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Managing Change and Beyond...

tapasya

AGRICULTURE

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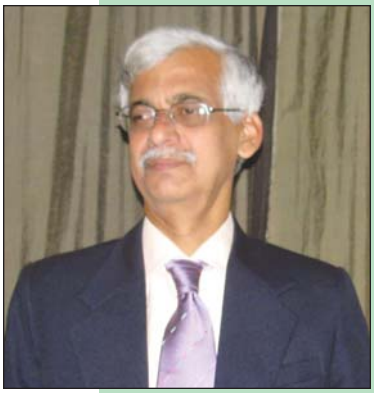
AGRICULTURE

With a 15% share in India's GDP, agriculture is a key constituent in India's growth story. Wide ranging changes have occurred in the way the Indian farmer grows his crop with use of technology, fertilizers and improved seeds to help him. Tapasya looks at the agriculture scene in the country and seeks to know how our progress is dependent upon how the ubiquitous and humble seed charters our course.

Editorial

P. G. Vijairaghavan



India's growth story does look like it has hit a roadblock if the figures trickling in over the last couple of months are any indication. The projected GDP for 2012-13 is between 6 to 7% - a fall of about 30% from the high of 9.4% registered in 2007-08. While the stock indices are not a final indicator of the state of the economy, the direction is clear – from a high of 21000 the BSE is struggling to retain the 16000 levels; the rupee is floundering at around Rs 53/54 to the dollar; industrial production is nothing to feel proud about; foreign capital has found flight out of India and worst of all, India Inc is struggling to deliver positive results – and even the ever performing IT sector seems helplessly caught in the web of recession. And inflation is taking a toll on everybody – most of all the common man who is seen to be struggling to keep body and soul together after a brief romance with rising standard of life. Government is either clueless about how to handle the looming crisis or just not able to, despite knowing the way out, given its compulsions – within and outside the ruling coalition. India Inc. has sounded its caution repeatedly since the signs turned amber from a seeming green over a year ago. The latest is the opinion expressed by the usually suave and diplomatic scion of the bellwether IT monolith, Infosys, Mr N. R. Narayana Murthy, rather uncharacteristically direct too – that the finance Minister has failed to attend to the economic problems of the country - a measure of the anxiety of the business community in the present uncertain economic climate.

While the stock indices are not a final indicator of the state of the economy, the direction is clear – from a high of 21000 the BSE is struggling to retain the 16000 levels; the rupee is floundering at around Rs 53/54 to the dollar; industrial production is nothing to feel proud about; foreign capital has found flight out of India and worst of all, India Inc is struggling to deliver positive results – and even the ever performing IT sector seems helplessly caught in the web of recession.

The unfortunate part of this decline is that most of it was avoidable; or atleast predictable, hence beatable. Yet, we have had the unholy sight of economics becoming hostage to politics for the best part of the past two years. Prudent economic policies have been advocated by the best brains in the business, the Finance Minister himself is no novice at handling such a crisis, yet, we have had the picture of a paralysed Government – unable or unwilling to take strong policy decisions that could have sent a signal to the rest of the world about our intentions to glide over the unsavoury international situation caused by the Eurozone crisis and Greek imbroglio (likely to be followed by Spain) and implementing the next set of reforms could have meant at worst retention of foreign capital or at best, attracting more of the same. The spate of jumbo sized scams hitting the frontline of newspapers has been more predictable than the Indian monsoon and there is justified gloom over the law and order situation in the country – raising the question, can the business community contribute to the country's economic recovery in such a climate of uncertainty?

If recent economic history is any indicator, India has it in her to ride the crisis and come out on top of it. From the foreign exchange crisis of 1991 emerged a largely free Indian economy; and booming growth, and

the IT sector leading in this revival of the Indian mindset; emerging as a worthy competitor to the other Asian giant – China. It was the teetering Indian economy that was on the verge of default in sovereign debt repayment that released a gush of entrepreneurial talent that was to take the world by storm, smothering the best of corporations with homegrown talent in business management, and happily, brought the likes of thinkers like C K Prahlada and his ilk to the fore.

But the question that begs an answer is – do we need to go to the brink to be able to prove ourselves? And again, as the saying goes, things have got to get worse, in order to get better. For the sake of the Indian economy, we must surely hope they get better before they are allowed to get any worse.

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In this issue we try and look at the way agriculture in the country has been shaped with a massive campaign to increase foodgrains production in the wake of the ever increasing population and the need, especially, to ensure the availability of nutritious food for the millions, 65% of whom belong to the under 35 years age bracket. Some of the best names in the country have contributed their knowledge and views and we are happy to have brought them all together in Tapasya, to celebrate the crucial role of agriculture in India's development.

Without Comment....
Are we serious about Climate Change ?
Sunita Narain writing in the Centre for Science and Environment Newsletter :

Rio: not plus or minus, just 20

The Rio+20 UN conference on sustainable development is over. The conference declaration, titled "The Future We Want", is a weak and meaningless document. It aims at the lowest common denominator consensus to say it all, but to say nothing consequential about how the world will move ahead to deal with the interlinked crises of economy and ecology. Is this the future we want or the future we dread?

Only when the last tree has died, the last river has been poisoned and the last fish has been caught, will we realize that we cannot eat money.

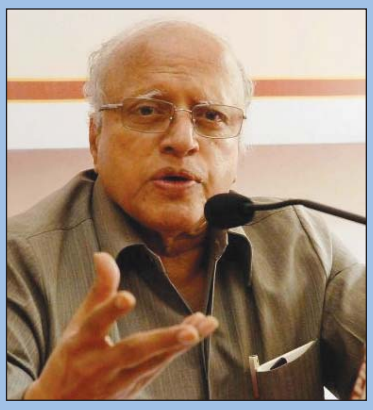
– Cree proverb

cover to cover

All opinions expressed in the articles are those of the authors.
The Editor, the Institute and the Publisher bear no responsibility for the same.

This column focuses on and profiles individuals who, through the power of their achievements and the force of their personality have become success stories and have created a niche for themselves in society.

Profiling *Prof. M. S. Swaminathan, the tallest among agricultural scientists in India*



Professor M S Swaminathan has been acclaimed by TIME magazine as one of the twenty most influential Asians of the 20th century and one of the only three from India, the other two being Mahatma Gandhi and Rabindranath Tagore. He has been described by the United Nations Environment Programme as "the Father of Economic Ecology" and by Javier Perez de Cuellar, Secretary General of the United Nations, as "a living legend who will go into the annals of history as a world scientist of rare distinction". He was Chairman of the UN Science Advisory Committee set up in 1980 to take follow-up action on the Vienna Plan of Action. He has also served as Independent Chairman of the FAO Council and President of the International Union for the Conservation of Nature and Natural Resources.

A plant geneticist by training, Professor Swaminathan's contributions to the agricultural renaissance of India have led to his being widely referred to as the scientific leader of the green revolution movement. His advocacy of sustainable agriculture leading to an ever-green revolution makes him an acknowledged world leader in the field of sustainable food security. The International Association of Women and Development conferred on him the first international award for significant contributions to promoting the knowledge, skill, and technological empowerment of women in agriculture and for his pioneering role in mainstreaming gender considerations in agriculture and rural development. Professor Swaminathan was awarded the Ramon Magsaysay Award for Community Leadership in 1971, the Albert Einstein World Science Award in 1986, and the first World Food Prize in 1987. Recognition of his services have come to him not only from India, but internationally from almost every notable country in the world and world bodies like the United Nations which have hailed him as the messiah for a world desperately fighting off drought and famine for its billions.

Professor Swaminathan is a Fellow of many of the leading scientific academies of India and the world, including the Royal Society of London and the U S National Academy of Sciences. He has received 53 honorary doctorate degrees from universities around the world. He currently holds the UNESCO Chair in Ecotechnology at the M S Swaminathan Research Foundation in Chennai (Madras), India.

Tapasya considers it a privilege to have Dr Swaminathan participate in this special issue on Agriculture by way of an interview with the Editor, as also through his article, To The Hungry, God is Bread, in which his concern and compassion for the underprivileged is apparent.

In conversation with P. G. Vijairaghavan

***Q** What according to you are the reasons for the gradual fall in the contribution of agriculture to India's GDP over the years with industry and services recording a consistent rise as part of increased GDP base?*

MSS : The gradual decline in the contribution of agriculture to our GDP is because of the rapid expansion of the secondary and tertiary sectors of the economy. This is the normal trend in all nations. The manufacturing and industrial sectors as well as the services sector grow fast adding to the total economic wealth. There is nothing wrong in agriculture's contribution to GDP going down. What is disturbing is the fact that the onus for employment still remains largely with the farm sector. Over 60 per cent of the rural population depend on crop and animal husbandry, fisheries, forestry and agro-processing for their livelihood. The

involvement of the majority of population in agriculture and the concurrent drop in agriculture's share of total GDP is the main cause for rural poverty and hunger.

Table - 1. Sectoral GDP Growth since 1950s
Gross Domestic Product—Sector wise at 1993-94 prices (%)

Year	Agriculture	Industry	Services	GDP
1950-51	(55)	(15)	(30)	100
1960-61	(51)	(19)	(30)	100
1970-71	(44)	(23)	(33)	100
1980-81	(38)	(24)	(38)	100
1990-91	(31)	(26)	(43)	100
2000-01	(24)	(20)	(56)	100
2004-05	(20)	(20)	(60)	100
2009-10	(15)	(28)	(57)	100

Note: Figures in brackets show the GDP of the three sectors as % of total GDP

Q Fragmentation of landholdings is said to be a major bottleneck in increasing agri production in the country. Can land reforms help in changing the ownership pattern ?

MSS : Fragmentation is a real problem. The average size of holding is now only about one hectare. It is therefore important to develop institutional mechanisms for giving the power and economy of scale to small producers. This point has been discussed in detail in the report of the National Commission on Farmers under the chapter "Farmers' of the 21st Century".

Q Huge tracts of agricultural land are being converted to non-agricultural use in many States, which is working to the detriment of agriculture sector and the farming community per se. Yet, no protests or cautionary signals are heard from people who matter. Do you think the scientific community should take a strong view on this degradation of valuable land which might cause untold harm to the agricultural aims of the country?

MSS : I agree that the diversion of prime farm land for non-farm purposes will affect adversely the future of food security. We should develop land use policies with food security as the bottom line of such policy. A National Land Care Movement should be launched to improve soil health and fertility. Soil carbon banks should be built up.

Q Your efforts to empower the farmer through the Gram Gyan Abhiyan are commendable. However, at times the knowledge which is required to be supplemented by Government agencies through assured supply of seeds, and fertilizers etc stymies the growth of the sector. Is there any move to improve co-ordination between voluntary organizations working in this area such as GGA and Government agencies to minimize bottlenecks?

MSS : In agriculture, the extension of knowledge should be simultaneously accompanied by the transfer of the inputs essential for the application of the knowledge. It is this need for a "deliver as one" approach which is not being met today. There is no correspondence in space and time between the spread of knowledge and the availability of the needed inputs. This is one of the reasons why extension work is not very effective.

Q While the farmer is eulogized as the food-provider for the country, in effect however, he seems to be the last in the line for distribution of wealth in the country –

Average increase in Per capita agri income was a meagre 0.5% per annum during 1951-2005, compared to whopping increase in per capita industry sector workforce income at 4.7% per annum and that of services sector workforce income at 2.7% per annum.

MSS: I agree with you that the role of farmers is always praised in words. The words are not translated into action. Farming is in a serious crisis. Young women and men do not want to take to farming as a profession. The monsoon and the market still remain the major determinants of a farmers' well being. A National Policy for Farmers placed in Parliament in November 2007 on the basis of a draft provided by the National Commission on Farmers, which I chaired during 2004-06, is still remaining on paper. This is very unfortunate since this is the first time either in colonial India or in Independent India, Government has announced a policy for farmers. This policy calls for a paradigm shift from measuring agricultural progress only in terms of the growth rate in production, to measuring such progress by the growth rate in the real income of farmers. The policy calls for an income orientation through concurrent attention to the farm and non-farm sectors of the rural economy.

Q Is crop insurance the answer to farmers' woes and suicides in India? Is non-remunerative prices for agri produce also not contributing to the problems of farmers in India?

MSS : Effective crop insurance will be very helpful. Unfortunately there are still no farmer friendly insurance policies.

Q It is said that not much research to increase food grains production has been carried out since the 90s in India. What more can be done, according to you to make India the granary of the world. This could also be a resource to enable India to reach the regional power status that it is aiming for.

MSS : Science is the prime mover of change. If farm ecology and economics go wrong, nothing else will go right. Therefore, the technological upgradation of farm operations and ending the prevailing mismatch between production and post-harvest technologies are areas which need urgent attention. Research organizations should give more attention to the nurturing of brains, rather than concentrating on assembling bricks.

Science is the prime mover of change. If farm ecology and economics go wrong, nothing else will go right. Therefore, the technological upgradation of farm operations and ending the prevailing mismatch between production and post-harvest technologies are areas which need urgent attention.

There is also not much evidence of attention being paid to optimum use of water resources and conserving of water through rainwater harvesting which is also impacting the soil in many States. What could be the reason for lack of attention to this important aspect of farming in India?

MSS : Water use efficiency is poor. There is need for greater attention both for augmenting supplies and managing demand. Sustainable water security should receive high priority. Also, the programme for Sea Water Farming developed by MSSRF needs to be taken up all along the coast of India.

Will the recent Supreme Court directive to the Government of India to expedite the linking of rivers in India help in improving the water situation in the country?

MSS : In the Sixth Five Year Plan (1980-85) when I was initially the Deputy Chairman and later Member in-charge of Agriculture, Irrigation and Science and Technology I had provided for detailed studies on the inter-basic transfer of water in the irrigation sector. This is how the study started. Linking rivers in peninsular India will not have international political implications, since all these rivers are under our political control. In contrast, diverting water for international rivers will present numerous political problems.

However, more than the increase in food grain production, it is the management of the food grains in the godowns which has been drawin g criticism all round. The question therefore arises, if we are unable to manage our foodgrains even with bumper harvests, such that every hungry mouth is fed and that lakhs of tonnes of grains do not rot in the rains, how is the production of more food going to solve our consumption needs…?

MSS : The state of food grain storage is really a national shame. In the 1960s, when we were working for what was later termed as Green Revolution, I developed the following four point strategy for saving grains and distributing them without spoilage.

- Making available simple farm level bins like the Pusa Bin for helping farmers to store the grains safely without spoilage, until they sell them.

- Establishing in all villages Rural Godowns both for perishable commodities and for foodgrains. This rural godown scheme was launched in 1979 when I was Secretary, Agriculture and Rural Development in the Government of India.

- Establishing a National Grid of Ultra Modern Grain storages at fifty locations in different parts of the country, with each location having a capacity to store one million tones of grains. This will give us the capacity for the safe storage and regional distribution of about fifty million tones of foodgrains. Without such a decentralized storage, it will be difficult for the country to fulfill the legal obligations of the National Food Security Act.

- Improve the Public Distribution machinery and plugging all loop holes which provide opportunity for pilferage and corruption. Arrange the PDS through cooperative societies and Women's Self Help Groups.

Marketing of agricultural produce has always been the bane of farmers who are deprived of their legitimate share of the profits made by exploitative middlemen… What is the way out? Even co-operatives which have been talked about as the remedy are not free from lobbies of interested sections of population.

MSS : Producer oriented marketing is the key to sustaining farmers' interest in farming. Government procurement at the announced minimum support price should continue since procurement will stimulate more production.

How much of a part does biotechnology have to play in the rejuvenation of Indian agriculture? You are known to have an agnostic view of the use of bio technology in foods as a remedy for food shortages. Are the current safeguards enough to prevent undesirable consequences of use of genetically modified crops?

MSS: Biotechnology is a useful tool but to get benefit from it, we should have an effective regulatory mechanism. In a report I submitted in 2004, I had mentioned the following guidelines for the regulatory mechanism:

"The bottom line for any biotechnology regulatory policy should be the safety of the environment, the well being of farming families, the ecological and economic sustainability of farming systems, the health and nutrition security of consumers, safeguarding of home and external trade, and the biosecurity of the nation.

While organic farming is considered environmentally and hygienically best suited for a healthy country, it has cost implications for the vast majority. What could be the way out for the common man?

MSS : Organic farming will be easy if the farmer has several farm animals. Crop livestock integrated production system will facilitate organic farming. The great challenges in organic farming are soil fertility replenishment and plant protection. Organic farming needs more research support than chemical farming.

The Food Security Bill is under a cloud for various reasons, chief among them being the huge toll the subsidy is likely to take on the finances of the country. Can the Bill really be implemented in spirit, even though well intentioned?

MSS : The Food Security Bill if implemented properly will be the brightest jewel in the crown of Indian democracy. My article titled "To the Hungry God is Bread", which deals with this issue will shed more light on the same (see inside).

AGRICULTURE : **P.G.Vijairaghavan**

The Agriculture Scene – Time to take stock

The Indian agricultural scene has a lot going for it by way of records; for instance, it is the world's second largest producer of food grains and has the largest food processing industry at present. With a whopping 250 mn tons of food grains in the granaries last year, India should never have had to complain of food shortages even with the growing population figures year on year. Yet, we have had the spectacle of malnourishment and farmer suicides dotting the countryside like fleas on an unsuspecting nation. There are many reasons attributed to this state of affairs, chief among them a poor distribution system that lays little emphasis on end use, but more on paper records. An IndiaToday report last year spoke about overflowing Food Corporation of India godowns with a capacity of 62 mn tons, desperately trying to handle over 65 mn tons. The result - food grains rotting in the open during the monsoon. Yet, we continue to increase our procurement targets without providing for storage space; we ban exports of foodgrains on the specious plea that the country needs the food, when the grains have no way to reach the consumer! And more importantly, there is no way to ensure that the foodgrains reach the target audience and to fix accountability for defaults in the system.

Yet, this is only one aspect of the problem. May be it is all about logistics and supply chain management – and with appropriate management help, could be tided over. Yet, the major crunch in our agricultural progress effort seems to be embedded in the reservations of the educated class to take up farming on a large scale. The reason why the educated community matters is the maturity of thought and the fruits of their learning they can bring to agriculture instead of blindly taking up ventures and technologies that may actually do more harm to the country than help – e.g. indiscriminate use of chemical fertilizers and pesticides which are playing the killing fields of various States largely due to the ignorance of the farming community. Social activists have repeatedly pointed out that the commercial interests should be subservient to the interest of the general welfare of the community that agriculture hopes to serve. The question is does excessive technology cause more harm than help our cause. Technology is a double edged sword and the trick for our scientists is to decide where it ceases to be a boon and turns into abuse and counsel our farmers accordingly. It is good that a healthy debate is going on in the country on this very crucial aspect of our effort to lift agriculture out of the traditional orthodox view to a more modern, realistic and sophisticated realm.

The share of agriculture in India's GDP growth has shown a consistent decline over the years as the following figures will testify:

Sectoral GDP growth since 1950s

Year	Agriculture	Industry	Services	GDP
1950-51	(55)	(15)	(30)	100
1960-61	(51)	(19)	(30)	100
1970-71	(44)	(23)	(33)	100
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Source: Central Statistical Organisation

Curtain Raiser

The popular belief is that the share of agriculture in the growth of the country's developing economy is likely to fall behind as industry and services pick up, yet the virtually stagnant per capital income in the rural workforce is a cause for worry for our planners. But then, it is not just about share in GDP. The growth in agriculture has also not been steady over the years, and has actually been negative for some time even after 2000. Also, there is very little migration of labour from agriculture to other sectors of the economy which too requires to be explained and attended to.

The issues confronting our policy makers with regard to agriculture are many – the management of water resources for farming, the use of genetically modified seeds for improving productivity and the heated controversies around it; the need and advisability of corporate getting into farming are but just a few. We believe that with a 15% participation in our growth story, agriculture needed to be brought to the discussion table by Tapasya with the country's best players in the segments making up agriculture participating in it. Agriculture is too vast a subject to be discussed in the pages of one issue of Tapasya and we would be only too willing to agree that what we have attempted in the following pages is but a peek into a world that is our bread and butter, quite literally. There are any number of other segments of agriculture which too need discussion, and the issues equally disparate. Yet Tapasya's effort is to set the ball rolling and hope the readership will consider and ventilate their opinions on the way to go for Indian agriculture to well and truly become the granary of the world.

Do you know the difference between education and experience? Education is when you read the fine print; experience is what you get when you don't.

– Pete Seeger

Agriculture Factfile

India is the second-largest producer of food in the world and holds the potential of being the biggest on global food and agriculture canvas, according to a Corporate Catalyst India (CCI) survey. The food processing industry is one of the largest in India in terms of production, consumption, export and expected growth. The Indian food industry is projected to reach US$ 300 billion by 2015.

Agriculture including allied activities, accounted for 14.5 per cent of gross domestic product (GDP) at 2004-05 prices in 2010-11. The sector is critical from the income distribution perspective as it accounted for about 58 per cent employment in the country according to Census 2001. In terms of composition, out of the total share of 14.5 per cent that agriculture and allied sectors had in GDP in 2010-11, agriculture alone accounted for 12.3 per cent, followed by forestry and logging at 1.4 per cent and fishing at 0.7 per cent.

The average annual growth in agriculture and allied sectors realised during the first four years of the Eleventh Plan Period, i.e. 2007-08 to 2010-11, is 3.5 per cent.

Market Dynamics

As per the second Advance Estimates, production of foodgrains during 2011-12 is estimated at an all time record level of 250.42 million tonnes (MT) which is a significant achievement mainly due to increase in the production of rice and wheat. Rice witnessed production of around 95.98 MT, Coarse cereals of 43.68 MT, Pulses of 18.24 MT and Sugarcane of 342.38 MT, during 2010-11, according to data released by the Department of Agriculture and Cooperation.

Sugar output in India grew 13 per cent in October 2011-March 2012, to touch 23.2 MT as compared to 20.45 MT in the same period last year, according to the Indian Sugar Mills Association (ISMA).

India is among 15 leading exporters of agricultural products in the world. As per the International Trade Statistics 2011, published by the World Trade Organization (WTO), India's agricultural exports amounted to US$ 23.2 billion with a 1.7 per cent share of world trade in agriculture in 2010. On the other hand, India's agricultural imports amounted to US $ 17.5 billion with a 1.2 per cent share of world trade in agriculture in 2010.

Exports of agricultural products are expected to cross US$ 22 billion mark by 2014 and account for 5 per cent of the world's agriculture exports, according to the Agricultural and Processed Food Products Export Development Authority (APEDA).

India has emerged as world's top rice exporter overtaking traditional leaders, Vietnam and Thailand. India's total rice export in 2011-12 is expected to be 6.5-7 MT, which is around 7 per cent of the country's total production.

Further, cotton yarn exports have increased by 15 per cent during 2011-12, due to rising demand in the foreign markets. During the last financial year, 872.68 million kg of cotton yarn were exported, as compared to 720 million kg in 2010-11, according to the data compiled by the Directorate General of Foreign Trade (DGFT).

Meanwhile, oilmeal exports from the country has registered 8 per cent growth in volume and touched a figure of 5.5 MT in the financial year 2011-12 as compared to 5.1 MT in 2010-11.

Sympathy is what one girl offers in exchange for details

- Howard Ogden

Amalgamated Plantations Pvt. Ltd. (APPL) perspective on Agriculture

Prabir Banerjea, Chief Operating Officer - Agri Business, Amalgamated Plantations Pvt. Ltd., Kolkata.

With over 20 years experience in the FMCG category in the area of sales and marketing of tobacco products, personal care and pharmaceuticals, Mr Prabir Banerjea is currently the COO of the Agri Business division of Amalgamated Plantations Pvt. Ltd. (a Tata Enterprise).

Since 2006, has been active in community linkage programmes in the areas of fisheries, organic agriculture, eco-tourism and wild life conservation projects in the North-East region, and has worked extensively with farming communities in Andhra Pradesh, Himachal Pradesh and Rajasthan, and has been a committee member on the "Environment" panel of CII's North-East branch.

Agriculture in India – Agriculture in India has an extensive background which goes back to thousands of years. Today, India ranks 2nd worldwide in farm output. Agriculture accounts for 16.67% of Gross Domestic Product of the country, directly or indirectly influencing the economic lives of half of the population of India. With a total land area of 306.04 million hectares, 142.6 million hectares (46.6%) has been reported as net cultivable area.

As per 2010 Food and Agricultural Organization (FAO) statistics, India is the world's largest producer of many fresh fruits and vegetables, milk, major spices, selected fresh meats, selected fibrous crops such as jute, several staples such as millets, and castor oil seed. India is the 2nd largest producer of wheat and rice, the world's major food staples. India is also the world's second or third largest producer of several dry fruits, agriculture-based textile raw materials, roots and tuber crops, pulses, farmed fish, eggs, coconut, sugarcane and numerous vegetables. India ranked within the world's five largest producers of over 80% of agricultural produce items, including many cash crops such as coffee and cotton, in 2010. India is also one the world's five largest producers of livestock and poultry meat, with one of the fastest growth rates, as of 2011.

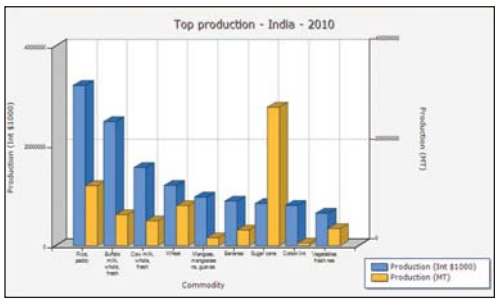

Figure: Top agricultural commodities, India-2010 (Source: FAO)

The burgeoning population has created a great pressure on agriculture sector, not only in India but worldwide. Inspite of being the largest producer of several food crops, the current food and land reserves will be insufficient to support the needs of the world 20 years hence. Adding to the issue of burgeoning population, increasing income, urbanization, and changing food habits are

the factors that put tremendous pressure on the food production sector. With limited resource of land, water; supply chain and warehouse facilities needs to be strengthened to reduce the wastage of food products.

Agriculture in North-East – Agriculture is the main occupation of people in the North-East region. The agricultural system here is predominantly traditional.

FACTOR	PROS	CONS
Uneven Terrain	• Increases the land surface area available for cultivation	• Constraint in optimum utilization of land • Difficulty in mechanization, developing infrastructure
Traditional Practices	• Organic farming, by default • Products free from any harmful chemicals, pesticides, etc. • Cost of production is low • Mainly mono-cropping done, good produce in the initial years	• Lack of knowledge for scientific agronomic practices leading to low productivity/yield • Soil fertility adversely impacted, mainly due to mono-cropping • Water harvesting/management not proper • High incidence of pest attack

The North-East region of India has diverse agro-climatic conditions, which supports varieties of life forms, thus creating diversity among the agricultural crops produced in this region. The different horticultural products from the eight sisters of North-East are –

State	Fruits	Vegetable	Spices	Others
Arunachal Pradesh	Apple, Orange, Kiwi, Walnut, Pineapple	Potato, Tomato, Cabbage	Ginger, Turmeric, Cardamom (Large)	Medical Plants, Herbs, Flower/Orchid
Assam	Banana, Coconut, Pineapple, Arecanut, Orange, Assam Lemon	Potato, Cabbage, Cauliflower	Ginger, Turmeric, Chilli	Medical Plants, Herbs, Flower
Manipur	Pineapple, Papaya, Banana, Lemon, Orange, Passion Fruit	Potato, Peas, Cauliflower, Tomato	Chilli, Turmeric	Medical Plants, Herbs, Flower
Meghalaya	Pineapple, Banana, Orange, Passion Fruit, Strawberry	Cabbage, Chow-Chow	Ginger, Chilli, Tejpat/ Bay leaves	Flowers, Orchid, Medical Plants, Herbs
Mizoram	Orange, Passion Fruit, Papaya, Grapes, Banana	Potato, Squash, Cabbage, Broccoli	Ginger, Chilli	Medical Plants, Herbs, Flower
Nagaland	Pineapple, Banana, Orange, Passion Fruit	Tapioca, Cucumber	Chilli, Ginger, Large Cardamom	Medical Plants, Herbs, Flower/Orchid
Sikkim	Orange, Passion Fruit	Cabbage, Potato	Larger Cardamom, Ginger	Medical Plants, Herbs, Flower/Orchid
Tripura	Pineapple, Mangoes, Litchi, Jackfruit, Banana	Potato	Ginger	Medical Plants, Herbs, Flower, Rubber

Amalgamated Plantations Private Limited (APPL) & Corporate Farming –

Amalgamated Plantations Private Limited (APPL – previously known as Tata Tea), a Tata Enterprise is the second largest tea producer in India and has its operations spread across 24 tea estates in Assam and West Bengal covering 24000 ha, employing approximately 30000 workers (www.amalgamatedplantations.co.in).

Teok Tea Garden, Assam

APPL has identified the demand-supply gap in major food grains across the nation, and therefore diversifying its business portfolio in other agri-business activities apart from tea, starting from the North-East region, with the aim "to become the most preferred supplier of differentiated horticultural products from the North-East in the next 5 years".

The diverse agro-climatic conditions in the North-East produces a variety of horti-crops including many rare and exotic varieties, but the lacunae across the value chain from cultivation to end consumer is preventing the region from realizing the economic and social potential that these crops offer. We understand that to overcome the major hurdles of procurement/aggregation, supply chain bottlenecks and market linkages, interventions from the organized sector would be required. This opens up a mutual beneficial opportunity both for us as well as for the community involved in it. Infusion of technology and scientific knowledge provides a platform for positive economic impacts among the local communities in terms of employment generation and sustainable wealth creation, and helps the company to expand the operations across the states to develop linkages with those communities, thus creating business opportunity.

APPL started diversifying into agri-business activities in the year 2005. During the initials years, the fallow lands of the tea gardens were utilized to access the agri-business opportunity for black pepper, floriculture, vegetables, high value timber plantation, fishery and dairy. APPL realized the potential of this opportunity and it started expanding its operations in-garden through community linked program, thereby leading to employment generation and creating a total of 152239 mandays in the year 2010-11. Presently our owned in-garden fisheries are the single largest organized producers of fresh water fish in this North-East region covering an area of approximate 150 hectares.

Employment generation and Mandays created in-garden (2010-11)

Sectors (2010-11)	Area in Ha	Mandays Created
Fishery	149	75915
Pepper	220	45741
Medical & Aromatic Plants	15	1393
Fruits and Vegetable	2	7797
Dairy and Dairy Fodder	25	17114
High Value Timber	50	4279
Contribution from Agri-business	**461**	**152239**

After realizing the potential of agri-business while operating in-garden, APPL then planned to extend to other domain of agri-business outside its gardens through community linkage programs. APPL understands that to develop the potential of agri-business in North-East, full intervention from organized sector is required. So, in addition to developing community linkages and market linkage, APPL has now started to intervene at the farm level through –

- Infusion of technology and expertise in agricultural practices
- Intervention in food processing and storage practices
- Creating institutional linkages for farmers
- Providing supply chain solutions and warehousing solutions
- Establishing national and international market linkages

Presently, APPL has engaged itself into aggregation of horticultural produces (kiwi fruit, orange, and pineapple, spices - ginger, turmeric, black cardamom and chilli) from across North-East, value addition and providing market linkages. This has helped the farmer communities of the operational area to sell their produce to a reliable party at a fair price. Also intervention by APPL at farm level has helped them to expand their operations and increase the productivity, thereby leading to employment generation and wealth creation for the farmers. The most recent activity by APPL in this regard was aggregation of "Kiwi fruit" and intervention at the farm level by bringing expertise knowledge for best agricultural practices.

Kiwi fruit – APPL launched one of the exotic citrus fruit – kiwi fruit, sourced from multiple clusters in Arunachal Pradesh under the brand name of "Indikiwi" in the modern format stores, namely Spencers, Food World and Metro Cash and Carry. This is the first time that these retail chains have stocked and sold Kiwi from the North-East, having traditionally relied on imports from New Zealand, Australia and Italy.

Kiwi farm – Ziro, Arunachal Pradesh

For spices, potential clusters for procurement has been identified across northeast and market linkages are being established for the available range of ginger, turmeric and black pepper among various marketing channels like extractors, masala industries, export houses as well as modern format stores. Specifically for black pepper, company owned plantations are expected to be among the top black pepper producers in the country in the next 5 to 6 years.

APPL's commitment to ensure fair price aggregation, subsequent value addition, marketing of horti-produce and community linked programs in the animal husbandry sector will provide sustainable livelihoods to the local communities. We are also evaluating setting up of "Food Security Zones" (FEZ) across the region in partnership with State Governments and farmer groups, and is in dialogue with "best in class" Indian and International experts for specific crops, processing opportunities and supply chain solutions to maximize yields, minimize wastages and increase earnings for the farmers. This will have a direct impact on the State of Assam as a whole through higher employment and income generation and reducing the reliance of imports from other States for local consumption.

APPL will also facilitate organic certification of farm land, not only to ensure price premiums and higher earnings for the farmers, but also to prevent and limit environmental degradation in the State. Keeping in mind the impact of use of inorganic chemicals on the environment and biodiversity, APPL has converted one of the tea estate, the Hathikuli Tea Estate, into an organic garden, which is situated in the vicinity of Kaziranga National Park, Assam. Last but not the least, APPL always aims to promote green cultivation practices and sustainable methods of farming to the communities it is linked with to ensure a sustainable growth for all.

Things are cheaper when you make more money

- Joanna Adams

To the Hungry, God is Bread

Prof. M. S. Swaminathan,
Chairman, M. S. Swaminathan Research Foundation, Chennai

The National Food Security Bill, 2011, designed to ensure legal access to food for all is the last chance for converting Gandhiji's vision of a hunger-free India into reality.

Mahatma Gandhi's articulation of the role of food in a human being's life in his speech at Naokhali, now in Bangladesh, in 1946 is the most powerful expression of the importance of making access to food a basic human right. Gandhiji also wanted that the pathway to ending hunger should be opportunities for everyone to earn their daily bread, since the process of ending hunger should not lead to the erosion of human dignity. Unfortunately, this message was forgotten after the country became independent in 1947, and Government Departments started referring to those being provided some form of social support as "beneficiaries". The designation, "beneficiary" is also being applied to the women and men who toil for 8 hours in sun and rain under the Mahatma Gandhi National Rural Employment Guarantee Programme (MGNREGA). Sixty five years after Gandhiji's Naokhali speech, we find that India is the home for the largest number of under- and malnourished children, women and men in the world. There are more persons going to bed partially hungry now, than the entire population of India in 1947.

Recent articles of P Sainath in the Hindu (September 26 and 27, 2011) bring out vividly the extent of deprivation and destitution prevalent in rural India. Rural deprivation and agrarian distress lead to the growth of urban slums and suffering. The recent submission of the Union Planning Commission to the Supreme Court on the amount needed per day per person in urban and rural India for meeting his/her needs in the areas of nutrition, education and health care (ie. ₹ 35 per person per day in Urban India and ₹ 26 in rural India) has shown how divorced this important organization has become from the real life of the poor. It is in this context that there is atleast a ray of hope in the draft National Food Security Bill, 2011 placed on the website of the Ministry of Consumer Affairs, Food and Public Distribution, now under the charge of the humanist, Prof K V Thomas. This draft will ultimately go through a Select Committee of Parliament and I hope the final version designed to make access to food a legal

right, rather than remain a token of political patronage, will help to erase India's current image as the land of the malnourished. The stated aim of the draft bill is "to provide for food and nutritional security, in human life cycle approach, by ensuring access to adequate quantity of quality food at affordable prices, for people to live a life with dignity". To realize this goal, we must ensure that every child, woman and man has physical, economic and social (in terms of gender) access to balanced diet (ie, the needed calories and protein), micronutrients (iron, iodine, zinc, Vitamin A, Vitamin B 12, etc) as well as clean drinking water, sanitation and primary health care.

A life cycle approach to food security will imply attention to the nutritional needs of a humanbeing, from conception to cremation. The most vulnerable but most neglected segment is the first 1000 days in a child's life. This covers the period from conception to the first two years in the life of the child. This is the period when much of the brain development takes place. Obviously the child during this period can be reached only through the mother. The life cycle approach to food security, hence starts with pregnant women. The high incidence of children with low birth weight (ie, less than 2.5 kg. at birth) is the result of maternal and foetal under-nutrition. Such children suffer from several handicaps in later life including impaired cognitive ability. Denying a child even at birth an opportunity for the full expression of its innate genetic potential for physical and mental development is the cruelest form of inequity. The Integrated Child Development Service (ICDS) will have to be redesigned and implemented in two time frames (0-2 and 3 to 6 years).

From the view point of legal rights, the draft bill addresses only the issue of economic access to food. The other two components of food security, namely availability of food, which is a function of production, and absorption of food in the body, which is a function of clean drinking water, sanitation and primary health care, cannot easily be made into legal entitlements. To make food for all a legal right, it will be necessary to adopt a Universal Public Distribution System (PDS) with common but differentiated entitlements with reference to the cost and quantity of food grains. The draft bill adopts the nomenclature suggested by the National Advisory Council (NAC) and divides the population into priority, ie, those who need adequate social support, and general, ie those who can afford to pay a higher price for food grains. The initial prices proposed are ₹ 3, 2 and 1 per kg for rice, wheat and millet respectively for the priority group, and 50% of the Minimum Support Price for the general group. In a Universal PDS system, both self selection and well defined exclusion criteria operated by elected local bodies will help to eliminate those who are not in need of social support for their daily bread. In fact, it is the general group that should be supporting financially the provision of highly subsidized food to the economically and socially under-privileged sections of our Society. In the case of the well-to-do, the aim of the Universal PDS should be to ensure physical access to food.

The widening of the food basket by including a wide range of nutri-cereals (normally referred to as "coarse cereals"), along with wheat and rice is a very important feature of the Food Security Bill. Nutri-cereals like bajra, ragi, jowar, maize, etc. constitute "health foods" and their inclusion in PDS, along with wheat and rice, will help to increase their production by farmers. Nutri-cereals are usually cultivated in rainfed areas and they are also more climate resilient. Hence in an era of climate change, they will play an increasingly important role in human nutrition security. During 2010-11, our farm women and men produced 86 million tonnes of wheat, 95 million tonnes of rice and 42 million tonnes of nutri-cereals or coarse cereals. The production of nutri-cereals, grown in dry farming areas, will go up if procurement and consumption go up. Thus, the addition of these grains will help to strengthen concurrently food grain availability

The two essential ingredients of success in implementing the legal right to food are political will and farmers' skill. Hence, it will be appropriate if the State level Food Security Commissions are chaired by farmers with outstanding record of successful farming.

and nutrition security.

The other components of the Bill, which do not involve legal commitments, refer to agricultural production, procurement and safe storage of grains, clean drinking water and sanitation. The temptation to provide cash instead of grains to the Priority Group should be avoided. Currency notes can be printed, but grains can be produced only by farmers, who constitute nearly two thirds of our population. Giving cash will reduce interest in procurement and safe storage. This in turn will affect production. The "Crop Holiday" declared by farmers in the East Godavari District of Andhra Pradesh is a wake up call. A Committee chaired by Dr Mohan Kanda, set up by the Government of Andhra Pradesh has pointed out that the following are some of the factors which formed the basis of the decision of a large number of farm families not to grow rice this Kharif season. First, the MSP presently offered does not cover the cost of production; the MSP fixed by the Government of India was ₹ 1080 per quintal for common varieties, while the cost of production was ₹ 1270 per quintal. Secondly, procurement is sluggish since it is largely being done by the Rice Mills. Third, late release of canal water, non-availability of credit and other essential inputs and delayed settlement of crop insurance dues are also affecting the morale and interest of farm families. Thus farmers are facing serious economic, ecological and farm management difficulties. Government should seriously consider adopting as a general policy the formula suggested by the National Commission on Farmers that MSP should be C2 plus 50% (ie, total cost of production plus 50%).

Finally, the Bill provides for the setting up of Food Security Commissions at the State and Central level. **The two essential ingredients of success in implementing the legal right to food are political will and farmers' skill.** Hence, it will be appropriate if the State level Food Security Commissions are chaired by farmers with outstanding record of successful farming. They will then help to ensure adequate food supply to feed the PDS. At the National Level, the following composition proposed by the National Commission on Farmers (NCF) in their final report submitted in October, 2006 would help to ensure adequate political will and oversight. NCF's suggestion was to set up a National Food Security and Sovereignty Board at the central level, with the Prime Minister as Chair. The other Members could be the concerned Ministers of the Central Government, Leaders of Political Parties in Parliament, a few Chief Ministers of surplus and deficit States and a few leading farmers and experts. Unless we develop and introduce methods of ensuring effective political and farmers' participation in implementing successfully the Food Security Bill, we will not be able to overcome the problems currently faced by PDS at some places arising from corruption in the distribution of entitlements.

The National Food Security Bill, 2011, provides the last chance for making a frontal attack on poverty-induced hunger and for realizing Mahatma Gandhi's desire that the God of Bread should be present in every home and hut in our country. We should not miss this opportunity.

The Democrats are the party that says government will make you smarter, taller, richer and weed your lawn. The Republicans are the party that says government doesn't work, and then they get elected and prove it.

– P. J. O'Rourke

Indian Sericulture: Tradition With A Future

Dr. S. M. H. Qadri
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Mysore

Silk is one of the oldest fibres known to man and remains as the most sought-after natural fibre, the world over. With its unparalleled grandeur, the silk fabric has reigned as the undisputed 'Queen of Textiles' over the centuries. Luxury, elegance, class, natural sheen, inherent affinity for dyes and rich colors, light weight, poor heat conduction, resilience and excellent drape are some of its irresistibly endearing qualities. In India, silk is considered to be a holy fibre from time immemorial, as commonly religious ceremonies are not complete without the use of silk.

There are five major types of silk of commercial importance namely, Mulberry, Tasar, Oak Tasar, Eri and Muga, which are obtained from different species of silkworms. Over 95% commercial silk produced in the world comes from Mulberry and often silk generally refers to Mulberry silk. India has the unique distinction of being the only country in the world, which cultures all the five known commercial varieties of silk.

Sericulture

Rearing of silkworms for the production of silk is called sericulture. The major activities, which sericulture comprises are (i) food-plant cultivation to produce leaf; (ii) rearing of silkworm to produce silk cocoons; and (iii) reeling of the cocoons for unwinding the silk filament for value added benefits such as processing and weaving. In addition, a portion of cocoons of desired breed is diverted for the production of silkworm eggs, which is a pre-requisite for the silkworm rearing. Sericulture industry is an age-old industry with a long tradition in India. The very nature of this industry with its rural based on-farm and off-farm activities and enormous employment generation potential has attracted the attention of the planners and policy makers to recognize the industry among one of the most appropriate avenues for socio-economic development of a largely agrarian economy like India. Sericulture industry provides employment to approximately 6.8 million persons spread over in some 59,000

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Apart from his experience in administration in Government service Dr. Qadri has an excellent research and academic record and handled many research projects funded by Central Silk Board, extra mural agencies like DBT and DST and foreign agency like JICA, Japan especially on many new diseases of onion, garlic, safflower etc. He has been instrumental in development of a number of sericulture technologies and has six patents (either granted or filed) to his credit. With more than 300 research/technical papers, to his credit published in various national and international journals of UK, France, USA, Netherlands, Bangladesh, Korea and Japan etc., besides a number of popular articles, his research works have been appreciated at home as well as abroad by USDA Washington, USA. He has also written ten books including a sericulture guide for farmers. He is a recipient of Indira Gandhi Priya Darshini Award 2010 and was also awarded by the Govt. of Tamil Nadu, Govt. of Maharashtra and Silk Society of India for his outstanding contribution in sericulture.

villages across the country, most of them being small and marginal farmers, or tiny and household industry mainly in the hand reeling and hand weaving sectors. It is estimated that about 11 persons get employment round the year to produce 1 kg of raw silk.

Present Status of Sericulture in India

India ranks second in the world in the production of Mulberry and Tasar silks, the golden yellow Muga silk is endemically Indian. The total annual production of raw silk in India during 2010-11 was 20,410 MT, of which mulberry raw silk output aggregated to about 16,360 MT (Table 1). The remaining 4,048 MT of total production consisted of non-mulberry (Tasar, Eri and Muga) silks. Mulberry sericulture is practiced mainly in five states namely, Karnataka, Andhra Pradesh, West Bengal, Tamil Nadu and Jammu & Kashmir, which collectively account for about 98% of the total Mulberry silk production in the country.

Table: 1. Details of raw silk production in India during 2010-11

Sr. No.	Type of silk	Quantity of production (MT)
1	Mulberry	16360
2	Tasar	1166
3	Eri	2760
4	Muga	124
Total		**20410**

Jharkhand and Chhattisgarh states are the leading producers of Tasar silk in the country followed by Odisha and Andhra Pradesh. Assam has, however, been occupying the top position in Muga as well as Eri silk production. Manipur is the second largest producer of Eri silk followed by Meghalaya and Nagaland. Meghalaya and Arunachal Pradesh also produce Muga silk in appreciable quantities.

Present scenario of sericulture industry in India

It is a matter of pride that we are the largest consumer of raw silk in the world, as India has a huge domestic market for silk sarees. As the domestic production does not suffice the industry needs, India imported 5,870 MT of raw silk and 3,780 MT of silk fabrics during 2010-11 and also emerged as the largest importer of raw silk. Around 85% of the silk produced is consumed with in the country. Its share in the international silk trade is just eight per cent occupying fourth position in the exports of silk goods.

About 92% of the silk produced in the country is produced from the cross between multivoltine and bivoltine silkworm races, which are less in quality to meet the international standards and cannot be used in high-speed power looms. Bivoltine silkworms, which are of temperate origin, excel in quality and productivity. Therefore, Central Silk Board has been taking various measures to produce and popularize bivoltine silk in India in coordination with State Sericulture Departments so as to improve the quality and productivity of Indian silk. With the new bivoltine silkworm hybrids and their rearing package of practices developed by Central Sericultural Research and Training Institute (CSRTI), Mysore production of internationally acceptable quality silk in India is a reality now. In the last one decade, a considerable progress was made in promotion of bivoltine sericulture in the country due to the efforts put by Central Silk Board with the support of State Governments through Japan International Cooperation Agency (JICA) assisted projects, Institute Village Linkage Programme (IVLP) and Cluster Promotion Programme (CPP). The bivoltine silk production occupies around 8.56% of the total Mulberry silk production in the country and it increased from 840 MT in 2001-02 to 1,400 MT in 2010-11. Tamil Nadu recorded a stupendous annual compound growth rate of 47.19% and emerged as the leader in the bivoltine silk production in India.

Trends in production, productivity and quality of Mulberry silk produced

Sericulture grew leaps and bounds after the thrust given by the Government of India for sericulture research in the earlier part of 1960s. It can be inferred from the Table 1 that the Mulberry area increased steadily from around 83,000 ha in 1960-61 to 3,42,728 ha in 1992-93, but there was decline in the mulberry area in the ensuing years and so reduced to 1,70,314 ha during 2010-11. The raw silk yarn production was stagnant and was hovering around 2,000 MT in sixties and seventies. But silk production increased considerably in the eighties and reached 11,487 MT in 1990-91. The growth rate of raw silk production reduced in the later part of the last decade due to the reduction in mulberry area, but still there was improvement in the silk production due to increased productivity and so the silk production reached to 16,360 MT in 2010-11.

Table 2: Trends in mulberry silk production and productivity during the last 5 decades

Particulars	1960-61	1970-71	1980-81	1990-91	2000-01	2010-11	ACGR (%)
Mulberry area (ha)	83000	05118	70061	313109	215921	170314	1.32**
Mulberry cocoon production (MT)	18818	34255	55890	110433	128181	130714	3.85**
Raw silk production (MT)	1185	2319	4593	11487	14617	16360	5.76**
Raw silk production/ ha (kg)	14.28	22.06	27.01	36.69	67.70	96.06	4.39**
Renditta*	16.80	14.80	12.20	9.61	8.80	7.99	-1.81**

Note: Renditta means the quantity of cocoon required to produce one kg raw silk.

The improvement in productivity was due to the replacement of age-old low yielding local mulberry varieties and pure local multivoltine silkworm breeds with high yielding Mulberry varieties like V1, S36, S13 etc and cross breed and bivoltine silkworm hybrids such as PM x CSR2, CSR2 x CSR4, double hybrid etc along with adoption improved practices for Mulberry cultivation and silkworm rearing in the field through the joint efforts of R&D Institutes of Central Silk Board particularly CSRTI, Mysore and others along with respective State Sericulture Departments. The export of silk goods steadily increased from a modest level of ₹ 17 million in 1960-61 to a whopping ₹ 333.84 million during 2006-07 but reduced to ₹ 270.80 million in 2010-11 due to the global economic recession.

Though the Indian silk industry has progressed steadily in the last five decades, there is almost stagnation in the production of Mulberry raw silk ranging between 14,000 and 15,000 MT since last few years, which is a matter of concern. The area under Mulberry cultivation has decreased by almost 20 % during the last one decade. The area under Mulberry plantation declined from 2,15,921 ha in 2000-01 to 170314 ha in 2010-11. Rapid urbanization in the sericulture belts, increase in input costs, labour problems and changing cropping pattern are the major factors attributing for decline in area under mulberry in the country. It is evident from Fig. 1 that though the area under sericulture has fallen significantly, the productivity levels have been steadily improving, which supports the sustainable silk production in the country.

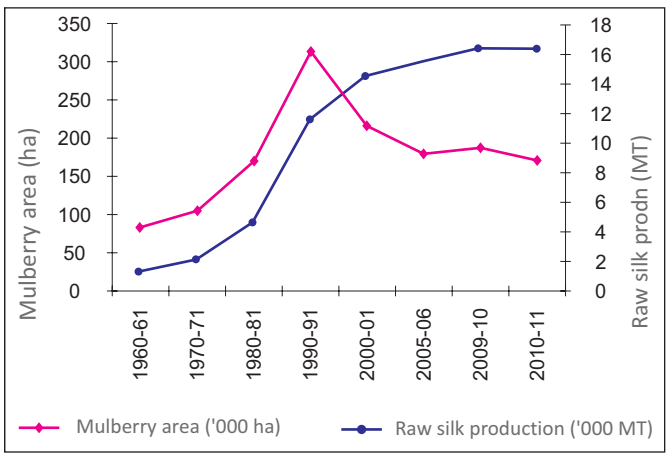

Fig. 1 : Growth in Mulberry area and raw silk production in India

Business opportunities in sericulture

Sericulture industry has turned from simple traditional industry to the modern to a vibrant enterprise due to the improved technologies generated and popularized in the field. Due to a wide demand and supply gaps and ever growing export opportunities, the silk industry has a bright future. Sericulture is now no longer an enterprise meant for small and medium sized farmers to meet their livelihood. Now considering the profitability generated from sericulture, many educated youths and professionals of varied interest like engineers, doctors, lawyers, etc are venturing into sericulture as a diversification of their activities.

The globalization of our economy has made the corporate sector to look for diversification as an essential means of growth. In search for

areas where Indian products could remain competitive in the global context has made the corporate to look towards agro-based products and textiles. Sericulture has the following inherent advantages, which can attract the interest of business houses:

1. Huge domestic market for silk: The industry is not dependent on export. About 85% of the silk produced in India is consumed within the country. Still there is a wide demand-supply gap existing in silk. Silk is income elastic and with general economic growth of the country, the domestic demand for silk is only likely to grow. Hence, there is a lot of growth prospects in the sericulture industry.

2. Potential international market: There are enormous export opportunities for India to encash in silk. Silk being a natural and luxury fibre with a lot of positive properties is liked by the affluent people of western countries. As silk garment production activities like weaving, printing, garment manufacturing are shifting from the traditional silk processing centres in Europe to Asian countries owing to high labour costs, India could benefit from this process.

3. Technology package: The new bivoltine hybrids and technology packages evolved by the research institutes of Central Silk Board like CSRTI, Mysore have proved with the farmers that it is possible to produce internationally acceptable quality silk in India.

4. Backward and forward linkages: Silk is a long chain industry involving different sectors from silkworm seed production to fabric and garment production. Hence, the corporates can increase the value addition by involving in various activities directly or through contract farming with the farmers.

Product diversification in sericulture – A potential area for research and business opportunities

Traditionally silk is used for making fabrics. But now many value added products, which have non-conventional uses, are tried out of mulberry and silkworm and are used in other than sericulture industry. Mulberry leaf in addition to serving as food source to silkworms has many medicinal properties besides yielding delicious fruits. Spoorthi, a processed powder prepared from quality Mulberry leaves, was found effective in controlling diabetes, hypertension, reducing gastric problem and constipation and revitalizing the body as an energy source. Many products which can have applications in pharmaceutical, cosmetics, chemical and food industries are currently being explored. In this line, CSRTI, Mysore has developed many products and processes such as silkworm powder, silkworm pupae as human food, pupae powder, induction of colour to fibroin, extraction procedure for fibroin, extraction procedure for sericin and extraction of sericin from sericin rich cocoons and applied for patenting. These will open up new avenues of product diversification and value addition once commercialized.

Still many areas are required to be explored by the Indian researchers, as there are reports of many useful by-products/

value added materials from China, Japan, Korea etc., but the relevant research in India is mostly at laboratory levels. Silkworm larvae have been reported as a possible source of adipokinetic hormone (AKH), chymotrypsin inhibitors, ß-N-acetylglucosaminidase, sex pheromone bombykol, amino acids, etc., apart from their value as health food especially for cardiac and diabetic patients, bronchial asthma, primary trigeminal neuralgia, vocal nodules, polyps and in the treatment of facial palsy and pain. Silkworms can be used as food supplements in health due to its high value protein. The product can be made available in the form of powder, pill, granules and drink. These products can be used in functional research and in pharmaceutical industry. The silkworm larval powder is most importantly utilized as a blood glucose-lowering agent or anti diabetic agent. Further, it can also be used as anti-aging and anti-hypertension agent.

Pupae are a source of proteins, vitamin B1, B2 and E, diapause hormone, amino acids, etc., and form a part of antibacterial and antihistaminic preparations. Lysine, chitin and chitosan can be extracted from pupae. Pupae when processed yield oil from which soap and plasticisers can be made. Sericin refined from cocoon/silk contains 18 amino acids besides 8 essential amino acids which are necessary for human body. It is an excellent protein, antioxidant, coagulant, chemo protective and nutrient supplement. Sericin can also be used as raw material for manufacturing moisturizing creams and lotions in cosmetics because of its high moisture absorption and preservative ability.

Silk proteins and amino acids provide intense moisture to the skin. Silk products are used in cosmetics such as skin care product, which contain sericin. Silk amino acids are used to prevent dehydration and mostly found in eye rejuvenation gels and creams. It is the most advanced unique nutritive material for skin and hair care.

Conclusions

Sericulture industry throws up a lot of opportunities for entrepreneurs because of its profitability, opportunities for value addition in different levels of production and increasing demand for silk in the domestic and international markets. As the corporate houses have professional knowledge, capacity for large investment and ability to mobilize resources, they can support the Government to achieve silky revolution in India.

Experience is a comb that Nature gives you when you are bald

– Thai proverb

Spices Sector Promising Better Opportunities...

Dr A. Jayathilak, IAS
Chairman, Spices Board India

Dr. Jayathilak ,I A S is the Chairman, Spices Board and has already made a mark with a number of pathbreaking achievements in the current position. He has also held several important positions from Secretary, Agriculture Dept, Government of Kerala and Member of Spices Board as nominee of Government of Kerala to Managing Director, Kerala Tourism Development Board, and has won numerous awards and recognition at State and Central level.

Quizzing and pistol shooting are two of his favourite pastimes and has won Tournaments like the Quiz Time and International Quiz at Islamabad.

Agriculture enjoys a prominent role in the lives of people all over the world. For many years the field of agriculture remained an area which was often taken for granted. Today's younger generations have finally realized the potential of the sector and their willingness to take risks brings in rays of hope to the sector which was on the verge of sinking. The immense business opportunities in the spices sector drives the youth to leave the white collar jobs for a life entwined with nature and plants. Moreover people are concerned about health and safety and overall food security. The younger generation of the present era believes in the ability of agriculture to meet their ever growing needs and the increasing participation of the youth in the sector is a testimony for this.

The spices have come out from the four walls of a kitchen and have traveled millions of miles from being merely a condiment meant for spicing up food to areas that are beyond human comprehension. Thus spices have an important role to play in different places on different occasions. The climatic condition of our country adds to the advantage. It aids the growth of different spices at different regions of the country. These benefits transcend the borders of the country and are made the most use of in foreign lands.

If one considers India's history, spice is a name that cannot be dispensed with. It has been there in man's life throughout and even one day cannot be spent without using spice in one form or the other. India has always been the dream destination of daring adventurers all over the world. In search of spices, foreigners flowed into the Indian soil and condition remains unscathed even today. Spices give zest and variety to lives and there are numerous applications that the spices sector ventures into. In ancient times the spices were valued as ingredients of incense, embalming preservatives, ointments, perfumes, antidotes, cosmetics and medicines. As time passed by the spices settled on being a condiment exclusively for culinary purpose but the scenario changes over the past 25 years. Taking hue from the bygone days at present spices enjoy the unique position of being one of the fairly good foreign exchange earner for the country. India is the largest producer, consumer and exporter of spices in the world. With a lot of medicinal, nutritional, dietary,

culinary, nutraceutical and pharmaceutical applications, the spices sector remains an area full of opportunities to be explored by the coming generations.

India, the spice bowl of the world produces a wide variety of spices like pepper, cardamom, chilli, nutmeg, mace, ginger, garlic, turmeric, tamarind, seed spices as well as herbal spices. Out of the 109 spices listed, India produces 75 spices and the spices export from the country together reaches almost 50 percent of the spice produces round the globe.

Though the industry is up for a flourish, there are issues that need to be reckoned with. The non-availability of the produce to meet the demand is one such issue. The spices produced in the country must be adequate enough to meet the growing demands of the domestic as well as the international market. Out of the total spices produced in the country, 90 percent is used for domestic consumption and only 10 percent is exported. But the 10 percent exported is accountable for almost 50 percent of the total spices produced all over the globe. Hence it is of vital importance that the spices produced are of top quality. The idea of sustainability, traceability and food safety comes in handy at this stage. The products must be available on a sustainable basis which could be enough for the domestic consumption as well as for the export. The exported products should be free of any contaminants or pesticides. This is possible only if the farmers are made aware of the issues. To trace and reach at the crux of the matter needs patience as well as perseverance. Today people are much more mindful of their health issues, woes and worries. They are not ready to take risks when it comes to their health. As the age old proverb goes, health is wealth, and people seems to stick on to it.

Apart from adding colour, flavour and taste, consumption of spices provides infinite health benefits. Spices can even be a substitute for the costly cosmetics that are normally used. The therapeutic values of spices were not given its due respect in shores other than India. But now is the time to retrospect and recognize the importance that our forefathers had given for spices. Hardly a few households could be seen without spice kits with curative powers. This power of spices had been well put to use in the recent times. In an age where people no longer have time to spare and are madly in rush, the value added products of Spice like nutraceuticals benefit immensely. A number of companies are sprouting up realizing this opportunity which has much scope for development. Nutraceuticals is an area where a lot of research needs to be done. There are a million other use in case of spice and it is just about identifying those and the rational use of it can take to new dimensions. It opens up a career for youth which is both challenging and exciting.

The importance of Spices Board India gains vital importance at this juncture. The Board which works as the nodal body for the development and world wide promotion of Indian spices is responsible for upholding

Timely intervention and advice will aid the farmers and this can boost the economy. Campaigns conducted in various parts of the country on good agricultural practices, integrated pest managements and organic mode of cultivation enlighten the cultivators and show them improved ways of crop growing.

Indian name around the globe. The multifarious activities by the Board help to further boost up the economy. The Board which has completed 25 years of existence tries to reach out to people to make them aware of the unique qualities of Indian spices and its various value added products. It has been a privilege for the Spices Board to be a part of this venture and spearheads activities of excellence for the promotion of spices keeping up with the pace and technology. There is a need to educate the farmers who are basically the key factor in the success of this sector. Timely intervention and advice will aid the farmers and this can boost the economy. Campaigns conducted in various parts of the country on good agricultural practices, integrated pest managements and organic mode of cultivation enlighten the cultivators and show them improved ways of crop growing. The Board also looks into the fact that farmers get fair prices and reasonable margins.

The various activities of the Board includes the promotion of exports of spices and spice products, maintenance and monitoring of quality of exports, development and implementation of better production methods, through scientific, technological and economic research, guidance to farmers on getting higher and better quality yields through scientific agricultural practices, provision of financial and material support to growers, encouraging organic production and export of spices, facilitating infrastructure for processing and value addition, registration and licensing of all spice exporters, assistance for studies and research on better processing practices, foolproof quality management systems, improved grading methods and effective packaging techniques, production of promotional and educative materials in a variety of media for the benefit of exporters and importers etc.

The Spices Parks now being built are for facilitating processing and value addition of Spices and Spice products in the growing areas at par with the international standards. The basic objective is to provide common infrastructure facilities for both post harvest and processing operations of spices and spice products, which also aims at backward integration by providing rural employment. Spices Parks have become operational in Chhindwara in Madhya Pradesh, Puttady in Kerala and Jodhpur in Rajasthan. Construction of Parks in Guntur in Andhra Pradesh, Sivaganga in Tamil Nadu, Guna in Madhya Pradesh and Ramganj Mandi near Kota in Rajasthan are in full stream. A network of quality evaluation laboratories in the major growing areas and ports have been established. Quality laboratories are now operational in Cochin, Tuticorin, Chennai, Guntur, Mumbai and new ones are coming up in Delhi, Kolkata and Kandla. The Laboratories are equipped with the state-of-the-art equipments and manned by trained personnel who are assigned the job of preshipment analysis of spices and spices products.

Serving the palates of billions around the world the saga of spices continues. As a career option the spices sector will beat any other business for the simple reason of its mounting demand both in the domestic as well as international trade. Even if there is a fall in price of spices in the international arena, the demand in the domestic market is more than enough to keep it upbeat. Moreover the use of spices for culinary purpose has increased manifold in regions where it was not traditionally used. The demand for spicy Indian food, Thai food, Chinese food in the international arena testifies this fact. It is sure that there will be absolutely no regrets once you are into the field.

Some are born great, some achieve greatness, and some hire PR officers.

– Daniel J. Boorstin

Spices Tourism : A Rising Hortitourism Industry in India

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Dr. Suresh Kumar Malhotra is an MSc (Ag.) Horticulture from GBPUA&T, Pantnagar, 1986 and Ph. D. from CCS, Haryana Agricultural University, Hisar. joined ICAR as Senior Scientist (Horticulture) at newly established NRC on Seed Spices, Ajmer (Rajasthan) and became Principal Scientist in the year 2007. Presently, he is Principal Scientist in Horticulture Division at ICAR HQ, New Delhi. He has contributed immensely not only for research but also for infrastructure development at NRC Seed Spices. He has been member of sub-group of horticulture and plantation crops of XII Plan Working Groups of horticulture constituted by Planning Commission. Dr. Malhotra has been a prolific writer of research papers, popular articles, books, manuals/bulletins etc. his association in various professional societies in various capacities has been notable. His contribution in research and development of spices has earned him recognition and awards in plenty such as PNASF, Young Scientist Gold Medal Award-2005; H.S. Mehta award, 2011, J.S. Pruthi Award-2010, NRCSS Scientist of the Year-2008, Hi-Tech Hort. Society-Scientist of the Year-2010 award, Best Paper Award in World Aqua Congress-2009; He is widely travelled in India and has been visiting scientist at Taiwan Agriculture Research Institute, Fengshan, Taiwan and Cornell University, Ithaca, USA.

India is blessed with several places which fascinate the tourist and have become points of attraction for them, combination of various activities which may exist around the hill or valley or lake or forest or sea or river with opportunity for nature photography, bird watching, boating in lake, farm walking, wild flower walks, water rafting etc. Such activities are generally based around ecology and have been popularly termed as ecotourism, which is the combination of two words ecology and tourism. With the increasing urban density a large group of population has delineated from nature may be because of busy life, lost backyards, limited access to parks and consequently environment deprivation takes toll on people's capacity to live good quality life. There has been observed shortage of physical activity, fresh air, sunlight, smell of plants and forests and as a result many health problems are seen. It has been proved that living close to nature reduces stress and carbon sequestration by plants also cleans the air. In addition to relieving stresses, exposure to greenery is expected to enhance productivity. In this context recognizing the crops having aesthetic values assumes much greater significance in health care. Realizing the importance, tourism developed with the objective to have outing to bring change in life, mood and refreshing our self to lead happy and productive life. Just as a part of ecotourism, when a farm area is conserved in its natural state for tourists to visit and experience various types of on farm activities have been coined as farm tourism and when horticultural crops become the major component then it is called as horti-tourism.

What is horti-tourism?

It is unique character of horticulture farm where cultivation of fruits, vegetables, plantation crops, flowers, medicinal and aromatic plants or spices have been taken up and combined with tourism to generate an income that is not only profitable, but can provide an income during adverse agro-climatic conditions such as drought, crop failure or unprofitable market prices. In the system of horti-tourism, varied crops can be grown singly or in mix, which provide unique opportunity to provide services to tourists. Horticulture farms which perform a wide range of tasks can have the advantage of attracting large number of tourists. The most successful horti-tourism place is where the

facility is generally the quality facilities which offer something new and different, when compared with other places. Medicinal and aromatic crops or organic fruits or vegetables or spices offer the best option as component crops, which are potentially quality rich in neutraceutical values as a part of nature care and nature cure.

Horti-business a unique opportunity

This sort of farm tourism provides a unique opportunity for tourists because such horticulture farms are located in the areas where facilities for tourists are limited than they are in cities. Such farms are close to nature where tourists can experience things which are different to their normal living. In addition to exhibition of farm activities, horti farm could offer services to tourists in one or several areas such as food service, accommodation, gift shops, open gardens, rides, fishes, hunting, boating, etc. All farm tourism enterprises shall require basic facilities for public convenience, car parking, drinking water, toilet, shelter points.

Spices also fit in farm tourism

India is known for production of wide range of spices crops and offers world with more than 63 kinds of spices ranging from wet land areas to arid land provinces. Some of the economically important spices are chillies, black pepper, ginger, turmeric, cardamom, coriander, cumin, fennel, fenugreek, ajwan, dill, cloves, nutmeg, cinnamon, saffron, vanilla etc. The increasing trend towards eating ethnic or oriental foods in the developed countries and the increasing affluence of consumers in Asian and Latin American and Middle Eastern developing countries have lead to the increase in world spices consumption. As a result, the world import of spices recorded a 6% annual growth rate during the last decade. This increase in world spice consumption holds good promise in the coming years for the spice industry both in domestic as well as international trade. The emphasis has been shifting from traditional to market driven cultivation with focus on high quality.

Spices play a pivotal role in the day-to-day life of mankind as important flavouring agents in foods, beverages and pharmaceuticals and also as ingredients in perfumes and cosmetics. The manufacturers of food items, beverages, cosmetics and pharmaceuticals are responding to the growing wave of consumer resistance and legislative limitations set for products containing chemical additives. Spices are source of natural colours and flavours present welcome opportunities to meet the growing demand for the indigenous and exotic market. The nutritional, antioxidants, antimicrobial and inherent medicinal properties of spices also have widespread applications.

India holds near monopoly in value addition and value added products in spices (Table 1). Spice oil and oleoresins, dehydrated green pepper, pepper in brine, freeze dried pepper, frozen pepper, spice whole or powdered forms in consumer packs, ground spice mixture and pre-mixed seasoning are few products from India which are much valued abroad. India meets 70 percent of the world demand of spices oils and oleoresins at present.

Table 1. List of value added products from spices

Spices	Product
Black pepper	Oil, oleoresin, green pepper in brine, dehydrated green pepper, freeze dried green pepper, frozen green pepper, white pepper, ground pepper, organic pepper, sterilized pepper, canned tender green pepper, encapsulated pepper.
Cardamom (large)	Oil, oleoresin
Cardamom (small)	Oil, oleoresin, green cardamom
Chillies	Chilli powder (pungent & non-pungent), green chilli in brine, canned green chilli, chilli paste, pickles, capsicum oil and oleoresins, natural pigments
Turmeric	Dehydrated turmeric powder, natural pigments, curcuminoids, oils, oleoresin, encapsulated oil
Ginger	Oil, oleoresin, candy, preserves, various forms of ginger powder, ginger brandy, wine, beer, medicinal beverages encapsulated ginger oil, dehydrated ginger
Fennel	Fennel powder, sugar coated fennel whole seed, organic fennel, fennel brandy, wine and beer, medicinal beverages, fennel sip, oil and oleoresins
Fenugreek	Fenugreek powder, organic fenugreek, dried fenugreek leaves
Coriander	Coriander powder, organic coriander, dried coriander leaves, oil and oleoresins
Cumin	Cumin powder, medicinal beverages, cumin sips, organic cumin, oil and oleoresins

Spices tourism, why?

There could be several reasons that why spices can become part of horti-tourism. Spices because of inherent benefits of adding agreeable flavor to food and also providing medicinal benefits, are the important component of food preparations in every household. The tourist who is consumer of spices also shall wish to experience a real farm where they can see crops growing and feel the spicy flavor in the air. People may choose to stay on farm rather than other accommodation, because of the uniqueness of the experience. Besides, tourists get opportunity to interact about farm experience with a contrast to urban lifestyle. Several spices products offer the opportunity to tourists to sample the product and then purchase. Extra income can be generated by selling the farm fresh spices and other horticulture commodities. The spices and spice products grown or processed on the farm are generally fresh and unique when compared to any retail outlet or supermarket. If realistic prices are offered, a farm shop can be very profitable. Besides spices several other horticultural produce such as fruits, vegetables, medicinal and aromatic plants, herbs, preserves can also be offered. An attractive gift packs of such horticulture produce shall be best option for the tourists to offer noval gifts packs to relatives or friends. An open spice garden in combination with floriculture and landscape will make the farm special in some way if this is to work through. It can be achieved by creating artistic features of theme gardens. The spice farm can play an important role in enriching the knowledge of visitors by making provision of spice museum, spice café, spice gift shop and spices fair.

Potential states with spices tourism

The spices plantations are one of the most fascinating tourist attractions in few states. The Western Ghats in Goa are ideal for growing spices such as nutmeg, chillies, pepper etc. Spice plantations in Goa are known as spice farms and are very popular tourist destination, where tourists get close to nature, and breathe in the sharp essence and fragrances of fresh spices. Spices have been integral part of Kerala history. Black pepper, nutmeg, cardamom, cinnamon, ginger, turmeric, clove are the main spices grown in Kerala state which has taken spices tourism on a mega scale. The tourists are provided knowledge about the spice gardens, cultivation, processing practices, grading methods, packaging and quality maintenance system. Anakkara spices tourism in Idukki district is one of the successful and most liked place in farm tourism industry, which is the home of wide range of spices and plantation crops. Maharashtra, Karnataka and Tamil Nadu are the states where there is large scope and great potential to develop horti-tourism because these states are the major producer of fruit, spices, and medicinal and aromatic crops. North East part of India has potential for growing large number of horticultural crops and horti-tourism is picking up in this area. The higher hills in J&K, Himachal Pradesh and Uttaranchal are unique states for growing saffron a golden spice. The arid to semi-arid region spreading from Gujarat and Rajasthan also offer opportunities for spices tourisms particularly for cumin, fennel and kasuri type of fenugreek.

Spices because of inherent benefits of adding agreeable flavor to food and also providing medicinal benefits, are the important component of food preparations in every household. The tourist who is consumer of spices also shall wish to experience a real farm where they can see crops growing and feel the spicy flavor in the air.

It will thus be seen that spice cultivation, tourism and trade, offers a wonderful opportunity for entrepreneurs to explore the prospects of doing business in this area,, and also in sharing the fruits of a bountiful nature with the rest of the country.

A Government that robs Peter to pay Paul can always depend on the support of Paul

- George Bernard Shaw

Farm Mechanisation Moves Agriculture Forward

Dr Madan Mohan Pandey,
Deputy Director General (Engg), ICAR

Dr Madan Mohan Pandey graduated with B. Tech (Hons) from the Indian Institute of Technology, Kharagpur in Agricultural Engineering obtained his Masters (in 1978) and Doctorate (in 1990) from the same institution. He is currently serving as the Deputy Director General (Engineering) in the Indian Council of Agricultural Research, New Delhi.

After being selected for the Agricultural Research Service of ICAR in 1976, he began his career as Scientist at IARI, New Delhi and has served in various capacities in the institutions under ICAR before his present posting.

His publications number over 120 comprising of contributions to International and Indian Journals and also books/chapters and others. His innovations have been many among them, the three point linkage force dynamometer, Naveen sickle, Animal loading car, Loading device for power tillers, etc.

He has found recognition for his contribution to agricultural engineering through memberships of prestigious organisations internationally. Among the awards conferred on him are the Jawaharlal Nehru Award for best Ph.D. thesis by ICAR (1991), Jyoti Award for design and development of vertical conveyor reaper windrower (1982-83), Fellow of ISAE (2002), and many more. He has been nominated as Chairman, Peer Review Committee for Agricultural and Food Engineering Department of IIT, Kharagpur. The Institution of Engineers (India), conferred on him the award of "Distinguished Engineer of the Year-2010".

He is presently the Chairman of Governing Council of UNAPCAEM.

Mechanization has been identified as one of the critical inputs for production agriculture. It may be described as an appropriate package of technology to (i) ensure timely field operations to increase productivity, reduce crop losses and improve produce quality, (ii) increase land utilization and input-use efficiency and (iii) increase labour productivity through labour saving and drudgery-reducing mechanical devices. The mechanization of Indian agriculture has proceeded along two-pronged approach based on improved equipment and enhanced power supply. However, compared to the mechanization of western agriculture which was motivated by the need to substitute human labour and draught animals with mechanical prime movers, the guiding principle in mechanizing Indian agriculture has been to maintain a socially desirable mix of human labour, draught animal power and mechanical power. Though there has been a considerable progress of agricultural mechanization in our country, its spread has been uneven across different regions. However, its growth has been closely linked with the overall agricultural development of different agro-climatic regions.

Status of farm mechanization

Tractorisation has been recognized as the main driver of farm mechanization for mitigating drudgery and increasing the level of farming, so as to improve the life and work environment of farmers. At present in India, tractors are being used for tillage of 22.78% of total area and sowing in 21.30% of total area. In addition to irrigation pumps and tractors, threshers have been adopted on large scale across the country. Combine harvester, reapers, potato and groundnut mechanization machinery have also shown commercial success. Now combine harvesters are commonly used in different parts of the country, on custom hire basis, for wheat, soybean and rice. Although utility of manual and bullock-operated equipment has been established, their acceptance has been limited. Due to limited annual use and economic advantage, some improved implements could not replace the local alternatives.

Farm power availability in India

Power is needed for operating different

equipment and machines used for both mobile and stationary operations. Availability of adequate power is, therefore, an important determinant for mechanization. The mobile farm power is obtained from humans, draught animals, power tillers, tractors and self-propelled machines, whereas the stationary power is derived from engines and electric motors. Over the years, contribution of animate source of power, especially that of draught animals, has been steeply going down (Table 1). This shows that the additional need of farm power is being met through mechanical and electrical sources of power. This trend is going to continue in future also to meet the increasing mechanization needs.

Table 1 : Status of farm power sources in India
(Number in million and power in million kW)

Year	Agri workers		Draught animals		Tractors		Power tillers		Diesel engines		Electric motors	
	No.	Power	No.	Power	No.	Power	No.	Power	No.	Power	No.	Power
1960-61	131.10	5.8	80.4	30.6	0.037	1.00	0	0	0.230	1.298	0.200	0.74
1970-71	125.70	6.21	82.6	31.39	0.168	4.38	0.0096	0.054	1.7	9.52	1.6	5.92
1980-81	148.0	7.46	73.4	27.89	0.531	13.86	0.0162	0.091	2.88	16.13	3.35	12.39
1990-91	185.30	9.17	70.9	26.94	1.192	31.11	0.0323	0.181	4.8	26.88	8.07	29.86
1999-00	206.19	10.6	60.0	22.8	2.371	61.89	0.1046	0.586	5.9	33.04	12.85	47.55
2005-06	238.81	11.47	55.8	21.2	3.132	81.76	0.1659	0.929	7.627	42.71	14.75	54.57
2009-10	243.42	12.17	52.65	20.01	3.781	98.68	0.2571	1.439	8.456	47.35	16.616	61.48

Note : 1 Human = 0.05 kW, draught animal = 0.38 kW, tractor = 26.1 kW, power tiller = 5.6 kW; electric motor = 3.7 kW, diesel engine = 5.6 kW

Cropping intensity and power availability scenario on Indian farms

Cropping intensity increases with an increase in per unit power availability (Table 2). It was 120% with power availability of 0.48 kW/ha during 1975-76 and increased to about 139% with increase in power availability to 1.71 kW/ha in 2009-10. Net sown area per tractor shows the reverse trend during the same period, which was 487 ha/tractor in 1975-76 and reduced to 37 ha/tractor in 2009-10. The power availability per unit production increased from 0.51 kW/tonne to about 1.03 kW/tonne during this period. The usage of tractors needs to be increased in various farm operations from seedbed preparation to harvesting and threshing.

Table 2 : Cropping intensity and power availability on Indian farms

Year	Cropping intensity (%)	Foodgrain productivity (tonnes/ha)	Power available (kW/ha)	Power per unit production (kW/tonne)	Net sown area/ tractor (ha)
1975-76	120	0.944	0.48	0.51	487
1985-86	127	1.184	0.73	0.62	174
1995-96	131	1.50	1.05	0.70	84
2004-05	135	1.65	1.46	0.87	50
2007-08	137.2	1.860	1.60	0.86	41
2008-09	138.01	1.909	1.66	0.98	40
2009-10	139.22	1.798	1.71	1.03	37

Mechanization Index

Planning for mechanization requires the quantification of level of mechanization for each operation in crop production. Appropriate indicators must be selected to determine the level of mechanization. An indicator of mechanization is a variable that allows describing and monitoring the process, state and tendency of systems at the farm, regional, national or worldwide levels. Different methods have been developed to quantify the level of mechanization based on power or energy availability, and its impact in agricultural and labour productivity.

A higher mechanization indicator based on electrical power and stationary engines might only reveal

mechanization of stationary operations. Whilst unit farm power could be considered as indicative of potential power availability, it may not necessarily be fully utilized on the farms. This may depend upon availability of diesel and electricity, and adequate workload. The majority of the farmers in developing countries use tractors for transport of agricultural and non-agricultural commodities.

Mechanization policy

Mechanization is capital intensive and substantial investments have been made in our country in this sector. In the absence of good planning and direction, investment on mechanization may not yield the expected results. The broad objectives and requirement of agricultural mechanization in the country may be described as:

- Agricultural mechanization should contribute to sustainable increase in yields, productivity and cropping intensity so that the planned growth rates in agricultural production are achieved.
- The benefits of agricultural mechanization should be extended to all categories of farmers with due consideration to small and marginal farmers and to all regions of the country especially the rainfed areas.
- Agricultural mechanization should contribute to conservation of land and water resources and to more efficient use of inputs such as seeds, chemicals, fertilizers and energy.
- Loss of agricultural production, both in quality and quantity, should be reduced through timely operations and improvement in equipment and techniques.
- Agricultural mechanization should lead to a reduction in costs of production of different commodities, increase in income of farmers and an increase in the competitiveness of Indian agricultural produce and products in the world market.
- Appropriate capacity and time-saving equipments are needed to reduce turn -around time and increase cropping intensity in irrigated agriculture.
- The average supply of power to agriculture should be increased from about 1.7 kW/ha in 2010 to 2.5 kW/ha by the year 2025 to achieve the planned production level.
- The widely fragmented and scattered land holdings in many parts of the country need to be consolidated to give access for their owners to the benefits of agricultural mechanization.
- India has limited water resources, which are being over-stretched to expand coverage. Efficient equipment and latest techniques are needed to make the best use of water.
- Appropriate equipment is required to improve moisture conservation and timeliness of operations in rainfed

agriculture.

- To achieve higher production levels, the quality of operations like seedbed preparation, sowing, application of fertilizer, chemicals and irrigation water, weeding, harvesting and threshing will have to be improved by using precision and efficient equipment.
- The benefits of mechanization have been so far confined mostly to wheat based cropping system. These benefits have to be extended to all cropping systems including horticultural crops.
- Hill agriculture, which covers about 20% of cultivated land, has little access to mechanization. This situation has to be improved by developing and promoting package of technology for mechanization of hill agriculture to achieve higher productivity.
- The quality of life and work environment of farm workers needs to be improved. Their work involves considerable drudgery and discomfort. They face serious risk of accidents and long-term health hazards.
- Proper ergonomic designs of agricultural equipment, incorporating latest safety measures and 'comfort features' should be made available.
- Matching equipment for tractors, power tillers and other prime movers are either not available or farmers make inappropriate selections in the absence of proper guidance, resulting in fuel wastage and high cost of production.
- Presently the agriculture produce gets damaged due to weeds, insects, pests and diseases during pre-harvest and due to mechanical damage during harvesting, threshing and handling. These losses need to be minimised to improve the quality of the produce through use of better machinery and techniques.
- Machinery and technology for reducing post-harvest losses and promoting on-farm value-addition to agricultural produce should be made within the reach of the farmers.
- Large-scale rural entrepreneurship for custom hiring operation of agricultural machinery needs to be developed at a faster pace.
- The quality of farm implements and machinery manufactured in the country is generally not of desired standard resulting in poor-quality work, longer down time, low output and high operational cost. The quality of equipment has to be improved.
- There is a need for strengthening training programmes at various levels and for different categories of people on operation, repair and maintenance of agricultural machinery and for transfer of technology.

Everyone's a genius in a bull market

– Mark Cuban in Esquire

Indian Fisheries : An overview

Dr. M. Surya Prakash, IFS
Senior Executive Director,
National Fisheries Development Board,
Hyderabad.

Dr. M. Surya Prakash is presently Senior Executive Director, National Fisheries Development Board, an autonomous body under the Ministry of Agriculture, GoI. He is an Indian Forest Service officer with more than 27 years of experience in the management of forests, coastal zone management and pollution control. He holds M.Sc. with specialisation in Marine Biology, Doctorate in Forestry and also possesses PG qualifications in Forestry and Environmental Studies. He rendered many consultancies for FAO of UN in Maldives and prepared biodiversity management plan for Shriharikota Island, ISRO, Coastal Zone Management Plans for the UTs of Daman & Diu.

Having achieved self sufficiency in food grain production, India has embarked on a path to achieve nutritional security of its citizens. Fish and various fishery products made from shrimp, prawn, lobster, mussels, oysters, etc., being high quality animal protein and rich sources of vitamins and Omega 3 fatty acids, could provide nutritional food at affordable cost. Since the country is endowed with various kinds of water bodies and long coast line, both capture and culture fishery could provide nutritional food, if made available in healthy and hygienic condition. Besides fishery could also contribute to economic well being of the country by providing sustainable livelihood options especially in the rural areas.

In view of the multiple benefits that accrue from fishery, Government of India have given lot of importance to the sustained management and development of marine, freshwater and brackish water fishery. Fisheries and aquaculture is the fastest growing food production sector contributing considerably towards food security, foreign exchange earnings, employment generation and socio-economic development of the fishing community. The following table indicates the fisher population in India which is dependent on the fishery sector in India.

Table 1. Fishermen population – both inland and marine (Livestock Census, 2003)

Gender	Numbers	Percentage
Male	4,696,158	32.4 %
Female	4,033,963	27.8%
Children	5,755,233	39.8%
Total	14,485,354	100
Fishermen engaged in fishing operations		
Full Time	0.93 million	
Part Time	1.01 million	
Ancillary activities	1.39 million	
Total	3.33 million	

India being one of the oldest civilizations, witnessed progressive evolution of fishery, which is manifested in the wide variety of crafts, gears and techniques people employ and naturally fisheries developed as one of the principal livelihood occupations. After independence, fisheries and aquaculture

started growing from a purely traditional livelihood option to a commercial enterprise. In the marine fishery sector 54% of the total catch comes from mechanized sector while motorized sector contributes 39% with the remaining 7% is contributed by the traditional sector.

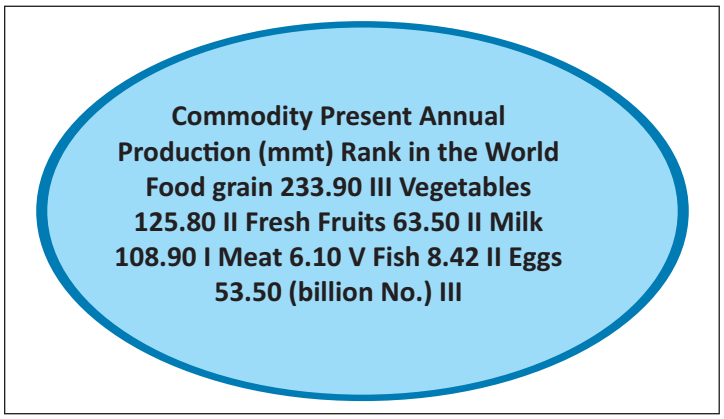
Table 2. Number of Marine Fishing Crafts in the country

(in Nos.)

Variety of fishing craft	Numbers
Traditional non motorized crafts	110,000
Mechanised vessels	59,743
Bottom trawlers and purse seiners	29,000
Motorized	76,372
Deep sea vessels	60
Total fishing crafts	243,939

Indian fishery vis-a-vis global scenario: Since independence India made great strides in development of farm sector and it emerged from importer of food grains to an exporter of the same. Not only the food grain production, fast growth is also witnessed in the production of pulses, oil seeds, sugar, commercial crops, poultry, meat, fruits and vegetables too.

Fig 1. India's contribution to World Food Basket



Today, India is one among the top ten fish producing countries in the world contributing over 8.423 million tons of the total world fish production of 145.1 mmt (FAO: 2008). The country ranks second in the world in total fish production and also in inland aquaculture.

Table 3. India's contribution to world fish production

(Source: FAO year book, 2008)

(Quantity in mmt)

Year	Capture fish production		Aquaculture production		Total fish production	
	Global	India	Global	India	Global	India
2005	92.0	3.691	44.3	2.967	136.3	6.658 (4.88%)
2006	89.7	3.845	47.3	3.180	137.0	7.025 (5.13%)
2007	89.9	3.859	49.9	3.112	139.8	6.971 (4.99%)
2008	89.7	4.105	52.5	3.479	142.2	7.584 (5.33 %)
2009	90.0	4.020	55.1	4.403	145.1	8.423 (5.71 %)

Contribution to Indian Economy. The fisheries sector in India contributes 1.07% of the total national gross domestic product (GDP) and 5.54% of agricultural GDP besides providing employment and income to over 5.7 million fishers. The fisheries sector has also been one of the major contributors of foreign exchange earnings. During 2011-12 (provisional), export of marine products reached 846,398 tonnes valued at ₹ 16,310 crores or about US $ 3 billion.

Fig 2. Contribution of maritime States/UT towards marine fish production

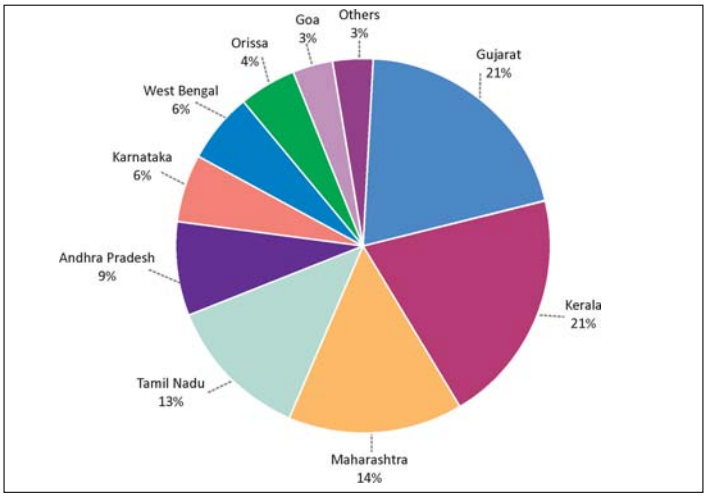


Plate No. 1 Open sea cage culture

Plate No. 2 Harvest of Lobster fattening by cage cultue

Marine, inland and aquaculture are the three main components of fisheries sector in India. Aquaculture is practiced in both fresh and brackish waters. With the pelagic waters in the marine sector overexploited, obviously due to manifold increase in the number of mechanised, motorised crafts, and due to introduction of various kinds effective fishing gears like purse seines, drag nets, the contribution from marine sector is showing signs of fatigue and is stagnating. In recent years, mariculture or sea farming is gaining popularity and a couple of fin and shellfish species and sea weeds are now being farmed.

According to Government of India figures, the marine sub-sector accounts for approximately 38 per cent of the total national fish production of 8.423 million tonnes while Inland fishing accounts for 62 per cent. With the development and standardization of technology for culture of carps and many new varieties of fish like Tilapias, Pangasius, and introduction of exotic shrimp species like L. Vannamei, the contribution from inland and brackish water sector is steadily increasing since 80's.

Ornamental fish farming, although a non-food activity, also has a promising future and is likely to contribute to the overall growth of fisheries sector in the coming years in terms of foreign exchange earnings and additional livelihood opportunities for fishers and unemployed youth.

Plate No. 3. Ornamental fish breeding centre

Resource base: In India 2163 species of finfish have been recorded of which 200 species are commercially significant. Upland cold waters contribute 157 species (7.26%) while warmer plains contribute 454 species (20.99%). Brackish water contributes 182 species (8.41%) while marine environment holds 1370 species (63.3%).

Marine resources: India is endowed with a coastline of 8,118 km with an Exclusive Economic Zone (EEZ) stretching over 2.02 million km^2, and a continental shelf covering 0.53 million km^2. It also has large area under estuaries, backwaters, lagoons, etc. which is highly amenable for developing capture as well as culture fisheries. The estimated potential of EEZ is 4.42 mmt. Depth up to 100 m contributes 87% of catch and inshore waters have almost been exploited. Chances for increasing the revenue from deep sea is only qualitatively significant and harvesting of larger quantities is not possible as deep sea fishing is beyond the conventional fishing limit and fishing capability of traditional indigenous craft.

Plate No. 4. Sea Bass Harvest

Table 4. Availability of fishery resources along the Indian coast As per National Marine Fisheries Census, 2005 *(in mmt)*

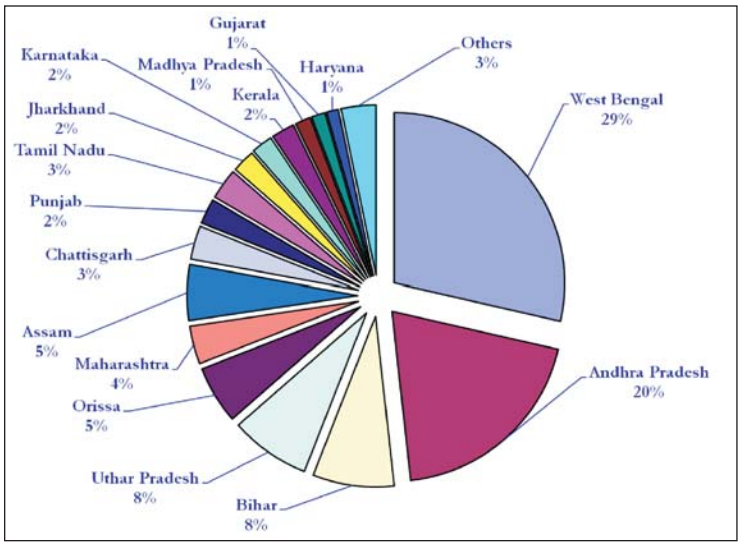
Depth in meters	Production potential	Percentage
100	3.82	87
100-200	0.26	6
200 – 500	0.11	2.5
Oceanic area	0.21	4.7
Total	4.42	100

Inland fishery resources : The inland water resources of the country comprise a maze of rivers, canals, estuaries, floodplain lakes, wetlands, lagoons, upland lakes and reservoirs located at various altitudes, latitudes, temperature zones, geological formations and rainfall zones. All these variations are manifested as bio-diversity in fish resources and that is how India has wide variety of biological resources.

Table 5. Fact sheet of inland water resources

Name of the resource	Area
Rivers & canals (km)	195,210
Reservoirs (lakh ha.)	31.5
Tanks and ponds (lakh ha)	24.14
Floodplain/derelict water bodies (lakh ha)	8 – 12
Brackish water (lakh ha)	12.40
Saline/alkaline affected area (lakh ha)	12.00

Fig 3. State wise inland fish production



Category	Area in ha	No	Area million ha
Large	> 5000	56	1.14
Medium	1000 – 5000	180	0.527
Small	< 1000	19134	1.485
Total		19370	3.1

The river system includes 14 major and 44 medium rivers with innumerable tributaries. With a combined length of 45,000 km and 20,000 sq. km of catchment area, the country's riverine resources provide one of the richest fish germplasm of the world.

The country has an estimated 1.2 million hectare (mha) of floodplain lakes and wetlands where fish and fisheries remain a traditional economic activity with tremendous socio-economic impact in the rural sector. The cold-water fisheries resources comprise rivers, streams, lakes, reservoirs with a combined riverine length of 8,253 km and 41,600 ha of sprawling lakes and reservoirs.

Reservoirs, both natural and man-made, have huge potential for fresh water fishery. For the rural and tribal communities inhabiting the fringes of reservoirs, often set deep inside the forested areas, fishing is their principal occupation. The total number of reservoirs and their area has increased significantly in the post independence era.

Unfortunately the productivity of these reservoirs is very low and the main reasons are over exploitation, lack of regulatory regime, lack of strict enforcement of ban on fishing during the breeding period and also due to lack of appropriate fishing gear to harvest fish from the deeper zones of the medium and large reservoirs. The country has 2.41 mha of ponds and tanks and the other minor fresh water resources include flood plains and oxbow lakes, irrigation canals and paddy fields.

Brackish water: Area suitable for brackish water aquaculture in the country is about 1.2 million ha of which only about 15% is put to effective shrimp farming. Estuaries having the peculiarity of fluctuating salinity due to tidal effects, have huge potential for both fin fish and shell fish culture and have been providing sustainable lively hoods to the rural poor. Besides, vast sheets of inland saline water bodies in northern and central India hold promise for brackish water aquaculture, where sea bass, pearl spot and L.vannamei could be cultured.

Issues to be addressed: In the recently concluded FAO-APFIC-SEAFDEC workshop on "Assessment of fishery stock status in South and South-East Asia (November, 2009)," the following fisheries management issues were identified for India

- Large number of active fishermen population
- Increasing number and efficiency of craft and gear
- Overcapacity along the South-East (SE) coast
- Decrease in catch rate
- Fishing for juveniles
- Open access
- Inter and intra-sectoral conflicts
- Fishing down the marine food web
- Climate change

Issues concerning management of inland fishery resources:

- Low productivity in reservoir, ponds, tanks and lakes
- Access to genetically superior disease free quality seed of different species and fingerlings for aquaculture segment
- Environmental degradation in inland open waters
- Post harvest losses
- Unhygienic fish landing centres
- Absence or inadequacy of cold chains

Brackish water Aquaculture

Since aquaculture of giant tiger prawn (Penaeus monodon) was found highly profitable due to international demand large scale shrimp aquaculture was taken up along the coast in nineties forsaking paddy cultivation. Unregulated growth of shrimp aquaculture coupled with unscientific management practices, poor water quality management regimes, unhygienic and unhealthy culture practises resulted in the spread of viral diseases which not only led to environmental degradation, seepage of salt water into freshwater aquifer, but ultimately led to the collapse of the same. The late nineties saw a lull in the coastal aquaculture production with many of the aqua farms abandoned.

For regulating the activities connected with coastal aquaculture in coastal areas, the GoI have enacted Coastal Aquaculture Authority Act in 2005 and also constituted the Coastal Aquaculture Authority with HQ at Chennai under the MoA.

Pacific white leg shrimp L. Vannamei

Seeing the huge potential and international demand for shrimp, some enterprising aquaculturists have again taken shrimp farming with Litopenaeus vannamei, popularly known as pacific white legged shrimp, whose seeds were imported from firms dealing with genetically improved stocks of the same. This time caution is being exercised to import seed and mature adults of only those which are compliant to Specific Pathogen Free status and now its culture is gaining momentum and the production is likely to touch 1 lakh million tons during the year.

Policies and legislative support: As per the Indian constitution, control and regulation of fishing and fisheries within territorial waters is the exclusive province of the State, while the same beyond the territorial waters, is the exclusive domain of the Central Government. For sustainable management of the fishery resources the Central Government have passed many acts, rules and regulations including the Territorial Sea, Continental Shelf, Exclusive Economic Zone and other Maritime Zones Act in 1976, pursuant to which a 200 nautical mile EEZ was established. The other important legislations are Marine Products Export Development Authority Act, 1972; the Indian Coast Guard Act, 1978; Maritime Zones of India (Regulation of Fishing by Foreign Vessels), Act, 1981; Maritime Zones of India (Regulation of Foreign Fishing Vessels) Act, 1981 and The Marine Fishing Regulation Act (MFRA) of the maritime States/UTs.

The inland fisheries sector is regulated through the provisions of the Indian Fisheries Act, 1897, which has been repealed by most of the inland States as their own Act. Many States have also formulated stand-alone acts for regulating specific activities such as seed production, etc.

Resource survey, Research, Training and Extension: The Department of Animal Husbandry, Dairying and Fisheries (DAHDF) in the Ministry of Agriculture, in Government of India is responsible for policy formulation, and its implementation through State Governments and various other stake holders. India has 8 dedicated fishery research institutes under the banner of Indian Council for Agriculture Research (ICAR) besides various

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specialized engineering, survey, training and teaching institutes.

National Fisheries Development Board (NFDB): Government of India have established the National Fisheries Development Board (NFDB) at Hyderabad, Andhra Pradesh, in July, 2006 under the administrative control of the Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture to realize the untapped potential of fisheries sector in inland and marine fish capture, culture, processing & marketing of fish, and overall growth of the sector with the application of modern tools of research & development including biotechnology for optimizing production and productivity. The NFDB has come up with various development oriented schemes for addressing production, processing, transportation and marketing issues by formulating more flexible and easily accessible guidelines to derive funding support in the form of grants, subsidy. It is also mandated to be a platform for public-private partnership in fisheries sector. The Board desires to empower various States/Union Territories of the country for utilizing this opportunity and implement various activities to march towards Blue Revolution.

I like work. It fascinates me. I can sit and look at it for hours.

– Jerome K. Jerome

Manning Fisheries Sector – The Need For A Paradigm Shift

Dr. K. Vijayakumaran,
Director General, Fishery Survey of India

Definition of insanity is to do the same thing over and over again and expect different results

– Rita Mae Brown

Dr. K. Vijayakumaran is the Director General of Fishery Survey of India (under the DAHD&F Ministry of Agriculture, Government of India) since October 2009. Being the head of the most important fishery institution in India, he plays a key role in the fishery development and policy in the country.

Dr. Vijayakumaran belongs to CMFRI (1985 ARS batch of ICAR). A post-graduate in Industrial Fisheries from Cochin University of Science and Technology, his career started with stint as Chief Technologist in a fish processing unit at Mandapam in 1983.

Dr. Vijayakumaran worked on the problems and prospects of deep sea fishing industry for his MBA dissertation and on the sustainability of fishing operations along the upper East coast of India for his PhD thesis.

He is currently the National Coordinator for the GEF funded BOBLME project operational in eight countries of the Bay of Bengal region.

Introduction

India produced about 8 million ton of fish in recent times and became the third largest producer in the world. The country ranks second in aquaculture production. India's seafood exports crossed 800 thousand ton during 2010-11 fetching about ₹ 12000 crore in foreign exchange. The fishery products export exceeded all other agricultural commodities. The country is poised to achieve the projected demand of 16 million t production by the year 2025.

The quantitative figures are quite impressive though the qualitative aspects are not so visible. However, the national spirit soared high as the planners were comfortable to increase the outlay to tilt the slope of the trend line up. This has happened when globally capture fishery has been stagnating for several years. Surprisingly the limit to growth had not figured anywhere while sustainable development is being discussed everywhere.

The development of human resources to cater to the fisheries sector has apparently followed a parallel trajectory without much concern about the finer qualitative aspects on of demand and supply in space and time. Like most other sectors the incredible tendency to follow the beaten track with a more or less rigid system has infested the HRD scenario in the fisheries sector of the country. There are attempts to bring in homogeneity in the curriculum as linear thinking human mind always attempt to impose on any non-linear dynamic system.

As the age old saying goes, any system will deliver what it is designed for. Initiatives to mould a cadre of professionals who can adopt innovative approaches to resolve the challenges in the sector are lacking. The expression of human creativity to bring in the much needed revolutionary change is missing. This article tries to delve into some of the inherent flaws in the HRD scenario in the fisheries sector and tease out some pragmatic approach to revitalize the sector with creative interventions.

Tracing supply and demand

The country has 19 Fisheries colleges (the one in Kerala recently became elevated as the first Fisheries University in the country) and one Deemed University with a pooled

intake of about 570 undergraduate, 250 postgraduate and 93 doctoral students per annum. The most number of colleges, including the lone Deemed University, are in Maharashtra. The break-up human capital output and the level of employment varies for each State. Currently limited opportunities exist for these UG and PG level specialists in Government departments, research institutions and to some extent in private sector. However, the supply continues taking demand for granted. Presenting output statistics without evaluating the utilization of the products keeps the system running for ever.

The recruitment in Government has come down drastically over the years due to various policies. The State fisheries departments are more or less welfare departments, especially in maritime states. The lack of sufficient openings for fisheries graduates in Government departments has stimulated adoption of restrictive practices to avoid entry of other graduates. We can witness a sort of in-breeding in the State funded departments, universities and institutions. When the cake is small and mouths many, there is little room for excellence and more scope for manipulations.

After the initial boom during seventies and eighties when industrial processing for exports assumed importance, the processing industry has seen a sort of consolidation where several small and medium units became extinct. The highly specialized Industrial Fisheries graduates and fish processing specialists from Mangalore Fisheries College, hot cakes at one point of time, became less in demand. This has happened over time without stimulating, unfortunately, not much response from the institutions.

The explosion in coastal aquaculture sector came as a boon in nineties to the mariculture specialists from CMFRI. The corporate enthusiasm in floating several public limited companies subsided soon after they found that the conventional production equations are not applicable to the aqua farming sector. After looting a lot of public money these corporate ventures vanished declaring farming is good for farmers. Fortunately the M.Sc. mariculture course was discontinued in later years and taken over by CIFE. However there are several universities offering courses on mariculture or coastal aquaculture the fate of the students are not clear.

Banks like NABARD had absorbed several PG specialists in their role of agricultural officers. Opportunities available in the Gulf States for specialists in aquaculture and processing were grabbed by many enterprising people especially from Kerala. Outside the Gulf region there were very little openings abroad as the competency requirements varied from that of PG in fisheries.

Research is an area where many of the students ended up after PG studies. However the limited slots available in colleges of fisheries made them seek opportunities in conventional universities. They have to compete with other postgraduates to get a slot and compromise on the topic of research which is possible in the institutions. Thanks to a large number of research projects, and good package of fellowship, this is lucrative area where most PG students conveniently end up.

Sustaining Institutions

The major challenge in the HRD for fisheries is in reinventing the relevance of the institutions and thereby sustaining their operations. The fisheries UG course under State Agricultural University System boasted prestigious position among the professional courses till early nineties. The IT boom caused a severe shift in the HRD scenario with cascading effect on every other sector including fisheries. Lack of opportunities in the fisheries coupled with the emerging opportunities in other sectors caused a severe stint in the quality and quantity of the intake at the UG level. More recently, the once toughly competed entrance examinations were done away with and admissions were reportedly done by walk-in interviews in some institutions. Obviously the takers are good for nothing else, and GIGO principle applies to the products.

The overall decay was enhanced by the restructuring career advancements and pay packages of the university faculty. The UGC packages offer some of the best pay structure in the country. The career advancement schemes have been modified to keep the number of steps few and duration of climbing short. This has facilitated youngsters to acquire the minimum requirements to reach the top. The passion and involvement in research and learning became a disadvantage. The fertile environment for real innovations and blooming of creativity became rare. With little efforts anyone can reach the top and stagnate there forever drawing the highest pay without commensurate responsibility. Often several senior faculty members ended up as experts in investment portfolio matters rather than in their field of specialization.

The funding is a major constraint in management of institutions. The State Governments expecting central support had major problems for expansion when the demand for course dwindles in the wake of the boom in other sectors. Restrictions on recruitment have resulted in several faculty positions in these institutions remaining vacant. In the absence of sufficient qualified

and dedicated faculty it is impossible to ensure quality outputs, even when the quality of input is taken for granted.

Several institutions were started with international support at a time when the fishery in the country was at subsistence level. Once the external support stopped, these entities were transformed as Government departments or became part of existing organizations. Slowly once the fishery became fully developed, especially in marine sector, these entities lost their relevance in their current shape. Unless conscious attempts are not made to make the organizations turn around, the natural death would become the destiny. Supporting an entity with public fund will prove difficult in coming years when organizations are required to become more accountable.

Colors and Competency

Except the research and academic positions, most of the jobs in fishery sector do not fit to the blue or white collar aspirations of the young generations. There are few things like getting wet and smelling fish which cannot be avoided. Fishermen and fish workers are generally attached to the profession without qualifications while qualified fisheries graduates are invariably from non-fishermen communities. While the first group is committed to the job as the livelihood option, qualified fisheries graduates need not necessarily be commited to the profession. While there is a growing tendency to help fishermen to seek other jobs (to ease the pressure on exploitation), very little attempt is made to improve the community's capacity to take responsible positions in their own traditional field. Perhaps India may the only country in the world where the highest fisheries technical positions are often occupied by people who do not eat fish.

The level of competency needed for the fisheries sector can be broadly categorized into three. Barring the unskilled laborers at the ground level and the ancillary sectors supporting fisheries there is a segment of manpower requiring limited special skills. Farm workers need limited skills and form the bulk of the manpower requirement in the aquaculture sector. In the capture fisheries the skilled operatives such as deck hands and fishing hands belongs to this category. In the post-harvest sector the factory workers engaged in processing and packing also need limited skills. These group forms the bulk of the skilled human resources needed for the fisheries sector.

The second category is the middle level where higher technical competency is required. This includes those in the Government and private departments, involved in middle level management, extension, and development activities. The numbers in this segment is comparatively lesser than that in the first segment. Public investment on this qualified lot is significant. However, by removing the 'professional' tag they could fit in any field, provided the courses are tailored appropriately.

The third category comprises those who occupy the coveted positions and make harvests without getting their hands wet. The number of slots is fewer compared to the other two. These are highly qualified people occupying the research, academic and higher administrative positions in Government and to a limited extend in private sector. They are the products of huge investment of public funds. The oversupply of this category is of great concern. Of late there is an undue shift in priority toward the biotechnology, perhaps due to the invasive strategies of multinationals in the field. The result, we have more molecular taxonomists and not many conventional taxonomists.

Moving forward

The people of the first and second categories need local orientation and are to be pruned to local flavor. In the ideal situation the initiatives must be at the State level and to some limited extent from the central level. Vocational schools are ideal for catering to the local needs provided the curriculum is tailor-made to suit the local requirements and practical exposure is incorporated as the core of the programme. Development of quality course material in local languages has been a major constraint. Training of teachers to deal with the specialized subject is another area where immediate attention is needed.

State run special training facilities are the next option. There are examples of institutions such as the one in Kakinada, Andhra Pradesh doing a good work. In other States like Maharashtra, the training facilities are long abandoned. A revival of the existing facilities and opening of new facilities are to be given priority. The facility of funding from NFDB for HRD has not been utilized properly by many of these States. Innovative thinking coupled with ability to rope-in the right partners would help the States to make best use of the available opportunities.

The Central initiatives like CIFNET, NIPHATT, etc. are doing their job since their inception but their services have skewed distribution in space. A reorientation of their programmes to cater to the regional requirements of the country, partnering with the State departments and other organizations to serve on need base would ensure delivery of their products uniformly.

University departments including fisheries universities need to invent and create their special niches by focusing on their special endowments relevant to their locality and differentiating from the conventional universities.

Fisheries colleges need to take periodic stocks of the demands and supply of the second and third categories of manpower and reorient their strategy to negotiate the supply demand gap. Revision of curriculum to improve the versatility of the students (perhaps by including more IT and quantitative components), offering wider range of specializations, etc. would help them sustain the relevance of the courses. The changing needs of the dynamic environment have to be perceived and the course adjusted to sustain the activities. Homogenization is not at all desirable.

University departments including fisheries universities need to invent and create their special niches by focusing on their special endowments relevant to their locality and differentiating from the conventional universities. Further creation of new universities has to be weighed properly in terms of the existing situations. Rather than Kerala, Maharashtra could have formed a Fisheries University if the three fisheries colleges can be brought under the same umbrella with resultant optimization of resource and funds. Still the vital question is what other benefit will it bring other than elevating a person to the post of VC?

No doubt that the country has made good progress in fish production. But is there any direct evidence that this happened due to the additional manpower generated in time and space. One can argue that absence of evidence cannot be taken as evidence of absence. However an objective analysis would not be harmful. This would enable us to stop fooling the public with irrelevant statistics.

Perhaps the total number of expert positions in a fishing nation like UK will be less than the annual HR output in the specialized field of fisheries in India. Oversupply of specialists is not a healthy option. Course needs to be discontinued when there is an oversupply. Institutions need not be created for solving the problem of unemployment which in turn has been caused by oversupply.

There is need for channeling public spending on the development of core capabilities in a more disbursed manner. Private investment in fisheries education is very unlikely as there would not be any free lunch in private sector. Special emphasis must be on raising the capabilities of the traditional communities from getting marginalized in their own field. The sector can rejoice in achievement when a person from traditional fisher community occupies the highest technical position in the country.

Courses need to be restructured and the flow adjusted and if necessary, temporary discontinued. Credit based systems with a wide range of topics overlapping the conventional graduate streams would increase the versatility while keeping the options for specialization. The narrow bounded view of the resource management paradigm has to shift towards broader transboundary approach. If resources are transboundary can the resource persons be otherwise? There is need to pool the faculty and resources in various states and share them to get the best benefits rather than cursing the vacant positions and lack of funds. Opportunity costs of unemployed specialists are very high. So is the opportunity cost of underutilized assets. A precautionary approach is needed in application of public funds in most useful ways. What is needed is a shift in paradigm of fisheries education.

Disclaimer:

The views expressed in this article are purely personal views of the author.

Further Reading

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I have no idea what to give my husband for his birthday. He's already got everything I need.

– Komsomolskaya Pravda

Horticulture – The Composite Indian Food Solution

Dr H. P. Singh,
Deputy Director General (Horticulture), ICAR

Dr. Harishchandra Prasad Singh, is a 1969 alumnus of BHU, Varanasi, and Gold Medallist Post- Graduate from RAU, Pusa. He earned his Ph.D from UAS, Bangalore in 1985. He later acquired training in Leadership in Agriculture at IMD, Lausanne, Switzerland, besides many trainings in relevant topics in India.

He has held a number of critical positions in his career such as Horticulture Commissioner, Govt. of India (1997-2003); Chairman, Coconut Development Board (1999-2003); Dean (Agriculture), GBPUA&T, Pantanagar (2004-05); Vice Chancellor, Rajendra Agricultural University, Pusa (2005-07) and currently the coveted position of Deputy Director General (Horticulture), ICAR (2007-till date). He also graced the other positions comprising DDG (Ag. Extn); Director of Horticulture, Uttarakhand; National Director, Technology Mission on Horticulture; National Director, Foreign Aided Projects of FAO, Biodiversity International and bilateral programmes and projects.

Dr Singh was Chairman of APCC, Jakarta. He has also chaired various high powered committees both at national and international levels in shaping the Horticulture Development in the country. Dr Singh has outstandingly contributed to horticultural research, management and development and also human capital formation which earned him 3 international awards and 34 National Awards and 9 Fellowships, including Fellow of National Academy of Agricultural Sciences (NAAS) and National Academy of Biological Sciences (NABS). The Orissa University of Agriculture & Technology (OUAT), Bhubaneswar conferred D.Sc (Honoris Causa) to Dr. Singh in 2009 for his outstanding contribution to horticultural research and agricultural education.

Food and nutritional security are pivotal to human, social and economic development. Options are also needed for the livelihood. Besides, cereals, nutritional food become essential for the healthy life to avoid medicine. In this context, horticulture which includes fruits, vegetables, tuber crops including potato, spices, plantation crops and medicinal and aromatic plants have become important. Currently 350 million people continue to suffer from malnutrition which is a cause for various types of diseases and premature death of children and women. Therefore, a country could only be food secured if the citizens have access to nutritious food having balance diet to meet their need for productive and effective life. The current trend shows that dietary habit is changing with increasing income, from cereal based diet to nutritious diet. Resultantly there is a growing demand for horticultural produce. Since horticulture also provides better profitability per unit area of land and has potential to give more employment, besides nutrition is seen as source of food, nutrition, healthcare added with opportunity for livelihood option.

Why horticulture?

Horticulture has wider adaptability and provides wider choice to farmers, for growing wide range of crops in different environments, soil and climate conditions. Horticultural crops, can be grown even in marginal and degraded soils, and has enriched the farmers having degraded land by having choice of crops and practices. There are many horticultural crops which are complementary as food, i.e. potato, tuber crops and banana and vegetables. Fruits and vegetable therapy is now a practice to have good health without medication and many crops are used as herbal medicine. New paradigm, therefore, has to be horticulture based farming system for greening, environmental service and to provide nutritious food and enhanced farm profitability.

Nutritional status of Indian population

India is one of the fastest growing countries in terms of population and economics, sitting at a population of 1,155.3 million (2009) and growing at 8-10% annually (from 2001–2007). The

combination of people living in poverty and the recent economic growth of India has led to the co-emergence of two types of malnutrition: undernutrition and overnutrition. This new phenomenon of the rising incidence of chronic diseases such as heart disease, cancer and type II diabetes along with the presence of infectious diseases such as pneumonia and tuberculosis is mainly attributed to rapid population growth and the increase in the country's economy. The increase in income has made it possible for people living in urban areas to have access to a wider range of food outlets, to afford transportation and other luxuries of western society that have led to an increase in fast food consumption and a more sedentary lifestyle. Data from the third National Family Health Survey shows that 35% of the adult population of India is underweight (with a BMI of less than 18.5). Today child malnutrition is prevalent in 7 percent of children under the age of 5 in China and 28 percent in sub-Saharan Africa compared to a prevalence of 43 percent in India. Micronutrient deficiencies are also a widespread problem in India in terms of geographical regions; Madhya Pradesh, Jharkhand, and Bihar have very high rates of under-nutrition. States with lowest percentage of under-nutrition include Mizoram, Sikkim, Manipur, Kerala, Punjab and Goa, although the rate is still considerably higher than that of developed nations. The prevalence of micronutrient deficiencies varies in different states. Further, anemia is found in over 70% of individuals in the States of Bihar, Chhattisgarh, Madhya Pradesh, Andhra Pradesh, Uttar Pradesh, Karnataka, Haryana and Jharkhand. Less than 50% of individuals in Goa, Manipur, Mizoram and Kerala have anemia. The World Bank estimates that India ranks second in the world in the number of children suffering from malnutrition, after Bangladesh.

Food as Prophylactic Medicine

Major shifts in dietary patterns are occurring throughout the world, even in the consumption of basic staples towards more diversified diets. Though cereals continue to remain the most important food source in the world, contributing 50 per cent of calories in developing countries, it is as much as 70 per cent of energy intake, in industrial countries, like UK and USA. While fruit and vegetables do not make a significant contribution to macronutrient intake, they make an important contribution to vitamins, minerals and dietary fibre. The legumes, especially the seed legumes, are of major nutritional significance, particularly in the developing world as they are the main source of proteins. Rising income levels in developing countries like China, India and Brazil coupled with increase in production of many foods of plant and animal origin have made food more accessible and affordable. A major shift in consumption pattern of animal food is being seen together with increased consumption of sugar, sweeteners and vegetable oil in many parts of the developing world. Besides these changes in food habits, a significant change in lifestyle is contributing to increased lifestyle disorders and nutrition related non-communicable and degenerative diseases (NR-NCD) like diabetes, CVD, obesity and intestinal diseases/ disorders.

India's history in health foods is one that is full of traditional and regionally ethnic foods. Cooking contains condiments, herbs, spices, whole foods, fruits, and vegetables, many of which are unique to Indian cuisine. In India, food containing healthy properties, beyond its nutritional value, has been documented throughout the ages, and many foods and medicinal plants have been used to treat common illnesses. Most of these foods were crude extracts and mixtures of naturally occurring substances of plant origin, widely referred in ancient Indian texts like 'Ayurveda (the science of longevity)'. New research shows that many of these foods, in fact, do have preventative properties. Since the mid 1980s, numerous studies have shown the relation between colorectal cancer and consumption of fruit and vegetables. The hypotheses as to how fruit and vegetable intake may reduce the risk of colon or rectal cancer are numerous and involve independently or additively the many potential anti-carcinogenic compounds found in fruit and vegetables (eg, fiber, carotenoids, vitamin C, folate, glucosinolates, and allium compounds).

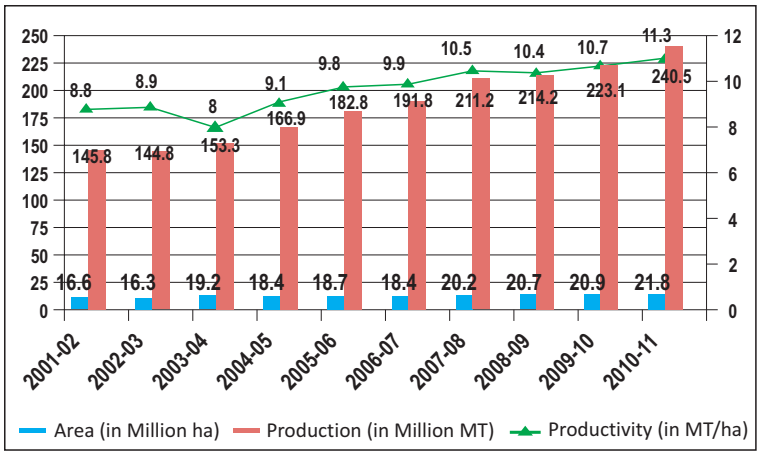


Figure 1. Area, production and productivity of horticultural crops in India

Scenario of horticulture and human nutrition

Horticulture has emerged as a core sector in agriculture passing through the various phases with coverage of nearly 21.8 million ha, having an annual production of 240.5 million tonnes, which includes a wide variety of crops, vegetables, root and tuber crops, mushroom, floriculture, medicinal and aromatic plants, nuts, plantation crops including coconut and oil palm which are grown in different agro-climatic conditions. Change in area and production provided in Fig. 1 clearly indicates that production gain is both due to area and productivity increase. Though these crops occupy hardly 9% of the cropped area they contribute over 30.4% to the gross agricultural output in the country. Fruits and vegetables are also rich source of vitamins, minerals, proteins and carbohydrates, etc. which are essential in human nutrition. Hence, these are referred to as protective foods and assume great importance as nutritional security of the people. Thus, cultivation of horticultural crops plays a vital role in the prosperity of a nation and is directly linked with the health and happiness of the people. The emphasis on horticulture is recognition of the need for attaining nutrition security and for a sustainable income. Healthier diets will improve the learning capacity of children and the working capacity of adults, leading to higher incomes and a reduction in poverty.

India is the second largest producer of fruits after China, with a production of 70.5 million tons of fruits from an area of 6.1 million hectares. A large variety of fruits are grown in India, of which mango, banana, citrus, guava, grape, pineapple and apple are the major ones. Apart from these, fruits like papaya, sapota, annona, phalsa, jackfruit, ber, pomegranate in tropical and sub-tropical groups and peach, pear, almond, walnut, apricot and strawberry in the temperate group are grown in a sizeable area. In human nutrition, fruits and vegetables play an important role towards the making of a balanced diet. To some extent, they provide energy rich food. Banana, jackfruit, annona, sapota and fig contain carbohydrates in the range 19 to 24 percent and are good sources of energy comparable to potato, colocasia, tender maize, yam and green peas (15.9 to 24.6 per cent carbohydrates and 79 to 125 k cal energy). Closely following this group of fruits as good sources of energy are mango, litchi, grapes, ber, pomegranate, phalsa and jamun. Fresh avocado is the only highest energy yielding fresh fruit yielding 161 to 215 kcal per 100 g of edible portion due to its high fat content (15-26%). But, fruit and vegetables are indispensable as sources of vitamins and minerals, which help in building resistance against diseases. Fruits and vegetables furnish 90% of the vitamin C and 60% vitamin A in the world. Mango and papaya are rich in pro-vitamin A and guava in vitamin C, Banana, among fruits is a good source of carbohydrate.

Fruits yield larger quantities of food per hectare compared to cereals. For example paddy yield (max.) is 3 tonnes/ ha whereas it is 22 tonnes/ha in case of banana; 45 tonnes/ha in case of pineapple and 40 tonnes/ha in case of grapes. Much less area is required to obtain the calorific requirement per adult per year (11,00,000 kcal) from growing banana (0.03 hectare) or mango (0.16 hectare) than from growing wheat (0.44 hectare). Horticultural crops in general are poor sources of protein as they contain less than 2% protein. Fruits are a rich source of organic acids like citric acid in citrus fruits and tartaric acid in grapes, which stimulate appetite and helping digestion. Papaya contains protein digesting enzymes. Many fruits and vegetables possess laxative property due to the presence of dietary fibre and pectin, which stimulate intestinal activity. Due to poverty, micronutrient malnutrition, is posing a threat to vulnerable sections in Asia and the Pacific regions. This is manifested in the form of vitamin

The emphasis on horticulture is recognition of the need for attaining nutrition security and for a sustainable income. Healthier diets will improve the learning capacity of children and the working capacity of adults, leading to higher incomes and a reduction in poverty.

Table 3. Projected demand of horticultural crops

Commodity	Production (million ton)			
	1991-92	2007-08	2010-11	2016-2017
Fruits	28.63	63.50	74.87	98.00
Vegetables	58.53	125.89	146.55	220.20
Spices	1.90	4. 10	5.35	5.50
Flowers	-	0.87	1.08	1.50
Plantation Crops	7.49	11.30	12.38	15.60
Total	**96.95**	**207.01**	**240.5**	**333.8**

[Source: Singh, HP, 2007, Indian Horticulture, 52(4); NHB, 2011]

A deficiency, iron deficiency anaemia and iodine deficiency disorders. The first two could be minimized, as discussed earlier, through horticulture intervention and awareness drive.

Production of horticultural crops needed to achieve food and nutritional security

Vegetables and fruits appear to be playing a prominent role in prevention of several chronic diseases such as heart disease, cancer, cataract, osteoporosis, diabetes, etc. The active constituents responsible for this property have been shown to be a number of nutrients, phyto-chemicals and fibre. Apart from micronutrient related function, the bioactive phyto-chemicals prevent degenerative processes by antioxidant activity. In order to have protective effect, it is necessary to consume 400-600 g of fruits and vegetables every day. But, the consumption level of fruits is low and widely variable from region to region in India. Fruit consumption level is as low as 1 g/day/person in the states of Manipur and Nagaland to 70 g/day/person in the Union territory of Chandigarh. An increase in the intake of fruits along with vegetables will meet the required daily allowance (RDA) of many nutrients. India with more than 74.8 million tonnes of fruits and 146.5 million tonnes of vegetables is the second largest producer of fruits and vegetables in the world next only to Brazil and China. However, per capita consumption of fruits and vegetables in India is only around 46 g and 130 g against a minimum of about 92 g and 300 g respectively recommended by Indian Council of Medical Research and National Institute of Nutrition, Hyderabad. With the present level of population, the annual requirement of horticulture produce will be 333.8 million tonnes by 2016-17 as against the present level of production 240.5 million tonnes during 2010-11.

Challenges ahead in food production

The growing population is the major concern and is the big challenge for meeting the food needs worldwide. According to one of the predictions from FAO, the agricultural productivity in the world will sustain the growing population in 2030, but millions of people in developing countries will starve for food nutrition and remain hungry due to shortage. By 2025, 83% of the expected global population of 8.5 billion will be in the developing world. The question before us is - can we meet food needs and provide nutrition, health care, fuel and fiber to growing population? The answer is – 'it is difficult, but not impossible'. Past experiences build the confidence, that, country has achieved. It was difficult to feed 320 million populations and now we are able to feed 1011 million people and have surplus too beside appreciate growth in horticultural and livestock. Crops which were not grown at particular location are made to grow. Indian Agriculture, even with high pressure on land (17% population from 2.3% land and 4.5% water) has fed the Indian population. In the post-independence period, India made a steady progress in agriculture. Agriculture was simple, extra land and water was available, few genes did wonder that ushered in 'Green Revolution'. But the challenges before us now are much greater than before. In the prevailing circumstances of shrinking farming land, depleting water resources and changing climate, the situation has become complex. Optimistically, through the inputs of science and technology, challenges ahead could be converted into opportunities for sustainable production. Horticulture has proved to be the best mean of diversification for higher land productivity has been achieved with context to gross return per hectare. But there is need to make the sustainable development in production of fruits, vegetables, tubers, plantations and tuber crops for meeting the growing demand of rising population with nutritionally rich horticulture produce.

Impact of climate change

Climate change has been perceived as threat and will have impact on horticultural crops, due to erratic rainfall, more demands for water, and enhanced biotic and abiotic stresses. However, the changes will not only be harmful, as enhanced CO_2 concentration may enhance photosynthesis and increased temperature may hasten the process of maturity. Increased temperature will have more effect on reproductive biology and reduced water may affect the productivity but adaptive mechanism like time adjustment and productive use of water shall reduce the negative impact. These challenges could be addressed through identification of the gene tolerant to high temperature, flooding and drought, development of nutrient efficient cultivars and production system for efficient use of nutrients and water. Strategies have to address the enhanced water efficiency, cultural practices that conserve water and promote crop. Development of climate resilient horticultural crops which are tolerant to high temperature, moisture stress, salinity and climate proofing through genomics and biotechnology would be essentially required. This would need highly prioritized research to address the impact of climate change. We must also have to enhance the knowledge to address all the strategies which can convert the challenges into opportunity. Concerted and integrated efforts with effectiveness and efficiency will be essential to meet the ever increasing demand.

Research system of horticulture in India

The research system for horticultural crops in India, is well organized and committed. The research for horticultural crops is being carried out at 10 ICAR institutes (with 24 regional stations) 6 Directorates and 7 National Research Centers (on major crops). Multi-disciplinary and area specific research is also conducted under All India Co-ordinated Research Projects each on Tropical, Sub-Tropical, Arid Fruits, Vegetables, Potato, Tuber Crops, Mushroom; Floriculture, Medicinal and Aromatic crops, Betel vine, Palms, Cashew, and Spices at 251 centers located at various research institutes and State Agricultural Universities. In addition, 5 network projects have been approved in XI plan to address specific issues.

Technological advancement in horticulture

In the present time, diversification, market orientation and commercialization, involving the introduction of new crops and varieties, increased share of horticulture in the cropping pattern, diversion into processing and export oriented production of a large number of crops are the most important changes noticed in the recent past. Several technological innovations have been advanced in the complete value chain involving technology for orchard establishment, availability of true to type planting material, plant architecture engineering and management, mulching, fruit thinning, integrated nutrient management, water management, integrated pest and disease management, post harvest technology, processing and marketing. The positive changes in horticulture sector have occurred because it has received the importance from all the stakeholders, public sector, private sector and farmers during the last decade. This is primarily the result of realization that diversification to horticultural crops is now the major option to improve livelihood security and health care. Keeping in view the dynamic needs of diverse stakeholders under the National Agriculture Research System, the R&D on horticulture has been undertaken in several multi-crop and multi-disciplinary institutes and the several technologies has emerged.

Crop improvement in horticultural crops

Efforts have been made to develop high yielding varieties and hybrids of different horticultural crops for different regions and have been widely adopted for cultivation by farmers in the various parts of the country. More than 1780 improved high yielding, high quality coupled with disease and pest resistant varieties and hybrids have been released by various institutes/universities for cultivation in diverse agro-climatic conditions of the country. Regular bearing mango hybrid, export quality grapes, multiple disease resistant vegetable hybrids, high value spices and tuber crops of industrial use have been developed. Improved varieties have revolutionized the horticultural sectors. High-yielding Gauri Sankar and Sree Bhadra sweet potatoes have focus in minimizing malnutrition and improving nutritional security. Similarly, breeding to develop grape cultivars suitable for vine making, black pepper cultivars rich in aroma compound 'Caryophyllene', development of processing tomatoes etc. are some of the research programmes being carried out in various horticultural institutes. Varieties are being bred for processing qualities such as Kufri Chipsona in potato for chips making, high TSS white onion in NRCOG W448, grape varieties suitable for vine making, papaya varieties for table and papain production are some of the successful research attempts being carried out at various ICAR institutes.

Hybrid technology for high productivity and quality

The hybrid technology has revolutionized the production of vegetable crops and demand for hybrid seeds is continuously increasing. Hybrid of tomato, chilli, cucumber

and muskmelon are being produced at several locations in the different States in the country. Besides this, imported seeds of mostly for cole crops are available to the Indian farmers. All India Co-ordinated Vegetable Improvement Project (AICVIP) has so far recommended for cultivation of more than 45 hybrids. Besides, many hybrids of vegetable crops, developed and marketed by private sector are also available to the farmers. At present, area under vegetable hybrids accounts for 10% of total area. Area under high yielding F1 hybrids in important vegetable crops ranges 17.8-31.5% in tomato (31.5%), cabbage (31.39%) and brinjal (17.8%) and areas under capsicum and chilli are also under expansion. High production, earliness, superior quality, uniform produce and resistance to biotic and abiotic stresses are the main advantages of F1 hybrids. Keeping in view the dynamic needs, the research efforts in various institutes has focus on development of hybrids with multiple disease resistance, early maturity and utilizing male sterility system. CMS lines have successfully been utilized to produce potential experimental crosses of onion and commercial hybrids of chilli. Nuclear male sterile lines (GMS) of tomato, brinjal and chilli were introduced/established and are being successfully utilized for developing a number of cost effective experimental crosses at various centers. Hybrid seeds of chilli (CH-1, CH-3, CCH-3), brinjal (Kashi Sandesh), tomato (TH-1) are being now produced by the farmers by up scaling their skill. The parental lines of a number of hybrids developed have been sold on non-exclusive basis to the seed companies with aim to promote these hybrids among the farmers.

Biotechnological interventions for crop improvement

Biotechnological tools have supplemented various conventional approaches in conservation, characterization and utilization in horticultural crops for increasing the production and productivity. These tools have provided ample scope for the breeder to improve diverse traits, including yield, disease resistance, abiotic stress tolerance and quality more precisely and in reduced time. Androgenesis has been successfully used for brinjal, pepper, cabbage, cauliflower, potato, asparagus and carrot, whereas gynogenesis has been successful in onion. Embryo rescue has been successfully employed in production of hybrids of Musa accuminata x Musa balbisiana, Carica papaya x Carica cauliflora, interspecific crosses in pineapple and seedless x seedless grape varieties. Use of molecular markers for crop profiling, finger printing, molecular taxonomy, identification of duplicates, hybrids, estimation of genetic fidelity and tagging of genes for marker aided selections is gaining importance. Efforts are under way to fingerprint mango, banana, cashew nut, kiwifruit, walnut, grape, citrus, etc. by different research centers. DNA sequence has been isolated for root-knot nematode resistance (Mi) gene in tomato and is being used to facilitate breeding this valued trait into new varieties and even other species. QTL mapping are in progress in many crops such as brinjal, tomato, capsicum while association mapping (linkage disequilibrium) is used in case of perennials such as black pepper, cardamom and coconut. Gene pyramiding for useful genes in one back ground variety of commerce is the mainstay of biotechnological research and is in progress in solanaceous vegetables.

Efforts are in progress at various institutions in India to tackle issues of managing disease resistance, resistance to insect pests, nutritional quality improvement and to extend shelf life of fruits and vegetables through development of transgenics. A network project is in operation which involves 6 horticultural crops (banana, brinjal, cassava, papaya, potato and tomato. A large number of transgenics with Cry-l AB gene have been produced with resistance to the most damaging insects, usually Lepidopteran followed by Coleopteran and Dipterans. Nutritionally improved transgenic potatoes have been obtained by transferring the amaranth seed albumin gene (AmA1) from Amaranthus hypochondriacus into potato and also succeeded in reversing the sweetening process in potato by using invertase inhibitor gene. RN Biotechnology has succeeded in developing potato which do not sweeten at lower temperature. RB gene transferred in two potato cultivar has given appreciable protection against Late blight disease which is a major concern.

High density planting system

High density planting technology has been standardized for many crops and also adopted by many fruit growers in India. It has become a success story in banana, pineapple, citrus, papaya, mango, cashew and few other fruit crops. High density orchards not only have provided higher yield and net economic returns per unit area in the initial years, but also facilitated more efficient use of inputs. In high density planting, closer spacing has given two and half times more yield than normal spacing in mango, guava, papaya and pomegranate. The varieties suitable for high density planting system have also been identified. Technologies for high density planting, canopy management and rejuvenation of old and senile orchards have been developed and successfully demonstrated for many fruit crops. Technologies for meadow orcharding in guava is being adopted for

higher productivity. Coconut based high density multi-species cropping system helps to improve soil properties, realize the better stability for the farm net income and generates additional employment.

Water use technology with high efficiency

Good water management using well designed system is critical for sustaining production and quality of produce, more specifically for horticultural crops. If water is applied, when stresses is needed there is crop loss, and if water deficit is experienced at active growth phase or fruit development stages it causes severe loss to production and quality. Therefore, it is imperative to manage the water which answers, when, where and how to draw maximum efficiency and productivity. Therefore scheduling based on plant water balance in consonance with soil and climate is appropriate.

Green or organic horticulture

Changing dietary habits among many segments of the population coupled with health consciousness has resulted in growing demand for organic food. Demand for green food is on increase and harnessing the potential of organic farming which address soil health, human health and environmental health is considered to have greater significance. In last few years, organic farming has attracted many farmers across the country especially combined with ecotourism and have experimented successfully. India is best known as an exporter of organic tea and also has niche market for spices and fruits and vegetables. India also encouraged the production and export of organic food by developing capacity and capability which exists more in horticultural crops. Protocol for organic production may horticultural crops has been worked out which includes use of resistant varieties, management of soil vermin-compost and biofertilizer and management of disease and pests using biological control as well as bio-pesticides.

Horticulture based cropping systems

Farming system and cropping system approach for sustainable use of farm resources and reduced risks have been successfully demonstrated in perennial horticulture. Various farming system models have been developed and suitable crops in earlier year of tree plantation to maximize the output in different agro-climatic conditions have also been developed. Shade loving medicinal and aromatic crops like patchouli, rose geranium, long pepper, sarpgandha, kacholam, etc., are successfully grown under coconut and areca nut. The choice of crop selection is mainly based on farmer's need. The elephant foot yam is widely grown as intercrops in litchi, coconut, banana orchards. Spices like black pepper, ginger, turmeric, vanilla, nutmeg, clove and some medicinal plants are the ideal intercrops for coconut. Careful selection of enterprises vis-à-vis optimum allocation of resources available in farming system enables dynamic nature of competition, cost effectiveness and efficiency by improving the efficiency of inputs, enhanced genetic productivity and harnessing complementarities of enterprises.

Hi-tech horticulture and precision farming

Hi-tech horticulture is the deployment of modern technology which is capital intensive, less environment dependent, having capacity to improve the productivity and quality of produce. On the other hand, Precision Farming involves the application of technologies and principles to manage spatial and temporal variability associated with all the aspects of horticultural production for improving crop performance and environment quality. Precision farming calls for efficient management of resources through location-specific hi-tech interventions. Hi-tech horticulture encompasses a variety of interventions such as micro irrigation, fertigation, protected/greenhouse cultivation, soil and leaf nutrient based fertilizer management, mulching for in-situ moisture conservation, micro propagation, biotechnology for germplasm, genetically modified crops, use of biofertilizers, vermiculture, high-density planting, hi-tech mechanization, green food, soil-less culture, biological control etc. Precision farming application of fertilizers has been proved profitable than the recommendations based on package of practices. About 17 Precision Farming Development Centers (PFDC) have been established in different agro-climatic regions. Activities like green house construction, mulching, shade net and plastic tunnels are also being promoted. The crops where some of the components of precision farming have been practiced are banana, grape, pomegranate, capsicum, tomato, chilli, cashew and selected flowers.

Post harvest technology

In order to make horticulture a viable enterprise, value addition is essential. Harvest indices, grading, packaging, storage techniques have been developed/standardized for major horticultural crops. Value addition through dehydration of fruits and vegetables including freeze drying, dried and processed fruits, vegetables and spices and fermented products have also been developed. Potato chips, spices flakes and fingers, French fries are becoming popular as fast food business. Development of new products like juice punches, banana chips and fingers, mango nectar and fruit

The nutritional status of the population can be improved through creating an environment in which every household has sufficient access to fruits and vegetables at affordable prices throughout the year and the necessary knowledge and skills to prepare and consume foods to complement their diet.

kernel derived cocoa substitute, essential oils from citrus, fruit wines, dehydrated products from grape, pomegranate, mango, apricot and coconut, grape and fruit wines, value-added coconut products like snowball tender coconut, coconut milk powder and pouched tender coconut water (Cocojal), etc. are getting popular day by day. Improved blending/packaging of tea and coffee have opened new markets. New products such as tetra pack filled fruit juices are now house hold items. Packing materials like Corrugated Fibreboard Boxes (CFBs), perforated punnetttes, cling film wraps, sachets, etc. have been standardized for packaging of different fresh horticultural produce.

As food consumption patterns are changing towards more convenient foods, the demand for products like pre-packed salads, packed mushrooms and baby corn frozen vegetables, etc. are increasing and are sold in shopping malls. Consumer friendly products like frozen green peas, ready to use salad mixes, vegetable sprouts, ready-to-cook fresh cut vegetables are major retail items, which have already started peeping out of retail windows. In order to reduce dependence on refrigerated storage, low cost eco-friendly cool chamber for on-farm storage of fruits and vegetables has been developed. For preventing the post harvest losses proper storage, cold preservation, packaging and transport methods with Hazard analysis Critical Control Point norms have to be given more thrust. Standardization of Modified Atmosphere Packaging and Storage systems with greater emphasis on safety (pesticide free), nutrition and quality is getting emphasis.

Mechanization in horticulture

Most of the horticultural operations in India are done manually or with animal power. Wherever, the farming operations are mechanized the crop productivity is high. Several machines and tools have been developed to enhancing the efficiency of farm operation. In fruit crops, the tractor operated pit hole digger and bucket excavators (JCB) have been developed and need adoption. The fruit nurseries mechanisation using media siever, media mixer and plastic bag filler have been achieved.

Steps ahead towards ensuring nutritional security

There is need to enhance the level of food security and nutrition by improving the efficiency of the horticultural production system and associated support services such as marketing, processing, credit, post-harvest loss prevention, etc. through the application of modern technologies and diversified cropping patterns, that will promote the production and productivity, and provide higher incomes to the small and marginal farming communities in a sustainable manner. The nutritional status of the population can be improved through creating an environment in which every household has sufficient access to fruits and vegetables at affordable prices throughout the year and the necessary knowledge and skills to prepare and consume foods to complement their diet, specifically targeting the poor women farmers and children. Develop sustainable capability among low income communities in increasing productivity and year round production of horticultural crops (fruits, vegetables and spices) through the introduction of superior quality planting materials and seeds and the promotion of production skills. Minimize post-harvest losses, improve post-harvest handling and maximize primary producers' profits and income through the promotion of on-farm and community-based produce handling methods as well as to enhance marketing support services. Promote income-generating activities, including agro-processing, to enable the optimum utilization of horticultural produce to supplement family incomes, with additional support from micro-credit and food assistance programs, especially for poor and disadvantaged group. Increase the nutritional awareness among the beneficiaries and develop a comprehensive food-based nutrition program to reduce malnutrition in the target groups comprising all groups of population with major focus on women and children.

Production of fruits, vegetables, flowers, spices and plantation crops has been success stories of the last decade, and to continue to build on success, sector has to face challenges. Therefore, there is a need to prioritize the action outlining the research, development and extension, to make this sector a key driver in rural and regional economic development. Demand for high value produce is growing both in domestic and overseas market at the same time, competition is also increasing. New changes in retailing participation of corporate sector means that retailing will

depend upon strategic alliance and supply chain management. Strengthen research on impact assessment of climate change on horticultural crops using controlled environmental facilities and simulation models, analysis of past weather data and integration with productivity changes (including extreme events). Production, demand and supply of commodities, economics and trade, sensitive stages and process during crop development, diversity and dynamics of major insects, microbes and pathogens, intensification of studies on pest, disease and weather relationships demand focused alteration. Therefore, sustainability will depend upon improving competitiveness, reducing impact on environment, quality assurance and food safety and capability of communities engaged in this sector to manage change.

Strategies for XII Plan

Horticultural crops are highly dynamic, especially the flowers, vegetables and many fruits wherein consumer preference determines the economics. Production of fruits, vegetables, flowers, spices and plantation crops has been a success story of the last decade, and to continue to build on success, sector has to face the challenges. Therefore, there is a need to prioritize the action outlining the research, development and extension, to make this sector a key driver in rural and regional economic development. Demand for high value produce is growing both in domestic and overseas market at the same time, competition is also increasing. New changes in retailing participation of corporate sector means that retailing will depend upon strategic alliance and supply chain management. Strengthened research on impact assessment of climate change on horticultural crops using controlled environmental facilities and simulation models, analysis of past weather data and integration with productivity changes (including extreme events). Production, demand and supply of commodities, economics and trade, sensitive stages and process during crop development, diversity and dynamics of major insects, microbes and pathogens, intensification of studies on pest, disease and weather relationships, etc. Therefore, sustainability will depend upon improving competitiveness, reducing impact on environment, quality assurance and food safety and capability of communities engaged in this sector to manage change. The new initiatives to be taken to strengthen the research activities are as follows :

i. Genetic resource enhancement, its evaluation and valuation and development of cultivars which can fit into achieving vertical growth and can sustain climate change and meet consumer's requirement towards ensuring nutritional security. Improve the understanding of interactions between native ecosystems and production systems and develop best practices to conserve biodiversity. Genotypic and phynotyping to locate desirable genes.

ii. Develop varieties with durable resistance to multiple diseases and pests; heat, drought and salt with high level of bioactive compounds, having high nutrient and water use efficiency.

iii. Biotechnological tools must be used in conjunction with conventional breeding to tag genes of interest for marker assisted selection. Utilize the tools of bio-informatics and nanotechnology for enhancing the output.

iv. Eco-region specific technology generation based on maximum productivity of available natural resources.

v. Develop system for productive use of water on nutrient.

vi. Developing a system for plant architectural engineering and its management for efficient utilization of nutrients, air, water and sunlight to optimize production with resources.

vii. Integrated management of emerging diseases and pests and development of new innovative diagnostic techniques for rapid, accurate and cost effective detection of high impact pests and diseases.

viii. Use of nanotechnologies for effective management of key biotic and abiotic stresses in horticultural crops and development of nano based diagnostic kit for quick diagnosis of pathogens and viral diseases.

ix. Develop production and post-harvest technologies to improve product quality and minimize environmental impacts. Increasing the value of production by reducing variability in yield, quality, reducing crop losses and increasing marketability.

x. Mechanization of operation and use of non-conventional energies.

xi. Technological innovations value chain management for reduction of losses.

xii. Protected cultivation for enhanced profitability and availability to meet consumers need.

xiii. Inter institutional mechanisms to network and review the ongoing program of biotechnology, cost effective production technologies, post harvest technology, farm mechanization, transfer of technology and organic farming for optimization.

Conclusion

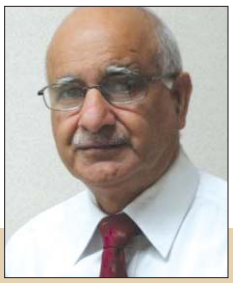
The agricultural paradigm is already undergoing a shift with focus from cereal production to diversified farming. The food security was defined in its most basic form as physical, social and economic access by all people at all times to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life. Horticultural crops besides improving biological productivity and nutritional standards also have enormous scope for enhancing profitability of farm and providing livelihood options. This group of crops comprising fruits, vegetables, root and tuber crops, plantation crops, medicinal and aromatic plants, spices and condiments and ornamental crops, would constitute core of any such agro-economic strategy. Past investment has been rewarding in terms of increased production, productivity and export of horticultural produce. However, challenges confronting are still many. Although, the country is second largest producer of fruits and vegetables; the availability of fruits and vegetables still continues to be much below the dietary requirements. With increase in per capita income and accelerated growth of health conscious population, demand for horticultural produce is on increase which is expected to further accelerate, which will require more production. But the production has to be competitive both in terms of quality and price. Thus, the potentialities, which exist, need to be harnessed and gains have to be sustained. Development of improved cultivars with high quality characteristics, productivity, resistance to pest and disease and tolerant to abiotic stresses. The technologies must improve the efficiency of water and nutrients and variability in yield, quality and also reduced post harvest crop losses. Efforts will also be needed to ensure timely availability of quality seed and planting material. Consequently, horticultural development has to be seen as integrated approach, addressing important gaps, in harnessing the potential through targeted research with focus on enhancing efficiency. Thus, technology driven horticulture is expected to address the concern for complimentary and nutritional security, health care leading to ultimately economic development.

'Status quo' as you know, is Latin for 'the mess we are in.'

– Ronald Reagan

Innovation In Agriculture – Need Of The Hour

Dr. Bangali Baboo,
National Director, National Agricultural Innovation Project, ICAR



Innovation in agriculture has become imperative with the growing need for food for a burgeoning world population that is now close to 7 bn. The agriculture scene in India saw a sea change from the early days of chronic dependence on monsoons, outdated techniques of tilling the land, obsolete technologies that gave at best marginal rise in income to the already bent farmer. The Green Revolution brought about a qualitative change that metamorphosed India from a net agricultural produce importer to a net exporter of grains and cash crops today. It may rightly be said that innovation has been at the source of this positive change in scene that once saw famine and droughts, starvation deaths and acute shortage of food grains as a recurring theme in India. The setting up of the National Agricultural Innovation Project, a World Bank aided institution set up to speedup the innovation practices in India jointly with the many stakeholder institutions working with ICAR.

During the currency of the NAIP, a number of pathbreaking innovations have been introduced and popularized which have the potential to keep India ahead in the race to self-sufficiency and a nutritionally balanced Indian population. Here are a few of the achievements under NAIP which would be of interest to the general readership of Tapasya.

Dr. Bangali Baboo is National Director of World Bank funded National Agricultural Innovation Project (NAIP) with Indian Council of Agricultural Research (ICAR). As National Director he is overseeing, monitoring and implementing this mega project at national level through partnerships with all stakeholders in Indian agriculture. He was Director, Indian Institute of Natural Resins & Gums, Ranchi; Project Coordinator, All India Coordinated Research Project on Processing, Handling & Storage of Jaggery & Khandsari, at Indian Institute of Sugarcane Research, Lucknow besides Head of Division at Central Institute of Post Harvest Engineering and Technology, Ludhiana and Network Coordinator of all India Network Project on Natural Resins and Gums at Ranchi.

An eminent Agricultural Engineer having handled several multidisciplinary research projects centered around post harvest technology in 23 crops and commodities sponsored by different Ministries of Govt. of India as also FAO of the UN. Served in five different States of India viz. Kerala, U.P., Punjab, Jharkhand and Delhi.

His outstanding contribution in agricultural research and management, creative organizational deeds, research extension and commercialization are recognized by several national and international professional societies besides State agricultural university. His areas of interest are research project management, post harvest technology and agricultural innovations.

Millets Revived in Indian Diet

Millets are important source of food, feed and livelihood in disadvantaged areas like less rainfall, high temperature and poor soils. These are good source of dietary fibre, minerals, alkaline in nature besides other health benefits. During last 3-4 decades food preference shifted from millets resulting in reduction in area and production. Through NAIP efforts several consumer acceptable products have been developed, commercialized and popularized. Some of these are multigrain atta, millet flakes, biscuits/cookies, etc. Some products are being produced by private sector and sold under their brand names. The efforts on pilot scale have opened up potential to recapture millets in Indian diet.

m-KRISHI® - Fisheries Advisory Service

In coastal districts where marine fishermen are losing livelihoods due to distribution shift of pelagic fishes, submergence of low lying areas, unseasonal and extreme rains, an innovative service "m-KRISHI®" has been developed under the GEF component of NAIP. This advisory service is packaged and promoted by Central Marine Fisheries Research Institute (CMFRI), Indian National Centre for Ocean Information Services (INCOIS) and Tata Consultancy Services (TCS). It is a collation, analysis and integration of thermal, wind speed and algal movement data. It provides oceanic wind speed and direction advisories 4 times daily and 5 days in advance and potential fishing zone (PFZ) advisories 3-4 days in advance. This service, being mobile based, ensures continuity and dependability in reaching the communities most effectively and quickly as compared to other sources of dissemination.

About 1040 craft owners and operators, 6240 fishermen and women are collectively benefited under 14 pilot fisheries cooperatives in Raigad district of Maharashtra. This innovation increased fish catch efficiency, reduced time taken in each trip and diesel consumption in every trip besides mitigating GHG emissions due to reduced diesel consumption.

The advisory service is likely to result in a fiscal saving (subsidy) of INR 20 M annually to the Govt. of Maharashtra, and a financial savings of diesel to the extent of INR 97 M annually by the fishermen.

Composite Rubber Dam for Watershed Check Dams

"Flexi-Rubber Dams" have been designed under NAIP for existing check-dams on small rivulets. In Odisha, several check dams are constructed on small perennial and seasonal water streams for irrigation. The valves in these check dams are not completely leak proof and are inconvenient to operate, thus, risk of breach on both sides of dam. The rubber dam installed on these check dams are free from such shortcomings as these can be deflated during floods.

The composite rubber reinforced with technical textile for the flexi-rubber dam is jointly developed by Indian Rubber Manufacturers Research Association (IRMRA), Thane, Central Institute of Research for Cotton Technology, Mumbai, Kusumgar Corporates (KC), Mumbai and installed by Directorate of Water

Management, Bhubaneshwar. The estimated cost of flexi-rubber dam is ₹ 30,000-35,000. It facilitates one assured crop during monsoon season and irrigation during the rabbi crop. Around 100 farmers are benefited in Bhaghamari village (40 ha) with 62% increased rice productivity.

Enhancing Income through Processing and Value Addition to Non-timber Forest Produce

Among several tree species of economic and food value, tamarind, jackfruit and palas are found to be naturally occurring in and outside forest. Efforts through NAIP organized forest and forest fringe dwellers into commodity specific groups. They were given technological and financial inputs, for scientific production, processing and also linking to market. The results are as follows:

In Pedawada cluster of Bastar district (Chhattisgarh), 60 tribal families were organized in 6 groups. They are doing collection, dehulling, deseeding, packaging and marketing themselves. For this, NAIP trained these families and facilitated this activity as a successful pilot. Total produce handled by the cluster is about 200 q providing additional income of about ₹ 8200 to each family every year besides eliminating middlemen.

Jackfruit occurring abundantly in Sunderpahari and Godda forest ranges, Godda district (Jharkhand) were underutilized and sold at low price. A group was trained, facilitated and encouraged by NAIP for promoting jackfruit value addition. Pickles were prepared and sold under the brand name Yogini". It fetches higher price besides employment to 117 women. Total production in a year is about 2 tons resulting in additional income of about ₹1150 to every participant in the group.

Palas (Butea monosperma) is found in abundance in Betul district of Madhya Pradesh. Aiming at utilizing this resource for additional income, 92 tribal farmers were organized in a group by an NGO (Pragya). About 4500 trees of Palas, Kusum, Ber were inoculated for lac cultivation producing 13470 kg of brood lac. This resulted in an income of about ₹ 12000-15000 to each farmer every year. Attracted by the successful model, other villagers are following.

Commercial minituber production from net house at CPRI Regional Station, Modipuram

Nanocellulose to Enhance Performance of Biodegradable Polymer Composites

A membrane reactor, for continuous production of nanocellulose by enzyme hydrolysis using ultrafiltration membranes, was designed and fabricated by Central Institute for Research on Cotton Technology (CIRCOT), Mumbai. Nanocellulose impregnated potato starch film showed 40% improvement in mechanical properties, and nanocellulose impregnated ê-carrageenan film showed 10 times low oxygen permeability compared to that of their non-impregnated counterparts. This biodegradable film has potential for use as packaging material.

EMCCD camera in clean room at NDRI, Karnal

The problem is never how to get new, innovative thoughts into your mind, but how to get old ones out. Every mind is a building filled with archaic furniture. Clean out a corner of your mind and creativity will instantly fill it.

– Dee Hock

Often enough, we tend to take basic concepts and thinking on most human endeavours and issues for granted. This includes Management and its many hues. Some of the principles and concepts of Management subjects like Marketing, Organizational Behaviour or Human Resource Management would do well to be reignited in our minds and jog our awareness, so as to make our functioning in the workplace more effective and rewarding – both for the organization as also for ourselves. With this in view, through this column, Tapasya brings the thoughts of eminent writers on Management related subjects back on stage, which could remind us of the basic purpose of management – to get the best out of every stakeholder in the business and bring satisfaction in the process through better results for one and all.

(For more on strategy planning and execution, readers are recommended to read Crafting and Executing Strategy: The Quest for Competitive Advantage: Concepts and Cases by Arthur A Townsend, A. J. Strickland, John E Gamble and Arun K Jain, published by Tata McGraw Hill, from which the following is excerpted)

In a Nutshell

Corporate Governance: The Role Of The Board Of Directors In The Strategy-Making, Strategy-Executing Process

Although senior managers have lead responsibility for crafting and executing a company's strategy, it is the duty of the board of directors to exercise strong oversight and see that the five tasks of strategic management are done in a manner that benefits shareholders (in the case of investor-owned enterprises) or stakeholders (in the case of not-for-profit organizations). In watching over management's strategy-making, strategy-executing actions and making sure that executive actions are not only proper but also aligned with the interests of stakeholders, a company's board of directors has four important obligations to fulfill:

1. Be inquiring critics and oversee the company's direction, strategy, and business approaches. Board members must ask probing questions and draw on their business acumen to make independent judgments about whether strategy proposals have been adequately analyzed and whether proposed strategic actions appear to have greater promise than alternatives. If executive management is bringing well-supported and reasoned strategy proposals to the board, there's little reason for board members to aggressively challenge or pick apart everything put before them. Asking incisive questions is usually sufficient to test whether the case for management's proposal is compelling. However, when the company's strategy is failing or is plagued with faulty execution, and certainly when there is a precipitous collapse in profitability, board members have a duty to express their concerns about the validity of the strategy and/or operating methods, initiate debate about the company's strategic path, hold one-on-one discussions with key executives and other board members, and perhaps directly intervene as a group to alter the company's executive leadership and, ultimately, its strategy and business approaches.

2. Evaluate the caliber of senior executives' strategy-making and strategy-executing skills. The board is always responsible for determining whether the current CEO is doing a good job of strategic leadership (as a basis for awarding salary increases and bonuses and deciding on retention or removal). Boards must also exercise due diligence in evaluating the strategic leadership skills of other senior executives in line to succeed the CEO. When

the incumbent CEO steps down or leaves for a position elsewhere, the board must elect a successor, either going with an insider or deciding that a better qualified outsider is needed to perhaps radically change the company's strategic course.

3. Institute a compensation plan for top executives that rewards them for actions and results that serve stakeholder interests, and most especially those of shareholders. A basic principle of corporate governance is that the owners of a corporation delegate operating authority and managerial control to top management in return for compensation. In their role as an agent of shareholders, top executives have a clear and unequivocal duty to make decisions and operate the company in accord with shareholder interests (but this does not mean disregarding the interests of other stakeholders, particularly those of employees, with whom they also have an agency relationship). Most boards of directors have a compensation committee, composed entirely of outside directors, to develop a salary and incentive compensation plan that makes it in the self-interest of executives to operate the business in a manner that benefits the owners; the compensation committee's recommendations are presented to the full board for approval. But in addition to creating compensation plans intended to align executive actions with owner interests, the board of directors must put a halt to self-serving executive perks and privileges that simply line the financial pockets of executives. Numerous media reports have recounted instances in which boards of directors have gone along with opportunistic executive efforts to secure excessive, if not downright obscene, compensation of one kind or another (multimillion-dollar interest-free loans, personal use of corporate aircraft, lucrative severance and retirement packages, outsized stock incentive awards, and so on).

4. Oversee the company's financial accounting and financial reporting practices. While top managers, particularly the company's CEO and CFO, are primarily responsible for seeing that the company's financial statements fairly and accurately report the results of the company's operations, it is well established that board members have a fudiciary duty to protect shareholders by exercising oversight of the company's financial practices, ensuring that generally accepted accounting principles (GAAP) are properly used in preparing the company's financial statements, and determining whether proper financial controls are in place to prevent fraud and misuse of funds. Virtually all boards of directors monitor the financial reporting activities by appointing an audit committee, always composed entirely of outside directors. The members of the audit committee have lead responsibility for overseeing the company's financial officers and consulting with both internal and external auditors to ensure accurate financial reporting and adequate financial controls.

The number of prominent companies penalized because of the actions of scurrilous or out-of-control CEOs and CFOs, the growing propensity of disgruntled stockholders to file lawsuits alleging director negligence, and the escalating costs of liability insurance for directors all underscore the responsibility that a board of directors has for overseeing a company's strategy-making, strategy-executing process and ensuring that management actions are proper and responsible. Moreover, holders of large blocks of shares (mutual funds and pension funds), regulatory authorities, and the financial press consistently urge that board members, especially outside directors, be active and diligent in their oversight of company strategy and maintain a tight rein on executive actions.

Every corporation should have a strong, independent board of directors that (I) is well informed about the company's performance, (2) guides and judges the CEO and other top executives, (3) has the courage to curb inappropriate or unduly risky management actions, (4) certifies to shareholders that the CEO is doing what the board expects, (5) provides insight and advice to management, and (6) is intensely involved in debating the pros and cons of key decisions and actions. Boards of directors that lack the backbone to challenge a strong-willed or imperial CEO or that rubber-stamp almost anything the CEO recommends without probing inquiry and debate (perhaps because the board is stacked with the CEO's cronies) abdicate their duty to represent and protect shareholder interests. The whole fabric of effective corporate governance is undermined when boards of directors shirk their responsibility to maintain ultimate control over the company's strategic direction, the major elements of its strategy, the business approaches management is using to implement and execute the strategy, executive compensation, and tile financial reporting process. Thus, even though lead responsibility for crafting and executing strategy lies to top executives, boards of directors have a very important oversight role in the strategy-making, strategy-executing process.

Fear is the foundation of most Governments.

– John Adams

Country Moves On From Being Just A Statistic To Stamp Its Economic Power

Brand India saving grace in time of crisis

Firms Create Low-Cost Products For India, Ship Them Out To Global Markets

Innovation comes home to go global

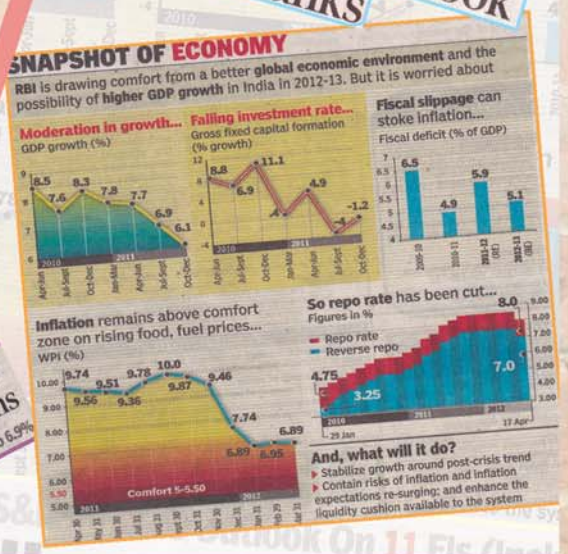
India will be No. 1 economy by 2050: Report

What's going Up?

What's going Down?

₹ falls below 56 as Fitch lowers outlook of banks

The Writing On The Wall



IMF too flags India's governance concerns

Fund Lowers 2012 Growth Forecast To 6.9%

India Inc's FY12 defaults highest ever

Banks Sought Recast Of Record $12Bn Corporate Loans, Up 156% From FY11

After Sovereign Rating Assessment, S&P Revises Outlook On 11 FIs (Including A

India Inc's funding costs to soar

Global Inc Edgy Over Retrospective Amendments To Tax Laws

'Cos reviewing India investments'

Work-Life Balance – A Programmed Approach To 'Employee Wellness'

Amar Kumar

Balancing is a fine art. It requires all elements or objects to be arranged in a way that facilitates overall harmony. It is true for life as well. And with work eating into most of our time, work life balance becomes essential to maintain harmony in our lives, relationships and finally society at large.

The last two decades India has witnessed unprecedented changes from a socio-economic and a cultural perspective. As our economy liberalized, growth became the driving force creating jobs and opportunities, fueling ambition and desires. Companies are expanding, the mood is mostly buoyant. People take up jobs, change jobs, plan their professional careers and work hard to please. Sometimes it is the individual who is driven and other times the corporate culture pushes employees to meet targets and deliver. Whichever way you look at it mostly it is a high pressure environment that demands results. There is no place for laxity.

In this new world striving towards 'corporate excellence', the employee needs to continuously explore impossible targets, and design tasks and activities around them quite unlike the predictable 'top down task orientation' of a corporate job in the past. This makes life more complicated with each passing day for every employee, decreasing the predictability and certainty of success and outcomes, thus forcing the new age employee to strive harder towards success. Further Blackberrys, mobile phones and email bring work and other corporate activities home, slowly pervading individual lives and blurring the professional and private space. Urban lifestyles, travel time and deteriorating social infrastructure compound the problem. All this slowly begins to take a toll.

We are all aware that the levels of stress and 'burn outs' are on a historic all time high in this new subculture that has emerged. Though each passing generation is more prepared and better equipped to deal with this new stress, the onslaught of expectations and newer demands keep adding up, outstripping the individual's

Amar Kumar is a well known Traditional Reiki Master Teacher (highest attainable level-equivalent to Grand Master) and is a registered Medical Practitioner with Indian Board of Alternative Medicine. Reiki Kendra, one of the oldest Government recognized Reiki Centers in the country, was set up by him in Kolkata in 1998. Although based out of Kolkata he has been practicing and teaching Reiki for the last several years both in different parts of the country and abroad. Apart from Reiki he is also exposed to other areas of alternate therapies, such as Yoga, Meditation, Pranik Healing, Art of Living, Fire Walking, Past Life Regression, Five Tibetan Rites, Nadi Pran Release amongst others.

Meditation techniques developed by him, although very simple to follow is very intense and has been very popular. A Mech. Engineer (B.I.T. Ranchi) and MBA (XLRI - Jamshedpur), he opted to pursue Reiki on full time basis after resigning from the post of Senior Vice President in BK Birla group. He has fond memories of his role as Training Manager in Dunlop when it was a multinational co. and subsequently as Co-ordinator of HRD movement in B.K. Birla group of companies and he feels life has again given him an opportunity to train people to live a happy and healthy life with Reiki. Because of his corporate background Amar Kumar understands the stress of the modern day workplace and has conducted numerous workshops for training executives in techniques of Reiki, yoga, meditation, pranayam, music therapy for relaxation, etc in companies like TCS, Tata Steel, NHPC, Gloster Jute Mills, etc. His services are frequently sought by Rotary Club, Dignity Foundation Sri Aurobindo Institute of Culture, Kolkata ATTN Educational Institution Pvt. Ltd., etc.

His students and client base come from diverse countries. Amar Kumar has been very active in creating awareness about Reiki through his lectures on various platforms and has a desire to leave behind an Institution of Reiki professionals to promote it in its original form.

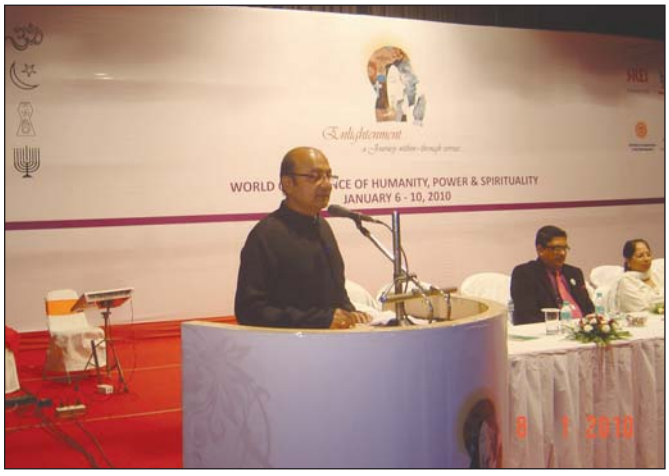
capability to handle this constant change.

It is only natural for us to try and deal with the built up stress in our own way, and most people use a combination of both modern and ancient techniques. Some prefer to engage in retail therapy by splurging on shopping, others use the gym, or play sports or indoor games. The health route is gaining popularity with many taking to pursue Reiki, yoga and meditation. For others it would be music, vacations and weekend getaways, time spent with friends and family. In fact nowadays mindless hours in front of the television is also a popular choice.

Importantly while some of the above mentioned stress busters address the mind directly, others such as sports, reiki or yoga have a holistic positive influence on the individual. What I want to attempt in this article going forward is to explore the feasibility of a 'Program Managed Approach' for any organization towards a healthier, more productive and driven employee base by focusing on their Overall Wellness.

Human Resources today is an established and empowered line function in most corporate setups today. It has evolved from a labour management or payroll management system to an organizational steward to the employee or the custodian of the most valuable and important asset to the top management.

Work-Life Balance as a philosophy is being attempted across organizations to help the social infrastructure which the HR can create around the employee that ultimately helps him cope with the stress, heal himself and further create a sense of belonging to the organization. There are two observations that I would make here. The first is recognizing the correlation between Work-Life Balance and Employee Wellness. The second is that could there be a singular answer to Corporate HR's dilemma to program managing employee wellness to ultimately deliver the Motivated Employee as an Asset back to the organization?



Creating Reiki awareness at World Confluence

However, for the HR to achieve program success it would need leadership support, high performance wellness teams/services and effective communication strategies internal to the organization, wellness incentives tied to benefits, outcome monitoring and most importantly - A Structured Wellness Program.

I have had the opportunity to work in the corporate world as Senior Management across companies for many years and I have also been actively practicing Reiki, Yoga, Meditation, etc. for more than 15 years. Having observed both sides closely I realise that it is absolutely imperative for companies to nurture their employees to create a positive work environment that will ultimately benefit both sides. The good news is that this has now become the success mantra across many organizations already.

In fact I would argue to go one step ahead and translate this into an organizational culture. Wellness programmes should be a regular feature embedded in the overall HR policy of the company. One-off training sessions have limited benefit. It should be consistent, held at fixed intervals for maximum mileage. For those who are sceptic I suggest try it out with a handful of senior executives chosen to go through a wellness programme through a pilot training program across four quarters, and see the benefits for themselves. Once the top management is convinced through self experience, they could be instrumental in driving the change across the organization.

The training should not just be a skill being imparted over a two to three day program, but must engage the employee. Refresher courses, graduation parties with employees and their family, quarterly training on Reiki, Yoga, Meditation among other therapies, experience sharing should all be factored into the "Organization Wellness Strategy" before being rolled out to the employee.

The key success parameter of such

a program is the low entry barriers. It is difficult for individuals to pick up newer sports, have access to open spaces or quality gymnasiums. Sometimes the time demanded by the stress buster formula could be a strain on the over-stretched employee. But in case of a holistic wellness programme there are no preconditions. Irrespective of - one being overweight, introvert, thin, with no exposure to sports- Reiki, Yoga and Meditation can enable them to become Healthier and Happier.

These ancient 'Wellness' techniques have helped multitudes tide over chronic and non-chronic health and wellness issues. Among Reiki Kendra's thousands of trainees and a multitude of CXO level personnel who have participated in the corporate workshops, an overwhelming majority have seen a marked improvement in the quality of their lives. There are many encouraging examples, from getting rid of a nagging migraine that plagued them for years, or curing oneself of diabetes, blood pressure and other lifestyle diseases. There are countless experiences. These include overcoming chronic fatigue, orthopedic issues, conceiving a child, addressing memory loss and lack of concentration and dealing with insomnia or depression.

Though the examples above may not necessarily be life threatening immediately, our urban lifestyles continue to deplete our strength and happiness. The possibility of overcoming these obstacles through a Programmed Approach initiated by the HR team and driven by the top management of conscious companies is very real.

It is most common for exhausted employees to return home after a long day, tired and irritable, nursing aching backs and feelings of guilt about not being able to give one hundred percent to their families. All this can change. Companies with right policies can enable the same employee to come home after a hard day of work and still find the energy to play with his or her children, or read a book or go out with spouce or friends, to chat, to laugh, to listen.

Demonstrating Yoga

A healthier, happier employee is an invaluable asset for companies. It is a win-win situation for all. Companies can make the change, and the good news is more and more of them are willing to try it.

NOTE : Reiki Kendra has researched and identified such programs suited for Corporates which include Reiki, Yoga, meditation, etc. among other therapies. It has held several such successful workshops for top tier companies across India.

www.reikikendra.com

Health is a state of complete harmony of the body, mind and spirit. When one is free from physical disabilities and mental distractions, the gates of the soul open.

– B.K.S. Iyengar

'AWARDS' IS THE MIDDLE NAME OF INDIRA GROUP OF INSTITUTES !

The start of the New Year finds Indira Group once again in the midst of a shower of awards. Way to go, Team Indira!

INDY'S AWARDS

- Best B-School Communication Plan for Placement
- Best Media School of the year

DNA INNOVATIVE B-SCHOOL AWARDS

Indira Indira College of Engineering and Management

- Innovation in Placements
- B-School who Innovate in Teaching Methodology

Indira Group of Institutes

- Best B-School with Innovative Marketing to the Target Segment
- Innovation Leadership Award

BLOOMBERG UTV B-SCHOOL EXCELLENCE AWARDS

Indira Group of Institutes

- Outstanding B-School (West)
- B-School with Industry related Curriculum in Retail Management

Indira Global Business School

- B-School with Industry related Curriculum in International Business
- Best Emerging Business School

Indira College of Engineering and Management

- Best Teacher in Financial Management - Prof. Virendra Tatake
- Nikhil Awad - Best Student in Management

Indira School of Business Studies (ISBS)

- Chaitanya Naidu - Best Student in Management

Exemplary Leader Award

- Dr. Tarita Shankar, Chairperson, Indira Group of Institutes

Innovative Leader In Education Award

- Prof. Chetan Wakalkar, Group Director, Indira Group of Institutes

WORLD CSR DAY

Shree Chanakya Education Society

- Award for Outstanding Contribution to Education

INDIA LEADERSHIP SUMMIT

Dr. Tarita Shankar, Chairperson, Indira Group of Institutes

- Achievers & Leaders Award (Academics) by Bengal Chamber of Commerce & Industry and Eastern Institute for Integrated Learning in Management, Kolkata

World Education Congress Awards

The recently concluded World Education Congress, held in Mumbai on 29th and 30th June, 2012 proved once again, that success is a habit that partners excellence! Excellence it was that made its mark once again as Indira Group of Institutes for one more time, walked away with as many as 11 major awards announced at the Congress.

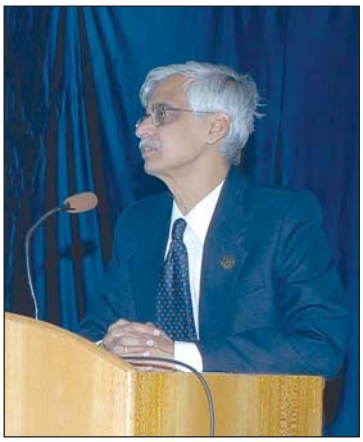
The Awards at the World Education Congress is all the more prestigious as it is a recognition of Indira's allround competence in providing the best in higher education to its students, as it comes with an acknowledgement from the who's who in the education world – from Educationists and Ministers in charge of education in various countries who were present at the occasion!

For the past few years, Indira Group has been at the top of the list of awardees at every credible Awards function where smart and hard work by Institutions of higher learning are recognised – and awards in all categories – be it for infrastructure, innovation in teaching, best teacher, industry interface, or best presentation by a student – have been bagged by Indiraites. Team Indira proves once again, that Teamwork matters!!

The list of Awards and Awardees are as follows

Sr. No.	Organization	Category	Name of the Receiver
1	World Education Congress	Thought Leader Award	Chairperson, Dr. Tarita Shankar
2	World Education Congress	Innovative Leader	Group Director, Prof. Chetan Wakalkar
3	World Education Congress	Best Director Award	Dr. Renu Bhargava – Director, ISBS
4	World Education Congress	Young Achiever Award	Dr. Shriram Nerlekar – Director, IGBS
5	World Education Congress	Education Institute with best Academic & Industry Interface	Indira Global Business School
6	World Education Congress	Award for best Educational Institute in Pharmacy Management	Indira College of Pharmacy
7	World Education Congress	Award for best Educational Institute in Management.	Indira Institute of Management
8	National B-School Award	Best B-School Using Technology in Training & Education	Indira Institute of Management
9	National B-School Award	Outstanding B-School (West)	Indira School of Business Studies
10	National B-School Award	Outstanding Engineering Institute (West)	Indira College of Engineering and Management
11	World Education Congress	Best Student in Management	Mr. Ketan Kirad – ISBS (2nd year student)

Tapasya Gyanganga Lectures



The man taking the stage was frail by Army standards, even considering that he was a retired officer ; you could easily pass him on the streets as just another common man and not credit him with the fighting qualities of a fiery Indian. Yet that is exactly what he proved to be much to the sorrow and annoyance of the enemy country during the Bangladesh war in 1971. As Major General (Retired) Ian Cardozo spoke on 'Making Service Before Self Work' the students and faculty in attendance were transfixed at the sheer passion and determination of the man who refused to capitulate to injury or death in the face of the worst in the war. Leadership as it should be was effectively the theme of his address and there were lessons galore for the youngsters who would eventually be leaders in their field. A saga of sharing the best and the worst with his men, of leading by example, of keeping alive the morale of the fighting forces even after losing a leg to a deadly landmine and later walking over 40 km during the day along with his jawans when a vehicle was all his for the asking and refusing Pakistani blood to be transfused when the injury drained his body of essential blood….

"There is a need for building a strong national character," said Gen. Cardozo when a student asked him about the chaotic state of affairs in India, and proceeded to speak with feeling on the need to develop a national character out of deeply felt patriotism and not the superficial homilies we hear every day from interested people out to grab media bytes. Gen. Cardozo is a pioneer for the disabled citizens of the country and as

Chairman of the Rehabilitation Council of India, a statutory body set up by an Act of Parliament in 1993, he believes in helping the disabled to believe in themselves through the programmes and assistance of the RCI.

The Group Director, Prof.Chetan Wakalkar, welcomed Maj. Gen. Cardozo and Prof. P. G. Vijairaghavan, Editor, Tapasya and Convenor, Tapasya Gyanganga Lecture Series introduced him to the audience.

Human Achievers Award for Dr. Tarita Shankar

Human Achievers Foundation celebrated 6th March as International Women's Day, by acknowledging and felicitating women achievers with awards for exceptional achievements in different walks of life. Dr. Tarita Shankar, Chairperson, IGI was felicitated along with other women achievers for her distinguished service in the field of education.

ICEM Students Get Microsoft Recognition

Our students Mayura Samrat Dolas and Mandar Rajan Kulkarni of B.E. – IT were invited by Microsoft Tech Ed 2012. Out of 51 participants only 3 students were from India and out of 3 students 2 students were from ICEM. They were felicitated by Director Microsoft India as Rockstars at Microsoft Tech. Ed 2012 Bangalore.

Avishkar 2012

"AVISHKAR 2012" was celebrated with great zeal and enthusiasm from 11th to 18th of February. During this event, students could exhibit their excellence in basketball, football, relay running race, Kabbadi, Volleyball, Cricket, and In-door games like Chess, carrom, badminton. Students enjoyed three memorable days full of sports activities. The sports activities were enthusiastically co-ordinated by Sunil Pansare, Sports in-charge of ICEM.

The Guest of Honour of the day was Mr. Vishwas Pandhare, DCP, Traffic Pune, who enlightened the students by addressing them on how they can have successful careers by looking at the positive aspect of life, technical as well as other careers.

Avishkar 2012 was also graced by Chairperson Dr. Tarita Shankar and IGI Group Director Prof. Chetan Wakalkar. Winners of the competitions were given medals, trophies and certificates at the hands of the Guest of Honor Mr. Vishwas Pandhare (DCP-Traffic Branch), Chief Guest Prof. Chetan Wakalkar and Dr. R. V. Kulkarni (Director,ICEM) and Dr. S. S. Deo (Vice Principal, ICEM) followed by heart-warming performances presented by the students.

The 5th Indira International Innovation Summit (3i)

Hosted by Indira College of Engineering and Management (ICEM), a part of the prestigious Indira Group of Institutes (IGI), was organized on the 13th and 14th of January 2012. Inaugurating the summit, IGI Chairperson, Dr. Tarita Shankar and Group Director, Prof. Chetan Wakalkar, highlighted the importance of constantly having an innovative spirit and nurturing a culture of thinking out-of-the-box towards creating a successful career, amongst the students pursuing various professional courses within the institute.

The summit witnessed various talks and sessions by prominent innovators, entrepreneurs and leaders from corporate houses across the country on both the days.

The key-note address on the first day was delivered by Mr. Ranjukumar Mohan, Director, JK Ansell Ltd. followed by other prominent speakers like Ms. Sunita Singh, Senior Director and co-founder, NEN, Mr. Maneesh Sharma from SAP India and Mr. Ashish Patel, Euphoria Consulting.

The other highlight of the day was Mr. Ramaprasanna Chellamuthu, Microsoft India R&D Ltd. who had the audience in a trance through his session on cutting edge technological innovations. Aliya Hasal and her crew from Drum Café International entertained the audience with an exceptional percussion session.

An integral part of the summit are the "Innovation Awards" that were presented on Day 1 and the "Engineering Excellence Awards" presented on Day 2 to Innovators, Entrepreneurs and Senior leaders from companies of repute, for their contribution in their respective fields and inspiring a spirit of innovative thinking. The lifetime achievement award recipient, Mr. Patrick McGoldrick, MD and CEO of TATA Technologies while commending IGI for providing an effective platform for the students to be inspired and learn from various innovative practitioners through the 3i summit, also shared from his rich experience along with the other award recipients on the preparation needed for a successful and enriching career.

Mr. Deepak Rao, motivational speaker and Edutrainer, Mastermind India, mesmerized the audience in his session on Extra Sensory Perception (ESP).

Dr. Marshall Goldsmith was in Mumbai during the Leadership summit when our students and faculty met him. Prof. Kumendra Raheja caught up with him for an interview.

At the Thinkers 50 Conference (sponsored by Harvard Business Review) in London – Dr. Marshall Goldsmith was recognized as the Most Influential Leadership Thinker in the world. Along with being named the #1 Leadership Thinker, Marshall was listed as the #7 Greatest Business Thinker in the world.

Dr. Marshall Goldsmith in conversation with Prof. Kumendra Raheja, ISBS

I was travelling from Pune to meet Dr. Marshall Goldsmith for an interview for which he had agreed to meet at 6:30 pm at hotel Taj Lands End. I had mixed feelings of my meeting with him as I was both excited and nervous given that I was meeting #1 leadership thinker in the world and the #7 business thinker in the world as announced by bi-annual Thinkers 50 ceremony sponsored by the Harvard Business Review.

I set the thinking on the questions that I would ask him and kept scribbling on a piece of paper about the threads. Least did I realise that I was at the entrance of Taj Lands End. There was a soothing music being played in the lobby.

'Good Evening'! Dr. Marshall comes at the lobby exactly at 6.30 pm, gives a genuine smile and bends forward as he shakes my hand. Looking at him, it was difficult to believe that the leading coach in the world who coaches the top CEOs of the world could be so simple and unassuming. Marshall makes me comfortable and I start interacting with him (ofcourse not before I share my anxiety of intercating with world's no#1 leadership thinker!!)

Sir thanks a lot for your time. Was getting into coaching / executive education a planned move?

Dr. Marshall Goldsmith: The way I got into business was largely accidental. I worked with a very famous person, Paul Hersey. He gave me an opportunity. I learned what he did. I was a college professor, and he offered me a job making 1000 USD a day. I was making 15,000 USD a year at that time. Because he was very tied-up, he asked if I wanted to deliver a session in executive education for a very large corporation and I said "Sign me up". I did the session. It was extremely successful. And that is how I got into executive education business. So in that sense it was very accidental. How I got into the coaching business was also accidental. I was working with a CEO. He said, "We have this young guy who is smart, dedicated, hardworking, driven to achieve, entrepreneurial, gets results, stubborn opinionated, and all that. It would be worth a fortune to us to turn the guy around. Do you think you could help us?" I said "Sign me up" He said "I don't think it would work." Then I came up with my idea and I said "I will work with him for a year. If he gets better, pay me. If he does not get better it is free." He said, "Sold !" That is how I got into coaching. Both of those were reasonably accidental.

What type of coaching are you engaged with?

Dr. Marshall Goldsmith: There are several different types of coaching like behavioural coaching, strategic coaching, life planning or organizational change coaching. We only focus on changing leadership behaviour. We first get an agreement with our coaching clients and their managers on two key variables.

1) What are the key behaviours that will make the biggest positive change in increased leadership effectiveness and
2) Who are the key stakeholders who can determine if this change has occurred

We then get paid only after our coaching clients have achieved a positive change in key leadership behaviour as determined by stakeholders. He says with a smile "We must be achiveing the results because we almost always get paid for our assignment."

You put more emphasis on 'feedforward' process as opposed to 'Feedback' process. Could you please elaborate the feedforward process?

Dr. Marshall Goldsmith: Providing feedback has long been considered to be an essential skill for leaders. As they strive to achieve the goals of the organization, employees need to know how they are doing. They need to know if their performance is in line with what

their leaders expect. They need to learn what they have done well and what they need to change. Just as employees need feedback from leaders, leaders can benefit from feedback from their employees. Employees can provide useful input on the effectiveness of procedures and processes as well as input to managers on their effective leadership. But there is a fundamental problem with all types of feedback. It focuses on the past, on what has already occurred - not on the infinite variety of opportunities that can happen in the future. As such, feedback can be limited and static as opposed to expansive and dynamic. Over the past several years, I have observed more than ten thousand leaders as they participated in a fascinating experiential exercise. In the exercise, each participant is asked to provide feedforword that is, to give someone else suggestions for future and help as much as they can. In the second role, they are asked to accept feedforward - that is to listen to the suggestions for the future and learn as much as they can. The exercise typically lasts for 10 - 15 minutes, and the average participant has 6 - 7 dialogue sessions. Feedfoward helps people envision and focus on a positive future not on a failed past. By giving ideas on how they can be even more successful we can increase their chances of achieving success in future.

What is your experience with India?

Dr. Marshall Goldsmith: During my trip to India; I had the opportunity to work with many dedicated professionals at the Indian School of Business (ISB) in Hyderabad. I love teaching in India. Every participant in my programme was eager to learn. People in India have a deep respect for education and for educators. As for my coaching assignment, I have been approached by many Indian Corporates.

Do you have any advice for the student fraternity?

Dr. Marshall Goldsmith: My advice to the students who are just entering working is simple;

It is tough out there, and it is only going to get tougher.

Forget about security.

Make peace with reality and your life is going to be a lot better.

Invest your time and money in your future.

In an era of uncertainty, nothing can be taken for granted. Young people are going to have to develop skills and talents that make them globally competitive. And they are going to need to keep upgrading and changing their skills and talents to fit the needs of an ever changing market place.

Sir thanks a lot for the interview!

Dr. Marshall Goldsmith: Thank you!

As I say good bye to Dr. Marshall and present two books viz; 'My experiments with Truth' a biography of Mahatma Gandhi and 'Krishna the man and his philosophy' by Osho, he says that he uses lots of Gandhi ji's sayings in his programs and departs with a thank you and namaste with hands folded!

ISBS Convocation

Indira School of Business Studies, Pune organized its 4th Convocation Ceremony, "IMPRINTS" on 11th Feb, 2012, at its Universe Campus. The convocation witnessed Batch 2009-11 PGDM students, being conferred their diplomas by the Chief Guest Mr. Arvind Padhye, Delivery Centre Head, TCS.

The inauguration of the convocation ceremony was marked with National Anthem by the students of ISBS. Compelling the students to go back the memory lane was "NOSTALGIA" a film of batch 2009.

Mr. Arvind Padhye, In his message gave very valuable insights about the drastic changes happening in the business environment across the world with respect to technology, economy and the fierce global competition. In order to come out winner in such ever changing business environment, he stressed on the importance of health, smart investment from the first day and to be sensitive to the society around.

On this occasion Group Director, Prof. Chetan Wakalkar and Director ISBS Dr. Renu Bhargava, stressed on update with changing technology, current happenings, continuous reading. They also insisted on how they along with the alumni can take this association ahead with relationship and brand building.

ISBS Wins Dhruv Rolling Trophy

ISBS won the rolling Trophy of Dhruv 2012, and repeated history of carrying home the trophy in the past few years.

"Dhruv" is one of the most prestigious intercollegiate events organized by PUMBA for management students. More than 5000 participants have participated in the 3 major categories, Cultural, Sports & Management from Pune and various other institutes from Mumbai and even outside Maharashtra. Every year they have a theme for the event. This year the theme was "Punavadi the Pune". All the events revolve around the theme.

With participation in all the categories ISBS gave a cut throat competition to all the participants and managed to win the overall Trophy.

Spectacular 11th Indira Marketing Excellence Awards Night Dazzles Pune

The sun went down and the corporate stars of the evening came up at the glittering 11th Indira Marketing Excellence Awards presentation night held on Saturday, 10 March which saw the city's who's who in attendance. Most stars walked up to the stage to receive their mementoes and spoke about the motivation and the insights into consumer behavior that helped them scale new heights in their career. The Excellence in Marketing Awards are presented by Indira every year to the scions of the corporate world in India and recognizes their value addition to the function of Marketing while doing wonders for their organization. Prominent among the awardees in this category were Anil Khanna, Managing Director Blue Dart Express Limited and Chandreshekar Pitre, Sr. Director - Marketing (south Asia) DHL Express India Pvt. Ltd. from the logistics sector, and Women's Achiever award winners Nita Kapoor, Executive Vice President Marketing & Corporate Affairs, Godfrey Philips India Ltd and Manisha Amol, Vice President – Marketing, Modicare Ltd.

The occasion also saw the presentation of the Indira Excellence Awards to corporates whose performance in brand building was specially recognized in various sectors. Federal Bank Ltd., ITC Ltd. and HDFC Bank Ltd. were some of the prominent winners in this category.

Conceived and presented by Fun and Joy at Work, the piece de resistance was a performance by playback singer KK which brought the more than 3000 strong crowd to its feet and led them to join in the singing. The audience was seen up in a trance and dancing as he belted his most popular numbers, from films like Iqbal and Om Shanti Om sending the crowd into raptures.

The Chairperson of Indira Group, Dr. Tarita Shankar while welcoming the guests and the students recounted the journey of the Awards Function over the years to its preeminent position on the national stage, and thanked the corporates, faculty and staff of Indira and the students for their contribution in making the Awards function what it is today. Mr. Arun Aurora, ex- Economic Times head who was specially invited for the function advised the student community to work to their strength and outsource their weakness, which was the best way to forge ahead in a competitive world.

Indira Awards For Marketing Excellence 2012

Exemplary Leader Award	**M V Tanksale** Chairman and Managing Director **Central Bank of India**
Brand Builder Of The Year	**R S Subramanian** Country Manager **DHL Express India Pvt. Ltd.**
	Anil Khanna Managing Director **Blue Dart Express Limited**
	Chandreshekar Pitre Sr. Director - Marketing (South Asia) **DHL Express India Pvt. Ltd.**
	Ketan Kulkarni VP & Head Marketing Corp. Communication & Sustainability **Blue Dart Express Limited**
	DHL Express India Pvt. Ltd & Blue Dart Express Limited (Malcom Monterio, VP & Area Director, Blue Dart Express Ltd.)
Woman Super Achiever Award	**Nita Kapoor** Executive Vice President Marketing & Corporate Affairs **Godfrey Philips India Ltd.**
	Manisha Amol Vice President – Marketing **Modicare Ltd.**
	Tara Prabhakar Development Director, R & S **TNS Asia Pacific**
	Virginia Sharma Vice-President, Marketing and Communications **IBM India/South Asia**

Indira Excellence Awards (For Contributions Towards Brand Building Indira)	
Dr. Chandra Mauli Dwivedi President & Global Head – Corporate HRD **Datamatics Global Services Group**	**Mr Sanjay Muthal** Managing Director **Nugrid Consulting**
Dr. Saugata Mitra Chief People Officer **Mother Dairy Fruits & Vegetable Ltd.**	**S.K. Dutt** Group Head HR **ABG Group**

MARCOM Professional Of The Year	**Bishwajeet Samal** Head of Marketing Communication **Volkswagen India Pvt. Ltd. & Volkswagen Group Sales India Pvt. Ltd.**
Young Achiever Award	**Vikrant Nagre (ALUMNI OF INDIRA)** Relationship Banking Head - Premium Banking **HDFC Bank**
Brand Leadership Award	**Office Depot (A Reliance Retail Venture)** (T.V. Thyagharajon, VP & Business Head – Office Depot Retail, Gifts & Stationery)
	Philips Electronics India Ltd. (Sumit Joshi, Head – Marketing, Lighting)
	Tractors & Farm Equipment Ltd. (Ravindra Gupta, Asso. Vice President – Marketing & Sales)
	Monsanto India Ltd. (Shrikant Shivale, Regional Business Manager)
	Maxwell Industries Ltd. (Sunil Pathare, Vice Chairman & Managing Director)
	Bajaj Auto Ltd. (Sanjay Sarawat, General Manager – Marketing & Sales)
	Vedanta Group (Priya Agarwal, Director)
Retail Leadership Award	Shailesh Chaturvedi Managing Director & CEO **Tommy Hilfiger Arvind Fashion Pvt. Ltd.**
	Bipin Gurnani CEO **Provogue India Ltd.**
	LEE - VF Arvind Brands Pvt Ltd. **(Amiya Prakash, Zonal Head West and East India)**

Indira Excellence Awards	
HRO	**Neeyamo** Mr. Ashol Bildikar, CEO
International Placements	**Victoria Furnitures & Lights** Ms. Rashmi Kishore Sharma, CEO
FMCG	**ITC Limited** Mr. Anjan Bhowmick, HR Manager
Banking	**HDFC Bank Ltd.** Mr. R. Padmanabhan, Senior Vice President
	The Federal Bank Limited Narayan K R, Zonal Manager
Information Technology	**Tech Mahindra** Mr. Nilesh Salvi, Sr. HR Manager
	Thoughtworks Technologies India Pvt. Ltd. Mr. Sameer Soman, General Manager
Automobile	**Mahindra Navistar Ltd.** Mr. Damodar Tota, Sr. GM – HR
Broking & Investment - Banking	**Darashaw & Co. Pvt. Ltd.** Mr. Lakshman Kumar Iyer, Vice President
Life Insurance	**Bajaj Allianz - Life Insurance** Ms. Nupur Ray, Head – Talent Acquisition