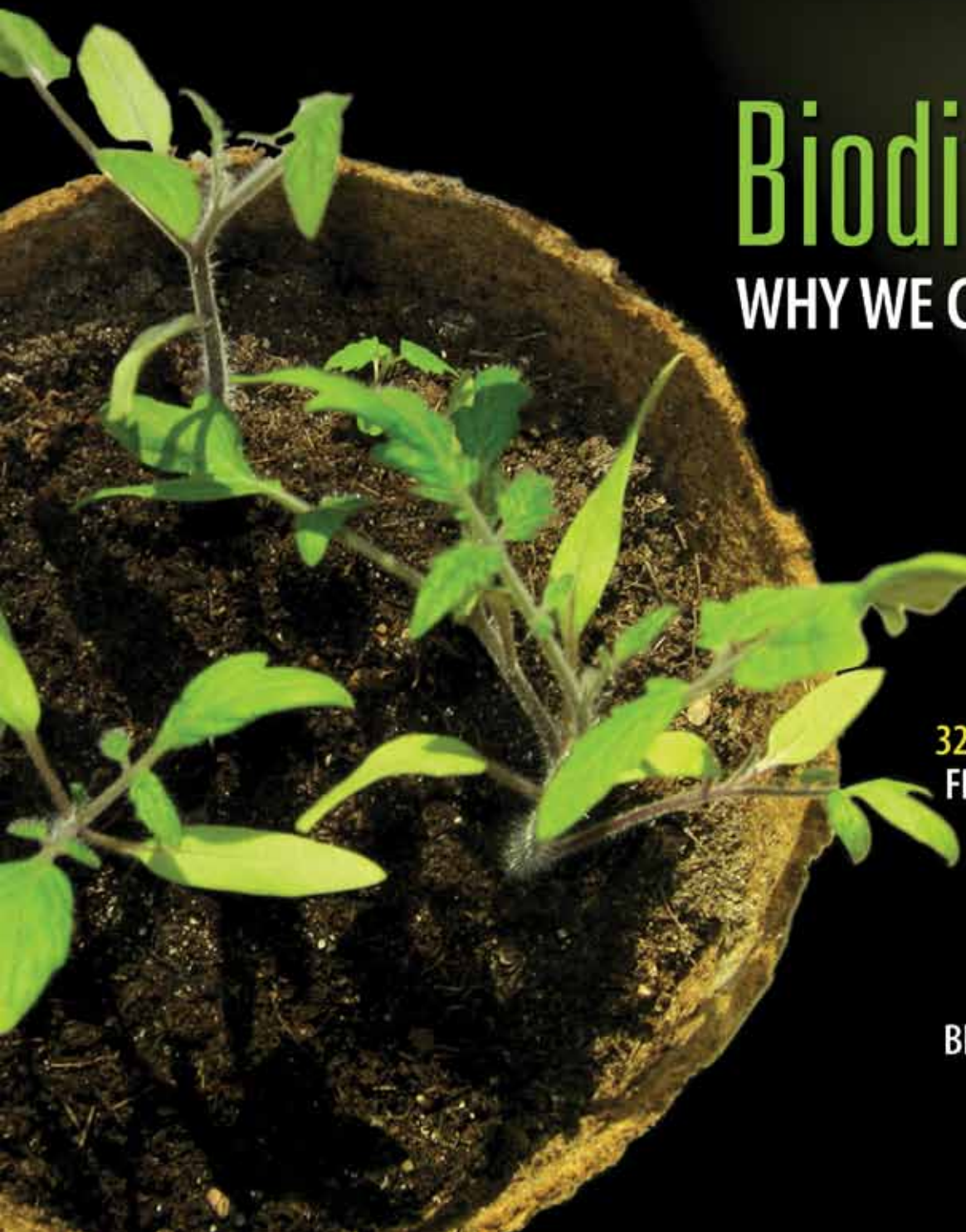
Outlook: Reforming Agri-Marketing Reforms 54 **Green Fingers:** Belakud's Sweet Dreams 64

FARMERS' FORUM

Vol.10; No.12; September-October 2011 ₹50 www.farmersforum.in Issues and Ideas for Indian Agriculture



Saving Biodiversity

WHY WE CANNOT WAIT 20

COVER STORY

24 SAFEGUARDING INDIA'S BIOLOGICAL DIVERSITY

32 SAVING BIODIVERSITY FROM BIOPROSPECTORS AND BIOPIRATES

38 NET ASSET VALUE FOR BIODIVERSITY

42 TOWARDS BIODIVERSITY-FRIENDLY FARMING

IFFCO KISAN SEZ - Nellore

Creating India's First Agribusiness Based Special Economic Zone

Realizing the need to bring in high value agribusiness activity into the country, **IFFCO, Asia's largest** fertilizer company through its SPV IFFCO Kisan SEZ Ltd., has embarked on the development of an **Agri-based Special Economic Zone based on the** concept of **"Agroparks" (AP) in Nellore** in the state of **Andhra Pradesh.** The developer has brought in the expertise and lessons learned by the northwestern European agro sector in **innovating metropolitan agriculture by forging strategic consultants with Wageningen University and Research** Center, the Netherlands and YES BANK Limited.

*IFFCO Kisan SEZ is a notified Multiproduct Special Economic Zone spread over 1000 hectares located 22 KM North of Nellore, A.P. It comes with many customs duty and sales tax concessions provided by the government of India to promote economic activity in notified Special Economic Zones. The concept of Agropark is based on the principles of sustainable development, i.e.

- Application of principles of industrial ecology, i.e. mutual use of waste and by-products.
- Advantages of scale through industrial production and processing.
- Improvement of farmers position as a preferred supplier.
- Independence from seasonality and land during the whole year of production cycle
- Significant reduction of costs

Locational Advantages: IKSEZ is at a distance of just 50 Km from Krishnapatnam Sea Port, a new mega port on the east coast, and within a reach of three hours drive from Chennai International airport.

Nellore, the catchment area which is the Heart of Indian Aquaculture, is a strong source of various agricultural produce such as paddy, sugarcane, fruits & vegetables (especially tomato) and is a prime source of supply of poultry products and milk to near by metropolis. Major fruits include mango, citrus, papaya, banana & sappota.

• Infrastructure that is being provided: The IFFCO Kisan SEZ comes with a bundle of world class common infrastructure conforming to international standards including internal roads, high quality rain harvest supported water supply, uninterrupted power supply, common operation, maintenance and management of security, logistics, ICT etc. Moreover, the Agropark offers a framework of industrial ecology, managing waste and byproducts thus significantly reducing costs.

• Land at IFFCO Kisan Project site is being offered on long term lease basis for 33 years for potential Entrepreneurs for setting up their units on attractive terms and conditions. For further details contact our website www.iffcokisansez.com or can be obtained from,

Head Office :
Indian Farmers Fertiliser Cooperative Limited
IFFCO Sadan, C-1, District Centre, Saket Place,
Saket, New Delhi-110017
Ph.: +91-11-42592626, 26510001

Project Office:
IFFCO Kisan SEZ Limited
2nd Floor, Srinivasa Towers, Srinagar Colony,
Nellore-524003, Andhra Pradesh
Ph.: +91-861-2320483,

mail-guptark@iffco.nic.in, raja@iffco.nic.in, dsrmurthy@iffco.nic.in, mlnmurthy@iffco.nic.in

Volume 10; No. 12;
September-October 2011
RNI No. DELENG/2001/5526

Editor, Printer & Publisher
Ajay Vir Jakhar

Editorial Board
Prof. M. S. Swaminathan
Dr R. S. Paroda
J. N. L. Srivastava
Prof. R. B. Singh

Editorial Support
Paranjoy Guha Thakurta
Aditi Roy Ghatak

Design
© Peali Dezine
pealiduttagupta@pealidezine.com

Contact us
editor@farmersforum.in

Advertising
Sunil Kumar (+91 9811222902)
sunil.kumar@farmersforum.in

Subscription
subscription@farmersforum.in

Owner
Bharat Krishak Samaj

Published at
Bharat Krishak Samaj,
A-1, Nizamuddin West,
New Delhi 110013

Printed at
Brijbasi Art Press Ltd., E-46/11, Okhla Industrial Area, Phase-II, New Delhi

Cover Picture
Inga Ropsa

Unity in Diversity: BIODIVERSITY

"People seldom do what they believe in. They do what is convenient and then repent".
– Bob Dylan

That India has 17 per cent of the world population and no more than two per cent of its arable land mass is well known. What is also talked about is the pressure of population on the soil, especially because 60 per cent of Indian agriculture is rain-fed, leaving little scope for substantial production increases. The climate change implications for the tropical regions around the world too are dawning upon the nation because they will hamper existing levels of production in the business-as-usual scenario. The obvious worry is around the task to feed this nation and do so sustainably. It is imperative to grow enough of the right produce to feed the nation without being dependent on imports.

INDIA'S WORRY IS TO FEED ITS PEOPLE AND TO DO SO SUSTAINABLY

What is probably not realised is the significance of these critical issues for Indian biodiversity and its potential role in ameliorating the problems facing Indian agriculture. What has, therefore, not received enough attention is the criticality of retaining biodiversity and the possibility of enhancing farm produce while protecting biodiversity. These are not easy questions to deal with. In a hypothetical world, makind can survive on roots, barks, planktons and algae but that is not what can be contemplated for the real world. Mankind – and India – will go its own way; never mind the consequences.

Jared Diamond's celebrated 'Guns, Germs and Steel: The Fates of Human Societies' (and other writers before him) explains the history of global agriculture and the impact of environment on societies. Modern agriculture began not more than 8,000 to 10,000 years ago, when man started to select, collect and use bigger and better seeds in the Fertile Crescent[1]. It would be safe to suggest that, that was also when the destruction of biodiversity began; upsetting the balance of things ordained or existing. Helped by the invention of the water wheel and the plough, monoculture cropping sustained mankind till the last century, when population started to increase by leaps and bounds.

Over thousands of years, mankind has managed to keep production ahead of the rising population by applying new technology but

1 The Fertile Crescent is a crescent-shaped region containing the comparatively moist and fertile land of otherwise arid and semi-arid west Asia; considered to be the birthplace of civilization as one knows it today.

Photo: Dilip Banerjee

there is global acknowledgment that a plateau is being reached in crop yields. Worse, in India, the demand for food is increasing faster than the rate of population increase and there is no arguing against the belief that traditional practices alone cannot satisfy its increasing demand. Consider this along with the harsh truth that agriculture is possibly the activity that causes the most widespread destruction of nature and yet it is the instrument that must be deployed more and more to feed a hungry populace. The quandary then is around the need to destroy what needs to be preserved (biodiversity and other forms of life) to survive!

At a scientific and philosophical level, mankind is living and developing in a manner that is at variance with every other living form on this planet; it is slowly destroying species completely; driving them to extinction at an increasing pace. Truth to tell, there is no agriculture practice that is perfect, other than possibly gathering food. Where does that leave India?

IN INDIA, THE DEMAND FOR FOOD IS INCREASING FASTER THAN THE RATE OF POPULATION INCREASE AND THERE IS NO ARGUING AGAINST THE BELIEF THAT TRADITIONAL PRACTICES ALONE CANNOT SATISFY ITS INCREASING DEMAND

Much of the Indian biodiversity has been retained in its rain-fed areas and not because people want to do this out choice. That is farthest from their minds. They do this because better-yielding seeds are expensive and prone to the risk of inconsistent rainfall. Where there is rainfall dependence, not more than a single crop can be grown and there is little hope of improved living standards based on agriculture alone. The living is usually around or below the poverty line and the holdings small for such farmers. Unable to afford or take the risk of purchasing better seeds, they prefer to use their own seeds for every sowing. If farming were to become lucrative for these small holder farmers, they would probably first buy seeds that gave better yield and, thus, actually embark on a journey that is counter-productive for biodiversity. Nevertheless, agriculture has to become remunerative for all farmers, especially small holder producers in the rain-fed areas. These are complex issues and deserve the attention of the best minds in the country if a sustainable solution is to be found. Thus far, sustainable solutions for agriculture have not exercised Indian planners and administrators to the extent that they should have.

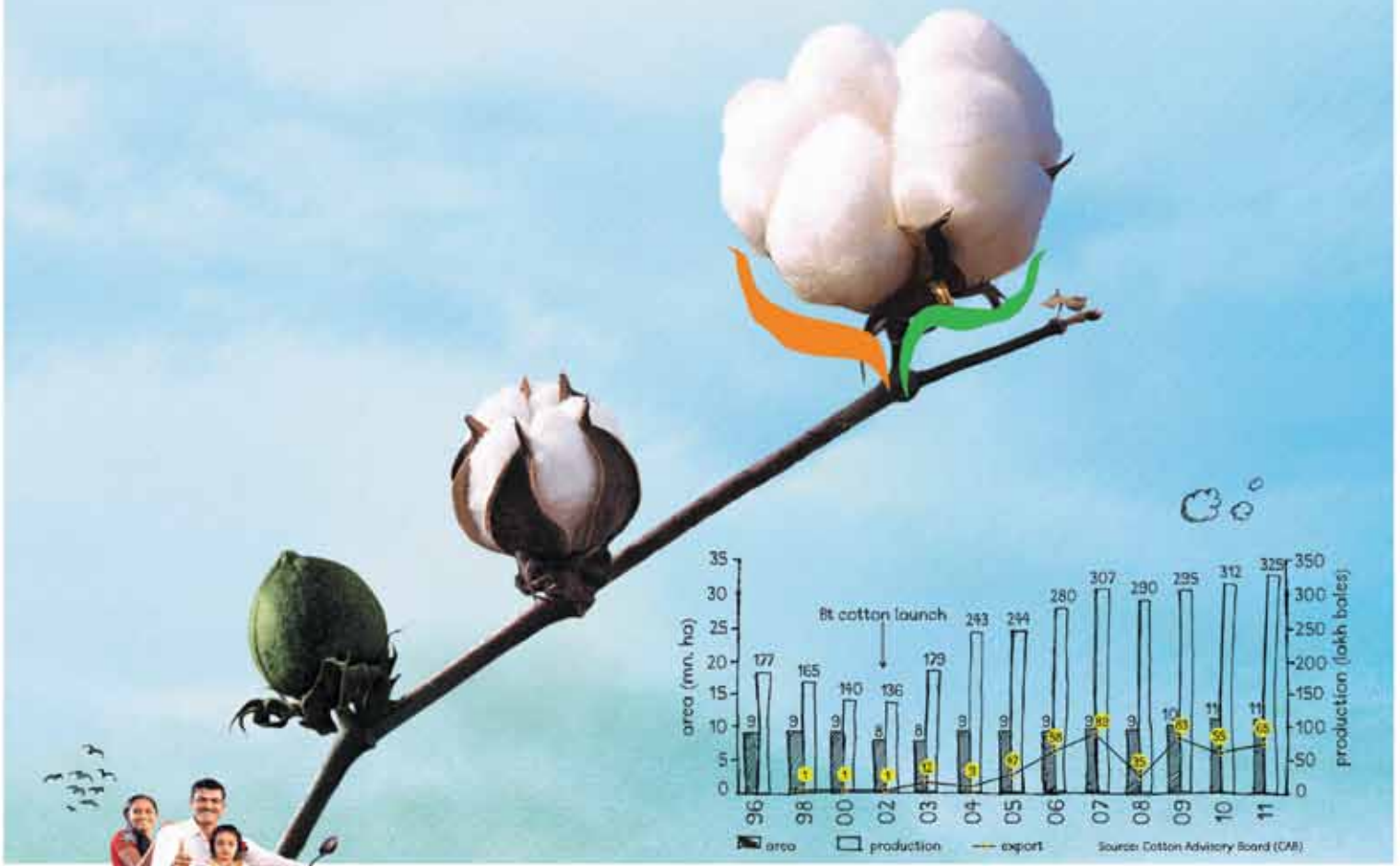
What could the possible solutions be? Of course, the government must use the land available with it to maintain biodiversity, maintain seed banks and collect knowledge. It must also find a way to transfer cash or compensate these farmers to continue to grow what they are growing. Unfortunately, the well-intentioned minimum support price programme has, over the years, become a tool for guaranteeing a minimum price to the farmer (which always falls short of expectations). Yet a general increase in the MSP is surely not the right answer. The government has to create a market for farming's varied output that, again, is easier said than done. There is also need for schemes to be tailor-made for different produce for different regions so as to incentivise farmers to grow what is required while they are compensated by cash transfers.

A lot of hard decisions need to be taken. Fortunately, there is considerable land that is not under intensive agriculture practices and it is important to prevent it from being forced under the plough or tractors to increase production. What is needed instead is better technology to increase yields from existing land to reduce

India emerges as the world's leading cotton exporter ....from being a large importer

India's farmers choose to plant hybrid cotton seeds with insect-protection Bt technologies on 90 per cent of India's cotton acres. Within a span of seven years*, 60 lakh cotton farmers realized their dreams using superior Bollgard® insect-protection technologies as India transformed from a large importer of cotton into one of the world's leading exporters.

Partnering India's cotton revolution - Mahyco-Monsanto Biotech (MMB).



Farmer's Pride. India's Pride.

Bollgard II®

Mahyco Monsanto Biotech (India) Ltd.

*2002-08

• Bollgard® and Bollgard II® in-the-seed trait technologies provide cotton plants in-built insect protection against bollworms infestation leading to lower insecticide use, better boll retention, and higher yields. • Bt cotton is widely planted around the world as an environmentally friendly way of controlling bollworms, which are known to cause maximum yield loss and economic damage to the cotton crop. • **Mahyco-Monsanto Biotech India Ltd. (MMB), a joint venture between Maharashtra Hybrid Seeds Co. Ltd. (Mahyco) and Monsanto Holdings Pvt. Ltd. (MHPL)** has broadly licensed in-the-seed cotton trait technologies to several Indian companies so farmers can access technologies in the preferred hybrid seeds of their choice. • Bollgard II and Bollgard logo designs are registered trademarks and under the license from Monsanto Company. For information/career opportunities, contact www.mahyco.com or www.monsanto.com.

1414A.2011

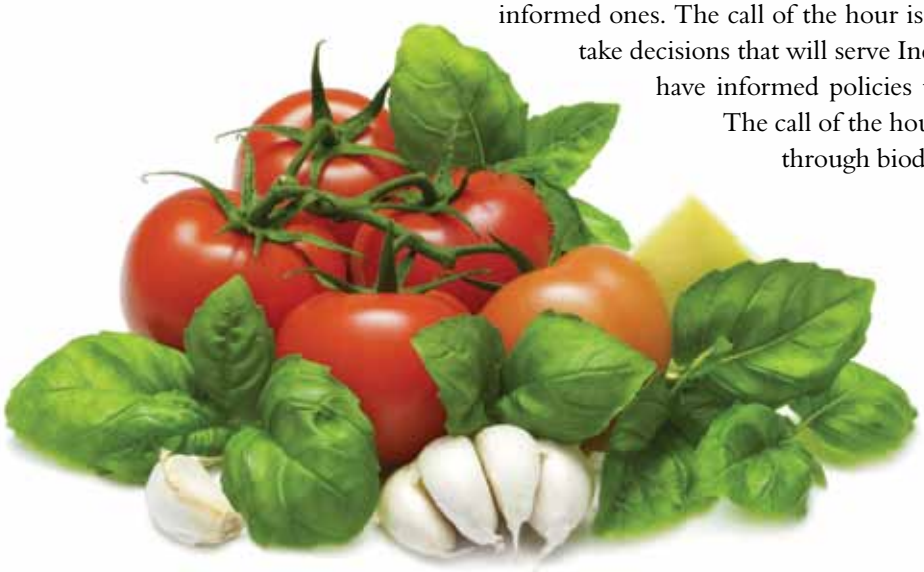
Photo: Dilip Banerjee

MAINTAINING THE LOCAL HABITAT FOR THE FLORA AND FAUNA DESERVES PRIORITY ON THE GOVERNMENT AGENDA AND MUST BE SUPPORTED BY SUITABLE LEGISLATION THAT IS ENFORCED WITH GRIM DETERMINATION.

the pressure to plough new tracts. Special attention needs to be paid to delicate ecosystems and the need to retain large areas as natural reserves across different regions. Maintaining the local habitat for the flora and fauna deserves priority on the government agenda and must be supported by suitable legislation that is enforced with grim determination. This is entirely feasible in India, which still has large areas free from intensive cultivation. Human opposition can be avoided if social and economic needs of the people are kept in mind and attended to.

Agriculture includes animal husbandry and aquaculture. Indigenous breeds of domesticated animal like cows are being lost in the quest for higher earnings across India. Every animal or agriculture research centre, government state farm or Krishi Vigyan Kendra could be tasked to save, maintain and indeed serve as the caretaker for a particular breed or variety, depending on the location of the institute. Only with focused responsibility can one achieve set goals. There are also the threatened marine ecosystems that must be preserved.

As far as agriculture is concerned, there is no option but to adopt practices that do not destroy biodiversity; can still satisfy the requirements of the Indian population; and also make economic sense for all the stakeholders to adhere to and, indeed, support sustainable practices. The solution lies in an enlightened agriculture policy that will support scientific research. Unfortunately, India has had the singular shame of being served by only half-baked policies with good components eroded by ill-informed ones. The call of the hour is to generate the political will and courage to take decisions that will serve India and not just pockets of vested interest; to have informed policies that are not destroyed by poor governance. The call of the hour is for harmony with nature; creating unity through biodiversity. ●



Ajay Vir Jakhar
Editor

CONTENTS

COVER STORY

SAVING BIODIVERSITY WHY WE CANNOT WAIT 20

SAFEGUARDING INDIA'S BIOLOGICAL DIVERSITY THE BIOLOGICAL DIVERSITY ACT 24
Balakrishna Pisupati

SAVING BIODIVERSITY FROM BIOPROSPECTORS AND BIOPIRATES 32
Aditi Roy Ghatak in conversation with Dr Asish Ghosh

NET ASSET VALUE FOR BIODIVERSITY 38
Prepared for Farmers' Forum by ENDEV (Society for Environment and Development)

TOWARDS BIODIVERSITY-FRIENDLY FARMING 42
Ranmal Jhala

PERSPECTIVE
CREATING A MARKETABLE SURPLUS 09
D. S. Bhupal

PROFILE
NIKOLAIVAVILOV AT THE CENTRE OF ORIGIN 52
A Farmer' Forum Report

OUTLOOK
REFORMING AGRI-MARKETING REFORMS 54
J. S. Yadav

GREEN FINGERS
BELAKUD'S SWEET DREAMS; SWEETER REALITY 64
Ajay Vir Jakhar

Letters to the Editor

The interlopers

Your editorial, "India's Misunderstood Culture: Agriculture", ***Farmers' Forum***, July-August 2011, focuses on the problems posed by private guilds such as middlemen, commission agents at the sabzi mandis. These middlemen exploit the farmers by purchasing their produce at cheap prices and sell them at huge profits. The government should take serious steps to eliminate them. I am a farmer and I face this problem every single time that I go to the mandi. You are trying to create awareness on a serious topic but the government is busy in solving its own problems. Keep up the good work.

Tanveer Faiz,
Muzaffarnagar, (Uttar Pradesh)

Wonderful jute

I enjoyed Dr Dhrubajyoti Ghosh's article, "Little Help for India's Wonder Crop: Jute", ***Farmers' Forum***, July-August 2011, which talks about the many benefits of jute that are probably unknown to large segments of people. Do keep focusing on such crops in every issue. As Dr Ghosh explains, what jute needs is very little support from the government but most jute growers in India do not get this help. The most important help that they will need – as will many farmers from several agroclimatic zones – is transparent policing of the manipulating intermediaries and overseeing payments to the farmers to avoid threat-based buying rates from them.

Ramesh Kumar, *New Delhi*

Background check please

Your article, "Towards life without food", though educative, well-written and interesting is clearly ideologically motivated. I believe William Engdahl is affiliated to the Lyndon LaRouche movement, a group that is alleged to have distorted information and propagated unsubstantiated conspiracy theories. You should be careful about taking such people at face value.

Anonymous, *USA*

Radhuvanshi fan

I have become a great admirer of Mr Raghuvanshi after reading Bhavdeep Kang's article, "Beej daan, maha daan": the Raghuvanshi slogan, in the Green Fingers segment of your magazine, ***Farmers' Forum***, July-August 2011. He will inspire every farmer who may read the article other crops. Our agriculture scientists too must learn from him and capture his knowledge. It would be useful if you published contact details of the farmers that you profile in your magazine.

Arun Kumar, *Patna, (Bihar)*

Well done

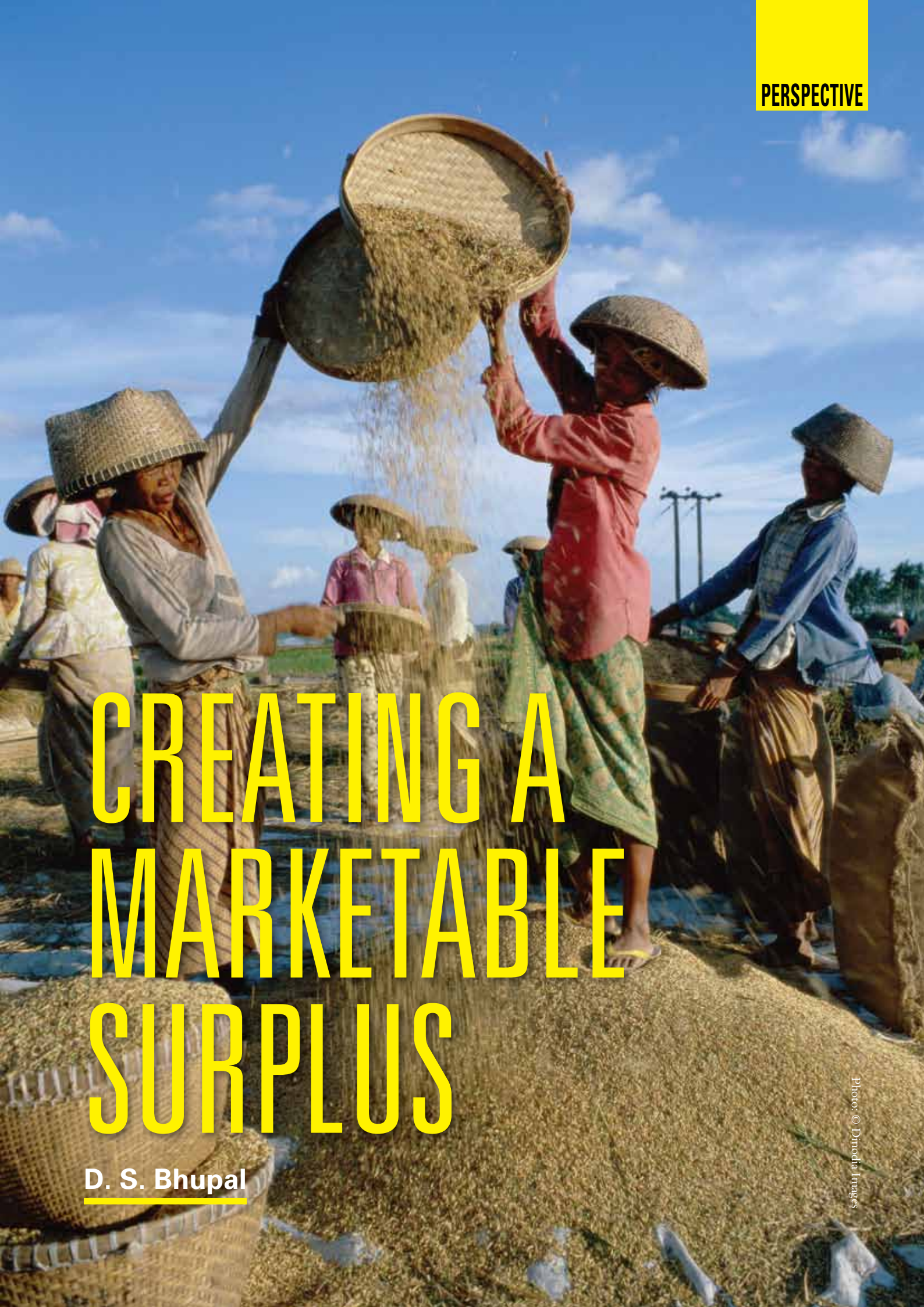
The quality of content and appearance of the issue of ***Farmers' Forum***, July-August 2011, is excellent. Great Job!

Dr S. Baskar Reddy,
Head – Agriculture, FICCI

Let the good men work

Your section, "Face to Face", in every issue of the magazine, is very interesting. The questions that you ask these very key persons in their respective fields are probing. I especially liked your interview with Mr Sanjeev Chopra, Horticulture: a matter of value addition (***Farmers' Forum***, July-August 2011). Clearly, he is very talented and has wanted to do something beneficial for every organization in which he has been posted. The question is: does our system allow such persons to do their work efficiently? Indeed, how can the National Horticulture Board be accessible to individuals with its poor officer strength?

Ranjan Biswas, *Kolkata, (West Bengal)*



CREATING A MARKETABLE SURPLUS

D. S. Bhupal

'The farmer toils to produce grain by grain in his fields but loses in seers and maunds '

– Indian adage

For a bulk of Indian farmers, between 70 per cent and 80 per cent, agriculture – given the small size of holdings – is a source of subsistence; not a business. Marketing practices, largely defined as time of sale, agency to whom the produce is sold, quantity of produce sold (marketed surplus)[1], place of sale, its terms of sale and such like, depend upon size of land holdings, types of crops grown, financial position of the producer and so on. Large size farms have holding capacity and can and do sell a substantial portion of their produce during the lean season, at markets where prices reign higher. Small and marginal farmers have no holding capacity and have to sell immediately after harvesting to buyers whom they owe money due to a number of poverty-driven reasons, without being able to wait for better prices.

Agronomists must pay attention to enhancing yield rate. Technological intervention in the case of horticultural crops is also needed to spare land for other uses

Often the retained produce is not enough to last till the next harvest. Also, farmers are forced to sell the saved produce to meet financial commitments and have to buy food from the market or borrow from other landowners. Much of the produce is sold to the village traders and moneylenders. About 85 per cent of wheat, 75 per cent of oil seeds in Uttar Pradesh; 90 per cent of jute in West Bengal; 60 per cent of wheat, 70 per cent of oil seeds and 35 per cent of cotton in Punjab are estimated to be sold by the farmers in the villages themselves. Often the moneylenders act as commission agents of wholesale traders.

There is evidence to suggest that more than 75 per cent commercial crops, fruits and vegetables, cotton, sugar cane, guar (even paddy), is sold. Of food grains, between 40 per cent and 50 per cent is sold and the rest is retained for personal consumption; for the next year's seeds; for payment in kind to the land owner; or in lieu of wages to harvesters, threshers and such others; and, partly, wasted. Seed, feed and waste accounts for between 10 per cent and 15 per cent of the produce, depending on the type of crops (Bhupal 2006).[2]

Large size farms have the means to transport their produce to even distant markets (regulated markets mostly) where mal-marketing practices have either been dispensed with or reduced to the minimum whereas small farmers prefer to sell the produce in the village itself, to the village merchant, itinerant trader (or occasionally in the regulated markets), where they are prone to marketing mal practices like under-weighment of the produce, price discrimination and unfair deductions. They prefer to sell in the village itself to save on time, transport costs and avoid unwarranted delay in the disposal of the produce in the markets. Some salient features about farm behaviour need to be understood:

- While large farmers have holding power, a majority sells most of the produce immediately.
- It is incorrect to presume that the farmer has realised the importance of new techniques of production and is making efforts to earn more and to improve his standards of living, or that the cropping pattern is no longer dictated by what the farmer needs for his personal consumption but by what is responsive to the market in terms of prices received by him.
- Also, while the trade is very organised, the farmers

1 The two terms marketable surplus and marketed surplus are different in the sense that first refers to the saleable amount of the produce in a given period of time and the second to the actual amount sold at a particular time of sale (for details see Bhupal, 1987)

2 This is in the case of cereals. Percentage goes quite high in the case of horticultural crops.

Photo: Ronald Schuster

are not. The farmer is not conversant with the growing complexities of the marketing system. He is handicapped by several disabilities as a seller, being forced to sell his produce at an unfavourable place, time and price, as one has seen.

Post-liberalisation, the government has introduced four major policy changes with regard to agricultural marketing:

- The Agricultural Produce Market Committee Act (APMC) has been changed to allow direct sale and purchase, without any supervision of the APMC and without bringing the produce to the regulated market yards.
- Liberal imports[3] and exports have been permitted so that the farmers can benefit from exports and consumers would be helped on the price front with liberal imports
- Firms have been allowed contract farming for captive production to meet their own quality and quantity requirements, to facilitate private investment in agricultural marketing
- Future trading in agricultural commodities has been permitted and a number of commodity exchanges have started functioning to benefit all the stakeholders: farmers (on account of price discovery and risk sharing by hedging; or firms by way of getting uninterrupted supply without market fluctuations; and consumers to get supplies at reasonable rates throughout the year.[4]

These changes have not yet yielded the desired outcome and it is important to understand the status of agricultural marketing in India as envisaged by the National Commission on Agriculture. It defined agricultural marketing as a process that starts with a decision to produce a saleable farm commodity and involves all aspects of market structure, functional and institutional, based on technical and economic considerations and includes pre and post-harvest operations, assembling, grading, storage, transportation and distribution. The three important functions are (a) assembling of produce (from fields to the markets, warehouses (b) processing (preparation for consumption) and (c) distribution of the produce to the final consumer that are considered to be the main marketing functions or the entire

3 The evidence also suggests that many times both the producer as well as the consumer suffer due to unscrupulous decisions. For example during the four years, 1996-97 through 1999-2000, more than five million tones of wheat worth about Rs 3,500 crores was imported when the country was facing problems in storing 62 million tonnes of wheat procured from domestic producers against the laid down stock norms of two-thirds of the stocks, which neither benefitted the consumers and nor the producers. Similarly milk products, fruits and vegetables were imported in huge quantities and continue to be imported. Export and import of onions is another classic example.

4 There is evidence that often both the consumers and farmers suffered due price variations. For example, farmers sold pulses at Rs 15 to Rs 20 per kg and for the first time consumers paid Rs 60 per kg.

supply chain process. An assessment of the reality will inform one why the adage that the farmer toils to produce grain by grain in his fields but loses in seers and maunds (the two traditional Indian measures prior to change of weights) at the hands of the market still holds true for India.

For the market to be efficient it is necessary that it enables the primary producers to get the best possible returns (costs plus nominal margins as an incentive to continue in the profession); provide facilities for lifting the entire produce that the farmers are willing to sell[5]; reduce the price spread between the primary producer and the ultimate consumer – a substantial share of the consumers' rupee should go to the producer – and make available all products of farm origin to consumers (at the desired place, time and at reasonable price without hurting quality (Nigel, Bhupal and Marshall, 2003)[6] of the produce.

To achieve these goals, the market committees (APMC) were supposed to provide certain facilities in the market yards, like provision for proper coverage and display of the produce, open auction, fencing, watch and ward, cleanliness, parking facilities, storage facilities if the produce was not sold, proper weighment, immediate payment, disputes settlement structure and so on, apart from out-of-yards facilities like, link roads, culverts, storage, grading and standardisation of the produce and other infrastructure to facilitate efficient marketing. The market committee was supposed to charge officially fixed market fees for providing these services.

With the passage of time and increase in production and market arrivals, facilities fell far short of needs. The committees became a source of revenue for the state marketing boards initially and, with accumulation of huge funds due to increase in valuation of market arrivals, the state governments. The central government and the corporate sector too became keen to get a share in this uninterrupted source of huge cash[7]. The advisory bodies and consulting firms under the leadership of the International Food Policy Research Institute (IFPRI), World Bank, have been suggesting privatisation the market yards in the name of increasing efficiency and to attract FDI in the agricultural marketing sector. Ironically, when the regulation of markets was being suggested to reduce the role of intermediaries, these very bodies were against such moves and were openly emphasising the role of market functionaries as a source of value addition. Now, with changed priorities, middlemen are seen as the main culprit of everything for food inflation, for the farmers' poor conditions, for rural poverty and so on. That apart, for the market system to be efficient, certain provisions need to be made to help the farmers get due remuneration of their produce, which the present structure lacks. A few inadequacies need immediate attention, apart from the MSP that seems to work against the farmer, not for him:

Inadequate warehousing has been a major concern. There are three main agencies in the public sector engaged in building large-scale storage/ warehousing capacity. The Food Corporation of India (FCI), Central Warehousing Corporation

The MSP Mess

Fixing minimum support prices has been an important measure to protect the interests of the farmers to encourage them to grow certain crops; and for their entire produce to be purchased by such government agencies as the FCI, CCI and other state agencies. These prices were fixed in accordance with the recommendations of the Agricultural Price Commission, now renamed Commission for Agricultural Costs and Prices (CACP), based on scientific data obtained through the Agro-Economic Research Centres, keeping in under the cost of cultivation (COC) scheme. Over time, with financial reforms and given private sector interests, the MSP regime changed: the government purchased to meet its public distribution system needs and would intervene to make purchases only if the market prices fell below the MSP. The entire arrivals purchase responsibility was quietly done away with.

In other words, the government indirectly

5 Due to the seasonal nature of agricultural produce, farmers, the world over, cannot plan their production as per the market requirements.

6 Quality of the produce broadly contains size, shape, freshness, flavor, nutritional value and lack of blemishes.

7 The APMCs are being termed as rent seekers by the supporters of international trade giants (like Dr Ashok Gulati) in the name of attracting FDI in the sector.

sets the price ceiling for the market, leaving enough indications for the private trade to keep the maximum prices around the MSP. The purchases made by the government through its agencies like the Food Corporation of India at the support prices are sold through the public distribution system. Thus the MSP not only helps the government to escape the extra procurement cost for the PDS but also creates enough room for the private sector to profit from the measure.

Photo: Tracy Olson

- In practice, the MSP scheme did not fulfill the given targets mainly because the purchase agencies did not buy the entire amount of the market arrivals on more than one plea. Lack of 'bardana' (gunny bags) was one excuse; arrivals coming before or after the announcement of purchase dates was another; lack of storage and transport facility was the third...
- Instead of taking the real costs into consideration the MSP was increased at a lower rate than the increase in the cost of cultivation (Bhupal, 2008)
- Often the MSP is announced after the crops season starts, leaving a little choice for the farmers to choose crops.

The state warehousing corporations do not open warehouses anywhere below the subdivisional level to avoid unfair competition with co-operative society godowns.

(CWC) and State Warehousing Corporation (SWC). The CWC operates 476 warehouses across the country with a storage capacity of 10.18 million tonnes, providing warehousing services for a wide range of products ranging from agricultural produce to sophisticated industrial products (wines and spirits, for example).

The FCI stores foodgrains in its own godowns and hires storage capacity from other sources such as the CWC, the SWCs, state governments and private parties. In 1960-61, there were only 40 general warehouses in the country with a total capacity of less than 0.1 million tonnes. Since then co-operatives have also constructed warehouses in rural areas to store members' produce, stock fertilisers and other inputs and consumer goods. The state warehousing corporations do not open warehouses anywhere below the subdivisional level to avoid unfair competition with co-operative society godowns. By 1987-88, there was a capacity of more than 10 million tonnes in the co-operative sector but there has been no enhancement since. Inadequate warehousing capacity often means distress sales or produce going waste: about 1.5 per cent to two per cent of the country's produce is thus wasted. The APMCs have built limited capacity shops-cum-godowns in the yards for the traders. For farmers not even that capacity is available. The overall storage capacity in the country is far short of requirements.

The FCI, with 31 million tonnes capacity, can store only half the 60 million tonnes that have to be stored (*Table 1*). There has been no increase in the overall storage capacity of the CWC since 2005 (*Table 2*) and there is no guarantee that the others will make available their stores for the agricultural produce. Reportedly, public sector warehouses in Haryana stored wines while grain was exposed to rains and at places not even covered with water-resistant sheets.

Lack of grading and standardisation leads to lower prices. The government has facilitated grading and standardisation under the Agricultural Produce (Grading and Marketing) Act of processed goods. It has set up grading stations for commodities like

Table 1: FCI storage capacity (million tonnes)

Capacity	1st April 2003	1st April 2004	1st April 2005	1st April 2006	1st April 2007	1st April 2008	1st April 2009	1st April 2010	1st April 2011
Covered									
Owned	12.82	12.82	12.91	12.93	12.94	12.95	12.97	12.97	12.99
Hired	13.77	10.85	10.46	9.90	9.34	8.71	10.12	12.89	15.46
Total	26.59	23.67	23.37	22.83	22.28	21.66	23.09	25.86	28.45
CAP (Cover and Plinth)									
Owned	2.26	2.21	2.25	2.21	2.29	2.20	2.17	2.51	2.62
Hired	2.88	1.36	0.41	0.51	0.63	0.03	0.02	0.47	0.54
Total	5.14	3.57	2.66	2.72	2.92	2.23	2.19	2.98	3.16
Grand Total	31.73	27.24	26.03	25.55	25.20	23.89	25.28	28.84	31.61

ghee, flour, eggs and such others, where graded goods are stamped with the seal of the Agricultural Marketing Department – AGMARK. Goods thus branded have a wider market and command better prices. No attempt has been made to grade primary produce though.

The directorate of marketing and inspection has formulated grade specification for 142 agricultural commodities. It enforces compulsory quality control before export on 41 of them and is extending financial assistance to selected regulated markets for providing grading facilities for commodities like tobacco, jute, cotton, groundnut and cashew nut at the producers level.

The grading facilities are thus available to limited areas and stakeholders. Also, most of the common man's goods like fruits and vegetables are affected by hazardous chemicals, fertilizers and pesticides due to lack of quality control and grading and standardisation. Even countries like Bangladesh and war-torn Iraq have been known to return Indian exports like wheat on grounds of poor quality.

Transport facilities are highly inadequate in India with only a small number of villages joined by railways and pucca roads to mandis. Produce has to be carried on slow-moving transport vehicles like bullock carts and (tractors in some states like Punjab, Haryana). Poor transportation facilities mean that farmers are keen to sell their produce in the village with all its negative consequences. Significantly, not everything is wrong with non-mechanised transport. A comparative study by the AERC Delhi, reveals that for smaller load,

The Middleman Mess

The presence of a large number of middlemen leads to a severe reduction in the producer's share of the consumers' rupee. Studies show that for cereals like paddy and wheat, the producers get only 50 per cent to 60 per cent of what the consumer pays. For fruits and vegetables, the producer's share is 34 per cent (Bhupal, 1994). It was observed (Bhupal 1989) that the wholesale trade of potato and onions was controlled in Azadpur by a handful of wholesalers-cum-A-class commission agents, who could fix prices and charge commission at the full rate of six per cent, which was legally permissible. The scenario changed in a decade with the increased number of wholesalers forcing a reduction in commission to half the officially fixed rates. It was estimated that in 1999-2000, in the Azadpur fruit and vegetable market, a B class commission agent could, on an average, earn up to Rs 24,000 per day without any tangible investment due to increase in the volume of trade, notwithstanding the increased competition. Retail price is still at the mercy of retailers (Bhupal, 2004, 2009), a sector now attracting the FDI, starting with horticultural crops.

Photo: George Bosela

Table 2: STATE WISE STORAGE CAPACITY IN THE COUNTRY (Lakh metric tonnes)

(as on 1.4.2005)

STATE	FCI	CWC**	SWC	OTHERS*	TOTAL
ANDHRA PRADESH	33.68	14.40	22.82	12.85	83.75
BIHAR	4.91	0.97	2.03	5.49	13.40
GUJRAT	5.70	6.23	2.27	2.25	16.45
HARYANA	22.95	4.40	16.07	15.90	59.32
KARNATAKA	6.30	4.54	8.98	4.31	24.13
KERALA	5.36	1.30	1.92	0.79	9.37
MADHYA PRADESH	5.46	6.75	11.38	5.25	28.84
MAHARASHTRA	15.71	15.64	12.20	13.69	57.24
ORISSA	6.25	1.88	4.05	4.52	16.70
PUNJAB	77.81	7.74	60.12	60.67	206.34
RAJASTHAN	9.09	3.75	7.19	0.03	20.06
TAMILNADU	7.67	8.02	6.36	24.33	46.38
UTTAR PRADESH	25.60	11.56	28.88	14.95	80.99
WEST BENGAL	10.62	6.86	2.27	1.31	21.06
JAMMU & KASHMIR	1.03	0.21	0.00	1.49	2.73
HIMACHAL PRADESH	0.26	0.07	0.00	0.40	0.73
GOA	0.15	1.04	0.00	0.14	1.33
ASSAM	2.52	0.64	2.48	1.10	6.74
ARUNACHAL PRADESH	0.18	0.00	0.00	0.05	0.23
MANIPUR	0.18	0.00	0.00	0.23	0.41
MEGHALAYA	0.19	0.00	0.11	0.01	0.31
NAGALAND	0.27	0.13	0.00	0.11	0.51
SIKKIM	0.11	0.00	0.00	0.07	0.18
TRIPURA	0.34	0.24	0.00	0.31	0.89
MIZORAM	0.18	0.00	0.00	0.00	0.18
JHARKHAND	1.11	0.36	0.00	0.35	1.82
UTTARANCHAL	2.11	0.75	0.00	0.00	2.86
CHHATISGARH	9.27	2.37	6.07	0.00	17.71
U. TERRITORIES	5.30	2.05	0.00	0.00	7.35
GRAND TOTAL	260.31	101.90	195.20	170.60	728.01

** based on the information as in 1998-99*

*** The CWC currently operates around 514 warehouses across the country with a storage capacity of 10.27 million tonnes. There has been only 0.7 million tonnes enhancement in the storage capacity of the CWC between 2005 and 2011.*

8-10 quintals travelling a shorter distance of up to eight kms, the per unit the cost of transporting on animals is the lowest. For a further load of 20-50 quintals and for a distance of up to 25 km per unit, the cost of transportation by tractors is comparatively less. For further loads and distances, LCVs are economical. For longer distance and heavy loads commercial vehicles and for farthest distances and bulk loads, railways are economical. (Bhupal, 1993)

Inadequate market information goes against a market economy based upon profits that depend upon timely and accurate information[8]. The farmers neither have the access to information nor are they trained to make accurate analysis. Permitting future trade assumes that farmers will be able to earn more by price discovery, which seems to be wishful thinking. Scientific surveys show that the majority of farmers accept whatever is offered to them. The government does broadcast market prices regularly to tackle this problem over radio and television and newspapers also keep the farmers posted but the quotations are sometimes not reliable and suffer from a great time lag.

Eventually, the amelioration of the farmer's conditions cannot be based upon future trading alone as the experience of the developed nations also suggests. For example, in the USA, where agriculture is practiced more on corporate lines, it is hugely subsidised to keep agriculturists in the farming business. The subsidies provided per unit of area are larger than the entire earnings of the Indian farmers from that amount of land. Similarly, Indian farmers, for instance, cannot earn £2 from a

8 The theory of rational expectations, leading to Lucas' Nobel Prize is based upon the availability of information. This has also led to the development of Game Theory.

In the USA, where agriculture is practiced more on corporate lines, it is hugely subsidised to retain agriculturists in the farming business

cow every day, which is the daily subsidy for a cow owner in the United Kingdom.

Enabling the farmer to hold on to his crop would need institutional finance, which is far from adequate. Farmers often take loans from private sources, that are usually city traders keeping a close watch on the produce. They persuade the hapless farmers to sell immediately and double their loss: one because it is immediate sale without any consideration of market prices and, two, it is through the particular middleman, who remains more interested in his profits rather than a rational remuneration to the farmers. The financial institutions have largely failed to provide mandatory finance (18 per cent of loanable funds to farmers) and only the SBI could provide 10 per cent of its loans to this sector. To save them from legal obligation, the then finance minister, Jaswant Singh, allowed loans provided to the agro-processing industry to be counted under loans to agriculture.

The only safeguard for the farmer from such "forced sales" is access to credit that empowers him to wait for better times and better prices. In the absence of such credit facilities, the farmers are forced to take loans from moneylenders, while agreeing to pledge their produce to them at less than market prices. The co-operative marketing societies generally cater to the needs of the large farmers while the small farmers are left at the mercy of the usurers.

A good marketing system has certain distinctive features:

1. No government restrictions on foodgrain movements in the country. The restrictions on the quantity to be processed or on the construction of processing plant, price supports, rationing, price ceiling, entry of persons in the trade and so on are not supported financially or physically by providing land, cheap credit and such like. Also, there are no restrictive administrative orders.

Photo: Dilip Banerjee

An Ideal Marketing System

It is one that maximizes the long run welfare of society; physically efficient, leaving no scope to produce the same output with fewer resources. It must be electively efficient, with no better option to change the allocation of resources to increase the total welfare. Basic physical functions such as transportation, storage and processing should be carried on in such a way so as to achieve the highest output per unit of cost incurred on them.

An ideal marketing system must also allocate agricultural products in time, space and form to intermediaries and consumers in such proportions and at such prices as to ensure that no other allocation would make consumers better off. To achieve this condition, prices throughout the marketing system must be efficient and must, at the same time, be equal to the marginal costs of production and marginal consumer utility.

2. It generates employment by ensuring the development of processing industries, consistent with the tastes, habits and income levels of the consumers. This is necessary in the light of the faster falling share of agriculture in the GDP as compared to the slower falling rate of people's dependence on agriculture.[9]
3. It changes the crop rotation in favour of more nutritious, more valuable and environmentally sustainable agricultural crops.[10]

The evidence in India, however, points to the increasing disparity in the country, with lower income for the farm sector; new generation farmers unwilling to take up agriculture as a profession amongst others. The market system should, therefore, increase the net income of the farm sector to make it self-sustainable and attractive. To what extent have recent measures helped? A study (Bhupal, 2009)[11] to assess impact of agricultural market reforms on change in cropping pattern, land use pattern, employment and income of the farmers by Haryana and Uttarakhand took samples from those villages where there were direct purchase arrangements by Mother Dairy and private firms like, Birla, Chirag, Reliance and such others. The data pertains to three years 2005-06 through 2007-08. For purposes of comparison, two sets of farmers were chosen: those who had arrangements with the aforementioned buyers, termed as non-control group and those following traditional practices of sale, termed as control group.

There was change in cropping patterns during the three years in both sample households of Uttarakhand. In the first case, the area under vegetables as percentage of GCA increased by about one per cent and declined under fruits by that percentage. In the second case, it went up under fruits by one per cent but declined under vegetables by two per cent. In both cases, the area increased under maize and declined under wheat. The increase under maize was by about 12.5 per cent and seven per cent, while the decline under wheat was 26 per cent and 20 per cent respectively.

A decade back, when there were no private agencies to buy horticultural crops people grew wheat, edible oil seeds and pulses. Now they have to purchase wheat and even edible oils for their household consumption. Earlier, almost the total food grain demand could be met locally. Now, about 25 per cent of the wheat is purchased from the markets like Haldwani.

The increase in area under maize could have neutralised the shortfall in area under wheat and the resultant shortage cereals, had it been used to produce grains. Instead, sweet and baby corn for Delhi and other vegetable markets are produced to enhance the farmers' income but not meet basic food needs. In Haryana, the area under vegetables increased by seven per cent and 19 per cent respectively for these two sample groups during the last three years but area under cereals decreased by about 11 per cent and two per cent respectively, which is a huge area. Reportedly, area under foodgrains, particularly under coarse cereals in Rajasthan, is also being placed under commercial crops like Jathropa. The area under maize in

9 Share of agriculture in National GDP has fallen to less than 20 per cent while more than 65 per cent population is still dependent upon agriculture.

10 High value crops like fruits and vegetables, for example, consumption of which is likely to increase with the increase in income and also which are more nutritious after fulfilling the other needs of cereals, pulses and edible oils etc. Sustainable in the sense, that in view of the excessive use of fertilizers, chemicals, pesticides and routine crops, soil fertility should not fall as is happening in the case of Punjab, in other words, crop rotation with less water requirement, less strain on soil, air, water etc.

11 Impact assessment of agricultural market reforms, 2009. The study was based upon the data collected from Haryana and Uttarakhand.

Haryana has gone down by about 17 per cent in non-control group households with no maize-growing area in the control sample households.

The production of fruits in Uttarakhand increased by about two per cent and nine per cent respectively for the two sample households during the period but the vegetables output in both the sample groups increased by about eight per cent and 11.5 per cent respectively, thus leading to overall increase in production by about 20 per cent. However, the area under foodgrains, (particularly for wheat) fell by about 18 per cent in both sample groups. For maize, it decreased by about 21 per cent in the group and increased by about 23 per cent in the other, balancing the overall output but there was certainly a shortfall in the wheat crop.

In Haryana, the area and production of vegetables in both sample groups have increased and production increased significantly by more than 17 per cent in the control group and by more than 33 per cent in the non-control group. Thus, the aggregate production has increased by about 51 per cent in the three years. This not only leads to increase in farmers' income and more employment but also provides nutritious food to city consumers where the produce was sold. What needs to be addresses is the shortfall in wheat production by about two per cent in the control group and by about nine per cent in the non-control group. Thus, there was a visible impact on cropping pattern and production; there was increase in area and production of fruits and vegetables, with the increase in production more than the increase in area. This shows better productivity, which should be beneficial to the farmers of the area and consumers in the far off areas.

That the area under cereal crops was being shifted towards fruit and vegetables, which are more prone to weather, price fluctuations and not as critical as food grains, particularly for the small and marginal farmers, is significant. It is obviously because of the major difference in returns, both due to difference in production (quantity) and margins (difference in costs and prices) in both the states. The generation of extra income, in comparison to traditional crops to the producers of high-value crops was supported by the favourable cost benefit ratio.

On field employment in horticultural crops, particularly in vegetables, increased and the women in Uttarakhand, who were already overburdened, met the need for extra labour. Horticulture was more remunerative than cereals, pulses or edible oil, supported by Mother Dairy and other players in the sample area. Not only has the number of sellers to these players gone up but it has also increased for the other group of sample households, that was left with more market space in the absence of those who sold to the Mother Dairy and other players.

In states like Haryana, where cropping pattern is

Photo: Christa Pichler

It helps immigrant labour to earn more. Overall, irrespective of which category of labour benefits, the extra workload in vegetable cultivation is taken care of by women

shifting in favour of cash crops, specifically in the sample area, extra labour absorption was useful to only those families that had family labour but not enough land to work on. The labour cost in Haryana is about the highest in the country. It helps immigrant labour to earn more. Overall, irrespective of which category of labour benefits, the extra workload in vegetable cultivation is taken care of by women. Thus the direct intervention by the Mother Dairy and other players in horticulture has helped increase the area under high value crops, bring more area under its cultivation in Uttarakhand, apart from leading to an increase in farm employment and income. However, it has also led to a serious concern for the food security given the falling area under low-value food grain crops like wheat. Promotion of horticultural crops at least in states like Uttarakhand should find some extra support as it most suits the conditions, marketing facilities permitting. Therefore, infrastructure facilities such as roads, transportation, storage and on site processing, need to be upgraded and supported. The only caution is that the problem of food security cannot be overlooked. That shortage will have to be met from other areas. Besides, there is need to increase yield in hill areas by upgrading technology. In fact, the overall yield in the sample households of six to seven quintals per acre in the case of maize and about eight to nine quintals per acre in the case of wheat is just about equal to the pre-Green Revolution yield of these crops in the plains.

Agronomists must pay attention to enhancing yield rate. In fact, the technological intervention in the case of horticultural crops is also needed to spare land for other uses, both in hill areas as well as in plains. Most importantly, Haryana, a sizeable portion of fertile land adjoining the National Highway towards Delhi has been devoted to construction of malls, shopping and housing complexes, needs efforts to increase productivity.

The study quoted here had its limitations: it was carried out in the area specifically chosen for the purpose that is where there was direct marketing intervention by agencies in both states. That was not perfectly representative and the results are not applicable in general. Mother Dairy played the main role; the other players are different in character. Direct intervention in other crops was not part of the study. Therefore, it cannot conclusively be said that direct intervention will invariably be as useful as in this case. Yet the findings are important because without serious efforts to improve marketing efficiency it will be difficult to sustain production. ●

The author is Fellow, Agro-Economic Research Centre, University of Delhi

References:

Bhupal, D.S, (1987): Marketing of Cotton in Haryana, AERC, University of Delhi

Bhupal, D.S, (1989): Marketing of vegetables in Delhi, AERC, University of Delhi

Bhupal, D.S, (1995): Impact of mechanized and non-mechanized modes of transport on agricultural marketing in Haryana, Mittal Publications, Delhi

Bhupal, D.S, (1994): vegetable Marketing: Delhi Experience, Agricultural Marketing, Jan-March, 1994

Bhupal, D.S, (2006): Estimation of seed, feed and wastage of some important crops in Haryana, AERC, University of Delhi

Dolf te Lintelo, Bhupal: D.S, and Marshall Fiona, (2001): Peri-urban agriculture in Delhi, Food Nutrition and Agriculture, FAO, 2001,pp 4-12

Bhupal, D.S, (2000): Changing pattern of Agricultural Marketing in India, Indian Journal of Agricultural Marketing, pp,8-17

Bhupal, D.S, (2003): Poole, Marshall and Bhupal, Food hazards and consumer awareness , air pollution effects in India, ACTA Horticulture, Holland, pp 247-254

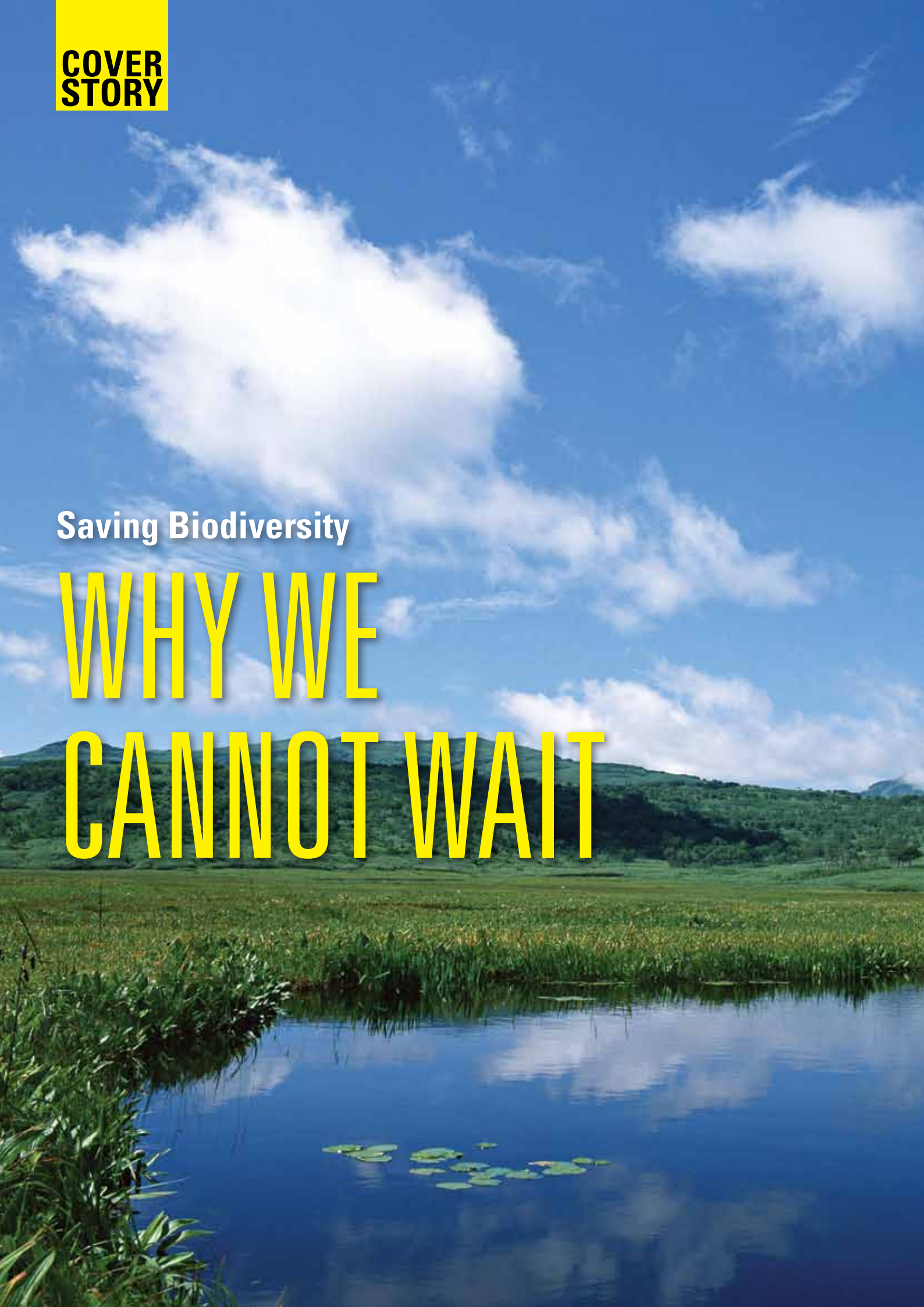
Bhupal, D.S, (2004): Working of Fruit and Vegetable markets in and around Delhi, AERC, University of Delhi

Bhupal, D.S, (2002): Poole, N, Bhupal, D.S. and Marshall Fiona, Air pollution effects and initiatives to improve food quality assurance in India, Quarterly Journal of International Agriculture, Germany, pp 363- 385

Bhupal, D.S, (2009): Impact assessment of agricultural market reforms, AERC, University of Delhi

Bhupal, D.S, (2008): India's Development pattern: A case for inclusive growth policy, Rajasthan Economic Journal, no. 2, pp 157-170

COVER STORY



Saving Biodiversity

WHY WE CANNOT WAIT

We live in the period of the greatest extinction of plant and animal species since the extinction of dinosaurs some 65 million years ago. The history of life on earth has included at least five periods during which huge numbers of species vanished forever, primarily due to changes in climate and sea level. Some scientists worry that a sixth extinction has begun because of humanity's gross misuse of the earth's resources.
– Population Reports[1]

The only certainty around biodiversity is that mankind knows precious little about it. The good thing is that there is admission at last that "we do not know enough" but that has not moved those who administer the world to take definite steps to preserve biodiversity, despite global conventions and national and even international laws. What the best scientific work tells us is that there are between 10 million and 30 million species sharing our planet with us; there is even some consensus around the figure of 14 million but the real point is that no more than 1.7 million species have been identified and categorised. Even these have not been studied. Once again, the more important point is that while mankind is not studying them all, human activities are leading to an increasing number of species getting lost every day. Not just plants and animals even human species are being lost: Boa Sr, who died in February 2010, at 85, was the last member of the Bo – one of the 10 Great Andamanese tribes. There are many such tribes across the world, from Papua New Guinea to Australia to South America.

With every death of a species some contributing force of nature perishes: tribes are a storehouse of endogenous knowledge; plants animals store properties that help preserve life. For those driven entirely by the apparent value of things, it would be worthwhile to note that more than 40,000 species of plants, animals, fungi and microbes are currently being exploited for man's benefit with some 40 per cent of the drugs owing their origin to them. Their current estimated worth would be in the region of $40 billion a year in over-the-counter and prescription sales.[2] Then there is the food that biodiversity supplies that is taken for granted by man and the fish. Yet there is little concern over published facts that nearly 40 per cent of all freshwater fish species in the USA are facing extinction, as are 33 per cent of Australia's freshwater fauna and 42 per cent of Europe's. In India, there is scant realisation of the value of biodiversity, which, indeed, has been the greatest attraction for ancient seafarers who travelled across the world to discover this country. "A critical analysis of the trading patterns of the colonising countries, largely in the tropical region, would establish that they were enormously attracted by the living natural resource base of the colonised countries. The entire southern hemisphere, from South America in the west to Australia in the east, became colonised over a 300-year period," says Dr Asish Ghosh, former Director, Zoological Survey of India and currently Director for the Centre for Environment and Development, Kolkata in his interview 'Saving biodiversity from bioprospectors and biopirates.'

India has been playing a leading role in establishing a regulated biodiversity regime and its success with the classic case of haldi and its medicinal properties – known in India for thousands of years – or the properties of the neem plant prove the point. "In both cases, US companies had got patents, knowledge of which could be traced back to India.

This brings one to the issue of the economics of biodiversity. In Punjab, there are some 257 Ayurvedic drug units; some 350 herbs are used by herbal industries of which 290 are available in Punjab. The Khadi Village Industrial Board too has its own databank on the size of the business and the employment generation potential. "The issue is valuing the raw material and ensuring that effective market linkages are provided for them for India's mega-biodiversity is indeed a mega business. At least three sectors relevant to India: Certified Agriculture & Fisheries, Carbon Sequestration through forestry and bioprospecting may fetch from $21,000 million per annum to $60,000 million, $100 million to $1,500 million, $17.5 million to $30 million to $35 million, respectively

1 *http://info.k4health.org/pr/m15/m15print.shtml*
2 *http://info.k4health.org/pr/m15/m15chap7.shtml*

The 25 Biodiversity Hot spots

Source: Cincolla, 2000 (275)

India has been playing a leading role in establishing a regulated biodiversity regime and its success with the classic case of haldi and its medicinal properties

between 2008 and 2010. By 2050, each of these three sectors is likely to show quantum jump," says Endev in its article on calculating a net asset value for biodiversity that is fast gaining currency.

While clearly the official line is in favour of supporting biodiversity, "biodiversity-friendly farming may sound like an oxymoron to the votaries of the Green Revolution but it is an option that deserves serious consideration," says Ranmal Jhala, environmentalist, and educationist. The world – and India especially – faces Herculean challenges of a burgeoning population, a looming food security crisis and exponentially increasing threats to the web of life. "Policymakers need to not only dismantle and replace the prevailing, unsustainable and 'un-ecological' agricultural systems on a global scale but also address the burning issues of environmental degradation caused by modern industry, urbanisation, auto-mobilisation and the humungous treadmill of consumption".

That indeed was the message of the great Nikolai Vavilov, Russian botanist, plant-breeder, geneticist, geographer and science organizer, who was inspired by his vision of ending global hunger. Genetics as a science was in its infancy in the early 1900s when the young Vavilov pursued his dream of breeding super plants that could grow anywhere, in any agroclimatic zone – from the Sahara to the Tundra – in what he described as a "mission for all humanity". A special report by ***Farmers' Forum*** profiles the great plant geneticist in the hope that it will inspire policy makers to understand the import of biodiversity.

Where does India stand in this evolving world of biodiversity loss and protection? Dr Balakrishna Pisupati, Chairman, National Biodiversity Authority, says in his lead article in the cover story: 'Safeguarding India's biological diversity: the Biological Diversity Act' that "with the enactment of the Biological Diversity Act and notification of the Rules, India is leading global, regional and national actions to safeguard biodiversity. While acknowledging the relevance of conservation of biodiversity and its use to sustainable development, the NBA is striving to further strengthen the SBBs and BMCs to effectively translate conservation action to livelihood opportunities and sustainable use to economic well-being." Hope at last? ●

Photo: Viktors Kozers

Five Extinctions and Counting

First extinction: End-Ordovician. About 440 million years ago. This was the second-most severe extinction yet discovered. About 85 per cent of all species were wiped out.

Second extinction: Late Devonian. About 365 million years ago. Marine species were particularly hard-hit in an extinction that took place in two waves a million years apart.

Third extinction: End-Permian. About 251 million years ago. With an estimated extinction of 96 per cent of all species, this is the largest mass extinction of all. It dealt a near fatal blow to mammal-like reptiles that had ruled life on land for 80 million years. The dinosaurs stepped into their place as the dominant species.

Fourth extinction: End-Triassic. About 205 million years ago. An estimated 76 per cent of all species, mostly marine creatures, vanished.

Fifth extinction: End-Cretaceous. About 65 million years ago. This is the most famous mass extinction of all because it signaled the end of the dinosaurs, which had dominated the land for 140 million years. Probably between 75 per cent and 80 per cent of all species disappeared during this time.

Sixth extinction? Since 1950 some 600,000 species have disappeared and nearly 40,000 more currently are threatened. The pace of extinction may increase under the weight of human consumption and pollution of natural resources and, with global warming and resulting rising sea levels, take on alarming proportions.

Can we assume that life on earth, as we know it, will continue no matter what the environmental conditions? Or are we setting the stage for an eventual sixth extinction — our own?

Source: Population Reports; Population and the Environment – The Global Challenge

COVER STORY

Safeguarding India's Biological Diversity

THE BIOLOGICAL DIVERSITY ACT

Balakrishna Pisupati

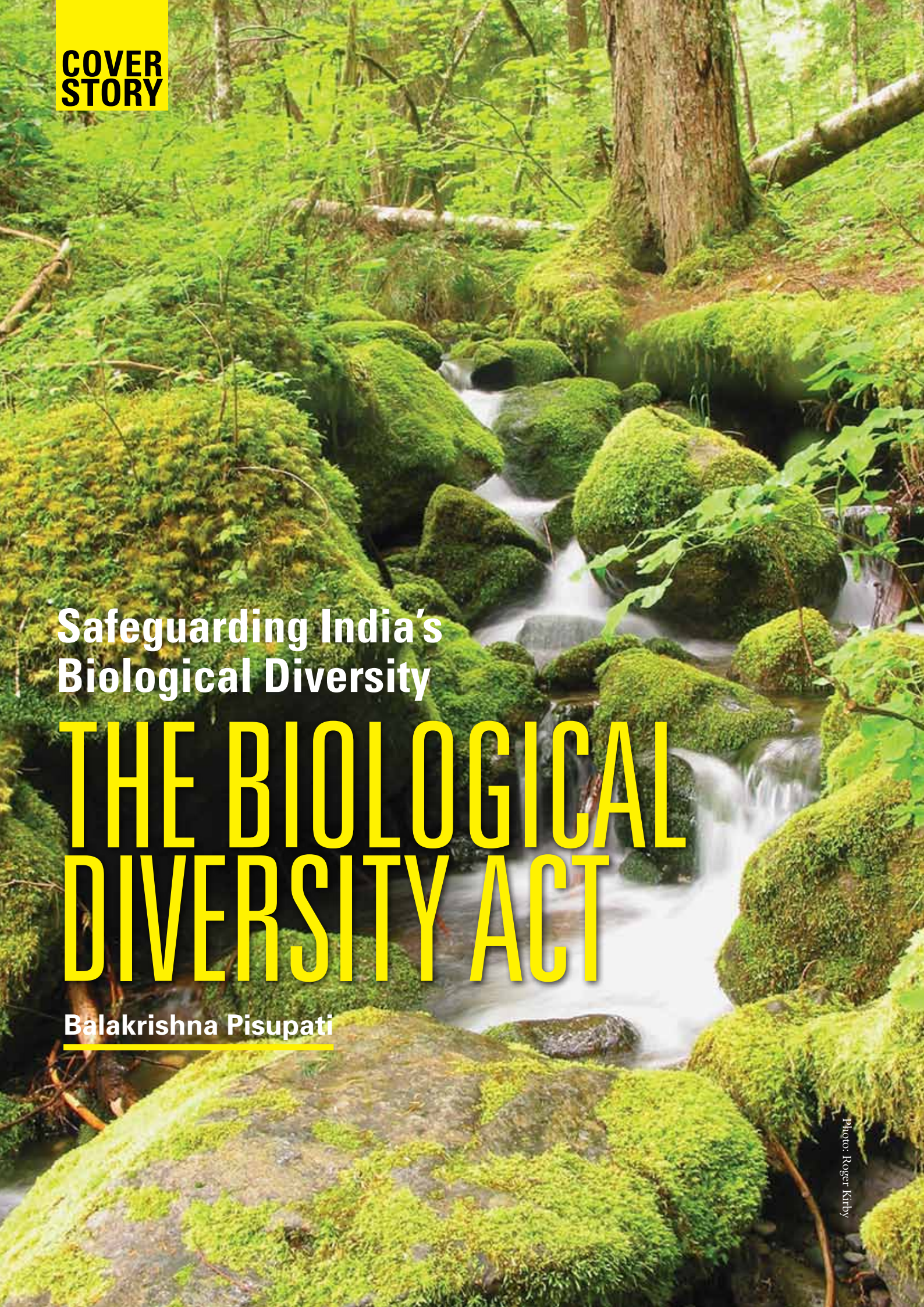
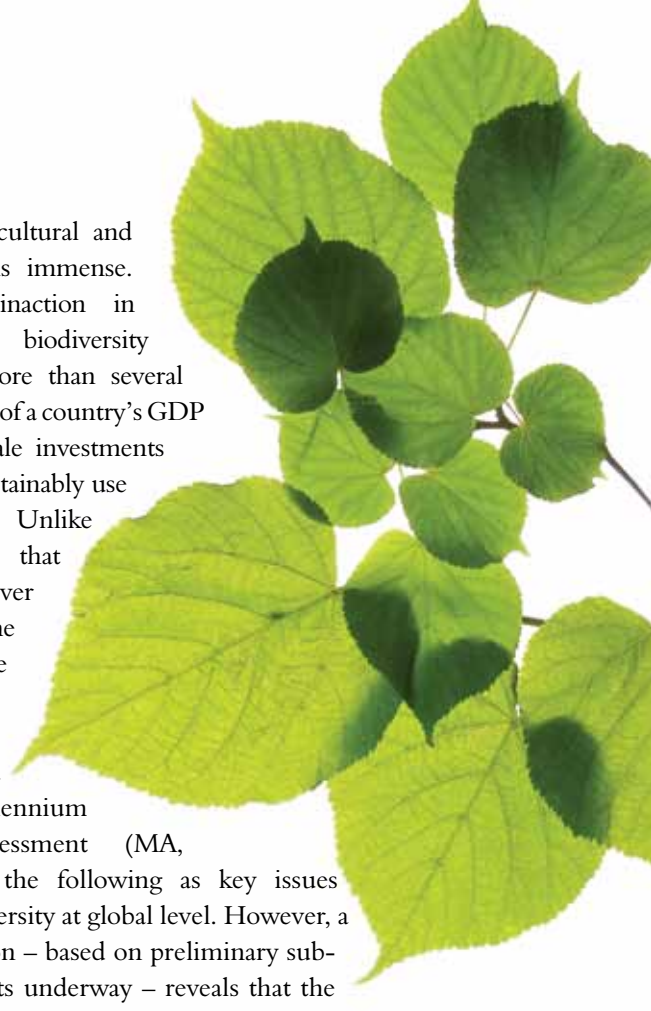


Photo: Roger Kirby



Biodiversity means the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part. This includes diversity within species, between species and of ecosystems (CBD 1993)[1]. Bio-resources include genetic resources, organisms or parts thereof, populations or any other biotic component of ecosystems with actual or potential use or value for humanity.

India is one of the mega biodiversity countries of the world. It is home to the four of the 34 "global biodiversity hotspots". With only 2.4 per cent of the land area, India accounts for 7.8 per cent of the recorded species of the world. This biodiversity is of immense economic, ecological, social and cultural value and it has tremendous value for posterity. The ecosystem services from the forested watersheds of two major mountain chains — the Himalayas and the Western Ghats — indirectly support several million people and, annually, provide non-timber forest products worth $200 million.

Within its geographical area, India possesses major ecosystems: mountains, forests, desert, freshwater, marine, island, wetlands and mangroves. Beside ecosystem diversity, the species diversity makes India one of the mega-diverse countries of the world. It ranks 10th globally and fourth in Asia in terms of plant diversity and accounts for 11 per cent of the world's diversity. Further, the genetic diversity of Indian bio-resources led to the formation of dedicated bureaus to work on the genetic resources of plant, animal, fish, insects and microbes. India has pioneering survey organisations like Botanical Survey of India, Zoological Survey of India, Forest Survey of India, Fisheries Survey of India, Central Marine Fisheries Institute and National Bureau of Soil Survey and Land Use Planning exclusively dedicated to survey, collection and classification of species within the country.

As described by The Economics of Ecosystems and Biodiversity (TEEB) study published in 2010[2], the value of biodiversity in both use values (goods biodiversity provides agricultural diversity, medicinal plants, microbes and others) and non-use values (such as cultural and aesthetic links) is immense. The cost of inaction in managing such biodiversity will often be more than several percentage points of a country's GDP than the smallscale investments to protect and sustainably use the biodiversity. Unlike climate change that can be reversed over a period of time with suitable interventions, biodiversity once lost is lost forever.

The Millennium Ecosystem Assessment (MA, 2005)[3] suggests the following as key issues relating to biodiversity at global level. However, a closer examination – based on preliminary sub-global assessments underway – reveals that the issues are relevant to India as well.

- Biodiversity benefits people through more than just its contribution to material welfare and livelihoods. Biodiversity contributes to security, resilience, social relations, health and freedom of choices and actions.
- Changes in biodiversity due to human activities were more rapid in the past 50 years than at any time in human history and the drivers of change that cause biodiversity loss and lead to changes in ecosystem services are either steady, show no evidence of declining over time, or are increasing in intensity. Under the four plausible future scenarios developed by the MA, these rates of change in biodiversity are projected to continue or to accelerate.
- Many people have benefited over the last century from the conversion of natural ecosystems to human-dominated ecosystems and from the exploitation of biodiversity. At the same time, however, these gains have been achieved at growing costs in the form of losses in biodiversity, degradation of many ecosystem services and the exacerbation of poverty for other groups of people.

1 Secretariat to the Convention on Biological Diversity (1993) Convention on Biological Diversity, Montreal, Canada.

2 TEEB (2010) The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature: A synthesis of the approach, conclusions and recommendations of TEEB; TEEB Secretariat.

3 Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Biodiversity Synthesis. World Resources Institute, Washington, DC.

The most important direct drivers of biodiversity loss and ecosystem service changes are habitat change (such as land use changes, physical modification of rivers or water withdrawal from rivers, loss of coral reefs and damage to sea floors due to trawling), climate change, invasive alien species, overexploitation and pollution.

Improved valuation techniques and information on ecosystem services demonstrate that although many individuals benefit from biodiversity loss and ecosystem change, the costs of such changes, borne by society, are often higher.

- To achieve greater progress toward biodiversity conservation to improve human well-being and reduce poverty, it will be necessary to strengthen response options that are designed with the conservation and sustainable use of biodiversity and ecosystem services as the primary goal. These responses will not, however, be sufficient, unless the indirect and direct drivers of change are addressed and the enabling conditions for implementation of the full suite of responses are established.
- An unprecedented effort would be needed to achieve a significant reduction in the rate of biodiversity loss at all levels.
- Short-term goals and targets are not sufficient for the conservation and sustainable use of biodiversity and ecosystems. Given the characteristic response time for political, socio-economic and ecological systems, longer-term goals and targets (such as for 2050) are needed to guide policy and actions.
- Improved capability to predict the consequences of changes in drivers for biodiversity, ecosystem functioning and ecosystem services, together with improved measures of biodiversity, would aid decisionmaking at all levels.
- Science can help ensure that decisions are made with the best available information but ultimately the future of biodiversity will be determined by society.

The third edition of Global Biodiversity Outlook (GBO 3)[4] indicates that India and its neighbouring regions constitute the global tipping point for the future of coastal systems (GBO3, 2010), indicating the significance of India in terms of its biodiversity.

Responses from India

Within the overall context of moves to secure global biodiversity for public good and ensure biodiversity, ecosystem goods and services benefit its citizens, India's foresight in developing national policy and regulatory framework to not only focus on conservation but also sustainable use of biological diversity and sharing the benefits of such use has been commendable. At a time when countries were contemplating how to address the three principles in a coordinated way, India enacted the Biological Diversity Act (BDA) in 2002 and notified the Rules in 2004.

Building capacity to strengthen the implementation of the Biological Diversity Act is a national priority identified in the 11th Five Year Plan of India (2007-2012), the National Environment Policy (NEP 2006) and National Biodiversity Action Plan (NBAP 2007). The NEP seeks to achieve balance between conservation and development. The dominant theme of the NEP is that while conservation of environment and biological resources are necessary to secure livelihoods and the well being of all, the most secure conservation is to ensure that people dependant on particular resources obtain better livelihoods from conservation than degradation of the resources.

Building capacity to strengthen the implementation of the Biological Diversity Act is a national priority identified in the 11th Five Year Plan of India (2007-2012)

The National Biodiversity Action Plan (NBAP), based on the evaluation of existing legislations, regulatory systems, implementation mechanisms, existing strategies, plans and programmes, using the final technical report of the NBSAP as one of the inputs, was prepared by the Ministry of Environment and Forests (MoEF), involving wide consultations with various stakeholders across the country. The NBAP is consistent with the ecological, social, cultural and economic mosaic of the country and its preparation is in pursuance of Article 6 (a) of CBD as well as Section 36 (1) and (3) of BDA, 2002.

The NBAP identifies some of the key capacity

4 SCBD (2010) The Global Biodiversity Outlook: Third Edition. SCBD, Montreal, Canada.

Photo: Sam Hummel

constraints in addressing these challenges as: biodiversity information base; implementation of Biological Diversity Act and safeguarding traditional knowledge; new and emerging biotechnologies; economic valuation and natural resource accounting; policy, legal and administrative measures; and institutional support. Thus, there is an urgent need for building and strengthening capacities at different levels and sectors.

India's Biological Diversity Act sets a futuristic trend in dealing with issues related to biodiversity by the following features:

- Establishing an independent statutory authority with powers to oversee development and implementation of the national policy in relation to biodiversity at ecosystem, species and gene levels;
- Suggesting a decentralised framework for the implementation of the Act through the National Biodiversity Authority (NBA) that deals with national and translational issues related to biodiversity, the State Biodiversity Boards (SBBs) that deal with implementation of the Act at the state level and the Biodiversity Management Committee (BMCs) at the Panchayat level;
- The Act also calls for the establishment of a Biodiversity Fund to facilitate benefit sharing. The operation of the fund will be overseen at central, state and local levels. The fund will also be the depository of finances received under grant of access and the related benefits as well as receipts from the central government and others concerning license fee, royalties and other receipts for the authority;
- Ensuring the terms of co-ordination to deal with biodiversity issues are clearly spelt in terms of roles and responsibilities of both the three-tier structure discussed here as well that of the central government;
- Providing options to deal with biodiversity not just as a commodity but also as a resource for the future use by suggesting creation of heritage sites and specific focal areas such as special focus on conservation of agro-biodiversity;
- Regulating the use of biological resources in a manner that does not stifle local resource use, research and development but clearly ensuring that such use is within the overall framework of conservation, use and principles of fair and equitable sharing of benefits between the providers and users of resources; and
- Empowering decentralised decisionmaking while implementing the Act at NBA, SBB and BMC levels with clear compliance procedures and deterrents.

Photo: John Nyberg

Given these, the Act is certainly a comprehensive piece of legislation that the Government of India has enacted in the recent years that facilitates and promotes use of biodiversity with certain terms and conditions and advises national policy making on biodiversity related issues.

Progress so far

The NBA is the national authority to discharge all decisions pertaining to conservation, sustainable use of biological resources, including approval for access to and transfer of resources and scientific research results (technologies) to foreign citizens, companies and non-resident Indians, prior approval for applying for intellectual property rights based on biological resources or traditional knowledge obtained from India, arranging benefit-sharing from the use of biological resources from India, approval of third-party transfer of accessed biological resources and traditional knowledge and several other matters related to conservation and sustainable use of biodiversity of India.

Provisions for setting up of biodiversity funds at the central, state and local levels are provided (Sections 27, 32 and 42) in the Biological Diversity Act, 2002. The monetary benefits, received as fees and royalties for approvals by the National Biodiversity Authority is deposited in the National Biodiversity Fund and used for conservation and development of areas from where resources have been accessed. As this article goes to press, NBA has facilitated the establishment of 25 State Biodiversity Boards (SBBs) and close to 32,000 Biodiversity Management Committees (BMCs). Though the functioning of SBBs and BMC can be improved greatly, so far 14 states have notified state level rules related to the implementation.

The issue of access to genetic resources and benefit-sharing (ABS) is the one receiving enhanced attention since effective implementation of ABS provisions under the Act will not only contribute to conservation and sustainable use components for biological resources as covered under the Act but also to local development. For example, if people recognize the potential of genetic resources available and their value, local level conservation action as well as identification of means to sustainably use the resource can be achieved.

BHCs have been designated in India.

Additionally, in order to promote research and development in biological resources, the Ministry of Environment and Forests has initiated a major new programme to value the immense wealth of natural resources and biodiversity in India. In tune with the Economics of Ecosystems and Biodiversity (TEEB) study, the Ministry has begun the process of valuating its natural capital and ecosystem services in terms of economic value.

The study will focus on the following:

- Identification of specific ecological and economic problems in the state
- Specifying the ecosystem services and natural capital that are relevant to state policy
- Selecting appropriate methods for disseminating information
- Identification and assessment of policy options
- Assessment of distributional impacts of policy options
- Building capacities of various stakeholders on economics and biodiversity

As exemplified in the fourth national report of India to the Convention on Biological Diversity (2010), India has further strengthened implementation mechanisms in policy, legislative and administrative measures for biodiversity conservation and management. In this context, such major initiatives were established as: i) Entities of Incomparable Value (EIVs), as defined in the NEP; ii) Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act (2006); iii) Wildlife Crime Control Bureau; iv) Integrating biodiversity concerns in environmental impact assessment of development projects under Environmental Impact Assessment (EIA) Notification (2006) and Coastal Management Zone (CMZ) Notification; v) Promoting best practices by awarding "Plant Genome Savior our Community Recognition" to farming communities; vi) Creation of National Tiger Conservation Authority (NTCA) (2006); and vii) setting up of National Fisheries Development Board (NFDB) (2006) among others.

Various initiatives to develop national capacities for biodiversity conservation and appropriate use of new technologies have been undertaken at different levels involving a wide range of stakeholders.

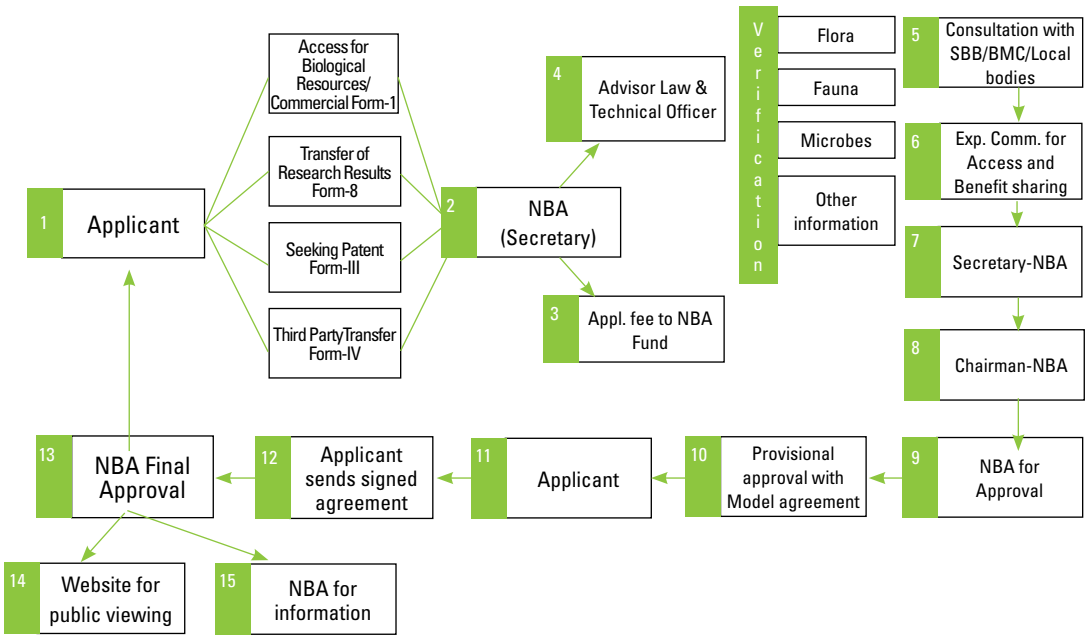
In order to promote research and development in biological resources, the Ministry of Environment and Forests has initiated a major new programme

A sample on implementation: Access Applications approved by the NBA

In accordance with various sections of the Biological Diversity Act and Rule, the NBA has so far received 652 applications related to various forms of access to biological resources of which 92 are approved with related agreements already signed, 357 applications cleared by the authority, 238 under various stages of processing and 57 withdrawn. The decisionmaking structure and its components are exemplified in Figure1.

Recognizing the relevance of documenting local level biodiversity, the Act also calls for preparation of People's Biodiversity Registers (PBRs) at local levels. So far 1,121 PBRs are developed by various states in cooperation with BMCs. Considering the importance of biodiversity in the 'hot spot' locations, the Act also requires designation of Biodiversity Heritage Sites at the local level with significant and special biodiversity for conservation and use purposes. So far, three

Figure 1. Processing of ABS applications under BD Act 2002 and BD Rules 2004



In tune with the Economics of Ecosystems and Biodiversity study, the Ministry has begun the process

While an All India Coordinated Project on Capacity Building in Taxonomy (AICOPTAX) provided impetus to taxonomic capacity building for lesser known groups of plants, animals and microorganisms, India further intensified research on genetic fingerprinting of captive stock. In capacity building, India made remarkable progress in areas related to: i) forest based micro-enterprises; ii) development of Self Help Groups (SHGs) for synergy of Joint Forest Management (JFM); with other schemes of the Government, iii) biosafety; iv) environmental education and awareness involving over 10,000 organizations, 84,000 eco-clubs and 40,000 schools; v) poultry, bee-keeping, fisheries and other related sectors (participation of 0.5 million youth) and extension activities (for 1.2 million farmers); and vi) forest management, policy and legal issues, international conventions, wildlife management.

During August 2011, the NBA and the Ministry of Environment and Forests launched a national programme on ABS in five states with plans for moving forward on a biodiversity technology initiative also under discussion. In addition, a Centre of Excellence on Biodiversity Law and Policy (CEBPOL) is also under establishment within the NBA with a mandate to undertake policy and legal research on issues of biodiversity for the country and globally.

The future

With the enactment of the Biological Diversity Act and notification of the Rules, India is leading global, regional and national actions to safeguard biodiversity. While acknowledging the relevance of conservation of biodiversity and its use to sustainable development, the NBA is striving to further strengthen the SBBs and BMCs to effectively translate conservation action to livelihood opportunities and sustainable use to economic well-being.

With India hosting the next Conference of the Parties to the Convention on Biological Diversity (CBD COP 11) in October 2012, it is time that all stakeholders working on biodiversity combine their forces to forge a new national partnership on biodiversity and development, which will showcase for the world what India means in term of translating intent of sustainable development to local action. Knowledge management and sharing, information exchange, best practice guidelines, learning from practitioners, responsive policymaking and inclusive implementation would form the six-point mantra to achieve the conservation and development goal of India. ●

The author is the Chairman, National Biodiversity Authority, Chennai

A STEP TO EMPOWER A MILLION LIVES

IFFCO, the largest producer and marketer of processed fertilisers now makes a foray into the power sector with IFFCO Chhattisgarh power Ltd. (ICPL), a joint venture between IFFCO and Chhattisgarh State Electricity Board

HIGHLIGHTS OF ICPL :-

- *A pit head mega thermal power plant with a capacity of 1320 MW to be set up at Vill. Salka, Distt. Surguja in Chhattisgarh*

- *Use of enviroment friendly, super critical technology for power generation*

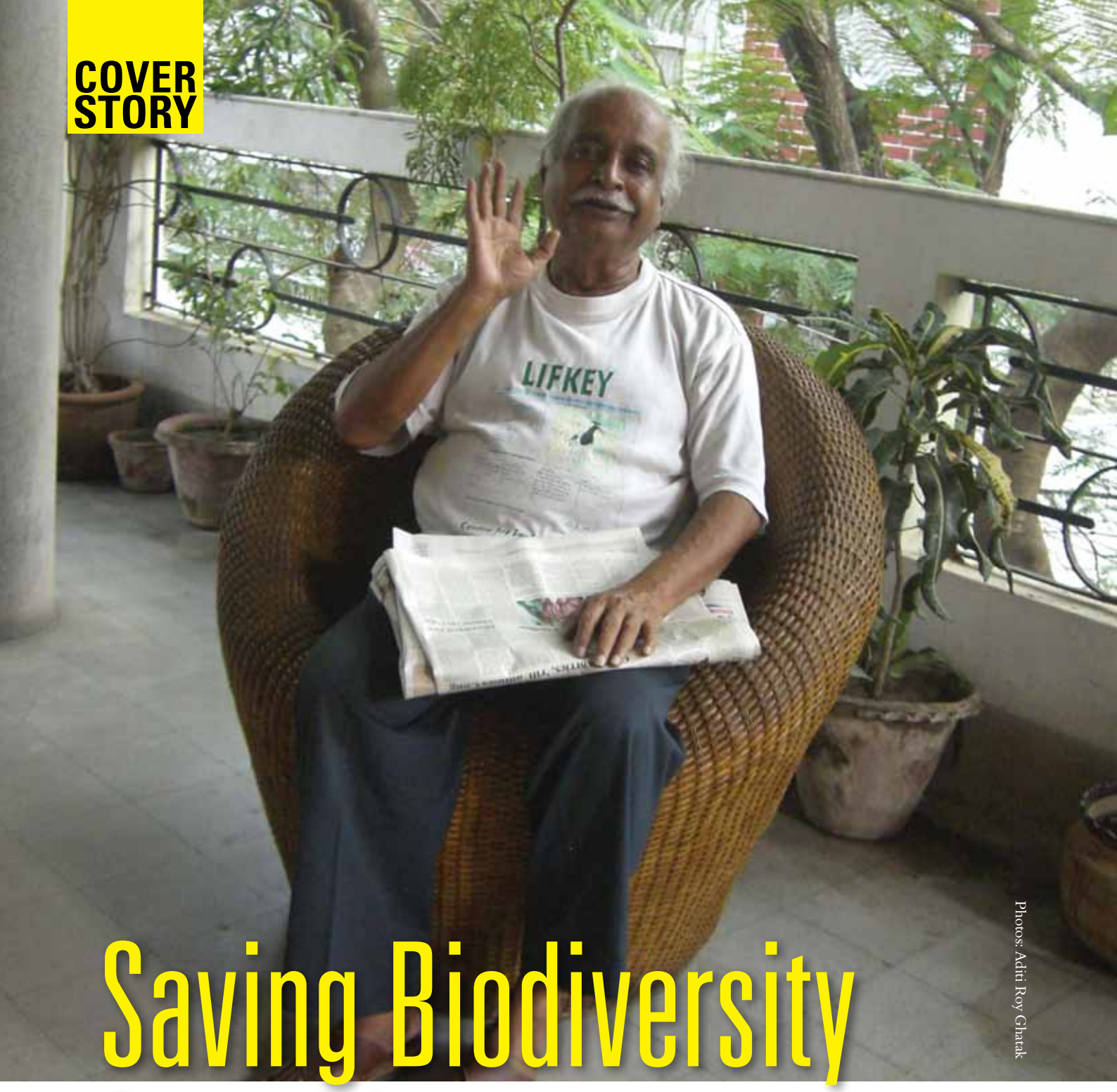
- *A project aimed at the holistic growth of the farmers*

IFFCO CHHATTISGARH POWER LIMITED

IFFCO SADAN, C-1 Distt Centre,Saket Place,New Delhi-110017

Website: www.icplindia.in

COVER STORY



Photos: Aditi Roy Ghatak

Saving Biodiversity from Bioprospectors and Biopirates

Aditi Roy Ghatak in conversation with **Dr Asish Ghosh**

***Dr Asish Ghosh**, former Director, Zoological Survey of India is currently Director for Center for Environment and Development, Kolkata. He is a widely published author on the subject of natural resource management and on all dimensions of environment and development. Between 1992 and 1996, he led the Indian delegation to the Ramsar Convention in Japan and served as a member of Indian Delegation to the Asian Wetlands Conference to Malaysia, Indo Russia Forest Meet to Russia, IUCN General Assembly to Argentina and other International Meets in Kenya, China and Mexico. He was invited to Chair UNEP-CBD meet in Paris in 2009. He has served as a member of the National Biodiversity Authority, Government of India and as a Member of the Working Group for the 11th Five Year Plan on Environment, Biodiversity, Planning Commission, Government of India.*

Farmers' Forum: ***Till mid-1992, biodiversity was an open access resource – a global common – but it has since become a sovereign rights issue. What has prompted the change and what are its consequences for India?***

Asish Ghosh: A critical analysis of the trading patterns of the colonising countries, largely in the tropical, would establish that they were enormously attracted by the living natural resource base of the colonized countries. The entire southern hemisphere, from South America in the west to Australia in the east, became colonised over a 300-year period.

FF: ***Was there a design behind it?***

AG: Well, it would be fair to say that countries from a single continent, Europe, taking advantage of their early industrial revolution and consequent development of science and technology, possibly identified that natural resources in the south could be turned into real profit, first by trading in them in the larger global market and then changing the resources into value-added products. Historic evidence would substantiate this. In India, from 1590, when Vasco Da Gama landed in the Malabar Coast till the mid-18thcentury, five European countries came to the Indian subcontinent and established colonies and four of the five – the Dutch, the Danish, the French and the British – established their own East India Trading Companies and if one looks at the export basket from India, taking for purely trading purposes by these companies, one comes up almost 100 per cent products from living natural resources – whether it be timber or textile or spices and tea. The Portuguese who came first to trade never formed their own company but they did come to collect spices, which the Malabar Coast was very rich in. It continues to be so.

FF: ***So biodiversity has always been a matter of big bucks?***

AG: Yes and India never charged a fair price for the raw material, including medicinal plants and the finest quality of cotton textile fibre. Not only medicinal plants, but even traditional knowhow was taken from the time of Vasco Da Gama's arrival in India in 1592 to 1992, when the United Nations Conference on Environment & Development at Brazil decided that biological diversity in each country would be its sovereign right and, henceforth, the access to biological resources would be governed by the principal of prior informed consent and benefit-sharing.

FF: ***Today, then, the country of origin must permit the export of the asset as well as the traditional knowledge (oral or written in classical language) that accompanies it on a predetermined agreement on the benefit sharing from such export?***

AG: Yes and the intervention of the World Trade Organisation vis-à-vis the concept of patent and geographical indicators has made it more definitive. Significantly, these are all covered under the Convention on Biological Diversity (CBD), which the United States of America is not a signatory to. It can hardly do so since so much of its claimed innovations would be discredited if it did.

FF: ***What was India's role in establishing this biodiversity regime?***

AG: India played a very vital role; almost as the

leader of the G-77 countries and its briefing paper on biodiversity gave enough evidence of the economic bonanza that it provided to the west without any return to the country of origin and as such this was highly acceptable to a large number of countries, especially from the tropical south. No one has actually established how much material and knowledge, unchecked, uncontrolled, has been taken out but there is evidence of what was happening when, after the 1992 convention, the US. Patent office was giving out patents by the dozen on the plea that they were innovations of research groups/companies in the USA.

FF: ***Till the haldi affair exploded?***

AG: The classic case of haldi and its medicinal properties – known in India for thousands of years – or the properties of the neem plant prove the point. In both cases, US companies had got patents, based on knowledge traced back to India. It was not their innovation but pre-existing knowledge translated into English.

Notably, not only plants or animal based products but even microbial organisations harvested from India's rich and variable agro-climatic zones, could provide the basis for 27 new patents obtained by five US-based multinationals: Bristol Myers, Pfizer, Lepetit Labs, Merck and Lederle Labs[1]. These companies obtained their raw material from India and, using their bioactive ingredients, created products for international markets. This happened even five years after CBD and scientists from India asked the government to stop this practice that was termed as 'biopiracy'. This is reflected in India's Biological Diversity Act of 2002. Soil too is an integral part of the BDA and cannot be taken out without prior informed consent.

US companies had got patents based on knowledge traced back to India. It was not their innovation but pre-existing knowledge translated into English

FF: ***Have we adequately protected Indian biodiversity?***

AG: If you consider the issue of legal protection, yes, it has been adequately protected since the passing of the 2002 Act and more so after the rules have been framed in 2004. The Act states that the entire system should be working on a three-tier basis. At the top, the Act suggests the setting up of a National Biodiversity Authority as an autonomous body linked with the Ministry of Environment and Forest, with its chairman given the same status as a secretary of the Government of India. The authority would be acting as the apex body to decide all the cases pertaining to access, transfer and benefit-sharing. It will have *exofficio* members from all ministries concerned besides five nominated members of national and international repute in the field nominated for no more than two three-year terms.

At the second level, every state is to form a state biodiversity board with separate budget provision with a chairman and member secretary as in the case of the central authority with state level *exofficio* members and nominated members for fixed terms. The last tier of the system will be located in the local level – in urban areas at the level of urban local bodies – and in the case if rural areas at the level of gram panchayat/panchayat samitee that can be equated with the community block. These will be called Biodiversity Management Committees and will have seven members nominated from the community.

FF: ***What about global laws?***

AG: About 15 countries at the international level have made separate laws relating to biodiversity but the Indian law stands out as the most democratic law.

FF: ***What will the role of the local biodiversity management committee be and how will it be constituted?***

AG: The law states that the first meeting of the community will be convened by the head of the local panchayati raj system. However, all the seven members of the local biodiversity management committee are to be nominated from within the community. There is no government representation. One of the seven members will be nominated the chairperson and at least two members must be women and 18 per cent must be from the tribal and other backward communities in the area. The criterion for nominating members is knowledge.

FF: ***What about funding the bodies?***

AG: At each tier, a biodiversity fund will be established and the local biodiversity management

1 These companies admitted while filing their patent claims that they were based Indian soil micro-organisms; see scanned images published in Conserving Life by Asish Kothari

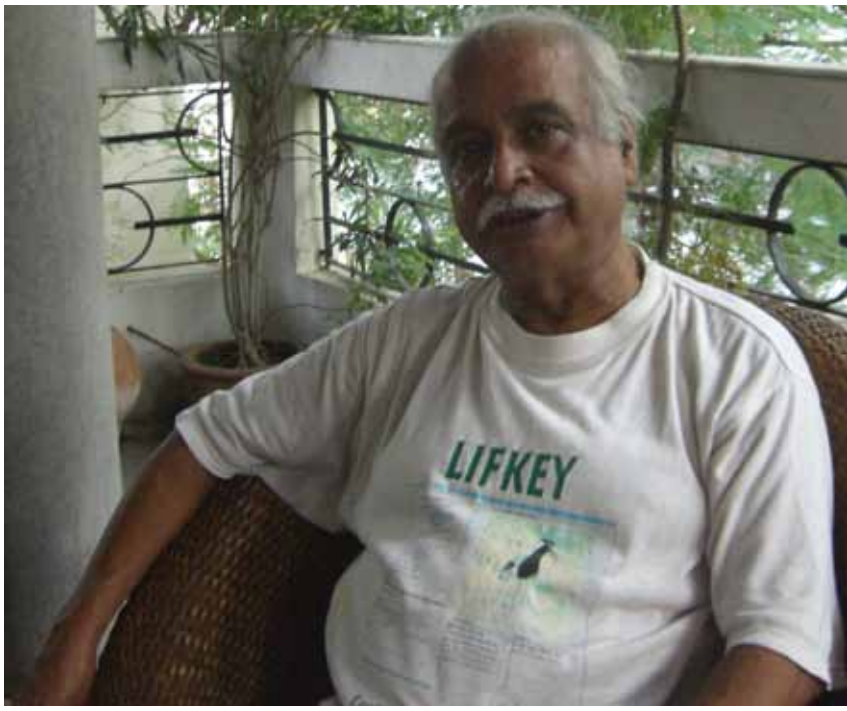
committee can levy a tax under the law in case of commercial utilisation of bio-resources from within their jurisdiction. This law also empowers the NBA and without the NBA's approval, no Intellectual Property Right application can be entertained. This is applicable to both material and knowledge transfer. Thus, the law as it is has ensured that the benefit ultimately percolates down to the conservers and the providers of the biological resource and knowledge.

FF: ***How is the law being implemented?***

AG: The NBA has been formed with its headquarters in Chennai. Of the 28 states, 25 have formed State Biodiversity Boards but the formation of BMC in most of the states remains pathetically poor. Let us consider a progressive state like Madhya Pradesh that issued an executive order to set up BMCs at the local/gram panchayat levels resulting in more than 2,500 BMCs being set up. The question is: are they functioning? Sadly the answer is no. Is the large tribal population of Madhya Pradesh benefitting from its huge biodiversity base? The answer is no again. Yet some specific initiatives are being taken to set this right. Under a United Nations Environment Programme – Global Environment Facility (UNEF-GEF) financial support is being provided to five identified states for three years to initiate the Access Benefit-Sharing mechanism by implementing 40 agreements (eight each) within three years (2011-14). If this is translated into positive action, India can become a path-finder in making the mechanism functional. Others, especially Afro-Asian and Latin American countries, can then emulate the example. Since India is a country of mega biodiversity – having eight percent recorded biodiversity of the world within 2.4 per cent of the geographical space – this action in India is eagerly awaited. There is actually a forum of like-minded mega-diversity countries.

FF: ***What about any positive examples of benefit sharing as of now?***

AG: Till 2010, there are to my knowledge around 50 agreements of benefit sharing approved by the NBA, which were cleared by its expert committee on the subject. I recall one that proposes the use of a product formulation developed by the community from traditional knowledge and herbal practitioners. The beneficiary mechanism proposed involved sharing five per cent of the profit with the community to be deposited with the local biodiversity fund; and 30 per cent to the product innovators, who were from the



local community. Many of the proposals had come from civil society organisations connected with the National Innovation Foundation and not from the corporate sector. As it is, there is a Rs 10,000 fee to be deposited for filing a first-time application. So over the past seven years India has made some progress in terms of ensuring benefit sharing but it still needs to go a long way.

FF: ***Does one sense a lethargic response from states to implementing this benefit-sharing regime?***

AG: I would rather blame the entire funding mechanism because the local bodies are more enthused about projects for which they receive funding under the NREGA, for example. There are so many such projects. Here they would have to generate the fund through bioprospectors to their area to ensure that their natural resources are researched into for commercial utilisation upon which only they can levy a tax to enhance the local biodiversity fund.

FF: ***So what is the way forward?***

AG: The local biodiversity fund can be created especially in the forest rich areas. As it is, under law, for every project cleared by the government of India in forest areas, which involves use of forest land for non-forestry purposes, the project authorities have to deposit Rs 8 lakh per hectare towards new present value of the forest. This includes the biodiversity value, apart from ecotourism, watershed, carbon sequestration values. Logically, for every such project cleared at least one fifth of the funds should be given

to the biodiversity management committee. That would provide the incentive for the conservation and sustainable utilisation of biological resources. Additionally, special incentives can be given to individuals or to the community with proven records of conserving biodiversity or traditional knowledge. It is a question of making the forest department concede this money for incentivising the process and if required to sensitise the Supreme Court under whose directive this compensation regime was started.

FF: ***What are the other critical issues around biodiversity that should concern us today?***

The slips between the law and reality continue to be a matter of concern. There is also great worry about there being no established mechanism to control the land use changes in the agro-biodiversity rich areas, which need immediate attention. Many such areas can be identified: Adilabad district in Andhra Pradesh, Raigad district in Orissa, in the southern state if Kerala, which are biodiversity rich but where there is almost no control mechanism over the loss of biodiversity through land conversion.

We talk of science, but the reality is that of the 2,500 fish species in fresh/braking/marine waters of India, we have not been able to develop technology to culture even 50 species. The fisher community in India depends largely on capture fishery (netting fish) and deep sea trawling has come as a major threat to the coastal fishers because fish migrates from the deep sea to the coast. In Kerala, about 20 years ago, one could see the effect of intensive coastal fishing on size of the catch for the small fisherfolk. India's exclusive economic zone extends up to 12 nautical km and foreign fishermen had been allowed to fish within this zone upon payment of a royalty. It took mass protests from the local fisherfolk (some three million of them) to agitate against them and finally have the permission revoked for global fishers because it was affecting their livelihood.

There is also the question of degraded quality of coastal waters because of pollution from the mainland. Fishermen, therefore, agitate against the intensification of coastal industry in a country where environmental laws are often not respected. This has become more apparent with private ports coming up in the country; where the fisher's rights are hardly respected.

Many biodiversity rich area have almost no control mechanism over the loss of biodiversity through land conversion

FF: ***What about economic valuation of biodiversity or its loss?***

AG: There is no economic valuation of the impact of such changes, as has been done in the case of forests. This means that the existing mechanism of assessing Net Present Value for forests has not been made valid for agriculture and this is something that must be done in the ongoing, UNEP-GEF Project in five Indian states. This is a major lacuna in India's biodiversity conservation effort and, hopefully, there will be a control and regulatory mechanism as in the case of forests that will say yes or no for converting agriculture land in the name of national development. It would be no surprise if such exercises showed that the value of the agro-biodiversity in such areas was more than the value of the crop being grown there.

FF: ***How does it affect the fishing regime?***

AG: That is another major area of concern: around the dual professions that many farmers follow: a farmer is a farmer and a fisher and both professions involve engaging with elements of biodiversity and whose resources are being dangerously dilapidated.

FF: ***The other very worrisome issue is the fast rate of depletion of breeds of domestic animals. Why is this happening?***

AG: When we started promoting high-yielding seeds in agriculture, we also started promoting breeds of the so-called exotic variety as Red Leg Horn for poultry chicken and jersey cows and such others. The same mistake has been made and millions of farmers whose total occupation encompasses farming and poultry were never advised that the traditional breeds should not be neglected because each traditional breed has its genetic character. Realising that such breeds would be important in the future, the government of India set up the National Bureau of Animal Genetic Resources in Karnal but by then many of the farmer's breeds around India had become rare or had got lost without any record.

FF: ***What kind of a role are these national institutions for genetic biodiversity resources – for seeds or animal genetic resources – playing or not playing?***

AG: Let me ask a counter question: what are

US Patents and Patent Claims on Indian Soil Micro-organisms

(Information supplied by the Rural Advancement Foundation International (RAFI), Canada, based on records of the American Type Culture Collection, Rockland, Maryland).

ATTCN No.	Depositor	Material	Purpose	US Patent
53646	Bristol-Myers	Soil bacteria	N/A	Claim
55076	Bristol-Myers	Soil bacteria	N/A	Claim
31466	Pfizer	Soil bacteria	Production of antibiotic compound	4195079
31049	Lepetit Labs	Soil bacteria	Production of gardimycin	4022884
33076	Lepetit Labs	Soil bacteria	Production of ramoplanin	4303646
31121	Lepetit Labs	Soil bacteria	Production teichoplanins	4239751
31430	Bristol-Myers	Soil bacteria	Production of antibiotics	4250170
21828	Bristol-Myers	Soil bacteria	Production of antibiotics	3880994
31805	Bristol-Myers	Soil bacteria	Production of antibiotics complex	4341768
31638	Pfizer	Soil bacteria	Production of antibiotics	4287182
31203	Bristol-Myers	Soil bacteria	Production of antibiotics	4287182
53710	Bristol-Myers	Soil bacteria	Production of capreomycin	4026766
31724	Bristol-Myers	Soil bacteria	N/A	Claim
31725	Bristol-Myers	Soil bacteria	Production of nocandicins	432019
31086	Bristol-Myers	Soil bacteria	Production of nocandicins	432019
31295	Bristol-Myers	Soil bacteria	Production of sorbistin	401257
31296	Bristol-Myers	Soil bacteria	Production of antibiotics complex	4169096
31297	Bristol-Myers	Soil bacteria	Production of antibiotics	4169096
31298	Bristol-Myers	Soil bacteria	Production of antibiotics complex	4169096
53712	Bristol-Myers	Soil bacteria	Production of antibiotics complex	416909
31217	Bristol-Myers	Soil bacteria	Production of antifungal antibiotic	44956374
31218	Bristol-Myers	Soil bacteria	Production of apramycin, nebramycin, tobramycin	4032404
31219	Bristol-Myers	Soil bacteria	Production of apramycin, nebramycin, tobramycin	4032404
39012	Pfizer	Soil bacteria	Production of CP-56,063, CP-56,064	4450237
31431	Bristol-Myers	Soil bacteria	Production of rachelmycin	4301248
13382	Lederle Labs	Soil bacteria	Production of nucleocidin	2914525
21344	Pfizer	Soil bacteria	Production of mitocromin	3852425
53527	Merck	Soil bacteria	Production of virginiamycin M1/analogs	4476111
53784	Bristol-Myers	Soil bacteria	N/A	Claim
53807	Bristol-Myers	Soil bacteria	Production of hydramycin	4952604
53548	Bristol-Myers	Soil bacteria	Production of 3,7-dihydroxytropolone	4952604
53904	Bristol-Myers	Soil bacteria	N/A	Claim
20927	Merck	Soil fungus	Production of antibiotic	4952604
53903	Bristol-Myers	Soil fungus	N/A	Claim
31668	Lepetit Labs	Soil Fungus	Production of antibiotic	4476111

the access levels to these institutions from the grassroots, where the farmers need help. My personal experience (despite my considerable clout in the field of biodiversity) makes me wonder. When I asked for the six traditional salt-tolerant rice varieties from the South Bengal Sundarbans region from the Central Rice Research Institute Cuttuck, the Chinsura Rice Farm, West Bengal and the Soil Salinity Research Station under the ICAR at Port Canning (near Sundarbans), on being advised to do so by the director, National Bureau of Plant Genetic Resources, New Delhi, all three regretted their inability to provide any of the seeds that I sought. It was finally through the good offices of the director, NBPGR that I received 100 grams of two of the seeds that I was looking for because it did not have the others. Through our own initiative through intensive scouting in villages of Sundarbans, we have been able to collect two more varieties while a fifth variety was obtained through the good offices of Prof R. N. Basu, former Vice Chancellor, Calcutta University, himself a renowned agriculture scientist. We are still looking for the sixth one and we understand that it is available with one national-level institute that has never been approachable by the farmer.

The point is that the system of having these national repositories of genetic resources is of little use to those for whom they have been built. There is almost zero connectivity between the farming community and these institutions. ●

COVER STORY

NET ASSET VALUE FOR BIODIVERSITY

Prepared for **Farmers' Forum** by **ENDEV**
(Society for Environment and Development)

Classical agriculture, derived out of diversity of wild relatives of crop species, has been ensuring food security through the millennia for humans and livestock. Fodder for domesticated animals also come from the bioresources, grown at a industrial scale in the west and the 'business' in agriculture continues to boom, with new opportunities opening up in the area of organic products on the one hand and GM crops on the other. The growth of certified products from these industries is undoubtedly faster than conventional products and clearly there is a business value associated with this. Besides, there is the global carbon market with which the biodiversity space is closely connected.

However, even in an era in which there is growing concern about evaluating the actual worth of natural resources, including living resources and soil, the question is asked whether standard calculation models will work for such assessments. The man on the street will argue that nature is invaluable but more serious commentators will explain that for all practical purposes natural resources markets are non-existent. Again, transactions around biodiversity often take place between parties without the actual stakeholders ever being involved in the process that in turn makes genuine markets for them non-existent.

Partha Dasgupta (University of Cambridge and Beijer International Institute of Ecological Economics, Stockholm) in an article, Valuing Biodiversity[1], had explained that they are so because "costs of negotiation and monitoring are too high." Economic activities may be affected by ecological interactions involving long geographical distances (the effects of uplands deforestation on

1 The Encyclopedia of Biodiversity, edited by Simon Levin (New York: Academic Press), forthcoming, 2000.

Photo: Dilip Banerjee

> "Problems arising from an absence of forward markets for 'transactions; between the present generation and those to appear in the distant future are no doubt ameliorated by the fact that we care about our children's well-being and know that they, in turn, will care for theirs, in an intergenerational sequence. This means, by recursion, that even if we do not care directly about the well-being of our distant descendants, we do care about them indirectly. However, there is a distinct possibility that our implicit concern for the distant future via such recursion is inadequate, due, say, to institutional failure in other spheres of economic activity. This is why economists have argued that market rates of interest do not reflect socially desirable discount rates. In short, market failure involves not only misallocation of resources in the present but also misallocation across time".
>
> **– Partha Dasgupta**

downstream activities hundreds of miles away for instance) or by large temporal distances: "The effect of carbon emission on climate in the distant future, in a world where forward markets are non-existent because future generations are not present today to negotiate with us."

Again, there are atmosphere, aquifers and the open seas, for instance, where the migratory nature of the physical situation "makes private property rights impractical and so keeps markets from existing." In others, he says, "ill-specified or unprotected property rights prevent their existence or make markets function wrongly even when they do exist." This boils down to environmental problems being caused by market failure.

Given the 21st century order of things, it would be worthwhile to examine biodiversity resource valuation from the perspective of agriculture, forestry, non-timber forest produces (NTFP), fishery, carbon sequestration in business, bioprospecting, ecotourism and biofuel. Organic products not only fetch higher market prices, they also conserve some traditional varieties, as in the case of rice in India and, of course, have associated controversy around safety. For agriculture as well as forests there is the very important question of "net present value" that deserves to be determined.

Forest resources have been dismissed as tradable 'timber' till recent times when their value has been officially recognised even though forests are far from being secured. Officially conversion of forest for non-forestry purposes in India is subject to critical scrutiny of the purpose and only allowed after NPV per hectare is paid, hopefully with the view to using the funds to regenerate degraded forest or for new plantation. The private sector is engaged in many forestry programmes, especially companies that need paper or pulp that is the basis of a very prosperous and progressively sophisticated industry and applications. Other takers for forest product are farmers who engage in agro-forestry. Forest communities in Nepal and India generate more than an estimated $3 billion in economic activities annually (Moiner et. al., 2004). Significantly, even Non-Timber Forest Produce (NTPF) featuring medicinal plants, bamboo, rattans, grass and Kendu leaves, wax, resins and such others have been getting their deserved places given their contribution to profit by companies using them. These also represent a significantly growing space in terms of business revenues.

Photo: Jeremy Doorten

biological material used for commercial products.

Ecotourism around biodiversity rich areas is yet another business venture that falls within this space. A recent study shows that in West Bengal, the growth of ecotourism in northern forested area of 'Gorumara' sanctuary vies with the southern mangrove haven in the 'Sundarbans'. Given infrastructural support, this space will grow and nature tourism will emerge as a leading revenue earner for India that offers a vast range of biodiverse regions. The last important element in this space is biofuel that has been taking centrestage ever since it emerged as a source of renewable fuel sources with sugarcane based ethanol and jatropha plantations becoming popular

These developments raise the very important issue of economics of biodiversity. The West Bengal State Biodiversity Board says that 96 industries were identified in the organised space (nearly 50 per cent in the pharmaceutical sector, the rest in the homoeopathic and food processing sectors with two per cent in the cosmetic sector); in Punjab, there are some 257 Ayurvedic drug units; some 350 herbs are used by herbal industries of which 290 are available in Punjab. The Khadi Village Industrial Board too has its own databank on the size of the business and the employment generation potential. The issue is valuing the raw material and ensuring that effective market linkages are provided for them for India's mega-biodiversity is indeed a mega business. At least three sectors relevant to India: Certified Agriculture & Fisheries, Carbon Sequestration through Forestry and Bioprospecting may fetch between $21,000 million per annum and $60,000 million, $100 million and $1,500 million, $17.5 million to $30 million and $35 million, respectively between 2008 and 2010. By 2050, each of these three sectors is likely to show quantum jump.

Several globally best-selling drugs are based on plants and companies are now forced to pay a price for bioprospecting and paying royalty on drugs derived from plants

Fish is the next important element in the biodiversity space with more than 35 million people involved in fishery and aquaculture across the world, according to published estimates and a billion people depending on fish as primary source of animal protein. In India, fish also constitutes an important item in the export basket

Biodiversity secures additional value in the regime in which the importance of the U.N. Framework Convention on Climate Change and the Clean Development Management to offset extra carbon emission is gaining importance. Not only can one encourage the change over to green technology to save energy and reduce emission but one can also secure carbon credits that are tradable and in demand from those who buy them to offset their own high emission rate. India and China are major players in the carbon market and India's carbon credit trading has reportedly touched $100 billion in 2010.

The other segment in this space is bioprospecting that essentially focuses on extracting medicinal value from plants and therefore far greater value; several globally best-selling drugs are based on plants and companies are now forced to pay a price for bioprospecting and paying royalty on drugs derived from successful commercialisation of produce from plants. India has empowered its indigenous communities to levy a fair free for

It is imperative that these elements in the biodiversity space be respected and evaluated for what it is worth if one is to prevent slaughter exploitation. "One by one, perhaps, species may disappear and not be missed. Eventually, however, the cumulative effect of loss of biodiversity will lead to the crash of ecosystem functioning, just as the cumulative loss of redundant rivers will lead to the crash of an airplane," says Das Gupta. ●

ENDEV (Society for Environment and Development) is engaged in surveying natural resources, documentation, field trial and management; and education programmes on various related to environment protection

India surfaces as the world's second largest cotton producer: by doubling production#

India's cotton production doubled as farmers adopted superior Bollgard insect-protection technologies in high-yielding hybrid cotton seeds on over 90 per cent of India's cotton acres and experienced significant insecticide use reduction, yield gains, and increase in income; the greatest benefit from Bt cotton technologies as compared to their peers anywhere in the world*.

Partnering India's cotton revolution - Mahyco-Monsanto Biotech (MMB).

Farmer's Pride. India's Pride.

Bollgard II®

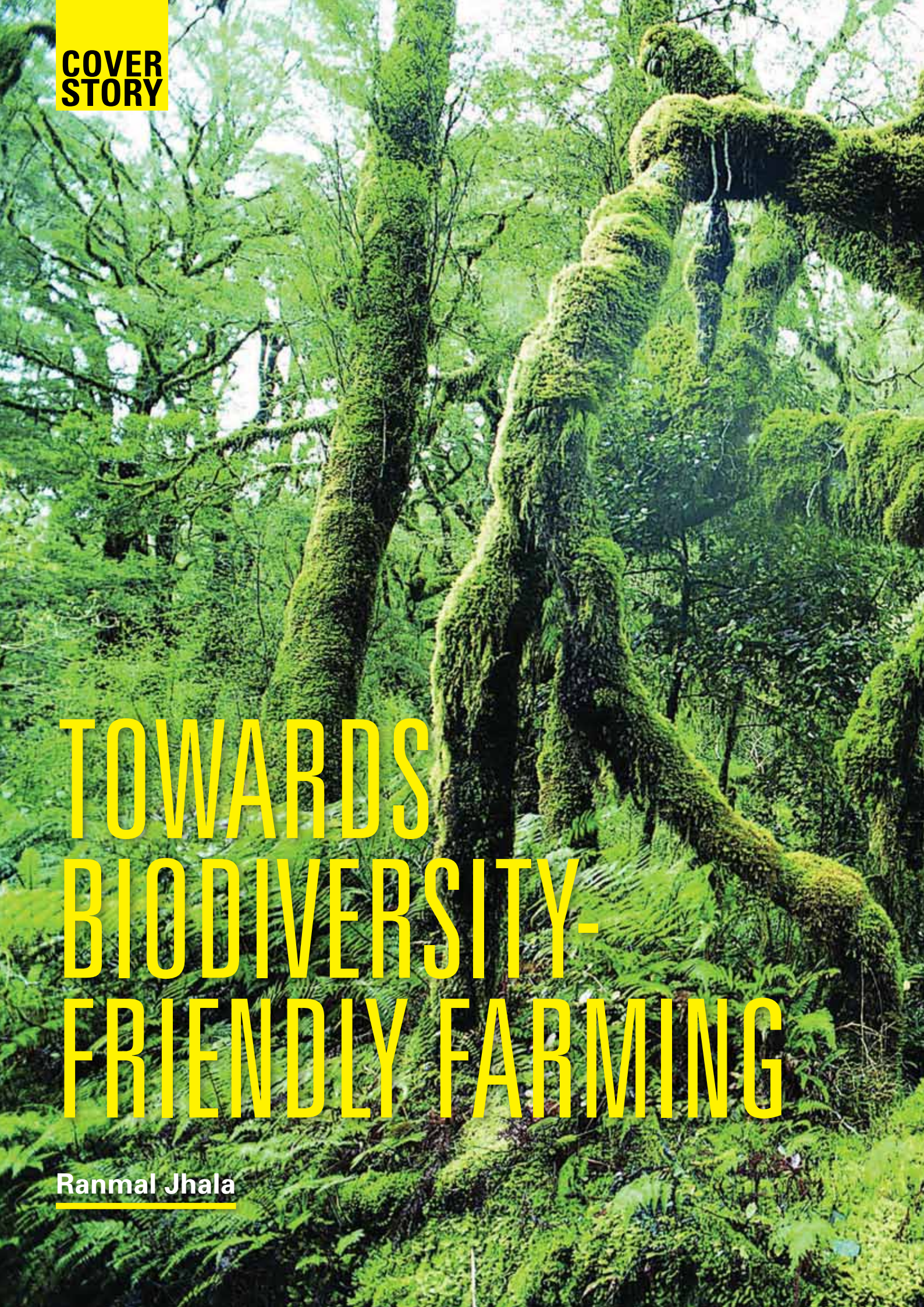
Mahyco Monsanto Biotech (India) Ltd.

#2002-08 *International Cotton Advisory Council

• Bollgard® and Bollgard II® in-the-seed trait technologies provide cotton plants in-built insect protection against bollworms infestation leading to lower insecticide use, better boll retention, and higher yields. • Bt cotton is widely planted around the world as an environmentally friendly way of controlling bollworms, which are known to cause maximum yield loss and economic damage to the cotton crop. • **Mahyco-Monsanto Biotech India Ltd. (MMB), a joint venture between Maharashtra Hybrid Seeds Co. Ltd. (Mahyco) and Monsanto Holdings Pvt. Ltd. (MHPL)** has broadly licensed in-the-seed cotton trait technologies to several Indian companies so farmers can access technologies in the preferred hybrid seeds of their choice. • Bollgard II and Bollgard logo designs are registered trademarks and under the license from Monsanto Company. For information/career opportunities, contact www.mahyco.com or www.monsanto.com.

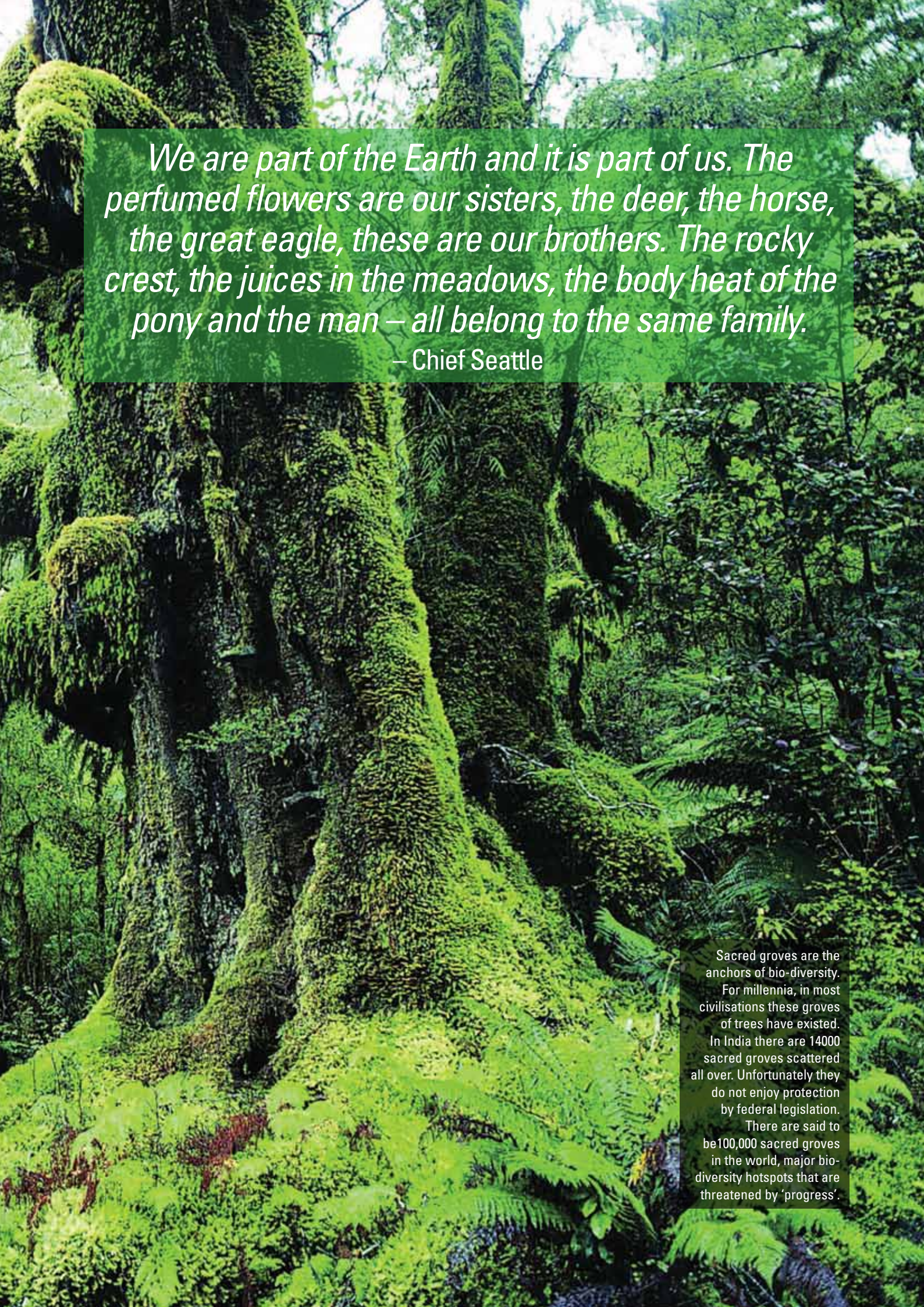
1414B.2011

COVER STORY



TOWARDS BIODIVERSITY-FRIENDLY FARMING

Ranmal Jhala



We are part of the Earth and it is part of us. The perfumed flowers are our sisters, the deer, the horse, the great eagle, these are our brothers. The rocky crest, the juices in the meadows, the body heat of the pony and the man – all belong to the same family.

– Chief Seattle

Sacred groves are the anchors of bio-diversity. For millennia, in most civilisations these groves of trees have existed. In India there are 14000 sacred groves scattered all over. Unfortunately they do not enjoy protection by federal legislation. There are said to be100,000 sacred groves in the world, major bio-diversity hotspots that are threatened by 'progress'.

We are part of the Earth and it is part of us. The perfumed flowers are our sisters, the deer, the horse, the great eagle, these are our brothers. The rocky crest, the juices in the meadows, the body heat of the pony and the man – all belong to the same family. – Chief Seattle

Biodiversity-friendly farming may sound like an oxymoron to the votaries of the Green Revolution but it is an option that deserves serious consideration. Today, the world – and India specially – faces Herculean challenges: A burgeoning population, a looming food security crisis and exponentially increasing threats to the web of life. Policymakers need to not only dismantle and replace the prevailing, unsustainable and 'un-ecological' agricultural systems on a global scale but also address the burning issues of environmental degradation caused by modern industry, urbanisation, auto-mobilisation and the humongous treadmill of consumption. All of these are disastrous for biodiversity and, of course, air, water, soil and rocks. Dismantling is easier said than done but if the progeny is to be cared for, there must be action on a war footing.

Consider the trajectory of the evolution of life on earth till the present; examine the evolution of agriculture from pre-historic days till now and assess the merits and demerits. Farming is not restricted to the land alone but is also aquatic and marine. What are the main threats to biodiversity today and then what are the alternative solutions? Some 4.3 billion years ago, when planet Earth was born, there were no living forms as the conditions were unsuitable for life. About three billion years ago, primitive life began in the water. Since then it has evolved into myriads of species both in water and on land. The planet has also seen five mass extinctions, the last being 65 million years ago when the dinosaurs disappeared. The next one could be caused by either by a huge meteorite colliding with the Earth or by some human factors.

The way humans are behaving, to the sixth mass extinction may well be near – in the form of a nuclear holocaust, climate-weirding or when a critical point in the degradation of air, water or soil is reached, leading to a proliferation of natural catastrophes. These are already on the rise – tornadoes, tsunamis, earthquakes, heat waves, acidification of the oceans and so on. Man may lose control over external forces but as far as catastrophes triggered by humans are concerned, there is the choice to shift the course away from the present trend, which has brought lives to the tipping point. For this to happen, there is a desperate need to shift away from the present collective mindset – predominantly anthropocentric – to find resonance with other life forms and co-exist in harmony with the planet's biodiversity (See box).

Importance of biodiversity

The point is that were all the insects to disappear from the earth, there would be no life on Earth but were humans to disappear, other life forms would flourish. Humans have used a wide range of natural resources for millennia, ranging from all

Photo: Frédéric Dupont

Classification of Biodiversity

MONERANS (single-celled creatures without nuclei) – 4,000 (*e.g. bacteria, blue-green algae*)

PROTISTS (single celled creatures with nuclei) – 50,000 (*e.g. amoebas, diatoms*)

FUNGI – 100,000 (The latest figure is over 13,000,000; *e.g. slime moulds, true fungi*)

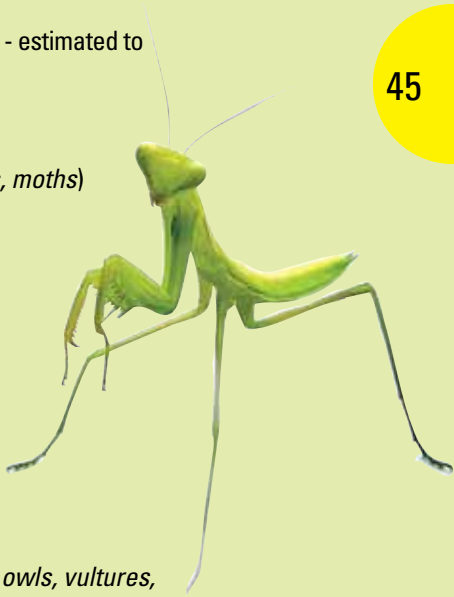
PLANTS

Green Algae – 6,000 (*e.g. sea lettuce*)
Red Algae – 4,000 (*e.g. crimson-tuft seaweed*)
Brown Algae – 2,000 (*e.g. sugar kelp*)
Mosses and Liverworts – 10,000 and 14,000 (*e.g. bog moss, pellia liverwort*)
Club mosses – 400 (*e.g lycopodium*)
Horsetails – 30 (*e.g. common horsetail*)
Ferns – 1,200 (*e.g. buckler fern, stagshorn fern*)
Conifers – 300 (*e.g. deodar, chilgoza pine, cypress, spruce, etc.*)
Flowering Plants – 250,000 (*e.g. orchids, gulmohur, amaltas, the ficus varieties*)

ANIMALS

Sponges – 10,000 (*e.g. breadscrumb sponge*)
Jellyfish and Sea Anemones – 10,000 (*e.g. Portugese man of war, corals, hydras*)
Bryozoans – 4,000 (*e.g. sea mat*)
Flatworms – 25,000 (*e.g. flukes, tapeworms, free-living flat worms*)
Nematoides and Rotifers – 20,000 and 1,500 (*e.g. rotifers, pig hookworms*)
True Worms – 14,000 (*e.g. earth worms, leeches*)

ARTHROPODS Invertebrates with an exoskeleton, a segmented body, and jointed appendages - estimated to be 1,400,000 species
Millipedes – 7,000 (*e.g. spotted snake millipedes*)
Centipedes – 1,500 (*e.g. garden centipedes, burrowing centipedes*)
Insects – about 1,000,000 (*e.g. ants, bees, beetles, butterflies, cockroaches, dragonflies, fleas, moths*)
Spiders and Scorpions – 100,000 (*e.g. tarantulas, tremble spiders, mites and ticks*)
Crustaceans – 25,000 (*e.g. barnacles, crabs, shrimps, lobsters, prawns, water lice*)
Molluscs – 100,000 (*e.g. slugs, snails, bivalves, octopuses, cuttlefish and squids*)
Starfish and Sea Urchins – 6,000 (*e.g. brittle stars, cushion stars, sea urchins*)



CHORDATES The so-called higher animals with vertebrae
Jawless Fish – 60 (*e.g. hagfish, lampreys*)
Sharks and Rays – 600 (*e.g. manta rays, sting rays, lesser-spotted dogfish, sharks*)
Bony Fish – 20,000 (*e.g. herrings, slender eels, pomfret, salmons, sardines, tunas*)
Amphibians – 3,500 (*e.g. frogs, toads, salamanders, caecilians*)
Reptiles – 5,000 (*e.g. tortoises, turtles, snakes, lizards, crocodiles, alligators*)
Birds – 9,000 (*e.g. ducks, swans, crows, larks, sparrows, eagles, hawks, grouses, pheasants, owls, vultures, pigeons, doves, geese*)

MAMMALS Members of a class of vertebrates with mammary glands for feeding their young – 4,000
50 per cent - Rodents – 2,000 (*e.g. rats, mice, voles, squirrels, beavers, porcupines, guinea-pigs*)
25 per cent - Bats – 1,000 (*e.g. flying foxes, vampires*)
Bats are the only flying mammals, flying with their babies clinging on to their mothers, something birds cannot do. (They are legally treated as vermin. Without them a lot of plants would not get pollinated!)
25 per cent are the rest of the mammals – 1,000 (*e.g. elephants, shrews, moles, hedgehogs, armadillos, anteaters, sloths, rabbits, hares, pikas, whales, dolphins, porpoises, Carnivores (which include tigers, lions, panthers and cheetahs), Odd-toed Ungulates(which include zebras, rhinos, horses and asses), Even-toed Ungulates (which include camels, hippos, antelope, deer and giraffes), Primates(which include lemurs, bush-babies, monkeys, apes and humans*)

Source: Gerald and Lee Durrell; Amateur Naturalist, 1982. The figures indicate the number of species under each head.

manner of animal and plant matter to minerals, metals, water, oil and natural gas. The focus here is on how man has affected other living forms or the whole gamut of biodiversity.

For a long time, humans could make do with hunting and gathering; the basic plant foods were present in the wild state. So were the basic animals. The rainfall was adequate for grains to grow. Then came agriculture around 8,000 B.C. (Neolithic period) when hunter-gatherers began discovering the secrets of agriculture; the relationship of seeds to plants. Till then man depended on animals and fish and wild plants for food. Fish was the first staple food of this Neolithic Revolution. In the rough agricultural patches or human-made meadows wandered herds of grazing animals. An infant lamb or kid may have been captured as a playmate for children. Women would also nurture them. Keeping pets was the initial stage of domesticating animals. Animal husbandry followed.

Over the next 5,000 years, as farming gradually became established, settlement sizes increased. This was accompanied by simple irrigation methods for farming but the advent of agriculture transformed the face of the earth. Ownership of land and the amassing of wealth led to conflicts and wars. Agriculture too diversified from growing cereals and vegetables to animal husbandry, poultry, dairy, fish farming, growing cotton and rearing sheep and silk worms for clothes. Harvesting fibres for baskets, architecture, fishing nets, oils for lamps and cooking became commonplace. By altering their natural environment through tilling and exploiting the earth's surface and cutting forests, humans set in motion the process of erosion that wasted the soil and created deserts and wastelands. This was the beginning of changing the balance of existing eco-systems. This was followed by selection of higher yielding or better-quality wild plants and selective breeding as has been happening for millennia. These highly-evolved plants are today called cultivars and hybrid crops.

There is a myth that population pressures require modern, technology-based agricultural solutions for widespread hunger. Hunger is caused by inequitable distribution of wealth; it is a socio-political problem. Large quantities of food grain rot or are eaten by rodents every season due to inadequate storage facilities. On the surface this appears to be a problem of mismanagement. It is by design that food grain is allowed to rot and even ferment and then sold for a pittance to the liquor industry!

In the last two hundred years technologies have became more advanced. With the advent of tissue culture, genetically modified crops, terminator technology and patent mafias, the threat to biodiversity has increased manifold. Mangroves are destroyed for modern prawn farming and more than 90 per cent of marine fish cannot survive without mangroves. These marine trees are closely linked to the fish's life cycle. Loss of mangroves leads to a loss in the fish catch for smallscale fisherfolk. Mangroves also protect coral reefs. Coral eco-systems are highly

Ancient farmers took cues from the movement of the sun, moon, planets and the constellations to tell them when to sow, prune, pluck and harvest. – Rudolph Steiner

fragile. With the seas rising, they are among the most endangered in our biodiversity.

Anthropocentricity and human needs and greed have grown exponentially since the hunter-gatherer days. Man is now transiting from the Palaeo-Cybernetic Age (Industrial Age) to the Neo-Cybernetic Age (Information Age). If biodiversity has to be saved from the sixth mass extinction, a collective change in thinking and action is the only hope. This may happen via an information revolution through cyber space.

With globalisation, the MNCs have entered the fray in developing countries. The policies are shifting towards largescale, mechanised farming and phasing out or displacement of small and traditional farmers. Monocultures, chemical fertilizers and pesticides are the order of the day. Artificial pesticides kill the natural enemies of the pests. They also kill bees that are natural pollinators. It is estimated that 300,000 people die of pesticide poisoning annually. The story of BT Cotton and expensive pesticides leading to farmer suicides is well known. Fish and shrimp farming in paddy fields in Indonesia was practically eliminated after the introduction of pesticides.

At present, every minute, 50 tonnes of fertile soil are eroded from croplands and 51 acres of tropical forest are destroyed. Every hour, 1,800 children die of malnutrition and hunger (15 million per year) and 1,692 acres of productive land becomes desert. Every day 230,000 babies are born and five species become extinct. Global food production will need to double by 2050 to head off mass hunger. Unless we resort to farming methods that are in resonance with nature, meeting the food requirements for the world will become increasingly difficult.

Non-industrial farming

Ancient farmers took cues from the movements of the sun, moon, planets and constellations to know when to sow, prune, pluck and harvest. In India, a farmers' almanac called the *Krishi Panchang*, which is based on ancient traditions, began getting printed in 1879. This astronomical lunar

calendar became a guide, which incorporated the traditional agricultural wisdom and is used till this day. Hydroponics is a technique that has evolved since the early 17th century. It allows one to grow plants using mineral nutrients in water, without soil. Organic Hydroponics is also an alternative to chemical farming. These methods were by and large biodiversity friendly. In the last century, there have been some great visionary thinkers and crusaders who have questioned and opposed modern farming. (***Farmers' Forum*** has published a detailed account of the work of Sir Albert Howard)

Rudolph Steiner, another pioneer, was the founder of Bio-Dynamic Farming, which is an inter-dependent development of soil, minerals, plants and animals by human beings to obtain agricultural products that are socially responsible, ecologically friendly and economically self-sufficient. Bio-Dynamics is a science of life-forces which recognises the Earth as a living organism. It is an approach to agriculture based on respect for nature and aims to achieve sustainable living and harmony with the primary elements. Steiner said that as long as one feeds on food from unhealthy soil, the spirit will lack the stamina to free itself from the prison of the body.

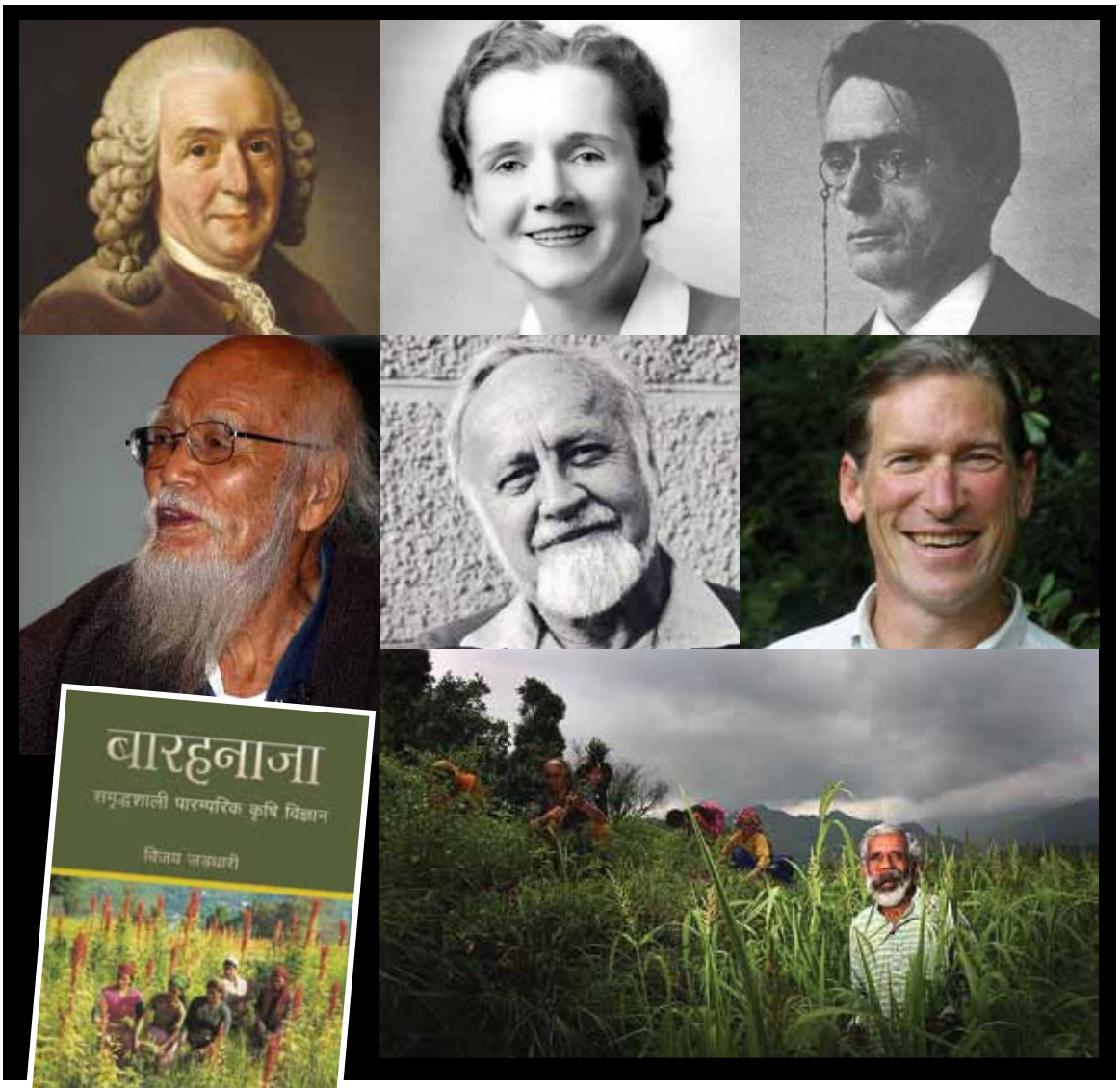
In Japan, Masanobu Fukuoka was the proponent of no-till, no-chemicals grain cultivation methods that had been practiced by many indigenous cultures. He was the originator of Natural Farming, or Do-Nothing Farming. In Australia, Bill Mollison and David Holmgren developed a system called Permaculture, which worked towards self-sufficiency and sustainability. It has high productivity,

The holistic recycling of wastes for manures range from using human faeces and urine to kitchen wastes. The other options are vermi-composts and leaf manures

Photo: Ieva Verikaite

consumes low energy and sees waste resources as assets. China has a rich tradition of the Rice-Azolla-Fish system. This is a three-tiered system, where there is the Azolla growing on top, the fish in the water and the rice growing out of the soil below. Azolla is a free-floating aquatic fern, which houses blue-green algae, which fixes atmospheric nitrogen. Azolla is an excellent bio-fertilizer as well as a rich form of cattle feed. Traditionally crop rotation replenished the soil's nitrogen by planting legumes in between other crops.

To conserve biodiversity, one can use a range of bio-fertilisers and natural pesticides. The holistic recycling of wastes for manures range from using human faeces and urine to kitchen wastes. The other options are vermi-composts and leaf manures. Organic farmers minimise the use of pesticides. They avoid mono-culture farming that increases resistance to pests. Rotation of crops helps to maintain the ecological balance in the soil. However, when organic farmers need to use pesticides they do not use synthetic ones. Natural pesticides are derived from neem, tobacco leaves, sulphur or copper. All these farming methods work with Nature, rather than against it and hence are biodiversity-friendly. With a rapidly growing population, the major concern today is food security. The challenge is to have adequate food



Clockwise from Left: 1. Carl von Linnaeus, better known as Carolus Linnaeus(1707- 1778), was the Swedish scientist who proposed the first adequate method for classifying all species in the web of life. **2.** Rachel Carson (1907-1964) was an American marine biologist and conservationist whose writings are credited with advancing the global environmental movement. **3.** Rudolph Steiner (1861-1925) was an Austrian philosopher, social reformer, architect and esotericist. **4.** Masanobu Fukuoka (1913-2008) was a a Japanese agricultural scientist, farmer and philosopher, celebrated for his Natural Farming Method. **5&6.** BIll Mollison and David Holmgren are Australians who developed an agricultural system called Permaculture. This is a philosophy of sustainably working with, rather than against Nature. **7.** Barahnaja literally means twelve seeds. It is a centuries-old agrarian tradition in the Garhwal Himalaya an agro-biodiversity hotspot. **8.** Vijay Jardhari is a farmer and social activist, the founder of the Beej Bachao Andolan in 1983. He has a herbarium of about 150 cultivars of traditional paddy and other food grains.

production that will meet the growing needs in a sustainable way without harming biodiversity.

There is a myth that population pressures require modern, technology-based agricultural solutions for widespread hunger. Hunger is caused by inequitable distribution of wealth; it is a socio-political problem. Large quantities of foodgrain rot or are eaten by rodents every season due to inadequate storage facilities. On the surface this appears to be a problem of mismanagement. It is by design that foodgrain is allowed to rot and even ferment and then sold for a pittance to the liquor industry!

The other myth is that organic farming has lower yields. In their report 'Health per acre', Vandana Shiva and Vaibhav Singh present evidence that organic farming can produce more health and nutrition per acre while also increasing the farmer's income. The U.N. has submitted a report to the General Assembly stating that ecological agriculture could double food production in a decade. Apart from alleviating poverty and hunger, it would free farmers from debts and suicide. Above all, it would free the environment of toxins and hence benefit biodiversity.

Were all the insects to disappear from the Earth, there would be no life left on the planet but, were humans to disappear, other life forms would flourish.

The genetic base has become frighteningly low. South Asia had 500,000 varieties of rice. Most have been wiped out. This is true of many crop species. A greater variety of species harbour more bio-diversity and natural predators. Monocultures are more prone to pests. A million people died and two million migrated to America during the Irish potato famine of 1840, which was caused by a fungus called potato blight.

A Global Seed Vault was set up in Svalbard, Norway in 2004, to protect precious plant genes against the vagaries of climate, politics and human error. The goal is to store every kind of seed from every collection on the planet. In the U.K. there is the Millennium Seed Bank, home to the Doomsday Vault, which endeavours to safeguard against apocalyptic disasters. It is also an archive of plant history.

India has the National Bureau of Plant Genetic Resources and the National Bureau of Animal Genetic Resources, which are two nodal organisations under the ICAR, whose objectives are to exchange, quarantine, collect, conserve, evaluate and systematically document the plant and animal resources. Outside the government domain, in Jardhargaon, Uttarakhand, a quiet revolution took place in 1983 with the launch of the Beej Bachao Andolan. The Andolan (movement), spearheaded by Vijay Jardhari, a Chipko activist, has revived many lost knowledge systems by conserving many varieties of indigenous seeds of rice, kidney beans, wheat, millet, many of which were considered extinct. This was done by door-to-door collection of seeds, which can withstand pests and extreme weather conditions. Perhaps, there is need a broader genetic base to cover as wide a range of biodiversity as possible to include species that may not seem to be of immediate use.

The Book of Trees by Risto Isomaki and Menaka Gandhi focuses on the significance of trees for alleviating hunger and dealing with climate change as well. It mentions that in his old age, Mahatma Gandhi decided to only eat food that was produced by trees, besides goat's milk. Many of his followers did not get the point but the Mahatma was more far-sighted than most people. Another giant of human history, the Buddha, had also emphasised the importance of food from trees.

Trees can produce, for the same area of land, more food than other kinds of food-producing plants, especially if various trees of different sizes are grown together. They can produce food in rocky marginal soils, mountain slopes and dry lands, where ordinary field farming is impossible. Most tree species produce food even during drought or floods or during periods of war when cultivation of annual crops is interrupted by mindless fighting. Besides, trees have many other advantages over conventional crops. Firstly, they are much taller and can collect a larger amount of sunlight and carbon dioxide from the air. Secondly, because trees have deeper roots they can collect moisture and nutrients from deeper soil layers.

Only when the last tree is cut and the last river is poisoned and the last fish is dead, will we realize that we cannot eat money. – A 19th Century Cree Indian Prophecy

There are 250,000 to 300,000 plant species in the world. Of these 10,000 to 50,000 are edible in their wild forms. Others could be made edible through selective breeding. Baobabs are majestic trees that produce nutritious fruits, nuts and leaves for human consumption. There are 200 wild tree species and 120 wild shrubs that produce edible fruits, nuts and berries in the Hindukush-Himalaya region. Many oil-seeds come from trees. For instance, olives, avocados, oil palms, marula and mongongo provide edible oils that are good for the heart.

Forest scientists promote trees for timber and wood pulp. Agriculture experts concentrate on annual crops. Horticulture, Pomology (study of fruit trees) and Myco-forestry (science to enhance forest eco-systems), marine farming are under-

Photo: Christa Richert

There are 250,000 to 300,000 plant species in the world. Of these 10,000 to 50,000 are edible in their wild forms. Others could be made edible through selective breeding. Baobabs are majestic trees that produce nutritious fruits, nuts and leaves for human consumption. There are 200 wild tree species and 120 wild shrubs that produce edible fruits, nuts and berries in the Hindukush-Himalaya region.

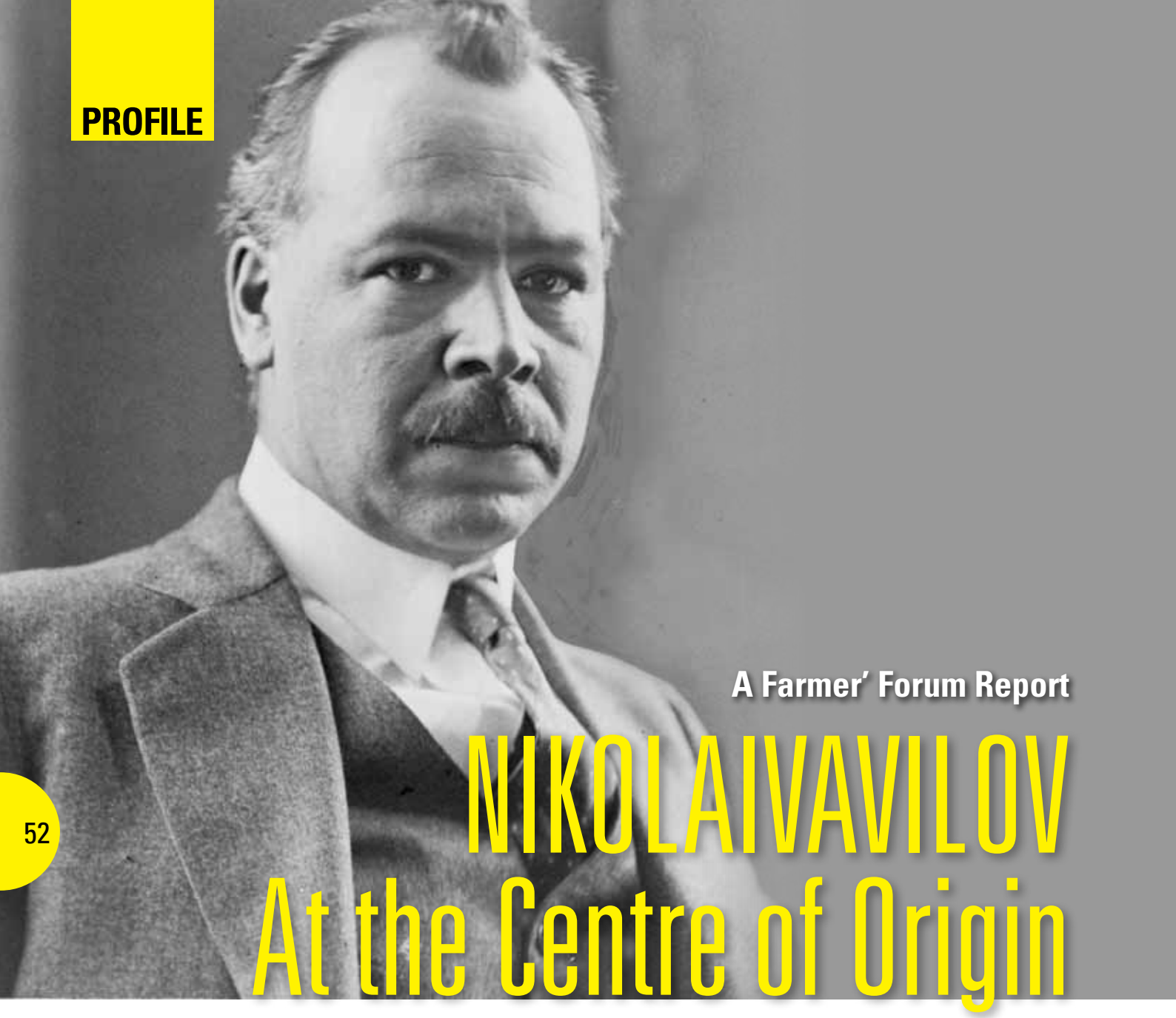
stressed. There is a need for a shift to trees and plants that provide food, spices, edible fungi or edible oil seeds. Myco-forestry has begun an underground revolution where edible fungi are grown in the root systems of trees and plants. Ectomycorrhizal fungi are not only edible but they also have a symbiotic relationship with trees and enhance soil fertility. Marine farming has a great potential for growing food. One example is the cultivation of giant edible seaweeds, fast growing kelp or algae that grow to 70 metres or more. The sea is a vast unexplored frontier, which could take the load of food production off the land but people's palates have to be trained to appreciate such food.

The problem of pressure on the land is compounded by the production of biofuels for cars and trucks, wood for paper mills, fodder for cattle and pigs (as meat consumption has increased tremendously). Annually, at least 15,000 sq kms of the Amazon forest are being cleared to cultivate soya beans to feed the cows and pigs for multinational food chains, as well as for mining. Eighty per cent of India's native forest cover has been lost to mining, industry, urbanisation and auto-mobilisation. The tipping point may already have been reached. Indonesia loses a million hectares of forests annually. All this means a huge loss of biodiversity.

Only 8-10 per cent of the world's land area is currently being cultivated, which includes a large majority of existing quality farmlands. According to the World Watch Institute, in 2004, 65 per cent of all agricultural land in Africa, 45 per cent in South America and 38 per cent in Asia was degraded. The current figures must be higher.

Tree crops, however, could theoretically be grown on at least 75 per cent of the world's land area. This might be critical to do as pressures on our present food production systems are increasing at a frightening speed. By growing food-producing trees, perhaps we could make hunger and malnutrition things of the past. Biodiversity-friendly farming or tree/forest farming seems to be the option. ●

The author is an environmentalist, educationist and a graphic designer



A Farmer' Forum Report

NIKOLAIVAVILOV
At the Centre of Origin

Nikolai Vavilov (November 25, 1887-January 26, 1943) was a Russian botanist, plant-breeder, geneticist, geographer and science organiser, inspired by his own vision of ending global hunger. Genetics as a science was in its infancy then and the young Vavilov pursued his dream of breeding super plants that could grow anywhere, in any agroclimatic zone – from the Sahara to the Tundra – in what he described as a "mission for all humanity". Vavilov's dream was just what Russia, under Lenin, needed and the young plant geneticist built the world's first seed bank featuring a quarter of a million specimens: a gloriously alive museum of plant diversity!

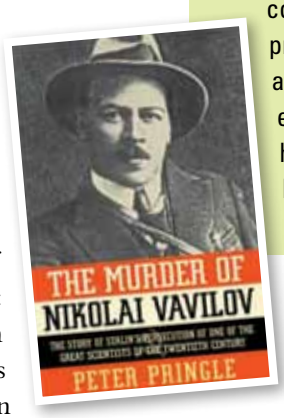
Vavilov joined the Agricultural Academy at Petrovsko-Razumovskoe and, between 1913 and 1914, studied at the School of Agriculture, Cambridge University, under Sir Rowland Biffen and at the John Innes Horticultural Institution, working with William Bateson, a pioneer geneticist. He then moved to France to a large seed-growing farm, from where he continued to Germany to study scientific innovations in agriculture there. Vavilov burst upon the scientific community with his papers on the immunity of cereals from fungus diseases, explaining immunity in terms of Mendelian factors, systematics and plant physiology. In 1926, he first conceived of a gene bank to obviate the disappearance of species, given the rapidly-dwindling biodiversity in the world.

It was on an expedition to Abyssinia (now Ethiopia) in 1926 that Vavilov realised that he was in a rare location where the wild relatives of the current food crops had first been domesticated. Later, he mapped out seven "centres of origin of cultivated plants", which he described as the ancient birthing grounds of agriculture. "It is possible to witness there", he wrote, "the great role played by

Vavilov had established that the greatest genetic diversity of wild plant species would be found near the origins of modern cultivated species

man in the selection of the cultivated forms best suited to each area". His famous 'The Centres of Origin of Cultivated Plants' (1926) followed and Vavilov had established that the greatest genetic diversity of wild plant species would be found near the origins of modern cultivated species. Till 1935, he organised expeditions to remote corners of the world to collect, catalogue and preserve specimens of plant biodiversity; seeds were gathered from five continents; from the wild relatives and unknown varieties of the crops that one consumed. The mission was to preserve genes that conferred such essential characteristics as disease and pest resistance and the ability to withstand extreme climate conditions. Then came the Research Institute of Plant Industry in St Petersburg, the first global seed bank, symbolically housed at a former Czarist palace!

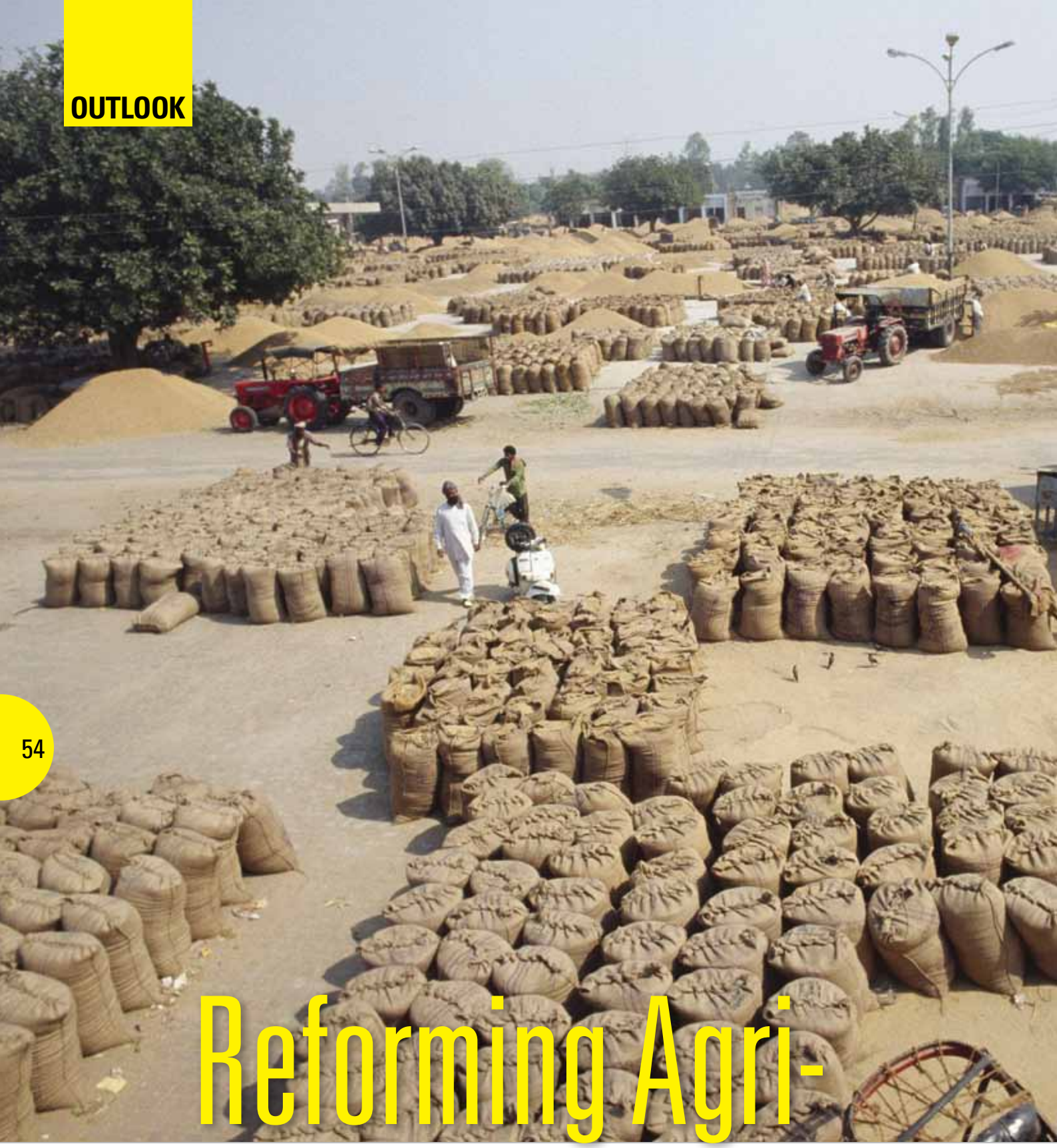
Lenin, who understood Vavilov's genius, gave him the freedom to flourish as he evolved as a powerful advocate and organiser of scientific institutions. Vavilov was director, Institute of Applied Botany (1924-1929); member, USSR Academy of Sciences; director, All-Union Institute of Plant Breeding (1930-1940) and the Institute of Genetics (1933-1940), vice-president and president, Lenin All-Union Academy of Agricultural Sciences (1929-1938); president, All-Union Geographical Society (1931-1940).



Stalin's agenda was quite different and Vavilov's uncompromising opposition to the falsification of genetic science propagated by Trofim Lysenko and his followers led to his arrest in 1940. His death sentence was commuted to a 20-year prison term in 1942. In 1943, one of the world's foremost authorities on the potential cures for famine died of starvation in a prison camp on the Volga.

By this time, Hitler's army had already closed in on St Petersburg (then Leningrad) – a desperate city that had lost more than 70,000 people to hunger and disease. The Soviets had ordered the evacuation of art from the hermitage anticipating a German attack but had done nothing to safeguard the 4,00,000 seeds, roots and fruits stored in the world's largest seed bank. It was left to a group of scientists at the Vavilov Institute to box up a cross section of seeds, move them to the basement and take shifts to protect them. Historical documents revealed that Hitler had, in fact, established a commando unit to seize the seed bank, perhaps hoping to control the world's food supply one day. Though starving, the seed's caretakers refused to eat what they saw as their country's future. Indeed, by the end of the siege in the spring of 1944, nine of the institute's self-appointed seed guardians had died of starvation. ●

Recommended reading: *The Murder of Nikolai Vavilov* by Peter Pringle, who recreates the extraordinary life and tragic end of one of the great scientists of the 20th century. Pringle uses the now open Soviet archives, including Vavilov's secret police file, official correspondence, vivid expedition reports, previously unpublished family letters and diaries and the reminiscences of eyewitnesses to bring an intensely human story of a brilliant life cut short by anti-science demagogues, ideology, censorship and political expedience



Reforming Agri-Marketing Reforms

J. S. Yadav

Photo: © Dinodia Images

India's agriculture sector is at the core of the economy's purchasing power; its produce is the most important component of the Indian commodity sector. A large number of state and central level institutions are engaged in agricultural marketing, employing technical manpower, with functional and commodity specialisation. Additionally, co-operatives, processors, financiers, service providers and consultants contribute to agricultural marketing. Fisheries, livestock, horticulture, poultry, dairy and forest produce are the other specialised areas with their own marketing angularities to which new dimensions have been added by organic farming, contract farming, group farming and farmers' companies. The advent of globalisation and WTO prompted challenges have distorted agricultural marketing further. These changing mechanics of agri-marketing have lent special significance to its policy framework.

Promoting vibrant competitive marketing systems means that the government needs to examine all existing policies, rules and regulations and remove legal provisions inhibiting a free marketing system. Today, state governments alone are empowered to initiate the process of setting up markets for certain regulated commodities and for certain areas in which the regulation is enforced. These provisions will have to be replaced an omnibus provision enabling everyone to set up a market, provided minimum standards, specifications, formalities and procedures, as laid down by the Government of India are complied with and getting dedicated area accordingly notified.

Need for reforms and a model Act

There was a felt need to bring reforms to make the government administered marketing organisations financial viable and managerially competent in keeping with the liberalised trade atmosphere. The marketing activities are manifold and need liaison and collaboration with related organisations. Market committees, including sub-yards, should be headed by professionals and existing secretaries need to be trained in professional management of the markets. The functions of APMC and marketing boards need to be remodeled accordingly. The draft model legislation, the State Agricultural Produce Marketing

(Development and Regulation) Act, 2003, provides for the establishment of private markets/yards, direct purchase centres, consumer/farmers markets for direct sale and promotion of public private partnership in the management and development of India's agricultural markets.

- It provides for the constitution of special markets for commodities like onions, fruits, vegetables and flowers among others.
- A separate chapter has been included in the legislation to regulate and promote contract-farming arrangements in the country.
- It provides for prohibition of commission agency in any transaction of agricultural commodities with the producers.
- It redefines the role of the present Agricultural Produce Market Committee to promote alternative marketing systems, contract farming, direct marketing and farmers/consumers markets.
- It redefines the role of State Agricultural Marketing Boards to promote standardisation, grading, quality certification, market-led extension and training of farmers and market functionaries in marketing related areas.
- It provides for the constitution of State Agricultural Produce Marketing Standards Bureaux for promoting grading, standardisation and quality certification of agricultural produce. This would facilitate pledge financing, e-trading, direct purchasing, export, forward/future trading and introduction of negotiable warehousing receipt system for agricultural commodities.

Agriculture being a state subject, it is the responsibility of respective states to take steps for reforming their marketing structures. Now that many states have introduced some reforms in agricultural marketing, the need of the hour is to consolidate the gains of reforms through appropriate policies and plans. The Model Act has been implemented since 2004 and the first phase of reforms is about to be completed. However, no significant efforts have been made to study the impact of these reforms and determine if they are fulfilling their purpose or are only making the processes more complex. A detailed analysis of the changes proposed and their execution is necessary to evaluate the agricultural marketing system and justify the efforts and resources (including time) devoted to introducing important reforms and amendments in the proposed Model Act.

In line with the reforms suggested, states have brought amendments in some of the areas

APMC officials agree that there is an APMC monopoly, which leads to political influence. Private markets will give the farmers another option for selling their produce

Photo: Eva Schuste

mentioned in acts/rules but most states are in the process of implementing them. The status of reforms in the country is summarized below:

Progress of reforms in agricultural markets (APMC Act)

† States/UTs where the APMC Act has been reformed to make for direct marketing; contract farming and markets in the private and co-operative sectors: Andhra Pradesh, Arunachal Pradesh, Assam, Chhattisgarh, Goa, Gujarat, Himachal Pradesh, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Nagaland, Orissa, Rajasthan, Sikkim and Tripura.

† States/UTs where the APMC Act has been partially reformed:
- Direct marketing: NCT of Delhi.
- Contract farming: Haryana, Punjab and Chandigarh.
- Private markets: Punjab and Chandigarh

† States/UTs where there is no APMC Act and which do not require amendments: Bihar (APMC Act repealed from September 2006), Kerala, Manipur, Andaman & Nicobar Islands, Dadra & Nagar Haveli, Daman & Diu and Lakshadweep.

† States/UTs where the APMC Act provides for reforms: Tamil Nadu

† States/UTs where administrative action has been initiated for the reforms: Mizoram, Meghalaya, Haryana, J&K, Uttarakhand, West Bengal, Puducherry, NCT of Delhi and Uttar Pradesh.

Status of agricultural marketing reforms

A study undertaken in June 2010 by Premium Farm Fresh Produce Ltd, the country's first private wholesale market developing company, to assess the impact of these reforms across the country also tried to understand the perceptions of the stakeholders and identify the major gaps between provisions and their implementation at the ground level. It paves way for the second phase of reforms and the identification of a conducive policy environment and improvements required in the marketing system. A total of 300 samples of farmers and traders, including 60 APMC officials and 20 private investors were selected across the states of Rajasthan, Gujarat, Karnataka, Andhra Pradesh, Maharashtra, Tamil Nadu, Punjab, and Himachal Pradesh. The study analysed the following aspects of reforms in the Model Act in identified/ selected states.

- Provision to promote and encourage PPP in management of markets and e-trading

- Provisions on indemnity against the alienation of producer's land on failure of contract farming
- Provision specifying a model agreement format for contract farming
- Provision for single-point levy of market fee in the state
- Registration of market functionaries (not licensing)
- Provision for single-point registration for trade and transaction in more than one market area
- Provision for prohibiting commission agents in the APMCs
- Provision for setting up of producer/consumer markets (being facilitated through exemption clause) and dispute settlement mechanism for private markets/direct marketing
- Provision for setting up of a separate market extension/training cell and the agricultural produce marketing standards bureau
- Identifying Acts amended but respective rules not notified
- Provision for notification of market area for private markets.
- Provision for strengthening backward-forward linkages by declaring value added centres (collection centers) such as sub-yards of private markets.
- Provision for level playing field between private markets and APMCs and maintaining market fee parity.
- Provision of developmental issues (preamble focused)

Major findings

† Farmer awareness of PPP and about the establishment of separate market extension/ training cell and State Agriculture Marketing Bureaus (SAMB) is nil in all states.

- In Tamil Nadu, Karnataka and Andhra Pradesh, however, there is 100 per cent awareness about direct marketing and farmer/consumer market.
- Few farmers know about private wholesale markets.
- Even in a state like Maharashtra, where the country's first private market (Premium Market) has started operations, the awareness level was only 13 per cent.
- In Maharashtra, Gujarat, Rajasthan and Andhra Pradesh a number of traders were aware that the Model Act prohibits commission agents. In other states, none of the respondents knew about this reform.
- The respondents in all states were completely unaware about the provision for establishment of State Agricultural Marketing Standards Bureau and single-point registration/licensing of functionaries.
- Even the awareness level for private wholesale markets was low in all states except Gujarat, where 80 per cent of the traders were aware of the reform.

† The farmers do not deny the multifaceted role played by commission agents. The survey reveals that in Punjab they are all dependent on commission agents for inputs, especially seeds. Most CAs provide them with interest-free credit. In many cases, the farmers are dependent on CAs for market information as well. In spite of these contributions, about 85 per cent of the farmers want CAs to be prohibited because they charge more than the APMC-prescribed commission, provide inadequate market information. Besides, there is interlocking because of the the credit taken.

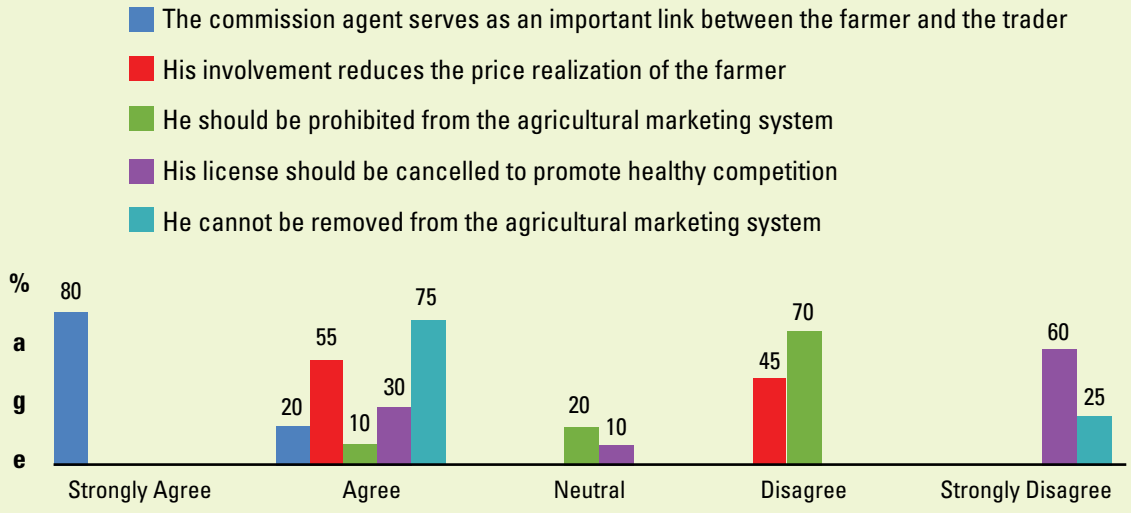
† About 55 per cent of the traders agree that their involvement reduces the farmer's price realization. Most believe that apart from acting as the most important link between farmers and traders, the CAs provide them with credit facilities (with or without interest), supply inputs (especially seeds) and such like on which most agriculture business runs. Banning CAs will give rise to questions around who would provide credit and risk lending money without collateral.

† No farmer involved in contract farming is aware of any dispute settlement mechanism as laid down by the law. He does not know where and whom to complain to and is unaware that the laid down provisions can help him resolve issues within 15 days.

† On an average, 80 per cent of APMC officials revealed that contract farming has led to transfer of new technology on inter-cultivation operation, new improved seeds, good fertilizers, quality chemicals along with expert guidance. They all agreed that if contract farming is done in strict accordance with rules and regulations and with some modification in existing rule about rates fixation, it will help farmers as well as the sponsors (farmers will be assured of price and sponsors of qualilty and quantity of produce). On an average, 75 per cent of the private investors feel that farmers benefit from contract farming by getting better prices while 90 per cent say that they benefit through technology transfer.

† In all states except Rajasthan more than 85 per cent of the traders want a separate agriculture produce marketing standard bureau that, they

Perception about Importance of Commission Agents



believe, will help trading because the absence of grading and lack of uniformity even in a single lot leads to problems around fixing rates. Also, the farmers are at a loss because of improper grading and standardization. Many APMC officials agreed that a state agricultural marketing standards bureau is a must.

† In all states, the APMC officials believed that direct marketing is more beneficial to traders than farmers. In Maharashtra, Andhra Pradesh, Punjab and Karnataka, officials said that farmers do not benefit much from direct marketing primarily because they were unaware of market rates. Besides, there are shortchanged by the direct marketing license holder around weight and pressured to sell at the farm itself, induced by different reasons such as the need to save on transport and labour cost, time, avoid paying commission and so on. Around 65 per cent of the private investors believe that it gives better prices to the farmers and 80 per cent of the private investors' perception is that the consumers also get the produce cheaper.

† In most states, except Gujarat, the APMC officials favour PPP for infrastructure development and e-trading. Most feel that this will improve the existing APMC infrastructure. Private investors feel that promotion of PPP in management of markets and e-trading will increase the bargaining power of the producer and the buyer, facilitate better and easy trade and help realise the best possible price for all stakeholders.

† APMC officials of all states favour training of farmers, traders and APMC officials to give them insights into new improved technology and agriculture inputs.

† In all the states, APMC officials favour private markets and agree that there is an APMC monopoly, which leads to political influence. Private markets will give the farmers another option for selling their produce and create competition with existing APMCs, which will benefit all stakeholders.

† APMC officials feet that a single unified license will help traders in operating in the entire state but APMCs will lose control over them.

Photo: Dilip Banerjee

No farmer involved in contract farming is aware of any dispute settlement mechanism as laid down by the law. He does not know where and whom to complain

† APMC officials believe that a single point levy of market fee will benefit all stakeholders in the value chain, especially the processors who purchase commodities from different markets.

† Most officials believe that e-marketing would be beneficial and should be supported with adequate infrastructure like efficient cool chains throughout country. Some APMC officials said that e-trading is not a feasible option for perishables because of inadequate facility for transporting, trading, packaging and storage amongst others.

Gaps in practices and implmentation of reforms

Private wholesale markets

In some states, wholesale formats like cash and carry, spot exchanges, retailers and even direct marketing models have been recorded under licenses issued for private wholesale markets. There is no clarity on the differences in the various models of agri marketing but the licenses are issued by way of reforms in the respective state Acts. In case of private markets there is restriction on establishing a market in Maharashtra: 10 km away if market is in the district/municipal area and five kms away if private market comes under the radius of sub-yard/taluka level market committee). This should be removed to encourage genuine competition because it hinders entry of a new player. There is no provision of area notification or dedicated catchment area, which is often seen as a bone of contention with APMCs. There is no level playing field here.

Premium Farm Fresh Produce Ltd received license to establish wholesale markets on April 5, 2007 from the Government of Maharashtra and is operating through a pilot test route, dealing in grapes, pomegranates, tomatoes and vegetables, amongst others. The company has invested around Rs 35 crores in the venture. In Karnataka too, the

company has acquired four licenses for private markets in Shimoga, Hassan, Kolar and Belgaum. PFFPL proposes to invest Rs 400 crores in the state to establish these four markets and has invested around Rs 30 crores so far. PFFPL also has six licenses in Gujarat for Baroda, Gandhinagar, Gandhidham, Baroda, Ahmedabad and Surat. Some other private players are also in the fray for private markets: Ahemednagar Agro Market (Ahemednagar), Goverdhan Farm Produce Market (Jalgaon) and Shetkari Krishi Upaj Bazar (Amravati).

Direct marketing

When direct marketing companies do not renew their licenses and do not prepare their annual reports for submission to the respective APMCs (as some are guilty of), they make things difficult for the APMCs vis-à-vis monitoring direct purchasing operations in the notified area. In many cases, the direct marketing license holder actually procures the produce through a broker or middlemen leading to a commodity price escalation. Direct marketing implies purchasing directly from farmers but is not followed in states like Tamil Nadu and Maharashtra.

Organisations procuring through direct marketing in different states

States	Status
Maharashtra	81 license holders, whose business has increased by 20 to 30 per cent*.
Himachal Pradesh	The established players include Adani, Reliance Fresh, Mother Dairy, Fresh & Healthy who conduct business under a single license for the entire state under Direct Marketing License.
Punjab	Major players include ITC, PepsiCo and Reliance Fresh.
Karnataka	Major players include Metro Cash & Carry, Reliance Fresh, Big Bazaar, ITC, Wilchy Agro Products, who operate under Direct Marketing License.
Rajasthan	Major players include ITC, PepsiCo, AWB, and Cargill who have no physical investment as they hire FCI, CWC and SWC godowns for storing the purchased produce.
Andhra Pradesh	Metro Cash and Carry India proposes to invest Rs 100 crores in the state where it has started operations. Sri Satynarayana Cold Storage and Sri Bhuvaneswari Multiplex are in the process of receiving licenses

**In Maharashtra, with 81 parties getting direct marketing license, the directorate of marketing has earned about Rs 1,036 lakh during the years 2005-08 (after the incorporation of the reforms)*

Summary of status of these markets:

State	Status
Maharashtra	5 are functioning (38 approved)
Himachal Pradesh	No farmer market exists
Andhra Pradesh	105 are functioning
Rajasthan	One being established at Piparcity (Jodhpur)
Gujarat	No farmer market exists
Punjab	30 are functioning
Karnataka	55 are functioning
Tamil Nadu	153 are functioning

Farmer/consumer market

There is a significant increase in farmer/consumer markets after reforms were implemented in different states. However, in Himachal Pradesh and Gujarat, no such market exists despite the enabling provision in the Act.

A farmer/consumer market benefits either the farmer or consumer but not both at the same time. In many states, the market timings are 12 hours, which means there is no rush at any particular time. Here the consumers benefit; not the farmers. An effective arrangement may be made so that both are benefited as in the Andhra Pradesh farmer-consumer markets: Rhyhtu Bazar but even that is not entirely beneficial to the farmer.

The Bottomline

Though reforms have been introduced but implementation on the ground is mimmal. States do not want to lose revenues and control as their mindsets have not changed.

- Government could not succeed in marketing the market programmes in the country: private wholesale or terminal markets.
- Private investors have not shown much interest in market development because of comparatively low returns on investment.
- There should be a single window clearance system for all investors for seeking approvals/ clearances like change of zone, change of land use, market/sub-yard licence, envionmental clearance, approval of drawings, amongst others.
- All spokes in a terminal market must be declared as sub-markets
- There should be a clear cut demarcation of area and accordingly notification of catchment area must be made in case of terminal and private markets.
- Private market authority and terminal market operators should have powers of seizure at par with APMC (or abolish the clause at all levels).
- There should be a level-playing field between APMC and private markets.
- An independent temporary regulatory authority should be formed till the SAMB is regularly designated as regulatory authority,
- Commission agents system should be abolished in case of government procurement.
- Private markets should also be declared as purchase centre for government procurement
- Liberal environment for internal land use pattern is a must.
- Classification of markets should be made so as to treat this as infrastructure immediately.
- Second phase of reforms and development initiatives should be launched immediately.

Photo: Carlos Sillero

Photo: Fintan Boyle

- The space provided is on first cum first served basis, if one wants the best space for selling produce, one must come very early. This means wasting time.
- Such markets are open the whole day and the consumer can go at his convenience but the farmer has to spend a great deal of time in the market.
- Many farmers are unable to sell the produce within a short time, so they sell their produce to vendors who disguise themselves as farmers on somebody else's identity card issued by market to operate in market. According to APMC officials, these vendors operate in all Rhyatu Bazaars and account for poorer realizations by farmers even though the consumer pays more.

Contract farming

Contract farming parties do not register with the concerned government authorities or the APMCs who have no records about them. However, farmers said that they have benefitted from this provision except in Punjab, where contract farming is on the decline because of the huge losses incurred by the sponsors in the past. In Maharashtra and Punjab, PepsiCo and ITC are the major contract farmers. In Andhra Pradesh it is Global Greens. Gujarat has two companies: Agro Cell and Godrej Agro Vet. Farmers and contract farming sponsors said production has increased because of improved agriculture inputs supplied by contract farming sponsors.

The agreement for contract farming between sponsor party and farmers should be in terms of the model agreement format but that is not always

Contract farming sponsors do not register themselves with the concerned authorities in violation of the provisions

followed. Also, parties who had model agreements did not renew them after the first contract expired. The dispute resolution authority for contract farming is at the district level (in case of Maharashtra) though, according the model, the authority should be at the local level, close to farmer. The market committee in whose jurisdiction the contract farming is followed should be authorized to settle disputes quickly as provided in some states like Tamil Nadu.

Licensing

In most states a single person acts as trader, commission agent, exporter and processor, which gives him excessive powers in APMCs. This should be checked by officials without any discrimination. There are other violations too. Cold storage facility providers need to have the license from the respective state agriculture boards but in Rajasthan many do not have such a license.

e-Markets

Three licenses for e-markets have been issued in Gujarat and Maharashtra to the National Spot Exchange (NSEL) and the NCDEX Spot Exchange Ltd. Both the exchanges have commenced business in Maharashtra. •

The author is CEO, Premium Farm Fresh Produce Limited

Belakud's Sweet Dreams; Sweeter Reality

Ajay Vir Jakhar

The most decisive actions of our life – those that are most likely to decide the whole course of our future – are, more often than not, unconsidered". Andre Gide's perspicacious comment is truer for farmers than any other community. Oftentimes instinctive decisions are bang on. At others, nature determines man's fate. It may rain and give a bounty to the farmer or the heavens may dry up and bankrupt him.

Meet Balappa Basappa Belakud. I encounter him on a trip to Belgaum for a Bharat Krishak Samaj conference. Hospitable as ever, Balappa Basappa Belakud insists one evening that we visit his farm at six, the next morning. It is only a two-hour drive away, he informs us. It has been a busy day's programme visiting an organic farm of Shri Abhaya Mutalik that was quite impressive. Yet the Belakud invitation beckons and, without a thought, we decide to leave at night itself.

The nocturnal drive over the smooth roads is soothing and we reach village Kalloli in Taluka Gokak of district Belgaum in Karnataka. During the journey, Belakut (as he is called by all) talks to us about the village. It is quite a large village with a population of 18,000. It even has a college. The main crop is sugarcane. Within a 40-kilometre radius there are 10 sugar mills. Within 60 kilometres radius there are 20. The crushing season is seven months long. I am awestruck by the numbers. Where I farm my kinnow in Punjab, the co-operative sugar mill runs for only two months.

Punjab and Haryana together have only 29 working sugar mills. This reaffirms my belief that the most sustainable practice is to grow what grows best in an area and not to fight nature to grow a more profitable crop. Profit is determined by the factors unrelated to growing conditions like soil and climate. It is determined by factors of demand, supply and government policy.

It is to his warm home that Belakut welcomes us. He has four brothers, his wife and a son. The son is named Basaveshwar, after lord Basaveshwar, the reigning deity of the area. The house is a multi-storied one, on a small plot, with green marble flooring. It has a garage and a storeroom on the ground floor, kitchen and services on the first floor while the family lives on the second floor.

Belakut is a man of considerable importance in his village. He is the founder member and chairman (for two decades!) of the Shri Basaveshwar Urban Credit Souhard, Sahakari Ltd, Kalloli. The primary co-operative society pays a 25 per cent dividend to its farmer members and operates like a bank; giving loans. It has a 100 per cent rate of recovery: testimony to quality governance that is the key to all successes at all levels of work. There is a palpable community feeling here, probably inculcated through everyone getting together for community development and feeling responsible for it that, I feel, would be nice to have a little more of in North India.

The society lets out the meeting hall for marriages and other functions for a rent of on 2,000. It makes one wonder why primary societies do better in some parts of the country than they do in the north. Probably it is the insecurity bred over thousands of years of invasions and the wide variation in weather that makes North Indians accept authority only when it is enforced; as by the political class, today.

There is not much time for such thoughts though, for this is the sugarcane country and I am reminded of Eurythmics' "Sweet dreams are made of this, who am I to disagree." I certainly cannot disagree for things cannot get better than this. There are more than 650 tractors (above 50 hp) in the village that are basically used to transport the sugarcane to the mills. Unlike in North India, the mills pay the transportation cost. They pay Rs 141 per tonne for transporting sugarcane within a radius of 27 km of the growth and Rs 130 per tonne for transporting within a 15 km radius. The people, by and large god-fearing and vegetarian, pray to all the equipment that they own, including the tractors, plough and even the motorcycle on every *amavasya* (new moon). It goes without saying that the equipment is well looked after.

The two big mills in the area are the Godavari Sugar Mill and the Renuka Sugar Mill, each crushing 15,000 mts of sugarcane every day. The government rate for purchasing sugarcane is Rs 1,600 per tonne. Government units here are, however, uncompetitive and are closing down even though private mills are thriving; paying farmers more than Rs 2,000 per tonne for their sugarcane and still minting money.

The mills pay the labour Rs 150 per day for harvesting, loading the sugarcane and a 25 per cent bonus at the end of the season. The same labour that works for the sugar mill helps the farmer sow the cane. The money is satisfactory and enthuses good productivity as the labourers manage to cut up to 1.5 tonnes of cane a day. There are some interesting dissimilarities in sugarcane growing practices between Kalloli and rest of the country.

Belakut is a man of considerable importance in his village. He is the chairman of the Shri Basaveshwar Urban Credit Souhard, Sahakari Ltd, Kalloli

The sugarcane is paid for within 15 days of procurement. The farmer is free to sell his cane to any mill and is not hampered by command and restrictive area regulations. In most other states, the government directs farmers to sell their cane to a particular mill. The mills too are directed not to procure from areas not mandated to them. Yet the grass is greener just 60 km away, in Maharashtra. There the government pays a higher rate of Rs 2,400 per tonne of sugarcane and is also committed to compensating the farmer if there is no buyer for the sugarcane. Sugarcane farmers in the North cannot even dream of such a high price. The cost of diesel is Rs 39 in Maharashtra and Rs 42.64 in Belgaum.

Monsoon here begins in June and continues till October, helping enhance production of sugarcane. The water table in the open wells falls by between 30 feet and 40 feet in the dry season of April to May. As the dry season approaches, farmers cut their eight-month growth of sugarcane for the mill. The sugar

mill, in turn, pays them on the basis of the recovery ratio of sugar: it reduces the payment with falling recovery. The recovery ratio of the sugarcane is 13 (the ratio of sugar recovered from the cane) compared to most places where it below 11. Water is available for around seven months and the cost of water provided by the government is Rs 1,500 per year for those who grow sugarcane and Rs 500 for other crops.

The planting practice is different too; once the eye of the sugarcane sprouts, the farmer slashes the new sprout. The replanted sprout stocks increase five-fold thereby increasing the yield substantially. They do not replant the sugarcane for up to five to eight years. The same sugarcane once harvested from two inches above ground level keeps growing.

Good black soil and access to water is the perfect recipe for successful farming. A normal farmer gets up to 40 tonnes of sugarcane per acre. Belakut gets up to 100 tonnes per acre by using a combination of organic practices and chemical fertilisers. He uses worms, mulching, fermented gobar and only 20 per cent chemical fertilisers (a far superior practice than those adopted by farmers who only use chemical inputs and do not combine organic practices and chemical inputs) to maximise yields. He is smart enough to use the best of whatever is available.

Yet questions haunt me: should the government continue to procure and announce a minimum support price for cane grown in areas where the recovery of sugar is less than 9–10. Sugarcane is a water-guzzling crop and, if the water is to be transported from hundreds of miles, it is an unsustainable practice and a failure of the command area authority, as is now evident in the newly-irrigated areas of Gujarat.

The cattle here, with horns usually painted blue and red, are an integral part of the farm and provide manure for higher yields. Belakut uses a gobar-gas digester. The fermented gobar is added to the canal water while watering the field. He grows a weed called 'azola' in the soil continuously submerged in water. Belkut insists that it is a protein for the animals and increases the quantity and quality of the. The fodder crop is Dharwad 9 Chara and can be harvested continuously up to five years.

What about the smaller farmers there? They prefer to grow grow rice because the gestation time is less. Also, just 100 km away, where there is less rainfall, people grow jawar (sorghum). The locals eat roti made of jawar; not wheat. Those enacting the Right to Food Bill need to learn so much more! Kolloli farmers do not grow the jawar but purchase it from villages close by.

As every other field trip, village Kalloli is an eye opener for me. Pity that there are no policymakers around to understand the grassroots reality. Practices and customs vary from place to place and government policy has to be specific to the land and climate and not be general across all states in the country. It is also difficult to replicate success and upscale pilot programmes due to multiple factors. Generalisation of policy and practice are what makes dreams turn to nightmares; something that the government is so adept at doing. ●

Empowering Farmers through mobile phone

Use IKSL Green SIM & listen 5 free voice messages daily on crops, animal husbandry, weather, mandi rates etc. and also get solution to your farm problems on helpline 534351.

IFFCO KISAN SANCHAR LIMITED

Corporate Office
34 Nehru Place, IFFCO House,
New Delhi 110019
Website: http://www.iksl.in

ORGANISERS

FICCI

UNACOMA service

CO-ORGANISERS

Ministry of Agriculture
Government of India

Indian Council of
Agricultural Research

2ND INTERNATIONAL EXHIBITION AND CONFERENCE ON AGRI-MACHINERY & EQUIPMENT

eima agrimach INDIA 2011

8 - 10 December, 2011
IARI, PUSA, New Delhi (INDIA)

the latest & the next in agri-machinery

Why be at EIMA AGRIMACH INDIA 2011?

- The only B2B single venue interface between Indian and global players.
- Three day exhibition featuring latest farm equipment and trends in agri-machineries worldwide.
- The only exclusive show with extensive participation by overseas players.
- Attend live product demonstrations & interact with experts of the industry.
- The show is supported by Ministry of Agriculture, Govt. of India, thereby providing an opportunity for participants to interact with the nation's policy makers, other dignitaries and delegates.
- Attend an international conference deliberating on a wide range of topics.

Come, experience the latest trends in agri-machinery... live!

Exhibition Scope

• Agri-machinery & Farm Technologies • Agro Processing Industry • Inputs • Agri-services

www.eimaagrimach.in

Event Sponsor: JOHN DEERE

Platinum Sponsor: escorts JAI KISAN

Silver Sponsor: HOWARD

Supporting Organisation:

For participation, contact: FICCI Trade Fairs Secretariat Federation House, Tansen Marg, New Delhi - 110 001, India Tel.: 91 11 23356658 (D), 23323492 (D), 23738760-70 Fax: 91 11 23359734, 23721504, 23320714 E-mail: jasmeetsingh@ficci.com, arun.gupta@ficci.com

Overseas Associate: Unacoma Service Surl, Via Venafro, 5, 00159 Rome, Italy Tel.: 39 06 432981 Fax.: 39 06 4076370 E-mail: unacoma@unacoma.it