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Let noble thoughts come to us from every side
Rig Veda

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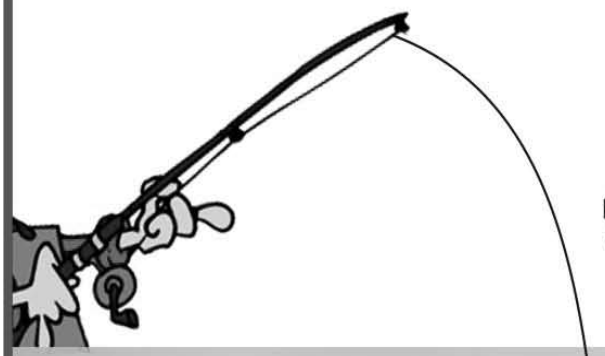

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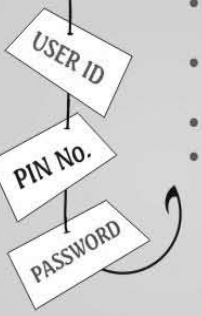

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About the Issue

One of the biggest achievements of post independence India is the turnaround of agriculture. From a period in the fifties when India depended on yearly imports of grains to feed its population to a buffer stock that has become an embarrassment of riches is a proud tale indeed.

The abundance of wheat and rice in the granaries and some in the open, is a reflection of a smart agricultural strategy which has paid dividends. The farmers, as a class have by and large improved their economic conditions. Especially those who sow the staple grains for which there is a government set minimum support price. The system has managed to ensure a reasonable return for the farmers every year. Those who sow cash crops have the chance to do better as the prices of their produce rise; at the same time a decline in prices is still a disaster, as some of the cases of farmer suicides show. The grain bowl of India has by all accounts stabilised.

What has not happened simultaneously is a corresponding rise in the ability of a large percentage of the Indian population to buy those grains. This is a dichotomy that needs fast solution. It is now an embarrassment that a country which runs one of the largest stock of grains has famished millions. To redress this problem, a solution that has been offered is to distribute the grains free. There are apprehensions however, that this could lead to a collapse of the trade in these grains. When there is no trade in grains, the farmer is left with no choice but to depend on the government to buy all his produce. Year after year there will be no possibility of the farmer to expect any windfall profit or any opportunity to improve his farm management on more commercial lines by his own effort as there will be no agency to buy anything from him, except the government. Surely we do not want to harm our farmers this way.

The way forward is therefore to mix the needs of the farmers with the needs of the poor. This means providing buying support in the hands of a poor labourer, so he too can pay the farmer the price of the grains. This can be done in numerous ways including providing them cash support from the government, or food stamps that can be exchanged for grains from the shops.

But this ambitious exercise means identifying the poor, reaching them the cash or the stamps and simultaneously halting the emergence of a possible black money business in the stamps. Doing all these is possible and different states have shown these can be done. It is a complex task but nowhere else in the world has a government attempted such a mammoth task in the course of history.

In the following pages, a distinguished panel of authors have attempted to describe and explain all the aspects of the problem. These specialists have highlighted the scale of the problem and the solutions offered. ❑

Sustainable Food Security

M S Swaminathan

We face many challenges on the farm front. We have to run twice as fast to stay where we are. The current obsession with bricks in institution building should give way to nurturing brains

FROM 1947 onwards, achieving food security for all has been a national goal. Jawaharlal Nehru articulated this goal by emphasizing "everything else can wait, but not agriculture". Food security is now defined as physical, economic, and social access to balanced diet, clean drinking water, environmental hygiene, and primary healthcare. Unfortunately, inspite of numerous government schemes and safety nets, under and malnutrition remain widespread in our country. Children and women suffer the most. Inspite of all the progress we have made in industry and economic growth rate, our reputation in the field of eradication of hunger and malnutrition is poor. In the last decade, emphasis in relation to basic human needs has shifted from a patronage to a rights approach. Thus, we have now legal rights through Parliament Approved Legislation in the fields of education, information, and employment. Currently, there is an ongoing exercise in developing a National Food Security Bill which will confer on every Indian the legal right to food.

To achieve sustainable food security, the following three dimensions of this problem need concurrent attention:

Availability of food, which is a function of production and where absolutely essential, import

Access to food, which is a function of purchasing power and employment

Absorption of food in the body which is a function of clean drinking water, sanitation and healthcare.

Thus, food and non-food factors relating to food security need integrated attention. Fortunately,

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we have many schemes which address these issues. The Rajiv Gandhi Drinking Water Mission, the Total Sanitation Programme and the National Rural Health Mission can all ensure that whatever food is consumed is beneficial. The various employment generation schemes and more particularly, the Mahatma Gandhi National Rural Employment Programme are helping to provide the minimum essential purchasing power. For increasing the availability of food, several steps have been taken such as the following :

Rashtriya Krishi Vikas Yojana with an outlay of Rs. 25000 crore

Naitonal Food Security Mission with an outlay of about Rs. 6,000 crore

National Horticulture Mission with an outlay of Rs 10,363.46 crore during the 11th Five-Year Plan period

There are many other schemes dealing with different areas of production, such as soil healthcare, crop protection, and irrigation. Inspite of all these schemes our agriculture is still very vulnerable to the behaviour of the monsoon. For example, during 2009 the widespread drought brought down the agricultural growth rate to - 0.2 per cent, as against the target of four per cent. Our country faces the challenge of producing food not only for 1.2 billion people, but also for about a billion farm animals. Nearly seventy per cent of our population live in villages and their main sources of livelihood are crop and animal husbandry, fisheries, agro-forestry, agro-processing and agri-business. Therefore, in our country agriculture is not merely a food producing machine but is the backbone of the livelihood security system of a majority of our population. This is why we should concentrate on building our food security system with home grown food. Importing food grains by a predominantly agricultural country like ours will have the same impact as importing unemployment and will lead to greater agrarian distress.

The National Commission on Farmers (2004-06) has provided a detailed strategy for the agricultural progress of India. The strategy has the following four components:

Defend the Gains already made in the heartland of the green revolution namely, Punjab, Haryana, and Western UP through conservation and climate resilient farming and agronomic techniques. Fortunately the Finance Minister has provided an initial grant for launching this programme during 2010-11.

Extend the Gains to the green but no green revolution areas such as Bihar, Jharkhand, Chattisgarh, West Bengal, Assam and Orissa. NCF has described this region as a "sleeping giant". The large untapped production reservoir of this region should be tapped through an appropriate blend of technology, services, input and output rising policies and above all, farmers' enthusiasm.

Make new Gains in rainfed areas which constitute nearly sixty percent of the cultivated area. Here again there is a considerable difference between potential and actual yields. Most of the pulses and oil seed crops are grown under rainfed conditions. An important requirement for success is rain water harvesting and watershed management. Jal Kunds should be spread all over the Northeast

In addition to the above measures we should take steps to bridge the growing mismatch between production and post harvest technologies. We are not deriving benefit from the opportunities for value addition to primary produce and to agricultural biomass. A national grid of grain storages based on modern technology should be established as soon as possible. Food grain conservation strategy should start from villages where Community Grain Banks containing local grains like Jowar, Bajra, Ragi etc. can be established by Women's Self Help Groups. Atleast at fifty locations in different parts of the country ultra modern grain storage structures, each capable of providing safe storage to a million tonnes of grains should be established.

Malnutrition persists in all parts of the country. Hidden hunger caused by the deficiency of micronutrients like iron, iodine, zinc, vitamin A and vitamin B12 is affecting over forty percent of our population. The most cost effective and speedy way for overcoming

hidden hunger is by providing horticultural remedies to nutritional maladies. This can be done through mainstreaming nutrition in the National Horticulture Mission. A Home Science graduate well versed in the area of nutrition could be added to the staff of the Horticulture Mission in every one of the 128 agro-climatic regions in our country. Fortunately we have over a billion farm animals comprising cow, buffalo, sheep, goat, and poultry. Through crop livestock integrated farming it will be possible to shift from food to nutrition security. There are also vast opportunities for inland and coastal fisheries including aquaculture.

Food is the first among the hierarchical needs of a human being. Therefore, food security should have the first charge on the available financial resources. Spoilage of grains through lack of investment in storage is a sad reflection on our sense of priorities. A National Food Security Act giving legal rights to food can be implemented only by attending to the safe storage of both grains and perishable commodities like fruits, vegetables, and milk. At the same time animal nutrition will also require greater attention. Unfortunately, grazing land is fast shrinking. Animals are underfed, and are therefore low yielding. Animal food security is essential for human nutrition security.

Above all, we should prepare for meeting the challenge of climate change. Threats to agriculture, food and water security and the loss of livelihoods will be the most serious consequences of climate change. Even a one degree Celsius rise in mean temperature will affect wheat yield in the heartland of the green revolution, because of a reduction in duration, and reduced grain weight. Climate Refugees comprising of fisher and coastal communities will become internally displaced persons, in the event of sea level rise. The situation will be particularly serious in states like Kerala and Goa and cities like Mumbai where a large percentage of the populations live very near the shoreline. Anticipatory research and development are essential to strengthen our coping capacity to meet such challenges. I would like to indicate briefly some of the steps which should be included under the proposed National Mission for Sustainable Agriculture.

Climate Change and Agriculture: Factors to cope with

- Unfavorable changes in temperature.
- Unfavorable changes in precipitation.
- Snow Melt and floods.
- Higher carbon dioxide levels in the atmosphere.
- Sea level rise.

A. Temperature: Impact of a rise in mean temperature by 1 to 2 degree Celsius (Copenhagen Accord)

- Wheat yield is a gamble in temperature. Major consequence of 1 degree Celsius rise in mean temperature will be a reduction in the growing period in the case of wheat, and greater risk of vector borne diseases in crops like potato.
- Response measures should include shifting the breeding strategy to per-day rather than per-crop productivity in the case of wheat, and developing and spreading the True Potato Seed (TPS) methodology in the case of potato.
- Rice has a wide range of adaptation. Short duration varieties or hybrids together with efficient agronomic practices like SRI should be promoted. Hybrid rice strains characterized by hybrid vigour in the development of the root system should be recommended.
- In all crops, the problem of pests and diseases may become more serious. Plant protection measures should particularly be tailored to meet the threat to crops and farm animals arising from the outbreak of vector-borne diseases.

B. ***Unfavorable alterations in precipitation.***

- Both drought and floods may become more serious. Building a sustainable water security system and spreading more crop and income per drop of water technologies should receive priority attention. Drought and high temperature tolerant crop varieties should

be developed through Marker Assisted Selection, as well as genetic engineering. A good example is the work done at MSSRF, Chennai in transferring to crop plants genes for drought tolerance from Prosopis Juliflora and for salinity tolerance from Avicennia Marina.

- In the case of floods, post-flood agricultural rehabilitation measure as well as flood tolerant rice varieties with the submergence (Sub) tolerant genes should be developed. After flood waters recede, crops like yellow-flesh sweet potato (rich in Vitamin A) Sathi maize (short duration) and sunflower, as well as fodder crops can be introduced.

- To implement alternative cropping strategies based on different weather conditions, seed reserves should be built. Seed reserves are as important for crop security, as food grain reserves are for food security.

- Drought and Flood Codes indicating the scientific strategies needed for reducing to the extent possible the adverse impact of drought on agriculture should be developed based on computer simulation models. The codes should spell out in implementable terms alternative cropping strategies and contingency plans. Along with Drought and Flood Codes, a Good Weather Code should be developed for each agro-climatic region, in order to help in maximizing production during good monsoon season.

C. Meeting the challenge of sea level rise

- The strategy should include the following components:

- Developing Mangrove and non-mangrove bio-shields to minimize the impact of coastal storms and sea water inundation.

- Promoting Sea Water Farming through agri-aqua farms.

- Promoting Below Sea Level Farming, as already practiced by farmers in the Kuttanad area of Kerala.

- Breeding salinity tolerant crop varieties for cultivation in coastal areas, based on genetic engineering techniques.

- Preparing contingency plans for the resettlement of climate refugees.

2010 marks the 80th anniversary of Gandhiji's Dandi March (Salt Satyagraha), which emphasized that sea water is a social resource. 97% of the global water is sea water. We should launch a dynamic programme in the area of sea water farming involving salt tolerant crop varieties, agro-forestry and marine aquaculture.

D. Livestock

A Food and Fodder Security Pan should be developed to safeguard our Dairy, Poultry, Sheep, Wool and other animal based enterprises which are the ones coming to the rescue of families living in the desert and semi-arid areas. Fodder and Food Banks should be developed with the help of local self-help groups (SHGS).

Mitigation and Adaptation strategies

Mitigation efforts should include both carbon sequestration through green plants and building Soil Carbon Banks through fertilizer trees, which enhance soil nutrient status. Soil carbon enrichment will help to enhance fertilizer use efficiency and thereby help to reverse diminishing factor productivity. A Farm Pond to collect rain water, a biogas plant and a few fertilizer trees in each farm should be promoted in rainfed areas.

Adaptation Measures should include the steps already indicated. In addition, green house horticulture should be promoted to take advantage of higher carbon dioxide content in the atmosphere. Arid and semi-arid horticulture combined with animal husbandry, and agro-forestry systems of land use, will help to enhance both livelihood and nutrition security.

Research and Development Infrastructure

A. Research and Training Centres for Climate Risk Management

According to ICAR, there are 15 major agro-climate zones and 128 mini-agro-climatic zones.

We should establish in each of the 128 zones, a Research and Training Centre for Climate Risk Management. These can be virtual centres headed by an agricultural scientist with computer simulation capability. He/she should prepare computer simulation models of alternative weather probabilities and suggest how to checkmate the adverse effect. Each of these Centres should have the following facilities to convert plan into action.

- A village Resource Centre with Satellite Connectivity established with the help of ISRO.
- A Meteorological Station, capable of facilitating farm decisions on the basis of integrated weather forecasts.
- A Seed Bank containing seeds of the alternative crops to be sown, if the first crop fails due to drought or flood.
- A Fodder and Feed Bank to cater to the needs of Farm Animals.
- A Grain Bank should be established adjoining each Centre particularly with reference to underutilized crops like millets, ragi etc as well as bajra, jowar and maize.

B. Capacity Building

The Research and Training Centre for Climate Risk Management should train at least one woman and one male member of every Panchayat as Climate Risk Managers. They should be well versed in the art and science of climate risk management.

In each of the major agro-climate zones, there should be warehousing and safe storage facilities at least for a million tonnes of food grains. Such a decentralised network of Grain Banks will help to respond quickly to urgent needs.

We thus face many challenges on the farm front. We have to run twice as fast to stay where we are. The current obsession with bricks in institution building should give way to nurturing brains. We will then have a bright agricultural future. ❑

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Revamping Food Procurement and Pricing Policies

Madan Sabnavis

Procurement programmes are pragmatic but have to be adapted to the changing requirements. Stocking of farm produce should not just be a mechanical process and must be managed well

MINIMUM SUPPORT Price, procurement and distribution are three extremely critical government policies that are indispensable. More importantly, despite all the scepticism that has been expressed by critics, the progress made has been laudable, especially so since the canvas being addressed is expansive. Given that a large part of our workforce is engaged in agriculture, where typically poverty levels are also high, government support is absolutely necessary. These three policies have been designed for specific purposes but in the process of their implementation have led to certain unintended consequences that affect the rest of the economy, and hence need to be revisited.

The three policies may be looked at sequentially. The objective of having an MSP (Minimum Support Price) programme is to ensure that the farmers get a remunerative price for their produce. The scientific basis for calculating this MSP involves looking at various factors including cost of production, cost of living, price parity etc. It tells the farmer that he is assured of a minimum price at the time of harvest and hence can cultivate the crop of his choice. The farmer can look at the various alternatives and gauge the cost relative to price being offered and go in for the appropriate crop and sell at market prices or to the government if the latter is higher. Therefore, the MSP was to be the last resort for the farmer.

The MSPs are declared for around 25 crops but are effective for virtually only rice and wheat and to a very mild extent for coarse cereals. In case of all other crops the market prices are higher and farmers prefer to sell their produce in the open market. The government has been increasing the prices of all products under the MSP umbrella

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quite significantly in the last few years (an illustration of which is provided in Table -1 below) for various reasons. At times it has been to counter inflation; while there have been occasions where they have been increased to induce more cultivation in certain corps. At other times it had populist motivations.

Table- I
Minimum Support Prices (Rs/quintal)

	FY06	FY10	FY11
Wheat	650	1100	-
Rice	570	950	1000-1030
Maize	540	840	880
Arhar	1400	2300	3000
Moong	1520	2760	3170
Urad	1520	2520	2900
Sugarcane	79.50	129.84	139.12
Soybean	900	1350	1400
Groundnut	1520	2100	2300

Source: Ministry of Agriculture

The higher prices have had two consequences. The first is that there has been an upward bias imparted to all prices as the MSP serves as the benchmark for all other prices of the varieties of the product irrespective of whether or not the government actually procures the same. The inflationary impact has hence been quite significant which raises issues on whether the farmers or consumers interests are of greater importance. In fact such blanket increase in MSPs which leads to general food inflation affects farmers too as they are consumers of other products and hence to a certain extent are not really better off in receiving a higher MSP on their own crop.

The second consequence has been the tendency for the cropping pattern to get skewed towards rice and wheat as the prices offered are high and the procurement system is also strong in the states of Punjab, Haryana, Uttar Pradesh, Orissa, Bengal and Andhra Pradesh. Therefore, instead of being encouraged to grow pulses and oilseeds where India has a deficit, farmers prefer the more 'certain options'. The MSP has hence evolved to become the first choice rather than the last resort.

The MSP problem is linked with procurement, which is an enormous exercise undertaken by the government. There are three motivations for procurement from the point of the view of the government. The first is to provide for food security so that there are stocks that can be used in times of a crisis. The second is to provide for the PDS so that the poor have access to cheap food grains either directly or through specific government schemes and the third is to stabilize prices. This is done by selectively releasing stocks into the market through the Open Market Schemes to augment supplies and lower prices. Government procurement is for a fair average quality of the product and is an open ended scheme. There are accordingly prudential norms that are set for the stocks that are held by the Food Corporation of India for the government.

Presently procurement is mainly in rice and wheat and to a very minimal extent in coarse cereals. This encourages farmers to grow more of rice and wheat and deliver to the government which is represented by the FCI. From the point of view of the farmers this is an excellent scheme as they are assured of the price and a buyer. The fact that the procurement is an open ended scheme means that there are no limits to what the FCI can pick up. While procurement is open-ended, distribution through the PDS and other schemes is more or less fixed and grows marginally every year being related to population growth and development schemes being pursued by the government. The result has been the build-up of high quantities of food stocks.

There are certain prudential norms that have to be adhered to, based on the season and the flow of harvest. However Table 2 shows that the stocks being held by the government are quite in excess of the ideal norms. For example, in financial year 2009-10, the FCI procured 57 million tonnes of wheat and rice of which the off-take through PDS and other schemes was just 31.4 million tonnes. The

Table -2
Buffer Norms for Rice and Wheat (lkh tonnes)

	Buffer	Strategic reserve	Total	Actual stocks (year)
1st April	162	50	212	428 (2010)
1st July	269	50	319	578 (2010)
1st October	162	50	212	438 (2009)
1st January	200	50	250	474 (2010)

Source: FCI

issue of storing food grains stocks and the possible deterioration of quality of food grains is serious, but that is more on the implementation side that has to be addressed separately. There is a holding cost also involved for the FCI on these 25 million tonnes of excess stocks. Assuming an average cost of Rs 1050/tonne, the overall cost would work out to investment of Rs 26,250 crore with an interest cost of over Rs 2600 crore (assuming rate of 10%). Keeping aside these costs, the more serious implication is on the distortions in market brought about by this policy.

India produces around 80 million tonnes of wheat. Of this around 2/3 enters the market as the marketed surplus (Financial Year 2006-07 as per Ministry of Agriculture) which means that 54 million tonnes comes out in the open. Now from this 54 million tonnes, if the government takes in another 25 million tonnes as procurement, there would be around 30 million tonnes available for the private players. Given that procurement and subsequent stocking is far in excess of what is required, the government ends up hoarding food grains quite inadvertently in the process. This creates scarcity in the market pushing up prices despite there being healthy production. In the last couple of years we have witnessed this anomaly which results in both a perceived quantity shortage and high prices despite good production numbers. Clearly, we need to revisit the procurement policy and look for an efficient solution.

The third area is in distribution where procured food grains are distributed across the states under various schemes. Here, while a more decentralized system of procurement and distribution is advisable, better identification of the targeted groups and more robust systems to plug in the leakages of grains from the system is the ideal answer. There are debates over whether distributing food coupons is a better way of distribution wherein the holder can purchase the grains directly from the market rather than have foodgrains being procured by FCI, stored centrally, transported to the states and then delivered to the FPSs (Fair Price Shops) where there are considerable leakages. According to the Economic Survey, the procurement cost varies between Rs 2.12-2.89 per kilo for wheat and rice while the distribution cost varies between Rs 1.82 and 2.45 per kilo. Clearly, these costs need to be reduced while delivering a superior solution to the poor, who get rice at between Rs 3-7.95 /kilo and wheat at Rs 2-6.1/kilo as against a total cost of Rs 18.93 and Rs 14.02/kilo for rice and wheat respectively.

The two other issues need to be addressed with a different mindset and have to be combined. What are the ideal goals to be achieved in this process? The MSP has to be made the last resort for the farmer and should be as far as possible inflation neutral when revised. In fact, the farmers should gravitate towards the market finally. The procurement programme should ideally be closed ended but that would go against the principle of helping the farmer. Also given the perennial shortages that the country encounters in other farm products such as pulses, oilseeds and sugar, other alternatives need to be assessed in terms of having an incentive-based system for shifting cultivation patterns.

What are the solutions? First, the MSPs should not be increased unless there are serious distortions in the country. The government should instead provide direct subsidies to the farmers in the form of seeds, fertilizers, irrigation so that we increase the area under cultivation and the yields simultaneously so that the farmers get higher incomes without distorting the prices. In fact migration to pulses and oilseeds should be rewarded with incentives such as higher proportional food coupons or greater supply of water. In India, the major challenge is to increase the productivity of land and merely offering higher prices may not deliver the result. The long term solution is in increasing the yield per acre and this is where the subsidy should be directed.

Second, the procurement scheme should be widened to other crops and areas (not just a handful of 5-6 states where it is really effective today) to bring about parity among crops and farmers. We have had shortages of pulses and sugar in the recent past which calls for safety buffers to be built. While sugar can be imported, there are limited options for pulses, and a buffer will be useful.

Third, the procurement scheme should be closed ended to eschew the contradiction which has arisen in the last few years. However, to protect the interests of the small farmers and ensure that the bigger ones do not reach the procurement gates earlier, the FCI should make

use of the electronic spot and futures markets to manage these grains. NCDEX (both futures and spot exchanges) for example has robust platforms for futures trading in farm products while the spot platform has to be supported by making the APMC laws more amenable. The idea is that beyond the stipulated limit, the FCI should sell immediately in the open market whereby the buyers can pick up the wheat or rice from the exchange warehouses so that the procurement costs are reduced and the private players can buy their stocks rather than wait for the Parliament clearances for open market sales at a later date. This will reduce the storage costs and lower the chances of deterioration of the foodgrains.

Fourth, the government should enable farmers to sell directly on the electronic spot exchanges as long as they receive a higher price for the same and should create the necessary systems to enable this – price information, trading terminals, grading and warehousing facilities. Exchanges like NCDEX already have in place warehousing capacity of over 1.3 million tonnes which can be harnessed for this purpose.

Fifth, the farmers should be encouraged to use the futures prices of farm products to decide on which crop should be grown that gives the best returns. This will enable them to migrate to other crops rather than restricting their cultivation to rice and wheat.

Food security is a major issue for any country as scarcity can cause considerable distortions in the country. Policies must be geared to ensure that the cropping pattern is diversified and that farmers receive an income while also contributing to economic growth. Procurement programmes are pragmatic but have to be adapted to the changing requirements. Stocking of farm produce should not just be a mechanical process and must be managed well just as is done by corporates with their inventories. There are structures in place like electronic trading platforms, which should be leveraged to provide a superior solution that takes care of all the requirements of a cogent and robust Food Policy. ❑

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DIRECT TAX CODE 2010

Why do we need a new Direct Tax Code ?

The current Income Tax Act in India which was enacted more than 50 years ago in 1961, is not in tune with the radical transformation that the economy has undergone during this period. A simple, stable, robust and modern tax regime is what the economy needs today. Therefore, while presenting the Union Budget for 2005-06, the Government had announced its intention to revise, simplify, rationalize and consolidate laws and procedures relating to direct taxes .The purpose of the Code therefore is to consolidate and amend the law relating to all direct taxes, that is, income-tax, dividend distribution tax, fringe benefit tax and wealth-tax so as to establish an economically efficient, effective and equitable direct tax system which will facilitate voluntary compliance and help increase the tax-Gross Domestic Product (GDP) ratio. Another objective is to reduce the scope for disputes and minimize litigation.

If enacted, when would the DTC 2010 come into force ?

In enacted the Direct Tax Code 2010 would come into force from 1st April 2012.

What are the salient features of the Code ?

The main features of the Code are a single code for all direct taxes with unified compliance procedures, use of simple language, reducing scope for litigation by avoiding ambiguity, providing flexibility to the statute so that it can be modified according to the needs of a growing economy, to ensure better understanding of the laws and provisions, attempt has been made to simplify the laws and reflect them in the Form and consolidate all procedures, the regulatory function of the taxing statute has also been withdrawn.

How is income classified under the DTC 2010 ?

Income has been proposed to be classified into two broad groups – Income from **Ordinary Sources** and Income from **Special Sources**. The former refers to income from employment, from house property, from business, capital gains and income from residuary sources. Income from Special Sources would include specified income of non-residents, winning from lotteries, horse races, etc.

Losses arising from Ordinary Sources would be eligible for set off or carry forward and set-off against income only from ordinary sources without any time limit. Similarly losses from Special Sources would be set off against income from Special Sources.

What are the broad provisions relating to salary income under the Code ?

Salary / Employment income is proposed to be computed as the gross salary due, paid or allowed, minus the aggregate of the specified deductions. Exemptions such as house rent allowance, leave encashment and medical reimbursements have been retained. The exemption for medical reimbursements would be increased to 50,000 rupees. An allowance to meet personal expenses has been introduced. Leave travel concession and non-monetary perquisite have been done away with. Receipts under the Voluntary Retirement Scheme, Gratuity and Commuted Pension deductible from employment income subject to limits without the condition to make any prescribed investments.

For purposes of Residency, the category of 'Not Ordinarily Resident' is proposed to be abolished and only two categories of taxpayers would remain -viz. residents and non-residents. A citizen of India or person of Indian origin living outside India and visiting India will trigger residency by staying in India for more than 59 days.

What are the proposed tax rates under the Code ?

Income tax rates

For Individuals and Hindu Undivided Families

Upto Rs 200,000 – NIL; 200,001- 500,000 -10 % ; 500,001- 1,000,000 – 20 %; 1,000,001 and above – 30 %. Basic exemption for a resident senior citizen (65 years or above), is proposed to be Rs 250,000.

For co-operative societies

Upto Rs 10,000- 10 %; Rs 10,001-20,000 – 20 %; Rs 20,001 and above – 30 %

Societies other than co-operative societies – 30 %

For non-profit organisations

Upto Rs 100,000 Nil; Rs 100,001 and above - 15 %

For domestic companies- 30 %

For foreign companies- 30 % Profits of branches of foreign companies are taxable at 15 %

Total Income Tax Rates

Minimum Alternate Tax (MAT)

MAT is proposed at 20 % of

the adjusted book profits in case of those companies where normal income-tax payable is less than 20 percent of the adjusted book profits

MAT credit is available for 15 years

Wealth tax

Wealth tax is proposed at 1 % on the value of specified assets held by the taxpayer on the valuation date (31 March) in excess of the basic exemption of Rs 10,000,000

Dividend Distribution Tax (DDT)

Domestic Companies are liable to pay DDT at 15 % on dividends. Any dividend to a company or non-resident in respect of which DDT has been paid, is exempt from income-tax. For the purposes of computing DDT payable by a domestic company, the amount of dividend received by a domestic company will be reduced if - such a dividend is received from its subsidiary or if the subsidiary has paid DDT on such dividend. An equity-oriented mutual fund is liable to pay income distribution tax of 5 percent. Income received by unit holders from an equity-oriented mutual fund is exempt from income-tax. The life insurer of an approved equity-oriented life insurance scheme is liable to pay income distribution tax of 5 percent. Deduction is available to policy holders in respect of income on which such distribution tax has been paid.

Special rates for non-residents

The following incomes in the case of non-resident are proposed to be taxed at special rates:

Dividend at 20 percent (other than dividends on which DDT has been paid); Interest at 20 percent; Income received in respect of units of a fund at 20 percent(other than income on which tax on distributed income has been paid); Royalty or fees for technical services at 20 percent; Income by way of insurance including reinsurance at 20 percent; Income from lottery or crossword puzzle, race including horse race, games, gambling or betting at 30 percent

Tax on non-resident sportsmen or sports association on specified income at 10 %

Capital Gains

No special rates are provided for capital gains under the DTC. Capital gains tax is to be levied at normal rates as mentioned above. However, in respect of capital gains arising on transfer of equity shares or a unit of an equity-oriented fund on which STT has been paid, deduction would be allowed as follows:

- 100 percent in case aforesaid investment assets are held for more than one year
- 50 percent in case aforesaid investment assets are held for one year or less.

J&K WINDOW

ISRO GRANTS 22 AUTOMATIC WEATHER STATIONS TO J&K

The Indian Space Research Organization (ISRO) has granted 22 satellite linked Automatic Weather Stations (AWS) to Jammu and Kashmir. These stations will be established one at each district headquarters. The first of its kind in Jammu and Kashmir, the Automatic Weather Stations will provide hourly weather data pertaining to temperature, humidity, pressure, wind, rainfall and solar radiation.

The establishment of Automatic Weather Stations will be a boon for the people in general and the farming community in particular. The data available in these stations will help the State Agriculture Production Department in combating situations like drought and floods. Impending natural disasters can also be forecast at the district level by the establishment of these Stations helping the State to effectively mitigate the impacts of such disasters.

ISRO has a network of 750 satellite linked Automatic Weather Stations throughout the country and there was none in Jammu and Kashmir. The ISRO has accorded approval for the procurement and installation of 22 Automatic Weather Stations in Jammu and Kashmir. ❑

CENTRE APPROVES RS 371.18 CR FOR NATIONAL SAFFRON MISSION

For revivel of saffron production in Jammu and Kashmir, the Central Government has approved a plan of Rs. 371.18 crore under National Saffron Mission Programme for four years which includes Rs. 286.06 crore as Government of India share and Rs. 85.12 crore as farmers share. The mission is commencing from this year. The objective of the Saffron National Mission is to improve the overall production of saffron, enhancing quality of saffron, enhancement of Research and Extension capability and develop appropriate system for organized marketing for the growers.

The main objective of the scheme is to extend support for creation of irrigation facilities through tube wells and sprinklers which would help better crop in the area. The four year Saffron Mission would take off from this year and an amount of Rs. 39.43 crore would be utilized during the current fiscal for the purpose. To ensure Quality Testing and Marketing of the saffron for which Kashmir was famous world over, a Quality Control Lab would be established at Pampore by National Spot Exchange with a financial outlay of Rs. 8.90 crore.

With regards to providing improved irrigation facilities to the saffron growers under the Mission, 128 tube wells would be set up in Pulwama district, 106 in Budgam, 10 in Srinagar, 6 in Kishtwar and 3 in public farms. In addition 3715 sprinklers sets would also be distributed among farmers with the total financial investment of Rs. 9.69 crores including 28 sprinkler sets for public farms. The total cost for 53 tube wells and 1548 sprinkler sets for the current fiscal has been worked out at a Rs. 14.54 crore.

Under Saffron Mechanization Schemes, 125 dryers are also targeted to be distributed among farmers in each year of the Mission commencing from this year. After completion, four Saffron National Mission the State would earns Rs. 4642.5 crores against Rs. 236.55 crore at present on account of saffron production. ❑

Revamping the Public Distribution System

Sandip Das

As NAC formulates National Food Security bill, the next few months would be crucial for the centre to firmup a sustainable policy of food grains procurement, storage and distribution

WITH ALL the fuss and noise created around amount of grain to be distributed to poor families across the country under the proposed Food Security Act , Raju Marandi, a poor marginal farmr from Dumka district in Jharkhand is happy that despite deficient rainfall which is likely to impact his paddy crop, he can feed his family thanks to the subsidised food grains and other essential items he gets under the Targeted Public Distribution System (TPDS).

Similarly Pawan Kumar, a small farmer in far away Ranga Reddy district of Andhra Pradesh is happy that this year because of good monsoon rains he will get a better kharif paddy output which he would sell in the market for getting an extra income while his family of seven members could get their food requirements from the food grains supplied under the TPDS.

Marandi and Kumar are amongst 6.52 crore families registered under the Below the Poverty Line (BPL) category, which includes 2.43 crore Antyodaya Anna Yojana families (poorest of the poor), who are eligible for 35 kg of food grains (including rice, wheat, coarse grains and sugar), a month under TPDS. The government supplies rice to poor families at Rs 5.65 a kg, while wheat is allotted at Rs 4.15 a kg. For running this mammoth programme, the government incurred an expenditure of more than Rs 58,000 crore last fiscal as the food subsidy bill. More than 25 million tonnes of food grains are supplied to states for distribution under TPDS.

The author is a Delhi based senior journalist.

The PDS earlier covered the whole population without any segmentation. There used to be a lot of pilferage under the system and huge amounts of food grains would enter the open market with the connivance of fair price shop owners. In order to prevent this and make the system more targeted the government decided in 1992 to make PDS more oriented towards poor families. A Revamped Public Distribution System was launched in June, 1992 with a view to strengthen the PDS and improve its reach in the far-flung, hilly, remote and inaccessible areas. Subsequently the government launched the TPDS in June, 1997 with focus on below poverty line population.

However, for years the governments both at the centre and the states have been grappling with the issue of efficient running of more than five lakh odd ration shops or fair price shops which deliver food grains under TPDS. Many parliamentary committees and food ministry studies have confirmed leakages in the delivery mechanism which result in food grains often not reaching the beneficiaries. Many state governments have initiated innovative measures to stop pilferage in the TPDS system by introducing smart cards, biometric thumb impression of the beneficiaries etc.

As food subsidy bills mount, the need for complete revamping of the existing TPDS has been felt across many quarters including the food ministry and state governments.

The total food subsidy released during the last three years is as under:

Years	Subsidy released (Rs/Crore)
2007-08	31259.68
2008-09	43668.08
2009-10	58242.45

Source: Food ministry

During a recent conference of food secretaries of states and union territories, several possible initiatives were discussed to improve the delivery system, including the issue of food coupons, introduction of IT based initiatives through computerization of the TPDS and introduction of Smart Card based delivery of foodgrains.

Various state governments have introduced measures in this regard. For example, Andhra Pradesh has issued bar coded coupons for rice and kerosene under TPDS to ensure that there is no impersonation or false accounting in distribution of essential commodities by the fair price shop dealers. Arunachal Pradesh has initiated coupon system on a pilot basis in Tirap district. Coupons are issued to beneficiaries at the time of issuance or renewal of ration cards. The next month's allocation is based on the coupons submitted by the fair price shop dealer. Jammu and Kashmir has also issued ration cards in a booklet form for two years containing 24 coupons, while Bihar issues monthly food coupons to BPL families for a year and food grains are distributed on the basis of these coupons.

Despite all these initiatives to ensure transparency in food grain distribution, the Minister of State for Food recently said in the parliament that 'effectiveness of such coupons in eliminating deficiencies in TPDS has not yet been evaluated'.

Meanwhile, the National Advisory Council (NAC) is working on the amount of grain to be distributed to each family under the proposed Food Security Act. In a quest towards universalisation of PDS, NAC is also considering a proposal which would entail providing 35 kg of grain at Rs 3 per kg to all rural households, excluding the top 20% of the eligible group.

The second option, 'universal with differential entitlements,' divides the eligible group into above poverty line and below poverty line. This would mean that 42% of rural households would receive 35 kg grain every month at Rs 3 per kg and remaining rural households will get 25 kg grain at a price that would vary between Rs 5 to Rs 7.50 per kg.

When it comes to the urban population, NAC has considered just one approach. The target group, which is roughly 33% of the households, will

be given 35 kg of grain every month at Rs 3 per kg. The focus beneficiaries will be homeless or slum residents, households in vulnerable occupations, and socially vulnerable households.

However till now the food ministry headed by agriculture minister Sharad Pawar has consistently opposed universalisation of PDS by stating that it would dilute the focus of TPDS on poor families. The Minister had recently said that procurement of huge quantities of wheat and rice to meet the requirement of Universal Public Distribution System would result in very less availability of foodgrains in the market, leading to rise in open market prices. If the same quantity of foodgrains is distributed equally among all, then the scale of issue will have to be reduced.

In an oral observation recently the Supreme Court has said that the government should ensure free distribution of foodgrains to the poor instead of letting the stock rot. This observation was in reference to reports of huge stocks of food grains being stored in temporary sheds at FCI godowns because of huge storage crunch However, in its written order the court said "The government shall supply foodgrains to poor at low cost or no cost."

The government is considering an overhaul of PDS including upgrading the number of eligible BPL families. This is expected to increase the number of BPL families eligible for assistance and would correspondingly increase the allocation by central government. The next few months would be crucial for the centre to firm up a long term and sustainable policy of food grains procurement, storage and distribution so that poor families get ready access to food without having to face any red tapes. ❑

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NORTH EAST DIARY

REMOTE VILLAGES IN MANIPUR LIT WITH SOLAR ENERGY

Manipur Renewable Energy Development Agency (MANIREDA) is trying to explore more renewable energy resources for the State's energy security. MANIREDA has been handicapped due to paucity of resources, However, they have so far electrified 150 remote villages in the hill districts with renewable energy, the solar home lighting systems are being provided under the Remote Village Electrification Programme. There are 354 non-electrified villages among the State's 2,320 villages as per Economic Survey report (2009-10).

Out of 150 electrified villages, around 70 were located in Churachandpur district while Chandel district has around 20 villages. Few days back the Agency distributed solar home lighting system and village street lighting system to every resident of seven villages located close to the Indo-Myanmar border in Chandel district. The country had recently launched an environment-friendly Jawaharlal Nehru National Solar Mission to provide solar home lighting system at an affordable rate across the country so that at least 10 per cent of each State's power requirement could be substituted by renewable energy".

Chojeng Lunghar, Tora and Hongbei villages under Ukhrul districts were some remote villages that have received solar home lighting systems. For the first time since Independence, the people of five villages in Ukhrul district located along the Indo-Myanmar border, have every reason to smile as their homes have been lit up at night with help of solar home lighting system.

Under the assistance of MANIREDA, altogether 286 solar home lighting system have been provided to the people of Chatrik Khunou, Chatrik Khullen, Khayang, Kachouphung (T) and Kachouphung (K) villages which are located along the international border. ❑

FOREST VILLAGES WAKING-UP TO NEW DAWN

Located on the outskirts of the capital city of Assam Garbhanga, Pahamjila and Natun Garbhanga, three forest villages amongst many, are gradually waking up to a new dawn. Deprived of all basic amenities of modern life, children of these three villages did not know what a school is until the intervention of Parijat Academy, an institution in Pamohi that has now attracted global attention because of its relentless contribution towards the development of the society. Parijat Academy, founded by Uttam Teron for the underprivileged children, has set up a Parijat Children Education Centre each in these three villages which have education provision from Class I to IV.

Dominated by tribal people belonging to the Karbi community, these three villages had not the slightest idea about the world that has been changing rapidly outside their impoverished settlement.

Dependant on jhum cultivation for their livelihood and selling vegetables now and then in the Lokhra market, these people are now realizing that there is a big world outside and this awareness has come since their children started attending the Parijat centres.

What has been happening since Parijat's centres started functioning from 2008 is a perceptible change – the beginning of a new chapter. Parijat has extended micro loan to the needy. Through the loan, some villagers have started ginger and turmeric cultivation in organic way, and a few have started broom cultivation to increase their income. What is encouraging to Parijat is that most of them have succeeded in returning the loan.

Apart from disseminating various ideas about improving their way of living, Parijat has also been promoting the ideas of nature conservation and saving the trees amongst the villager. ❑

What Ails Cold Chain Logistics in India?

Jitendra Rathore
Karunesh Saxena

There should be more intervention from primary stakeholders - retail players, corporate houses, government, cooperatives and farmers/ producers in the business

THE ECONOMY of India has gained momentum. The country is viewed as a lucrative destination for business world over. Businesses are now diversifying and in this changing landscape India is witnessing the growth of organized retail business.

Organized retail business can broadly be categorized as food and grocery, consumer durables, apparel, pharmacy and others. Out of the above categories, food and grocery constitute the biggest pie at 54% with others at 7%, 7%, 2% and 30% respectively (An Ernst & Young Report, 2007). Food clearly is big business and the growing organized retail formats can provide the food business, the required thrust.

India is a major producer of food and offers congenial environmental and geographic conditions as revealed by encouraging statistics presented in Table 1 below. The figures indicate an opportunity for India to become a major food exporter to the world thereby catering to a sizable population but sadly, so far, export of commodities like fruits and vegetables and other perishable food remain a weak area. Many smaller countries of the world like Philippines and Malaysia have performed well in spite of having limited land resources. Various studies undertaken by industry researchers and academicians suggest that the primary reason for colossal wastage is poor infrastructure and operational inefficiency. According to a recent report in *The Financial Express* dated 28 June 2010, it was cited that India loses more than Rs.58,000 crore worth of agricultural food items every year. The present article is an attempt to understand the state of 'cold chain' logistics

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in India and the reasons for post-harvest losses.

What is a Cold Chain?

The temperature controlled supply chain for perishables consisting of cold storage facilities (also pre-cooling facilities in case of fruits and vegetables), refrigerated transport (reefer vans, insulated containers) and mechanisms that keep the produce safe from ambient temperatures to maintain desired quality, safety and taste is referred to as the *Cold Chain*.

Cold chains are a complete and comprehensive facility and measure, which put the nondurable goods to certain suitable conditions by adopting certain technical measures in the whole process of collection, processing, packaging, storage, transportation and sales, cut down the decline speed of the quality of goods as much as possible and maintain the best quality at maximum (Chinese Cold-chain logistic industry – A research report, 2009).

Perishable Food Business: Indian Scenario

Even after sixty years of independence, India has not shown expected progress, in Agriculture. Majority of the population is dependent on the Agro sector but there is a huge dearth of suitable infrastructure in terms of pre-cooling facilities, cold storages, good roads, power (for local or near-field establishment of small processing units). The Governments over the years have relentlessly tried to bring reforms but the focus remained on pre-harvest practices thereby leading to increased production but post-harvest practices and infrastructural development has received only a nominal attention.

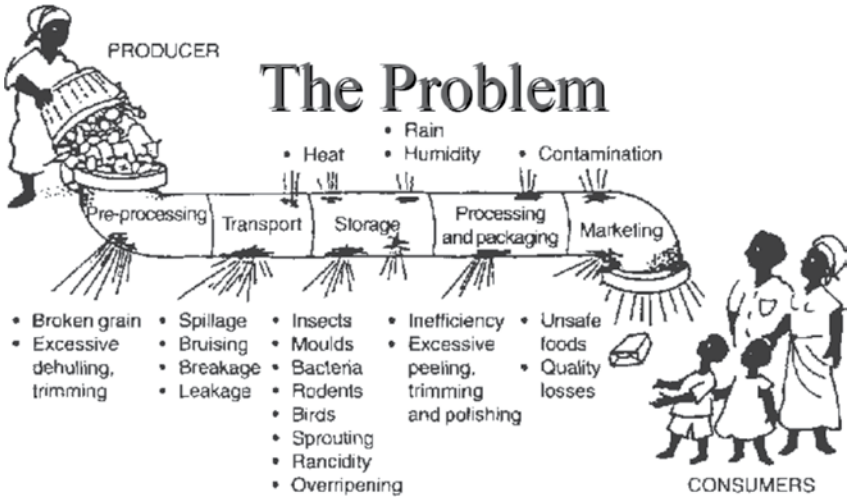
TABLE 1 INDIAN AGRI-BUSINESS: FACTS AND
Varied agro climatic zones
2nd largest arable land (184 million hectares) in the world
Largest irrigated land (55 million hectares) in the world
Largest producer of wheat (72 million tones), accounting for nearly 15% of global wheat production
Largest producer of pulses (15 million tones), accounting for nearly 21% of global pulse production
Largest producer of milk (90 million tones)
Largest producer and exporter of spices
Largest producer of tea, accounting for nearly 28% of the global tea production
2nd largest producer of rice (92 million tones), accounting for nearly 22% of global rice production
Largest producer of world's best basmati rice
2nd largest producer of fruits (50 million tones) and vegetables (100 million tones)
2nd largest producer of sugarcane (296 million tones), accounting for nearly 21% of the global sugarcane production
3rd largest producer of coarse grains (31 million tones), including maize, accounting for nearly 4% of the global coarse grain production
3rd largest producer of edible oilseeds (25 million tones), accounting for nearly 7% of the global oilseed production
Largest livestock population
India produces 6.3 million tones of fish (3rd largest in the world)
Meat production is estimated at 2.3 million tones

Source: FICCI, Ministry of Agriculture (2008)

According to Maheshwar and Chanakwa (2006), about 30% of the fruits and vegetables grown in India (40 million tons amounting to US$ 13 billion) get wasted annually due to gaps in the cold chain such as poor infrastructure, insufficient cold storage capacity, unavailability of cold storages in close proximity to farms, poor transportation infrastructure, etc. This results in instability in prices, farmers not getting remunerative prices, rural impoverishment resulting in farmers' frustrations and suicides. A brief description on state of logistics and that of cold chains in India is elicited.

The logistics industry in India is evolving rapidly and it is the interplay of infrastructure, technology and new types of service providers that will define whether the industry is able to help its customers reduce their logistics costs and provide effective services (Chandra and Jain, 2007). Logistics costs (i.e., inventory holding, transportation, warehousing, packaging, losses and

Exhibit I Wastages at different stages in food chain



Source: A presentation by C Maheshwar, Fleet Management Training Institute, Mumbai

related administration costs) have been estimated at 13-14 per cent of Indian GDP which is higher than the 8 per cent of USA's and lower than the 21 per cent of China's GDP (Sanyal, 2006).

Overall, India's spend on logistics activities – equivalent to 13% of its GDP is higher than that of the developed nations (Table 2). The key reason for this is the relatively higher level of inefficiencies in the system, with lower average trucking speeds, higher turnaround times at ports and cost of administrative delays being just a few of the examples. However the state of affairs in India is changing in the present times as a growing need for strong back end is being felt by the industry.

Talking of cold chain logistics in India, companies have identified the difficult areas but view it as a sizable opportunity for the future. The need for expansion in terms of cold storages and transportation services comes in the wake of boom in the food sector. The cold storage business in India is on an upswing and the estimated market size by 2010 is around $ 1.2 billion The companies into cold chain logistics solutions are playing the role of an aggregator and are helping in curbing wastages, increasing yield and revenue. Abattoir. The important stages in cold chains logistics: cold storages (facilities), packaging and distribution, where most lapses are likely to take place are discussed below:

Table 2 A comparison of logistics costs

Country	Logistics Cost / GDP	Share of 3PL in overall logistics
China, India	13-15%	<10%
U.S.	9.9%	57%
Europe	10%	30-40%
Japan	11.4%	80%

(Source: Logistics in India, SSKI)

Cold Storages

Warehouses are a critical component in the Cold Chain Logistics. The rapid evolution of organized retail in India along with the emerging large food processing sector has made modern and well developed warehousing and cold chain infrastructure indispensable for storage and transportation of perishable goods.

India which is world's largest producer of fruits and the second largest producer of vegetables does not have facilities for proper storage. Cold Chain network in India is practically non-existent with majority of the facilities as stand alone cold stores with a few integrated complete systems, limited to exports. India is short by 10 million tonnes of cold storage capacity due to which over 30 percent of agricultural produce goes waste every year, according to an industry report.

The statistics released by Government of India (31 December, 2006) through Directorate of Marketing and Inspection (DMI) reveal following statistics:

India has 5101 cold storage facilities with a total capacity of 21.6 Million Metric Tones (MTs). Industry experts estimate that cold storage capacity utilization in India is 30-40%.

More than 80% of cold storage capacity in India is owned and maintained by the private sector.

There were only 200 cold stores with a capacity to store 69,947 MT of milk and milk products.

Besides inadequacies in number, the technology adopted in majority of cold storages is outdated. This leads to inefficiencies. The exhibit below illustrates the technology levels used in the cold storages assisted by National Horticulture Board (NHB).

In India, most of the cold stores (78%) cater to one crop: potato (and potato seeds) whereas the cold stores should be designed in a way to store multiple crops, fruits and vegetables.

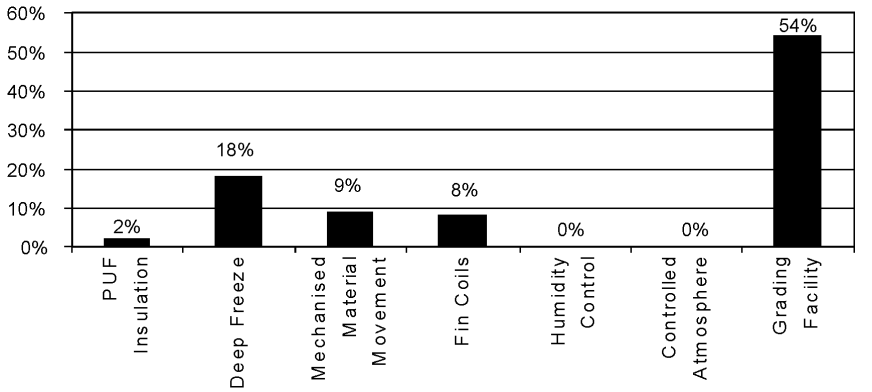
Packaging

The right packaging of perishables can lead to increased shelf life and also preserve the quality of product. This would in turn lead to profitability and safety of food. The post-harvest losses can occur due to various reasons like careless dropping of product; frequent loading and unloading; vibrations during transportation; puncturing and compression; bad roads etc.

In India, the packaging industry is growing at over 15% annually and the industry is worth USD 14 billion. The Indian packaging industry comprises of both organized and unorganized players. Food and agricultural markets dominate the sales of converted flexible packaging in India and will continue to expand on account of several factors — rising consumption of packaged foodstuff; the increasing presence of multinational food and beverage firms in India; the trend towards additional processing of food grains and fresh produce; ongoing efforts to improve sanitation and food safety.

The packaging industry is coping to varied demands of different industries but the packaging for perishables in the cold chain comes with a typical set of problems as temperature abuse, handling and pressure remain the utmost concern.

Exhibit II Technology Levels used in Cold Storages assisted by NHB



Source: Directorate of Marketing and Inspection (DMI)

Though a lot is happening in packaging industry, India lacks in standards. India needs to develop its own food processing and packaging standards as per local conditions and this should be done without compromising quality.

Distribution

Apart from food production, its distribution is a big business. The challenge that food distributors face is how to balance the demands from each end of the supply chain without sacrificing revenues and alienating loyal customers. The distribution process in cold chains can be very complicated as the various stages from farm to a collection centre to a warehouse to a distribution centre to a retail store and finally to a retailer requires that prescribed temperature is maintained.

Various models have been adopted by businesses for distribution like hub and spoke model. Hub and spoke distribution centers receive products from many different origins, consolidate the products, and send them directly to destinations (Hudson, 2003). The other types of distribution models are: Farm direct distribution model; farmer collaborative etc.

The factors that influence the adoption and application of particular distribution models in India are: geography; exhausted supply of produce; cultures; maintaining the identity of local foods etc.

Following factors pose a challenge in distribution of perishable food in India:

- No roads / poor conditions of roads in remote rural areas.
- Dependency on one type of transport (road transport)
- Limited usage of reefer vans/ trucks
- Expensive third-party-logistics
- Sparsely located pre-cooling and processing facilities

Conclusion and Suggestions

The cold chains in India are still in a nascent stage, though developing. The growth in the area is getting affected due to lack of infrastructure for post harvest handling and storage, absence of cold chain facilities and fragmented supply chain of food products. Inadequate infrastructure remains the biggest of all problems for this important sector. Also, the export figures are discouraging due to weak cold chains.

There should be more intervention from primary stakeholders - retail players and corporate houses, government, cooperatives, farmers/ producers in the business. Expanding public investment is crucial in building rural on-farm infrastructure like primary processing centers, collection centers, cold chains etc. Corporate and private players can play a pivotal role by providing influx of capital and technology to improve cold chains.

This would lead to India not only becoming self sufficient but one of the major exporter of food in the world. Carving out effective strategies related to infrastructural development can lead to an organic growth in this area. ❑

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Food Security : The Challenges Ahead

Parveen Kumar

The challenge of meeting the food requirement of an ever increasing population can only be met by practicing sustainable agriculture and protecting natural resources

AGRICULTURE IN India still accounts for 52% of employment, 12% of national export and 17.8% of GDP. Over the next four decades, the world population will grow by 2.3 billion. Meeting the demand of 9.1 billion inhabitants in 2050 will require 70% more food than we currently produce. At the same time world food system will have to cope with challenge of climate change which may reduce the potential agriculture output by up to 30% in Africa and 21% in developing countries. The sector will have to deal with a small agricultural labour force, as some 600 million peoples will move from country side to cities. The country has achieved a fourfold increase in food grains from 50mt in 1950 to 219.3mt in 2007-08 against a threefold increase in population from 33 million to more than 100 million. Today, India has become the largest producer of milk, vegetables, fruits, fish and eggs. But, what a tragedy in a country which is the one of the largest producer of food in the world, nearly 300 million go without two square meals a day.

Food security is the "the access of all people to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life". It has four basic components: availability, accessibility, utilization and stabilization. The four components of food security viz. availability, is a function of production, accessibility is related to purchasing power, utilization is determined by the availability of minimum basic needs i.e. safe drinking water, primary health care, primary

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education, proper housing facilities, environmental hygiene and fourth one, stabilization is influenced by the extent of attention given to the sustainability of the system. The challenge of meeting the food requirement of ever increasing population and plateauing productivity of agriculture can only be met through sustainable agriculture. This will involve approaches like integrated nutrient management, Integrated pest management, Integrated disease management, eco agriculture, increased investment in Agro-infrastructure, improving farm productivity by crop diversification, developing suitable site specific farming system models; developing innovative methods like System of Rice Intensification, removal of barriers to both internal as well as external trade, institutional reforms, input provisioning, greater thrust on rain fed areas, value addition, research and development particularly on the impact of climate change on agriculture and stream lining the Public Distribution System for an effective delivery mechanism

Major challenges before Indian agriculture:

Stagnation in Indian agriculture: A National survey shows that nearly 40% of farmers want to give up farming if an option was available. The reason is obviously low profit. Today, yields in India for almost all crops are stagnant and lower than other countries. Indian wheat yield in 2003-05 was 26.89q/ha while that of major wheat producing countries was 64.49q/ha. Production of pulses decreased from 14.28 million tonnes in 1990-91 to 13.38 million tonnes in 2004-05. At 638 kilogram per hectare our yield is way below the best of the countries which produce 1800 kilogram of pulses per hectare. Indian rate of growth of rice production is least in Asia, even lower than Pakistan, Myanmar and Srilanka

Small and marginal land holdings: The Indian economy is predominantly rural and agriculture oriented. Per capita availability of land in India has declined. Nearly 60% of the farmers on an average own 0.4 hectares, while another 20% on an average hold 1.4 hectares. This puts the population of small and marginal farmers at about 80% of the total. Such meager land holdings by a large majority of the farmers are neither viable nor sustainable for a country with billion plus mouths to feed. The declining trend in the average size of farm holdings also poses a serious problem.

Hunger and poverty: Our food grain production is now well over 220 million tonnes. We are facing double digit inflation in case of food items. There is an extremely high prevalence of hunger and malnutrition. At some places the poorest families are eating on alternative days. As we celebrate the 64th year of our independence, the rampant malnutrition, anemic mothers and stunted children indicate our failure to feed the empty stomachs. The international food policy research institute, Washington has placed India in the 66th position out of 88 countries for global hunger index. India ranks below all other South Asian nations, except Bangladesh; Kenya, Nigeria, Cameroon and Sudan fared better than India. India has more states under 'alarming to extremely alarming' categories with Madhya Pradesh being the worst affected. No state in India is in the 'low to moderate hunger index' category.

Food wastage: A recent headline that captured the attention of all was that food grains worth 580 billion got spoiled due to lack of storage facilities with the Food Corporation of India. It is no less than a sin to waste such huge quantities of food grains when millions in the country remain unfed and their daily ration of calories of many others is much below the minimum necessary for their survival. It necessitates looking for alternatives to Public Distribution System. The use of food stamps can be such alternative. Under this scheme the intended beneficiaries are provided with food stamps which recipients can exchange for an equivalent amount of food at any shop. The shopkeepers can get them credited in their Bank accounts. The biggest advantage of Food stamps is that it can plug the leakages associated with the PDS.

Little accountability in investment in agriculture research and education: We have the largest area under cultivation (161mh), have highest area under irrigation (55.8 mh), are one of world's largest users of fertilizers, have a fairly high degree of farm mechanization and largest scientific men power with over 30000 scientists and technicians employed in about 40 SAU's and near about 600 KVK's in the country. But, still those varieties are popular that were developed 20 years ago. In 1997, ICAR developed 72 varieties of field crops. By 2001 the figure was reduced to 35.

Climate change: Threat of climate change looms large over Indian agriculture. This is due to global warming. A 1^0c increase in the temperature will reduce the duration of wheat and rice in north and western India by a week. This will result in reduction of rice yield by 4 to 5 quintals per hectare). The corresponding decrease in yield of the wheat will be 4 to 5 million tons. Day and night high temperatures are having an adverse effect on tilling of wheat plants. In Northern parts in December the night temperature continues to be 7-8^0c and day temperature is hovering about 20^0C in the country. At this stage the night temperature should not be more than 4^0 C and the day temperature should not be more than 14-16^0 C. High temperature at this stage of winter stunts the growth of wheat plants and affects the tillering process. In Haryana wheat production has declined from 4106 Kg per ha in 2000-01 to 3937 Kg per ha in 2003-04 with maximum temperature rising by 3^0C during February- March in last seven years. Besides affecting the productivity, Climatic change will result in the emergence of new insect pests, shifting the range of various species, decline in the milk production and increased susceptibility to various diseases.

Dry land agriculture: Dry land is home to more than 450 million farming people. It contributes 42% of total food grains especially coarse grains, 75% of pulses and oilseeds and 40% of wheat. Climate change would expand dry land by 11%. Dry lands are characterized by low level of fertility, low productivity, frequent crop failure, uneven and untimely rainfall, extensive holdings, prolonged dry spell and low moisture retention capacity.

Agro-Infrastructure: We still are lacking in the desired infrastructure for providing irrigation to the cultivable areas, technology for soil and moisture conservation, infrastructure for storing perishable products, road connectivity for bringing perishable products in the market at the earliest, chain of cold stores at the village level, small scale industries for value addition and water harvesting structures for conserving water.

Ensuring food for all: Paradigm shifts desired

Promoting Farming system approach: Today, there is a need to improve the overall agricultural scenario with the multiple goals of growth, equity, employment and efficiency. The future food strategy depends on the conversion of green revolution to an evergreen revolution rooted in the principles of ecology, economics, employment generation and social equity. We have entered a millennium where we have to abandon the old concept of a crop centered green revolution and substitute it with a 'farming system' centered evergreen revolution to produce more from the available land, water and labour. Farming system integrates enterprises like fishery, poultry, livestock, horticulture and others within the biophysical and socio-economic environment of the farmer to make it more profitable. It is considered to be not only a reliable way of obtaining a fairly high productivity but also a concept of ecological soundness leading to sustainable agriculture. This offers advantages such as better utilization of resources, recycling of farm wastes, sustainability, employment generation and reduction of risk. The future of Indian agriculture depends

upon the development of specific farming systems as applicable to resource poor farmers and suited to different agro-ecological zones.

Strengthening Public Distribution System: Mahatma Gandhi wrote in 'Young India' in 1920, "We want to organize our national power not by adopting the best methods of production only, but by the best method of both production and distribution". Public Distribution system needs immediate reform. It needs to be strengthened. To avoid the rotting of food grains in open, community grain storage banks should be established at the village level from which the people could get subsidized food grains against food coupons. The management of these storage banks should be decentralized to the local level with the active monitoring of PRIs. The ambit and scope of safety net programmes such as Mahatma Gandhi National Rural Employment Guarantee Act, Integrated Child Development Scheme, Mid Day Meal, and National Old Age Pension Scheme should be broadened to benefit more and more.

Thrust on Food processing: The food processing sector has been described by Prime minister Dr. Manmohan Singh as the 'sunrise sector'. It has potential to dramatically improve rural livelihoods, opportunities and employment and bridge rural urban divide. Our share in the international trade is just 2%. Level of processing in the country is extremely low i.e. 6% as compared to 60-80% in developed countries. There is high wastage and low value addition. Vision-2015 strategy aims to enhance the level of processing from 6 to 20%, increase value addition from 20 to 35% and to increase global trade from 2% to 3%.

Institutional reforms: Consolidation of holdings to avoid further fragmentation and a proactive policy for small, marginal farmers and landless labourers through innovative mechanisms like cooperative farming, contract farming need to be devised. The extension system of the country has to reorient itself to the changing needs of the farming community. Public extension systems have not given the desired results. Private extension systems too are profit oriented. As such suitable public-private partnership models need to be put in place to effectively deliver the services to the farmers.

Provision of inputs: Supply of inputs such as seeds and fertilizers need top priority. Small farmers also need implements for timely sowing, weed control and post harvest management. Public and private sector seed agencies should be revamped to ensure seed production and distribution both qualitatively and quantitively. Timely supply of inputs is more critical for dry land areas. Dry land areas need varieties which have a short growing period and are resistant to drought. A greater stress needs to be laid on development of watersheds in these areas to conserve water which is a scarce commodity. To combat the effects of global temperature rise researchers should investigate how to make the crops more resilient to environmental stress. Search for biotic and abiotic stress tolerant genes must be intensified to create a gene bank both for plants and animals for development of new heat drought and flood tolerant genotypes. This will also involve converting C_4 plants to C_3 type.

Removal of barriers to interstate trade: India being a founder member of WTO is supposed to undertake further economic reforms in agriculture. It will have to remove all the interstate and inter country tariff and non tariff barriers, abolition of restrictions on trade, opening future markets and protecting Patent rights. At the same time it will have to improve its competitiveness in the world market through quality produce.

Right to food: The universal declaration of Human rights of 1948 asserts in article 25(1) that "everyone has the right to a standard of living adequate for the health and well being of himself and his family, including

food ". Food and nutrition rights were subsequently reaffirmed in two major binding international agreements. In the international covenant on Economic, Social and Cultural rights (ICESCR), which came into force in 1976, article 11 says that, "The state parties at the present covenant recognize the right of everyone to an adequate standard of living for himself and his family " and also recognizes the fundamental right of everyone to be free from hunger. India is an active member of the United Nations and a state party to ICESCR. Hence there is an obligation to respect, protect and fulfill right to food of every citizen of India. The National Food Security (NFS) Bill is taking shape . The National Advisory Council has recommended that the Act should provide every family in the 200 most disadvantaged districts of the country with 35 Kg of rice or wheat at Rs 3 per Kg.

The challenge of meeting the food requirement of an ever increasing population can only be met by practicing sustainable agriculture, protecting natural resources from being degraded and polluted and using production technologies that conserve and enhance the natural resource base of crops. We need to look into the potential green revolution areas of Eastern Uttar Pradesh, North Bihar, West Bengal, Orissa, Chhattisgarh and Madhya Pradesh, which have been neglected so far. Without them, the battle for food security cannot be won. Some targets of opportunity in agriculture have been exploited, many more difficult ones lie ahead. ❑

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Futures Trading – Existing and Potential Linkages to Cardamom Planters

V Shunmugam
Dhwani Mehta

The expected next-level reforms in the commodity derivative market in India will certainly provide an impetus to Kerala's cardamom exports

"IF IT weren't for the tastes of coffee drinkers in Saudi Arabia, the cardamom traders in the Indian state of Kerala might well run out of business," quoted a leading cardamom exporter in Kerala, which is a major source of cardamom for all Gulf countries, where the spice is used as an essential ingredient in coffee – 'Qahwah'.

The Cardamom Hills, situated amidst the Western Ghats in Kerala, produce a wide variety of spices and fruits including tea, coffee, teak, pepper, cardamom, rubber and jackfruit. It is cardamom, tea and rubber that make Kerala one of the most prosperous states in India. Its per capita GDP at Rs. 11,819 far exceeds the national average. At present, the southern state accounts for around 70 percent of domestic and 60-66 percent (next only to Guatemala) of world cardamom output.

During 1998-2000, India's cardamom exports accounted for less than 4 percent of its total production compared with Guatemala's 100 percent. India's average yield of cardamom was a mere 60 kg per acre while that of Guatemala was 147 kg per acre during the same period. Thanks to its increasing productivity and cheap labour, Guatemala supplied almost 64 percent of all cardamom traded worldwide while India's exports declined to 30 percent during late 1990's from its peak level of 50-60 percent of world cardamom exports in the 1970's. Thus, Guatemala gave India's cardamom exporters a run for their money, leading to the loss of its key markets such as Kuwait, Oman, and Japan in late 1990's. However, India retained Saudi

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Arabia as the largest importer of Indian cardamom.

There are several factors that had contributed to the declining trend in the export competitiveness of cardamom (during 1985-2007). While the growers attributed this to the rising cost of cardamom due to the high labour costs, the exporters stated that high cardamom production in Guatemala resulted in it pushing the entire production in the export market at cheaper rates. Hence, it became difficult for the Indian exporters to compete with them on the price front. Besides, deteriorating quality of their produce and high cost of financing their export operations were cited as the reasons why India lost her dominant position in the world market.

All of a sudden, there seemed to be a rebound in cardamom exports starting 2007 – a year after the futures in cardamom was launched for delivery at the major growing center of Vandanmedhu. Was it a magic wand that turned around the business prospects of cardamom exporters in Kerala? The gradual dip and the sudden recovery of cardamom exports in the past decade made us get to the ground to explore the reasons behind the phenomenon. Did the start of futures trade in cardamom in 2004 play a role in the recovery of the sagging exports of cardamom ? With no knowledge of the terrain, the geography, the culture and the language, only with the promised help of local contacts and a few acquaintances belonging to the cardamom ecosystem, our team of research experts went on an explorative mode in Kerala.

To give specific details of the cultivation centres, they are at the foothills of the Western Ghats, in Idukki district. In the major hilly areas of the district, there are extensive patches of woodland shading cardamom plantations.

The inside story, prior to 2004

A week-long tour of the Cardamom Hills, particularly in the major growing areas of Nedumkandam, Puttady and Vandanmedhu, was indeed an enriching experience. Thanks to the local acquaintances the team was able to sift through several private cardamom plantations, auction centres and warehouses across these three major cardamom-producing zones in Idukki and talk to the stakeholders.

What became evident to us is that the problems largely existed before the revival of the country's futures market (in 2003-04) after decades of suspension.

Most of the planters that our team interacted with said that before the introduction of futures trade in cardamom they had no idea about better variety/quality of a crop and no practice of grading or sorting, which could help them get a better realization for their produce. The reason for this was that the entire auctioned stock would be shifted for storage to Cochin which was the main trading centre for cardamom traders and exporters.

Interaction with the exporters revealed that during a prolonged period of 1985-2004 they had hurdles on all fronts, which made them globally uncompetitive, with the toughest challenge coming in from Guatemala. The chief problem was the rising labour cost leading to increasing costs of cultivation, process, and marketing. Added to this was the additional cost that the exporters had to incur as the charges for intermediaries who not only carried the produce from planters but also made value-additions in terms of quality certification, grading, transportation, warehousing, etc. Further, lack of trust between the exporters and the bankers made it difficult for the former to finance their exports operations easily. The bankers financed only 50 percent of the value of the produce to the exporters and that too based on their past credit performance and their income statement – not based on any credible model of collateral management.

The problem on the labour front lay – and still lies – in the inflexibility of their cost even when the price of the commodity and with that profit margin moved up and down drastically.

Thus, Kerala's export business suffered being pitted against this inflexibility of labour cost and volatility of prices of exportable products. Additionally, what also posed a serious hurdle to them is that the exporters had neither advance price signals (likely future prices) available to them nor adequate information on the commodity's fundamentals to figure out what could be its approximate price at a point of time in the future, which is a key to clinching export deals with importing countries.

The silver lining -rising awareness about futures market

A better quality crop is generally considered as one that is capable of yielding better quality in a short span of time. And cardamom is no exception. On this aspect, a small planter, KP Raju said, "With an increasing awareness about quality parameters due to futures markets, we are now growing a superior variety of cardamom called Njallani. This has resulted in a shortened yield span and an improved capsule size." Njallani variety yields 1,500 kg per hectare against a conventional yield of 200 kg per hectare. In fact, this variety is now grown in almost 87 percent of Idukki's cardamom plantations. This helped them lower their price expectations for the export quality crop given the rigid and rising labour costs.

The general opinion of the planters was that the improved yield (from Njallani variety) has indeed helped the planters get better prices – thanks to the advent of futures markets, which taught them that the better size and quality of the produce they have, the better will be the price that they will get i.e. a premium price to their product. They further said that based on the online futures exchanges' efficient and real-time dissemination of price information (price signals), the planters are now empowered to bargain for an appropriate price for their produce.

Noted a large planter, "The introduction of futures trade (in cardamom) has not only created a transparent mechanism of price discovery but also moved out the redundant intermediaries in the value chain. This has led to an improvement in our price realisation." He continued, "Besides, I am now able to plough back more of the increased realization as investment to enhance the yield of my crop."

Local traders – a part of the value chain – buy the produce in bulk from both small and big farmers as well as auction centres to sell it to big traders and exporters. They said, "We find it economically viable to grade the bulk produce as we procure it in large volumes." The traders bring the graded produce on to the exchange platform and, thus, reap better prices. A local trader in Nedumkandam, R. Suresh, enthusiastically said, "The awareness about the exchange-graded quality (6-7mm) and its prices enable us to get higher prices for graded cardamom compared with mixed grades."

The increased awareness about grading has led to setting up of many grading and standardisation facilities in the cardamom growing areas. "So, we do not have to go to Cochin to grade our produce now – something that has drastically reduced additional costs," Suresh said. He added, "The futures market has also enabled us to overcome the uncertainty in prices as we can calculate with certainty our realization from tomorrow's harvest."

The team then visited what is next in the value chain – the auction centres where big traders and exporters procure cardamom from planters or local traders. At present, there are eight auction centres that conduct auctions daily for sale of cardamom by the planters. These auction centres are run by private organizations or government-owned bodies licensed by the Spices Board. With regard to the impact of transparency of futures trading on the functioning of the auction centres, some planters remarked: "With the advent of the futures market, the prices emerging from these centres have become much more transparent compared to the opaqueness that existed pre-futures. We are really happy that

prices are no longer controlled by a handful of players."

Finally, the team met a few exporters and big traders who act as the last link in the value chain that connect the planters with the market. Most of them are privately-owned companies that export mainly to countries in West Asia apart from the US and Europe. Officials from some of these companies said that they were happy that now they can hedge their physical produce on the futures market and manage the risks arising out of price volatility. Further, thanks to the futures exchanges they are also able to get financing of up to 80 percent of the value of the produce from financial institutions without difficulty as their holding of exchange-graded quality provides it the status of a credible collateral, insures them against any price fluctuation (if hedged on the exchange), etc.

Re-emerging as the leader

With all the benefits of commodity futures already flowing into Kerala's cardamom economy, India's declining trend of cardamom exports has reversed and the exports have gone up around 215 per cent from 475 tonnes in 1998 to around 1,500 tonnes in 2009-10. Also, a significant jump in the unit value of realisation from exports, from Rs. 300 per kg levels to above Rs. 900 per kg, has been witnessed during the same period.

The expected next-level reforms in the commodity derivative market in India will certainly provide an impetus to Kerala's cardamom exports – beyond its current dependence on Saudi Arabia, to not just being truly globally competitive but being able to make strides towards re-emerging as the leader among international cardamom players in sync with India's overall economic aspirations. ❑

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Securing Food for all

Velu Suresh Kumar

Imports can help improve the country's supply situation for a short term, but for the long term, the country will need to focus on productivity enhancement

THE CONCEPT of food security has undergone considerable change in recent years. Food availability and stability were considered good measures of food security till the seventies and the achievement of self-sufficiency was accorded high priority in the food policies of developing countries. Though India has made substantial progress in terms of overcoming transient food insecurity by achieving self-sufficiency in food production, it could not solve the problem of chronic food insecurity. This necessitated a change in approach and as a result, food energy intake at household level is now given prominence in assessing food security. Food energy intake depends on many factors, most importantly on purchasing power and availability of food of appropriate quantity and quality at affordable prices. Currently the cost of food items is increasing rapidly, making them unaffordable to a majority of the people.

In policy design, a distinction is made between transient and chronic food security. Transitory food insecurity is associated with the risks related to either access or the availability of food during the off-season, drought and inflationary years and so forth. Policies such as those relating to price stabilization, credit, crop-insurance and temporary employment creation are initiated for stabilizing the consumption of the vulnerable groups. In contrast, the problem of chronic food insecurity is primarily associated with poverty and arises due to continuously inadequate diet. The strategy to overcome this problem includes intervention (agricultural production programmes, infrastructure, human resource development, etc.) to raise the purchasing power of the poor through the endowments of land and non-land assets and by generating

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employment opportunities, as well as long-term growth-mediated interventions to improve food availability and incomes of the poor.

India is one of the few countries which have experimented with a broad spectrum of programmes for improving food security. It has already made substantial progress in terms of overcoming transient food insecurity by giving priority to self-sufficiency in foodgrains and through procurement and public distribution of foodgrains, employment programmes, etc. However, despite a significant reduction in the incidence of poverty, chronic food insecurity persists in a large proportion of India's population. At the national level, we have solved the problem of food security which is reflected in mounting buffer stocks. Yet, there are millions of food insecure and undernourished people in India. The limitation is not food supply, but food distribution. Careful consideration of food security requires moving beyond food availability and recognizing the low incomes of the poor. It is also important to recognize the choices that households and regions face, including exploitation of natural resources when incomes fall short. Substantial human resources are wasted due to malnutrition related diseases.

Trends in Food Production

India achieved near self-sufficiency in the availability of foodgrains by the mid-seventies. The annual growth rate of food production including non-cereal food increased from 2.1 per cent during the 1960s to 3.0 per cent in the subsequent decade and further to 3.8 per cent during the 1980s. Between 1960 and 1980, food production barely kept pace with the population but in the 1980s per capita food production increased at a satisfactory rate of 1.6 per cent per annum.

During the period of triennium ending (TE) 1980-81, rice production was 49.9 million metric tones (mmt) which increased to 89.2 mmt by TE 2006-07. Production of rice increased at a rate of 2.4 per cent per annum during this period. Similarly, the production of wheat nearly doubled from 34.6 mmt in TE 1980-81 to 71.0 mmt in TE 2006-07, at the annual rate of 2.9 per cent over these years. Total production of cereals has also grown at the rate of 2.2 per cent per annum during the 26-year period. However, this growth has been decelerating very fast over the decades.

Growth in rice production slowed down to 1.8 per cent per annum during the 1990s and has only been growing at the annual rate of 0.1 per cent in the last six years, while the annual growth rate was 3.7 per cent in the 1980s. Overall total growth of cereals declined from 3.1 per cent per annum in the 1980s to 2.0 per cent per annum in the 1990s, and further to 0.2 per cent in the early period of the current decade, because the yield gains for cereals in the post-green revolution era have been low. For pulses and sugarcane also low yield have resulted in low production levels. However, oilseeds exhibited a high annual growth rate of 3.6 per cent in the overall period. But the oilseed sector suffers from the poor performance of the oil processing units.

The relative cereal price which showed a decline in the seventies and eighties, registered a rise in the nineties and also in the early period of the current decade. An increase in cereal price significantly reduces the calorie intake of the poor as their price elasticity of food/calorie estimates of price elasticity is numerically large. The upward trend in the real price of cereals in the nineties and also in the early period of the current decade had coincided with a slowdown in the decline of poverty.

Trends in Food Consumption

Cereal Consumption

The NSS data on consumer expenditure for various rounds indicates that per capita consumer expenditure at constant (1990-91) prices steadily increased since 1970 both in rural and urban areas. It increased around 1.5 per cent per annum in both the areas during '70s and '80s; and around 1.2 per cent per annum in rural areas and 2.8 per cent per annum in urban areas during the '90s. It appears that economic reforms benefited the urban households more than the rural ones. But the increase in consumption expenditure did not reflect in food expenditure. Per capita food expenditure at constant prices increased around 0.9 per cent per annum during

'70s and '80s while it declined at 0.9 per cent per annum in rural areas and was stagnant in urban areas during the last decade.

The consumption of per capita cereal has been declining since the early seventies despite a significant increase in per capita cereal production (Radhakrishna and Ravi, 1992; Rao, 2000). The consumption of per capita cereals declined in rural areas from 15.35 kg per annum in 1970-71 to 11.9 kg per annum in 2005-06 and from 11.4 to 9.8 kg in urban areas. The sharp fall in cereal consumption has been attributed to diversification in food consumption in favour of non-cereal foods, particularly milk and milk products, sugar and gur and other food items, changed tastes and preferences, as well as change in relative prices of food items (Mittal, 2006). Higher economic growth and per capita incomes have contributed to reduction in per capita demand for cereals.

Projections of Food Demand

Demand projections in general are estimated on the basis of assumptions about the base year demand, population, expenditure elasticity and economic growth. The domestic demand projections for rice, wheat and total cereals are arrived at by adding up the Direct Demand (human demand) and Indirect Demand (seed, feed, industrial use and wastage). It is observed that household food demand has been primarily driven by growth in population and income.

The demand and supply projection given below was developed at Indian Council for Research on International Economic Relations. The domestic demand are projected under two scenarios of per capita income growth. The two scenarios assume the gross domestic product (GDP) growth rates to be 8 per cent and 9 per cent. The results of food demand predictions corresponding to scenario of 9 per cent GDP is thought to be most likely in future. As per the projection, the total cereal demand for 2011 is 187.8 mmt if the economy grows at the rate of 8 per cent per annum and 188.5 mmt if the GDP is 9 per cent (Table 1). The cereal demand in 2026 will be 273.5 mmt and 277.2 mmt in the alternative scenarios, respectively. During the same period, demand for rice, wheat and pulses is expected to be 102.1 mmt, 65.9 mmt and 57.7 mmt, respectively, under scenario 2. Increase in demand for pulses is quite evident as this is the major source of protein for the vegetarian population. Demand for edible oil is projected to be 40.9 mmt by 2026 and sugar demand is expected to increase almost nine-fold in 2026 from base year demand of 11.9 mmt.

Projections of Food Supply

Medium and long-term supply projections of food have been made using a straightforward approach. Supply projections have been computed using the yield growth for the most recent period of 1993-2003 and taking 2003-04 as the base year for area and production and also assumed that further area expansion will take place. Supply prospects have accordingly been presented in Table 2 for selected food items.

If there is no area expansion and future supply is only dependent on yield growth, then total supply

Table 1: Projected Domestic Demand for Food Items in India

(million metric tones)

Food Items	Base Year	Scenario 1			Scenario 2		
	1999-00	2011	2021	2026	2011	2021	2026
Rice	66.0	94.5	96.9	102.2	94.4	96.8	102.1
Wheat	44.9	60.1	66.8	69.1	59.0	64.3	65.9
Total Cereals	119.0	187.8	242.8	273.5	188.5	245.1	277.2
Pulses	10.4	23.0	38.7	51.0	24.1	42.5	57.7
Edible Oil	8.6	15.7	26.7	35.3	16.8	30.2	40.9
Sugar	11.9	26.7	55.0	81.1	29.3	65.7	100.7

Source: Surabhi Mittal (2008)

Note: Scenario 1: GDP is 8% per annum; Scenario 2: GDP is 9% per annum.

Table 2: Projected Domestic Supply of Food Items in India

(million metric tones)

Food Items	Base Year 2003-04	Supply Projection		
		2011	2021	2026
Rice	88.3	95.7	105.8	111.2
Wheat	72.1	80.2	91.6	97.9
Total Cereals	186.9	209.1	242.2	260.2
Pulses	14.9	16.1	17.6	18.4
Edible oil	8.6 (25.3)	10.1 (29.9)	12.5 (36.9)	13.9 (41.1)
Sugar	24.2 (237.1)	25.0 (245.0)	26.0 (255.2)	26.6 (260.5)

Source: Surabhi Mittal (2008)

Note: Figures in the parenthesis are the supply projections for oilseeds and sugarcane in respective columns.

of cereals will be 209.7 mmt in 2011, 242.2 mmt in 2021 and 260.2 mmt in 2026. The yield growth of total cereals has been 1.5 per cent in the past decade, according to government estimates. Rice and wheat production is also estimated to increase to 111.2 mmt and 97.9 mmt, respectively, by 2026. There has been a diversification in the cropping pattern towards high-value commodities in major rice producing regions.

Food Gap

Increase in total demand is mainly due to growth in population and per capita income and as far as supply in concerned, production is constrained by low yield growth. A negative gap indicates that the demand of the commodity is more than its supply and this implies a deficit of the commodity in future (Table 3). The gap between supply and demand is narrowing down over the years for all the food items. The supply-demand gap for total cereals is expected to be 21.19 mmt in 2011 whereas it is projected at -16.96 mmt in 2026.

If we look at the medium-term prospect then in 2011 by the end of the Eleventh Plan, the situation for pulses, edible oil and sugar is alarming. This implies that in the years to come, the country will have to rely on imports of these food items to meet the domestic requirement.

Table 3: Supply-Demand Gap for selected Food Items

(million metric tones)

Food Items	Gap (Supply-Demand)		
	2011	2021	2026
Rice	1.26	8.98	9.13
Wheat	21.21	27.33	32.04
Total Cereals	21.19	-2.94	-16.97
Pulses	-8.05	-24.92	-39.31
Edible oil	-6.66	-17.68	-26.99
Sugar	-4.31	-39.67	-74.13

Source: Surabhi Mittal (2008)

Note: Demand scenario of GDP growth at 9% is considered here.

Rate of the growth of projected demand for the selected food items is much more than projected supply growths for these. Table 4 shows that in future, for cereals the demand grows at a much higher rate than the domestic supply. This difference in growth rates is much higher for pulses, edible oil and sugar.

Table 4: Per cent annual growth rate of projected supply and demand

Food Items	Demand	Supply
Rice	1.55	1.01
Wheat	1.42	1.34
Total Cereals	3.17	1.45
Pulses	6.51	0.91
Edible oil	5.95	2.13
Sugar	8.22	0.41

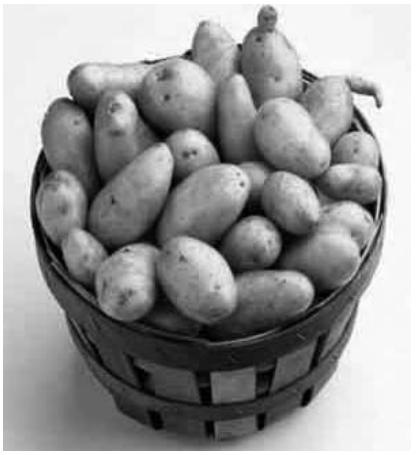
Source: Surabhi Mittal (2008)

Note: Growth rate are between base year and 2026. Demand scenario of GDP growth at 9% is considered here.

To meet the domestic food requirements, the country either needs to increase agricultural production or depend on imports. Since agricultural growth is limited, imports can help improve the country's supply situation for a short term. But for the long term, the country will need to focus on productivity enhancement through public investment in irrigation, research and efficient use of water, plant nutrition and other inputs. These policies will induce efficiency and can help in maintaining balance between domestic production and demand. ❑

Role of Potato in Attaining Food Security

V U Patil
S K Chakrabarti



Potato is an attractive smallholder crop because it acts both as a food security crop as well as an income-generating crop

INTENSE COMPETITION for reduced international supplies of cereals and other agricultural commodities is driving worldwide food price inflation, which brings with it the risk of food shortages and social unrest in low income countries. One strategy that could help to reduce the risk is diversification of food production to nutritious and versatile staple crops that are less susceptible to the vagaries of international markets. One such crop is potato. Potato is the world's fourth important crop after wheat, rice and maize, and stands third in terms of consumption. It has a great yield potential and high nutritive value and constitutes nearly half of the worlds annual output of all root and tuber crops, with an annual global production of about 350 million tonnes. Potato is an economically important staple crop in both developed and developing countries. The United Nations recognized the contribution that potato can make by declaring 2008 the International Year of the Potato, providing an opportunity for the global researchers to work towards increasing potato production and to increase the public awareness about this crop.

Potatoes are ideally suited to places where land is limited and labour is abundant, conditions found in much of the developing world. Potato yields nutritious food more quickly on less land and in harsher climates than any other major crop. Potatoes produce more food per unit of water than any other major crop. Potatoes are also an excellent source of complex carbohydrates. Far from being fattening, a medium size potato boiled with the skin provides

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about 100 calories, 26 grams of carbohydrates, zero cholesterol, about 4 grams of protein, 3 grams of fibre, about half the daily adult requirement of vitamin C, as well as significant amounts of iron, potassium, zinc, thiamin, niacin and vitamin B6. The potato also contains valuable supplies of such essential trace elements as manganese, chromium, selenium and molybdenum. One of the potato's secrets is its adaptability. Farmers in the tropics can harvest potatoes within 50 days of planting – a third of the time it takes in colder climates. In the highland areas, the potato is emerging as an off-season crop; planted in rotation with rice and maize, it brings relatively high prices at the market. Similarly, in the lowlands the potato's importance as a winter cash crop is rising dramatically. Particularly in India, the tuber is increasingly being viewed by the state as an alternative crop to feed its rice-dependent population.

In many developing countries, the poorest and most undernourished farm households depend on potatoes as a primary or secondary source of food and nutrition. These households value potato because it produces large quantities of dietary energy and has relatively stable yields under conditions in which other crops might fail. The potato is highly adaptable to a wide variety of farming systems. With its short vegetative cycle – high yields within 100 days – it fits well into double cropping systems with rice, and is also suitable for intercropping with maize and soybeans. Potato can be grown at altitudes of up to 4,300 m and in a variety of climates, from the barren highlands of the Andes to the tropical lowlands of Africa and Asia. Potato is also rapidly becoming a valuable source of cash income – a primary requisite of food security - for many small scale producers. In many developing countries, growth in urban population and incomes and the diversification of diets have led to rising demand for potatoes from the fast food, snack and convenience food industries. The structural transformation of agriculture-based economies into more urbanized societies opens up new market opportunities for potato growers and to their trading and processing partners in the value chain.

Global scenario

Potatoes are grown in about 150 countries throughout the world and more than a billion people worldwide eat potato. About 328.87 million tonnes of potato are produced in the world over an area of about 19.13 million hectare. The top ten producers in the world are China, Russia, India, USA, Ukraine, Poland, Germany, Belarus, Netherlands and France. These together contribute about 70% of the total production. Europe is the largest per capita consumer, followed by North America and Latin America.

Indian Scenario

India ranks 4th in area but it is the 3rd largest potato producer in the world after China and Russian Federation, contributing around 7.5% to the world's production**.** Potato is produced in an area of 18.10 lakh ha with a production of 285.72 lakh tonnes and productivity of 15.78 ton per ha. In India, more than 80% of the potato crop is raised in the winter season (Rabi). About 8% area lies in the hills during summer days. Rainy season (Kharif) potato production is taken in Karnataka, Maharashtra, HP, J&K and Uttranchal.

Potato is grown almost in all states of India. Major potato growing states are Himachal Pradesh, Punjab, Uttar Pradesh, Madhya Pradesh, Gujarat, Maharashtra, Karnataka, West Bengal, Bihar and Assam. UP, West Bengal, Bihar and Punjab together account for about 86% of India's production and about 90% of the potato crop in India is cultivated on Indo-Gangetic plain. However, potato consumption per capita in India (14.8 kg/head/year) is one of the lowest in the world and hardly 1% of the potato is processed. At present, the processing sector largely comprises of various kinds of dehydrated potato products, starch etc. Although India is the third largest producer, it exports hardly 0.45% of its produce. This is because in India the climate required to grow varieties suitable for French fries and chips is not so conducive. But now some varieties like Chipsona and Frysona are being released in by CPRI/ICAR especially for potato processing

industries. Once these varieties are fully adapted by the farmers, they will give a good competition to the European value added potato varieties.

Conclusion

For poor potato farmers in developing countries, improving yields is essential for achieving economic independence and food security. While average potato yields in North America and Western Europe often reach 40 tonnes per hectare, yields in developing countries are usually below 20 tonnes per hectare—a persistent and sizable yield gap. International Potato Centre, which is based in Peru seeks to reduce poverty and achieve food security on a sustained basis in developing countries through scientific research and related activities on potato, sweet potato and other root and tuber crops. Farmers could produce an increased yield if ways could be put in place to manage late blight, bacterial wilt and viral diseases. The second India International Potato Expo 2010 was held recently at Delhi, where it was said that India can become the "food factory of the world" if we adapt to the demand driven and cluster farming approach. In the same event the father of Indian green revolution MS Swaminathan said that "Potato is poised to play an important role for the burgeoning Indian and global population for food security. According to Prof. Swaminathan there are two immediate challenges for potato farming- quality potato seed in changed climate conditions and processing and nutritive quality of potato. Think tanks of Indian Council of Agriculture Research (ICAR) and scientists of Central Potato Research Institute (CPRI) are working towards these issues, mainly by providing the healthy and disease free seed material to the farmers and also by developing varieties like Chipsona and Frysona purely for the processing purpose. CPRI has developed more than 40 varieties due to which Indian farmers can harvest potato round the year. Though the potato is regarded as a fairly adaptable plant, it is susceptible to a number of pests and diseases, most notably late blight which still remains the most destructive food crop disease in the world, causing as much as $10-20 billion in annual losses. Wild species of potato are being utilized in the hybridization programmes to develop high yielding and disease resistant varieties in potato. It is certainly true that potato is an attractive smallholder crop because it acts both as a food security crop as well as an income-generating crop. As farmland continues to be threatened by urbanization, the potato indeed could become an important food crop, as it can be planted in dry areas not suitable for rice and is easy and cheap to produce. United Nations goes so far as to say that potato can help save the lives of many of the world's poor and hungry. ❑

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A Multipurpose Crutch

It has light wooden frame fitted with a buzzer, a glow light, a seat and an umbrella stand. A user can walk with the help of this crutch very comfortably despite all the add-on features

WHEN A disabled/ differently enabled person walking with crutches feels tired and needs to rest, finding a place to sit is not always easy. Rakesh Kumar Patra from Nayagada in Orissa has thought of a solution. He had made a crutch that has a foldable seat, a headlight, an alarm and even an umbrella holder-cum-stand.

Rakesh comes from a business family. He lives with his parents, brother and a sister. He is studying in class ten in his village high school. He loves the village environment with its temple, river and forests.

Rakesh has been a bit of an inventor and in his efforts to develop innovative products he has been guided by his uncle while his father, though not against his experiments, urges him to do well in studies as well. Rakesh was in class seven when he developed this multipurpose crutch for handicapped people.

Being a sensitive child, Rakesh remains distressed with many social issues. He feels uneasy about the sale of liquor in his village; he is worried about the fact that his school has no library or scientific laboratory equipment, but most of all he is concerned about physically challenged individuals.

Genesis

A keen observer, Rakesh saw that physically challenged people of his village faced acute difficulties while walking in sun, rain and in the darkness of the night. He realized that whenever they felt tired, and wished to sit down, they faced a lot of difficulty. Sitting on the ground was not possible as after

doing so getting back on their feet would be quite a difficult task. Also, it was difficult for them to see and walk in the dark.

This made him think hard and he conceived the idea of a multipurpose crutch: a crutch, which can have a light and sound source, a sitting mechanism and an indicator also.

He discussed the concept with his teacher Gopinath Pradhan of Gopalpur M.E. School and sought his help. A local carpenter made wooden frames for the crutch. It took Rakesh one year to add on the extra features and he had it ready in 2003.

Innovation

The crutch incorporates multiple use options. It has light wooden frame fitted with a buzzer, a glow light, a seat and an umbrella stand. A user can walk with the help of this crutch very comfortably despite all the add-on features.

There have been designs of seat being incorporated in crutches but in those cases, both the crutches have been involved in the seating mechanism while in Rakesh's model the seat along with other simple utilities have been provided in a single crutch. For the mute user Rakesh's model has a battery powered buzzer, which can be switched on while crossing roads; the buzzer can warn other passersby or any rushing vehicle. The upper part of the crutch has a light for night use and the lower part has a red indicator bulb. A 9-volt battery powers all these circuits.

The user can unfold the seat to rest on and fold it back after use. The crutch has a side stand, which accommodates a foldable umbrella. When going out in sun or in rain, the user can open out the umbrella and use it. Even while being seated, the user can use the umbrella. ❑

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Seize the Moment: Reform Rural Health Care Now

Rajeev Ahuja

These initiatives hold tremendous promise, but their impact will remain limited if they are not accompanied by certain core reforms to introduce systems of accountability

MOST PEOPLE agree that governments are responsible for providing their citizens with healthcare. What they don't agree about is whether governments should just finance health care, while leaving its provision to the private sector, or whether they should provide that care as well?

But, it's now time to put this old public vs. private debate aside because, let's face it, there isn't any good alternative to the public provision of health care, especially in India's rural areas which don't attract too many qualified private doctors.

Likewise, public-private partnerships to deliver rural health services have only been successful where special conditions have prevailed - such as strong commitment and leadership on the part of both the public and private partners. But, since these conditions are difficult to replicate across the vast expanse of the country, this doesn't look like a viable option, certainly not for the foreseeable future.

Appropriately then, India is now going ahead with renovating, up-grading, and expanding government rural health facilities, mostly under its 2005 National Rural Health Mission (NRHM).

So, the question we should now be asking is: how do we improve public health facilities in the rural areas, especially as, with increasing amounts of central funds going to them under the NRHM, we actually have a chance to improve things?

Let's look at some of the interventions in the rural health

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mission: primary health centres (PHCs) and community health centres (CHCs) are being renovated and upgraded; health workers are being reposted and hired to work here; volunteers from the community have been selected and trained in almost every village; and the availability of essential drugs is improving. Importantly, rural health facilities are receiving substantial funds in the form of untied grants every year, which they can use flexibly.

These initiatives hold tremendous promise, but their impact will remain limited if they are not accompanied by certain core reforms to introduce systems of accountability. For it is this accountability that will ultimately determine how well the public health centres deliver the services the people sorely need.

Let's, for a minute, take a look at the situation on the ground in many rural health facilities in India. Drugs are often pilfered and diverted to the market, expensive medical equipment lies unused or unrepaired, doctors don't show up at work every day or don't discharge their duties as they should. But, in how many states are PHC/CHC doctors encouraged to report wrongdoings without a backlash for the whistleblower? In how many states do doctors have control over their junior staff or over their work environments enabling them to perform well? In how many states do contractual staff receive their salaries on time? In how many facilities are the hygiene levels high enough to keep their patients safe from re-infection? Clearly, the 'business as usual' approach will not deliver on the promises of the NRHM, no matter how much more money is targeted at the sector.

Instead, the situation calls for the professional management of public health facilities. Conditions would undoubtedly improve if the medical officer in-charge of a rural health facility was given far greater authority to function and, in return, was held responsible for providing health services of the requisite level to the people.

A precedent already exists in the southern state of Tamil Nadu. Here, as in other Indian states, government funding is based on inputs -- such as the quantity of drugs supplied, the number of staff employed and salaries paid, the kind of medical equipment provided etc. But Tamil Nadu has succeeded where others have failed because it implements accountability mechanisms along with strict internal controls and oversight, both for the use of these inputs as well as for the delivery of services of the requisite standard.

Another approach is to link funding with performance. This includes: how many outpatients visited the facility, how many women delivered their babies in the institution, how many family planning operations were performed, and so forth. This is quite distinct from the conventional inputs-based approach where performance often takes a backseat. The biggest advantage of performance-based-financing is that those incharge of managing facilities have considerable freedom to organize themselves to achieve results. But, clearly, implementing this approach will take time, as it not only calls for a fundamental change of mindset, but also requires the breaking of new ground on the "how to" of doing so.

Now is also the time to introduce critical reforms because a number of new initiatives are being pioneered. For instance, a subsidized national health insurance scheme for the poor (RSBY) is spreading throughout the country. As this scheme progresses and competition between public and private providers for a share of this market intensifies, public health facilities will be forced to deliver – or wither away.

Much change is underway. But it remains to be seen if the health administrators and technocrats are sagacious enough to see this coming and speed up core reforms to meet the rapidly changing scenario. The know-how is available, it can be adapted to suit Indian conditions, but are they ready to actively go out and seek it? Much will hinge on how they decide to proceed. ❑

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Food Security of Paniyas in Wayanad

Raju Narayana Swamy

The critical food security factors that need urgent analysis backed by effective management mechanisms include agricultural policies and governance

THE PROBLEMS of rural poverty, food security and sustainable livelihood continue to be key policy challenges in India. The persistence of mass poverty among adivasis in India has been attributed to the problem of degradation of the natural resource base, resulting in its failure to support a decent livelihood for the adivasis. The present article deals with food security issues in respect of the Paniyas, the largest single tribe in Wayanad district of Kerala, highlighting their traditional food systems and exploring how these can be used to ensure food security.

Population trend and distribution of Paniyas

Paniyas constitute the largest tribal community in Wayanad district of Kerala. According to 1991 census their population is 67948, of which 33273 are women and 34675 are men. The Paniyas live in a variety of ecological settings-some in relatively isolated hilly tracts, some close to urban locations and relatively few near forest fringes. The word Paniya means a worker. It is derived from the word *Pani* meaning 'work' and those who do pani (work) is *Paniyar*. They have been mentioned by several authors mainly as agricultural workers. The name by which they refer to themselves is *Kachavan*, the subaltern to their employers (Somasekharan, Nair, P.,1976). They usually have no property of their own and have traditionally earned by rendering their services to others.

Means of Sustenance

Paniyar were traditionally food gatherers leading a nomadic life. They depend heavily on collection of edible roots, tubers and hunting small games for their sustenance. Along with this they also collect non-timber forest produce (NTFP) like honey, fruits, bark, leaves and other edible items. The sharp insights gained through close and

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sustained interaction with nature helped them to adapt to new modes of production in their forest life. Most wild food that Paniyas collect come from the paddy fields and its fringes, bunds, wayside bushes, agricultural or unmanaged or semi-managed habitats.

The Paniyas eat more of protein rich foods such as fish, crab, mushroom and animal meat. This is due to the easy availability of these food items in the forest, paddy fields, riversides and streams. Pulse intake is very less. A variety of 72 leafy vegetables form part of their diet. Around forty eight kinds of fruits are consumed. Wild fruits and tubers form a main part of their diet. During scarcity of cereals, especially rice they depend mostly on jack fruit. Monsoon food mainly consists of bamboo seeds, jack fruit etc.

Access to food

Though the Paniyar participate in the modern market economy, they still hold a world view similar to their food gathering days. They work only to meet their immediate needs and not to make savings for the future. Starvation deaths are common among adivasis in Wayanad. The Paniyas are the biggest victims of this. Many adverse starvation deaths occurred in tribal districts in Kerala like Palakkad, Kannur and Wayanad. There was widespread disillusionment and discontent and hostile reaction to these deaths. Reports of starvation death of thirty two adivasis in mid-July 2001 triggered an agitation. A group of radical adivasi women and men captured a mobile food shop belonging to the Civil Supplies Corporation and distributed the food to the adivasis (Krishnakumar, R. (2003), 'The Muthanga Misadventure'). The lack of purchasing power is the main reasons for the starvation deaths in these region. Deforestation and alienation of adivasi land has also resulted in the reduction in the use of their natural resources. Habitat destruction and commercialization has left the Paniyas of Wayanad with few choices. The younger generations of Paniyas have been forced to discard their traditional way of life and adapt to the changing situations.

The non availability of nutrient food items increases the risk of micronutrient deficiencies. The availability of food near to the household is a prerequisite to food security. Availability is influenced by factors such as a community's proximity to centres of production and supply, or by market forces, restrictions on trade and international policies that affect food supplies. Modern agricultural practices have resulted in shrinking of forests, soil degradation and degradation of natural resource base. This in turn has led to lower yields of tubers, crab and leafy vegetables from the fields and forests of Wayanad as compared to former periods. This creates a major problem since the Paniyas are dependent solely on forest produce - they neither have any significant purchasing power nor any land to cultivate.

Agricultural production and poverty

At present wage labour in the plantations and agricultural fields owned by the higher caste landlords is the main livelihood of the Paniyas in Wayanad. The wage paid per day for male ranges from Rs. 100 to Rs. 120 and in the case of females between Rs.60 to Rs. 80. The crisis in the agricultural sector, especially the plantation zone has resulted in major loss of job and wage for the agricultural labourers (Gopimony, R., 2004).This crisis affects wage labour households through decline in income from cultivation.

Conclusion

The problem of hunger and malnutrition in adivasi areas is clearly linked to the inequalities and threats to food security in these regions. They are also accentuated by the lack of proper infrastructure and services, most of the benefits of these being appropriated by richer farmers, and by degradation of natural resource base by modern agricultural practices. Paniya society is today marked by the breakdown of local self-sufficiency In this context the solution lies in adopting an alternative development paradigm in which conservation plays a major role. Wayanad's existing economic problems, especially rapidly declining agricultural production, food insecurity and hunger require objective analysis and appropriate improvement measures. The critical food security factors that need urgent analysis backed by effective management mechanisms include agricultural policies and governance, contribution of indigenous people, protecting the environment whilst ensuring food security etc. The traditional agricultural systems have a big role to play in this direction. ❑

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'Barahanaja' Holds the Key

Baba Mayaram

The Seeds Movement may seem a drop in the ocean at present, but it could hold the answer to the problem of soil degradation and declining productivity of our agriculture

RECENTLY, AT an agricultural festival in Indore, Uttarakhand was represented by a stall displaying traditional seeds. I was tempted to pick up these, fascinated by their texture, colours and sizes- like colourful beads. The stall stocked small plastic bags with seeds of *Dhan, Rajma, Mundwa (Kodo), Marsa (Ram Dana), Jhangora, Wheat, Lobia and Bhatt,* all traditional seeds. I later learnt that the credit for this display and indeed the movement that has ensured that these seeds remain in circulation amidst an environment of aggressive biotech altered varieties goes to Vijay Jaddhari, a long-standing conservationist and prominent seeds activist. The region where Jaddhari lives has been home to the famous Chipko Movement, in which local women came together to protect their trees from illegal felling and register their protest by hugging them, a spontaneous and powerful outcry against the destruction of their precious forests.

Associated with Chipko movement, Jaddhari has been active in protecting the biodiversity of the place as well through the Seeds Movement. Infact when the term 'bio-diversity' was not as fashionable as it is today, nor was biotechnology as advanced, he sensed the damage chemical fertilizers and new technologies could wreak on farming practices. The answer to that, he believed lay in reviving traditional agricultural practices, a critical need to which he devoted himself. This was the motivation behind the movement and at the core of this lay the urgency to protect local varieties of seeds.

The departure from traditional, sustainable agricultural practices and adoption of chemical farming and its new practices initially boosted productivity, but over

a period of time that gradually reduced. According to Jaddhari, "We tried to find native seeds, we kept searching for it. Finally, we met such farmers who do mixed farming" . This was a point of discovery, a turning point in his search and a concept, which made complete ecological sense. This was the concept of "Barahanaja" which literally means twelve seeds at one time.

This signified a holistic agricultural practice handed down over generations, one that produces a good crop, retains productivity of the land and ensures that the cultivation is integrated with animal husbandry, the other crucial sphere in the agricultural sector. Farming and maintaining livestock are in a sense, two pillars of the agricultural economy and 'Barahanaja' lends itself very well to this interface. The number 12 or barah is only indicative; it does not mean that the cropping and sowing pattern cannot use more varieties. The core idea being the strengthening of the twin pillars of farming and animal husbandry, it meant the optimum utilisation of by-products of each to boost the other. For instance, the non-harvested portions of the crop become fodder for animals and the dung from the animals become fertile manure for the farms. By-products of harvested crops could also be used to produce bio-fertiliser in this holistic pattern of agriculture that has been the base of traditional farming. Practices like Barahanaja work to keep these agricultural practices alive and prevent them from falling into disuse with the onslaught of aggressive practices based on new technologies.

Going back to the stall at the *Mela,* I was curious to know what kinds of seeds are commonly used for this "wonder-package"? I learnt *that Koda (Mundwa), Marsa (Ramdana), Ogal (Kuttu), Jonyala (Jawar), Corn, Rajma, Gahath (Kulath), Bhatt, Raiyas, Urad, Sunta, Ragadwas, Tor, Mung, Bhanjgir, Til, Jakhya, San, Kakhdi* are some of the varieties . The cultivation pattern hinges on the irrigation facilities available. 13% of lands in Uttarakhand have irrigation facilities while 87% remain un-irrigated. Interestingly, it is the un-irrigated land, which is suitable for cultivation of Barahanaja, Dalhan (a mix of 'dal' seeds, Tilhan (a mix of oil-producing seeds)

The system also lends itself to soil conservation. It is common to find fields left uncultivated after harvest, a natural way to enable it to regain fertility. In today's times when the focus is to suck out the most from the land, this seems an aberration. It would be considered a good farming practice for instance to produce three crops in a year. This leads to the abuse of nutrients and moisture inherent in the soil. It is a practice which would render the soil unfit for use beyond the immediate sense.

'Barahanaja' though in use in Uttarakhand is not confined to the region alone. The actual seeds may differ but the concept remains universal. Several mixed-crop cultivation patterns are popular in dry lands of Madhya Pradesh. One such is 'Utera' practiced in forest lands of Hoshangabad. Here farmers sow *corn, urad, soyabean and jawar*. The dry lands of Satpura forest and unirrigated areas are used for Utera. 'Birra' a modified form of Utera uses wheat and 'chana'. Elders still relish 'rotis' made from this.

Without a doubt, Barahanaja and similar practices are invaluable for the ecology, retaining the productivity of the soil and thus ensuring sustainable agriculture. They play a vital role in protecting rural livelihoods, which in our country are largely agriculture based. This type of mixed farming signifies a safety net for farmers. If one harvest fails, one can cover the deficit in the next harvest. This does not happen in cash crops, which once damaged by insects or natural calamities, is a permanent loss for the farmers. There are no casualties in 'Barahanaja'; 'Utera'; 'Birra' or any of the traditional farming practices across different regions of this country. Every stage of agriculture, every product or by-product gets recycled and thus sustainable. It would be a crying shame for us to give this valuable tradition a go by. The Seeds Movement may seem a drop in the ocean at present, but it could hold the answer to the problem of soil degradation and declining productivity of our agriculture.

Charkha Features