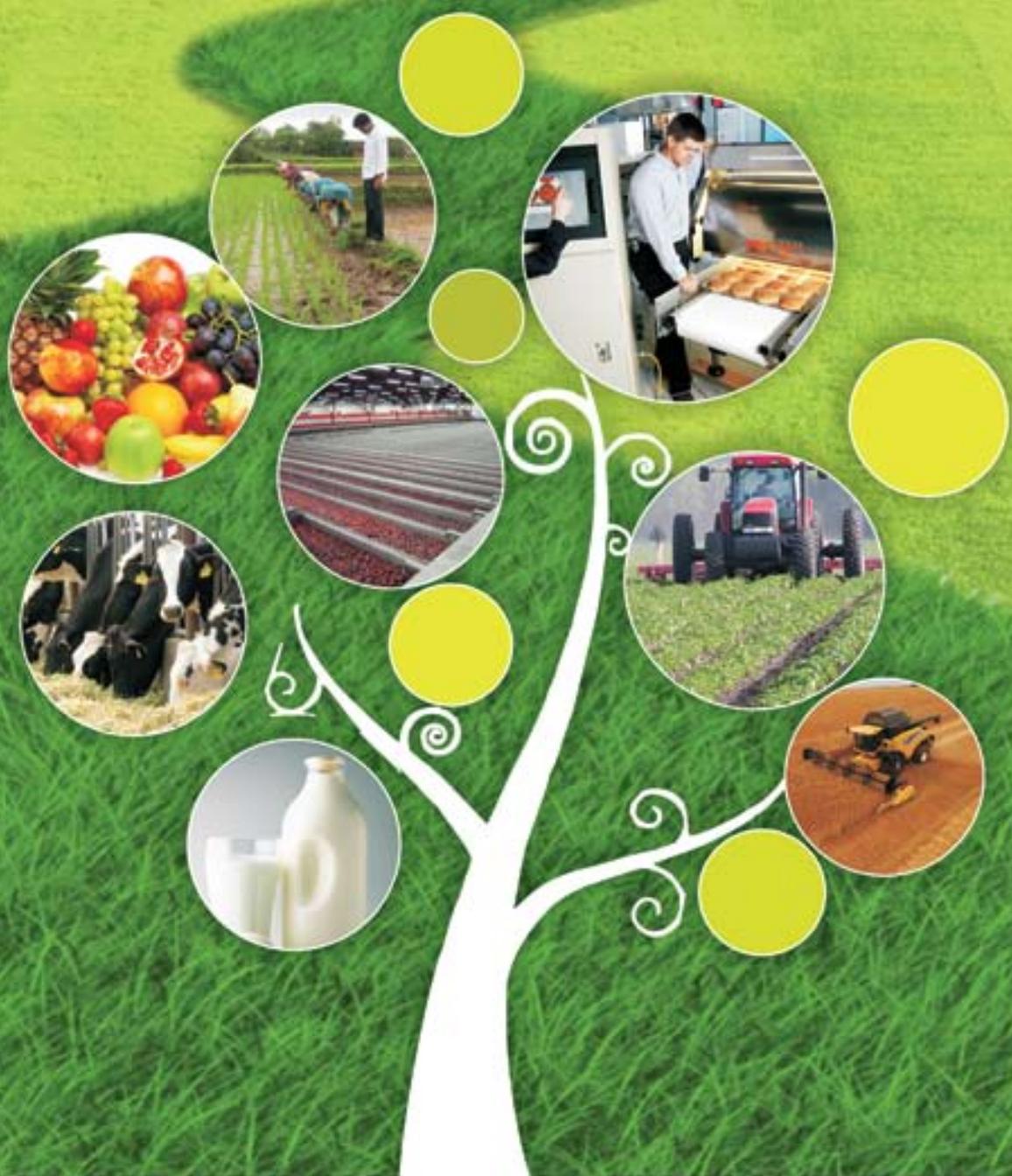


Skill Development in Indian Agriculture



National
Skills
Foundation
of India

..enabling sustainable livelihoods





Skill Development in Indian Agriculture



National
Skills
Foundation
of India

..enabling sustainable livelihoods



Title Skill Development in Indian Agriculture

Year October, 2013

Author Food and Agribusiness Research Management (FARM) Group, YES BANK
Food and Agribusiness Strategic Advisory and Research (FASAR) Group, YES BANK

Copyright No part of this publication may be reproduced in any form by photo, photoprint, microfilm or any other means without the written permission of YES BANK Ltd.

Disclaimer This report is the publication of YES BANK Limited ("YES BANK") & the National Skills Foundation of India ("NSFI") and so YES BANK & NSFI have editorial control over the content, including opinions, advice, statements, services, offers etc. that is represented in this report. However, YES BANK & NSFI will not be liable for any loss or damage caused by the reader's reliance on information obtained through this report. This report may contain third party contents and third-party resources. YES BANK & NSFI take no responsibility for third party content, advertisements or third party applications that are printed on or through this report, nor do they take any responsibility for the goods or services provided by its advertisers or for any error, omission, deletion, defect, theft or destruction or unauthorized access to, or alteration of, any user communication. Further, YES BANK & NSFI do not assume any responsibility or liability for any loss or damage, including personal injury or death, resulting from use of this report or from any content for communications or materials available on this report. The contents are provided for your reference only.

The reader/ buyer understands that except for the information, products and services clearly identified as being supplied by YES BANK & NSFI, they do not operate, control or endorse any information, products, or services appearing in the report in any way. All other information, products and services offered through the report are offered by third parties, which are not affiliated in any manner to YES BANK & NSFI. The reader/ buyer hereby disclaims and waives any right and/ or claim, they may have against YES BANK & NSFI with respect to third party products and services.

All materials provided in the report is provided on "As is" basis and YES BANK & NSFI make no representation or warranty, express or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, title or non – infringement. As to documents, content, graphics published in the report, YES BANK & NSFI make no representation or warranty that the contents of such documents and articles are free from error or suitable for any purpose; nor that the implementation of such contents will not infringe any third party patents, copyrights, trademarks or other rights.

In no event shall YES BANK & NSFI or its content providers be liable for any damages whatsoever, whether direct, indirect, special, consequential and/or incidental, including without limitation, damages arising from loss of data or information, loss of profits, business interruption, or arising from the access and/or use or inability to access and/or use content and/or any service available in this report, even if YES BANK & NSFI are advised of the possibility of such loss.

Maps depicted in the report are graphical representation for general representation only.

Contact

YES BANK Ltd.

Registered and Head Office
9th Floor, Nehru Centre
Dr. Annie Besant Road
Worli, Mumbai – 400 018
Tel : +91 22 6669 9000
Fax : +91 22 2407 4088

National Skills Foundation of India

Registered Office
K-59, South City I
Gurgaon – 122 018
Tel : +91 124 4058 848-49
Fax : +91 124 4048 840
E-mail : info@nsfindia.org
Website : nsfindia.org

Northern Regional Office

48, Nyaya Marg, Chanakyapuri
New Delhi – 110 021
Tel : +91 11 6656 9000
Fax : +91 11 4168 0144
Email : nitin.puri@yesbank.in
Website : www.yesbank.in

FOREWORD

The importance of skill development cannot be undermined in the challenging economic environment prevalent today. While on one hand the persistently increasing unemployment rate is creating unrest in the country on the other hand most of the sectors are facing severe labour shortage. Thus, the real challenge lies in meeting the labour demand supply gap in each sector, not only in terms quantity but also quality. Skilled workforce is undoubtedly the key to a nation's holistic growth and stability, and it is one of the determining factors for bringing in investments.

Today, like most other sectors, the Indian agriculture sector is also in dire need of skill development. Agriculture holds strategic significance for the country's growth and also provides support to other industries. The Planning Commission has envisioned that by 2020 less than 40% India's workforce will be employed in agriculture. This declining workforce and increasing pressure on available land necessitates efficient usage of manpower in this sector. Analyzing the current status of agricultural employment where most people have received no formal education or training and farmers willing to shift to other non-agri occupations, it is imperative for the industry to develop skills and resources swiftly to survive, adapt and grow.

Augmenting knowledge and skill levels of the agricultural workforce and youth in particular is essential to enhance productivity, boost innovation, manage finance, mitigate risks and improve decision making ability. With a renewed focus on skill development in agriculture various initiatives in public as well as the private sector have already been taken up to harness the advantage of 'demographic dividend' in India. I am confident that the implementation of the three tiered structure envisaged by the Government of India for skill development will ensure that we meet our skilling target of 500 million people by 2022.

The NSFI-YES BANK knowledge report '**Skill Development in Indian Agriculture**' outlines the skill development scenario in India and its renewed significance in agriculture. The publication will examine the huge untapped potential and highlights the intervention areas for skill development in sectors like Dairy, Horticulture, Food processing etc. It also gives an insight into various initiatives taken up by the private sector companies to augment skill development at the grass root level. I am sure that this report shall give all the stakeholders a renewed perspective to skill building in agriculture.

Thank you.

Sincerely



Rana Kapoor

Managing Director and CEO

CONTENTS

Foreword	3
Executive Summary	7
Introduction.....	9
Agricultural Skill Development - The Renewed significance.....	13
Challenges in Skill Development	17
Various Ongoing Measures on Skill Development in India	21
Private Sector Initiatives.....	23
Skill Development Interventions in Dairy Sector in India.....	33
Background	33
Emerging Trends	34
Intervention Areas for Sustainable Growth and the Skill Development Factor.....	37
Skill Development Interventions in Horticulture in India	39
Background	39
Emerging Trends	39
Intervention Areas for Sustainable Growth and the Skill Development Factor.....	41
Skill Development Interventions in Off Farm Activities	47
Food Processing	47
Retail	50
Farm Mechanization	51
Farm advisory.....	52
Information and Communications Technology.....	52
Conclusion and Way Forward	55

EXECUTIVE SUMMARY

Skills and knowledge are the driving forces of economic growth and social development for any country. Skill development not only contributes to the overall labor productivity but also empowers an individual and increases social acceptance. Appropriate efforts towards skill development in our country would help in achieving inclusion and productivity within the country and also to grab the potent opportunities in the world labor market.

The current skill development scenario in India is grave. Many sectors including agriculture face severe labor shortage due to unavailability of skilled workforce in the industry. Currently, only 10% of the workforce in the working age group of 15-59 years has been vocationally trained. Of this 10% trained workforce, less than 2% have received formal training while the remaining have been trained informally.

Realizing the significance of skill development, the Government of India has adopted this as a national priority over the next 10 years. The Eleventh Five Year Plan detailed a road-map for skill development in India, and favored the formation of Skill Development Missions, both at the State and National levels. For creating an institutional base for skill development at the national level, a “Coordinated Action on Skill Development” with three-tier institutional structure was formed in India.

The private sector has also taken appreciative steps in this regard and has initiated several programs for skill development. However, the public as well as private sector initiatives have faced severe challenges with respect to large illiterate population, reaching out to rural destinations due to insufficient infrastructure, getting suitable trainers, convincing the rural youth, changing the attitude of people towards training and providing training at low cost and of suitable duration so that maximum people may reap its benefits.

Within agriculture, sectors like dairy, horticulture etc. are considered to be the high value commodities which can give good returns to farmers. However, these sectors face numerous challenges in terms of attaining and retaining skilled manpower. Skill development interventions in these sectors are relevant with respect to technical skills of operating machines, better farm practices like integrated nutrient management, nursery management, breeding techniques, harvesting techniques etc, animal care, accountancy and many more.

There are other segments as well where the rural youth can be skilled and effectively employed, some of which include activities like providing para veterinary services, repairing and maintenance of farm equipments, retailing, providing crop advisory services by using information and communication technology etc.

The report outlines a roadmap towards adoption of enhanced skill building measures and taking the initiatives of skill development forward to provide gainful employment to the entire workforce of the country.

Introduction

Creation of employment opportunities has emerged as one of the most significant challenge for the Indian government over the past few decades. Persistently high and increasing unemployment rate is creating a negative impact on the economy and has resulted in renewed concern for job creation in relation to rising population. But a counterview comes into the picture when we find labor shortage in various industries in the same country. The real challenge lies in fulfilling this labor demand supply gap in each sector, not only in terms of the labor requirement but also the skills required in each industry. Skill development becomes highly imperative in order to generate employment opportunities and employing people on decent job roles which adhere to their academic background.

Skills and knowledge are the driving forces of economic growth and social development for any country. For India, this statement assumes a greater significance as the country shall be harnessing the demographic dividend through its largest working population soon. India shall be amongst the few countries of the world where the average age of the working population shall be far lesser than other developed and developing nations. In 2020, the average Indian will be only 29 years old, compared to 37 in China and the US, 45 in West Europe and 48 in Japan. This age advantage for India is expected to continue for at least three decades till 2040.

While as the global economy is expected to witness a skilled manpower shortage to the extent of around 56 million by 2020, the young workforce in India paves a way for lot of opportunities. Thus, the “demographic dividend” in India needs to be exploited not only to expand the production possibility frontier but also to meet the domestic and international skilled manpower requirements.

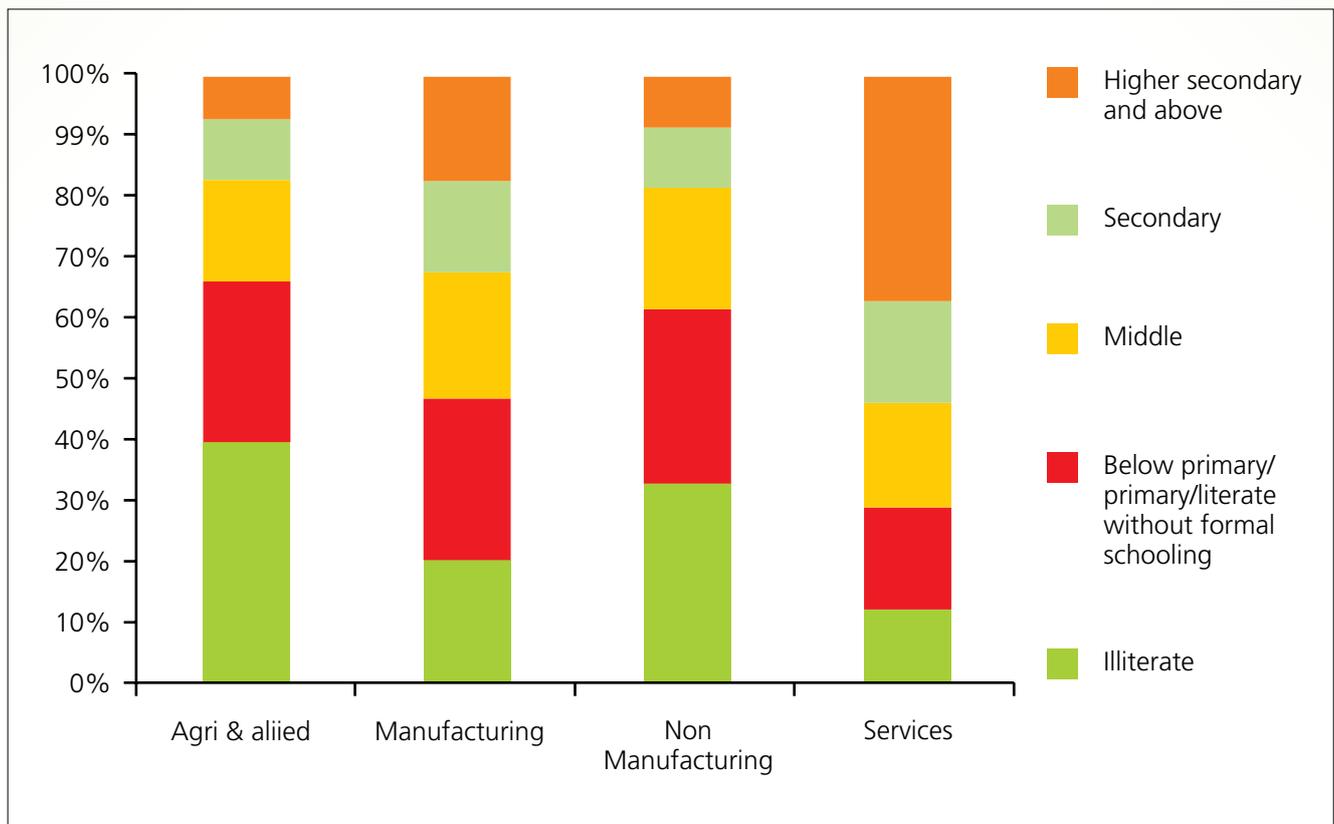
Appropriate skill development efforts would help in achieving inclusion and productivity within the country and also to grab the opportunity in the world labor market. However, looking at the current status of skill development, wherein only 10% of the labor force and workforce in the working age group of 15-59 years is vocationally trained (2009-10), seizing this opportunity shall not be very easy for India. Of this 10% trained workforce also, less than 2% have received formal training while the remaining have been trained informally. The proportion of workers who received vocational training was the highest in the services sector (33%), followed by manufacturing (31%) and agriculture (27%). The proportion of workers with non-formal vocational training was the highest in agriculture and it was primarily in the form of hereditary transfer of knowledge. In the non-agricultural sectors, the non formal vocational training was in the form of on the job learning.

Today, like most other sectors, the Indian agriculture sector is also in dire need of skill development. Declining workforce and increasing pressure on land calls for an efficient usage of manpower in this sector.



Majority of the employed people in agriculture are illiterate and untrained. The agric sector comprises 40% illiterate people as compared to 33%, 20% and 12% in non manufacturing, manufacturing and service sector respectively.

Exhibit 1: Sector wise level of education in India



Source: Planning Commission of India

The trend of employment in different sectors in India is also changing. The table below clearly highlights the sectoral shift of employment from agriculture and manufacturing to sectors like construction, mining, banking etc. Thus, there exists a disparity within the sectors wherein the manpower supply surpasses the demand in some sectors, while others suffer labor shortage.

Exhibit 2: Sector wise employment status in India

Sectors	Employment across various sectors 1999-00 (millions)	Employment across various sectors 2004-05 (millions)	Employment across various sectors 2009-10 (millions)	Absolute increase in employment (in millions) 2004-05 to 2009-10	Percentage Growth
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%

Source: Data Portal India

It is essential to note that agriculture is one such sector which has observed a declining employment status and the decline is deemed to increase in the coming years. On the other hand, the non manufacturing sector which includes mining, construction etc. has seen an increase of over 60% (2005-10). Services like banking, real estate, education and public services have also witnessed an increase since 2005.

Analyzing the current status of agricultural employment where most people have received no formal education or training and farmers are most willing to shift to other professions, it is imperative for the industry to strongly develop skills and resources to survive, adapt and grow. Augmenting knowledge, skills and attitude level of the agricultural workforce is essential to boost innovation, financial management, improve the decision making ability and enhance productivity.

Agricultural Skill Development - The Renewed Significance

The importance of training and skill development cannot be undermined in the challenging environment which agriculture sector is facing today. Vagaries of weather, rising input costs, urbanization and changing consumer preferences have led to concerned focus on strategic decision making, market awareness and optimum utilization of resources. The requirement of skills to improve productivity, increase adaptability to deal with change and crisis, and facilitate the diversification of livelihoods to manage risks are indispensable for rural India. The renewed significance of skill development in agri sector is requisite as agriculture forms the backbone of Indian economy, contributing around 14% to the nation's GDP, 11% to the export basket and is the primary source of income for almost half the country's population.

Skill development towards sustainability: The non judicious usage of plant protection chemicals by the Indian farmers has not only led to environmental degradation, but has also hampered the exports of agricultural, horticultural, livestock and marine products due to quality issues. Skill training and awareness programs are required in collaboration to apprise the farmers about non judicious usage and towards latest developments in the agri sector in terms of new varieties of seeds, fertilizers, and farming techniques.

Another aspect of sustainability is combining agriculture and micro enterprise that can help smallholders achieve a year-round income. Micro enterprise shall allow farmers to supplement their farming income with small business profits during the lean agricultural months. This can also reduce vulnerability to environmental and market risks, by providing a second source of income during extreme climatic conditions and economic downturn. Thus skill building is required to develop entrepreneurship among farmers and teach them the basics of an enterprise in terms of technical skills, accounting, interpreting market information etc.

Women empowerment in agriculture: The role of women cannot be undermined in Indian agriculture as they constitute a major workforce in the fields. It has been observed that empowering women is not only important in its own right, but also highly conducive to improving agricultural productivity, food security, and nutrition. Hence access to resources and skill development for women assumes a greater significance. Improved education, introduction of labor-saving technologies and training can significantly improve their efficiency in the field.

Political will and project interventions to address the needs of women in agriculture and contribute to gender equality are increasing. However, additional efforts are needed to further incorporate these gains



in the mindset of people so that attention to gender becomes an integral part of agricultural and rural development. More efforts need to be put in to build up gender equality in agriculture, strengthen women's assets, and engage with women's groups as real partners in development.

Women empowerment: The World Development Report 2012 stresses that gender equality can lead to productivity gains, that women's increased control of household resources can improve outcomes for the next generation, and that empowering women as economic, social, and political actors can result in more representative decision making. The report also identifies areas where policy can help close the gender gap: addressing excess deaths of girls and women; improving girls' education; equalizing access to economic opportunities and reducing productivity gaps between women and men; giving women a stronger voice in households and societies; and limiting the transmission of gender inequality across generations.

Enhance agricultural competitiveness: Indian farmers have been facing a lot of constraints in terms of smaller landholdings and fragmentation, non remunerative returns, lack of decision making and risk taking ability, inappropriate access to market information etc. Due to these reasons, many farmers have not been able to upgrade their production practices at par with the standard ones. Although many of the above stated factors are irrevocable, some of these can be overcome through training and skill development. Comprehending market information timely to take effective decision is one such area of intervention towards training. Indian farmers are not aware of the quality standards, right market for their produce and practices and procedures for producing export quality product. This is essential to increase the competitiveness of agri produce in the export market and earn foreign exchange. In the current context of weakened rupee, enhanced agri exports can help strengthen the economy and reduce the current account deficit.

Youth opting out of agriculture: Rising input costs, presence of numerous middlemen in the supply chain and unawareness of the market scenario have led to decreased profitability of the farmers and made the sector all the less lucrative for the youth.

A national sample survey (59th Round of NSSO), conducted a few years back showed that 40% of the farmers wanted to opt out of their current profession. The latest NSSO (National Sample Survey Organization) report also shows that the number of total agriculture workers has come down from 403 lakh in 2004-05 to 369 lakh in 2009-10 and 354 lakh in 2011-12. The intensifying gap in per capita income between the farm sector and other sectors has led to youth opting out of the agriculture profession and hunting for other job opportunities.

Agriculture alone cannot become lucrative for a smallholder because of the limited resources he owns. The vicious circle of small landholding- lower production- low income- lesser inputs- lower productivity-less income does not allow the revenues to increase beyond a point. Thus farming needs to be complemented by off farm activities like dairy, food processing, or other small enterprise.

Suitable skill development of the people is essentially required to gainfully employ them in non-farm activities which shall contribute to achieving the objective of inclusive growth as well.

Attracting and Retaining Youth in Agriculture (ARYA): This initiative taken up by ICAR will be implemented with a youth-centric approach, targeting areas of agriculture research which can be converted into viable economic enterprises and build capacities to attract rural youth to agriculture.

Challenges in Skill Development

Agriculture sector has been facing many challenges across the value chain in relation to inefficient handling and storage, improper marketing and inadequate processing due to dearth of requisite skills and training of the human resource and various other factors. Skill development agencies have also been facing hurdles in reaching out to the farming fraternity because of their rural inhabitation. Skill development in itself is a challenging task and in a sector like agriculture it is all the more exigent.

Low level of education: People engaged in agri and allied activities have considerably low level of education. The low level of general education makes it all the more difficult to provide vocational training to farmers. In other words, the first challenge is to provide functional literacy and numeracy to the large mass of population and then build up on their skills. There are certain skill sets that do not require any elementary education and anyone can be trained to perform such jobs like planting techniques, operating machines etc. However the advanced skills like accountancy, food processing, producing quality planting material etc. require some basic reading and writing ability.

Lack of supporting infrastructure: Trainings and skill development related to agriculture require a set of specific tools/implements and other related infrastructure for effective demonstrations. Rural areas also lack basic infrastructure like roads, electricity etc. making their connectivity with skill development agencies quite difficult.

Agriculture perceived as no skill requirement sector: One of the major reason for least number of formally trained people in agri sector is the notion that agriculture requires very limited or no skill. Traditionally, the skills needed to work in the agriculture industry have been hands on, and developed on the job. However, the environment of primary production is changing. The United Nation's Food and Agriculture Organization suggests that by 2050, the global food production will be required to get doubled to meet the demand of the predicted world population. Thus, Indian agriculture needs to accomplish substantial increase in productivity along with the management of the problems of land degradation, climate change, deteriorating natural resources and increasing pest infestations. Increased productivity relies on improved skills in efficient usage of all resources.

Allied activities to agriculture such as dairy, fisheries, poultry etc. are still more demanding than agriculture and minimal interventions towards skill development in such activities can enhance family income and provide a sustainable source of livelihood.



In this context the concept of prior learning recognition can also be stated. Recognition of Prior Learning (RPL) - whereby skills and knowledge gained by individuals outside formal learning processes are assessed and granted formal recognition has become an increasingly important topic within skills policy in recent years. It is seen as a tool for delivering a fairer, more efficient, more flexible and more inclusive skills system, and it is of increasing interest to developing countries wishing to make better use of their existing human resources.

Prior learning assessment is a process that might save a person's time as well as money in completing a certificate or degree program. The process reviews learning that may have been mastered through a variety of life experiences, including professional responsibilities, civic and volunteer experiences, military and corporate training, and independent study. Through Prior Learning Assessment, individuals with learning that has been acquired outside of a formal classroom setting have the opportunity to have that learning reviewed for college-level equivalency.

The concept of lifelong learning indicates that learning should encompass the whole spectrum of formal, non formal and informal learning. Learning occurs in many contexts that include work, involvement in social and community activities, or learning through life experience generally. In order to enable the individual to learn throughout life, equal value should be given to all these forms of learning regardless of source, how it is achieved or when in life it is achieved.

A major objective of the National Framework of Qualifications is to recognize all learning achievements. It aims to do this by supporting the development of alternative pathways to qualifications (or awards) and by promoting the recognition of prior learning. Recognition is a process by which prior learning is given a value. It is a means by which prior learning is formally identified, assessed and acknowledged. This makes it possible for an individual to build on learning achieved and be formally rewarded for it. Prior learning may have been acquired through formal, non-formal, or informal routes. While the principle behind RPL – that individuals deserve credit for their skills and competencies even if these have been gained outside formal learning – is not new, it is only since the early 1990s that the idea has gained widespread currency and been formally incorporated into public approaches to education and training.

RPL and Agriculture: RPL has been seen as a way to bring those who may have felt excluded from education back into learning pathways and into better jobs. Agricultural sector has great relevance to this system as most of the knowledge has been gained on the fields and not through any formal channel. Through RPL, these qualifications can be recognized and this shall motivate farmers and boost their self esteem. RPL leads to maximum utilization of existing human resources by allowing for current skill sets to be codified and to serve as a step into further training or development. It also saves time and money by avoiding duplication of learning.

Government Policies and Funding: Most of the policies framed towards skill development are usually without any visible synergy. Many times the funding also falls short of the actual requirement. Moreover, the incentives provided to the trainers to reach out to the hinterlands is very less as compared to other professions.

Lack of Market oriented training and professional knowledge based curriculum: In India, most of the trainings which are carried out, especially in the agri sector, are based on the availability of trainers and ease of training and not as per the market demand. Apart from that, most of the training programs lack a structured design for effective execution. Structured program design is crucial to ensure the effectiveness and success of any training program. A professional knowledge based curriculum is essentially required so that vocational skills may result in a sustainable and long-term growth in income & employment level. There are many institutions in the country which impart training and certificate courses to students. However the curriculum is usually not in line with the industry requirements which lead to unemployment or underemployment. Moreover, the industry again bears huge expenses on training the youth for meeting their job requirements.

Declining Rural Population: The level of urbanization in India has increased from 27.81% in 2001 to 31.16% in 2011, while the rural population declined from 72.19% to 68.84% during the same period. There is considerable shift from the rural areas to cities in search of new means of livelihood by the rural youth. The declining population in rural areas is making it very difficult to attract and retain workforce in agri sector. Unfortunately, in urban areas, these youth work in some small manufacturing units and take up some menial tasks or indulge in illegal activities. The challenge lies in retaining the target population in agri and allied activities which can provide them a better living standard if they are ready to learn and work more proficiently.

Training of Trainer: A notable impediment towards addressing skill shortages in the agriculture sector is the limited availability of qualified trainers. This is further aggravated by unavailability of trainers in the required region. Most of the trainers are unable to reach out to the rural interiors of the country, where there is actual need for training. This is sometimes due to lack of supporting infrastructure and sometimes lack of personal interest to move out from the urban locations. Reaching out to large farmers located in the suburbs of a city is easy but does not fulfill the requirement on an inclusive skill development program. These farmers already have access to labor, market information and latest technologies.

Time and Duration of Trainings: Another challenge that trainers and training agencies face is the time and duration of trainings. Majority of the farmers are not ready to sacrifice farm activities in lieu of skill development workshops.



Skill Development in Indian Agriculture



Affordability of Trainings: Nearly 40% of the Indian population is below the poverty line and lives on less than USD 1 per day. Majority of this population resides in the rural areas and take up farming for sustenance living. These people strive hard to fulfill basic amenities leave aside education and training. Thus, paid training option is not affordable for this group of population.

Various Ongoing Measures on Skill Development in India

To reap the benefits of “demographic dividend”, the Eleventh Five Year Plan favored the creation of a comprehensive National Skill Development Mission. As a result, a “Coordinated Action on Skill Development” with three-tier institutional structure was created in 2008. The structure consisted of

- (i) Prime Minister’s National Council
- (ii) National Skill Development Coordination Board (NSDCB)
- (iii) National Skill Development Corporation (NSDC)

The National Council for Skill Development, chaired by the Prime Minister himself, at the apex laid down the broad framework for this arena, a National Skill Development Coordination Board (NSDCB) coordinated by the Planning Commission was set up to combine public and private point of action and the National Skill Development Corporation (NSDC) as a no-profit no-loss company was formed through the public-private partnership route to catalyze private sector involvement in the skills space. The Council has set a target of creating 500 million skilled people by 2022 with emphasis on inclusivity so as to deal with divides of gender, rural-urban, organized-unorganized, employment and traditional-contemporary work place.

Other schemes like the Swarnjayanti Gram Swarozgar Yojana are also covering all aspects of self-employment such as organization of rural poor into Self Help Group (SHG) and their capacity building, training, planning of activities clusters, infrastructure development, financial assistance through bank credit, subsidy, market support, etc. The SGSY has been implemented in all states except Delhi and Chandigarh since 1999. It was primarily designed to promote self-employment oriented income generating activities for below poverty line households in the rural areas.

The scheme has been restructured as a National Rural Livelihood Mission (NRLM) which will function in a mission mode for target-based delivery of outcomes and follow a demand driven approach. The mission aims at reducing poverty through promotion of diversified and gainful self-employment and skilled wage employment opportunities to increase income of the rural poor on a sustainable basis. The mission will broadly adopt objectives such as universal social mobilization, formation of people’s institutions, universal financial inclusion, training and capacity building, enhanced package of economic assistance for setting up of micro enterprises and larger role for Self Help Groups (SHGs) level.

ICAR has also taken up initiatives like Rural Entrepreneurship and Awareness Development Yojana (READY). This is a one-year composite program with the objective to develop professional skills for entrepreneurship: knowledge through meaningful hands-on experience in project mode; confidence through end to end approach in product development; and enterprise management capabilities including skills for project development and execution, accountancy and national/international marketing.



Skill Development in Indian Agriculture



Besides the vocational education and vocational training programs under MHRD and MOL&E respectively, there are several other VET programs and activities under the purview of other departments/ministries, which include Ministry of health and family welfare, Ministry of rural development, Department of women and child development, Ministry of agriculture, Ministry of micro, small and medium enterprises, Ministry of industry, Ministry of rural development, Ministry of urban employment and poverty alleviation, Ministry of information technology, Ministry of tourism, Department of small scale industries etc. Some of these are mentioned below:

Ministry	Programs
Ministry of Agriculture	<ul style="list-style-type: none"> • Training in Agricultural Extension (21 training centres), • Training in use of Agricultural Implements & machinery, • Soil Conservation Training Centre • Cooperative Education and Training.
Ministry of Food Processing Industries	<ul style="list-style-type: none"> • Person power development in rural areas (FPTC Scheme) • Entrepreneurship Development Program • Programs for development of human resources in food processing, testing, training, quality management etc.
Ministry of Rural Development	<ul style="list-style-type: none"> • National Institute of Rural Development (NIRD) conducts about 150 programs • Swarnjayanti Gram Swarozgar Yojana (SGSY)
Ministry of Small and Medium Enterprise	<ul style="list-style-type: none"> • Entrepreneurship Development Program • Skill Development Program (SDP), • Management Development Program
Ministry of Urban Development & Poverty Alleviation	<ul style="list-style-type: none"> • Urban Self Employment Program under Swarna Jayanti Shahari Rozgar Yojana
Department of Women & Child Development	<ul style="list-style-type: none"> • Support to Training and Employment Program for Women (STEP) • Swalamban (previously NORAD) • Training in Home scale preservation of fruits and vegetables • Women Empowerment Program in collaboration with IGNOU • Kishori Shakti Yojana

e-learning portal on agricultural education

Under Learning and Capacity Building program of NAIP, several UG level interactive & multimedia e-Courseware contents in seven disciplines viz. Agricultural Science; Fisheries Science; Dairy Science; Veterinary and Animal Husbandry; Horticulture; Home Science and Agricultural Engineering have been developed at SAUs and other organizations. This portal provides 24/7 services for online access to all the teachers and students learners in the field of agricultural education. For remote area institutions/ faculty/ students, free download facility is provided for using the e-Courseware contents offline.

Private Sector Initiatives

The private sector has been taking various initiatives on its own and in collaboration with the Government and NGOs, to upgrade the skills of farmers. A few case studies have been highlighted below

Jain Irrigation Systems: Jain Irrigation Systems Ltd is a diversified entity with a turnover in excess of 3000 crores. Jain Irrigation is a Total Agri-Solution provider from end to end; concept to commissioning. It is through such multi dimensional activity profile that they have nurtured the complete agri value chain and have become a 'one-stop hi-tech agri shop'. The reward has been over a million satisfied farmers and scores of happy customers globally.

With a dream to change the way Indian farmers do agriculture, the company set up a Jain Hi-Tech Agri Institute (JHAI) in Maharashtra that has eventually become a centre of excellence in Agriculture training. The motto of JHAI- "There is nothing nobler than educating a rural soul to grow crops in the most productive and sustainable way" itself speaks volumes of the initiative.

The courses are designed to provide the learner

- (i) A broad background of hi-tech agriculture.
- (ii) A very practical knowledge of efficient input management, especially irrigation and fertigation.
- (iii) Precision farming packages for all crops.
- (iv) Harvest and post harvest management.

The procedure followed provides 45% time for classroom discussions and 55% for field work. This unique division is aimed at building confidence and generating manpower that is not shy of field work. The various training modules for different target groups from India and abroad include farmers, Government bank officers, dealers, students of agriculture, company associates. Specialized courses are tailor made for different client groups.



Skill Development in Indian Agriculture



Some of the thrust areas of training for farmers are:

- ✓ Installation and maintenance of micro-irrigation systems
- ✓ Soil and water conservation and management
- ✓ Crop management
- ✓ Modified agronomical practices for crop production
- ✓ Organic farming
- ✓ Bio-fertilizers
- ✓ Biopesticides
- ✓ Organic manures
- ✓ Vermin-compost
- ✓ Green house/shade house cultivation and
- ✓ Fruit and vegetable processing.

Digital Green

Passionate about sustainable agriculture and using technology for socioeconomic development, the founder's interest in leveraging rural telecenters to disseminate education and information about health and agriculture in remote areas led to the creation of Digital Green. Digital Green was conceived as a project in Microsoft Research India's Technology for Emerging Markets team in 2006, branching out as an independent nonprofit in 2008.

The company's innovative communication approach focuses on low cost and effective peer-to-peer learning processes, thus, empowering poor households to increase their productivity and incomes in a sustainable manner

Their target population comprises rural community members, focusing on smallholder farmers, mothers' groups and vulnerable women's groups, who have limited access to reliable and locally relevant agricultural, livelihood, health and nutrition knowledge. The USP of the organization's approach, and indeed, a key reason for its success, is the community sourcing aspect: engaging and building the capacity of the community to collaboratively produce and screen videos on relevant agricultural and livelihood best practices using low-cost and durable technology

Case study:

Shanti Devi, a farmer in a small village Pirakpur in the Indian state of Bihar, had been struggling to make ends meet trying to ensure a sustainable livelihood for her family. The meager yield from the old traditional ways of farming and the huge spend on chemical pesticides had been demoralizing. What she missed most was relevant technical guidance and cost-effective and natural ways of increasing her land's productivity while reducing the production costs.

Shanti Devi is one of the millions of poor small-scale farmers in low income countries who make up 70% of the world's food insecure (FAO 2013). Strengthening the capacity of these farmers to make informed decisions, manage risks and adopt improved technologies with higher productivity would serve multiple purposes: food security, improved nutritional status, and sustainable economic growth. Information on accurate, relevant and evidence-based agricultural best practices, however, remains inaccessible for most poor farmers in countries like India due to limited outreach by Government extension officers and dated content of broadcast programs.

Given the information deficit, agricultural practices are largely influenced by prevalent traditional practices and farmers' collective wisdom, which do not necessarily translate to optimal productivity and resource management. Programs have attempted to address this lacuna by distributing information, education and communication materials through agricultural extension officers or health care workers. Although useful, these methods have been constrained due to understaffing in the relevant cadres and low literacy levels which result in inadequate counseling and field demonstrations.

Shanti Devi's life turned a corner six months ago when she and others in her village's women's self-help group started attending video screenings on non-pesticidal management (NPM) practices facilitated by community mediators in her village. NPM advocates organic, non-chemical alternatives to increase farm productivity as well as utilization of natural resources readily available to farmers, for instance, preparing vermicompost, poultry manure or using natural pest-repellent sprays. The videos featured farmers like her, from similar socio-demographic and geographic settings, advocating zero budget natural farming with minimal production costs. Watching her peers adopt these practices with good results inspired her to try these practices on her patch of land and she has not been disappointed. Today, she sells vegetables like cauliflower for as much as INR 2,000 in the local market, which she grows on one kattha (750-2000 square feet) of land using the practices disseminated through the videos.

The videos which changed Shanti Devi's fortunes is one of the thousands produced and screened by farmers themselves, with a helping hand from Digital Green, an independent nonprofit which recognizes the importance of empowering rural communities with requisite knowledge for improved food security and health outcomes. Leveraging rural social networks, the organization deploys a cost-effective and ICT-enabled knowledge exchange, behavior change and accountability model.

Bayer Crop Science

Bayer CropScience, India has been focussing on development of agriculture skills and interventions under a broader umbrella - 'Learning for life,' initiatives. The interventions are aimed at providing opportunities to develop vocational skill for young people in rural areas.



Skill Development in Indian Agriculture



Through these initiatives, Bayer CropScience works with a number of important stakeholders such as the State Governments, civil society and educational institutions to imbue skill development in the agricultural sector.

Bayer - RVJ School of Agriculture: Farm Assistantship for young people

In the beginning of 2008, Bayer CropScience, in cooperation with Vignana Jyothi, a reputed non-governmental organisation, established the Bayer-Ramanaidu Vignanjyothi School of Agriculture (Bayer – RVJ School of Agriculture) in the Tuniki Mandal of Medak District near Hyderabad. Bayer – RVJ School of Agriculture runs a six-month full time residential vocational training programme in agriculture. The course content covers topics such as an introduction into agriculture including basics in seed production techniques and the principles of integrated crop protection. Plant diseases and their appearance on the fields are tackled.

A knowledge base in business administration including agricultural marketing is part of the curriculum, along with communication and awareness-raising for teamwork. In addition, special guest lecturers are invited to share their expertise on selected topics.

To date, 267 students have graduated from Bayer RVJ School of Agriculture since inception.

Introduction to Basic Technology: Imparting vocational skills to children

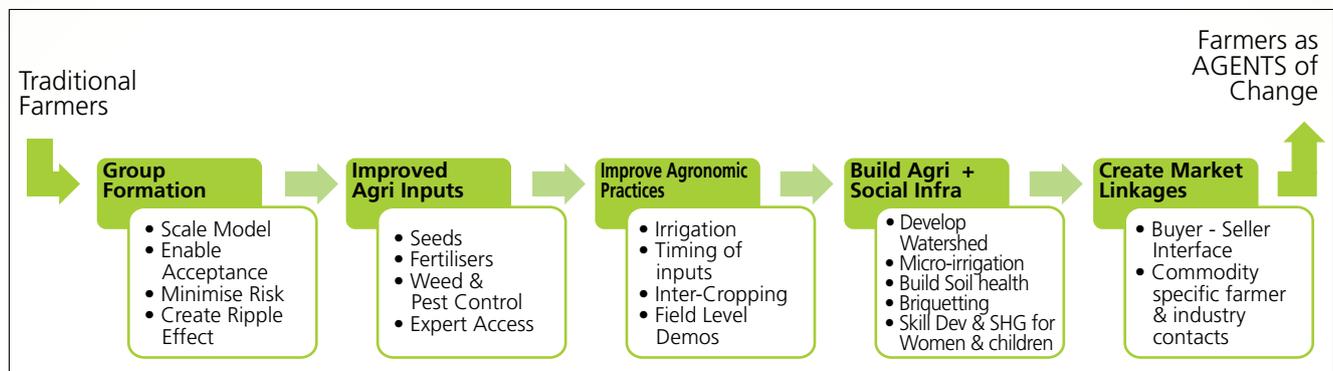
Introduction to Basic Technology (IBT) project in Karnataka (started 2008) teaching various trades as part of the curriculum (one day per week). E.g.; agriculture, tailoring, masonry, plumbing etc. in five villages in government schools

Bayer CropScience introduced - Introduction to Basic Technology (IBT) program as an inspired extension of CCP to communicate and promote the benefits of education for young people in India. In a joint venture with two well-known, non-governmental organizations, Vignyan Ashram and Prajayatna, the company has been driving the project forward since spring 2008. It is based on the idea of learning by doing, and offers vocational training on one-school day-a-week. It is aimed mainly at eighth and ninth standard children attending Government schools.

More than 3746 children have been covered under Introduction to Basic Technology (IBT) program to date.

Monsanto

The team at Monsanto India partnered with Indian Society of Agribusiness Professionals (ISAP), a non-governmental organization to develop and implement a system driven model for delivering sustainable increases in yield. For yields to be sustainable there had to be improvements across the Agri-production cycle at the farmer's end – right from inputs to disposal of the produced grains. Without disrupting across the chain, yield increases would not be sustainable. The impact points in the model are given below.



The attempt was to augment small & marginal farmers' household income on a sustainable basis through increased yield in the crops that they chose. The team identified Amravati in Maharashtra & Adilabad in AP as geographies where it engaged with around 7500 cotton farmers and Bhilwara and Bundi in Rajasthan where it engaged with around 2500 corn farmers.

The attempt was to expose these 10,000 farmers to the socio-economic benefits of the above and develop the existing farmer groups as Agents of Change to create a ripple effect that had the potential to benefit over 1 lakh farmers in these geographies. The project duration was expected to be around period of 4 years starting late in 2009.

Execution

The project has been implemented in one district each of Maharashtra and Andhra Pradesh with cotton farmers and in two districts of Rajasthan with corn farmers. The 10,000 farmers being targeted cover a ground space of more than a 1050 villages and acreage of approximately 30,000 acres.

In the implementation, the first set of activities were to create awareness about the project to enlist support and participation of project participants and the wider population including the local self governance units that govern the villages, Department of Agriculture officials, State Agriculture Universities and other related departments. This was done through various public messaging campaigns, followed by more structured Farmer Awareness Campaigns whereby key community leaders addressed groups of farmers to invite their enrolment in the project and this has finally culminated in enlisting of the 10,000 farmers and



Skill Development in Indian Agriculture



their consolidation in 350 groups. There were more than 1000 information, Education & Communication activities conducted across the villages. These activities were further supported with posters, pamphlets and temporary leave-behinds to create remembrance as well as initiate discussions. Starting May 2010, ahead of the first crop season under the project these groups were provided training on sowing, crop management, pest and nutrient management, irrigation techniques and pre and post harvest activities. More than 1000 events were organized to provide the training to the farmers' pre & post harvest.

The team also setup crop demonstration plots of one acre each with more than 400 farmers using advanced hybrid seeds were set up to showcase best practices, farmers were taken on exposure visits to see examples of good crop features, Improved agronomic practices and harvests of high yielding seed among other related learnings.

In Rajasthan the Project SHARE field team and farmers designed a unique corn seed-cum-fertilizer drill to facilitate systematic sowing as per the recommended spacing and with the right fertilizer input. The farmers were also involved in the designing and fabricating of the equipment locally and contributed a share of the costs upfront. More than 100 farmers used the drill to sow in 200 acres across 20 villages in the wet season on 2010.

Exposure visits for the project share farmers were organized to leading agriculture universities like MPUAT, Akola Agri University to expose them to advanced agri techniques. They were also taken to local centers of agriculture research to expose them to advanced practices. These helped create appreciation for newer technologies and the advantages of these technologies.

To improve the agri infrastructures in these villages, the team setup Vermi-Compost Units, Low cost micro-irrigation demonstrations & Water harvest and recycling pilot demos.

To improve market linkages, the Team organized Buyer-Seller meets in the project areas. The team enabled signing of MOUs and Common consent paper between the Farmer groups and the private buyers.

As a critical input focused on improving livelihood of the farm families the team engaged and helped establish around 300 self help groups involving the women. These SHGs were then taken through skill development programs skilling them to undertake other economically profitable activities.

Achievements

Extensive engagements with the farmers and farming communities in the districts where the projects were undertaken have helped in making significant shifts.

Yields have seen significant increases across the project geographies. In Rajasthan, Corn yields have gone up from 1.5-2 ton/Ha pre-project to around 4.5 t/ha by 2011. In some cases the farmers have realized

yields as high as 8 T/ha. In AP & Maharashtra, Cotton yields have gone up on an average from around 5Q/ Ha to around 7 Q/ Ha and increase of around 40%. The yield increases are sustainable and has the potential to go up further. Cumulatively, farmer income in project share geographies in Rajasthan have increased by Rs 3 Crores & in AP & Maharashtra by around Rs 3.2 Crores over the project tenure, creating substantial economic improvements in the project geographies.

Farmer acceptance of advanced agronomic practices & better quality inputs has increased substantially. The farmers have started to choose good quality inputs in seeds, fertilizers and micro-nutrients. They are increasingly becoming aware of planting geometry & plant stand count and this is causing a shift in traditional practices. Most of them have started to experiment in small parts of their field trying to get more out of their land.

They have become open to micro-irrigation techniques and are adopting rain-gun & drip irrigation technologies aggressively.

It has created awareness about community initiatives on Water harvesting and has driven the farmer groups to link with government programs in building water harvesting structures, check dams and ponds to drive long term gain.

Project farmers in AP & Maharashtra, have prepared herbal repellents with the help of the project personnel and are increasingly using them to prevent pest attacks.

The project has made a very positive impact on the community. The income potential from agriculture, as established by the project, has made the youth evaluate agriculture as an economically viable source of livelihood. In the project geographies, young farmers have started to engage with agriculture. Young farmers are getting progressively more involved in decision making in the presence of elders who had till now had a larger control on decisions related to the crop and farm. The younger farmers are also championing the cause for adopting technology and participating in creating market linkages to take them to the future. Increasingly themes like water conservation, rain-water harvesting, micro-irrigation has taken the forefront in community discussions in the project villages and surroundings.

Empowering women and creating self help groups have also helped the community evolve. There is an increased acceptance of women's employment in other skill areas and augmenting the family income and the SHG driven livelihood centers have also made the project villages an integral part of local conversations. The women's self help group has taken various initiatives in developing livelihood right from creating a sewing center in an AP village to making detergent powders and selling them commercially in Rajasthan. What is important is that it has helped evolve newer ways of empowering the women of the households and allowing them to become contributing members of the society.



Skill Development in Indian Agriculture



Some Snippets



John Deere India Private Limited

Indian cotton sector, despite its high potential is constrained by low productivity levels particularly when compared to countries like China which has less area but still produce more due to better yields. The drivers for mechanization may vary in different countries based on Government policies, current status of agricultural practices and the need to reduce crop cycle time. However, some mechanization drivers are universal in nature and remain same such as, need to increase cotton yield, producing better quality of cotton, tackling the rising cost of labor and eventually increasing the food supply for growing population with finite/declining suitable arable land resources.

A consortium of various value chain partners (Equipment, Seed, Chemical, Gin and Processing Industry) has been working with various cotton growing states and central government institutions since 2009.

This was aimed at looking at the value chain in an integrated way and define the way forward specifically in the following domains

1. Develop a complete crop cultivation package of practices
2. Get the suitable technology in the area of machines, chemicals and seed
3. Training and Capacity building on Agronomy (land preparation, Soil testing and planting, Crop care and Chemicals, Machine operation and Maintenance, Post-harvest technology.

The result has been very successful and has led to evolution of a strategic approach, which will be beneficial for the nation, grower and cotton industry. Some of these results are depicted as below

VARIETY (Company)	Seed Cotton Yield			% Yield Increase w.r.t. Existing	
	Existing (100 x 60)	HDPS 80 x 30	HDPS 80 x 15	HDPS 80 x 30	HDPS 80 x 15
MALIKA GOLD (NSL)	5.19	8.76	11.19	69%	116%
DR.BRENT (Mahyco)	7.77	9.87	18.01	27%	132%
KARAN - RCH-314 (Rasi Seeds)	3.61	5.51	9.65	53%	167%
DHANNO (Bayer)	4.70	6.10	12.16	30%	159%
GOLD MINE (Bayer)	4.01	6.67	9.03	66%	125%



These are one of the sample results, but similar results have been experienced at other locations in different states. The yields have gone up by 116-165%.

The training and capacity building needs clearly emerge in the following domain and have been proven to be able to improve efficiencies at various elements if the value chain.

1. Agronomy and Sowing
 - A. Soil Testing for chemical and moisture
 - b. Land Preparation – Head Land preparation
 - c. Equipment setting and operation training (special seeding equipment)
2. Crop Care
 - a. Training on crop growth, stages of plant and boll development
 - b. Usage and spraying technology of harvest air chemicals
 - c. Water management
3. Harvesting
 - a. Training on equipment setting and operations of picker
 - b. Maintenance of the picker
 - c. Harvested cotton handling and transportation
4. Post Harvesting
 - a. Pre- Cleaner installation, operation and maintenance

Bringing this required change in the entire value chain of cotton would require an equal contribution from cotton stakeholders involved in production, input technologies, post-harvest technologies and sector skill council. This will be the only way forward for a sustainable cotton mission programme in India. Government of India can particularly create a significant positive impact on the speed of mechanization through Information dissemination and providing a supportive policy for the cotton industry.

The Above picture shows various government officials, value chain partners (Seed, Chemicals, Equipment, Gin and process industry representatives) of the cotton mission.



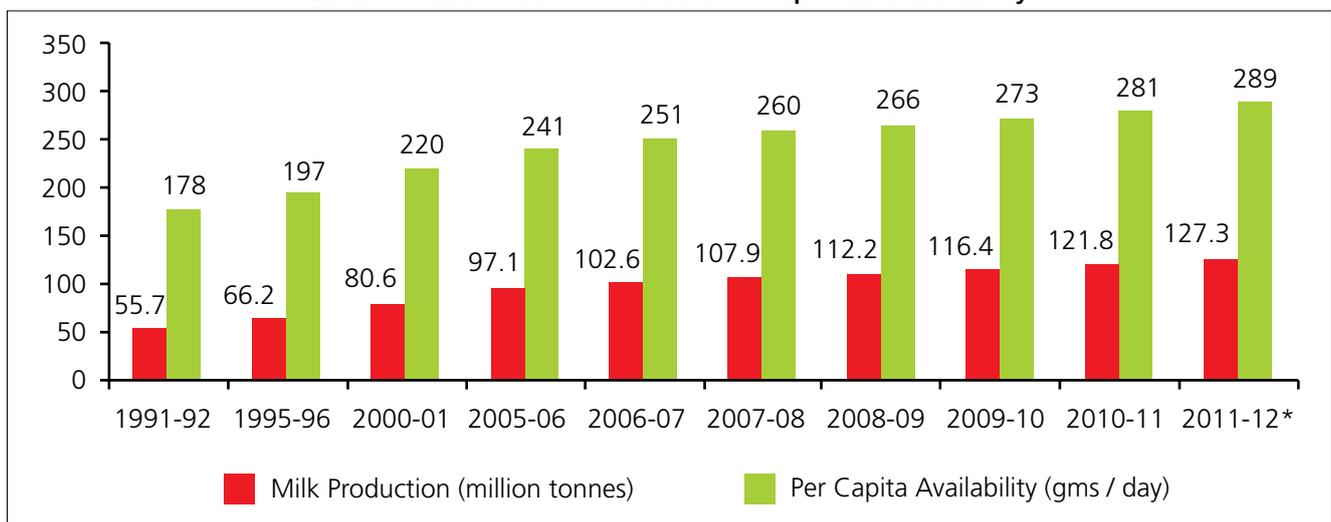
Skill Development Interventions in Dairy Sector in India

Background

The dairy sector in India has seen remarkable growth in the last few years. The white revolution transformed India's dairy sector and brought it to number one position in milk production in the world. The Indian dairy sector is the largest contributor to the agricultural GDP. Livestock sector comprises 28-30% of the agricultural GDP and milk makes up 70% of the livestock GDP.

India's milk production has gone up from 55.6 million tonnes in 1991-92 to 127.9 million tonnes in 2011-12. The milk production for the year 2012-13 is estimated at around 133 million tonnes. The per capita availability of milk has also increased from 178 grams per day in 1991-92 to 291 grams per day in 2011-12. This is comparable with the world per capita availability of 289.31 grams per day (2011).

Exhibit 3: Milk Production in India & Per Capita Milk Availability



Source: Department of Animal Husbandry, Dairying & Fisheries

Five states in the country account for 50% of the total milk produced. Uttar Pradesh has the pre-eminent position in milk production followed by Rajasthan, and Andhra Pradesh. Tamil Nadu, Uttar Pradesh, Rajasthan, Maharashtra and West Bengal are the major cow milk producing states whereas Uttar Pradesh, Andhra Pradesh, Rajasthan, Punjab and Gujarat are the major buffalo milk producing states. Milk processing in India is around 35%, of which the organized dairy industry accounts for only 13% of the milk produced, the remaining 22% is processed in the unorganized sector.



In India, the dairy sector is of high significance for reasons like:

- ✓ A large part of India's population including 70 million rural households primarily small and marginal farmers and landless laborers in the country are connected, either directly or indirectly, with the dairy sector
- ✓ Dairy provides a major source of secondary income to the farmers
- ✓ Capability of milk and milk products to enrich the protein diet of the large vegetarian population of the country and hence enhance food and nutritional security
- ✓ Creating employment opportunities throughout the country, especially in the rural areas.
- ✓ India has a unique pattern of production, processing and marketing/consumption of milk, which is not comparable with any large milk producing country
- ✓ The country is the world's largest milk producer as well as consumer, consuming almost 100% of its domestic milk production
- ✓ The market for milk and milk products is still largely dominated by the unorganized sector

The vast vegetarian population of India and cultural significance translates into demand for milk that remains in-elastic, despite the recent surge in milk prices. Substantial increase in demand for milk over a period of time, with limited increase in production, has contributed significantly to inflation in milk prices. Thus, there is a need to develop innovative and implementable production models that are futuristic, and have a long-term vision of producing more milk so as to ensure fulfillment of milk demand in the country.

Emerging Trends

The Indian dairy industry is witnessing winds of change in terms of production, processing facilities and consumer preferences. With unprecedented growth in milk production from about 59 million tonnes in 1992 to about 128 million tonnes in 2012, India has emerged as the largest milk producer in the world, and is expected to reach 220-250 million tonnes in 2020. With an overall growth rate of 4%, which is almost three times the average growth rate of the dairy industry in the world, the Indian dairy industry is sure to reach its zenith in the coming few years.

The trends that have emerged or are seeing signs of emergence are:

Augmented milk processing: At present, about 35% of the milk produced in India is being utilized for processing. The remaining is either consumed at the household level, or is sold as fresh, non-pasteurized milk through unorganized channels. The trends are now changing fast in India and with changing consumer preferences, it is expected that the processing of milk will increase sharply like in other developed countries.

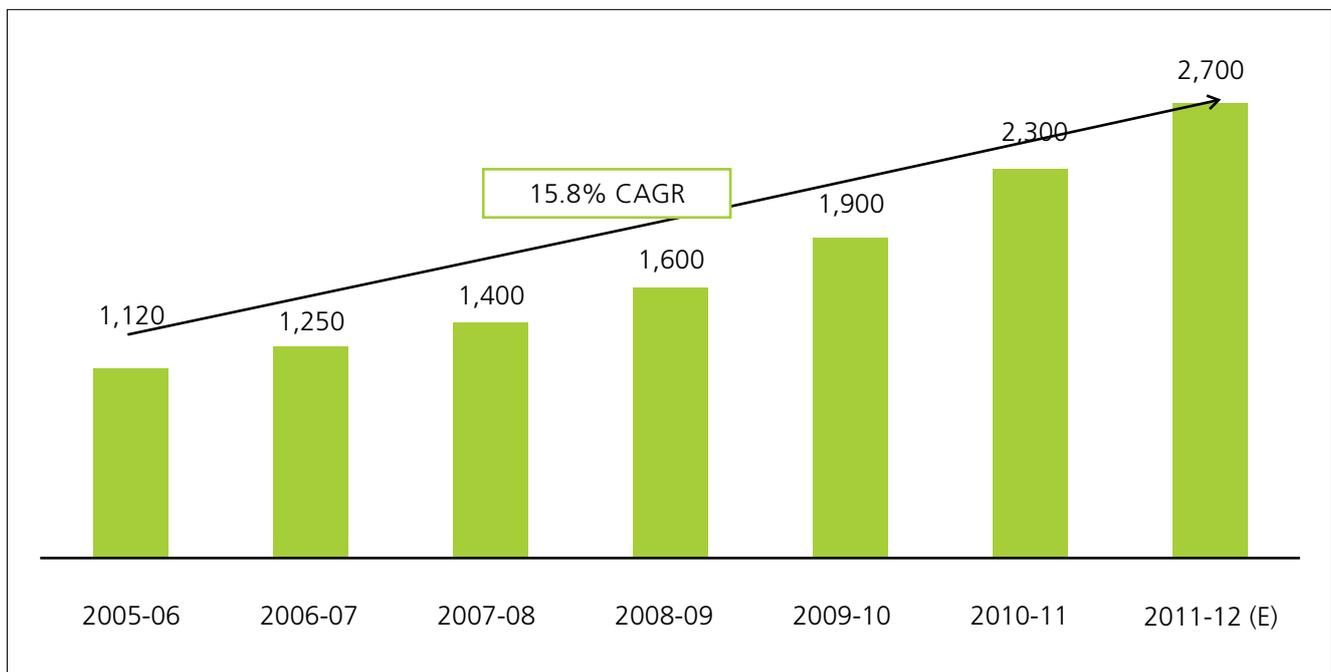
Value addition to milk: Maximum processing units in India, whether organized or unorganized are largely involved either in pasteurization of liquid milk or conversion of milk to milk powder and ghee. The value

addition is generally low due to the fact that units either do not have the capacity to process milk or do not have knowledge of the market of value added products of milk.

However, the production of such value added milk products is showing a rising trend in India and there lies enormous scope for products like fortified milk, de-mineralized whey, cheese, yogurt, lactose etc. the current market size for dairy products is estimated at INR 2,700 billion and has seen a lucrative growth of 15.8% since 2005.

With changing consumer preferences and rising income in rural as well as urban India, the demand for processed products is bound to increase. The urban population shall demand more of milk based health drinks, new premium ice cream flavors, fortified milk, dietary supplements, whipped cream, condensed milk and many other value added milk products.

Exhibit 4: Dairy Products Market Size (INR Billion)



Source: CRISIL

Lack of usage of high end technologies: In India, even today the processing of milk takes place through pasteurization. Contrary to this, many developed countries have resorted to the usage of highly advanced technologies like Ultra High Temperature (UHT) treatment and aseptic packaging which helps in extending shelf life of milk, modern centrifugation techniques for removal of micro organisms from milk, high pressure processing, irradiation etc. These technologies are yet to gain momentum in India.



Preparation under hygienic conditions: The demand for traditional dairy products like mawa, ghee, paneer etc. shall witness a change in terms of source of buying. The urban population, now more concerned about hygiene shall seek packaged products rather than loose ones. Thus large players are bound to increase their capacities and new players will enter to seize the opportunity of mounting demand.

Export orientation: Dairy industry shall observe more of export orientation of milk as well as value added products in the near future. Presently the processing facilities in India are concentrated more in the unorganized sector with no checks on the quality standards. However, for exports, safety norms and quality standards shall play an important role and big players shall try to foray into the export market with traditional as well as new innovative products.

Till now India had been striving to meet its domestic demand but with focus of private players and government on increasing milk production the shift towards exports is bound to happen in coming years. . India may not be able to reach out to developed nations very soon, but surely it shall cater to the demands of other South East Asian countries and Middle Eastern Countries.

Quality improvement: Proper milk handling at each stage of the supply chain is indispensable. Clean milk production is a resultant of totally integrated approach starting from the village level to the market with cold chain management at every step of handling, processing and transportation.

Integrated Dairy Farms: In India, milk is handled at several levels across the value chain before it reaches the consumer and this multi-layered system not only poses hygiene issues, but each level of handling also increases the end cost. The issue of high cost of domestic production is compounded by the fact that Indian dairy products cannot be exported to overseas markets due to their poor quality resulting out of poor animal health, unhygienic environment and manual handling delays.

Enhancing competitiveness of the Indian dairy industry will require both improvements in technology as well as better management. In order to address the challenges and increase the efficiency and productivity levels of milk, the concept of integrated dairy farms (IDFs) can be implemented across the country.

Increase in herd size in each farm, better quality of dairy animals, mechanized milking, breeding with improved bulls as well as hi-tech production of fodder and feeds are some of the notable changes seen in dairy farming activity. Establishment of IDFs to produce high quality milk and making value-added milk products for competitive markets in metro cities as well as for exports will require integration of all the available technologies for mechanization and automation with sound management practices of dairy farming.

This is comparatively a new concept to India, wherein all the components of a dairy are merged as one unit. Traditionally the dairy décor has been working on the following model



However the integrated dairy farm works on the following model:



Intervention Areas for Sustainable Growth and the Skill Development Factor

Animal Breeding: The Indian cattle breed is low in productivity as compared to the foreign breed. Today a major challenge before large dairy farms is procurement of high yielding cattle as breeding farms in India are rare. Thus major procurement takes place from farmers who are unaware of the latest breeding methods and resort to conventional ones. Artificial insemination is a worldwide phenomenon now; however our farmers have not been able to bank this technology for yield gains.

Artificial insemination is not merely a novel method of bringing about impregnation in females. Instead, it is a powerful tool for livestock improvement. In artificial insemination the germplasm of the bulls of superior quality can be effectively utilized with the least regard for their location.

However, the technique of inseminating a cow requires skill and adequate knowledge. Improper AI techniques can negate all other efforts to obtain conception. The required skill sets are not difficult to imbibe. Thus a farmer willing to learn the technique can easily do so under the guidance of an expert. This can also materialize into secondary source of earning.

Paravet equipped with new technologies: Animal health care is a major challenge for the dairy industry in India. Training people to become paravets or village-based livestock service provider who are able to provide artificial insemination (AI), basic veterinary, and preventive health services to the livestock in the village itself can prove to be a boon for the animals and farmers. In cases of emergency or otherwise also, it becomes difficult for any farmer to travel to towns for medical aid for his cattle. Paravets can ensure timely medical care in cases of emergency and can also provide preventive healthcare.



Good dairy farm practices: Good farm practices like regular cleaning of cow shed, providing right amount of green and dry fodder, procedures for detecting and handling sick animals, using medicines and chemicals as per the correct dosage for enhanced milk quality and maintaining congenial environment for the cattle are prerequisites to higher and hygienic milk collection. Some of these may not require very specific skills, but others like detecting diseases, providing correct dosage, knowledge of amount of feed and fodder to be supplied according to age of cattle etc are areas where specific skill sets need to be developed.

Technical skills: Technical skills are required at each level of dairy supply chain right from the operational to the management level. A list of skill sets has been identified for each level

Farmer level:

- ✓ General awareness on the lifecycle on an animal
- ✓ Amount of feed and fodder to be provided at each phase of lifecycle to enhance milk yield
- ✓ Maintaining general hygiene in the shed by regular cleaning
- ✓ Detection of common disease in animals
- ✓ Simple methods of avoiding diseases and infestation like washing hands before milking, udder cleaning before and after milking, using chemicals to avoid bacterial infection after milking etc.

Collection centre:

- ✓ Quality testing so that a farmer can be paid accordingly
- ✓ Handling the quality testing and adulteration testing kits
- ✓ Book keeping
- ✓ Handling chilling machine and bulk coolers

Processing plant:

- ✓ Operations of machines
- ✓ Book keeping
- ✓ Maintenance of processing infrastructure

Research laboratories

- ✓ New product development like flavored yoghurt, variants of processed cheese, new flavors of ice creams and flavored milk.
- ✓ Research on increasing shelf life
- ✓ Developing new packaging
- ✓ High level quality testing
- ✓ Operations of quality testing equipments

Skill Development Interventions in Horticulture in India

Background

Horticulture in a broader sense is the science of growing and management of fruits, vegetables, ornamental plants, medicinal and aromatic plants, spices and plantation crops, their processing, value addition and marketing. The sector accounts for 13.08% of the gross cropped area of the country and contributes close to around 30% to the agricultural GDP. Its contribution to the Indian export basket is also significant as it contributes about 37% to the total agri exports.

The total horticultural production in 2011-12 stood at around 240.5 million MT. Fruits and vegetables together constitute about 92% of the total horticultural production in the country. Over the years there has been a clear shift of demand from the conventional foodgrains to high value products like fruits, vegetables, milk, meat etc. The per capita consumption of fruits and vegetables (per month) in India has increased from 37 kg in 2004-05 to around 50 kg in 2009-10.

Farmers are now taking up horticulture in a big way as they have realized that these crops are much more remunerative than the conventional field crops. The cost of production for the conventional field crops has increased rapidly, while the returns remain almost stagnant. Farmer in search of new alternatives and diversification are shifting to high value agriculture especially the horticulture crops especially in the backdrop of several incentives under National Horticulture Mission and export promotion by the Government.

Emerging Trends

Protected cultivation: Cultivation of vegetables and small fruit plants by farmers in greenhouse under controlled conditions is emerging as a new trend. This is due to increasing demand during off season and exotic fruits and vegetables in the domestic as well as overseas markets. With large subsidies being provided by the government and farmers realizing the benefits of protected cultivation, it has emerged in a big way for growing colored capsicums, berries, off season vegetables and flowers. Off season vegetables fetch a very good price for the farmers as they are able to cater to the escalating demand of the foodservice industry as well as individual customers. Protected cultivation also increases the export opportunities for cultivators as better and uniform quality products can be obtained year round. Protected cultivation has removed most of geographic and climatic barriers.



Protected cultivation is thus considered as one of the most promising areas of agriculture in the current context and an upcoming and alternative production system involving high-tech and intensive practices of horticultural crops for food, nutrition and economic security.

Production of quality seed/planting material: In India, inadequate availability of quality inputs is one of the major constraints of the horticulture industry. Farmers have often faced problems like sudden drying of grafts, non-flowering of the trees even after 5-7 years, poor fruit setting, less yield and poor quality of fruits. The only reason for all these problems is the lack of quality planting material.

In view of more number of farmers realizing the potential of horticultural crops, there is an increasing demand for good quality planting material. Thus to meet the demand more number of certified nurseries are required which can produce quality material through conventional as well as latest scientific methods. This is essential to provide genuine and quality planting material in adequate quantity from reliable sources. In India, more than 4,400 fruit nurseries including about 1,500 under government sector and 2,800 under private sector, are functioning, which have an annual target of producing about 1,400 million fruit plants.

Floriculture: Floriculture is emerging as a big industry in India. With amiable climatic conditions, India has tremendous potential for floriculture. Many players in the country have started to exploit the opportunity of surging demand of cut and loose flowers in the domestic as well as export market.

Organic farming: The green revolution made India self sufficient in foodgrains and reduced its dependence on imports. However, along with this prosperity came huge usage of fertilizers and pesticides which has over the years deteriorated soil health that bears an impact on the sustainability of a farmer's livelihood. In recent years, this has emerged as a major issue brought up by many environmentalists and agriculturists. To overcome this, efforts are being made to produce agricultural crops using methods of organic farming.

Besides having a non detrimental effect on the environment and human health, organic agriculture has tremendous export potential. This can be attributed to stringent regulations on import by various countries especially on account of pesticidal residues in agricultural crops. The stringent standards for non-organic food in European and US markets have led to rejection of many Indian food consignments in the past. Organic farming, therefore, provides a better alternative to chemical farming.

Production of other high value crops: India has an upper hand in production of high value crops like medicinal and aromatic plants and spices and condiments. The Himalayan region of the country has rare and valuable medicinal plants in abundance. Similarly the southern part of the country is bestowed with different kinds of spices and condiments. A proper marketing channel is being developed for these products in India and production has also started at a commercial level.

Farmers are resorting to these crops because amidst decreasing land holding and dwindling farm revenues, these high value crops offer an immense opportunity to increase farm revenues, especially in case of small and marginal farmers.

Intervention Areas for Sustainable Growth and the Skill Development Factor

After livestock products and cereals, horticulture crops have the largest value of output in Indian agriculture. Owing to the immense opportunities of growth and employment in various sub sectors of horticulture, various skill development interventions are required. Some of the intervention areas for skill development in the sector include:

Protected cultivation: With increasing demand of protected cultivation by small and marginal farmers as well, the need for skilled manpower has increased. Skills are required for farming as well as establishing the green house structure with precision. Manpower at technical, managerial and operational levels are required for the growth of enterprise in the country. A focused effort is required to build the skills of various stakeholders in the industry. It will not only address the issues of price fluctuations of various fruits and vegetables in the domestic markets but will also be a tool for earning foreign exchange. Under protected cultivation, specific activities that need skill development include

- ✓ Crop production technologies
- ✓ Greenhouse management
- ✓ Design and development of greenhouse
- ✓ Grading & sorting operations
- ✓ Automation in protected cultivation
- ✓ Proper packaging to increase shelf life
- ✓ Innovative irrigation and fertigation techniques in greenhouse
- ✓ Vermi-compost production and use
- ✓ Mulching for moisture conservation and weed control
- ✓ Identify crop diseases, common insects, weeds and determine control methods
- ✓ Calibrate and operate sprayer and granular applicator for volume output

Production of quality planting material: As the demand for good quality planting material is increasing so is the need of nurseries and manpower to manage them. Owing to the high skill requirement of this vocation in spite of great demand for such nurseries, not many are able to venture into it. While certain government agencies have initiated programs to provide trainings to rural population in nursery management, the requirement for such skilled manpower is far from meeting the demand. The skills need to be developed for production of quality plant material through conventional methods like grafting,



layering, cutting, budding etc. as well as latest technologies like tissue culture. Both the techniques require precision and perfection for which skill development is very essential. For tissue culture, lab techniques like preparing culture, autoclaving, production of disease free tissue culture saplings etc. are critical and require trained manpower.

Plant breeding techniques: There are instances where farmers have created new varieties by breeding traditional varieties and developed resistant crops. Such breeding does not require very high end skills but a basic learning of breeding techniques and some preventive measures to avoid contamination. A standing example is of a farmer from Kerala, who developed a yellow mosaic resistant ash gourd variety by crossing a local variety with a resistant variety, followed by repeated selections. The average weight per fruit is 12 kg during monsoon and 4-6 kg during summer. Average yield is 250 tonnes per ha with average yield of 10 kg per plant. It is a short duration variety and has good cooking quality as well as taste. There are many such examples where through basic breeding knowledge farmers have been able to come up with superior quality crops.

Floriculture: With the increasing global demand for flowers, India can effectively capitalize this opportunity to generate employment opportunities & reduce poverty through achieving a consistent growth in production and export and earn valuable foreign exchange. The floriculture industry in India has tremendous potential for generation of gainful employment in rural as well as urban areas; however there is a need for skilled manpower in particular for this industry

Thus, various dimensions of the context on which skill development can be promoted include:

- ✓ Green house management for flower production
- ✓ Packaging techniques
- ✓ Breeding techniques
- ✓ Integrated nutrient management
- ✓ Seed treatment and soil treatment
- ✓ Handling of soils, nursery bed, potting media, potting etc.
- ✓ Propagation by cutting, budding, grafting etc.
- ✓ Post harvest technology of cut flowers, seeds, bulbs - e.g. study of pulsing solutions and holding of cut flowers
- ✓ Methods of seeds & bulbs collection and storing.
- ✓ Irrigation & water management: Including micro irrigation techniques like drip, sprinkler, fogger, fustigation, etc
- ✓ Pruning and shaping of the plants- Identification of indoor and bonsai plants.
- ✓ Other cultural practices like planting time and distances and methods of planting, nutrition & plant protection.
- ✓ Study of quality parameters for cut flowers for domestic markets and for export.

- ✓ Landscaping & Indoor Gardening: Preparation and execution of landscape plants, maintenance of gardens and lawns, accessories and containers for flower arrangements, floral arrangement, preparation of bottle gardens, terrarium, maintenance and recycling of indoor pot plants.

Organic farming: Due to the changing consumption patterns in lieu of higher per capita income of the middle class, there is an emerging trend towards consumption of organic farm produce in the domestic markets as well. This provides a great scope for employment generation and skill building. The principal skill building opportunities and dimensions in the context of organic cultivation include:

- ✓ Techniques of organic farming
- ✓ Business development for organic products including marketing and brand building interventions
- ✓ Post harvest handling of organic agricultural produce
- ✓ Production of bio fertilizers and its quality control
- ✓ Production of bio pesticides and its quality control
- ✓ Organic Systems Certification
- ✓ Vermi-composting

Good horticultural practices: Good agricultural/horticultural practices are those which address environmental, economic and social sustainability for on-farm processes and result in safe and quality food and non-food agricultural products. Good agri/horti practices are based on four pillars - economic viability, environmental sustainability, social acceptability and food safety and quality.

In recent years, this concept has evolved due to increasing concerns of different stakeholders about food production and security, food safety and quality, and the environmental sustainability of agriculture. These stakeholders include governments, food retailing industries, farmers and consumers who seek to meet specific objectives of food safety, production efficiency, livelihood and environmental benefits.

Awareness and applicability of good practices has to be strengthened at the grass root level. Thus skill building is required for the producers so that they imbibe these practices in their occupation. The skill development activities should include:

- ✓ **Soil Testing:** Soil testing is being taken up by many farmers. With greater awareness on the harmful effects of excess usage of Plant Protection Chemicals (PPCs) farmers are taking up soil testing to know the actual requirement of fertilizers and pesticides in their fields. This can become an employment generation tool for the rural youth as well as farmers. Interested candidates may be trained for soil testing with the basic testing kit and they can cater to a cluster of their villages and earn decently.
- ✓ **Safe production:** The over usage of pesticides and fertilizers in horticultural crops had led to rejection of many Indian consignments to countries like UK and USA. Thus farmers need to be made



aware of the excess usage of plant protection chemicals and should be given alternative methods for plant protection like mulching, using vermi-compost, Integrated Nutrient Management etc.

- ✓ **Farm mechanization:** Farm mechanization is need of the hour because of labor shortage and pressure on increasing yields. However farmers should be well acquainted with the usage of implements and machinery. They should be aware of the operations and maintenance of various crop specific harvesting machines. However, the skill development is required in the field of maintenance and repair of these implements as well. A few people from each village can be trained to take care of any repair and maintenance need of farm machinery in their village.
- ✓ **Micro Irrigation:** with the dwindling water resources it has become imperative to manage water in the field through latest technologies like drip irrigation, sprinkler irrigation etc. With an increasing demand for such technologies, there is spiraling need for skilled manpower to install, handle and operate such technologies.
- ✓ **Accurate harvesting techniques:** Harvesting techniques can bring a marked difference by avoiding the damages caused during the process. Using the correct tool for the correct category of plants, time of harvesting, correct collecting technique and containers, field packing etc. can reduce damages to a very large extent.

Need for correct harvesting techniques:

- Growers make mistakes by harvesting fruit crops too early, when they are under-ripe and have not yet developed their full flavor. While some vegetables, if allowed to grow large, become too fibrous or full of seeds making it less palatable.
- Mechanical damage during harvest can become a serious problem, as injuries cause produce to decay and quickly deteriorate. Thus usage of harvesting machine by an unskilled worker may cause serious damages.

Case Study: Kenya's Good Agricultural Practices

Kenya GAP is a national standard for fresh produce based on the principles of GAP, HACCP, principles for food handling and marketing, as well as on local regulations and international conventions ratified by the Government of Kenya. Kenya GAP was developed through private-sector initiatives and is owned and maintained by the Fresh Produce Exporters Association of Kenya (FPEAK). By adopting GAP and complying with food safety and quality, Kenya is among the leading African countries exporting fresh produce

Storage techniques: The post harvest losses in horticulture are a serious concern due to the perishable nature of the high value products specially fruits and vegetables. Estimates suggest that these losses account for around 25 – 35% of the total crop produce.



Realizing the need of storage facilities various state and central government schemes have gained momentum. Several attempts are being made in the country to erect the warehousing infrastructure including the financing facility on ware house receipts. Emphasis is also being laid on development of cold storages. Storing food products under hygienic and appropriate environmental conditions is crucial. Village level storage structures not only prevents distress sale for farmers but also triggers the rural economy through infrastructure development and also creates employment. However, specific skill building initiatives to meet the huge manpower requirement is yet to catch up. In this context, following skill developments may be taken up for various stakeholders of horticulture industry:

- a. Post harvest handling skills
- b. Technicalities of crop produce drying and packaging
- c. Cold chain management
- d. Grading and standardization for different crops and their specifications

Skill Development Interventions in Off Farm Activities

Maintaining the supply of agricultural produce, especially perishables is full of challenges. Each stage requires adequate care in handling and support in terms of infrastructure, finance and skilled manpower. Each node that carries the produce from farm to fork plays a substantial role in the value addition either in the form of grading and standardization or branding based on various parameters of the consumers' choice or through change in the physical form. However, till today these activities are not very prevalent among farmers. It is the middlemen who carry out these operations and in turn reap the benefits of higher prices gained due to processing.

The agri supply chain remains more or less unintegrated except a few interventions which have tried to assimilate the back and front end successfully. However such strengthened linkages handle a miniscule portion of the total produce. Thus added efforts need to be diverted to strengthen the supply chain to facilitate free flow of trade.

There exist many off farm activities which require capacity building especially for farmers so that they can earn better. Food processing, Retailing and Crop advisory services are sectors that have immense potential to engage many rural people especially women and give them a sustainable source of earning.

Food Processing

The level of food processing in India is very low as compared to other developed and developing nations. Its share to the global processed food trade is only 1.3% and the Ministry of Food Processing Industries envisions taking it to 3% by 2015. Currently, only 2% of fruits and vegetables in India are processed. The major states in India where food processing is carried out are Andhra Pradesh, Gujarat, Maharashtra and Uttar Pradesh.

The food processing industry is currently estimated to be of the size of INR 5,417 billion and is projected to increase to INR 15,636 billion by 2022. The F&V processing segment currently estimated at INR 259 billion is projected to increase to INR 887 billion by 2022.



Exhibit 5: Projected size of food processing industry (INR million)

Sector	2008	2012	2018	2022
F &V processing	159	259	543	887
Food grain milling	1,230	1,663	2,613	3,532
Dairy products	572	881	1,686	2,597
Meat & Poultry processing	369	675	1,673	3,063
Fish processing	139	180	265	343
Bread and bakery	714	1,137	2,288	3,646
Alcoholic beverages	101	171	380	645
Aerated water/soft drinks	338	451	693	923
Total	3,622	5,417	10,141	15,636

Source: National Skill Development Corporation

For the projected growth in the food processing industry, it is expected that the requirement of human resource in food processing industry shall be close to 17.8 million by 2022. Within the industry the bakery segment is deemed to employ the largest number of people. Currently the food grain milling industry employs the maximum number of people. The fruits & vegetables processing sector would alone employ around 3.1 million people by 2022.

It is expected that the organized sector would contribute to about 20% to 25% of employment, while a large portion of the employment would be generated in the unorganized sector.

Exhibit 6: Projected human resource requirement for the food processing industry till 2022 (000'persons)

Sector	2008	2012	2018	2022
F & V processing	140	183	273	357
Food grain milling	2,427	2,618	2,932	3,162
Dairy products	1,126	1,385	1,887	2,320
Meat & Poultry processing	658	961	1,697	2,479
Fish processing	216	223	234	242
Bread and bakery	3,420	4,348	6,235	7,928
Alcoholic beverages	390	528	834	1,131
Aerated water/soft drinks	153	163	178	190
Total	8,531	10,409	14,271	17,808

Source: National Skill Development Corporation

Intervention Areas for Skill Development

Unlike farm level skill development, food processing requires a more detailed and intensive capacity building. Food processing has a potential to involve budding entrepreneurs, house wives, farm women etc. on processing of products like squashes, jam, jelly and pickle on commercial scale. The set of skills that are required in the food processing industry and more specifically to the F&V processing industry are stated below:

- ✓ Ability to visually examine fruits and vegetables: A fundamental understanding of what quality of fruit/vegetable is acceptable in the processing unit is essential to understand. Not every unit of the produce can be used for processing and a rotten fruit/vegetable may spoil the entire processed food batch. Thus skills need to be build up for visually examining the produce and deciding which is suitable for further processing.
- ✓ Reading/writing skills for understanding the standard operating procedures: Unlike many field vocations, elementary education is required in the food processing industry. Ability to be conversant with basic measurements, reading the ingredients names, mixing in correct proportions, labeling the correct product and maintaining a record of inventory and the final product is imperative for the industry.
- ✓ Understanding quality parameters: With the increasing stress on food quality by the regulatory authorities as well as consumers, it is very crucial for the workers to have a basic understanding of the quality parameters like FSSAI, HACCP, ISO standards and work in accordance.
- ✓ Technical skills: Technical skills are required to operate the machines for processing and set parameters such as temperature, moisture, running time of machines specific to process requirement etc
- ✓ Packaging and labeling line: Packaging and labeling are an important component of the food processing industry. Since in most of the processing units packaging and labeling is done manually, adequate training needs to be provided for these workers to work effectively and minimize wastage.
- ✓ Product innovation: With increasing disposable income and changing consumer preferences, the demand for processed food is on a constant increase. To meet this demand constant innovations are taking place to develop new textures, tastes and products. Skill building can play a major role in innovating new products through training on blending and mixing techniques, new ingredients in the market, consumer demand, ingredient specifications etc.
- ✓ Quality testing: Adherence to quality standards is very important for a processing unit. Hence skilled manpower is required which will be capable of performing quality tests including chemical and microbiological analysis.



Retail

Another sector that has emerged radically over the last decade is organized retailing and within this the agri retailing has seen a phenomenal growth. Organized retail includes formats such as hypermarkets and supermarkets, and retail chains.

The organized retail was valued at INR 96,500 crores in 2008 and accounted for around 5% of the total retail market. Organized retail has been growing at an impressive rate of 35% to 40% year on year in the last few years compared to 9-10% growth in the overall retail industry. This growth was mainly driven by changing lifestyles, rising disposable incomes, favorable demographics, and easy credit availability, etc.

A major challenge in retailing is managing the highly fragmented supply chains and infrastructure issues. Indian retailers have to enhance their supply chain efficiencies to cut down costs and become competitive. The highly unorganized food supply chain demands maximum efforts to put things in place and reduce the wastages. The Indian retail market is very heterogeneous in nature. Moreover, the dynamics for various segments change with the geography and other cultural factors. The challenge for the retailer is to keep this heterogeneous nature of the target market in mind and to balance it with other issues like economies of scale.

Skill Development Interventions

Food and grocery, which is the largest segment of the total retail industry, is the second largest in the organized space accounting for 11.5% of the market. This segment holds the largest potential for organized retail. While many organized retailers have taken up agriculture as a section along with other goods, the likes of SAFAL have solely chosen agri produce for their stores. However, the manpower demand for these retail stores is hardly being met. Hence, most of these retail houses have initiated in house training for skill development of their employees.

Thus here lies an opportunity for skill building and meeting the industry requirements. Special efforts need to be made for enhancing the skill sets across the supply chain of the retail industry which may include:

- **Customer interaction/Customer service:** Retailing is the vital link in any typical supply chain as it is closest to the customers. Good interpersonal skills to interact with customers in a friendly manner is essential. The front staff should be able to handle customers with patience especially in situations like overcrowded store, delayed credit-card transactions, exchange requests by customers and refunds.
- **Store Management:** Store operations play a critical role in shaping the customer perceptions towards the store. Store operations involve selling, management of goods flow, store maintenance

and transaction processing. The sales staff should be able to keep the store well maintained at every time of the day so that customers can easily track items of their choice.

- **Detailed product knowledge:** All sales staff should be aware of the ongoing schemes in the store and its applicable terms and conditions. Most importantly staff should have knowledge of offers underway in the store and its implications on billing.
- **Computer application:** The organized retailers have to leverage IT and other technologies to sustain business growth. For this, the ground staff has to be conversant with basic computer skills, the transaction software and hardware such as bar code reading machines, etc. being used in the store. Staff should also have the knowledge of handling credit/debit card payments.
- **Material handling:** Material handling is essential to understand in context to food and agri because of their perishable nature. A very long inventory cannot be kept in case of horticultural products. Other processed food items like biscuits, cakes etc. also need to be handled carefully because of the delicate texture. Ensuring optimum stock levels and avoiding stock outs is also an essential element of retailing. Optimum inventory levels have a major impact on the store top-line and bottom-line.
- **Accountancy:** Totaling cash & credit-card transactions, comparing with receipts, entering the results in financial records, reporting cash surpluses or shortfalls, solving minor transaction software problems are the basics a person maintaining accounts of a store should be able to do.

The organized retail industry can be a job option for rural youth, out of their villages, aspiring to take up jobs in nonfarm activities. Their basic skill sets can be enhanced by making them computer literate and developing their soft skills. However elementary education may be a requisite for jobs in this industry.

Farm Mechanization

Farm mechanization has played a vital role in bringing about a significant improvement in the agricultural productivity. The success of green revolution can be largely attributed to farm mechanization. There are several factors that justify the need of farm machinery in India.

Machines not only help in increasing the farm productivity but also speed up the primary processing of crops (cleaning and handling) and hence reduce the delay in marketing of the crops. Moreover the transportation is done in a more efficient way.

The use of farm mechanization enlarges the employment opportunities both on farms and in nonfarm sectors as there is an increase in area under plough, multiple cropping, development of agro-industries and related services.

Under off farm activities rural youth can be trained for the repair and maintenance of tractors, harvesters and other agricultural implements. Technical training can be provided to rural youth with very small or no

landholdings to provide them a source of livelihood. This training would not necessarily require a formally educated background but having one can be an additional advantage.

Farm Advisory

The educated farmers and youth can be trained to give crop advisory to other farmers. This type of training program requires an exhaustive program design so that correct advisory can be given for:

- ✓ Cropping pattern
- ✓ Fertilizer usage
- ✓ Pesticide usage
- ✓ Good agricultural practices
- ✓ Integrated nutrient management
- ✓ Market information
- ✓ Ongoing government schemes and details to avail them

Through such interventions, farmers can get immediate solution to their queries which would help in reducing cost of cultivation & making more profit from higher crop yield.

Currently most of the farmers take advisory services from input dealers who to a large extent are biased towards making them use more fertilizers and pesticides than what is actually required. They may also suggest inputs from the company offering them highest commission. Thus crop advisory service from a person who is totally unbiased is required by the farmers.

For such advisory services certificate courses can be initiated and these may be either paid by the government or by the farmers themselves. These trained personnel may act as field workers for the Krishi Vigyan Kendra or under any similar initiative of the government.

Information and Communications Technology

The application of information and communications technology (ICT) in agriculture is increasingly important. Availability and access of farmers to information has been widely recognized as one of the critical factors bearing an influence on the farm productivity, production and returns. Different agencies generating, processing and transmitting the information for the use of farmers in the country have of late taken up interventions for increased access of the information to farmers. Modules of weather, market prices, package of practices and new technologies have already been developed by various agencies and are being made available to the farmers through various information and communications technologies. Farmers are also being facilitated through ICT driven crop advisory services by agencies such as CABI and RML for the benefit of the farmers. However, the utility of these technology initiatives is limited by the technology quotient of various users i.e. farmers, traders etc.

As perceived by many of us, ICT is not about a particular device, tool or application that permits the exchange or collection of data. ICT is a term used for any kind of communication technology ranging from radio to mobile phones. While many of these technologies are perceived to be not requiring skill development, certain computer applications including use of satellite images do need skill development. While the use of ICTs in increasing the productivity and farm revenues is widely recognized, the opportunity of rural youth for self employment through paying the role of ICT enablers and acting as a bridge between the farmers and various knowledge portals is to be given due emphasis. Thus self employment of rural youth where they can act of ICT enablers may provide off farm employment.

Conclusion and Way Forward

A skilled workforce is the key to a country's overall growth and stability, and it is one of the determining factors for bringing in investments and success of different enterprises. Improving the essential skills of workers has tremendous impact on the enterprise as well as the personality of the worker. Not only does skill bring in more productivity, it also increases the level of self-confidence of the learner.

Need for a Paradigm Shift

India is a witness to several capacity building/skill building initiatives for the last 4 – 5 decades. Different players such as Central and State Departments of Agriculture, ICAR institutes, Civil Society Organizations have been taking up training programs for several years now. With a perceived increase in the need for skill upgradation especially to harness the benefits of technological and institutional innovations in the country's economy, in the last decade, a new category of institutions have emerged especially in the private sector and civil society space that have mandated upon themselves the development of skills of various stakeholders. With a stagnant agriculture growth in spite of several policies, technological and institutional innovations, there is a dire need for a shift in the perspective of 'skill development'. The tools and context of vocations in agriculture have changed. It is time the capacities of the individuals who handle the tools in the dynamic contexts of agriculture are also developed.

As discussed in the previous chapters, in the high value agriculture sub sectors such as Dairy, Horticulture, Food Processing, while there are several emerging intervention areas for skill development holding a huge potential for growth of the sector, there is also a perceived need for a shift in the way the skill building interventions are taken up. The perspective shifts that have a large bearing on the way the skill development interventions are taken up and the way the ultimate beneficiary gets benefitted include:

- 1. 'Farmer' centred to 'Farm' centred skill development initiatives:** In the context of shift in the welfare perspective to empowerment perspective of various development initiatives in the country, there is a need for emphasis on how cultivation in a farm is to be made viable and profitable. Thus the skill development initiatives are to build the capacities of the individual farmer in his resource use efficiency at the farm level in the light of the financial, labor and land resources at his disposal.
- 2. Farmer as 'isolated producer/ contributor of labor' to 'Farmer as 'Entrepreneur':** While various contemporary skill development initiatives do focus on or mandated to enhance the productivity of the farm, there is a need for emphasis on measures that aim to increase the ability of the farmer to avoid or mitigate several production and market risks and arrange various resources of the farm to increase the farm viability from an entrepreneurial perspective.
- 3. Risk Mitigation through 'portfolio management' – to include animal husbandry and other options in addition to crops:** Several contemporary training programs by public and private sector



entities do emphasize on the need for risk mitigation by the farmers through various mixed farming measures such as taking up dairy, poultry, fisheries along with agricultural or horticultural crop production. In the backdrop of predominance of small and marginal farmers in Indian agriculture while these initiatives focus on the 'subsistence farming', there is a dire need to emphasize on 'commercial farming' through high value agriculture especially through portfolio management of the resources available at the farmer's disposal. With greater emphasis on 'financial inclusion' and increasing access of an average farmer to farm finance, there is a need include the dimensions of 'portfolio management' and 'financial planning and budgeting' for increased farm revenues.

4. Skill Building for activities 'beyond the farm gate': Several of the skill building initiatives taken up by various players are focusing either on the 'Farm Activities' or 'Non Farm Activities'. However, there is a great need to emphasize on the 'Off Farm Activities' of the rural areas.

A major proportion of the Indian agriculture is unorganized. While the segments of supply chain is more organized towards the consumer's end, the segments of supply chain that are closer to the farmer / producer remained unorganized to a large extent. Though the regulated markets in the rural hinterlands do offer organized services to the farmers, the distance between the farm and the market appears to be never decreasing. This scenario offers large scope for the development of 'off farm livelihood interventions' in the domain of agriculture especially in the domains of post harvest handling, village level storage, repair and maintenance of farm machinery, financial intermediation and farmer centred farm advisory services. This perspective helps in the graduation of several unorganized farm services to organized status and thus would attract private investments subsequently.

These shifts hold the potential to transform the Indian agriculture not only from the vantage point of an individual farmer, but also would aid in bringing various market efficiencies of the agriculture supply chain.

With a renewed focus on skill development efforts from the Government, various initiatives in public as well as the private sector have already been taken up to harness the advantage of 'demographic dividend' in India. However, skill development initiatives in the domain of agriculture could not play lasting impact in retaining the rural youth in agriculture sector. Though several efforts are taken up proactively to facilitate livelihood enhancement of the rural people especially small and marginal farmers and also for growth in agriculture, improvement in the operational strategies of the training institutions in the following dimensions is the need of the hour:

- ✓ Context and objective driven design of training programs with an implication on farm revenues or market efficiencies
- ✓ Trainings in vernacular languages
- ✓ Targeted training programs and the designs for small and marginal farmers, women, rural youth, veteran farmers that enables the improved learning outcomes among the trainees. This would galvanize and facilitate group efforts towards enhanced training outcomes.



- ✓ Promotion of 'training providers' as a vocation and scheduled training of the trainer to keep him/her apprised of latest developments in the field of agriculture. Systems for qualification and certification of the trainers to be put in place so as to ensure delivery of quality services.
- ✓ Promoting skill development initiatives in rural hinterlands through provision of special incentives for remote / inaccessible regions.
- ✓ Training programs for 'skill upgradation' and 'employment generation (job/self)' to be recognized as separate; and training methodologies and programs to be designed with a focus on targeted outcome.
- ✓ While there is utmost need to map and identify the job roles and their respective skill set requirement of a sub sector of agriculture, training needs assessment from the 'trainee /employer perspective' to be made pre-requisite for designing and implementing the training programs. In case of self employment driven training programs, aspirations and interest of the rural youth need to be recognized with high importance at the time of annual training program planning at a district / state level.
- ✓ Priority should be given to novel methods of training delivery such as video, demonstrations, hands on training rather than theoretical methods.
- ✓ Pilot plants to be promoted as training centers.
- ✓ Monitoring and feedback to be included in the assessment of training effectiveness. Making the 'feedback loop' integral part of all the training programs is also essential.
- ✓ Synergy between public private partnerships including universities to be effectively used harvesting the domains of expertise of various stakeholders. For example, the research expertise of the research centres & universities, the commercialization & market orientation methods of the private sector and training methodologies of the civil society may be synergized for training effectiveness.
- ✓ Revitalization of agricultural extension services both in public and private domains by equipping farm extension workers with IT skills in areas such as land use, ecology, crop production techniques, soil types and digital mapping.

While the country is bracing itself the mountainous task of building the skills of millions, it is time for making innovative and holistic efforts for focusing on the targeted livelihood enhancement and market efficiency building towards sustainable agriculture growth.



**Skill Development in
Indian Agriculture**



About



YES BANK, India's fourth largest private sector Bank, is the outcome of the professional & entrepreneurial commitment of its Managing Director and CEO, Rana Kapoor and his top management team, to establish a high quality, customer centric, service driven, private Indian Bank catering to the Future Businesses of India.

YES BANK has adopted international best practices, the highest standards of service quality and operational excellence, and offers comprehensive banking and financial solutions to all its valued customers. YES BANK has a knowledge driven approach to banking, and a superior customer experience for its retail, corporate and emerging corporate banking clients. YES BANK is steadily evolving as the Professionals' Bank of India with the vision of "Building the Best Quality Bank of the World in India".

About



NSFI is a not-for-profit Foundation started by a group of leading professionals from Agri business background and is primarily focused on the objective of skill building and development of vocational opportunities for India's large but relatively "unskilled" workforce. National Skills Foundation of India works towards poverty reduction through skill endowment and capacity building of unskilled labour force at the bottom of the pyramid. NSFI partners with Private Sector, Government, Universities, Institutions and Multilateral Agencies for skill development through: policy advocacy and research on building a holistic skill development eco system in the country. Execution of demand based market driven skill development training programs in emerging sectors like Agriculture, Agri supply chain, Food Processing, Retail, Logistics, Warehousing, Rural Distribution, Hospitality etc.; building strong knowledge base using research and development leading to policy formation and/or reforms; demand led training programs which nurture & develop employability and sustainable livelihood concerns of urban & rural youth, farmers, small vendors, women entrepreneurs and Workers in unorganized sector.