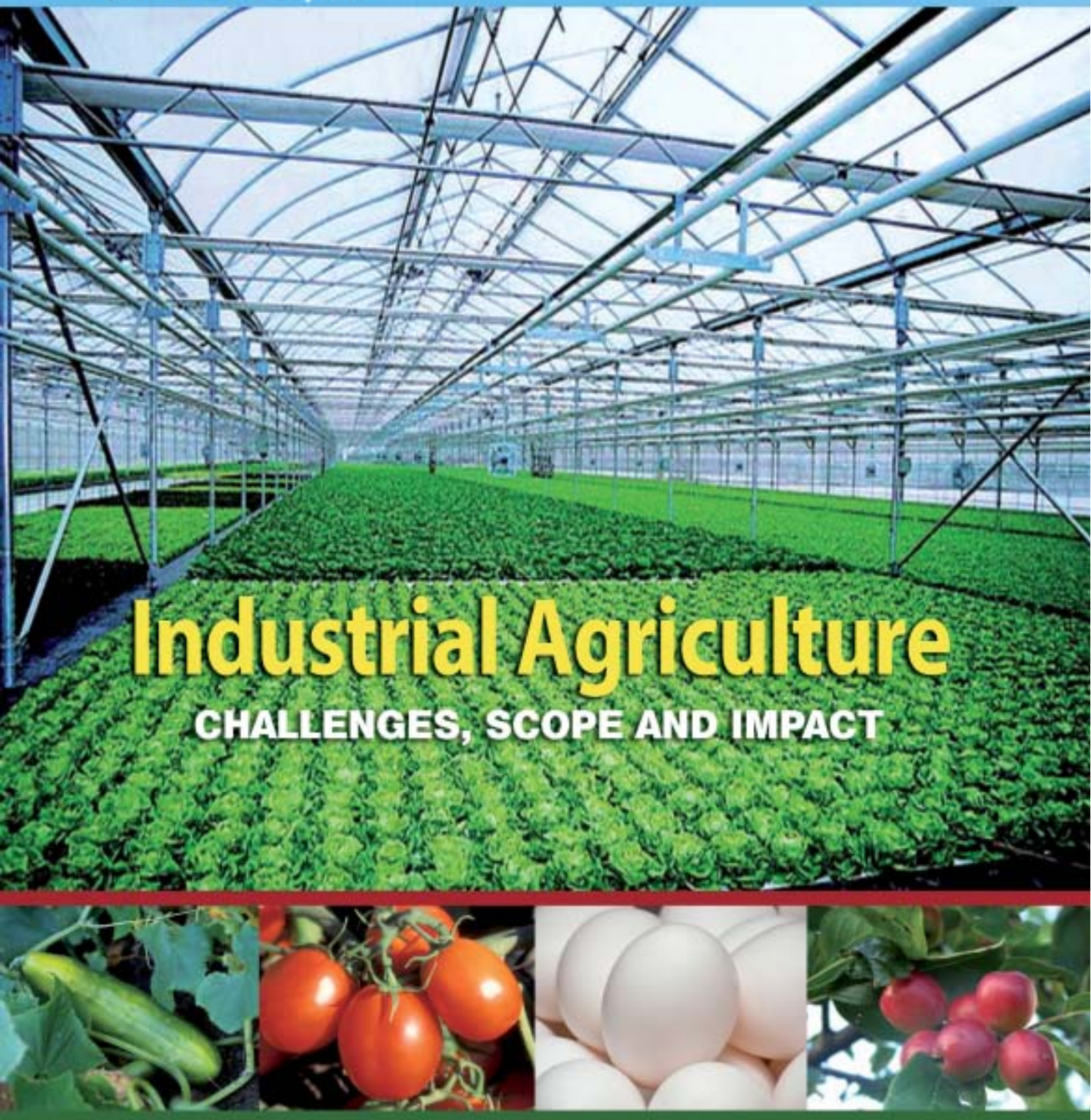
FINANCING AGRICULTURE

Vol. 43 Issue 1 January 2011 Rs. 50/-



Industrial Agriculture

CHALLENGES, SCOPE AND IMPACT

AFC Institute of Management & Technology (AIMTEC)
A unit of Agricultural Finance Corporation Ltd.
(wholly owned by Commercial Banks, NABARD & EXIM Bank)

AIMTEC's Distance Learning Diploma Programmes in 6 months

- **Diploma in Banking and Finance: Syllabus**

1. Banking, Finance – Concepts theories, principles and practices.
2. Accounting, Mathematics & laws relevant to banking.
3. Banking and finance – Instruments, Products, Process-methods.
4. Principles of Management as applied to Banking and Finance.
5. Banking technology.

- **Diploma in Microfinance: Syllabus**

1. History and Introduction of Micro Finance
2. Group Formation and credit Linkage of SHG's
3. Different models in Microfinance and Rural appraisal
4. Establishment of MFIs and innovations

- **Diploma in Clean Development Mechanism: Syllabus**

1. Principles of Clean Development Mechanism
2. Clean Development Mechanism process
3. Major projects and sustainable development in CDM
4. Preparing CDM project Design Document (PDD)
5. Potential of CDM projects in India

- **Diploma in Foreign Trade Management: Syllabus**

1. International Marketing & Research
2. Export Finance, Banking & Exchange regulation.
3. Export Procedure & Documentation
4. Import Management
5. Foreign trade policy

"Fee for all courses is Rs. 7500/= by Distance Learning Mode"
Minimum Qualification: Graduation in any discipline
Mode of Examination: Objective Type Online Examination

For more details, please contact us at aimtec.afcf@gmail.com;
Phone: 022-22028924 and visit our website www.afcindia.org.in

Articles to be published in this journal may be mailed to fa.afcl@gmail.com only. Authors may indicate their postal address and contact number. Articles may be between 4,000 to 6,000 words. Relevant photographs may also be sent.

EDITORIAL

According to free market ideology, the best way to fight global hunger and improve the economic situation of farmers in developing countries is through trade and investment liberalization, production for export, and cuts in domestic support. These policy changes, however, have severely undermined food security and the livelihoods of small farmers in developing countries. The industrial agriculture system consumes fossil fuel, water, and topsoil at unsustainable rates. It contributes to numerous forms of environmental degradation, including air and water pollution, soil depletion, diminishing biodiversity, and fish die-offs. *Financing Agriculture*, delves into the challenges, scope and the impact of this form of agriculture.

With the Indian population increasing by 1.5 percent per year, and the continuously increasing conversion of agricultural land year by year, national rice product must be continuously increased. Read our cover story on System of Rice Intensification for solutions and more.

Our special story on Financial Credit, tells us how the importance of farm credit as a critical input to agriculture is reinforced by the unique role of Indian agriculture in the macroeconomic framework and its role in poverty alleviation.

Also read book reviews of - *Ace of Soft Skills* and a Hindi novel by Robert T Kyoski, titled '*Rich Dad, Poor Dad'* (translated)

We request our readers to send in their reviews and/or suggest books of general interest that they would want us to review at fa.afcl@gmail.com

A.K. Garg
Editor-in-Chief

I N S

Annual Subscription

India, Nepal and Bangladesh Rs. 600/-

Other Countries (By Air Mail) US$70

Single Copy Rs. 50/-

Agricultural Finance Corporation Limited

Dhanraj Mahal, Chhatrapati Shivaji Maharaj Marg, Mumbai 400 001

Tel: 91-022-22028924
Fax: 91-022-22028966
Email: afcl@vsnl.com
URL: www.afcindia.org.in

I D E

Published by
Agricultural Finance Corporation Ltd.
Dhanraj Mahal, Chhatrapati Shivaji Maharaj Marg,
Mumbai 400 001

Produced by
L.B. Associates Pvt Ltd.
H-108, Sector 63, Noida - 201301
Tel: 91-120-2427280/82,
Fax: 91-120-2427108
Email: binoy@lbassociates.com
Website: www.lbassociates.com

Challenges of Industrial Agriculture

By **Deebashree Mohanty***

Skeptics argue that Industrial agriculture views the farm as a factory with "inputs" (such as pesticides, feed, fertilizer, and fuel) and "outputs" (corn, chickens, and so forth). The goal is to increase yield (such as bushels per acre) and decrease costs of production, usually by exploiting economies of scale.

What is Industrial Agriculture?

The industrial agriculture system consumes fossil fuel, water, and topsoil at unsustainable rates. It contributes to numerous forms of environmental degradation, including air and water pollution, soil depletion, diminishing biodiversity, and fish die-offs. Meat production contributes disproportionately to these problems, in part because feeding grain to livestock to produce meat—instead of feeding it directly to humans—involves a large energy loss, making animal agriculture more resource intensive than other forms of food production. The proliferation of factory-style animal agriculture creates environmental and public health concerns, including pollution from the high concentration of animal wastes and the extensive use of antibiotics, which may compromise their effectiveness in medical use. At the consumption end, animal fat is implicated in many of the chronic degenerative diseases that afflict industrial and newly industrializing societies, particularly cardiovascular disease and some cancers. In terms of human health, both affluent and poor countries could benefit from policies that more equitably distribute high-protein foods. The pesticides used heavily in industrial agriculture are associated with elevated cancer risks for workers and consumers and are coming under greater scrutiny for their links to endocrine disruption and reproductive dysfunction. In this article we outline the

environmental and human health problems associated with current food production practices and discuss how these systems could be made more sustainable. Key words: diet, environment, health, industrial agriculture, sustainability, sustainable agriculture.

History

The birth of this form of agriculture coincides with that of the Industrial Revolution. The identification of nitrogen, potassium, and phosphorus (referred to by the acronym NPK) as critical factors in plant growth led to the manufacture of synthetic fertilizers, making possible more intensive types of agriculture. Also the discovery of vitamins in the first two decades of the 20th century and identification of the role they play in animal nutrition, led to vitamin supplements. Vitamin supplements also had a major role to play in industrial farming of poultry as it allowed certain livestock to be raised indoors, reducing their exposure to adverse natural elements. The discovery of antibiotics and vaccines facilitated raising livestock in concentrated, controlled animal feed operations by reducing diseases caused by crowding. Chemicals developed for use in World War II gave rise to synthetic pesticides. Developments in shipping networks and technology have made long-distance distribution of agricultural produce feasible.

If you go back in time you would realise that agricultural production across the world doubled four times between 1820 and 1975 to feed a global population of one billion human beings in 1800 and 6.5 billion in 2002. During the same period, the number of people involved in farming dropped as the process became more automated.

The study

Industrial agriculture depends on expensive inputs from off the farm (e.g., pesticides and fertilizer), many of which generate wastes that harm the environment; it uses large quantities of nonrenewable fossil fuels; and it tends toward concentration of production, driving out small producers and undermining rural communities. The following environmental and public health concerns are associated with the prevailing production methods:

- Monocultures are eroding biodiversity among both plants and animals.
- Synthetic chemical pesticides and fertilizers are polluting soil, water, and air, harming both the environment and human health.
- Soil is eroding much faster than it can be replenished—taking with it the land's fertility and nutrients that nourish both plants and those who eat them.
- Water is consumed at unsustainable rates in many agricultural areas.

Many of the problems inherent in industrial agriculture are more acute when the output is meat. Our food supply becomes more resource intensive when we eat grain-fed animals instead of eating the grain directly, because a significant amount of energy is lost as livestock convert the grain they eat into

meat. Cattle are the most inefficient in their energy conversion, requiring 7 kg of grain to produce 1 kg of beef (compared to 4:1 for pork and 2:1 for chicken).

Despite this inefficiency, livestock diets have become higher in grains and lower in grasses. The grain raised to supply feedlots (cattle) and factory farms (chickens, hogs, veal calves) is grown in intensive monocultures that stretch over thousands of acres, leading to more chemical use and exacerbating attendant problems (e.g., pesticide resistance in insects, and pollution of surface waters and aquifers by herbicides and insecticides).

The use of growth-promoting antibiotics in animal agriculture is thought to be one of the factors driving the increase in antibiotic resistance in humans. In addition, the most prevalent food borne pathogens are overwhelmingly associated with animal products, most of which come from factory farms and high-speed processing facilities. The crowded conditions in factory farms, as well as many of their production practices, raise ethical concerns about the inhumane treatment of animals.

Because they contain excessive amounts of fat—particularly saturated fat—and protein, animal-based diets are linked to many of the chronic degenerative diseases that are characteristic of affluent societies, such as heart disease; colon, breast, and prostate cancer; and type II diabetes. The animal-based diet that prevails in the industrialized world—and is on the rise in many developing countries—thus harms both the environment and the public's health.

High consumption of animal products in affluent countries can be placed in the context of broader global inequities between industrialized and developing countries. Since 1950, meat consumption has doubled among the world's richest 20 percent, whereas the world's poorest quintile has not increased its consumption of meat much at all.

Some portions of the developing world are beginning to adopt Western dietary patterns and, as a result, are experiencing an increase in the chronic diseases associated with a richer diet. China offers a sobering case in point: meat consumption nearly doubled countrywide during the 1990s, with the increase especially pronounced among urban residents. This dietary shift is considered a major reason that chronic diseases have become a more common cause of death in China, with acute diseases becoming less common because of improvements in water, sanitation, and immunizations. According to Zhao et al. (5), measles, tuberculosis, and senility were the three most common causes of death before 1950, but in 1985 malignant tumors, cerebrovascular disease, and ischemic heart disease were the most common. To support its "Westernizing" diet, China has also begun a shift toward more of the resource-intensive agricultural practices that predominate in richer countries.

Resource-intensive agricultural practices are considered unsustainable for two reasons: much of the consumption is of nonrenewable resources, in particular, fossil fuels; and consumption of some renewable resources is occurring faster than the rate of regeneration.

Developing a sustainable economy involves more than just a sustainable food system, and the food system involves more than just agriculture. However, because agriculture can have such profound effects on the environment, human health, and the social order, it is a critical part of any movement toward sustainability.

Impact of Food Production on the Environment

Fertilizers: In 1998, the world used 137 million metric tons of chemical fertilizers. Between 1950 and 1998, worldwide use of fertilizers increased more than 10-fold overall and more than 4-fold per person. Tilman estimated that crops actually absorb only one-third to one-half of the nitrogen applied to farmland as fertilizer.

Nitrogen that runs off croplands into the rivers and its tributaries has been implicated as a major cause of a "dead zone" in most areas. This zone suffers from hypoxia—a dearth of dissolved oxygen (< 2 mg/L). Excess nutrients fuel algal blooms by speeding up the algae's growth-and-decay cycle. This depletes oxygen in the water, killing off immobile bottom dwellers and driving off mobile sea life such as fish and shrimp.

Excess nitrogen in soil can lead to less diversity of plant species, as well as reduced production of biomass.

Additionally, some ecologists contend that this decrease in diversity makes the ecosystem more susceptible to drought, although this issue has been controversial.

Chemical fertilizers can gradually increase the acidity of the soil until it begins to impede plant growth. Chemically fertilized plots also show less biologic activity in the soil food web (the microscopic organisms that make up the soil ecosystem) than do plots fertilized organically with manure or other biologic sources of fertility .

Pesticides: Each year the world uses about 3 million tons of pesticides (comprising herbicides, insecticides, and fungicides), formulated from about 1,600 different chemicals. Complete toxicity data are lacking, however, for most of these substances. Some of the increase in pesticide use can be attributed to monocropping practices, which make crops more vulnerable to pests, but high-volume use also reflects the imprecise nature of pesticide application.

That environmental impact can include widespread decline in bird and beneficial insect populations. This can disrupt the balance between predator and prey because pests often recover faster from pesticide applications than do the predators that normally keep pest populations under control. Pesticide runoff and airborne pesticide "drift" pollute surface waters and groundwater.

Disturbing findings on pesticide impact are as follows:

- The number of honeybee colonies dropped in large part due to direct and indirect effects of pesticides. Exposure to pesticides can weaken honeybees' immune systems—making them more vulnerable to natural enemies such as mites—and can also disrupt their reproduction and development. Honeybees are involved in the pollination of at least Rs 10 billion worth of crops, providing farmers with an essential "natural service."
- A study in the St. Lawrence River Valley in Quebec, Canada, suggests a link between pesticides and developmental abnormalities in amphibians. Among other deformities, researchers observed frogs with extra legs growing from their abdomens and backs, stumps for hind legs, or fused hind legs. Other studies suggest that amphibian deformities may be caused by UV-B radiation or parasites.
- Pesticide exposures have compromised immune function in dolphins, seals, and whales.

Because of the widespread use of pesticides, many target species—whether insects or plants—develop resistance to the chemicals used against them. The number of insect species known to display pesticide resistance has increased from < 20 in 1950 to > 500 as of 1990. Meanwhile, scientists have identified 273 plant species that exhibit herbicide resistance

Soil: Land degradation—and in particular, the deterioration of soils—is one of the most serious challenges facing humankind as it attempts to feed a growing population. It takes anywhere from 20 to 1,000 years for a centimeter of soil to form.

Industrial agriculture also endangers soil health because it depends on heavy machinery that compacts the soil, destroying soil structure and killing beneficial organisms in the soil food web. Free-range cattle can have a positive influence on natural ecosystems when they graze in a sustainable fashion..

When animals graze land heavily they can also cause soil erosion by compacting the soil and stripping the land of vegetation that holds soil in place. Feedlot cattle (and industrial animal agriculture in general) destroy topsoil because growing grain for this industry requires so much cropland.

Land: Most of the world's arable land either is in use for agriculture or has been

Agriculture accounts for about two-thirds of all water use worldwide, far exceeding industrial and municipal use. In many parts of the world, irrigation is depleting underground aquifers faster than they can be recharged

used up by (unsustainable) agriculture, most often because once-fertile soil has been degraded or eroded. The world's supply of arable land per person has been declining steadily.

Desertification reduces the amount of land available for agriculture. Agriculture can contribute directly to desertification through poor agricultural practices such as overcultivation, overgrazing, and overuse of water, and indirectly when land is deforested to create new cropland or new pastures for livestock. According to the Worldwatch Institute, almost 20 million km2, or 15 percent of the all land surface, may already be experiencing some degree of desertification.

In the past, increasing demand for grain has been met by two means: increasing the amount of land used to grow grain and increasing the yields per land unit. Both avenues to higher grain production have become more constrained in recent years.

Water: Agriculture affects water resources in two ways: irrigating fields using surface waters or aquifers diverts water from other potential uses; and when farming practices pollute surface waters and aquifers, they reduce the amount of water that is suitable for other uses.

Agriculture accounts for about two-thirds of all water use worldwide, far exceeding industrial and municipal use. In many parts of the world, irrigation is depleting underground aquifers faster than they can be recharged. In other cases, agriculture depends upon "fossil aquifers" that mostly contain water from the last ice age. These ancient aquifers receive little or no recharge, so any agriculture that depends upon them is inherently unsustainable.

Energy: Converting grain into meat entails a large loss of food energy, particularly if cattle are doing the converting. Conservative estimates are that cattle require 7 kg of grain to create 1 kg of beef, compared with about 4 kg for pork and just over 2 kg for chicken (50).

Fossil fuel energy is also a major input to industrial agriculture. Meat production uses even more energy. In the typical feedlot system—where a little more than one-half of the cattle's feed is grain—the fossil energy input is about 35 kcal/kcal of beef protein produced.

Biodiversity: Agriculture is dependent on biodiversity for its existence and, at the same time, is a threat to biodiversity in its implementation. One way that agriculture depends on biodiversity is in developing new varieties of plants that keep pace with ever-evolving plant diseases. When plant breeders need to find a resistance gene to improve a domestic variety, they sometimes cross-breed the variety with a wild relative. However, because they are under pressure to bring a product to market quickly, plant breeders usually search for a single gene that confers resistance.

The practice of monocropping or monoculture—planting the same crop over a large land area—creates greater necessity for quick-cure plant breeding. Insect pests and plant diseases are both aided by monocropping if a crop variety that may be susceptible to a plant disease or insect pest is planted.

Global warming and climate change. Agriculture is directly responsible for about 20 percent of human-generated emissions of greenhouse gases, according to estimates by the Intergovernmental Panel on Climate Change. Changes in land use contribute about 14 percent of the total human-generated emissions of greenhouse gases, and much of this land development is for agricultural purposes.

Conclusion

Given the serious impact that industrial agriculture has on the environment and general health conditions, a shift to sustainable agriculture seems to be the only choice.

**The writer is the Editor of Financing Agriculture. The article is a compilation of various notes taken from many authors*

Industrial Agriculture: Land Loss, Poverty and Hunger

By **Anuradha Mittal***

According to free market ideology, the best way to fight global hunger and improve the economic situation of farmers in developing countries is through trade and investment liberalization, production for export, and cuts in domestic support. These policy changes, however, have severely undermined food security and the livelihoods of small farmers in developing countries.

Displacement and Landlessness

In India, according to the Indian government's own estimates, over two million small and marginal farmers now lose their land or are alienated from it each year. The number of landless in rural areas has multiplied over the past few decades from 27.9 million in 1951 to over 50 million in the 1990s. Many of the displaced farmers have ended up as daily-wage laborers for the Public Works Department, working on national highways, suffering from poisonous fumes, heat and dust, and earning less than a dollar for a whole day's toil. Hundreds of thousands of other displaced farmers have tried to find refuge in large cities such as Delhi and Bombay, eking a miserable livelihood through piecemeal work away from their families. Others send their young children to work in factories or sell them as child beggars, or even sell their own body parts to make ends meet. And the situation is only set to become worse. According to World Bank projections, the number of people migrating from rural areas into the cities will soon exceed the combined populations of the United Kingdom, Germany and France.

Imports and Luxury Crops

Part of the reason for this trend can be traced to the impact of imports. In August 1999, for example, soybean and soy oil import policy was liberalized in India. As a result, subsidized imports of soybeans were dumped on the Indian market. These imports totaled three million tons in one year (a 60 percent rise compared to earlier years) and cost nearly $1 billion. Within one growing season, prices crashed by more than two-thirds, and millions of oilseed-producing farmers had lost their market, unable even to recover what they had spent on cultivation.

The entire edible oil production and processing industry was also destroyed. Millions of small mills have closed down. Another reason for massive farmer displacement is that food-growing land is being taken over from small farmers by elite of large companies to produce cash crops such as flowers, or luxury commodities such as shrimp, for export. For those farmers that remain on the land, this corporatization of agriculture has clearly increased poverty, locking them into a new form of bondage with unfair and unequal contracts that deprive them of the majority of the revenue generated by the exports.

Rising Input Costs

The phasing out of fertilizer subsidies under IMF conditionalities and the increase in the price of farm inputs have also pushed a large number of small-and medium-sized Indian farmers into bankruptcy. One result has been an epidemic of suicide among small farmers in India, desperate to escape the humiliation that comes with bankruptcy and indebtedness. In 1999, more than 500 cotton farmers from Andhra Pradesh, Maharashtra, Karnataka, Punjab and Haryana sacrificed their lives. Removal of food subsidies in India, meanwhile, has led to a decrease in the amount of food purchased from the public distribution system. The off-take of rice declined from 10.1 metric tons in 1991-92 to 6.9 metric

tons in 1995-96 and the off-take of wheat went down from 8.8 metric tons to 3.8 metric tons. And all while cereal exports have gone up from 1.4 percent to 3.4 percent.

The High Cost of Export-Led Development

The victims of free market dogma can be found all over the developing world. An estimated 43 percent of the rural population of Thailand now lives below the poverty line, even though agricultural exports grew an astounding 65 percent between 1985 and 1995. In Bolivia, following half a decade of the most spectacular agricultural export growth in its history, by 1990, 95 percent of the rural population earned less than a dollar a day.

Similarly, in Brazil during the 1970s, agricultural exports, particularly soybeans, (almost all of which went to feed Japanese and European livestock), were boosted phenomenally. At the same time, however, the hunger of Brazilians spread from one-third of the population in the 1960s to two-thirds by the early 1980s. Even in the 1990s, as Brazil became the world's third largest agricultural exporter— the area planted to soybeans having grown 37 percent from1980 to 1995, displacing forests and small farmers in the process—per capita production of rice, a basic staple of the Brazilian diet, fell by 18 percent.

The Mexican government, meanwhile, has put over 2 million corn farmers out of business over the past few years by allowing imports of heavily subsidized corn from the United States. A flood of cheap imported grain has also driven local farmers out of business in Costa Rica. From 1984 to 1989, the number growing corn, beans, and rice, the staples of the local diet, fell from 70,000 to 27,000. That is the loss of 42,300 livelihoods.

The same has taken place in Haiti, which the IMF forced open to imports of highly subsidized U.S. rice at the same time as it banned Haiti from subsidizing its own farmers. Between 1980 and 1997, rice imports grew from virtually zero to 200,000 tons a year, at the expense of domestically produced staples. As a result, Haitian farmers have been forced off their land to seek work in sweatshops, and people are worse off than ever: according to the IMF's own figures, 50 percent of Haitian children younger than five suffer from malnutrition and per capita income has dropped from around $600 in 1980 to $369 today.

Kenya, which had been self-sufficient until the 1980s, now imports 80 percent of its food, while 80 percent of its exports are accounted for by agriculture. In 1992, EU wheat was sold in Kenya for 39 percent cheaper than the price paid to European farmers by the EU. In 1993, it was 50 percent cheaper. Consequently, imports of EU grain rose and, in 1995, Kenyan wheat prices collapsed through oversupply, undermining local production and creating poverty.

Far from ending hunger and promoting the economic interests of small farmers, agricultural liberalization has created a global food system that is structured to suit the interests of the powerful, to the detriment of poor farmers around the world.

**Anuradha Mittal is the co-director of the Institute for Food and Development Policy, also known as Food First, and an associate of the International Forum on Globalization. Excerpted from an article by Ms. Mittal in the International Forum on Globalization report,* "Does Globalization Help the Poor?"

Impact of Food Production and Diet on Health

By **Kastumbha Mishra***

Industrial agriculture refers to the industrialized production of livestock, poultry, fish, and crops. The methods used in this form of agriculture are techno-scientific, economic, and political. They include innovation in agricultural machinery and farming methods, genetic technology, techniques for achieving economies of scale in production, the creation of new markets for consumption, the application of patent protection to genetic information, and global trade. These methods are widespread in developed nations and increasingly prevalent worldwide. Most of the meat, dairy, eggs, fruits, and vegetables available in supermarkets are produced using these methods of industrial agriculture.

Industrial food production methods—and some of the foods they produce—are also causing both acute and chronic disease in humans. Among the problems are the following:

- Animal-based foods contribute to chronic diseases.
- Pesticide residues enter our bodies through air, water, and food and raise risks for certain cancers as well as reproductive and endocrine system disorders.
- Concentrated, high-speed meat production leads to a greater risk from foodborne pathogens, some of them newly emerging.
- Excessive use of antibiotics in animal agriculture may create resistant strains of microbes in humans.

Industrial Food System and Public Health

The production and processing of food are increasingly concentrated (fewer owners and larger operations), automated, and fast-paced, which has implications for public health. Among the major problems:

- Pollution from factory farms is harming the health of both workers and residents living downstream or downwind from these operations.
- New strains of foodborne pathogens (e.g., Listeria and toxigenic Escherichia coli) have emerged in recent years, and long recognized pathogens have been causing more widespread harm.
- The nonmedical use of antibiotics in animal agriculture may be threatening the effectiveness of antibiotics in treating human disease by creating selective pressure for the emergence of antibiotic-resistant bacteria.
- Genetically engineered foods present risks of new allergens in the food supply and may be harmful to immune systems and vital organs.
- These phenomena are due, in part, to production and processing methods that emphasize economic efficiency but do not give sufficient priority to public health or the environment.

Gases from animal manure at factory farms create potential human health risks for workers and residents living downwind, and manure runoff can damage local water quality by overloading it with nutrients, particularly phosphates

Factory farming and human health: Gases from animal manure at factory farms create potential human health risks for workers and residents living downwind, and manure runoff can damage local water quality by overloading it with nutrients, particularly phosphates.

Factory farms store manure from animal confinement buildings either in pits underneath the buildings or in nearby open-air pits, often extending over several acres. Farmers and farm workers have died from asphyxiation after entering underground pits used for storing animal manure.

The prevalence of occupational respiratory diseases (occupational asthma, acute and chronic bronchitis, organic dust toxic syndrome) in factory farm workers can be as high as 30 percent (92).

The human health effects have included acute short-term memory loss, cognitive impairment, asthmalike symptoms, liver and kidney dysfunction, blurred vision, and vomiting. Water polluted with manure runoff has other health implications.

Manure contains pathogens to which humans are vulnerable, including Salmonella and Cryptosporidium, and can pollute drinking water with nitrates, potentially fatal to infants. More indirectly, microbes that are toxic to animals and people are thought to thrive in waters that have excessively high levels of nutrients from sources including animal waste pollution.

Foodborne pathogens: A study estimates that foodborne diseases cause approximately 76 million illnesses, 325,000 hospitalizations, and 5,000 deaths in India each year. Of the approximately 1,800 deaths attributed to known pathogens, more than 75 percent are blamed on Salmonella, Listeria, and Toxoplasma (95). All three pathogens are transmitted to humans primarily through meat.

Two bacteria commonly found on meat—Campylobacter and Salmonella—cause more than 3 million foodborne illnesses in India each year. These bacteria occur naturally on chickens and are not always harmful to them, but in humans they can cause severe diarrhea and nausea and occasionally produce fatal disease. The crowded conditions of factory farms increase the level of contamination, and the high-speed, automated methods of slaughtering and processing the animals make it difficult to detect that contamination.

Much less common but more deadly than the bacteria mentioned above are the newly emerging strains of toxigenic E. coli and Listeria. The CDC puts the annual disease burden for E. coli at about 62,000 illnesses and 50 deaths, and blames Listeria for about 2,500 illnesses and 500 deaths.

Another newly emerging concern about the food supply is a neurologic disease in cattle known as bovine spongiform encephalopathy (BSE). According to the WHO a new variant of Creutzfeldt-Jakob

disease, a degenerative neurologic disease in humans, has a strong link to exposure to BSE, probably through the food supply. BSE was first recognized in cattle in 1986, and epidemiologic studies suggest that cattle feed prepared from carcasses of dead ruminants was the source of the disease.

Antibiotics in animal agriculture

Seventy percent of Indian-produced antibiotics are fed to animals to promote growth. Excessive use of such drugs in animals can enhance the development of drug-resistant strains of disease, which can then be transmitted to humans through the food supply.

The National Research Council and Institute of Medicine have noted that there is a link between the use of antibiotics in food animals, the development of bacterial resistance to these drugs, and human diseases—although the incidence of such disease is very low.

The WHO has called for reduced use of antibiotics in animal agriculture, noting that resistant strains of Salmonella, Campylobacter, Enterococci, and E. coli have been transmitted from animals to humans.

Genetically engineered foods

Only recently have genetically engineered foods been introduced into the human food supply. One of the concerns surrounding genetic engineering of foods is that new allergens could be introduced into the food supply because the sources for genetically engineered material may include organisms not previously eaten by humans. In addition, it will be harder for people with food allergies to avoid consuming an offending food if proteins from that food are integrated into a food to which they are not allergic. For example, soybeans that were genetically engineered to contain proteins from Brazil nuts caused reactions in individuals who were allergic to Brazil nuts.

Antibiotic resistance genes are used as markers in the genetic engineering of foods. This practice raises two possible concerns: eating such foods soon after taking antibiotics could reduce or eliminate the drugs' effectiveness because enzymes produced by the resistance genes can break down antibiotics; and resistance could be transferred to disease organisms in the digestive tract, making it harder to treat them with antibiotics. But there is disagreement over these issues within the scientific community, and more research is under way.

Sustainable agriculture and why it is a better solution

Sustainable agriculture systems are based on relatively small, profitable farms that use fewer off-farm inputs, integrate animal and plant production where appropriate, maintain a higher biotic diversity, emphasize technologies that are appropriate to the scale of production, and make the transition to renewable forms of energy.

The health of both the environment and humans would be enhanced if more of our farms made the transition to sustainable systems of production. A more sustainable food system would involve closer connections between producer and consumer, meaning more direct marketing of foods to local consumers (through farmers markets, community-supported agriculture farms, farmer cooperatives, etc.). These localized marketing strategies mean shorter distances from the farm to the dinner plate, and therefore less energy use for food transport.

Humans have practiced agriculture for more than 10,000 years, but only in the past 50 years or so have farmers become heavily dependent on synthetic chemical fertilizers and pesticides and fossil fuel-powered farm machinery.

In that half-century of ascendance, industrial agriculture has substantially increased crop yields through high-yielding plant varieties, mechanization, and synthetic chemical inputs. For example, Indian farmers were producing 30 bushels of corn per acre in 1920, whereas 1999 yields averaged about 134 bushels per acre, an increase of almost 350 percent.

The higher yields of industrial agriculture have come, however, at great cost to the environment and the social fabric—costs that are not included in the price of our food (economists would call these costs "externalities"). Low prices at the grocery store give us a false sense that our food comes cheap, but they do not include the cost of cleaning up farm pollution, for example, or the cost of vast government subsidies to agriculture.

Industrial agriculture's tendency toward larger, more mechanized farms has also exacted a social toll. Studies have shown that farm consolidation leads to the deterioration of rural communities. According to a study this type of agriculture leads to depressed median family incomes, high levels of poverty, low education levels, social and economic inequality between ethnic groups, etc., … associated with land and capital concentration in agriculture.

**The writer is a student of Agricultural Economics from Delhi University*

System of Rice Intensification - For Food Security and Environmental Sustainability

By **D.Muthamizh Vendan Murugavel***

Rice is the staple food for more than half of the world population. With population increasing by 1.5 percent per year, and the continuously increasing conversion of agricultural land year by year, national rice product must be continuously increased. There is no other way to cover the rice shortage than to increase production. Rice is water intensive crop. More than 70 percent of the country's ground and surface water is being used for agriculture, and out of this, 70 percent is allocated to rice cultivation. Each kg of rice produced with irrigation requires 3000-5000 litres of water. Increasingly water is becoming single most constraint to produce more rice to meet increasing demand. In spite of providing assured irrigation, use of pest-resistant high-yielding varieties, and high inputs of fertilisers and pesticides, rice yields in India are plateauing. With inevitable growth of demand for human and industrial needs, water available for agriculture will become scarcer in future. Rice systems provide incomes and employment to millions of households. Rice systems are important for enhancing nutrition and sustainable development. Hence, India needs to invest on improving its water productivity, and any capacity to produce more rice with less water will be an important contribution to sustainable water and food security.

System of Rice Intensification (SRI) emerged in the 1980's as a synthesis of locally advantageous rice production practices encountered in Madagascar by Fr Henri de Laulanie, a Jesuit Priest who had been working there since 1961. But, it is Dr.Norman Uphoff from Cornell International Institute for Food and Agriculture, Ithaca, USA, who had brought this method to the notice of outside world in the late 1990s calling it the answer to the needs of farmers in the 21st century. Formal experimentation

in India started in 2002-2003. So far the method has been taken up in TamilNadu, Andhra Pradesh, West Bengal, Jharkhand, Chattisgarh and Gujarat.

Rice Intensification technology known as System of Rice Intensification provides bigger yields with less seeds, water and fertilizers is gaining popularity in India. For example, one conventional plant produces 5 panicles [fertile tillers], one SRI plant produces 8-10 panicles. Each conventional panicle contains 100-120 full grains while each SRI panicle has 180-200 full grains. The SRI technology is reported to have been successfully tried out in 40 countries. Many research institutes have initiated experimental trials on SRI across the country in several states including, TamilNadu, Andhra Pradesh, Orissa, Tripura, Punjab, West Bengal, Chattisgarh, Karnataka, Assam, Bihar, Himachal Pradesh, Uttarakhand, Jammu and Kashmir and Madhya Pradesh to promote among farmers SRI in paddy cultivation. Farmers, with less expense, are able to produce more rice to eat or sell, improving both their food security and income, while further benefiting their health and the environment by using less water and agrochemicals.

Reports indicate that SRI can increase farmers' current rice yield two or threefold (Uphoff, 2002). The net effect is to improve household incomes and food security while reducing the negative environmental impacts of rice production, and making food production more resilient. About 50 percent water savings are also reported with little or no reduction in yield (Thiyagarajan et al. 2002).

Rice Intensification technology known as System of Rice Intensification provides bigger yields with less seeds, water and fertilizers is gaining popularity in India

Reasons for Adoption of SRI

- Saving on seed cost as the seed requirement is less
- Younger seedlings
- Saving on water as Irrigated-Dry method is followed and found as the best option to address water crisis (Water use is reduced as the soil is kept moist in the SRI rather than submerged under inches of water as is done in the traditional system)
- Reduction of labour cost to the tune of 50 percent.
- Cost of external inputs gets reduced as chemical fertilizers and pesticides are not used
- Incidence of pests and diseases is low as the crop eco system provides congenial environment to the plant to show its full virulence and potential.
- SRI saved the operational cost involved in nursery raising, uprooting, bundling and lifting to the field.
- Higher yields compared to the prevailing cultivation system due to profuse tillering, increased panicle length and grain weight
- Grain weight increased without change in grain size
- Seed multiplication with less quantity of parent seed
- Farmers can produce their own quality seed
- Cold tolerance
- Younger seedlings
- It buries the weeds fully into the soil, making them an added source of nutrient instead of the conventional system in which the weeds are pulled out by hand and discarded
- More healthy and tasty rice as a result of organic farming practices
- Effectively, the crop gets adequate sunlight, nutrients and water because of wider spacing and optimal inputs. So each paddy plant puts out more grains.
- The wider spacing gives farmers the added benefit of lower labour costs, healthier paddy plants with strong rooting which means lesser incidence of disease and lower use of pesticides and more grain output.
- Concerted institutional support provided by various service organizations, research systems, Departments through trainings, inputs and monitoring support.

SRI Farmer practices Vs conventional paddy cultivation - A comparison

Input	SRI Technique-Recommended	Conventional Paddy
Seed	2 kg per acre	20-30 kg per acre
Spacing	25 X 25 cm	Closer spacing 15X10, 20X10, 20X20
Transplanting	8-14 days old	Seedlings about 30 days old
No. of Seedlings per hill	2-3 seedlings	Only one seedling
Fertilizers	Application of chemical fertilizers, insecticides and herbicides	Preference given to organic fertilization, insecticides and herbicides
Plant protection	Application of insecticides and herbicides, 2-3 times spray	Insecticides, pesticides are not necessary
Weeding	Manual weeding herbicide application	Non-chemical means of weed control by cono-weeder (2 times)

Relevance of SRI for climate change

Changes in climate will affect rice production and thus have an impact on food security. It has been estimated (IWMI 2007) that for every 1°C rise in mean temperature, there is a corresponding 7 percent decline in rice yield. The International Food Policy Research Institute calculates a 12-14 percent decline in world rice production by 2050 due to the effects climate change. Beyond increasing yields, SRI offers three major benefits that have significant climate implications if applied on a large-scale:

- Reduced demand for water
- Reduced methane gas emissions
- Reduced use of nitrogen fertilizers

In addition, with SRI practices, rice plants have stronger stems and root systems that are more resistant to flooding and storm damage compared to those grown using conventional practices. Perhaps even more important, their deeper root systems make crops more drought-resistant.

Constraints in Adoption

- Water management is difficult due to low-lying area.
- Problem of timely labour-availability in the initial stages.
- More chances for weeding
- Difficulty in handling the younger seedlings of 8 to12 days for transplantation.
- Crop protection is sometimes needed, although SRI plants have considerable natural resistance against pests and diseases.
- Farmer skill and motivation is the most important requirement since SRI involves more intensive and knowledgeable management
- Women find it difficult to operate the Cono weeder.
- Lack of standard package of practices
- Farmers feel that SRI method need extra care and laborious
- No visible evidence shown through demonstrations
- Non-availability of markers and weeders

Potentials for Sustainability

As SRI reduces the demand for water in agricultural production and also the use of agrochemical inputs, it has benign environmental impacts. By raising the agronomic and economic productivity of land, labour, water and capital all at the same time, it enables farmers to produce

more with less, by mobilizing the services and benefits of soil biota. It points the way to greater sustainability of agricultural production in general, and of production intensification. Producing more outputs with fewer inputs is unique and uniquely appropriate for sustainability.

Strategies to promote SRI in the country

- Expansion of SRI to larger areas i.e. at least to the extent of 20 percent of total rice growing area.
- SRI may be popularised through active involvement of Voluntary Agencies, Government Agencies, KVKs, Self-Help Groups, Farmer Interested Group (FIG), Farmers' Clubs, Joint Liability Groups, Self-Help Groups etc.
- Incentives in the form of quality inputs, exposure visits, advice by technical experts may be provided to encourage the farmers to adopt SRI.
- Capacity building programmes to the representatives of NGOs and farmers may be provided on SRI technology.
- Helping small and marginal farmers to overcome the fear complex of risk
- SRI is being popularised by State Government Agencies/Central Government Agencies/Voluntary Agencies/Financial Institutions. The efforts of all the stakeholders are to be synchronised and convergence of their programmes is required for better outreach at farmer level.
- Removing complex of delicacy in handling SRI seedlings and other practices through on-site experiential mode of facilitative training and demonstration.
- Even though SRI has been practiced for sometime, it is not so popular due to certain problems like weeds, labour requirement, lack of standard package of practices, etc. Hence, it is necessary to focus on relevant research to make SRI technology more popular.
- There are committed funds available with NABARD for promoting SRI. Stakeholders should take advantage of these funds for popularising SRI in traditional rice belts and also reaching SRI technology to non-traditional rice growing areas.
- Giving top priority for Farmer- to-Farmers Technology Transfer and ensuring frequent conference or workshop at farmer level to interface their knowledge and exchange experiences towards further refinement and development.
- To ensure fast and full adoption of SRI, more extension personnel and farmers should be trained on the aspects viz., production of healthy and robust seedlings through mat or conventional nursery, use of the recommended spacing with the square method of transplanting young seedlings, encouraging the use of the Cono weeder by having it available at a reasonable price and conducting demonstrations of its operation.

Conclusion

Certainly, SRI is a victor. SRI has made remarkable progress in the last five years in India, which has inspired policy makers to include SRI explicitly as an approach for the National Food Security Mission (NFSM).This is a technology adoption to overcome water and labour shortage. It rightly responds to the pressures of high input costs and low margins in this tough business where many farmers have suffered. They heavily applied chemical fertilizers, thus, soil becomes unfertile. The overuse and abuse of herbicide spray makes the rice plants become unhealthy and more susceptible to diseases and less productive. This emerging technology not only addresses food security, but also the water scarcity challenge that climate change is making all the more dangerous. These are all lessons for our world. Today SRI is being adopted in many states in India and the response from farmers has been overwhelming seeing the benefits of the method, notwithstanding the constraints.

SRI has made remarkable progress in the last five years in India, which has inspired policy makers to include SRI explicitly as an approach for the National Food Security Mission (NFSM)

[*]The Writer is Assistant Professor, PG & Research Department of Commerce, Gobi Arts & Science College, Gobi, Tamilnadu.

Issues of Financial Credit

By **Ramesh Golait***

Agriculture plays a crucial role in the development of the Indian economy. It accounts for about 19 percent of GDP and about two thirds of the population is dependent on the sector. The importance of farm credit as a critical input to agriculture is reinforced by the unique role of Indian agriculture in the macroeconomic framework and its role in poverty alleviation. Recognising the importance of agriculture sector in India's development, the Government and the Reserve Bank of India (RBI) have played a vital role in creating a broad-based institutional framework for catering to the increasing credit requirements of the sector. Agricultural policies in India have been reviewed from time to time to maintain pace with the changing requirements of the agriculture sector, which forms an important segment of the priority sector lending of scheduled commercial banks (SCBs) and target of 18 percent of net bank credit has been stipulated for the sector. The Approach Paper to the Eleventh Five Year Plan has set a target of 4 percent for the agriculture sector within the overall GDP growth target of 9 percent. In this context, the need for affordable, sufficient and timely supply of institutional credit to agriculture has assumed critical importance.

The evolution of institutional credit to agriculture could be broadly classified into four distinct phases - 1904-1969 (predominance of co-operatives and setting up of RBI), 1969-1975 [nationalisation of commercial banks and setting up of Regional Rural Banks (RRBs)], 1975-1990 (setting up of NABARD) and from 1991 onwards (financial sector reforms).

The genesis of institutional involvement in the sphere of agricultural credit could be traced back to the enactment of the Cooperative Societies Act in 1904. The establishment of the RBI in 1935 reinforced the process of institutional development for agricultural credit. The RBI is perhaps the first central bank in the world to have taken interest in the matters related to agriculture and agricultural credit, and it continues to do so (Reddy, 2001).

The demand for agricultural credit arises due to

i) lack of simultaneity between the realisation of income and act of expenditure;

ii) lumpiness of investment in fixed capital formation;

iii) stochastic surges in capital needs and saving that accompany technological innovations. Credit, as one of the critical non-land inputs, has two-dimensions from the viewpoint of its contribution to the augmentation of agricultural growth *viz.*, availability of

credit (the quantum) and the distribution of credit. In this paper, the trends in agricultural credit are analysed in Section I; Section II covers Statewise distribution of institutional credit; Section III deals with recent policy initiatives; issues and concerns are dealt with in Section IV; Section V draws implications for the future followed by the concluding observations in Section VI.

Agricultural Credit: Discernible Trends

In India a multi-agency approach comprising co-operative banks, scheduled commercial banks and RRBs has been followed for purveying credit to agricultural sector. The policy of agricultural credit is guided mainly by the considerations of ensuring adequate and timely availability of credit at reasonable rates through the expansion of institutional framework, its outreach and scale as also by way of directed lending. Over time, spectacular progress has been achieved in terms of the scale and outreach of institutional framework for agricultural credit.

Some of the major discernible trends are as follows:

1. Over time the public sector banks have made commendable progress in terms of putting in place a wide banking network, particularly in the aftermath of nationalisation of banks. The number of offices of public sector banks increased rapidly from 8,262 in June 1969 to 68,355 by March 2005.
2. One of the major achievements in the post-independent India has been widening the spread of institutional machinery for credit and decline in the role of non-institutional sources, notwithstanding some reversal in the trend observed particularly in the 1990s.
3. The share of institutional credit, which was little over 7 percent in 1951, increased manifold to over 66 percent in 1991, reflecting concomitantly a remarkable decline in the share of noninstitutional credit from around 93 percent to about 31 percent during the same period. However, the latest NSSO Survey reveals that the share of non-institutional credit has taken a reverse swing which is a cause of concern (Table 1).

Table 1: Relative Share of Borrowing of Cultivator Households from Different Sources

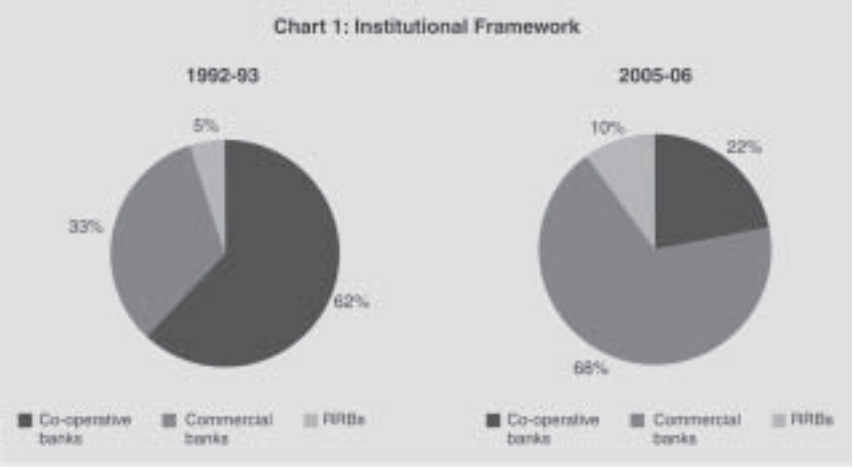
(Percent)

Sources Credit	1951	1961	1971	1981	1991	2002
1	2	3	4	5	6	7
Non-Institutional	92.7	81.3	68.3	36.8	30.6	38.9
of which						
Money Lenders	69.7	49.2	36.1	16.1	17.5	26.8
Institutional	7.3	18.7	31.7	63.2	66.3	61.1
of which						
Cooperatives Societies/Banks	3.3	2.6	22.0	29.8	23.6	30.2
Commercial Banks	0.9	0.6	2.4	28.8	35.2	26.3
Unspecified	–	–	–	–	3.1	–
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: *All India Debt and Investment Survey and NSSO.*

Notwithstanding their wide network, co-operative banks, particularly since the 1990s have lost their dominant position to commercial banks. The share of co-operative banks (22 percent) during 2005-06 was less than half of what it was in 1992-93 (62percent), while the share of commercial banks (33 to 68 percent) including RRBs (5 to 10 per ent) almost doubled during the above period (Chart 1).

4. However, the growth of direct finance to agriculture and allied activities witnessed a decline in the 1990s1 (12 percent) as compared to the 1980s (14 percent) and 1970s (around 16 percent). Furthermore, a comparative analysis of direct credit



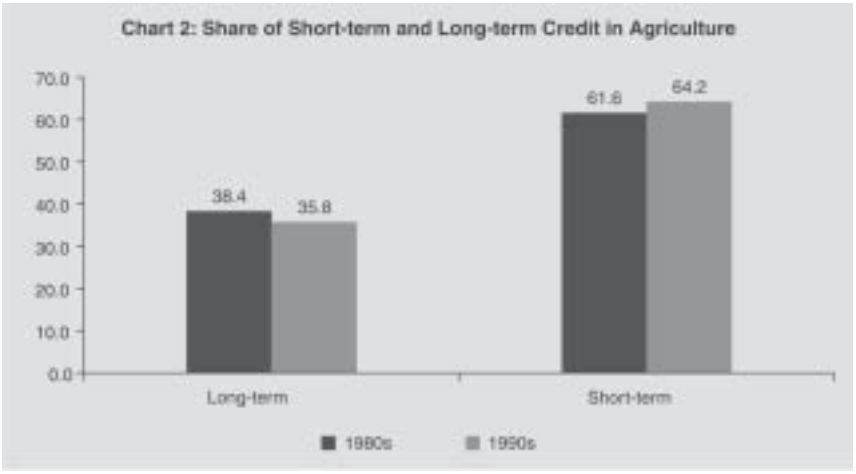
The efforts to increase the flow of credit to agriculture seems to have yielded better results in the recent period as the total institutional credit to agriculture recorded a growth of around 21 percent during 1995-96 to 2004-05 from little over 12 percent during 1986-87 to 1994-95. In terms of total credit to agriculture, the commercial banks recorded a considerable growth (from around 13 percent to about 21 percent), while cooperative banks registered a fall (over 14 percent to over 10 percent) during the above period (Table 2).

to agriculture and allied activities during 1980s and since 1990s reveals the fact that the average share of long-term credit in the total direct finance has not only been much lower but has also decelerated (from over

38 percent to around 36 percent), which could have dampening effect on the agricultural investment for future growth process (Chart 2).

The disaggregated picture as per size-wise distribution of credit reveals that the growth of direct finance to small and marginal farmers witnessed a marked deceleration from about 24 percent in the 1980s to little over 13 percent during the 1990s.

5. Sectoral deployment of gross bank credit reveals that the share of agriculture since the second half of 1990s has ranged between 11-12 percent. As at end March 2006, the share stood at around 11.9 percent (Table 3).



Some Recent Policy Initiatives

The Finance Minister in his Union Budget 1995-96 speech stated that, "Inadequacy of public investment in agriculture is today a matter of general concern. This is an area which is the responsibility of States. But many States have neglected investment in infrastructure for agriculture. There are many rural infrastructure projects which have been started but are lying incomplete for want of resources. They represent a major loss of potential income and employment to rural population."

Rural Infrastructure Development Fund (RIDF) was set up in NABARD2. Since then, 11 tranches of allocations have been made towards the Fund. Commercial banks make contributions towards the Fund on account of the shortfalls in their priority/agriculture sector lending. The scope of RIDF has been widened to enable utilisation of loan by Panchayati Raj Institutions (PRIs), Self-Help Groups (SHGs), Non-Government Organisations (NGOs), *etc.*, since 1999-2000.

The Fund has continued with additional corpus being announced every year in the Union Budget. The RIDF XI was announced in the Union Budget for 2005-06 with an allocation of Rs.8,000 crore making a total corpus of Rs.50,000 crore. RIDF XI accorded special emphasis for setting up of Village Knowledge Centres by providing Rs.100 crore out of the corpus of Rs.8,000 crore (Table 6).

Two innovations, *viz.*, micro-finance and Kisan Credit Card Scheme (KCCS) have emerged as the major policy developments in addressing the infirmities associated with the distributional aspects of credit in the recent years. The KCCS has emerged as the most effective mode of credit delivery to agriculture in terms of the timeliness, hassle-free operations as also adequacy of credit with minimum of transaction costs and documentation. Around 59.09 million KCCs were issued till end-March 2006. The cooperative banks (51.5 percent) had a major share followed by commercial banks (36.9 percent) and RRBs (11.6 percent)

The micro credit programme, which was formally heralded in 1992 with a modest pilot project of linking around 500 SHGs has made rapid strides in India exhibiting considerable democratic functioning and group dynamism. The programme has now assumed the form of a micro finance movement in many parts of the country.

There was a massive expansion during 2004-05 with the banking system establishing credit linkage with 539 thousands new SHGs, taking the cumulative number of such SHGs to 2.9 million at end-March 2007. Banks extended loans aggregating Rs.18,041 crore at end-March 2007 registering a growth of 58.3 percent over the previous year.

Several Committees were set up from time to time to look into the various issues relating to credit delivery for agriculture, the recent one being Advisory Committee on Flow of Credit to Agriculture and Related Activities from the Banking System (Chairman: Prof. V.S. Vyas, June, 2004)

**The writer is Assistant Advisor in the Department of Economic Analysis and Policy of The Reserve Bank of India*

Promoting Sustainable Agriculture in India

By **D. Amutha***

Agriculture sector, world over, has experienced a phenomenal growth since the mid-twentieth century. The growth, driven by Green Revolution technology, has made a significant dent on aggregate supply of food grains, ensuring food security to the growing population. The next stage of agricultural growth however, faces a serious challenge in terms of sustainability. Whereas the main problem faced by the developing countries in the south pertains to sustainability of resource use, the main challenge facing the developed economies in the north is overuse of chemical inputs. These problems have led to increasing awareness and a felt need for moving away from the input intensive agriculture perused during the Green revolution phase, to sustainable farming in different parts of the world. While the need for a paradigmatic shift in the growth strategy is well recognized, the transition from input intensive to sustainable farming however, has certain inherent difficulties. Notwithstanding these limitations, policies in both the north as well as the south have led increased emphasis on promoting sustainable agriculture.

India can safely be characterized as an agricultural country despite the recent spurt in manufacturing and services and the declining share of agriculture in the national income, since majority of its workforce (~ 65%) are still engaged in agriculture and allied activities. It has been the noblest profession in India since the time immemorial and has been carried out on sustainable basis. It is only relatively recent phenomenon that large-scale forest areas, grazing lands and waste lands have been converted into croplands to support the rising population, which has caused ecological imbalance and atmospheric pollution. With no further scope for expansion of

agricultural land efforts have been made to enhance the production of food grains using high-yielding variety of seeds, fertilizers and irrigation along with advanced farm equipments. However, so-called green revolution is cofined to a few crops, viz, wheat, rice and maize and has been possible only in restricted areas, i.e., Punjab, Haryana and Western Uttar Pradesh and certain selected districts of Andhra Pradesh, Maharashtra and Tamilnadu.

Naturally much work is needed to lift the agriculture to a level where it is least affected by vagaries of monsoon and needs little from outside the farm, i.e., lesser dependence on chemical fertilizers and water. The limited success of green revolution has been a mixed bag in that it has given rise to new set of problems: overuse of water and fertilizers. Excessive use of water results in water logging and salinization whereas excess of fertilizers and pesticide cause pollution of water bodies contamination of ground water. India has the largest area of irrigated land (55 million hectares) of which about one-third land is already degraded and 7 million hectare have been abandoned1. In such a situation a renewable and lasting alternative, sustainable agriculture, has to emerge for successful agricultural revolution. In the present paper the need for sustainable agriculture has been emphasized. Policies for sustainable agriculture and organic farming and possible actions in India are discussed.

Need for Sustainable Agriculture

We can compare three broad types of farming: traditional production systems, conventional modern agriculture (such as Green Revolution technologies), and sustainable agriculture. We can compare them across three dimensions: ecological, economic and social.

Ecological Sustainability

Many traditional and most conventional farm practices are not ecologically sustainable: they overuse natural resources, reducing soil fertility, causing soil erosion, and contributing to global climatic change. Sustainable agriculture has several major advantages over both traditional and conventional practices:

Soil fertility: A continuous fall in soil fertility is a major problem in many parts of India. Sustainable agriculture improves fertility and soil structure and prevents erosion, so would be an answer to this problem.

Water: Irrigation is the biggest consumer of fresh water, and fertilizer and pesticides contaminate both surface- and groundwater. Sustainable agriculture increases the organic matter content of the topsoil, so raising its ability to retain and store water that falls as rain.

Biodiversity: Sustainable agricultural practices frequently involve mixed cropping, so increasing the diversity of crops produced and raising the diversity of insects and other animals and plants in and around fields.

Pollution: Pesticides are hazardous to human health as well as to the local ecology. Incorrect handling, storage and use of pesticides lead to health and pollution problems. Sustainable agriculture reduces or eliminates the use of hazardous chemicals; instead it controls pests with a variety of biological

and agronomic measures and the use of natural substances.

Landscape: Agriculture and forestry clothe the rural landscape. Inappropriate use causes erosion, landslides and flooding, clogs irrigation channels, and reduces the ability of the land to support the local population. Impoverished rural people flock into the cities in search of jobs, forming unsightly, insanitary slums that further destroy the landscape. Rehabilitating ecologically damaged areas needs huge investments that few countries can afford. Sustainable agriculture avoids these problems by improving productivity, conserving the soil, avoiding the expansion of farming into unsuitable areas, and preserving rural jobs.

Climate: The way agriculture is practiced contributes significantly to global climatic changes. Conventional agriculture contributes to the production of greenhouse gases in various ways: by reducing the amount of carbon stored in the soil and in vegetation, through the production of methane in irrigated fields, and through energy-intensive activities such as the production of artificial fertilizers. Adopting sustainable agriculture would reduce these impacts significantly.

Economic Sustainability

Agriculture cannot be sustainable unless it is economically viable over the long term. Conventional agriculture poses greater long-term economic risks than "sustainable" alternatives.

Export vs. local orientation: Governments tend to view export-oriented production systems as more important than those that supply domestic demands. This is misguided. Focusing on exports alone involves hidden costs: in transport, in assuring local food security, etc. Policies should treat domestic demand and in particular food security (either by farmers producing food for themselves, or by selling produce for cash they can use to buy food) as equally important to the visible trade balance.

Debt: The Green Revolution raised India's grain output significantly, but a vast number of small-scale farmers ran into a debt trap: they took out loans to raise their production, and then found they could not pay the money back. About 40,000 were so desperate that they committed suicide.

Risk: Concentrating on specific commodities seems to promise high economic returns. But market production implies certain risks: markets change quickly, and international agricultural prices are dropping. Cheap foreign food may sweep into the national market, leaving Indian farmers without a market. As a World Trade Organization signatory, the Indian government is under pressure to deregulate and open its economy to the world market so cannot protect its farmers behind tariff walls.

Niche markets: Organic agriculture is one of the strongest ways to farm in an environmentally sustainable way. The demand for certified organic products is increasing quickly, opening opportunities to expand sales of such products and to explore niche markets.

Employment: Farming is the main source of employment for rural people. Trends towards specialization and mechanization may increase narrowly measured "efficiency", but they reduce employment on the land. The welfare costs of unemployment must be taken into account when designing national agricultural support programmes. Sustainable agriculture, with its emphasis on small-scale, labour-intensive activities, helps overcome these problems.

Social Sustainability

The social sustainability of farming techniques is related to the ideas of social acceptability and justice.

Inclusiveness: Development cannot be sustainable unless it reduces poverty for the broad masses of people in India. The government must find ways to enable the rural poor to benefit from agricultural development.

Political unrest: Gaps between the "haves" and "have-nots" feed a feeling of social injustice among those who feel neglected and excluded from development opportunities, as well as from better-off sympathizers. The result is a climate favorable to political opposition and even violence.

Local acceptance: Many new technologies fail because they are based on practices or assumptions from outside. Sustainable agricultural practices usually

are based on local social customs, traditions, norms and taboos, so local people are more likely to accept them and adapt them to their own needs.

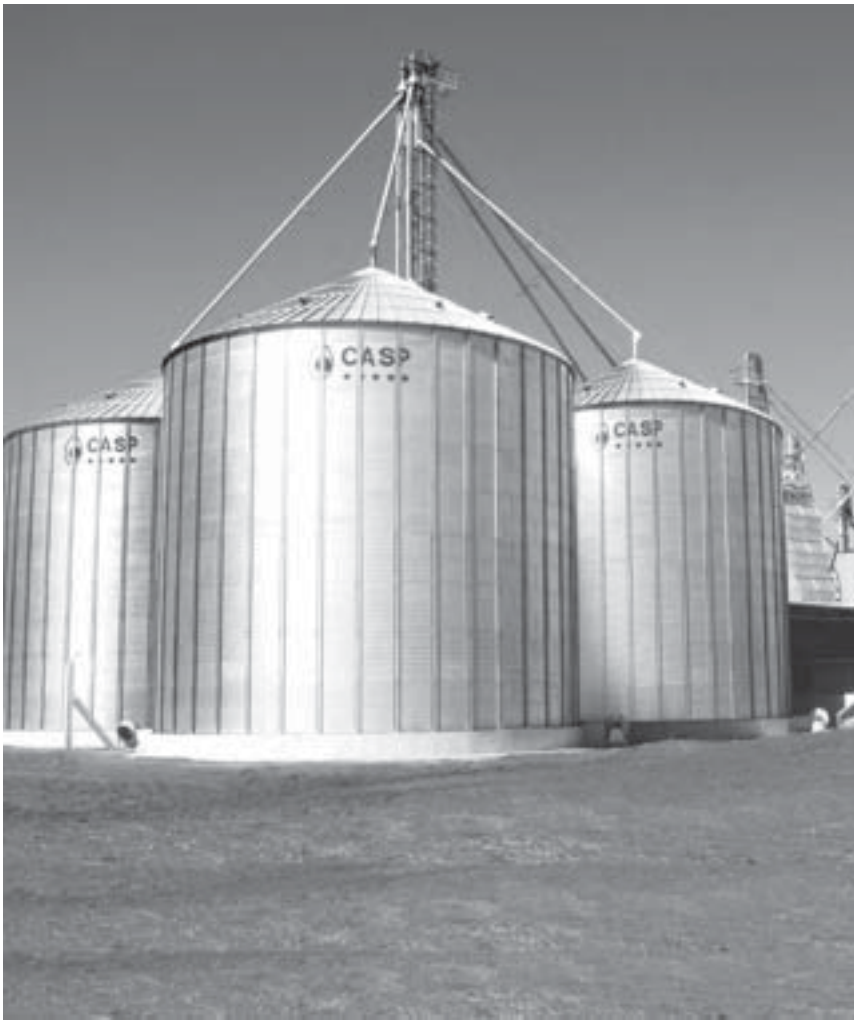
Indigenous knowledge: Sustainable agricultural practices often rely on traditional knowhow and local innovation. Local people have a wealth of knowledge about their environment, crops and livestock

They keep locally adapted breeds and crop varieties. They have social structures that manage and conserve common resources, help people in need, and maintain the social fabric. Rather than ignoring or replacing this knowledge, sustainable agricultural development seeks to build on it and enrich it with appropriate information from outside.

Gender: In traditional agriculture, women traditionally bear the heaviest burdens in terms of labour. In modern conventional farming, too, men often benefit the most: they control what is grown and how the resulting income is spent. Sustainable agriculture attempts to ensure that the burdens and benefits are shared more equitably between men and women.

Food security: Traditional farming techniques often fail to produce enough food, or enough variety of food for a balanced diet. Conventional modern farming focuses on a few commodities, so people still do not have a balanced diet. Sustainable agriculture improves food security by improving the quality and nutritional value of the food, and by producing a bigger range of produce throughout the year.

Participation: Traditional society in India is raven by wealth and caste distinctions. Introducing conventional farming innovations tends to exacerbate these: the rich and higher-caste tend to benefit, while the poor and lower-caste are left out. Sustainable agricultural interventions consciously target the less well-off, and empower them so they can organize and speak with their own "voice", so promoting dialogue and democracy.



Sustainable Agriculture in India

The sustainable agriculture may be defined as any set of agronomic practices that are economically viable, environmentally safe, and socially acceptable. If a cropping system requires large inputs of fertilizer that leak from the system to pollute ground water, drinking supplies and distant coastal fisheries, the system may be sustainable economically as the long-term supply of fertilizer is stable and the economic cost of fertilizer is easily borne by larger grain production but it is not sustainable environmentally or socially, since it does not cover the cost of environmental damage or social costs. The organic agriculture focuses on "living soil", on optimizing the use of biological processes and on avoiding the use of synthetic chemicals and fertilizers.

Advocates of sustainable agriculture agree with biological focus and hope to reduce but not necessarily eliminate chemical use. In the context of sustainable agriculture another term "alternative agriculture" has been prominently used. Definition of alternative agriculture sheds much light on operational aspects of sustainable agriculture. Any food or fiber production that has

- a more thorough incorporation of natural processes,
- reduced use of off-farm inputs with less harm to environment and consumers,
- a more productive use of biological and genetic potential of plants and animals,
- a better match between cropping patterns and the physical capacity of lands and,
- An improved emphasis on conservation of soil, water, energy and biological resources, is defined as alternative agriculture.

The normal agricultural practices using irrigation, chemical fertilizer, pesticides

and high-yielding variety of seeds is called conventional agriculture. With increasing use of chemical fertilizers and pesticides the conventional agriculture is major source of pollution of inland water bodies and coastal seas. There has been growing criticism of conventional agriculture for its side effects, the "external costs" which impact communities, the environment, and human health.

As for indicators of sustainability there is no single prescription. Sustainable practices will vary by cropping system, local environment and socio-economic system. Still, experience tells us that locally sustainable systems tend to be more resource conservative than less sustainable system and tend to rely less on external inputs and more on internal ecosystem services.

India – Policies for Sustainable Agriculture and Organic Farming

The Indian government's policies have always emphasized food grain self-sufficiency, which has not necessarily coincided with agricultural sustainability. The growth of agricultural production and productivity, which had risen significantly during 1970s and 1980s, declined during 1990s. These slowdowns have worsened since 2000, both overall agricultural production and food grains production have shown negative growth rates in 2000-01 to 2002-03 period. Decline in the growth rates of agricultural production and productivity is a serious issue considering the questions of food security, livelihood, and environment. As such, a critical examination of the approaches for sustainable agricultural development is necessary. This examination must be framed not only by India's ongoing need to ensure food self-sufficiency but also by the consequences of access to international markets.

Sustainable Agriculture – Possible Actions in India

- Improvement of existing production systems (e.g. altered crop rotations, introduction of green manuring, use of plant species adapted to specific locations)
- Improved protection of natural resources (e.g. erosion protection)
- Increase in efficiency of existing resources (e.g. irrigation, use of technology, basic and advanced training)
- Introduction of regenerative branches of business (e.g. horticulture or aquaculture)
- Introduction of a new production element in existing enterprises (such as fruit trees to stabilize terraced fields, fish-farming in rice fields)
- Optimization of post-harvest systems (e.g. storage)
- Increase the value of agricultural products through further processing (e.g. production of yoghurt from milk)
- Improvement of channels of distribution (e.g. market access, transport)
- Access to loans and other financial services
- Covering risk (e.g. through land law, support of producer groups)

Conclusion

Under the changing agricultural scenario, the agricultural technologies needs a shift from production oriented to profit oriented sustainable farming. In this direction, the pace of adoption of resource conserving technologies (RCTs) by the Indian farmers is satisfactory to a larger extent but, under the present scenario, we are in the half way of conservation agriculture. The CA systems will leads to sustainable farming and will be the most thrust of the future farming.

The conditions for development of sustainable agriculture are becoming more and more favorable. New opportunities are opening the eyes of farmers, development workers, researchers and policy makers. They now see the potential and importance of these practices not only for their direct economic interest but also as the basis of further intensification and ecological sustainability. This does not mean that agrochemicals can be abandoned. Also, research has an important role to play. Bankers and funders should think of how best to provide incentives and credits, accessible to poor farmers and women, to make investment in dry land farming possible. As conditions for farming will continue to change, the key to sustainable agriculture is the capacity of farmers and all other actors in agricultural development, as well as the wider society, to learn, experiment, adapt and cooperate in an effective way. To conclude, a small farm management to improve productivity, profitability and sustainability of the farming system will go a long way to ensure the all round sustainability.

The Writer is Asst. Professor In Economics St. Mary's College (Autonomous)

India's National Agricultural Policy: A Critique

By **Ramesh Chand***

Agriculture is described as the backbone of Indian economy, mainly because of three reasons. One, agriculture constitutes largest share of country's national income though the share has declined from 55 percent in early 1950s to about 25 percent by the turn of the Century. Two, more than half of India's workforce is employed in its agriculture sector. Three, growth of other sectors and overall economy depends on performance of agriculture to a considerable extent. Besides, agriculture is a source of livelihood and food security for large majority of vast population of India. Agriculture has special significance for low income, poor and vulnerable sections of rural society. Because of these reasons agriculture is at the core of socio economic development and progress of Indian society, and proper policy for agriculture sector is crucial to improve living standards and to improve welfare of masses.

Broad Characteristics of Agriculture

Agriculture in India is in the hands of millions of peasant households, a bulk of which comprise tiny land holdings with preponderance of owner cultivation. There is hardly any direct government intervention in the production and investment decisions of the farmers but the government does influence the legal, material and economic environment in which farmers operate (Vaidyanathan 1996). Though tremendous progress has been made to exploit irrigation potential in the country still two third of area under cultivation is unirrigated and there is thus heavy dependence of production on vagaries of nature i.e. rainfall. Irrigated areas have experienced sharp increase in productivity level and large part of output at such farms is for market. On the other hand, productivity in unirrigated areas has remained either stagnant or experienced very small growth and most of the farmers in such areas produce for subsistence purpose.

At overall level, agricultural growth remained slow (below 3 percent) in the country. Apart from that, agricultural growth remained confined to a few well endowed pockets which has created regional disparities.

Phases In Agricultural Policy

There is a close association between agricultural policy followed in the country and the magnitude and sources of output growth. Based on these, agricultural policy followed during the last five decades can be broadly distinguished in 3 phases. A detailed description of policy followed in each phase is given in Rao (1996) and in this section we have drawn mainly from this paper.

The period from 1950/51 to mid 1960s which is also called pre green revolution period witnessed tremendous agrarian reforms, institutional changes and development of major irrigation projects. The intermediary landlordism was abolished, tenant operations were given security of farming and ownership of land. Land ceiling acts were imposed by all the states to eliminate large sized holdings and cooperative credit institutions were strengthened to minimise exploitation of cultivators by private money lenders and traders (Radhakrishna 1993). Land consolidation was also affected to reduce the number of land fragments.

Expansion of area was the main source of growth in the pre green revolution period. The scope for area expansion diminished considerably in the green revolution period in which growth rate in area was less than half the growth rate in the first period. Increase in productively became the main source of growth in crop output and there was significant

acceleration in yield growth in green revolution period. The main source of productivity increase was technological breakthrough in wheat and rice. The country faced severe food shortage and crisis in early 1960s which forced the policy makers to realise that continuous reliance on food imports and aid imposes heavy costs in terms of political pressure and economic instability (Rao 1996) and there was a desperate search for a quick breakthrough in agricultural production. One choice before the country was to go for spread of new seeds of high yielding varieties (HYV) of wheat and rice which were available with CGIAR institutes like CIMMYT and IRRI. Amidst a serious debate the then Governmenttook bold decision to go for the import and spread of HYV of wheat and rice which involved use of fertilisers and irrigation. This marked second phase of agriculture policy in the country. The strategy produced quick results as there was quantum jump in yield.

Consequently, wheat and rice production in a short span of 6 years between 1965/66 and 1971/72 witnessed an increase of 30 million tonnes which is 168 percent higher than the achievement of 15 years following 1950/51. The biggest achievement of new agricultural strategy, also known as green revolution technology, has been attainment of self sufficiency in foodgrains. Since the green revolution technology involved use of modern farm inputs, its spread led to fast growth in agro input industry. Agrarian reforms during this period took back seat while research, extension, input supply, credit, marketing, price support and spread of technology were the prime concern of policy makers (Rao 1996).

Two very important institutions, namely Food Corporation of India and Agricultural Prices Commission, were created in this period in the beginning of green revolution period, to ensure remunerative prices to producers, maintain reasonable prices for consumers, and to maintain buffer stock to guard against adverse impact of year to year fluctuations in output on price stability. These two institutions have mainly benefited rice and wheat crops which are the major cereals and staple food for the country.

The next phase in Indian agriculture began in early 1980s. While there was clear change in economic policy towards delicensing and deregulation in Industry sector, agriculture policy lacked direction and was marked by confusion. Agricultural growth accompanied by increase in real farm incomes led to emergence of interest groups and lobbies which started influencing farm policy in the country. There has been a considerable increase in subsidies and support to agriculture sector during this period while public sector spending in agriculture for infrastructure development started showing decline in real term but investments by farmers kept on moving on a rising trend (Mishra and Chand 1995, Chand 2001). The output growth, which was concentrated in very narrow pockets, became broad- based and got momentum. The rural economy started witnessing process of diversification which resulted into fast growth in non foodgrain output like milk, fishery, poultry, vegetables, fruits etc which accelerated growth in agricultural GDP during the 1980s. This growth seems largely market driven.

Recent Trends

Though green revolution has been widely diffused in irrigated areas throughout the country, the dryland areas have not seen benefit of technological breakthrough as witnessed through green revolution technology. Of late, improved varieties of oilseeds and course cereals have provided some opportunities for productivity growth in dryland areas. A new phase was started in India's economic policy in 1991 that marked significant departure from the past. Government initiated process of economic reforms in 1991, which involved deregulation, reduced government participation in economic activities, and liberalization. Though much of the reforms were not initiated to directly affect agriculture sector, the sector was affected indirectly by devaluation of exchange rate, liberalisation of external trade and disprotection to industry. Then came new international trade accord and WTO, requiring opening up of domestic market. Initially there were strong apprehensions about the impact of trade liberalisation on Indian agriculture which later on turned out to be real threat for several commodities produced in the country. All these changes raised new challenges and provided new opportunities that required appropriate policy response. Besides, last two decades had witnessed mainly price intervention that had a very limited coverage, and there was a sort of policy vacuum. Because of this, there was a strong pressure on the government to come out with a formal statement of agriculture policy to provide new direction to agriculture in the new and emerging scenario. In response to this, government of India announced New Agricultural Policy in July 2000.

New Agricultural Policy and Challenges in Indian Agriculture

The challenges facing Indian agriculture can be grouped in four categories relating to (1) growth (2) sustainability (3) efficienc y and (4) equity. There are also other important concerns like food security, livelihood, employment, improvement in standard of living of agricultural population. Addressing these challenges requires efforts on several fronts like incentive structure, infrastructure, technology, market development, extension, regulations, input supply, tenancy etc. New agriculture policy should address above challenges through efforts in abovementioned areas and also provide direction to the future of agriculture in the country.

The National Agricultural Policy (NAP) document aims to attain output growth rate in excess of 4 percent per annum in agriculture sector based on efficient use of resources. It seeks to achieve this growth in a sustainable manner and with equity. The Policy resolution than describe in detail the strategy and policy

alternatives which are grouped under the following heads:

1. Sustainable agriculture
2. Food and nutrition security
3. Generation and transfer of technology
4. Inputs management
5. Incentive for agriculture
6. Investment in agriculture
7. Institutional structure
8. Risk management

Growth Prospects

Agricultural growth is essential for the sector's progress and for overall growth of Indian economy. This growth rate is also a sort of essential condition for improving living standard of those who are dependent on agriculture. Past growth experience of Indian agriculture can be seen from Table 1. The main goal of National Agricultural Policy to achieve growth rate higher than four percent seems to be formidable task particularly when we look at historical rate of growth in Indian agriculture. As can be seen from Table 1 long run growth rate in Indian agriculture in the post Independence period is found to be 2.55 percent per annum. This growth rate includes contr ibution of technological breakthrough of green revolution and major expansion in irrigation and in area under cultivation. Out of these three sources of output growth the scope for expansion of cultivated area is much more limited in future compared to that experienced in the past. Net cultivated area (NCA) has become stagnant at 142 million hectares (Table 2) and unless serious efforts are launched to bring wastelands under cultivation there would be no scope to expand NCA. However cultivated area as such can be expanded by raising more number of crops on the same piece of land i.e. by raising crop intensity. This expansion depends heavily on provision of irrigation.

According to official estimates, available water resources can provide irrigation to 140 million hectares area (Tenth Five Year Plan Vol. 2 Ch. 8) which can provide irrigation to 72 percent of gross cropped area, assuming irrigated crop intensity to be 1.36, as compared to 40 percent area

under irrigation at present. Further, productivity of one hectare of gross irrigated area is reported to be 2.75 times the productivity of unirrigated area (Dhawan 1994 p. 83). A simple exercise based on this information reveals that if irrigation potential is fully exploited it would raise present level of output by 50 percent. This further implies that if the entire irrigation potential is exploited by the year 2020 it would enable the country to realize annual growth rate of the order of 2.00 percent per annum for two decades. This would require decadal increment in gross irrigated area by 31.8 million hectare, which is more than double the irrigation potential created during the decade of 1990s. In case the pace of irrigation development is maintained at the level of decade of 1990s, it would help in attaining only 0.78 percent growth rate in output.

Sustainable Agriculture

The policy aims to promote technically sound, economically viable, environmentally non – degrading and socially acceptable use of country's natural resources – land, water and genetic endowments. This indeed is a tall order.

Land Resources: Status of land resources of India is presented in Table 3. Out of 304.9 million hectare area for which land use information is available item 1 and 2 cannot be considered for biotic production. This leaves 264 million hectare area that can be considered for some sort of biotic production. Out of this 142.2 million hectare area is under cultivation. The challenge relating to this land area is to maintain its fertility status and protect against degradation due to soil erosion, chemicalisation, waterlogging and salinisation and alike problems. In the remaining area, sum of items 6 to 10 can be taken to represent maximum wasteland area, assuming forest with poor cover and permanent pasture and grazing grounds are more or less bereft of vegetative cover. This comes to 79.5 million hectare which is more than half of the size of area under cultivation. NAP proposes to put this so called wasteland to use for agriculture and afforestation, but it does not elaborate any strategy to do so. Most of this land requires heavy capital investments to make it productive. Such investments can either come from corporate sector or from government but serious apprehensions have been expressed to allow corporate sector to control these lands. Enough care is also needed to ensure that some proportion of common property waste lands remains around all habitation to serve the community needs and needs of resource poor rural populace. Some innovative

mechanisms like leasing such lands to local households needs to be evolved to make productive use of wastelands.

According to Department of Land Resources this area of 95.5 mha must be a part of the 142.2 mha of land under agriculture. On that reckoning 2/3rd of our agricultural lands are degraded or sick to some extent and only one third are in good health.

In the case of degradation of cultivable land the problem seems to be less complex compared to the wastelands. In some cases use of chemical fertiliser is held responsible for soil degradation. This is somewhat surprising because level of use of inorganic fertilizer in the country is quite low. The reason for adverse impact of chemical fertilizer in the country does not seem to be because of excessive use but because of indiscriminate and non-judicious use. The problem can be tackled by creating awareness among farmers about proper use of fertiliser, and appropriate price structure for various formulations of fertiliser.

Another healthy way to take advantage of chemical fertilizer is by using them alongwith organic fertilizer. There is lot of wastage and diversion of valuable animal dung. Similarly, lots of agricultural bio mass go waste that can be decomposed to produce organic fertilizer. In some parts of the country like North West India lakhs of tonnes of rice and wheat straw is disposed off by burning. This not only causes wastage of biomass but also causes lot of air pollution. Efficient and quick methods for decomposing such biomass would increase availability of organic matter for application in agricultural land.

NAP emphasises use of watershed approach to manage land resources. Watershed approach is also proposed for rainfed agriculture. There are several success stories related to success of watershed approach which includes some outstanding and impressive experiences like those seen in Sukhomajri, Ralegaon Sidhi, Adgaon. There are two aspects of this strategy. One, to protect the inhabitants of fragile eco systems from acute distress caused by recurring drought. In such cases it is basically a survival strategy (Hanumantha Rao 2000). It is important to distinguish this strategy from wider strategy for development of agriculture in dryland or raifed area (Hanumantha Rao op. cit.) as proposed in the National Agricultural Policy. The success of watershed approach as a wider strategy for development of rainfed agriculture would require other ingredients like technology, credit, market and roads, remunerative price environment. Further, participation of local community is critical for success of watershed approach. This requires change in capability and incentives of government bureaucracy in organising communities to take advantage of watershed approac h (Kolavalli and Kerr 2002).

Water Resources: Water resources are becoming extremely scarce as demand for water for agricultural, industrial and household uses is increasing rapidly. It is often quoted that future wars would be fought over water and water would be the source of maximum local conflicts. As India has has only 4 percent of world water resources and 16 percent share in population (Iyer 2001) water scarcity is more acute in the country compared to world average. The pressure on water resources is increasing with population growth, urbanisation and improvement in living standard.

According to some scholars availability of ground water for irrigation would emerge as a critical bottleneck for self sufficiency in foodgrain by the year 2020 as demand for irrigation would exceed its availability by nearly 30 percent (Chopra and Golder 2000). Similarly, National Commission for Integrated Water Resource Development Plan has projected that requirement for irrigation water in India would grow by more than 50 percent by 2050. Evidence is accumulating that water table in several states is getting depleted at a fast rate. Based on various assessments it is concluded that even after fully exploiting available water resources water supply can match the dema nd only if there is a big improvement in efficiency of irrigation.

The success of watershed approach as a wider strategy for development of rainfed agriculture would require other ingredients like technology, credit, market and roads, remunerative price environment

In the light of this scenario, National Agricultural Policy announces that "rational utilization and conservation of the countrty's abundant water resources willl be promoted". It is somewhat surprising that against all evidence of scarcity the NAP feels water resources are abundant. It seems the importance and implications of growing stress on water resources are not adequately recognised by the policy. This requires efforts on several fronts. One, there is a need for creating awareness about the value of water and its sustainable use. The policy should lead to concrete measures for conservation of water resources through measures like rainwater harvesting and groundwater recharging and ens ure judicious use of water. This would require first of all placing value on water that reflects its opportunity cost. Second, improvement in water use efficiency is crucial. According to one estimate a 10 percent improvement in the efficiency of water use would be equivalent to 14 million hectare of gross irrigated area (Saleth 1996) which is as large as the total irrigation potential created during whole decade of 1990s. Achieving them would involve addressing property rights in water, institutions and public policy (pricing etc.).

Food and Nutrition Security

Food and nutritional security has remained central to India's agricultural and development policy since Independence. However, importance being accorded to food and nutrition security has receded during 1990s because of two reasons. One, there was accumulation of very large stock of grains in government stock after April 1998 which had posed very serious problem of disposal in domestic and international

market. This has also caused serious burden on state exchequer. If India had not experienced very severe drought during the year 2002, which caused 14 percent (30 million tonne) decline in foodgrain production, then country was going to have tough time to clear excessive stock of grains. Two, all kind of reduction in cereal consumption is being wrongly attributed to phenomenon of dietary diversification which involves structural shifts in demand from cereal to horticultural and livestock feed, without distinguishing between diversification by choice or diversification under distress.

A closer look at the household consumption data and macro data on availability of cereals for consumption reveals very disturbing trend in food and nutrition security during 1990s. It is found that per capita energy and protein intake declined very sharply during 1990s and percent of population getting energy and protein below the minimum threshold level has increased. This can be seen for rural cultivators and labour households from the data presented in Table 4 taken from Chand et.al. 2003.

Similar evidence for total rural population is reported by Meenakshi and Vishawanathan (2003).Average per capita calorie intake at cultivator households in India during the year 1983 was 2289 kcal, which increased to 2423 during 1987-88. By the year 1999-00 calorie intake declined to 2277. Protein intake increased between 1983 and 1987-88 and declined thereafter. Calorie intake at labour households also dropped sharply during 1990s.There was a sharp reduction in percent of population consuming less than minimum level of calorie suggested for a healthy person between 1983 and 1987-88. The process got reversed during the economic reforms. Incidence of malnourishment (protein deficiency) showed a sharp decline before reforms. With the intensification of reforms with trade liberalization there was sharp increase in malnourishment of farm population. According to the estimate for the year 1999-2000 more than 26 percent farm population and more than 45 percent of rural labour are suffering from energy and protein deficiency.

It would be seen from the results presented in Table 4 that reduction in poverty before reforms was associated with sharp reduction in under nourishment and malnourishment. However, after 1987-88, reduction in poverty did not reduce undernourishment. The patterns in poverty, nutrition and cereal intake show that poverty and cereal intake plays important role in nutritional security of rural households in India. These changes also show that high growth rate in output of fruits and vegetables and livestock products in India during 1990s did not help Indian masses to improve nutrition. As cereals constitute the major share in the food and the decade of 1990s witnessed their reduced consumption the net result has been increase in proportion of population deficit in calorie. Similarly, pulses are the main source of protein in India, stagnation in their production is the cause of protein deficiency. There is a strong feeling among some researchers that decline in cereal consumption in India is the result of structural shifts in demand or dietary diversification away from cereals caused by changes in life style, tastes and preferences and it should not be seen as causing adverse effect on nutrition.

Investments in Agriculture

The purpose of investments in agriculture is to generate capital in the form of infrastructure, improvement in quality of natural resources and assets, and creation of productive assets for promoting long run growth and improving efficiency in production and marketing. This investment in any sector comes from two sources viz. public and private. While public investment is meant mainly to create infrastructure, private investment is used mainly for assets formation and for improvement in quality of existing assets. Traditional agriculture and agriculture in underdeveloped countries is generally starved of investment resources because private capital is deterred by the risk involved in agriculture (Schultz, 1964) and institutional investment has also been meagre (Shonfield, 1960). Therefore, special efforts and attention are required to direct and induce public and private investments in agriculture in underdeveloped countries. In the recent years there has been renewed interest in public and private investments in Indian agriculture. This has been induced by serious concern for secular decline in public investments in Indian agriculture, which began in the early 1980s.

**The Writer is Professor and Head, Agricultural Economics Unit, Institute of Economic Growth, Delhi*

Cosmovisions in Health and Agriculture in India

By **Prabha Mahale and Hay Sor***

There are two major cosmovision traditions in India. The 'Great Tradition', which represents the Sanskrit or classical tradition described in the Vedas and the 'Folk Tradition', representing popular Hindu tradition and the tradition of the tribal people. The rituals and practices of the Hindu tradition, both classical and folk, is a continuing history. They both represent a living cult that is deeply ingrained in social, religious and cultural traditions, both in the orthodox and the popular sense. Generally they converge, occasionally they diverge. There is also the indigenous system of the original inhabitants, the tribal people who have another history and knowledge base.

The Vedas are a collection of hymns, mantras and prayers written in Sanskrit, that communicate the sacred knowledge of the cosmic order visioned by the rishis or seers. Thus, rishis are exalted beings who manifest divine wisdom and include the visionary sages of ancient India to whom the Vedas were intuitively revealed. A rishi or seer has a perfectly subjective and objective mind, because it is free from the six prejudices: lust, anger, greed, intoxication, delusion, jealousy. Because of this he is able to ma ke full use of the five senses and his mental capacity. The senses naturally move out to see, hear, touch, smell and taste, whereas the mind can move outward with the senses and move inward and experience an inner non-sensory world. For a seer, the way to understanding nature is to become one with it. Vedas cover diverse branches of learning, such as astrology, medicine, law, economics, agriculture and government. The Vedic tradition is the root of cosmology and knowledge for the vast majority of Indians, Hindus and Jains.

In India's traditional thought, there is no distinction between the sacred and the profane: everything is sacred. The essence of this tradition is to live in partnership with, rather than to exploit nature. The most complete holistic perspective of the universe was evolved by Vedic culture about 6000 to 8000

The cosmology, the total worldview, had the relationship between the Human and Nature as its core. All life is believed to be interrelated and interwoven

years ago, and has been sustained by Indian civilisation throughout the millennia. The Vedas have played a major role in bringing together mankind and faith in nature and have guided ma n through Rta, the cosmic morality. The cosmology, the total worldview, had the relationship between the Human and Nature as its core. All life is believed to be interrelated and interwoven.

According to Hindu mythology Brahma is the creator, Vishnu the conserver and Shiva the destroyer of the universe.

The basic theory of cosmovision is known as Siddhanta. The Sarva Tantra Siddhantas cut across all areas of traditional Indian science. The following elements are important for health and agriculture:

- Understanding the composition of all material, animate as well as inanimate, in terms of the five primordial elements, the Pancha Mahabhutas: vayu (air), jala (water), prithvi (earth), agni (fire) and akasha (ether, sky or space).
- Understanding the properties and action of human beings, animals and plants, in terms of three biological factors: vaata, pitta and kapha. Vaata: slender, light and averse to sunlight. Pitta: medium size, abundancy and fond of sunlight. Kapha: stout and bulky, abundant flowers and fr uits, housing many creepers.
- Understanding the fundamental existential principles of dravya (matter), guna (quality) and karma (action).
- All living beings are born and evolve from the five Mahabhutas earth, water, fire, air and space. In death they go back to them. The Mahabhutas are the primary natural resources essential for all life forms. Through myths and rituals mankind is ever reminded of his duty (dharma) to sustain these elements.

Gods and Goddesses from the Great Tradition

The cosmovision of ancient India can be illustrated by a quotation from an Ayurvedic text: 'The basic aim of the concepts and fundamental principles of all the sciences is to establish happiness in all living beings. But a correct and thorough knowledge of the basic principles of the universe and the (human) body leads to the correct path to happiness, while deceptive knowledge leads to the wrong path.' The cosmic forces were personified in the form of various gods and goddesses, whose influence or failure to maintain cosmic morality was considered the main cause of an imbalance in health. They play a role in healing and thus it was the responsibility of every individual to observe the prescribed rules. Most of the Vedic rituals are institutionalised in Hindu Dharma and are a part of the day-to-day life of the people. Varuna is the God of waters and all the rivers. Ganga, Yamuna, Saraswati and Kaveri are deities of the vast water cosmogony. No ceremony of birth, death or marriage is complete without the ritual purification of water. Vegetative and animal life forms such as lotus, coconut, mango, snake, tiger and cow are central in Hindu myths. Cows, which are a symbolical representation of the earth, have traditionally been objects of great worship and reverence. The killing of the cow is listed as one of the major sins in Hinduism: 'All that kill, eat and permit the slaughter of the cow will rot in hell for as many years as there were hairs on the body of the cow.' (Artha Shastra of Kautilya).

The teachings in ancient scripts such as the Upanishads, emphasise the importance of trees. Reverence for trees is expressed in the various tree worships related to the Ficus species. Trees have also been linked with penance, education and religious activities. Prithvi, the Mother Earth, is the divine mother who

sustains plant and animal life. She is perceived to be a powerful Goddess for the world as a whole. The cosmos itself is seen as a great being, a cosmic organism. Different parts of the world are identified as parts of her body. The earth is called her loins, the oceans her bowels, the mountains her bones, the rivers her veins, the trees her body hair, the Sun and Moon her eyes and the lower worlds her hips, legs and feet. Vayu (air) in the Vedic pantheon is associated with Indra, the God of the firmament, the personified atmosphere. He is prana, the pure breath of life. Finally the sun, the great ball of fire is the energiser, the life giver.

The Goddesses too illustrate important ideas in Hindu philosophy. For example, Prakriti denotes physical reality. It is nature in all its complexity, orderliness and intensity. The Goddess Sri, or Lakshmi, is today one of the most popular and widely venerated deities. In early Vedic literature she was invoked to bring prosperity and abundance. In the Sri-Sukta (an appendix to the Rig Veda dating from pre-Buddhist times) she is described as moist in cow dung. Clearly, Sri is associated with growth and the fecundity of moist, rich soil. Villagers, particularly women, worship Sri in the form of cow dung on certain occasions. Lakshmi is associated with the lotus (symbolising vegetative growth) and the elephant (whose power brings fertilising rains). Together they represent the blossoming of life. Durga is one of the most formidable Goddesses of the Hin du Pantheon. Her primary mythological function is to combat the demons who threaten the stability of the cosmos.

Deities of Villagers

In the villages, these goddesses are worshipped by upper caste Hindus. The 'Great Gods and Goddesses', though acknowledge d to be in charge of distant, cosmic rhythms, are only of limited interest to most village people. Every village has its own village deities. They often share the names or epithets of deities in the Sanskrit pantheon but they do not necessarily have any similarity with 'the Great Tradition' Goddesses. Unlike the 'Great Gods' whose worship is often restricted to certain castes, these deities are the goddesses of the whole village. All over southern India, these village deities are almost exclusively female. They are not usually represented by anthropomorphic images but by uncarved natural stones, trees or small shrines. The village and its immediate surroundings, therefore, represent for the villagers a more or less complete cosmos. The central divine power impinging on, or underlying this cosmos is the village goddess.

The extent to which order and fertility dominate the village cosmos is determined by the relationship between the goddess and the villagers. Their relationship is localised and aims not so much at individual welfare but at securing the welfare of the village as a whole. In return for their worship, the goddess ensures that the villagers have good crops, timely rain, fertility and protection from diseases, spirits and untimely death. The entire ritual complex built around agricultural operations involves protective, prohibitive and promotional values. For example, the villagers in Pachara (West Bengal) propitiate Lakshmi and Manasa a number of times each year. While Manasa is worshipped generally during the cultivation season, Lakshmi is worshipped during preharvest or post-harvest periods. Furthermore, many of the rituals performed for living human are also being extended to Mother Earth. The Adi Perukku agricultural festival is celebrated in Tamil Nadu. On the eighteenth day of the Tamil month of Adi (between mid-July and mid-August) this festival hails the arrival of the monsoon. Reverence is paid to the River Goddess and farmers are encouraged to sow seeds. An important aspect of this festiva l is the sowing of nine varieties of seeds: wheat, paddy, toordal, green gram, groundnut, bean, sesame, black gram and horse gram (Navadanya) in a pot. It is called Mulaipari and is a forerunner of the present germination test.

Apart from the festivals of the village goddess, there are a number of ritual performances that directly or indirectly relate to the various stages of managing agriculture production and consumption. These are observed by individual families and by particular caste communities. These rituals vary from region to region and from community to community. But the ultimate goal is the same: the worship of deities, implements, bullocks, and spirits in the fields to ensure a good harvest.

Classical Indian Agricultural Science

In the Vedas, particularly Rig Veda and Atharva Veda a great deal of attention is paid to agriculture, implements, cattle and other animals, and the rains and harvests. Ancient texts relating to agriculture are the Vrkshayurveda

(Ayurveda of plants) and the Krshisastra (science of agriculture) and Mrgayurveda (animal science). They provide a wealth of knowledge on such subjects as the collection and selection of seeds, germination, seed treatment, soil testing and preparation, methods of cultivating plants, pest control and crop protection, the rearing of cows and the care of draught cattle, for example.

Outbreaks of disease and pest attacks on plants are viewed as being based on the same principles as the epidemics that affect the human and animal species. The basic understanding is that epidemics occur because of imbalances in the ecosystem. One of the major causes of such inbalance is human error or living in the wrong way which leads to an incorrect intervention in natural processes. The main protection against epide mics is a thorough knowledge of nature which makes it possible to avoid causing serious imbalances in the ecosystem.

Vrkshayurveda - the science of plant health - was accorded a prime position in the history of agriculture in India. The three major ancie nt texts that provide the basis for Vrkshayurveda were compiled by Varahamihira, Chavundarya and Sarangadhara. These texts provide indications of an integrated approach to controlling crop pests and diseases through soil, seed, plant and environmental treatment. These different methods have several characteristics in common and can be used to launch a multi-pronged attack on pests and diseases; to improve plant health and increase resistance; to enrich the soil with nutrients and increase useful microbial activity, and finally to ensure a broad spectrum effect on pests and diseases.

Folk Knowledge

Farmers' perception and understanding of ecology, crops, land, labour, livestock and agricultural implements has a profound bearing on the strategy they adopt in their day-to-day agricultural operations. Their ideas about climate, crops, the optimum climatic conditions required for cultivation and beliefs relating to crops and fruits are the results of the knowledge they received from their ancestors and their own long experiences in the natural laboratory of their fields. Farmers have the ability to identify various types of seeds and seedlings and this is often based on morphological characteristics. By looking at the nature of the flowers on a plant, an estimation of the yield can be made. The technically useful items of indigenous agricultural practices are often documented without reference to the symbolic or ritual matrix in which they occur. It is a debatable point whether, by looking at these practices from a mere scientific and rational perspective does not devalue them. Despite the fact that farmers have been subject to external influences, they still continue to experiment and make innovations, sometimes adapting external knowledge to indigenous knowledge and sometimes revitalising their own knowledge.

Farmers' perception and understanding of ecology, crops, land, labour, livestock and agricultural implements has a profound bearing on the strategy they adopt in their day-to-day agricultural operations

There are indigenous institutions that regulate community administration, decisionmaking, elements of farming and the rites and rituals related to cosmovison. In the villages, religious functionaries such as Brahmin priests, and in the tribal communities of the Eastern Ghats traditional functionaries such as the Naiks and Disaris play an important role (see Gowtham Shankar in this publication). The functioning and strength of the institutions that kept the environment protected, depends on how successfully future citizens are introduced to the heritage that generates respect for these institutions. Knowledge systems cannot grow if traditional cultural anchors are not properly located. Culture provides a 'grammar', while technology provides new words. The meaning of life can only be discovered if both are blended together.

Synthesis of Local and External Knowledge

There is a close -knit relationship between cosmovision, or the way the relation between mankind and nature is viewed in the widest sense, and agricultural practices. Folklore, proverbs and songs are the vehicles of this process. This, however, does not necessarily mean that farmers always have a thorough insight into what they are doing or why. Traditional knowledge often seems to imply that rites, practices and customs are continued out of sheer habit or out of an undefined fear of the effects of bad influences if they are abolished. This could mean a slide towards superstition, which means there is a kind of mysterious belief. A constant review of any knowledge system is essential for further development.

The advantage of modern science is that it is analytical and tries to arrive at general truths by discovering the parts of the whole. The advantage of indigenous knowledge is that it is location specific, holistic and relates to diversity. The disadvantage of modern agricultural science is that it deals with parts only and is obsessed with the general. But knowledge systems are not static, they are dynamic. They change. Farmers and researchers experiment.

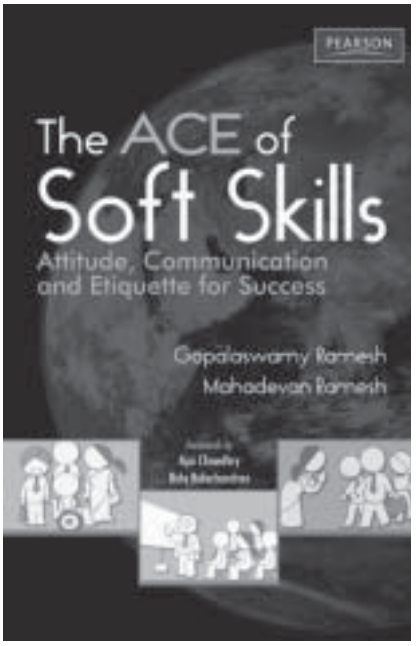
Is a synthesis of local and external knowledge, or traditional and western-based knowledge possible? In our opinion a synthesis is not possible if traditional knowledge is viewed as an 'alternative' to external knowledge. Both have their own bases and both have their limitations. Influencing each other would involve changing fixed paradigms and the creation of new ones, which no doubt would bring about major improvements and changes and involve a readiness to question one's own system and the courage to enter into a dialogue with the other. There are quite a number of indications that there is at least a growing interest in indigenous knowledge systems and their integration into conventional science. COMPAS is one example.

The Writers are Research Scholars of Agricultural Policy, Lucknow University

For A Better Grooming

A book asserting the importance of soft skills within the Indian business context and how they need to be acquired

By **Dharmendra D.**



Book	:	The ACE Of Soft Skills
Authors	:	Gopalaswamy Ramesh and Mahadevan Ramesh
Publishers	:	Pearson Education
Pages	:	472
Price	:	Rs 550

The ACE Of Soft Skills by Gopalaswamy Ramesh and Mahadevan Ramesh is an admirable effort in the direction of producing a book by Indian authors based on Indian experiences on the elusive topic of soft skills; divided into Attitude (A), Communication (C) and Etiquette (E). While Gopalaswamy Ramesh has been an academic in the past and currently practices as an independent consultant, Mahadevan Ramesh is an academic, after having spent several years in industry positions.

The book as described by its authors has a few objectives; One is that it should serve as a reference on how the business world operates. Second that there is indeed a vast inventory of soft skills to be acquired and finally, the reader must be motivated to improve his own soft skill sets.

Where the book more than succeeds is in meeting its second objective, given the vast sweep of the topics it covers. Despite being highly recommended by an academic luminary such as Bala Balachandran (who has written one of the two forewords) and an industry leader such as Ajai Chowdhry of HCL, (who has written the other foreword), the book does not necessarily provide a good feel of the modern business world. For one, almost all cases use hypothetical company names such as LMN, XYZ, etc. While these would be fine for an occasional case study, for a book of this size, it jars more than a little. The book could have also been better edited. For example, it says that Thomas Friedman said Geography is History, widely known as the Iridium campaign tagline. There are occasional odd moments when the authors' candour is not exactly disarming. Sample this - "..The only way to gain good vision is by poring over the biographies of famous visionaries and adapting some of their techniques - and hoping that they work for us..:" Surely the authors with their rich experiences could have come up with a better explanation. Even the section on what the book is and isn't, ends up discussing English in India and the British Raj, among other avoidable details.

The book perhaps needs a pithier second edition and could then aim to deliver on its third objective. If it could bring in some real life examples with better masking of the company names, it could then perhaps succeed in its first objective also.

However it is readable for the sheer volume of information it offers to the persevering reader on the topic of soft skills. It is a pity that it could have been much better if it had done better on the C aspect of its ACE.

The Review as Published in www.businessworld.com

कोई भी सीख सकता है पैसा कमाने का हुनर

पैसा कमाना एक आर्ट है, जो आप तब तक नहीं सीख सकते, जब तक कि आप इसे सीखना ठान नहीं लेते। एक बार आप ठान लेंगे कि यह आर्ट आपको सीखनी है, तो आपको पैसा कमाने से कोई रोक नहीं पाएगा। इसी फंडे को साबित करती है 'रिच डैड, पुअर डैड'। किताब कहती है कि आप छोटे–छोटे प्रयासों के जरिए पैसा कमाने की आर्ट सीख सकते हैं। हां, इसके लिए धीरज रखना जरूरी है। किताब पैसे के लिए लोगों के एटिट्यूड की बात करती है कि किस तरह इसे लेकर दो बिल्कुल अलग–अलग नजरिए हो सकते हैं। यह कहानी है किशोर रॉबर्ट की, उसकी परवरिश और एजुकेशन की। साथ में है उसका दोस्त और दोनों किशोरों के पिता।

रॉबर्ट के पिता गरीब (पुअर डैड) हैं। वह साधारण की नौकरी करते हैं। उनमें वे सारी असुरक्षाएं हैं, जो आम आदमी की होती हैं। और वह उन्हीं के अनुसार अपने बेटे को सीख देते हैं। पुअर डैड का फंडा बिल्कुल साफ है पढ़ो, डॉक्ट्रेट की डिग्री लो और नौकरी करो। वह कोई रिस्क नहीं लेना चाहता। पुअर डैड पढ़ा–लिखा है लेकिन उसे पैसे कमाने का हुनर नहीं आता। वह मानता है कि मैं कभी अमीर नहीं बन सकता इसलिए वह बन भी नहीं पाता। दूसरी ओर, रॉबर्ट के दोस्त का पिता (रिच डैड) है, जो सिर्फ आठवीं पास है, लेकिन पैसे कमाना बखूबी जानता है। रॉबर्ट दोनों डैड को देखता है और उनकी जिंदगी से सबक लेता है। आखिर में वह रिच डैड को फॉलो करने का फैसला करता है।

कहानी वहां से शुरू होती है, जब रॉबर्ट और उसका दोस्त नकली पैसे बना रहे होते हैं। रिच डैड यह देख लेता है और कहता है कि मैं तुम्हें असली पैसा कमाना सीखाता हूं। वह उन्हें समर जॉब देता है

पुस्तक	:	रिच डैड पुअर डैड
लेखक	:	रॉबर्ट टी. क्योस्की
प्रकाशक	:	वार्नर बुक्स
कीमत	:	175
पेज	:	207

लेकिन इतना काम कराता है कि वे हताश हो जाते हैं। वह उनसे और काम कराता है। आखिरकार दो हफ्ते बाद वे दोनों कहते हैं कि हम ऐसे काम नहीं करेंगे। बस, पैसे को लेकर यह उनकी जिंदगी का पहला सबक साबित होता है कि बार–बार इस बारे में मत सोचो कि हमें कम पैसे मिल रहे हैं, यह सोचो कि ज्यादा पैसे कैसे मिलें। अगर आप यह सोचेंगे कि मैं नहीं कर पाऊंगा, तो कभी नहीं कर पाओगे। जिस दिन यह सोचोंगे कि कमा सकते हो, उसी दिन से कमाने लगोगे।

दूसरा बड़ा सबक यह है कि दूसरों के लिए काम करके आप रईस कभी नहीं बन पाएंगे। इसके लिए अपना काम जरूरी है साथ ही, पैसे के बारे में बात करो। यह गलत नहीं है। यहां तक कि डिनर टेबल पर भी पैसे की बात करो कि आप कैसे ज्यादा कमा सकते हैं।

तीसरी बात, रिस्क लेना जरूरी है। आप संपत्ति बनाने के बजाय रकम को कारोबार में लगाओ। इससे और रकम पैदा होगी। रिच डैड का कहना है कि जो चीज पैसा खा रही है, वह एसेट नहीं हो सकती, फिर चाहे घर हो या गाड़ी। इन पर पैसे मत लगाओ। रियल एस्टेट में पैसा लगाओ। सौ घर खरीदो–बेचो, तब एक अपने पास रखो, न कि एक घर खरीदकर उसे ही अपने पास रख लो।

किताब में दोनो डैड की सोच में हर बात को लेकर बड़ा अंतर दिखता है। सबसे बड़ा अंतर दिखता है, जब पुअर डैड कहता है कि ज्यादा पैसा गलत काम करने को मजबूर करता है, वहीं रिच डैड कहता है कि अगर किसी के पास पैसा नहीं है तो वह गलत काम करेगा। कुल मिलाकर किताब पाठक में पैसा कमाने की जोरदार ललक पैदा करती है। यही इसकी कामयाबी है।

किताब के खास सबक

ऐसा नहीं होना चाहिए कि तुम्हारे पास पैसा नहीं है, इसलिए तुम पैसा कमा रहे हो। पैसा इसलिए कमाओ क्योंकि तुम्हें उससे प्यार है। जिंदगी से थककर मत कमाओ। ऐसे में कभी नहीं कमा पाओगे। जिंदगी में हर चीज के लिए जुनून जरूरी है, पैसा कमाने के लिए भी।

दिमाग में बार–बार डालते रहो कि पैसा कमाना है। आप जो भी दिमाग में रखते हैं, उसी से अपनी जिंदगी चुनते हैं।

लोगों को सही दोस्त चुनने के बारे में सलाह दो। आपकी संगति का बहुत फर्क पड़ता है। जो बिल्कुल सिक्योर लोग हैं, उनके साथ मत रहो। ऐसे में आप कभी रिस्क नहीं ले पाएंगे।

बहुत पढ़ें। पैसे से जुड़ी हर चीज और जिसमें भी आपकी दिलचस्पी है, उसे पढ़ते रहें। फाइनैंशली पढ़े–लिखे बनें यानी अकाउंटिंग, टैक्सेशन आदि सभी की जानकारी होनी चाहिए। ज्ञान को कभी रोकना नहीं चाहिए।

यह मत सोचो कि सब कुछ मेरा है। अपने कारोबार में से भी खुद को सैलरी दो। इससे वक्त की कद के साथ–साथ रकम की आदम भी बनी रहेगी।

शालिनी शर्मा

The Review as Published in www.navbharattimes.com

Agro Tech 2010 A Big Success: Farmers Get Empowered To Move Up The Value Chain

While the Jammu and Kashmir Minister asked the CII to hold such Agro Tech in his state, the Chairman of the CII Northern Region, Mr R.M.Khanna, announced the CII would hold three conclaves in regard to saffron, apple, basmati and Rajmah.

Mr Ghulam Hassan Mir, Agriculture Minister of Jammu and Kashmir, who was the Chief Guest at the valedictory function of the 4 day CII Agro Tech 2010 here today, appealed to the help upgrade and modernize agriculture in his State so that J&K could be "part of the glory of India."

Stating that even though J & K was the No. 1 producer in India of apples, his visit to CII Agro Tech had been an "eye-opener for him on the type of advanced technologies being used in different parts of the world." The farmers of J&K need exposure to all these developments and he hoped CII would help in facilitating this.

Responding to the Ministers request, Mr. R M Khanna, Chairman CII Northern region announced that CII would shortly organize an Apple Fest, a Saffron & Walnut Fest as well as Rajmah & Basmati Rice Fest in Jammu & Kashmir.

CII Agro Tech 2010, which was held from 3 – 6 December 2010 at Chandigarh, achieved one of its primary objectives of focusing on **Sustainable Agriculture** and bringing farmers face-to-face with the latest state-of-the-art technologies both in terms of machinery as well as agri-practices. It empowered them to look at the possibilities of moving up the value chain and ensure their long term prosperity. Enthused at the response generated from the farmers, 97 percent of the exhibitors stated that they would exhibit at Agro Tech 2012.

The 4-day Fair was visited by over **45,000 farmers** from a number of States from as far as Kerala in the South, Meghalaya in the East, Gujarat in the West and J&K in the North.

The farmers showed interest in large machines like combined harvesters, high powered tractors and also low cost agricultural machinery items. In addition, the farmers were also able to procure new varieties of high-yield seeds and learn about the latest agri-practices which could help them increase their yields, cut down on wastage and give a quantum jump to their incomes.

Left to right: Mr. Ghulam Hassan Mir, Dr. Rahul Mirchandani, Mr. Rajesh Srivastava, Mr. Salil Singhal, Mr. R.M. Khanna, Ms. Charu Mathur (Regional Director, CII, Northern Region)

The other primary objective that Agro Tech successfully achieved was in terms of generating long term business for global and Indian companies, becoming a successful platform for a number of launches by them and facilitating the finalization of joint ventures/MOU between these companies. The International Buyer-seller meets are a big success. Overall, 846 Joint Ventures/ MoUs/deals estimated to be worth at least Rs 50 crores were finalised at CII Agro Tech 2010 while the final enquiries figure was still being tabulated.

The Ministry of Agriculture, Government of India was the partner of Agro Tech 2010 and there was a huge showcase of technologies and best practices by them. State Governments also extended support to Agro Tech 2010, with Punjab & Haryana being the Host States. The Food Expo and Apple Fest were supported by APEDA, Food Tech by All India Air-conditioning & Refrigeration Association and Livestock Expo by the Compound Feed Manufacturers Association of India. Canada, France, Germany, South Korea and UK had set up their pavilions while companies from Australia, Italy, Spain and USA showcased their products and services. South Korea and France had set up pavilions for the first time at Agro Tech. This was strong evidence of growing international interest in the Indian agriculture sector.

There were 230 participants over 6500 sq. m of exhibition area, of which 63 participants had come from overseas. All the 9 concurrent shows saw huge crowds. Five international conferences on contemporary issues in Indian agriculture were held in which some of the leading experts and policy makers in the field of agriculture presented their views. Over 150 conference delegates participated in the Conferences.

After the resounding success of CII Agro Tech 2010, the 10th CII Agro Tech will be held from 1 – 4 December 2012.

AGRI NEWS

GM Rubber Trials Need of The Hour: Jairam Ramesh

According to news reports, Environment Minister Jairam Ramesh has argued that field trials are important for the extension of natural rubber cultivation to non-traditional areas like Tripura, Assam, Meghalaya and North Konkan. He is of the opinion that the GM approach has become necessary as the challenge of climate change has already resulted in longer dry periods for rubber cultivation.

The Government of Kerala is however on a different track. In a statement released to the press, it is stated that the Agriculture Minister of Kerala, Mullakkara Retnakaran, had written to the environment minister pointing out that the field trials which would be conducted by the Rubber Research Institute of India in Kottayam could impact not only the state's agriculture, "but its agrobiodiversity as well as the highly pristine and vaulable biodiversity". Retnakaran also mentioned in his appeal that the state is protesting to such a trial as it desires to remain GM free.

In response to the said letter, Ramesh has stressed that the GM plant which has been developed by the Rubber Research Institute incorporates a target gene from rubber itself. "Strictly speaking, therefore, this GM plant is not a transgenic in the normal sense of the word," the minister stressed.

He has clarified that the field trials will be conducted in designated experimental sites inside research farms. "The field trials will not be done in commercially cultivated holdings," he told media persons.

Further, the Rubber Research Institute of India is not a private research institute, and is therefore not interested "in making GM rubber and making money by selling it...There are no patents for RRII rubber clones which are not IPR protected as far as Indian growers are concerned," Mr Ramesh clarified.

CRISIL Report: Indian Economy to Grow 8.4 percent for Next 5 Yrs

India's biggest rating firm, CRISIL released a report recently stating that the Indian economy will maintain an 8.4 percent growth over the next five years. If some supply-side issues are addressed, it can sustain a 10 percent growth, it said.

Acording to the report; Crisil has highlighted five supply-side constraints — the quantity and quality of physical infrastructure , skill shortages in its bulging population, faltering agriculture and consequent high food inflation, fiscal inflexibility to spend on health, education and physical infrastructure, and a governance deficit.

According to statements released to the press; Crisil chief economist Dharmakirti Joshi has remarked that "If jobs are created and youth are equipped with the required skill-sets, India's economic growth will accelerate,". The prevailing skill deficit, in terms of insufficient quantity and quality of workforce, limits productivity, increases wages and raises unemployment levels, the report said. Only about 10 percent of India's youth (15-29 years) receive vocational training, and the majority of engineering graduates are unemployable in the IT-ITES sector without additional training, it said. Recently, rival Fitch revised upwards its forecast for India's economic output, or GDP growth, to 8.7 percent for the financial year ending March 2011 from 8.5 percent.

In the 2000-2010 decade, agricultural growth became more volatile; the average slipped to 2.5 percent from 3.2 percent in the 1990s. However, the demand for food increased, pushing up food prices. Rekindling agriculture by accelerating productivity-enhancing reforms is critical for taming persistently high food inflation, it said.

"India's main fiscal challenge is not reduction in debt and deficit ratios; this objective can be achieved by another spurt of high growth, as evidenced by the improvement in fiscal ratios during the growth upturn between 2003 and 2007. The country's fundamental fiscal issue lies in expanding its fiscal flexibility, which would enable it to increase spending on education, health, and physical infrastructure," added Mr Joshi.

Although its GDP growth dropped due to the global financial crisis to 6.7 percent in 2008-09, India's economy emerged quite rapidly from the crisis. With its GDP likely to grow at 8.6 percent in 2010-11, India will be one of the fastest growing economies in the world, it said.

AGRI NEWS

Government Initiatives to Boost The Agriculture and Food Industry in India: Netscribes

Netscribes (India) Pvt. Ltd. launches Agriculture and Food Industry in India 2011 report covering a market with strong growth potential. The report is a special feature from Netscribes.

Netscribes (India) Pvt. Ltd., a knowledge consulting solutions company, announces the launch of its report Agriculture and Food Industry in India 2011. Strong private participation has been witnessed by sectors in the industry which is expected to continue to grow in the future.

The report begins with an overview of the agriculture and food industry. It provides an introduction to the market and includes information regarding growth in agriculture, food consumption levels as well as the primary factors leading to a growing industry. The value chain in the market has been highlighted and includes the major sectors in the market.

Each of the sectors in the industry namely seeds, fertilizer, farm equipments, warehousing, cold chains, food processing and organic food markets have been analysed in detail offering the market size and growth, segmented share, drivers and challenges as well as the major trends. The report also discusses the segments with the maximum growth opportunities based on investment levels. It also enlists the various PE investments and M&A deals in the market.

A competitive landscape has been provided for each of these sectors which includes information regarding the major players in the market. The Annexure contains a snapshot of their corporation, business highlights and their product portfolio, providing an insight into the existing competitive scenario.

'Don't Hold Trade Hostage to One Issue' – Sharad Pawar

According to news reports, Food and Agriculture Minister Sharad Pawar ha replied strongly to the US Secretary of Agriculture Thomas Vilsack's letter on market access for American agricultural products to India. Pawar has held firm on the government's position, saying that the country's cultural and religious sentiments will have to be respected.

Reminding Washington of the historic level of Indo-US trade ties, Pawar is learnt to have cautioned against holding the burgeoning relations hostage to one issue: market access for US dairy products.

New Delhi's reiteration of its position was necessitated after Vilsack sent a letter to Pawar, asserting that agricultural ties will be "jeopardised" if India did not show flexibility on this issue.

Vilsack was referring to India's red flag on US dairy products, particularly cheese, saying it may hurt religious sentiments as the animal feed given to the cattle in US contains meat products.

Pawar is learnt to have conveyed that India had an open mind on a scientific analysis of the American position on this issue. A mutually acceptable decision could be arrived at only after the examination of scientific data by Indian scientists.

Vilsack had sent the letter after agricultural market access failed to make the cut for the Indo-US joint statement issued at the end of President Barack Obama's visit. This despite the fact that Vilsack held almost an hour-long closed-door meeting with Pawar.

At the core of the disagreement is the Indian regulation that any country exporting dairy produce to India must certify that the source was "never fed feeds produced from internal organs, blood meal and tissues of ruminant origin".

Govt to Raise Urea Price

In a statement released to the press recently, it is reported that the Centre is likely to come under intense pressure to raise urea prices at the upcoming meeting of group of ministers on fertilisers after a sharp rally in the prices of potash (K) and phosphate (P) fertilisers.

Stagnant urea prices and rising P&K fertiliser will encourage use of urea, hurting the case for balanced nutrition of soil and increasing the fertiliser subsidy bill sharply. "It is important for the government to hike urea price immediately," said a Fertiliser Association of India official.

The group of ministers will discuss the further decontrol of the urea sector and the new urea policy on January 5. "Higher urea prices will ensure balanced fertilisation and promote soil health, and allow the farmer better crop productivity. It will also firmly control the Centre's fertiliser subsidy bill," an industry official said.

The Editor
Financing Agriculture
Agricultural Finance Corporation Ltd.
Dhanraj Mahal, 1st floor
Chhattrapati Shivaji Maharaj Marg
Mumbai 400 001

SUBSCRIPTION FOR 'FINANCING AGRICULTURE'

I / We request you to enroll me / our organization as a subscriber to the Monthly Journal "***Financing Agriculture***" for a period of _____ year(s).

Details are as under

Name: _____

Mailing Address: _____

City: _____ **State:** _____

Pin Code: _____

Email: _____

Subscription Period:One, Two, Three, Year (s) _____

Subscription Amount:Rs. _____

(Rs: 600/- for one year; Rs.1200/- for two years; Rs.1800/- for three years)

Remittance details: Demand Draft / Cheque No.

Date: _____ **Bank:** _____

Cheque / Demand Draft should be drawn in favour of
M/s. Agricultural Finance Corporation Ltd., Payable at Mumbai.
Add Rs.25/- towards collection charges for outstation cheques.

SIGNATURE: _____ **DATE:** _____

FINANCING AGRICULTURE

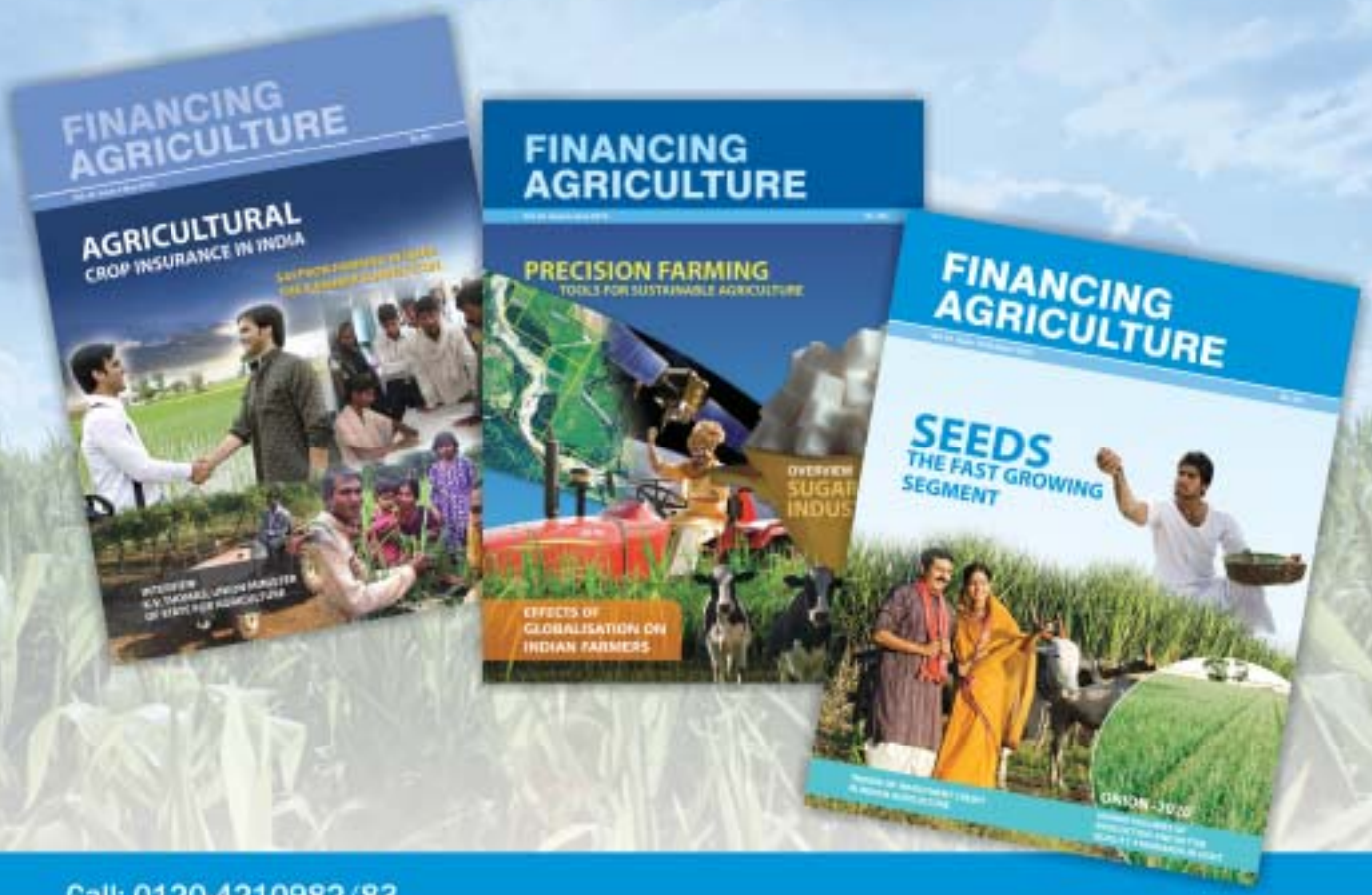
The Thought Leader in India's Rocking Agriculture Sector

In-depth Articles
Research Papers
Interviews
Event Reports
and More.....

The Indispensable Companion of India's Top Decision Makers and Who is Who in Agriculture Sector

Subscribe Today!

Order for bulk purchase/Subscription



Call: 0120-4210982/83

Agricultural Finance Corporation Ltd.

Incorporated since 1968

Technical Support Institution Committed to Rural Prosperity (Wholly owned by Commercial Banks, NABARD, EXIM Bank)

Vision: To facilitate increased flow of institutional credit and other support services for rural prosperity.

Mission: To continue to be leading agri-consulting organization by providing timely, appropriate and feasible client – specific end to end solutions not only in India but in other developing countries.

Consulting Services

Specialised services which by no means are exhaustive, can be classified as:

- Agribusiness Management
- Water Resources Management
- Watershed Development and Management
- Environment Impact Assessment & Environment Management Plans
- Horticulture & Plantation
- Micro Enterprises and Micro-Finance
- Fishery, Forestry, Wasteland Development
- Gender Development
- Resettlement & Rehabilitation
- CDM Services

Capacity Building and Training

Projects included in this category are:

- Consultancy for World Bank Assisted Process Monitoring of Andhra Pradesh Rural Poverty Reduction Project – Phase-II (Zone-II) – Society for the Elimination of Rural Poverty, Government of Andhra Pradesh – 2007-08
- Implementation of DFID funded Western Orissa Rural Livelihood Project (WORLP) – Watershed Development Mission, Govt. Of Orissa – 2005-2010
- Comprehensive Watershed Development Project in Karnataka - Watershed Development Department (WDD)-Government of Karnataka – 2006-07
- Madhya Pradesh Tribal Development Project - The International Fund for Agriculture Development (IFAD), Rome – 1997

Grass Roots level Livelihood Implementation

AFC has undertaken large scale Agricultural Extension Programme in 820 Blocks covering all 71 districts of Uttar Pradesh.

The mission of the implementation project is to increase the farm productivity, profitability and sustainability of farming systems, efficient use of natural resources and agricultural inputs etc., by customised farmers' trainings at village cluster level and to provide online information on weather parameters, demand and use of agricultural inputs and market intelligence.

Organic Farming

This project involves the adoption and certification of Organic Farming in 22000 hectares.

Watershed Development

AFC is implementing Livelihood Development Programme based on Watershed Development with funding by DFID, and NABARD.

Panchayati Raj Institutions

AFC has set up an independent division for providing support services in terms of grass roots level planning, training of various stakeholders in UP, Bihar and Jharkhand. AFC has prepared Perspective District Plans in 25 districts of Uttar Pradesh under Backward Region Grant Fund (BRGF).AFC has also conducted TNA and prepared Training Manual for PRIs in Jharkhand.

The PRI division will also provide the following services:

- Organise training programmes for the senior & middle level executives of the NGOs.
- Capacity building of the ERs and various stakeholders.
- Conduct research studies, develop learning material for each level on local self governance, organise seminars and workshops, promote exchange of academic expertise on various aspects related to local planning & DPCs, disseminate specialised information and provide expert advice to all concerned.
- Take up advocacy role to strengthen democratic process, particularly grassroots level democracy through decentralised institutions.
- Lay special emphasis on involving the poor, marginalised and weaker sections of the society in the democratic governance.

www.afcindia.org.in