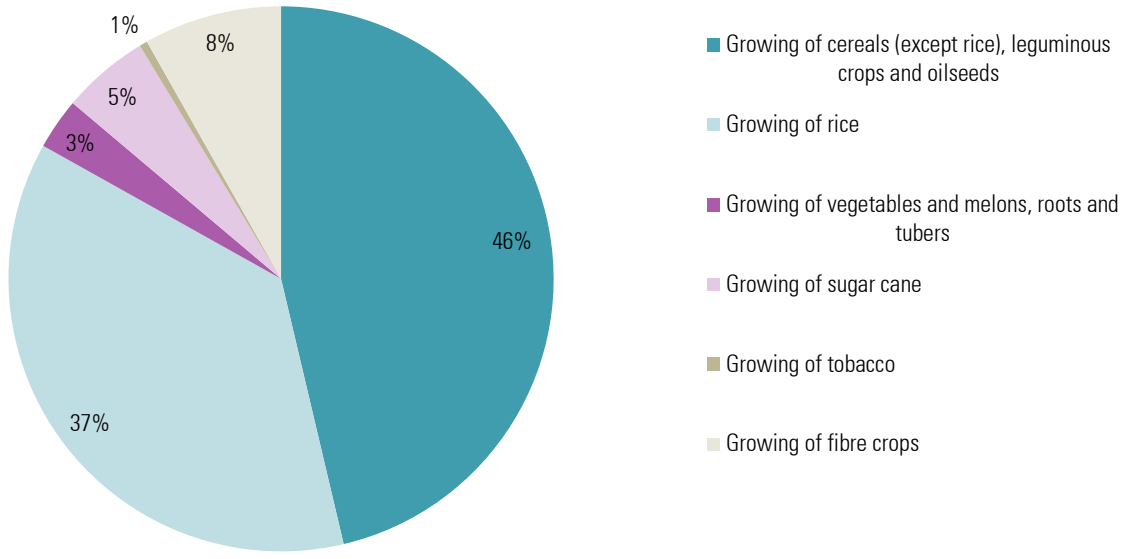
Total persons engaged in the sub sectors for 2011-12 (in nos.)

Sectors	Employment (1999 – 00) in mn	Employment (2004 – 05) in mn	Employment (2009 – 10) in mn	Absolute increase (2004 – 10)	Percentage growth/ decline
Agriculture	237.67	258.93	244.85	-14.08	-5%
Manufacturing	44.05	55.77	50.74	-5.03	-9%
Non manufacturing	20.84	29.96	48.28	18.32	61%
Services	94.2	112.81	116.34	3.53	3%
Total	396.76	457.46	460.22	2.76	1%

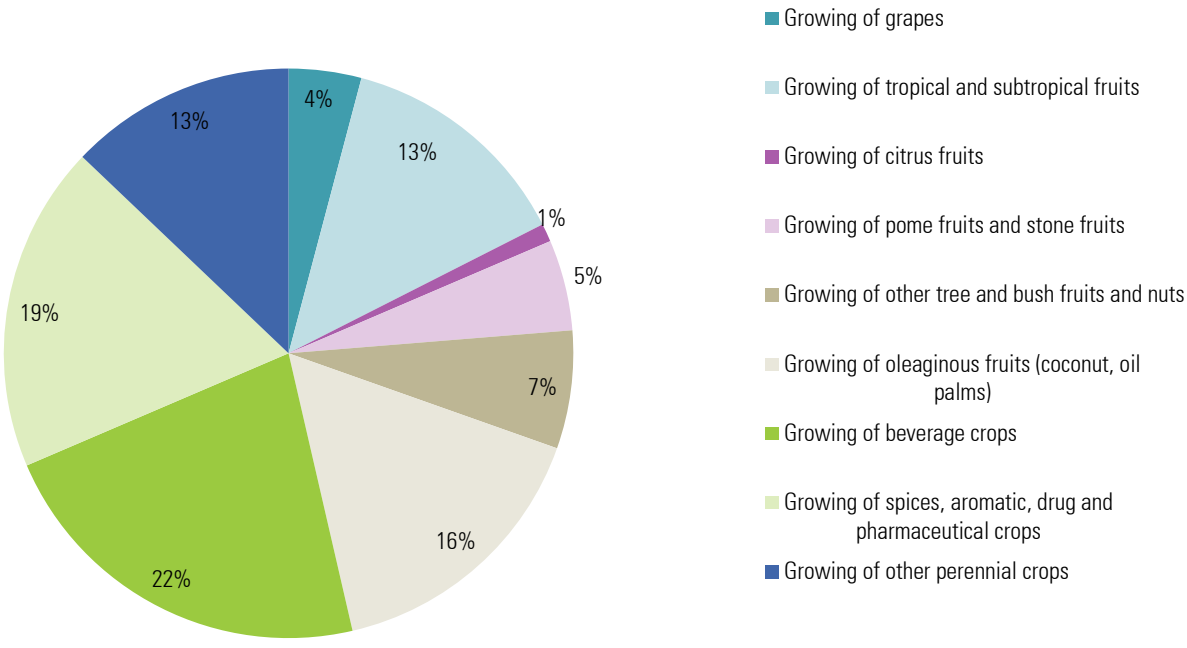
Sources: NSSO 66th and 68th rounds, planning commission, RBI Share of employment is calculated based on US (PS=SS)

Each of the sub segments is driven by a mix of components which shape overall employment intensity

Employment Split by sub group – Non perennial crops (011)



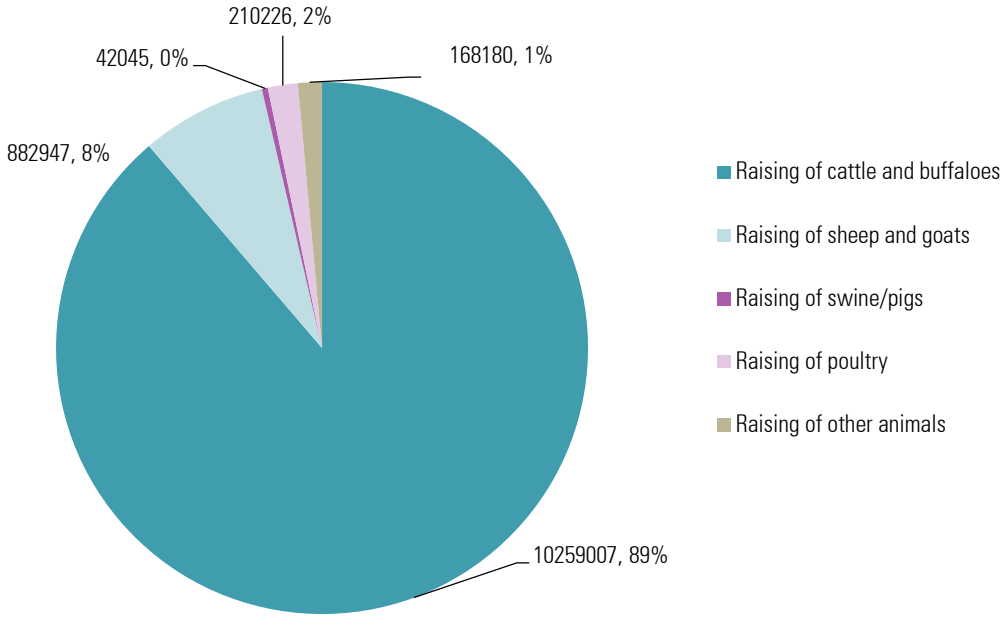
Employment Split by sub group – Perennial crops (012)



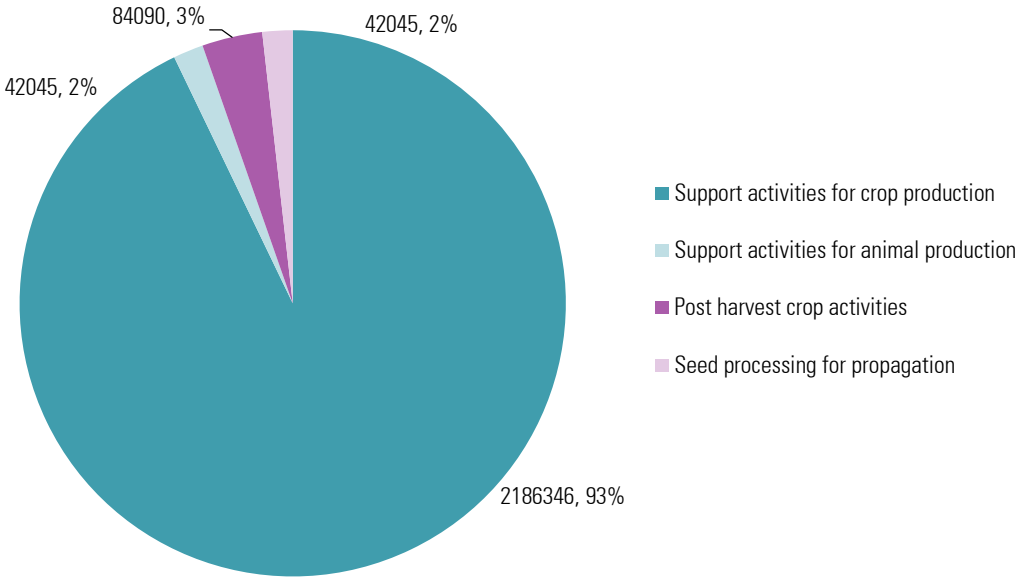
Source: KPMG in India analysis, NSSO 68th round

Each of the sub segments is driven by a mix of components which shape overall employment intensity

Employment Split by sub group – Animal Production (014)



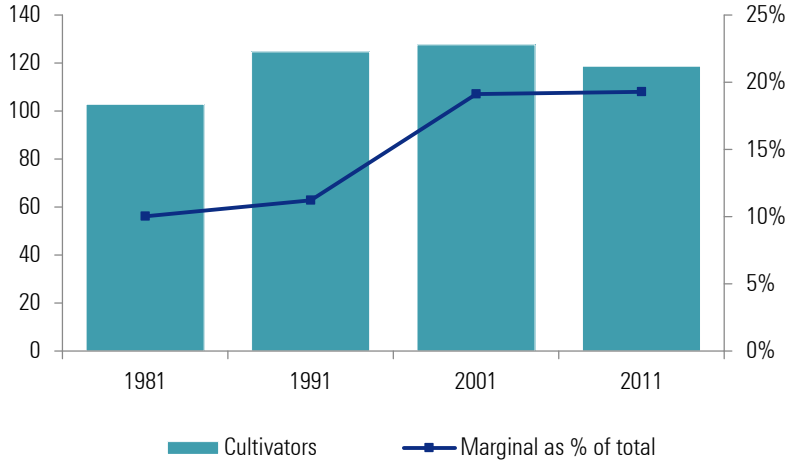
Employment Split by sub group – Support Activities (016)



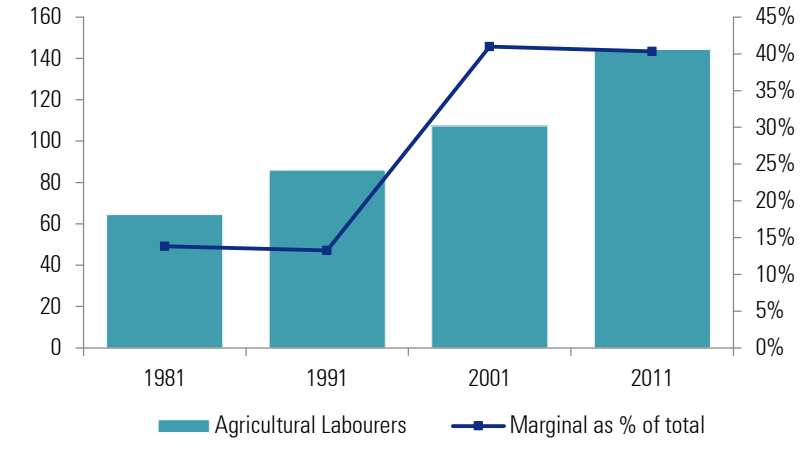
Source: KPMG in India analysis, NSSO 68th round

Workforce profile

Trends in workforce engaged as Cultivators (Millions)



Trends in workforce engaged as Agricultural Labourers (Millions)



State wise number of workforce (per 10,000 workforce) engaged in Agriculture and Allied Activities – 2012

Andhra Pradesh	6398
Arunachal Pradesh	7111
Assam	5860
Bihar	6665
Chhattisgarh	8142
Gujarat	6992
Haryana	5050
HP	3980
J&K	3590
Jharkhand	5215
Karnataka	6592
Kerala	2818
MP	6901
Maharashtra	6947
Manipur	5594
Meghalaya	6080
Mizoram	7649
Nagaland	6872
Odisha	5926
Punjab	4354
Rajasthan	4991
Sikkim	6234
TN	5160
Tripura	3515
Uttarakhand	4196
UP	5722
West Bengal	5685
All India	5936

- The past decade has witnessed decrease in number of workforce involved in agriculture – both as cultivators and as agricultural workers. 2011 witnessed close to 9 million fewer farmers than 2001
- Additionally, for the first time, the total number of cultivators has fallen behind the number of agricultural labourers, with the former at 118.7 million compared to the latter at 144.3 million
- This also ties in with the pattern of reducing size of land holdings. With a number of land holdings too small for viable cultivation, a number of the workforce are agricultural labourers
- This is also reflected in the sharp increase in the percentage of marginal workers (defined as the proportion who have worked between 0 – 6 months in the sector)
- Within States, there is significant level of difference in workforce concentration, with highly productive states like Punjab having much lower agriculture sector workforce thanks to mechanization

Source: KPMG in India analysis, Census (several), NSSO 68th round

Incremental human resource requirement (2013-17, 2017-22) and skill gaps

Summary of employment trends and projections till 2022

Overview of Manpower Demand Projections

- The manpower demand estimation has been developed in consideration of
  - The sub sector growth rates in line with output demand drivers
  - Labour elasticity for each sub segment has been estimated based on historical trend and inputs from stakeholders
  - Sector level projections from the 12th Five year plan have been cross referenced with the projections at a sub sector level to validate the estimation
  - Appropriate split between skilled and unskilled, and between specific education levels within the former
  - The projections have been tested with scenarios on the overall economic growth/ sector value add to build flexibility

- The total requirement of manpower for the Agriculture sector (Division 1) in 2022 is estimated to be ~ 2156 lakh. Of this, ~ 1733 lakhs are expected to be skilled **(from a competency perspective as defined under NCO)**

- Significant demands on skill are expected in two categories
  - Higher education (graduate and above) for specialist roles
  - Diploma and short term vocational training for on ground support roles focusing on the direct farmer interface

Projected Employment for Sector and key segments - Lakhs

Group	FY13	FY17	FY22
Agriculture Net	**2404**	**2290**	**2156**
Growing of non perennial crops	2103	1991	1860
Growing of perennial crops	97.6	94.4	90.4
Animal production	139	139	139
Support activities to agriculture and post harvest crop activities	64.4	65.6	66.6

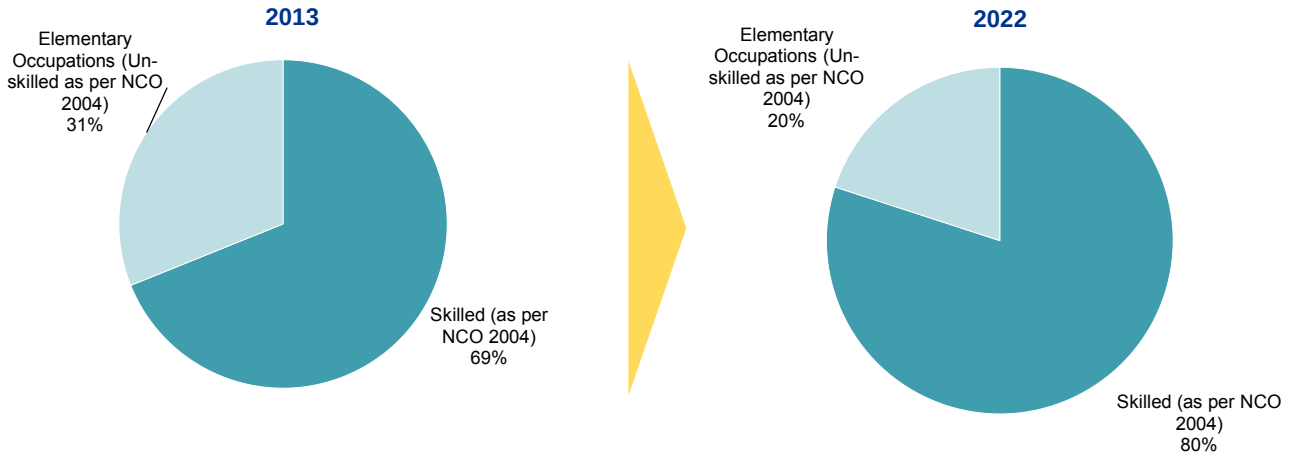
- The projections show contraction in the labour demand for cereals and pulses (staples). This is in line with the observed exodus from staple crops to other economic sectors

- Animal production, horticulture and support activities are expected to witness relatively higher growth. However, given significant scope for efficiency and yield, there is expected to be little employment additions on this count

Source: NSSO 12th Plan Commission report, IAMR Agriculture Sector Employment Assessment, market research, team analysis

Education and skill wise projections

Skilled and Primary Occupation Mix - employment



- The skilled : unskilled mix (according to NCO classification) is expected to move from the current 65 : 35 to a 80 : 20 mix by 2022
- From specialist perspective, a total of ~ 4.3 lakh diploma holders, and ~ 5.9 lakh graduates and above are expected to be required
- In addition to this requirement, a total of 6 lakh vocational trained workforce is anticipated to be required by 2020. This assumes that a cluster of 5 – 7 villages would have one service centre, comprising of an Agri specialist, veterinary specialist, dairy (mainly production side) specialist, horticulture specialist, farm machinery specialist and nutritionist (crop nutrition and soil fertility assessment)
- This team would provide on ground advisory and services to farmers to maximize impact and reach. These teams could in turn be trained by Agri Universities or Private sector

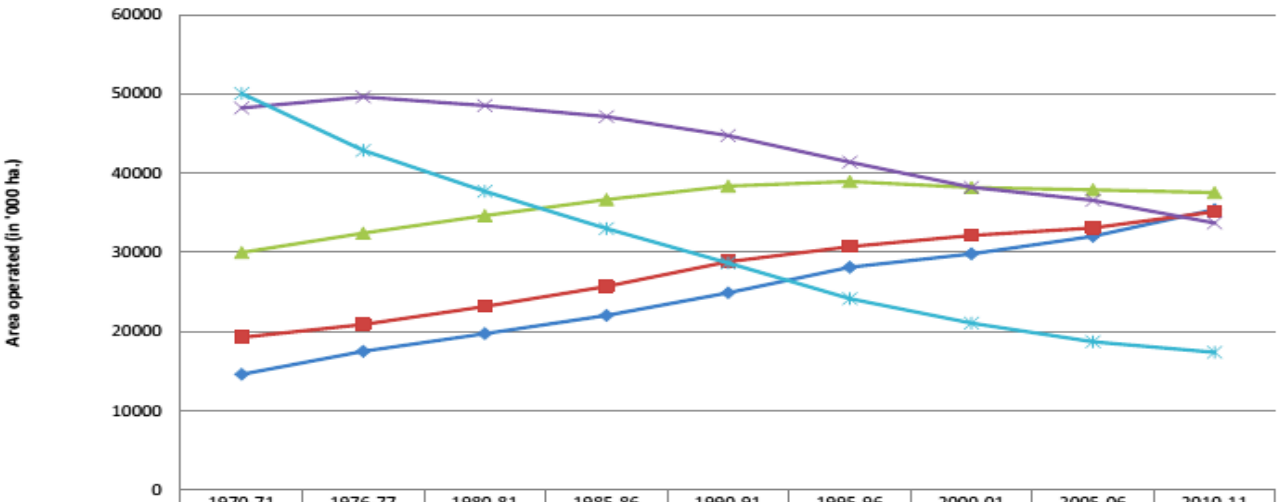
Educational Qualifications Anticipated (Percentage of Overall Employment)	Diploma		Graduate	
Sub Segments	**2010**	**2020**	**2010**	**2020**
Growing of non perennial crops	0.87	1.11	2.93	3.64
Growing of perennial crops	1.46	1.75	0.63	0.96
Animal production	0.49	1.40	0.60	0.98
Support activities to agriculture	0.02	0.04	0.21	0.35
Micro level force for ground level service centres	6 lakhs by 2020 of VET trained work force			

Source: NSSO 12th Plan Commission report, IAMR Agriculture Sector Employment Assessment, market research, team analysis

Industry trends/ issues and changing skill requirements

Trends/ Issues	Implication to skills
Increasing land fragmentation and decreasing size of holdings	▪ As the number of small and marginal farmers increase, it is vital to provide skill development programmes which are on ground/ at farm, rather than centralized programmes ▪ This creates requirement for decentralized advisors/ trainers
Increasing wage inflation pushing costs of production	▪ Enhanced mechanization is necessary to control costs ▪ This leads to skill requirements in areas of operating and repair & maintenance of farm machinery
Opening up of organized retail to private investment	▪ Farmers need to significantly augment their planning, cultivation and marketing capabilities to bypass intermediaries ▪ Need to be skilled in business and channel management in order to be competent counterparties to institutional procurers
Increasing resource scarcity	▪ Increasing scarcity of key resources like water and fertilizers (owing to external dependencies on factor inputs) ▪ Need to improve R&D skills to increase productivity ▪ High yield gaps (global best standards are 3X on cereals, 2X – 6X on horticulture, and 4X – 8X on milk and animal proteins) are partly attributable to poor practices

Area operated by operational holdings as per different Agriculture Censuses



	1970-71	1976-77	1980-81	1985-86	1990-91	1995-96	2000-01	2005-06	2010-11
Marginal	14599	17509	19735	22042	24894	28121	29814	32026	35410
Small	19282	20905	23169	25708	28827	30722	32139	33101	35136
Semi_Medium	29999	32428	34645	36666	38375	38953	38193	37898	37547
Medium	48234	49628	48543	47144	44752	41398	38217	36583	33709
Large	50064	42873	37705	33002	28659	24160	21072	18715	17379

Sources: FAO, DAC, GoI, Primary interactions, Team analysis

Critical job roles across sub-sectors

Understanding the top critical job roles in various sub-sectors		
Sub-sectors	**Critical job roles**	**Skill requirements**
Horticulture	Agronomist Tissue Culture Cultivator Quality Control	
	Cultivators	▪ Procuring seeds ▪ Cultivating and harvesting the crop at farm level ▪ Sale of produce in the market (for Maize, Soyabean, Sugarcane, Mango, Citrus fruits, Bulb crops, Solanaceous crops, Tuber crops, Coriander, Chillies, Bamboo)
	Quality seed grower	▪ Cultivation of seeds to produce foundation seeds ▪ Use foundation seeds to produce multiplication seeds of crops (by undertaking recommended practices and methods)
	Seed processing worker	▪ Cleaning seeds of extraneous and undesirable materials ▪ Takes samples for testing ▪ Drying seeds to optimum moisture levels ▪ Treatment, packaging and stores them in appropriate manner for distribution
	Paddy farmer & Banana farmer	▪ Cultivation as per the practices recommended for a particular agro-climatic zone, type of soil, rainfall pattern, and climatic conditions to achieve the yields as per the genetic potential of a given variety and ▪ Sell the produce as per competitive market prices
	Gardener	▪ Beautification of built environment
	Floriculturist (protected cultivation)	▪ Flower crop cultivation in green houses
	Floriculturist (open cultivation)	▪ Flower crop cultivation in open fields
	Coffee & Tea plantation worker	▪ Carry out ground level activity involved in a tea/coffee plantation right from nursery preparation to harvesting and storage

Source: KPMG in India analysis as

Mapping the most critical job roles in the various sub-sectors of Agriculture sector

Non Horticulture	Bee keeper	▪ Carrying out bee-keeping operation - understanding bee biology, behaviour and harvesting ▪ Processing of products
	Hatchery production worker – fishery	▪ Produce the post larval in hatcheries after producing seed in reproduction and maturation stage, ▪ Manage final grow-out stage of shrimp farming, considering labor and capital as major factors
	Hatchery in-charge – poultry	▪ Receive and grade eggs ▪ Manage incubation practice ▪ Grade and pack chicks ▪ Estimate and organizes required resources ▪ Maintain equipment and environment for hatching chicks according to market's standards
	Shrimp farmer	▪ Purchase seeds from hatcheries and deciding the type of species to harvest, ▪ Constructs a pond and harvest the shrimp by giving it a healthy feed and maintaining quality to sell in the market
	Marine catcher fisherman	▪ Choosing the appropriate crafts and methods, to catch fish and marine life
	Broiler poultry farm supervisor	▪ Estimate and organize required supplies & resources for the poultry farm ▪ Monitor and direct workers to maintain equipments; building; environment for raising broiler chicks according to market's standards
	Sericulturist	• Cultivate plantation for feed • Rears the silkworm on leaves from larval stage to cocoon stage for extraction of raw silk fibres from them
	Dairy worker	▪ Care, feed and milk livestock on the dairy farm
	Dairy farmer/entrepreneur	▪ Takes decisions on the viability and sustainability of a dairy farm. ▪ Ensure proper care of animals, their health and productivity ▪ Marketing of produced milk
	Broiler poultry farm worker	▪ Prepare the poultry farm for placement of chicks, carry out their feed; water; litter; brooding and health management to raise broiler chicks according to market's standards

Source: KPMG in India analysis

Mapping the most critical job roles in the various sub-sectors of Agriculture sector

Farm mechanisation/ infrastructure/ information/ others	Tractor operator	▪ Maintain vehicle in working condition, takes up basic repair wherever feasible. ▪ Take up agriculture activities as per the needs of the farmers
	Micro irrigation technician	▪ Installation, testing, commissioning of micro irrigation system to ensure uninterrupted supply of water at field level
	Greenhouse fitter	▪ Installation of greenhouse structure as per structural layout and bill of materials
	Agriculture extension service provider	▪ Guide and demonstrate on latest technologies related to agriculture. ▪ Work with other experts in agriculture to learn more or even develop new methods that could advance production
	Harvesting machine operator	▪ Set up the harvesting machine for day's work by conducting pre-start procedures, operate the machine to harvest the crop, perform machine shut down procedure, day-to-day maintenance ▪ Take up basic repair of the harvesting machine to keep it operational during critical harvest time
	Supply chain field assistant	▪ Manage the flow of goods and ensures continuity of supply by identifying the needs right from procurement, packing and transporting the goods to ensuring all requisites carried out for fresh quality of stock maintained till it reaches the buyer
	Warehouse worker	▪ Receive, sort and store the agricultural produce ▪ Keep records and assist in documenting ▪ Organize transportation of goods stored to customer locations. ▪ Ensure quality and safety of agriculture produce storage in the warehouse
	Agriculture extension executive	▪ Worki with R&D team in agriculture industries (including seed, fertilizer, pesticides, and micro irrigation industries) to satisfy the farmer needs. ▪ Understand and market the technology to be transferred to farmers by way of demonstrations and training. ▪ Coordinate and motivate the farmers to adapt to modern methods for good returns
	Agriculture field officer	▪ Loan products of the financial institution to prospective farmers, visit their areas to pre assess their credibility and reliability, ▪ Disburse the amount, supervise and follow up for recovery of the loan amount

Source: KPMG in India analysis

Mapping the most critical job roles in the various sub-sectors of Agriculture sector

Understanding the top critical job roles in various sub-sectors

Sub-sectors	Top critical job roles	Brief job Description
Animal Husbandry	**POULTRY**	
	Farm Supervisor	▪ Most of the job roles for this sub segment are field based with Farm Supervisor and Farm Assistant comprising the bulk of the jobs.
	Feed Procurement	▪ These roles require knowledge of tasks such as maintaining the livestock, monitor their health and ensure the dietary supplements are fulfilled
	Veterinary Doctors	▪ Regular checkup on health and treatment
	DAIRY	
	Milk Collection Agent	▪ Should be habituated in working on schedule. Delays will spoil the milk. The milk procurement team should be able to handle concerns and gain the trust of milk producers ▪ Experienced procurement personnel with good communication are rare to find, since a majority of them are from rural areas and have poor communication skills
	Artificial Inseminator	▪ Knowledge of breeding via vivo fertilization
	Bulk Milk Chiller Operator	▪ Knowledge of defrosting process and capacity management for cold storage facility ▪ Knowledge of refrigeration process ▪ Operation of DG sets

Source: KPMG in India analysis

Mapping the most critical job roles in the various sub-sectors of Agriculture sector

Understanding the top critical job roles in various sub-sectors

Sub-sectors	Top critical job roles	Brief job Description
Support Activities	**Seeds**	
	▪ Crop Scientist ▪ Production Seed Officer ▪ Marketing Field Executive	▪ Marketing this this sub segment is very crucial for the business ▪ 75% of the farmers still use uncertified seeds, hence there is a huge scope for growth in this market
	Fertilizers and Pesticides	
	▪ Marketing Field Executive ▪ Production Workman	▪ Workman form the core team responsible for production ▪ ITI qualified, they undergo apprenticeship for training before working in the production plant
	Farm Equipment	
	▪ Technical Engineer ▪ Servicing Technician ▪ Salesmen ▪ Workshop Supervisor	▪ For the Manufacturing function, minimum qualification is a Diploma holder. ▪ Potential areas of skill building are in the roles of technicians and salesmen. They are a crucial role since they act as ambassadors for the company by providing right advice to the farmers (buyers) for the right model of tractors.

Source: KPMG in India analysis

Training Infrastructure

Agricultural Extension Programs (AEP) – Government Scheme

The Agriculture Extension Service is an institution that aims to close the knowledge gap existing between agriculturalists and agriculture research scientists. By spreading information to farmers about new technologies and methods, the farmer is able to utilize the latest agricultural developments. AES does this by enhancing farmers' knowledge about crop techniques, increasing productivity and transferring latest technical know-how through training courses, on farm trials, kisan clubs and advisory bulletins.

For instance, in Andhra Pradesh, farmer clubs have been established and the State Agricultural Department has also set up numerous training centers to transfer technology and useful methods to farmers. The following training centers exist:

- State Agricultural Management and Extension Training Institute (SAMETI), Hyderabad.
- Soil Conservation Training Centre, Anantapur
- In-service Training Centres

In Karnataka, Pre-Kharif and Pre-Rabi Program Planning Workshops are organized by the Department of Agriculture. In attendance are field level functionaries, department officers, scientists from the University of Agricultural Science and officers of line departments.

In Odisha, technology transfer models were developed by the Odisha University of Agriculture and Technology for use by training departments like Krishi Vigyan Kendras, and distance education prorgams.

Similar programs also exist in Assam, Chandigarh, Dadra and Nagar Haveli, Gujarat, haryana, Jharkhand, Lakshadweep, Madhya Pradesh, Tamil Nadu and Maharashtra

Private Schemes:

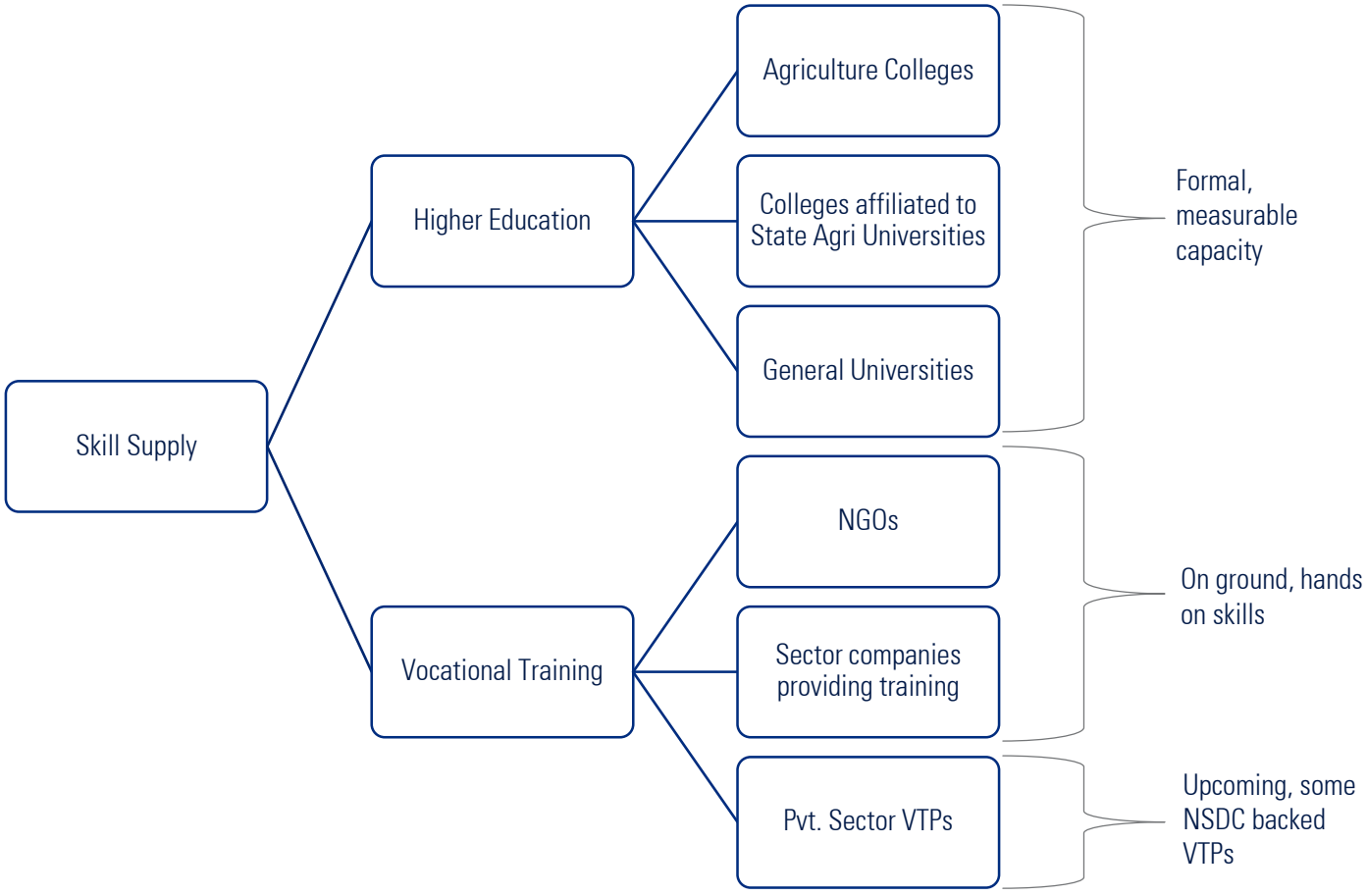
GCS Group Venture - GCS Computer Tech Pvt Ltd

An ISO certified Group with over 11 years experience in conducting government sponsored courses. GCS has imparted quality education and training in Agriculture, amongst other areas. It is affiliated with Agriculture Sector Skill Council of India (ASCI)

Basix Academy for Building Lifelong Employability (B-ABLE)

Was set up in 2009 to be a sustainable, nation-wide model for building high quality workforce, and connecting workers with employment – both in the unorganized and the organized sectors. B-ABLE works with youth primarily from the disadvantaged sections of society. The ASCI is an associated sector skill council

Current manpower-supply infrastructure of Agriculture sector



Supply projections - Assuming average out turns of 2006 - 2010 will be maintained - From formal sources (HE)					
Year	Agriculture	Horticulture	Dairy	Agri Engg	Agri Biotech
FY 13	203707	15118	6429	24497	2532
FY 14	208615	15426	6536	24921	2804
FY 15	213194	15708	6648	25301	3074
FY 16	217595	15976	6770	25659	3340
FY 17	221635	16215	6858	25970	3603

Source: INAARM and IAMR report on Agriculture Human Capital Requirements, 2011

Select Agricultural Universities in India

S.No	State	University
1	Andhra Pradesh	Acharya N G Ranga Agricultural University
2	Assam	Assam Agriculture University
3	Bihar	Bihar Agricultural University, Rajendra Agricultural University,
4	Chhattisgarh	Indira Gandhi Krishi Viswavidyalay
5	Delhi	IARI
6	Gujarat	Anand Agricultural University, Junagadh Agricultural University, Navasari Agricultural University, Sardar Krushinagar Dantiwada Agricultural University
7	Haryana	Ch Charan Singh Haryana Agricultural University
8	Himachal Pradesh	Ch Sarwan Kumar Krishi Vishwa Vidyalaya
9	J&K	Sher e Kashmir University of Agricultural Sciences and Tech – Jammu, Kashmir
10	Jharkhand	Birsa Agricultural University
11	Karnataka	University of Agricultural Sciences – Bengaluru, Dharwad, Raichur
12	Kerala	Kerala Agricultural University
13	Madhya Pradesh	Jawaharlala Nehru Krishi Vishwa Vidyalaya, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya
14	Maharashtra	Dr. Balasahed Sawant Konkan Krishi Vidyapeeth, Marathwada Agricultural University, Mahatma Phule Krishi Vidyapeeth, Dr. Punjabrao Deshmukh Krishi Vidyapeeth
15	Mizoram	Central Agricultural University
16	Odisha	Orissa University of Agriculture and Technology
17	Punjab	Punjab Agricultural University
18	Rajasthan	Rajasthan Agricultural University, Maharana Pratap Agriculture and Technology University
19	Tamil Nadu	Tamil Nadu Agricultural University
20	Uttaranchal	Govind Ballabh Pant University of Agriculture and Technology
21	Uttar Pradesh	Chandra Shekar Azad University of Agriculture and Technology, Narendra Dev University of Agriculture and Technology, Sardar Ballabh Bhai Patel University of Agriculture Technology, Allahabad Agriculture University
22	West Bengal	Bidhan Chandra Krishi Vishva Vidyalaya, Uttar Banga Krishi Vishwavidyalaya

Source: INAARM and IAMR report on Agriculture Human Capital Requirements, 2011

Recommendations for stakeholders

Development of industry accredited *training centres* for enabling rapid growth of all stakeholders of this sector

- Mechanization oriented roles (e.g. repair and maintenance of equipment is another significant area expected to have strong demand in the mid term)
- The industry number for sales was 4.5 lakhs in previous fiscal and it is expected that tractor sales will touch 6 lakhs in 2014. This will require increased manpower for servicing these machines at a field level. The service centres must be more organized similar to the automobile sector which is missing now. This is generally true of the overall farm machinery segment
- Improved farming practices have been proven to result in incremental earnings/ savings of ~ 5000 – 6000 per acre per season
- Since we have huge pool of labour , the industry needs to innovate ways which can utilize them by taking seasonality into consideration
- The overall coverage of hybrid seeds across categories has significant gaps. Crop cultivation protocols are specific to strains and introduction of hybrid seeds without knowledge of corresponding practices can result in suboptimal outcomes
- The existing machinery for skills, mainly the Agriculture Universities are felt as not being close to the farmer, but preferring a top down approach, which results in lower uptake and persistent inefficiencies

Recommendation 1: Educate cultivators on best practices for skills such as spoilage reduction, usage of machinery/mechanization for farming, trade and commercial aspects and emerging use of hybrid crops

- Building capacities of cultivators on aspects of mechanisation-oriented roles at a field level in subjects such as repair and maintenance, etc.
- Greater market integration of farmers on both inputs (procurement of crop inputs like seeds, fertilizers, pesticides etc.) and outputs (joint marketing, crop planning and scheduling etc.)
- Underscore the economic benefits of improved farming practices

- Some NGOs, and arms of businesses involved in Agri business have ground level training. The initiatives by Coromandel are an example of the same where training and consultancy services are provided at a ground level
- John Deere India worked with the Tamil Nadu State Govt. for rural unemployment skill development initiative. They selected 40 students from rural background with basic Class X qualification and provided 3 month training along with other facilities. It was a success and they recruited 30 out of the batch as a full time employee. Such initiative can be replicated by the industry.

Recommendation 2: Encourage on-the-job training and apprenticeships in relevant value chain segments

- Upgrade agriculture universities' curriculum
- Encourage greater industry-interaction with universities and training programmes

- Specialist job roles (e.g. machinery operator and maintenance expert) have better returns and greater sustainability than traditional roles
- Critical job roles identified in course of primary interactions include
  - Agronomists and crop planning experts. Key skills include soil testing, advisory on cultivars based on environment suitability and input availability
  - Machinery operators and R&M experts. This includes tractors, harvesters, tillers, threshers and other machinery
  - Block or District level technical support staff to advice and guide farmers across the process. Key skills include knowledge of crop specific farming practices, input, process and output management, knowledge of Govt. schemes and good practices
- Certified Agronomist is a role which has significant scope in not just Agriculture sector but in Food Processing as well. They act as advisors to the field staff on optimal usage of inputs for improving quality and productivity. ISAP administers certification for this role where practical concepts are tested
- Precision farming is another field where expert opinions are required for better output
- There is requirement for field based support work force to advice and guide farmers across the entire life cycle of processes
- The skill provider pool comprises of KVKs (under ICAR), SAMETI (under State Agriculture Department), Water and Land Management Institutes, District level RSETIs (under respective lead banks),RAWE programmes under Agri Universities. On the Private sector side, Corporates with presence in the sector, and NGOs provide training and advisory services
- The current farmers' extension programs focuses on training farmers to grow a particular (often new) product or crop. There is less emphasis on equipping the farmers with skills that can improve their current productivity level by focusing on the inputs, process, and machinery. This will require intensive training

Recommendation 3: Focus on downstream market activities skilling which can enable greater consumption

- Focus more on skilling for downstream market activities which can enable more consumption. E.g.: Potential areas of skill building are in the roles of technicians and salesmen. They are a crucial role since they act as ambassadors for the company by providing right advice to the farmers (buyers) for the right model of tractors. (from John Deere)

- Most of the training initiatives are focused on inputs and not on the outputs/marketing. At the post harvesting stage, marketing skills become very important. The demand-supply knowledge, lack of understanding of market, pricing volatility, are some skills that a farmer should be trained for.
- Agriculture Universities are perceived to be low on "on ground" insights and farmer connect. There is a strong felt need for more bottom up skill development
- Telecom, BFSI, FMCG companies who are trying to gain foothold in the rural market are aggressively hiring Agriculture graduates. Agriculture sector is no more attractive even for the graduates from the same field.
- Precision Farming is one area where increased focus should provide impetus to the industry.

Recommendation 4: Design industry-relevant training modules especially in supply chain logistics and precision farming are some of the emerging areas

- Upgrade agriculture universities' curriculum
- Encourage greater industry-interaction with universities and training programmes
- Vocational training institutes can be setup for field level tasks like drying, cleaning and packaging. Entrepreneurs can setup leasing service for automated machines (for cleaning / drying of produce). Operators will be needed to operate this hi tech machinery (from NCDEX)

Implementation of *standards*

- There are no specific certifications/ standards in the space of training specialists in the agriculture sector. Since most of the skill interventions have farmers as the key interface, generalist jobs are unlikely to have market driven standards. These need to be State mandated usually (through employment)

Recommendation 5: Establish standards for certifying specialists

- Specialist roles (e.g. machinery operator) could witness standards in the future
- ISAP certified Agronomist can be a point of reference

Enhance *profiling and diversification* of manpower

- Employing of women in this sector will positively impact the growth. DuPont have recently started hiring women for the Sales role and they are getting positive feedback on this.
- Companies are increasingly realising the potential of employing women in operations across the value chain.

Recommendation 6: Encourage employment of women in the industry

- The success of self-employment-based cooperative organisation — Shri Mahila Griha Udyog can be replicated in other sectors of agriculture and in other parts of the country
- The government can develop employment guarantee schemes specifically for women in this sector

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
National
Skill Development
Corporation

Transforming the skill landscape

National Skill Development Corporation
Block A, Clarion Collection, (Qutab Hotel)
Shaheed Jeet Singh Marg, New Delhi 110 016
Tel: +91-11-47451600, Fax: +91-11-46560417
Email: skillgapstudies@nsdcindia.org
Web: www.nsdcindia.org