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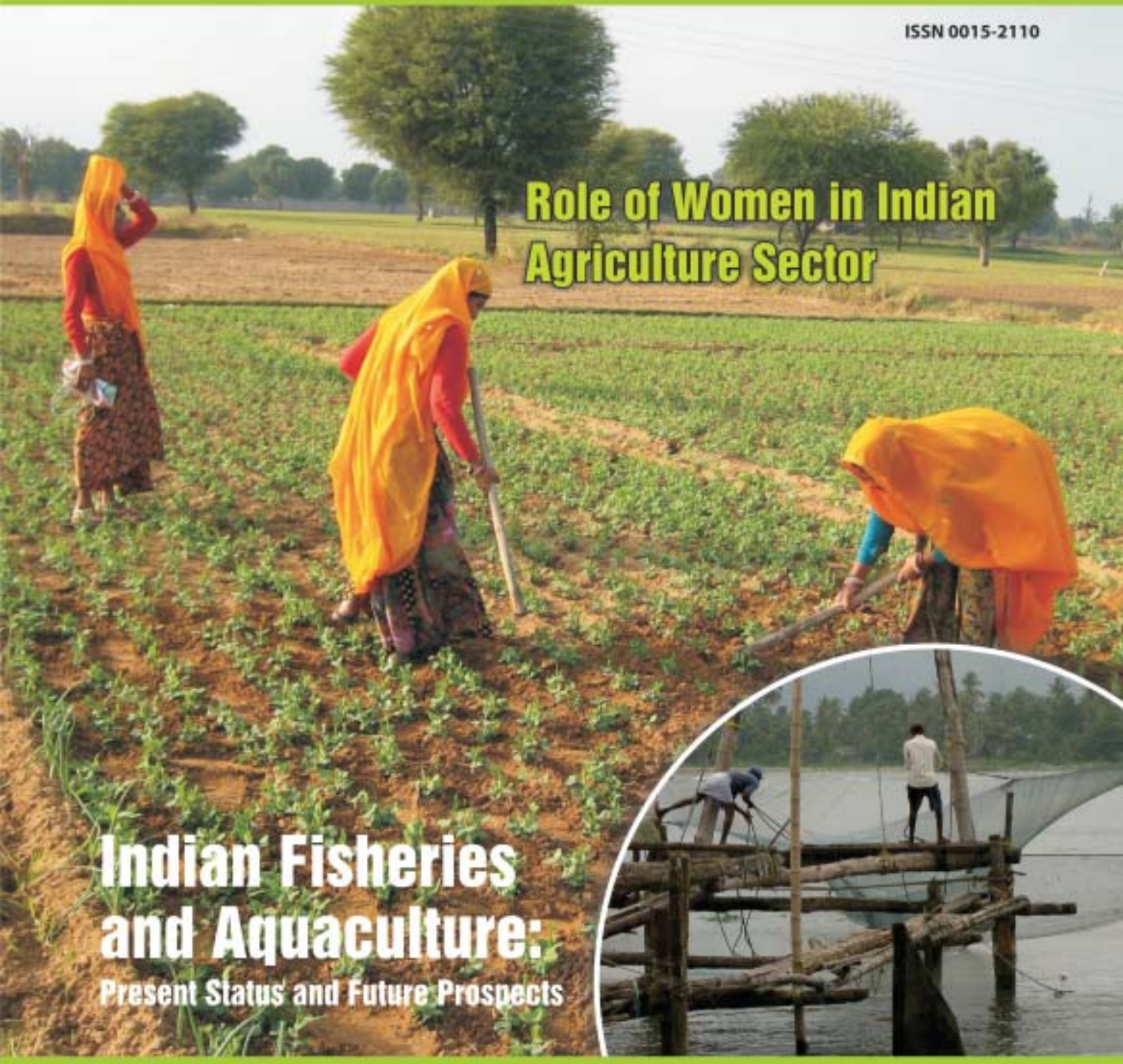

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Present Status and Future Prospects

CLIMATE SENSITIVITY OF INDIAN AGRICULTURE

INSTITUTIONAL CHANGES IN INDIAN AGRICULTURE

Photographs of handicrafts training of SHGs under NAIP, Godda (Jharkhand)












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EDITORIAL

Welcome to the May issue of FA. Global fish production from capture has remained stable over the past two decades while fish production through aquaculture has progressively increased. Read more about the status and the future prospects of this unique phenomenon in our Cover Story for this issue.

In this feature packed edition, we also talk about the importance of sugar and sugarcane in India of which india is the second largest producer in the world. Our Spotlight section in the magazine is on a special initiative called the Sustainable Sugarcane Initiative which is inspired from the successful approach of the System of Rice Intensification (SRI) paddy cultivation.

Also on view in this issue. is an article which discusses the role of women in the Indian agriculture sector. It is seen that rural Indian women are extensively involved in agriculture activities. However, the nature and extent of their involvement differs with the variations in the agro production systems. Read more in our Overview section.

Over the past two decades, the debate on global climate change has moved from scientific circles to policy makers with the world nations more seriously than ever exploring a range of response strategies to deal with this complex phenomenon of climate change. We have covered all aspects and challenges that this climate change would have on the Indian agriculture scene in our Perspective section.

Lastly, we have featured a special story on the Indian Dairy sector. India is among the world's largest and fastest growing markets for milk and milk products. The development and growth of this sector has been fascinating. Read more about the scope of this sector and the story behind how India catapulted from a milk deficit nation to a milk sufficient one.

Do leave your suggestions and comments at fa.afcl@gmail.com.

Happy Reading

A.K. Garg
Editor-in-Chief

I N S

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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
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Design
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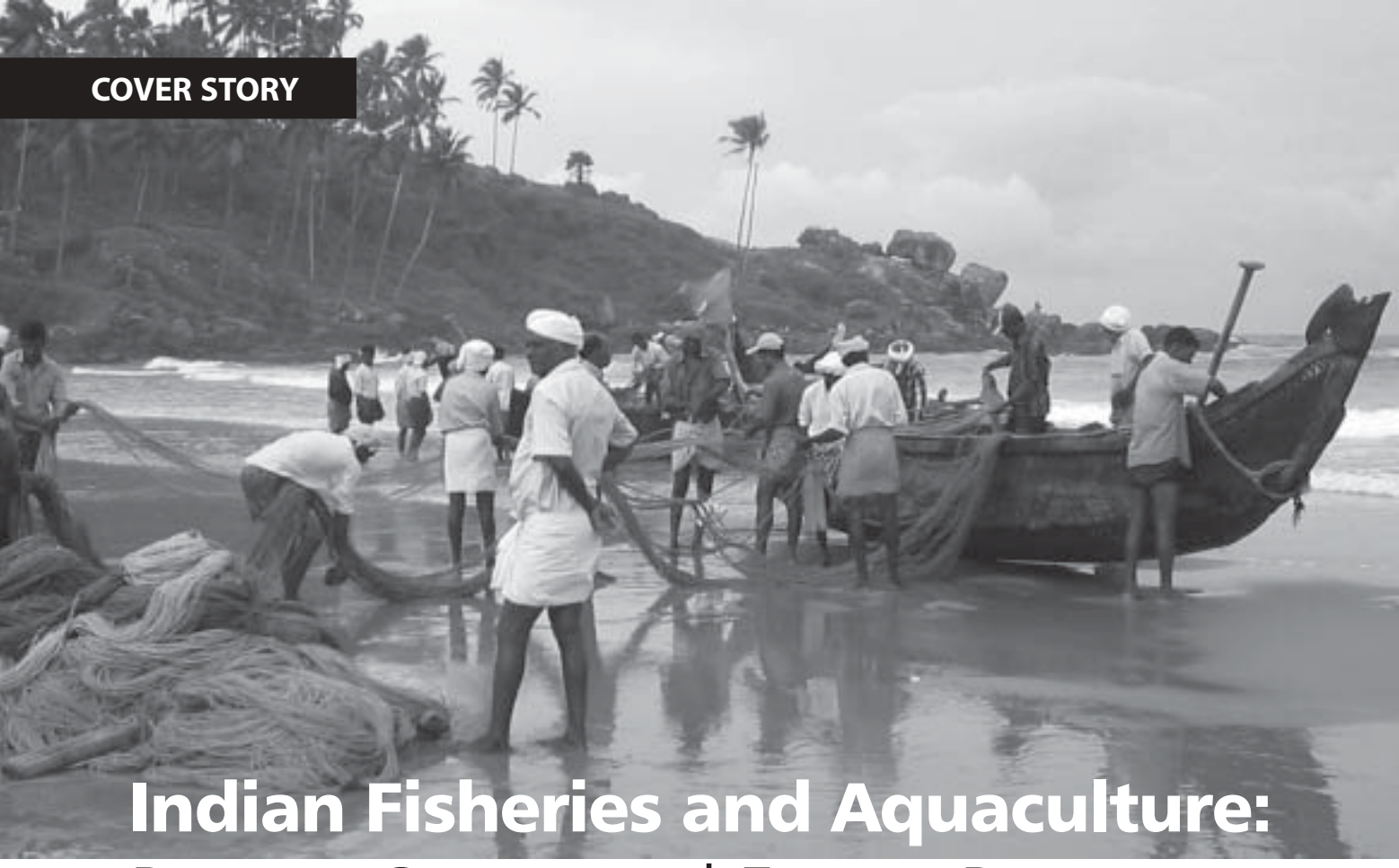


Indian Fisheries and Aquaculture: Present Status and Future Prospects

By **S. Ayyappan** *

Global fish production from capture has remained relatively stable over the past two decades while fish production through aquaculture has progressively increased. The Indian fisheries sector has come a long way since independence and has contributed immensely to the food basket of the country, with annual production levels of over six million tonnes of fish and shellfish from capture fisheries and aquaculture. India is the fourth largest producer of fish and is playing an important role in global fisheries.

Furthermore, with production over 3.1 million metric tonnes, the country occupies second position in the world from the inland fisheries sector. In the last five decades, Indian fisheries have made great strides, with the annual production increasing from 0.75 million tonnes of fish and shellfish in 1950 to about 6.1 million tonnes in the year 2002, indicating an increase of over eight fold.

The share of inland fisheries sector, which was 29 percent in 1950-51, has gone up to over 50 percent at present. While capture fisheries have solely contributed production from the marine sector, aquaculture contribution in the inland fisheries sector has been significant in recent years. The production from capture fisheries in the last two decades has grown by only 72 percent i.e. from 2.08 million tonnes in 1980 to 3.59 million tonnes in 2000, but the aquaculture sector has shown a growth of 468 percent in the same period, i.e. 0.37 million tonnes in 1980 to 2.1 million tonnes in 2000. The country has also emerged as one of the majors in exports, recording a peak during the year 2000-2001, earnings Rs. 5957 crores (US$1.25 billion). However, there has been a decline of 7.56 percent during 2001-2002 due to economic recession and steep decline in prices of black tiger prawns in the international market.

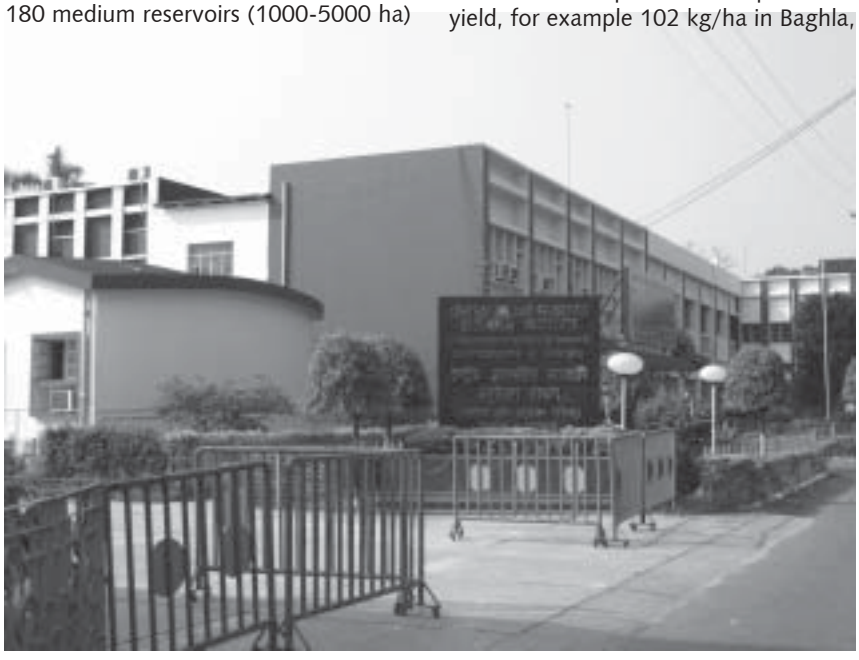
Inland Fisheries

India is blessed with huge inland water resources (29,000 km of rivers, 0.3 million ha of estuaries, 0.19 million ha of backwaters and lagoons, 3.15 million ha of reservoirs, 0.2 million ha of floodplain wetlands and 0.72 million ha of upland lakes). It has been estimated that about 0.8 million tonnes of inland fish is contributed by different types of inland open water systems.

Though, the production break-up of these water bodies is not available, it is believed that capture fisheries production from rivers and estuaries contribute only a small share of the total inland catch. The bulk of the production comes from reservoirs and floodplain wetlands, which are managed on the basis of culture-based fisheries or various other forms of enhancement. The 14 major rivers, 44 medium rivers and innumerable small rivers of the country with a combined length of 29,000 km provide for one of the richest fish faunistic resources of the world.

While production figures from different riverine systems are not available, estimates made for major rivers showed yield varying from 0.64 to 1.64 tonnes per km with an average of 1 tonne per km. The average estimated yield in different estuaries range from 45-75 kg/ha. Reservoirs form the largest inland fisheries resources in terms of resource size with 56 large reservoirs (>5000 ha), 180 medium reservoirs (1000-5000 ha) and 19,134 small reservoirs covering a water area of 1.14 million ha, 0.527 million ha and 1.485 million ha, respectively, with substantial areas added year after year due to construction of new impoundments created through erection of dams over rivers, streams or any other water course. In India, management of medium and large reservoirs can be considered akin to enhanced capture fisheries and their fisheries largely depend on natural recruitment. On the other hand, the fish catch of the small reservoirs depends on stocking and management and is termed as culture-based fisheries. Stocking in such small reservoirs is not merely a simple matter of releasing appropriate species into the ecosystem, but an important management option which needs evaluation of an array of factors, like biogenic capacity of the environment, the growth rate of the desired species, fishing condition, shallowness of the reservoirs and natural recruitment. In general, stocking of advanced fingerlings (10-15 cm) of Indian major carps at density of 400-500 numbers/ha is the option suggested for small reservoirs. However, the average national production levels obtained from the small reservoirs of the country have a productivity of about 50 kg/ha, and is low when compared to other Asian and Latin American countries.

Efforts on scientific management by CIFRI in several small reservoirs have shown that it is possible to improve the yield, for example 102 kg/ha in Baghla, 140 kg/ha in Bachhra, 150 kg/ha in Markonahalli (all are in Uttar Pradesh), 194 kg/ha in Aliyar, 182 kg/ha in Tirumoorthly (both are in Tamilnadu), 108 kg in Meenkara and 316 kg/ha in Chulliar (both are in Kerala). It has been estimated that the 1.5 million ha of small reservoirs can produce at least 0.15 million tonnes against the present levels of less than 0.07 million tonnes. The medium and large reservoirs can yield another 0.15 tonnes through proper species and stock enhancement. Thus, greater thrust is warranted to exploit the fisheries potential of these water bodies through culture-based fisheries in coming years.



Floodplain wetlands or beels are other potential fishery resources in the states of Assam, West Bengal and Bihar. They offer tremendous scope for both culture and capture fisheries. These water bodies play vital role for recruitment of fish stocks of the riverine system and provide nursery grounds for commercially important finfishes and shellfishes. It has been estimated that these beels possess potential to yield as much as 1000-1500 kg/ha/year, while the present level remains at only 100-150 kg/ha. The rich nutrients load and availability of fish food organisms make water bodies ideal for culture-based fisheries leading to higher growth of stocked fish species compared to the reservoirs. The marginal areas of the beels can be utilised for construction of ponds or pens of suitable sizes for raising the required fingerlings for stocking the beels.

Considering the present threat of increased pollution levels and siltation of open water resources like rivers, estuaries and lagoons and also the over-exploitation of these resources leading to stagnation of fisheries production, thrust on culture-based fisheries in reservoirs and floodplain wetlands holds the key for future of the inland fisheries development in India.

Marine Fisheries

Marine fisheries have played a pivotal role in ensuring food and nutritional security of the growing population, employment generation, enhanced income and foreign exchange earnings. India has vast resources in terms of a 8,129 km long coastline, 0.5 million sq.

Improved harvesting technologies coupled with increasing demand of fish for domestic and export market have resulted in significant increase of production over the last fifty years, i.e., from 0.53 mmt in 1951 to 3.0 mmt in 2001-2002

km of continental shelf and 2.02 million sq. km of exclusive economic zone. It is only after the establishment of Central Marine Fisheries Research Institute in 1947, that the marine fisheries development was put on sound footing.

Major thrust areas include research on biology of commercially important species and monitoring their stocks for proper management; judicious exploitation and conservation; conducting exploratory surveys and mapping of the productive fishing grounds, locating new areas and resource; and carrying out environmental studies related to fisheries.

Marine fish production trench in major coastal states between 2000 and 2004: In the first two Five Years Plans, emphasis on marine fishery sector was on the mechanizations of indigenous crafts, introduction of mechanized fishing boats, improvements in fishing gears, establishment of infrastructure facilities such as processing plants, ice plants, cold storages and landing and berthing facilities. These programmes, backed by the discovery of rich fishing grounds in inshore waters paved the way for establishment of Sea Food Exports Industries. In the next three Five-Year Plans, the above programmes were continued with greater emphasis on introduction of mechanized fishing boats and adoption of synthetic materials for fishing gears. Research on various aspects of marine fisheries and exploration of their resources was intensified. With the declaration of an Exclusive Economic Zone of 200 miles in 1976, the programmes relating to deep-sea fishing were intensified. While in fifties and sixties, mechanized boats with trawl nets and motorized indigenous crafts were introduced for efficient harvests from the inshore region, in seventies, purse-seines were introduced along the southwest coast. These developments resulted in expansion of fishing areas and increase in production. Improved harvesting technologies coupled with increasing demand of fish for domestic and export market have resulted in significant increase of production over the last fifty years, i.e., from 0.53 mmt in 1951 to 3.0 mmt in 2001-2002.

Gear designing was given greater emphasis for enhancing the production from the mechanized vessels and diversification of fishing activities. This led to development of different gears, introduction which were stern trawling, outrigger trawling, mid-water trawling, purse seining and long lining. Introduction of gears like four-seam trawl and bulged-belly trawl could increase the catching efficiency by about 30 percent. Specialised gill nets were fabricated for lobster fishing. The use of non rotting synthetic fibre in fishing gears was another significant development. Of late, the use of mechanical fishing accessories, ancillary fishing equipment and electronic testing devices of practical value in fishing operation have also added a new dimension for enhancing the catch per unit effort of a specific gear and craft.

An increase in fishing intensity, declining stocks, conflict between the fishing sectors, decreasing catch rate, decreasing recruitment, inappropriate exploitation pattern, habitat degradation and resource degradation have been identified to be the major problems of coastal fisheries, presently. Several regulatory measures like regulation of mesh size, regulation of fishing areas, seasonal closure of fishing, ban of the destructive gears, promotion of marine sanctuaries, promotion of artificial reefs and sea ranching, effecting code of conduct for responsible fishing have to be implemented to ensure sustainable growth in this sector.

Freshwater Aquaculture

Indian aquaculture has shown significantly higher growth rates than those of capture fisheries in the last decade, with the quantity increasing from 1.01 million tonnes in 1990 to 2.10 million tonnes in 2000. Freshwater aquaculture has continued to form a major share of the aquaculture production, with a contribution of over 95 percent in terms of quantity. It is only the three Indian major carps, which share as much as 1.6 million tonnes. On the other hand, shrimp forms the main

component of brackish water aquaculture sector with production crossing a lakh tonne mark, recently.

Freshwater aquaculture in India has made notable strides in recent years with a growth trend similar to that of the world. With an annual growth rate of over 6 percent during the last decade, the sector possesses higher growth rates than other food producing sectors. The sector has evolved from the stage of a domestic activity in the East Indian states of West Bengal and Orissa to that of an industry in recent years, with states like Andhra Pradesh, Punjab, Haryana and Maharashtra taking up fish culture as a trade. With technological inputs, entrepreneurial initiatives and financial investments, the pond productivity has gone up at a national level from 500-600 kg/ha/yr to over 2000 kg/ha/yr, with several farmers and entrepreneurs achieving higher production levels of 6-8000/ha/yr. Carps is the mainstay of culture practice in the country, which is supported by strong traditional knowledge base and scientific inputs in various aspects of management. Carps contribute 87 percent of the total aquaculture production. Though the country possesses a large number of potential cultivable carp species, it is only the three Indian major carps; catla (*Catla catla*), rohu (*Labeo rohita*) and mrigal (*Cirrhinus mrigala*), that contribute a lion's share with production (0.546, 0.567 and 0.517 million tonnes, respectively recorded during the year 2000). Scientific interventions in the last five decades have led to the development of a host of carp culture technologies with varied production potentials depending on the type and level of inputs.

Further, other produce like catfishes, freshwater prawns and molluscs for pearl culture have also been brought into the culture systems. In addition, a range of other non-conventional culture systems, like sewage-fed fish culture, integrated farming systems, cage and pen culture, running water fish culture have made freshwater aquaculture a growing activity across the country. Being mainly organic-based, the freshwater aquaculture practices are also able to utilise and treat a number of organic wastes including domestic sewage, enabling eco-restoration.

Carp Breeding and Seed Production

Seed being the basic input in any culture systems, its production has been accorded highest priority in terms of brood-stock management, establishment of hatcheries, refinement of induced breeding techniques, rearing and production of quality seed across the country. The technology of induced breeding of carps under control condition has become a common practice of the farmers today. The breakthrough of induced breeding through hypophysation is, undoubtedly, the most important aspect that led to the growth of freshwater aquaculture sector. The technology has made mass production of quality seed under control condition possible, thereby, reducing the dependence on natural seed collection. Development of several ready-to-use synthetic inducing agents, as alternative to pituitary hormone, made the technology of induced breeding easier and more farmer friendly. Besides Indian major carps, the technology of breeding of Chinese grass carp and silver carp has also been domesticated all over the country. Various carp species are domesticated to breed before and after the monsoon. The technology of multiple breedingof carps has been able to demonstrate 2-3 fold higher spawn recovery from a single female during season through 3-4 times breeding within an interval of about 45 days. The technological evolution of hatchery design and operation from initial earthen pits to double-walled hapa and subsequently to glass-jar and circular eco-hatchery provided scope to produce and handle mass quantities of eggs during hatching. Carp hatcheries in the public sector have contributed to an increase in seed production from 6,321 million fry in 1985-86 to over 18,500 million fry at present. Even states like Assam and West Bengal are producing seeds much beyond their requirement, showing the prospects of export trade and its economical viability. However, in the wake of increased emphasis on diversification of carp culture, greater research thrust is warranted for commercial production of important medium and minor carp species. Despite the domestication of induced breeding technology and production of carp seed to the tune of over 18,500 million fry in the country, the availability of stocking materials of desired species and size still remains a constraint. Raising of seed in the initial two stages is associated with high rates of mortality due to several management problems. Packages of practices have been developed and standardized for raising fry and fingerlings with higher growth and survival levels.

** Deputy Director General, Fisheries, Indian Council of Agriculture of Research Krishi Anusandhan Bhawan-II, Pusa, New Delhi*

Role of Women in Indian Agriculture Sector

By **Padma Lakshmi** *

Rural Indian women are extensively involved in agricultural activities. However the nature and extent of their involvement differs with the variations in agro production systems. The mode of female participation in agricultural production varies with the landowning status of farm households. Their roles range from managers to landless labourers. In over all farm production, women's average contribution is estimated at 55 percent to 66 percent of the total labour with percentages, much higher in certain regions. In the Indian Himalayas a pair of bullocks works 1064 hours, a man 1212 hours and a woman 3485 hours in a year on a once hectare farm, a figure that illustrates women's significant contribution to agricultural production. (Shiva FAO, 1991)

The impact of W.T.O rules and policies of trade liberalisation in the agriculture sector on women is distinctive for four reasons. Firstly, women have been the primary seed keepers or processors. They have been both the experts and producers of food, from seed to the kitchen. W.T.O impacts women's expertise and productive functions throughout the food chain. The Trade Related Intellectual Property Rights (TRIPS) agreement impacts women's knowledge of and control over seed. The Agreement on Agriculture impacts women's livelihood and income security, and also has secondary impacts in terms of increased violence against women. The sanitary and phyto sanitary agreement has a direct impact on women's expertise and economic role in agro processing. Secondly, as globalisation shifts agriculture to capital intensive, chemical intensive systems, women bear disproportionate cots of both displacement and health hazards.

Thirdly, Women carry the heavier work burden in food production, and because of gender discrimination get lower returns for their work. When WTO destroys rural livelihoods, it is women who loose the most. When WTO rules allow dumping which leads to decline in prices of farm products, it is womens - already low incomes, which goes down further.

Fourthly, their position vis-à-vis WTO is also more vulnerable because as the livelihoods and incomes of farmers in general, and women agriculturists in particular are eroded, they are displaced from productive roles, women in

agriculture and their status is further devalued, while the patriarchal power of those who control assets and benefit from asset transfer due to globalisation is increased, other social processes are triggered which result in increased violence against women. The violence associated with displacement, devaluation and disempowerment takes the form of intensive violence, increasing incidences of rape, the epidemic of female foeticide, and growth in trafficking of women.

Women also bear the ultimate burden of farm suicides, since they are left to look after their households without assets but with the burden of indebtedness. India has a geographical area of 328.73 million hectares; of which reported area for land use is 306.04 million hectares. The net area cultivated is about 142.60 million hectares i.e. about 46.6 per cent of the total reported area. Since nearly 50 million hectares of area is sown more than once, the cropping intensity works out to 135.1. Forests account for about 68.97 million hectares i.e. 22.5 percent of the total reported land area. Also nearly 13.97 million hectares are cultivable wastelands and 9.91 million hectares are fallow lands. Only about 30 percent of the total cropped area is irrigated and the remaining area is rain fed. The available statistics further shows that only about 66 percent of the gross cropped area is under food crops and nearly 34 percent area under non-food crops. Cereals and pulses account for nearly 52.93 percent and 12.64 percent of the total area respectively. Fruits and vegetables occupy nearly 4.24 percent of area. (Haque 2003)

Plantation crops accounts for insignificant proportion of total area at the macro level, although these are very important crops for certain regions, namely tea in Assam and West Bengal, Coffee in Kerala and Karnataka, Coconut, cashew nut and rubber in Kerala and Tamil Nadu. Of the total coconut area of 1.84 million hectares, Kerala accounts for 51 percent followed by Tamil Nadu 17 percent, Karnataka 18 percent, Andhra Pradesh 5.4 percent and other 9.6 percent. In the case of cashew nut, there are about 601 thousand hectares of which Kerala accounts for 20 percent, Andhra Pradesh 15 percent, Karnataka, Maharashtra and Tamil Nadu 14 percent each, Orissa 11 percent, Goa 8 percent, and others 4 percent.

Tea covers nearly 4.34 lakh hectares of area in the country of which 3.33 lakh hectares are in the states of Assam and West Bengal. Coffee is predominantly grown in the three southern states of Karnataka, Kerala and Tamil Nadu. Of the total coffee area of about 2.41 lakh hectares, Karnataka shares 1.28 lakh hectares, Kerala 66.5 thousand hectares and Tamil Nadu 32.9 thousand hectares. Similarly rubber is the crop of southern states. Of the total rubber area of 5.59 lakh hectares, Kerala shares 4.73 lakh hectares, Karnataka 19.6 thousand hectares and Tamil Nadu 18.7 thousand hectares. Also the contribution of plantation crops to foreign exchange earnings is very significant. While tea and coffee earn sizeable foreign exchange, rubber is a valuable import substitute, for rubber-based industries.

According to population census of India 2001, there are about 402.5 million rural workers of which 127.6 million are cultivators and 107.5 million are agricultural labourers. In other words, pure agricultural workers constitute nearly 58.4 per cent of the total rural workers, of which 31.7 percent are owner cultivators and 26.7 percent are mainly agricultural wage earners (Agriculture Statistics at a Glance, sourced from Registrar General of India, New Delhi 2001). The latest available agricultural census data (Govt. of India, Agricultural Census Division, Ministry of Agriculture 2002) also reveal that about 78 percent of operational holdings in the country are marginal and small, having less than 2 hectares. About 13 percent holdings have 2 to 4 hectares and 7.1 per cent have 4 to 10 hectares of land. (Haque 2003)

The relatively large holdings above 10 hectares number only about 1.6 percent of the total operational holdings. However, these 1.6 percent of the large holdings occupy about 17.3 percent of the total area, while 78 percent of holdings which are less than 2 hectares, operate only about 32.4 percent of the total area. This speaks of inequality in the distribution of operational holdings. Also there is inequality of income between agricultural and non-agricultural workers, which is evident from the fact that percentage share of agriculture in current total GDP is only 24.2, while the percentage share of agricultural work force to total work force comes to about 60 percent.

The agricultural Census data clearly bear out the fact that Indian agriculture is dominated by small and marginal farms, which are basically subsistence farmers. They provide mainly for self-consumption.

However, some of these farmers have to sell their produce immediately after harvest at low prices and buy the same products later at high prices.

Characteristics of Labour Market in Agriculture

According to 55th of National Sample Survey (NSSO, 2001), agricultural labour households constitute nearly 32.2 percent of the total rural households. The self-employed in agriculture account for 32.7 percent of the total rural households. In fact, the proportion of agricultural labour households increased from 30.3 percent in 1993-94 to 32.2 percent in 1999-2000. While that of cultivating (self-employed) households declined from 37.8 percent in 1993-94 to 32.7 percent in 1999-2000. The proportion of female-headed households increased from 9.7 per cent in 199394 to 10.4 percent in 1999-2000. Nearly 62.6 per cent of the rural households belonged to less than Rs. 470 monthly per capita expenditure class. Nearly 4.6 percent rural households reported that none in the family was having any work, 27.7 percent reported that only one male member was, usually working, while 27.8 households indicated that one male and one female member were usually employed.

Of the female households 22.8 percent reported that none of their person was usually employed and 39.6 percent mentioned that only one female member was usually working. The NSSO data further revealed that 7.2 percent of the rural households did not possess any land and 51 percent households possessed less than 0.4 hectare. About 19.1 percent household possessed between 0.41 and 1 hectare and 11.5 percent between 1.01 and 2 hectare. Only 11.2 percent possessed land above 2 hectare.

Thus by and large Indian farming is dominated by small and marginal farmers. In fact, the proportion of rural households not possessing any land or which possessed less than 0.4 hectare land was quite high in the states of Bihar, Goa, Maharashtra, Sikkim and Tamilnadu. Also the proportion of agriculture labour households was quite high in some of these states. It was 38 percent in Bihar, 41.7 percent in Maharashtra and Karnataka and 45.2 percent in Tamilnadu.

Another important source of data is Census of India (2001), according to which there are nearly 127 million cultivators, 107.5 million agricultural labourers and 6 million other farm workers engaged in livestock, forestry and plantations. Of the total agricultural labourers, 38.0 per cent were female and 61.9 percent male workers. Also among livestock, forestry and plantation workers, 78.3 percent were male workers and 21.7 percent were female workers. About 99.2 percent of agricultural workers were reported to be unorganized and unprotected.

Status of Plantation Workers

The data compiled by Labour Bureau, Government of India from annual returns under the Plantation Labour Act, 1951 show that nearly 10.9 lakh persons were employed in the plantation sector, comprising 10.2 lakh in tea, 30680 in coffee, 27302 in rubber, 3463 in cardamom, 2696 in cinchona and the remaining in other plantations. At all India level, 50 percent workers in tea and coffee plantations, 34 percent workers in rubber, 62 percent workers in cardamom, 38 percent workers in palm oil and 45 percent in cinchona were women. In the plantation sector, nearly 80 percent are small holders having less than 20 acres each. Workers in smaller estates are by and large unorganized and their levels of employment are relatively lower than their counterparts in large plantation estates. It has been known that coffee and rubber planters in Kerala, and Karnataka that workers in small plantation estates receive Rs. 10 to Rs. 20 less per day as compared to those working in large estates. Also they do not adequately get the benefit of minimum wages, bonus and other facilities such as housing, medical care, maternity benefit etc.

Laws Governing Labour Standards in Agriculture

The Government of India has passed a number of laws in order to promote labour standards in agriculture. These laws are also in conformity with various relevant International Labour Organization (ILO) Conventions such as:

1. Minimum Wage Fixing Machinery (Agriculture) Convention, 1969 (129);
2. Equal Remuneration Convention, 1951 (No. 100);
3. Discrimination (Employment and Occupation) Convention, 1958 (No. 111);
4. Forced Labour Convention, 1930 (No. 29);
5. Abolition of Forced Labour Convention, 1957 (105);
6. Minimum Age Convention, 1973 (No. 138), (vii) Worst Form of Child Labour Convention, 1999 (No. 182), (viii) The Safety and Health in Agriculture Convention, 2001, (No. 184); and,

7. Plantation Convention, 1958 (No. 110).

The Plantation Labour Act, 1951 as Amended in 1981

This is an Act to provide for the welfare of labour, and to regulate the conditions of work, in Plantations. According to this Act, in every plantation, effective arrangements shall be made by the employers to provide and maintain at convenient places in the plantation, a sufficient supply of wholesome drinking water to all workers, medical facilities, canteen, crèches, recreation facilities, educational facilities, housing facilities and annual leave with wages and maternity benefits. In most schools, there is a provision of free mid-day meal for the children of those employees drawing a monthly salary of Rs. 750. Every plantation, employing 50 or more women workers, also provides crèches.

However, only 20 to 25 percent of the plantation workers who are employed in large estates above 25 acres and who come under the purview of the Plantation Labour Act get such benefit. About 75 to 80 percent holdings in tea, coffee and rubber are small and marginal where workers have access to free housing facility, free electricity and drinking water facilities and sometimes even medical care, they do not generally receive many of the benefits indicated above. Particularly women workers do not have access to maternity benefit in smaller estates based on personal interviews. Also the wage rates of these workers are less by Rs. 10 to 20 as compared to those working in larger estates where the workers are organized. Besides, they do not get subsidized rations unlike the organized plantation workers.

Poverty and Unemployment

According to various rounds of National Sample Survey, the absolute number of rural poor persons increased from 232 million in 1987-88 to 244 million in 1993-94 and then declined to 193 million in 1999-2000. About 27 percent rural people are reported to be below the poverty line. In several states including Bihar (44.3 percent), Orissa (48.0 percent) and North Eastern states, the incidence of rural poverty is higher than the national average (Economic Survey 2001-02). The NSS data (NSSO. 50th round) further reveal that: among landless agricultural labourers, the incidence of poverty is as high as 71.8 percent in Western Plan region of Assam, 83 percent in Jharkhand (former south Bihar), 78 percent in Northern Bihar, 71.9 percent in Central Bihar, 67 percent in Eastern Haryana, 64.2 percent in Chhattisgarh, 89.6 percent in South Western Madhya Pradesh, 72 to 76 percent in various regions of Maharashtra (other than coastal and inland Western Maharashtra), 61.9 percent to 83.9 percent in different regions of Orissa, 73.5 percent in Southern Rajasthan, 65.8 percent in Northern coastal region, 73.4 percent to 89.8 percent in Central, Eastern and Southern Uttar Pradesh.

Also among self-employed cultivating households, the poverty ratio ranges between 30 to 50 percent in several regions including Assam, Bihar, Jharkhand, large parts of Madhya Pradesh and Marahashtra, Orissa, Southern Rajasthan, coastal Northern Tamil Nadu, all regions of Uttar Pradesh (other than Western UP), and Eastern Himalayan regions of West Bengal. Thus, a significant population of agricultural workers including both self-employed and wages workers stay below the poverty line. They have poor purchasing power and command over goods and services. The annual growth rate of employment as such has decelerated from about 2.04 percent during 1983-1994 to 0.98 percent during 1994-2000. But the growth rate of agricultural employment has declined from 1.51 percent in earlier period to - 0.34 percent during 1994-2000.

Women in Agriculture

According to Swaminathan, the famous agricultural scientist, some historians believe that it was woman who first domesticated crop plants and thereby initiated the art and science of farming. While men went out hunting in search of food, women started gathering seeds from the native flora and began cultivating those of interest from the point of view of food, feed, fodder, fibre and fuel.

Women have played and continue to play a key role in the conservation of basic life support systems such as land, water, flora and fauna. They have protected the health of the soil through organic recycling and promoted crop security through the maintenance of varietal diversity and genetic resistance. There fore, without the total intellectual and physical participation of women, it will not be possible to popularize alternative systems of land management to shifting cultivation, arrest gene and soil erosion, and promote the care of the soil and the health of economic plants and farm animals. (Prasad & Singh 1992)

That women play a significant and crucial role in agricultural development and allied fields including in the main crop production, livestock production,

horticulture, post harvest operations, agro/social forestry, fisheries, etc. is a fact long taken for granted but also long ignored. The nature and extent of women's involvement in agriculture, no doubt, varies greatly from region to region. Even within a region, their involvement varies widely among different ecological sub-zones, farming systems, castes, classes and stages in the family cycle. But regardless of these variations, there is hardly any activity in agricultural production, except ploughing in which women are not actively involved. In some of the farm activities like processing and storage, women predominate so strongly that men workers are numerically insignificant. (Aggarwal 2003) Studies on women in agriculture conducted in India and other developing and under developed countries all point to the conclusion that women contribute far more to agricultural production than has generally been acknowledged. Recognition of their crucial role in agriculture should not obscure the fact that farm women continue to be concerned with their primary functions as wives, mothers and homemakers.

Despite their importance to agricultural production, women face severe handicaps. They are in fact, the largest group of landless labourers with little real security in case of break-up of the family owing to death or divorce; inheritance laws and customs discriminate against them land reform and settlement programmes usually give sole title and hence the security needed for obtaining production credits to the husband. Agricultural development programmes are usually planned by men and aimed at men.

Mechanization, for example alleviates the burden of tasks that are traditionally men's responsibility, leaving women's burdens unrelieved or even increased. The excess burden of work on women (the double day. of the farm work plus house work) also acts as a stimulus to have many children so that they can help out with chores from an early age. Extension workers almost exclusively aim their advice at men's activities and crops. In some regions, this bias may depress production of subsistence food crops (often women's crops) in favour of increased production of cash crops (often men's crops) in favour of increased production of cash crops so that family nutrition suffers.

It may not be out of place to mention here that considering their dual responsibilities within and outside the home, it would be in the fitness of things that more and more in the village training is organised for rural farm women to suit their convenience with due realization that institutional training is important in its own place.

In order that farm women get a fair deal at the hands of change agents, one of the remedial measures that needs to be undertaken is to induct a sizeable number of well trained women personnel in training and extension programmes of agricultural development agencies at all levels and more so at the grass-root level.

According to 1991 census the male cultivators has increased in the country by 11.67 percent from 76.7 in 1981 to 85.6 million in 1991. The female cultivators however have increased at much faster rate of 45.23 percent from 14.8 million in 1981 to 21.5 million in 1991. As shown in table 2.1, the number of male agricultural labourer increased by 31.48 percent, but that of female by 36.45 percent. 74 percent of the entire female working force is engaged in agriculture operations. About 60 percent of agricultural operations like sowing of seeds, transportation of sapling, winnowing, storage of grain etc are handled exclusively by women, while in other jobs they share the work with women.

Apart from participation in actual cultivation, women participate in various forms of processing and marketing of agricultural produce (Aggarwal 2003).

In rural India, the prosperity of the household depends on the prosperity of agriculture and allied occupation in any particular point of time vis-à-vis the role of women in innumerable activities connected with farming, dairying, sericulture etc.

** The writer is Research Scholar A.M.U.*

Sustainable Sugarcane Initiative (SSI)

Making Sugarcane Production more Profitable and Environmentally Suitable

By **D. Muthamizh Vendan Murugavel** *

The importance of sugar and sugarcane in India cannot be underestimated. It is the second largest industry in the agro-processing sector, next to textiles, and represents the principal livelihood of 35 million farmers and 50 million others who are employed in its 571 sugar-related industries. India is the second largest producer of sugarcane in the world contributing 19.98 percent in world's total sugarcane production with the production of 348 million tonnes (as of 2008). In the year 2009-10 India produced about 324 million tonnes, covering 4.86 million hectares, with the yield of 66 tonnes per hectare. India is also the second largest consumer of sugar in the world, averaging a consumption of 15,588 TMT. India is ranked fourteenth in exports, averaging 210 TMT, and they are ranked fifth in the world for imports, averaging 667 TMT. On the other side, sugarcane cultivation in India is facing a serious challenge of unpredictable water availability. There is a need to explore every possible approach to reduce the water input to all crops including sugarcane. The Sustainable Sugarcane Initiative (SSI) is one such approach that could reduce the inputs – water, fertilizer, seed material – while improving sugarcane production significantly.

Sustainable Sugarcane Initiative (SSI) is inspired from the successful approach of System of Rice Intensification (SRI) paddy cultivation. Sustainable Sugarcane Initiative is an approach to the cultivation of sugarcane that can reduce inputs water, chemical fertilizers, seed material and farm space while improving sugarcane production significantly. It also reduces crop duration and provides a longer period

of the cane crushing season to the sugar industry.

This farm-based approach (as opposed to crop-based) also gives farmers options to grow intercrops such as pulses to improve their income. Most importantly, SSI reduces the overall pressure on water resources and contributes to recovery of ecosystems. It conserves soil moisture, thereby allowing for growing of dry land crops in the same region.

Major principles and benefits of SSI

SSI is a combination of cane planting innovations and water saving practices that had great potential to increase productivity, improve natural resource management, and assure higher income for farmers. Besides reducing water requirement, SSI has the scope of reducing seed cane cost, increasing farm income through intercrops, and facilitating mechanised cane harvesting due to wider spacing. Mechanised sugarcane harvesting is highly labour intensive.

- Raising nursery using single-budded chips (conventionally, 2-3 budded sets are used and normally no nursery is prepared).
- Transplanting young seedlings (25-35 days old), after grading (conventionally, direct planting of 3-budded chips is done). Raising a nursery and grading reduces plant mortality significantly as compared to conventional cultivation.
- Maintaining wide spacing (5x2 feet) in the main field, which reduces the seed requirement by 75 percent from 48,000 (16000 3-budded chips) to 5000 single-budded chips per acre (conventional spacing is 1.5x2.5 ft). Wider spacing supports easy air and sunlight penetration in the crop canopy, leading to better and healthier cane growth. It also allows for easier intercultural operations.
- Providing sufficient moisture and avoiding inundation of water, whereby 40 percent of water is saved (conventionally, flooding is practiced). This is significant as sugarcane consumes about 2500L of water per kg of sugarcane produced.
- Encouraging organic methods of nutrient management and plant protection.
- Practicing intercropping (which is possible due to wider spacing and non-flooding), thereby increasing effective utilization of land, giving additional income and reducing weed growth by 60 percent.

All the above practices lead to increased length and weight of individual canes, and at least 20-25 tillers/plant and 9-10 millable canes/plant, as compared to 10-15 tillers and 4-5 millable canes in conventional cultivation.

By practicing the above measures, the following benefits can be realised:

- Better germination percentage;
- High number of millable canes;
- Reduction in the duration of crop to some extent;
- Increased water use efficiency;
- Improvement in accessibility to nutrients with optimum use of fertilizers;
- More accessibility to air and sunlight;
- Reduction in cost of cultivation;
- Extra income from intercrops; and,
- SSI technique was eminently suited for mechanizing sugarcane harvesting

A Comparison between Conventional and SSI methods of Sugarcane Cultivation

Input	Conventional Method	SSI Method
Seeds/Setts	48,000 buds (16,000 three budded setts/acre)	5000 buds (5000 single budded chips/acre)
Nursery preparation	No	Yes
Measures to maintain uniformity among plants	No Grading	Grading is done during nursery
Planting	Direct planting of setts in the main field	Transplanting of 25-35 days old young seedlingsraised in a nursery
Spacing	1.5 to 2.5 ft between rows	5 ft between rows
Water requirement	More (flooding of field)	Less (maintenance of moisture in the furrows)
Mortality rate among plants	High	Low
No. of tillers per plant	Less (10-15)	More (20-25)
No. of millable canes achieved per clump	4-5	9-10
Accessibility to air and sunlight	Low	High
Scope for intercrop	Less	More

The Importance of the Sustainable Sugarcane Initiative

Sugarcane farming needs a lot of water and flooding method drains precious irrigation resources when used in large scale. While precision farming is an option, the cost of irrigating cane fields spread over large tracts is out of bounds for small and medium farmers. Besides technological shortcomings, farmers had to be assisted in leapfrogging to advanced cultivation methods to meet burgeoning demands. The SSI has the answers for all those necessities.

Conclusion

Producing more crops with less water, seed, and fertilisers is currently the greatest challenge facing the agricultural sector, warranting a new revolution in agriculture. From the point of view of water, sugarcane consumes about 2500 L of water per kg. The Sustainable Sugarcane Initiative (SSI) aims to provide practical options to farmers for improving the productivity of land, water, and labour reduce crop duration, providing factories a longer crushing season and increased employment opportunities for workers reduce the overall pressure on water resources and ecosystems. It stresses a practical approach that originates from farmers and civil society to improve productivity while reducing pressures on natural resources. It's estimated that by adopting SSI, a farmer will be able to produce at least 20 percent more sugarcane while reducing water inputs by 30 percent and chemical inputs by 25 percent. This concept surely can bring substantial changes in the production and productivity of sugarcane.

Though the SSI method has received an overwhelming response from the farmers of UP, Punjab, Orissa, Karnataka, Tamil Nadu and Andhra Pradesh, industries and researchers, it needs to be modified to suite the local conditions while retaining the main principles. Moreover, the extension functionaries should make sure the rapid spread and adoption of this method across the country.

Hence, it is right to say that the more-from-less sustainable agriculture approach like SSI which can deliver higher production, at lower economic and ecological costs including a lower water footprint has a vital role to play in shaping the future of our farmers, food security and economy.

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** The writer is Assistant Professor, PG & Research Department of Commerce, Gobi Arts & Science College, Gobi, TamilNadu, India, E-mail: mvm_gasc@rediffmail.com*

PERSPECTIVE

Climate Sensitivity of Indian Agriculture

By **K.S. Kavi Kumar** *

Climate change impact studies on agriculture are broadly based on agronomic-economic approach and Ricardian approach. The Ricardian approach, similar in principle to the Hedonic pricing approach of environmental valuation, has received significant attention due to its elegance and also some strong assumptions it makes. This article attempts to extend the existing knowledge in this field by specifically addressing two important issues: (a) extent of change in climate sensitivity of Indian agriculture over time; and (b) importance of accounting for spatial features in the assessment of climate sensitivity. The analysis based on four decades of data suggests that the climate sensitivity of Indian agriculture is increasing over time, particularly in the period from mid-eighties to late nineties. This finding corroborates the growing evidence of weakening agricultural productivity over the similar period in India. The results also show presence of significant positive spatial autocorrelation, necessitating estimation of climate sensitivity while controlling for the same. While many explanations may exist for the presence of spatial autocorrelation, this paper argued that inter-farmer communication could be one of the primary reasons for the spatial dependence. Field studies carried out in Andhra Pradesh and Tamil Nadu through focus group discussions provided limited evidence in this direction.

Over the past two decades the debate on global climate change has moved from scientific circles to policy circles with the world nations more seriously than ever exploring a range of response strategies to deal with this complex phenomenon that is threatening to have significant and far reaching impacts on human society. The Intergovernmental Panel on Climate Change (IPCC) in its fourth assessment report observed that, "warming of climate system is now unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global sea level" (Solomon et al., 2007).

Policy responses to climate change include mitigation of GHGs that contribute to the expected changes in the Earth's climate, and adaptation to potential impacts caused by the changing climate. While the first one is largely seen as a reactive response to climate change, the second one is a proactive response. Though GHG mitigation policies have dominated the overall climate policy so far, adaptation strategies are also being emphasised now to form a more comprehensive policy response. The United Nations Framework Convention on Climate Change (UNFCCC) – the international apex body on climate change – refers to adaptation in the context of change in climate only. In other words without greenhouse gas emissions there is no climate change and hence no need for adaptation. Going by this widely accepted interpretation, adaptation is necessary only because mitigation of greenhouse gases may not completely halt climate change. Stern Review summarises this view: "adaptation is crucial to deal with the unavoidable impacts of climate change to which the world is already committed" (Stern, 2006, emphasis added).

For both mitigation and adaptation policy formulation, one of the crucial inputs needed is the potential impacts due to climate change.

Climate Change and Indian Agriculture

With more than sixty percent of its population dependent on climate sensitive activities such as agriculture, the impacts of climate change on agriculture assume significant importance for India. Climate change projections made up to 2100 for India, indicate an overall increase in temperature by 2-4oC coupled with increase in precipitation, especially during the monsoon period. Mall et al. (2006) provide an excellent review of climate change impact studies on Indian agriculture mainly from physical impacts perspective. The available evidence shows significant drop in yields of important cereal crops like rice and wheat under climate change conditions. However, biophysical impacts on some of the important crops like sugarcane, cotton and sunflower have not been studied adequately. The economic impacts of climate change on agriculture have been studied extensively world over and it continues to be a hotly debated research problem. Two broad approaches have been used so far in the literature to estimate the impact of climate change on agriculture:

- Agronomic-economic approach that focuses on structural modelling of crop and farmer response, combining the agronomic response of plants with economic/management decisions of farmers. This approach is also referred as Crop Modelling approach and Production Function approach;
- Spatial analogue approach that exploits observed differences in agricultural production and climate among different regions to estimate a climate response function. This approach is referred as Ricardian approach and is similar in spirit to hedonic pricing technique of environmental valuation.

With more than sixty percent of its population dependent on climate sensitive activities such as agriculture, the impacts of climate change on agriculture assume significant importance for India

In the first approach the physical impacts (in the form of yield changes and/or area changes estimated through crop simulation models) are introduced into an economic model exogenously as Hicks neutral technical changes. In the Indian context Kumar and Parikh (2001a) showed that under doubled carbon dioxide concentration levels in the later half of twenty first century the gross domestic product would decline by 1.4 to 3 percentage points under various climate change scenarios. More significantly they also estimated increase

in the proportion of population in the bottom income groups of the society in both rural and urban India under climate change conditions. While this approach can account for the so-called carbon fertilisation effects, one of the major limitations is its treatment of adaptation. Since the physical impacts of agriculture are to be re-estimated under each adaptation strategy, only a limited number of strategies can be analysed.

In an alternative approach, called Ricardian approach, Mendelsohn et al. (1994) have attempted to link land values to climate through reduced-form econometric models using cross-sectional evidence. This approach is similar to Hedonic pricing approach of environmental valuation. Since this approach is based on the observed evidence of farmer behaviour it could "in principle include all adaptation possibilities. Of course, if the predicted climate change is much larger than the observed climatic differences across the cross-sectional units then the Ricardian approach can not (even in principle) fully account for adaptation.

While the Ricardian approach has the potential for addressing the adaptation satisfactorily, the issues concerning the cost of adaptation are not completely addressed. One of the main concerns of this approach is that it may confound climate with other unobserved factors. Recently, Deschenes and Greenstone (2005) and Schlenker and Roberts (2008) among others, have addressed this issue. Further, the constant relative prices assumption used in this approach could bias the estimates (see, Cline, 1996; Darwin, 1999; Quiggin and Horowitz, 1999 for a critique on this approach). For India, Kumar and Parikh (2001b) and Sanghi and Mendelsohn (2008) have used a variant of this approach and showed that a 2o ^{0}C temperature rise and seven percent increase in rainfall would lead to almost 10 percent loss in farm level net revenue (1990 net revenue).

The regional differences are significantly large with northern and central Indian districts along with coastal districts bearing relatively large impact. Mendelsohn et al. (2001) have compared climate sensitivity of the US, Brazilian and Indian agriculture using the estimates based on the Ricardian approach and have argued that using the US estimates for assessing climate change impacts on Indian agriculture would lead to under-estimation of impacts.

The results of the two broad approaches outlined above correspond to what could be termed as typical and clairvoyant farmer, respectively. While the estimates from agronomic-economic approach account for adaptation only in partial manner, the Ricardian approach treats farmer as though she has perfect foresight. In the Ricardian approach farmers are assumed to identify instantaneously and perfectly any change in climate, evaluate all associated changes in market conditions and then modify their actions to maximize profits. These assumptions also imply that agricultural system is ergodic – i.e., space and time are substitutable. Ergodic assumption imply, for example, that skills, institutional and financial endowments for responding to say, drought (that are typically refined in arid places) are assumed to be available for use by people in humid areas (where such resources are under-developed) immediately and in essentially cost-less manner.

Further there is scope for inter-farmer communication and information diffusion. Both these factors motivate incorporation of spatial features in the Ricardian analysis. There are other motivations for accounting for spatial autocorrelation in the Ricardian analysis. Scope for spatial autocorrelation of error terms could lead to inefficient estimation of the coefficients. Recent evidence from the US suggests that either way it is important to account for spatial autocorrelation to get accurate estimates of climate sensitivity of agriculture. Similarly, careful analysis of the changing nature of climate sensitivity of Indian agriculture is important to understand the role of technology in ameliorating the climate change impacts.

Climate Change Projections for India

The climate change projections for India used for the analysis are those reported in Cline (2007). From these regional projections, state-wise climate change predictions are assessed by comparing the latitude-longitude ranges of the regions with those of the states. Besides this India specific climate change scenario, the impacts are also assessed for two illustrative uniform climate change scenarios (+2oC temperature change along with +7 percent precipitation change; and +3.5oC temperature change along with +14 percent precipitation change) that embrace the aggregate changes.

Inclusion of interaction terms makes it difficult to interpret the marginal effects of temperature and precipitation. To gain

insight about the impact of various climate change scenarios and variability in the impacts based on climate response functions that correspond to different time periods, the climate change impacts are estimated. The climate change induced impacts are measured through changes in net revenue triggered by the changes in the climate variables. The impacts are estimated for each year at individual district level and are then aggregated to derive the national level impacts.

Evidence on Inter-farmer Communication

As observed in the previous section consideration of spatial effects has contributed to positive spin-offs in terms of reduced climate change impacts. For designing enabling policy responses, it is important to explore factors contributing towards such spatial effects. Hypothesizing that inter-farmer communication could among other factors be responsible for spatial auto-correlation, an attempt has been made to understand the scope and extent of information exchange between farmers through focus group meetings held at six villages each in Tamil Nadu and Andhra Pradesh. The focus group meetings mainly explored the perceptions of the villagers about the climate change and their views on strategies helpful in ameliorating the climate change impacts. Among other things, special attention is paid to the channels through which information diffusion takes place.

The field level analysis showed that while most farmers are familiar with the term climate change, their understanding is often overlapping with other phenomenon. All climate/natural patterns are perceived as climate change with little and/or no distinction between future climate change and preset day climate concerns (that manifest in the form of climate extremes like droughts, floods and cyclones, and abnormal weather patterns like un-seasonal rainfall etc.). However, there is a consensus in most discussions that anthropogenic activities leading to excess pollution are often responsible for the abnormal weather. Most farmers also consider climate/weather concerns to be more threatening than other risks, such as price changes. The reasons cited for such

perceptions include, bigger scale of impact that climate/weather risks may cause, and limited scope for adaptation. Such perceptions are uniformly held by small, medium and large farmers.

Almost all focus group meetings indicated that there is dearth of information. Farmers irrespective of size are in search of information – which could include advice on input use, pest control, agronomic practices, and soil and water conservation practices. Among the various sources through which information diffusion takes place, most focus group discussions ranked large farmers in the neighbourhood as the primary source. Not surprisingly, the agricultural extension services offered by the government are not seen as appropriate source of information, mainly due to the manner in which the extension services provide information. While the information needs are different across farmers based on their scale of operation and kind of crops cultivated, the agricultural extension services often package the information in uniform manner as though one size fits all.

Similarly, the usual information diffusion sources such as television and radio also appear to be less effective in reaching out, partly because these sources are often seen as entertainment sources rather than information channels. Discussion in several focus group meetings revealed that farmers often depend on fertilizer and pesticide dealers for information on new varieties and new agricultural practices. While this source has appropriate self regulated checks against provision of wrong information, it is important to ensure that incorrect information does not reach the farmers even inadvertently. Most importantly these sources provide information in a case-by-case manner that suits most farmers.

New information does not often reach agricultural labourers. Given the large size of this group and the important role it plays in determining agricultural productivity, it is important to ensure that this group is also targeted along with farmers in providing information on agricultural practices. Similarly, the information diffusion must take place to reach female farmers also alongside their male counterparts, which appeared to be lacking presently based on the evidence from the focus group discussions with the female farmers. There is two-tier structure for the information flow with the male farmers receiving it first and the female farmers learning through their male counterparts. Perhaps this is due to larger social prejudices and needs immediate attention.

The field studies also revealed that new sources of information diffusion should be explored and experimented. Given the fragmented nature of Indian agricultural lands, large scale participation of corporate sector in providing agricultural extension services could be difficult, and hence other options must be explored. Among other things, the farmers favoured participation of agricultural cooperatives, NGOs, and dealers of inputs and fertilizers in information diffusion. In this context, other country experiences should also be carefully studied to identify the routes through which the agricultural extension services could be provided to the farmers. For instance, in Ecuador the agricultural extension workers operate in tandem with the farmers through share cropping to ensure proper information diffusion. On the other hand, Chile finances the costs of private sector firms transferring the technology know-how and information on new agricultural practices to small scale farmers.

** The writer is Assistant Professor University of Delhi*

Sugar Co-operatives in Maharashtra: **A Political Economy Perspective**

By **Mala Lalvani** *

Origin of the powerful sugar lobby in Maharashtra dates back to the 1950s. Post Independence, cooperatives formed an integral part of the Congress vision of 'rural development with local initiative'. A 'special' status was accorded to the sugar cooperatives and the government assumed the role of a mentor by acting as a stakeholder, guarantor and regulator. Persistence of the maze of regulations instituted five decades ago, despite its stated original rationale being thwarted, suggests that it is by active design of entrenched vested interests. The clarion call of the times is a fresh start with minimal regulations. Teething problems and initial market failures that may occur cannot be worse than continuing the saga of government failure.

The sugar economy in many ways represents a "microcosm of the Indian economy in which there are inter-meshed a wide range of social groups who play an important role in the formulation of economic policy at a wider level" (Baru, 1990 p.2). For an economist, interest in the sugar economy stems from the fact that it is one of the most regulated sectors in the economy. Also, pressure from millers, growers and consumers, make formulation of sugar policy a challenging task for the administrator and the government. The intertwining of economics and politics in the sugar economy provides an exciting terrain for research in the Public Choice tradition.

Economists have traditionally failed to recognise the political dimension of policy prescriptions. This gap between sound economic principles and political reality has sought to be bridged by Public Choice theory. Public Choice theory has contributed significantly to understanding the institutional setup and quantitatively establishing the politico-economic nexus that prevails in society.

The proposed study attempts to take a close look at the deeply entrenched tradition or institution of sugar co-operatives in Maharashtra. A study of sugar co-operatives, particularly in Maharashtra, assumes significance as their leaders, the sugar 'barons', have constituted an important power structure in the state and the sugar co-operatives have played a pivotal role in shaping the socio-economic fabric of the state. It is an accepted fact that no other sector of the economy is as well represented in government as is the sugar sector. Many of the cane growers have occupied important positions in government, with two having reached the position of Chief Minister of the state.

The Beginnings

The spread of canal irrigation in the 1920s attracted migrants, especially Malis from Saswad who were experienced with growing irrigated crops, to move into the canal tracts and lease in land from local Maratha cultivators. According to Chitelen (1985) canal irrigation itself contributed to the differentiation process. A contrary view has been expressed by Attwood (1992) who draws attention to the fact that much of the land that was being brought under cultivation was being used for the first time and not taken away from the small peasants and society was already a highly differentiated one.

While Attowood (1992) disagrees with Chitelen's view of exploitation, both agree on the fact that the entrepreneurs who made use of canal irrigation did get richer than small peasants. The idea of a cooperative was first mooted at a

The decade of the 1950s alone saw 14 new sugar factories being set up in the cooperative sector. The control of sugar co-operatives soon became a means of acquiring political power for the rich peasant class, the Marathas

conference of irrigators and presided over by eminent economist Dr. D.R. Gadgil in 1945. It was only by the end of 1948 that the first cooperative society to be set up at Pravaranagar was registered. The resounding success of the Pravara resulted in the government taking a decision in 1954 of granting industrial licenses for sugar industry to co-operatives alone. This gave a major fillip to the growth of sugar cooperatives in Maharashtra. The decade of the 1950s alone saw 14 new sugar factories being set up in the cooperative sector. The control of sugar co-operatives soon became a means of acquiring political power for the rich peasant class, the Marathas. The government had begun to assume the role of a mentor by acting as stakeholder, guarantor and regulator.

An important factor which contributed to the success of sugar co-operatives was the encouragement provided by the ruling Congress party to the formation of these co-operatives. After Independence in 1947, India adopted a democratic constitution with universal adult suffrage. For the first time the vast majority of villagers got to vote. This led to a displacement of elite, high-caste urban politicians from state legislatures and resulted in strengthening of the nexus between the sugar cooperatives and government. Caste affiliations worked in favour of cooperatives and they received a variety of financial subsidies from the state government.

The deep rooted political nexus of sugar cooperatives that unfolds as the story progresses opens up a vast area of research in the Public Choice tradition. Before plunging headlong into details of the sugar sector, we contextualise the study and elaborate on regulation theory and Public Choice theory.

The Context: Regulation Theory & Public Choice Framework

Broadly speaking, regulation theory can be categorised into (i) Public Interest theory and (ii) Capture theory. *Public Interest theory* sees regulation as a product supplied in response to the demand from the public for correction of inefficient or inequitable markets. The theory of regulation that best describes the sugar cooperatives in Maharashtra is the '*Capture' theory.* There are a number of variants of this theory including the Marxist and the political scientists' version. The variant that is popular with economists and relevant here is that proposed by George Stigler (1971). It insists that economic regulation serves the private interests of politically effective groups. Economic regulation is thus viewed as product whose allocation is governed by the laws of supply and demand. Stigler (1971) identifies four main policies which an industry may seek (a) Cash subsidy (b) Control over entry by new rivals (c) Control on substitutes and complements and (d) Price-fixing.

The industry which seeks political power must go to the appropriate seller that is, the political party. In turn the industry must be prepared to pay with (a) votes and (b) resources in the form of campaign contributions and contributed services. Further, it is a conjecture of the capture theory that if a political party has in effect a monopoly control over the government machine, it could collect most of the benefits of regulation for itself.

In case of sugar cooperatives in Maharashtra, the more powerful farmers found their way into government hierarchy and occupied offices from where they were in a position to shape policy and indulge in 'pork barrel' politics.

The Political Nexus of Sugar Cooperatives

The state of Maharashtra has one dominant caste, the Marathas, who span the entire state and also dominate the political scene. The relative solidarity of the Congress party in Maharashtra and its stability is largely attributable to Maratha hegemony. Unlike Maharashtra, none of the other states of India have experienced regional hegemonic dominance equivalent to that of the Marathas (Lele, 1981). In

The sugar cooperatives are thus clearly a Congress stronghold. On the whole, sugar cooperatives have constituted a rural power structure and have provided an important political recruitment base

Maharashtra, the Marathas are estimated to constitute 40 percent of the population and have control over nearly 80 per cent of the positions of political power. Their predominance is felt especially in the western Maharashtra region. Apart from proximity to the state capital, Mumbai and an excellent transport network, it is the power of the sugar lobby or sugar 'barons' as they are often referred to, that gives the western Maharashtra region an edge over others in state politics (Sirsikar, 1995).

The management of a sugar factory rests with a Board of Directors. There is considerable prestige, material gain and patronage that comes along with Directorship and Chairmanship of a sugar cooperative. Baviskar (1980) provides a very lucid account of the status enjoyed by members elected to the board. The status and power that a Chairman and the Directors command makes them highly sought after by the political parties, who offer them tickets to contest in elections – both state and local. These positions are therefore very attractive and highly coveted by local leaders. Consequently, factory elections are intensely contested. Khekale (1999) in his study of the period 1952-72 found that 74 percent of the Chairmen of sugar cooperatives were elected as legislators and MPs. Controlling big cooperatives, such as sugar factories, helps leaders to rise in party and governmental hierarchy and this in turn helps them to get nominated on the Boards of various other cooperatives especially cooperative banks.

Thus a 'two-way' relationship has flowered between cooperatives and other structures of power. The sugar industry, in turn, has been a huge contributor to election funds during election campaigns. Baviskar (1968) provides ample evidence to substantiate this. Sugar cooperatives have sometimes even played host to election meetings of political parties and provided various facilities. The manpower and vehicles for election campaigns are customarily provided by sugar cooperatives.

The link of the sugar cooperatives with politics in general and the Congress party, in particular, is evident via some statistics provided by Khekale (1999). He finds that 21 Chairmen of sugar cooperatives have held important positions in the Congress party during the 1952-1972 period. The sugar cooperatives are thus clearly a Congress stronghold. On the whole, sugar cooperatives have constituted a rural power structure and have provided an important political recruitment base. In the words of Baviskar 'If sugar cooperatives have been instruments of rural development then politics is the process that has sustained this development'.

Such being the ties between sugar cooperatives and the politics, one is tempted to attribute the beginning of cooperatives itself to the political clout that the rich Maratha peasants enjoyed. Attwood (1993), however, cautions against 'reading history backwards' and attributing the success of the early cooperatives to the political power of the Marathas at the state level. He views these cooperatives as 'experiments in which commitment and performance of local leaders were all important' (Attwood, 1992, p.190). In his view, the fact that the State could pass land reform legislation in the late 1950s and early 1960s, which went against the interest of the cane growers, suggests that the cane growers lacked enough political power to prevent the legislation from being passed. That the rich farmers subsequently circumvented the hurdle by reallocating the land amongst family members, is a separate issue.

Contextually, one is inclined to go along with the view that the generous government support and the regulatory mechanism began with 'benign' intentions in the immediate years post Independence. However, when discussing the role of the state and the support it provides to the sugarcane crop and to the sugar cooperatives, in section 5 below we find adequate evidence to suggest that persistence of this maze of regulations is by design of entrenched vested interests.

Rules of the Game – The Regulatory Role of the State

A sugar cooperative is an agro processing industry, ridden with regulations on both, the output side, that is, sugar and on the input side, that is, sugarcane. An

important point to note here is that most of these regulations were initiated in the first decade after Independence – the fifties. But first we take a look at the role that the state in supporting the sugarcane crop itself.

The Sugarcane Crop – Net Subsidised?

Indian agriculture is highly subsidised through cheap fertilisers, free power and irrigation water in various states and that the system can no longer carry on with this burden. A crop-wise estimate of agricultural subsidies is difficult to compute. However, some indications of the magnitude of concessions to sugarcane crop and the channels via which subsidies are offered can be easily discerned.

The tropical climate of Mahrashtra necessitates that he sugarcane crop be cultivated entirely on irrigated land, hence irrigation assumes tremendous importance. A combination of three factors that is, relatively drier climate of western zone, historical factors and policy decisions have resulted in greater development of the irrigation potential in the western zone vis-à-vis the eastern zone. The recommended water application for sugarcane is 274 hectare-cm as compared to a mere 30 hectare-cm for rabi jowar. Sawant (1997) points out that in the 1980s, 50 percent to 70 percent of the incremental volume of irrigation water was diverted to the sugarcane crop alone at the expense of other crops. Table I below compares the yield in Maharashtra vis-à-vis the national average.

Table I: Yield of Sugarcane

(metric tonnes per hect)	Maharashtra	India	Gap
1986/1987 to 1990/1991	65.38	61.94	3.44
1991/1992 to 1997/1998	60.09	67.67	-7.58

Source*: District-wise Agricultural Database for Maharashtra 1960-61 to 1997-98, EPW*

Table I shows that the average sugarcane yield in Maharashtra has been higher than the national average in the mid 1980s (1986/1987 to 1990/1991), but has fallen to below the national average in the 1990s (1991/1992 to 1997/1998). The falling yield has been attributed to the shift to a shorter duration annual crop since there is water scarcity and the longer duration crop faces two dry seasons rather than one.

An added dimension of regional variation is that irrigation facilities are much better developed in western Maharashtra than in the eastern region. Undoubtedly, western region of Maharashtra being drier than the eastern region implies that it requires greater development of irrigation facilities. Also, Attwood (1985, 2005) points out that the construction of Nira Left Bank canal in western Maharashtra began in 1876 as famine relief work. Thus, while both environmental and historical factors provide some explanation for this regional skewness in the development of irrigation potential, the policy dimension cannot be ignored either.

Over time the irrigation 'backlog' of eastern Maharashtra has been observed to worsen (Report of Indicators and Backlog Committee, 1997). The Backlog Committee, 1997 welcomed the decision of the state government to invest Rs. 1400 crores annually upto the year 2000 in the Krishna Valley Development as a positive step, but expressed its concern about the impact on regional imbalances. The Committee pointed out that Krishna Basin in Pune division was ahead of all other regions in all sectors of

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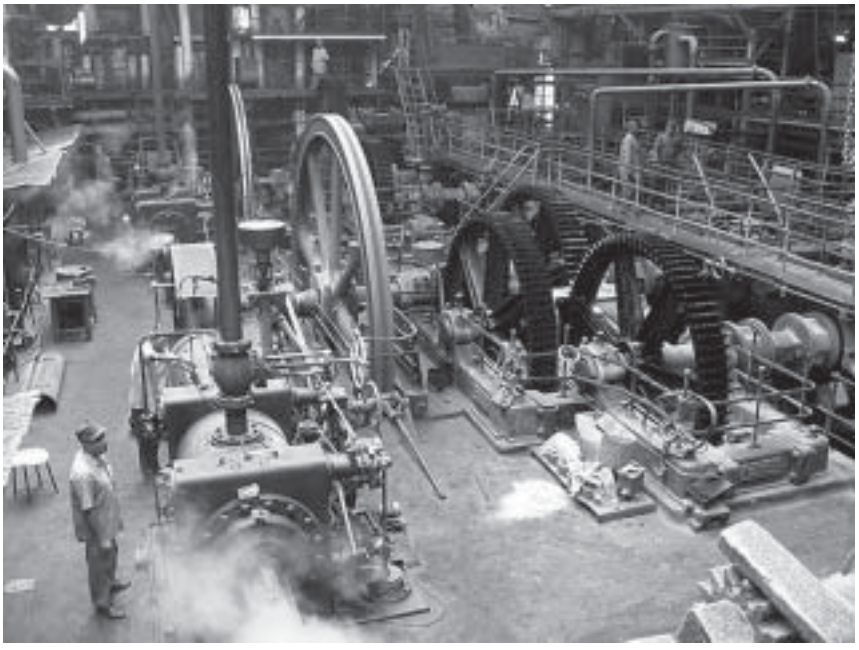

development including irrigation. Hence if a big boost to irrigation was required, then stepping up of irrigation activities in Vidarbha and Marathwada regions would have helped mitigate the growing regional imbalances. This worsening of the 'irrigation backlog' for the eastern region of Maharashtra must therefore be attributed, in some measure, to a conscious policy decision of the state government. Details on the magnitude of irrigation backlog for the eastern region of Maharashtra are provided in section 5D.

In addition to volume-wise distortions, there is also the system of fixing water rates which provides covert subsidies to all the sugarcane growers. Of the assessed amount, a mere 30 per cent was collected in 2002 (World Bank, 2004). As regards the system of fixing water rates, there is no denying that water rates in Maharashtra are among the highest in the country. Also, while most other states charge for water on a per-hectare basis, thus clearly subsidising water intensive crops like sugarcane, Maharashtra is among the few states that has water charges based on volumes consumed. One loophole that still remains is that even though the operation and maintenance (O&M) charges are based on actual usage, the capital cost is divided by scheme area and every beneficiary pays uniformly per hectare. Thus, farmers who grow crops that need very little water like groundnut, jowar have to pay heavily towards the capital cost component and effectively subsidise sugarcane and cotton farmers who consume a much larger volume.

Large scale usage of irrigation facilities also implies that cane cultivators are large consumers of power and gain substantially from power subsidies that politicians have often used as a tool for appeasing the rural masses. Sant and Dixit (1996) pointed out that the flat rate tariffs for large LIS, used mostly for sugarcane cultivation and irrigation pump sets (IPS) on wells resulted in much lower effective tariff for cane growers than their counterparts who consumed much less electricity.

Controls on Sugar

Sugar falls under the Essential Commodities Act, 1955 and hence the government is permitted to impose a levy quota, that is, procure a certain per cent of the sugar at a subsidised price to be sold via the Public Distribution System (PDS) at prices lower than the "free market" price within India. The objective of this compulsory procurement is to supply sugar to the lower strata of society at a subsidised price. Levy price is a cost plus price thus resulting in the government paying more to the high cost inefficient northern factories and effectively imposing a hidden tax on relatively efficient factories of Maharashtra. The sugar policy is a matter that falls within the purview of the central government and qualitative evidence seems to suggest that interests of the sugar producers (many of them being government officials at the state level) have been protected. Consequently, the centre-state relations too have played a role in shaping of policy decisions pertaining to sugar.

Government controls on the input side that is, sugarcane are even more stringent. Zoning and setting of the cane price are two sets of controls (imposed by the state government) that we discuss in some detail in the two sub-sections that follow.

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Conclusion

The way out of this financial mess that the sugar cooperatives are in cannot be small time tinkering around with the regulatory mechanism like increasing the distance between factories to nullify zoning or even rehabilitation packages provided by agencies like NABARD, which are in effect an arm of the government. A gradualist approach is passé and will not work. The clarion call of the times is to start afresh with minimal regulations. In keeping with the current ethos, a level playing field must be provided to the private sector. Greater scope for market forces such as trading of sugar futures is possibly the only road ahead. Here too, teething problems are bound to exist, but 'market failure', even if it does occur initially, cannot be worse than continuing the saga of 'government failure'.

** Department of Economics, University of Mumbai*

Indian Dairy Sector: Market Efficiency is the Key

By **Dr R.S. Khanna and Sharad Gupta ***

India is among the world's largest and fastest growing markets for milk and milk products. The development and growth of dairy sector in India has been fascinating. In a period of four decades, India catapulted from a milk deficit to a milk sufficient nation. During the 1950s and 1960s, 43 percent of milk solids in the total throughput of dairy industry were imported. The commercial import of milk powder touched its peak in 1963-64. This made the policy makers worried and led to the launching of "Operation Flood" programme in 1970 by the National Dairy Development Board (NDDB) and was supported by Technology Mission on Dairy Development in 1989.

These programmes resulted in spectacular growth of milk production — from 22 million tonnes in 1970-71 to 104.8 million tonnes in 2007-08 and the per capita milk availability more than doubled from 112 grams to 252 grams per day in the same period.

India is Cost Efficient

India's milk production today accounts for more than 15 percent of the total world output and 40 percent of Asia's total production. It continues to grow at about 4 percent per annum far exceeding the global average of 1-2 percent in recent years. Also, India's milk production economy is based on conversion of agro by-products and opportunity labour. Therefore the cost of milk production in India is among the lowest in the world, making it globally price competitive without any subsidy.

The global milk output growth remains slow. According to the FAO Food Outlook (Global Market Analysis) released in June 2009, world production of milk was estimated to be around 688 million tonnes in 2008, about 1.7 percent higher than the previous year. Recent milk production estimate for 2009 is 699 million tonnes, 1.6 percent more than last year. This growth is below the global trend rate of 2 percent annually, which prevailed in the previous decade. Milk production is now expected to rise by 3.5 percent in Asia to 256 million tonnes. Output in developing countries may reach 337 million tonnes, virtually counting for all the additional global output, as milk production in developed countries is anticipated to remain largely unchanged. Consequently, the share of developing countries in world milk production is expected to rise to over 48 percent, up from a 40 percent share ten years ago and 32 percent at the start of the 1990s.

Complimentary Role

The livestock sector is playing an important role in achieving the targeted agricultural growth in India. According to estimates of the Central Statistical Organisation (CSO), the value of output from livestock sector at current prices during 2007-08 was about 29 percent of the total value of output of the agriculture and allied sectors. Two-thirds of this was contributed by the milk sector alone. The livestock sector has been contributing over 5 percent to the total GDP. A target of 6-7 percent growth per annum for the livestock sector with milk group growing at a rate of 5 percent has been set during the 11th Five Year Plan.

India's Dairy Market

Over half of India's total milk production

is consumed in urban India. The urban population is projected to cross the 400 million mark by 2011. The expected rise in the purchasing power of this growing urban population would boost the dairy market. Presently, some 1,500 out of 5,000 cities and towns in India are served by milk distribution networks. Rising awareness about hygiene standards and preference against loose milk has prompted the urban consumer to switch to pasteurised packaged milk — a demand of some 140 million litres per day, expected to double in the next five years.

The food service institutional market is growing at double the rate of the consumer market. There is increasing consumption of 'away-from-home' food. The concept of parlours is opening new vistas for ready-to-serve dairy products. There is a growing market for dairy products as ingredients in pharmaceutical and allied industries. As per recent trends, a boom for dairy products is forecast in the defence market.

According to the five-yearly expenditure survey conducted by the National Sample Survey Organization (NSSO), the consumption of livestock products, particularly milk, has gained popularity in the last two decades, both in the rural and urban areas.

Market Size

India's dairy market is multi-layered, shaped like a pyramid with the base made up of the vast market for low-cost, liquid, raw milk. The narrow tip at the top is a small but affluent market, largely for western-type and fresh packaged dairy products.

The domestic market for value added products like butter, cheese, ice cream, dairy whiteners and spreads is galloping at 8-10 percent per year. The current annual estimated market for western type dairy products is: butter 60,000 tonnes; branded milk powders: 27,000 tonnes; ghee in small packs: 40,000 tonnes; cheese: 13,000 tonnes and infant foods: 125,000 tonnes. The butter and cheese market is growing between 8 percent and 10 percent annually; the infant food market is expected to grow at 10-15 percent. Increased consumption of pasteurised packed liquid milk is likely to retard the growth of branded milk powders.

Traditional Milk Products

Through millennia, Indian sweet delights have gone through waves of innovations, both in product formulations and processing by unsung master-confectioners. Traditional methods of ethnic sweet making are now being integrated with modern culinary technology. In the last two decades, scientists at R&D centres in India have used quarg separators and scraped-surface heat exchangers to pasteurize and process 'shrikhand', a fermented dairy dessert. Meatball-portioning machines and industrial fryers make 'gulabjamuns', fried balls of milk powder mixed with wheat flour. Japanese pastry-making machines and planetary mixers make ethnic delicacies.

The handbook on "Technology of Indian Milk Products", published by *Dairy India,* is a testimony to the significant R&D work done in this field that has resulted in production indigenous milk products on an industrial scale.

India's first plant to make traditional dairy foods went into production in 1981 in Vadodara, Gujarat, in Western India (Sugam Dairy of the Baroda District Cooperative Milk Producers' Union Ltd). Since then, a large number of dairy plants have taken to the production of Indian delicacies and specialties. Presently, the annual production of traditional sweets in India is estimated at three million tonnes, valued at Rs 70,000 crore. Branded ethnic dairy products like sweets, paneer, curd, etc, are witnessing rising demand and increased acceptance, especially among urban consumers. The success of the branded curd, flavoured milk variants like 'Amul Kool' and traditional sweets like shrikhand, gulabjamun, rasogolla, peda, burfi and several other combinations with added fruits, dry fruits, chocolates, etc, from Amul, Mother Dairy, Nestle, Britannia, Bikanervala, Haldiram, Chitale, K.C. Das and the like, are gaining strength in national and international markets.

Growth Graces Organised Sector

As per Government of India's Economic Survey for 2008-09, about 80 percent of milk produced in the country is handled in the unorganised sector and the remaining 20 percent is shared equally by cooperative and private dairies. Industry sources however maintain that between 22-24 percent of India's milk output is handled by the organised sector and this is expected to increase significantly in the coming years. However, it is not clear whether the cooperative sector or the private sector will have a larger share. All the planning that goes for increasing productivity, procurement, processing and marketing will have a tremendous bearing on this aspect.

Milk Processing

Under the Milk and Milk Products Order (MMPO) 1992, the Central and State Registration authorities have registered 865 dairy units with combined milk processing capacity of 88.66 million litres per day in the government, cooperative and private sectors as on March 31, 2009. MMPO has been subsumed as Milk and Milk Products Regulation under Section 99 of the Food Safety and Standard Act 2006 and it is now being implemented by the Food Safety and Standards Authority of India (FSSAI) which is administered by the Ministry of Health & Family Welfare.

Significant changes are expected in the livestock population structure, institutional arrangements and the organisation of livestock production. The declining trend in the population of bullocks and non-descript cows will gather momentum. Crossbred cows and buffaloes will contribute increasing share of dairy production.

Milk as a New Crop

The future strategy for growth would have to treat milk as any other crop and

dairy farming as an agricultural activity in its own right. Farmers may well be required to consciously grow fodder and invest in the productivity of their animals to bring down the cost of producing milk. But that cannot happen unless they have the incentive to do so, which the currently dominant systems of milk marketing certainly do not provide.

Managing Volatility

Managing volatility in milk markets will be central to the success and viability of any dairy farm over the next 10 years. To achieve maximum benefits, the entire dairy sector, both the cooperatives and private entrepreneurs, would need to invest in a rural milk procurement network and reduce its dependence on intermediary milk collectors and transporters. Private dairies, with rare exceptions, are following a procurement model that leaves milk collection to contractors and local agents.

To meet the quality requirements, this situation has to change. Proper institutional mechanism connecting farmers to dairies and further to consumers is needed. Today, more and more private sector companies are setting up infrastructure for direct procurement and closer links with the farmers. Cost inefficiency apart, the outsourcing model is not amenable to proper quality control by the processor. Farmers must receive remunerative prices, which the outsourcing model certainly does not provide, so that will have incentive to produce and supply more milk to dairies.

Prominent Players

Some big names in India, such as Reliance, ITC, DCM, Bharti, Coca-Cola and PepsiCo, are silently working on a big gulp of the country's milk industry. Yakult-Danone has already made their debut. With the recent acquisition of Cadbury by Kraft, the Indian dairy market can expect some new action.

Dairy India 2007 (sixth edition), the most comprehensive and reliable data compendium of the country's dairy sector since 1983, reckons the size of India's dairy sector in 2005 at Rs 227,340 crore (valued at consumer prices). The largest contributor to this is liquid milk (at Rs 82,835 crore), followed by ghee (Rs 22,980 crore), *khoa/chhana/paneer* (Rs 24,100 crore), milk powder (Rs 4,680 crore), table butter (Rs 770 crore), cheese/edible casein (Rs 975 crore) and other products such ethnic sweets, ice-cream, etc (Rs 9,100 crore).

Liquid Milk Leads

Out of the total milk production, 77 percent is sold as liquid milk, with the balance of 23 percent converted into products. *Dairy India* foresees the organised sector growing tremendously and by 2011, the size of the Indian dairy industry is expected to more than double to Rs 520,000 crore.

This growth represents an opportunity for multinational food and dairy companies as well as input suppliers to expand their exports, facilitate technology transfer, sign new joint ventures and make profitable investments in India. The challenge would be to focus on: quality, product development and global marketing. The industry would concentrate efforts on human resource development, R&D in milk products, equipment technology and emphasis on exports.

Government Programmes

The efforts of the Department of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture under the Government of India are concentrated on promotion of dairy activities both in Operation Flood and non-Operation Flood areas with emphasis on building up cooperative infrastructure, revitalisation of sick dairy cooperative federations and creation of infrastructure in the States for production of good quality milk and milk products.

For pursuing these objectives, the Department is implementing various development schemes — Intensive Dairy Development Programme (IDDP); Strengthening Infrastructure of Quality & Clean Milk Production; Dairy Venture Capital Fund; Feed & Fodder Development Scheme; and, Livestock Health & Disease Control Programmes.

In addition, a major programme for genetic improvement, the National Project for Cattle and Buffalo Breeding (NPCBB), was launched by the Department in October 2000 to be implemented over a period of 10 years in two phases of five years each and provides 100 percent grant-in-aid to implementing agencies. The NPCBB envisages genetic upgradation and development of indigenous breeds on priority basis. At present, 28 States and one Union Territory are participating in the project. Financial assistance of Rs 504.73 crore had been released up to July 31, 2009. Semen production in the country has increased from 22 million straws (1999-2000) to 46 million straws (2008-09) and the number of inseminations has increased from 20 million to 44 million during this period. As per the impact analysis report

submitted by NABARD, overall conception rate has increased from 20 percent to 35 percent.

National Livestock Policy (NLP)

The policy for development of dairying is a part of the National Livestock Policy (NLP) that is being finalised by the Department of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture. The policy aims to encourage dairy and livestock development through small holders, enhance participation of women, improve the productivity of livestock, augment feed and fodder resources, control and eradicate communicable animal diseases, expand capacities of milk handling in the organised dairy sector, improve quality to meet international standards of food safety, conserve animal bio-diversity and protect indigenous breeds of livestock, focus on R&D to improve products and productivity and ensure transmission of improved technology and management practices to the doorstep of farmers.

The breeding policy for cattle and buffaloes will focus on improving their performance by encouraging formation of breeders' associations. Characterised and threatened indigenous breeds would be conserved. The new technologies of Embryo Transfer and Open Nucleus Breeding System, biotechnology and genetic engineering will be applied.

Synergy among Sectors

The proposed National Livestock Policy also aims to strengthen milk production, procurement and processing facilities by synergising the cooperative and private sectors. Focus is to shift to organic farming, product diversification with value addition, product quality and food safety. The government is also exploring to corporatising its facilities through public-private participation and through a mission-mode approach. Emphasis would also be on strong legislative back up to prevent, control and eradicate Foot and Mouth Disease and other bacterial, viral and parasitic diseases having major impact on productivity. Through these policies the government aims to unfold a series of national plans for increasing milk production and controlling the epidemics. A massive programme to eradicate Foot & Mouth Disease (FMD) with an investment of Rs 7,000 crore is also being formulated by the Government of India.

National Dairy Plan

The National Dairy Development Board (NDDB) has prepared a National Dairy Plan which aims at meeting the projected demand of about 180 million tonnes of milk by 2021-22. With an estimated outlay of about Rs 17,371 crore, the Plan has three major components — enhancing milk production through increased productivity; substantially strengthening/expanding the infrastructure for procurement, processing, marketing and quality assurance through existing institutional structures and by promoting new ones; and, human resource development.

The NDDB is also focusing on increasing the milk production through better genetics. It has entered into collaboration with various institutions to produce a specified number of high genetic merit bulls for the entire country through progeny testing programmes for five breeds — Murrah, Mehsana, pure Holstein Friesian (HF), HF crossbred and Jersey crossbred.

As feed accounts for about 70 percent of milk production cost, NDDB has initiated steps to intensify the dissemination of various technologies that add value to feed and reduce the cost of milk production. The project included ration balancing advisory services at village level.

The NDDB has also set up a Centre for Analysis and Learning in Livestock and Food (CALF) at Anand. It offers a range of reliable and accurate analytical services for food and feed and diagnostic services for genetic disorders and animal health. It also conducts training programmes in food and feed analysis.

Reforms to Help Primary Producer

The dairy cooperatives in India have thrived not only on their inherent strength but also on the policy support they have rightfully received from the Central and State Governments. Market reforms are needed in the cooperative sector. Dr R.P. Aneja, one of India's most respected dairymen, wrote in *Dairy India 2007 (sixth edition):* "The backbone of the Indian dairy sector is cooperatives. These need to be unshackled from the non-business baggage that they carry so as to be competitive and more professional. The non-business baggage includes the one-member, one-vote norm irrespective of the business contributed. This needs to be revisited. The restrictions on the primary village cooperatives to sell their milk only to the next tier of the system have tied up the milk producers against the trends of today's market-oriented economy that expects greater freedom. Market reforms must help the primary milk producers. The form must be dictated by the content which in this case is the value that is brought to the primary milk producers. By implication, the village cooperatives should be able to sell milk to the highest bidder, on a sustainable basis, cutting across the milkshed lines. This would lead to greater competition and flexibility in the milkshed concept that is very necessary to maintain the viability of the primary village cooperatives. One of the important achievements of the dairy cooperative movement in India is that even now bulk of the milk cooperatives at the village level are still viable irrespective of the profitability of the Unions/Federations. These are the backbone of the milk cooperative structure and this character of the milk movement needs to be nurtured on a mission mode".

Second White Revolution

What is needed today is a second White Revolution and that too in half the time taken by the first. Keeping this in mind, all stakeholders in the Indian dairy sector should welcome and support the developmental approach proposed by the NDDB through its National Dairy Plan. It is this investment which will lead to increase in per animal productivity and meet the projected requirements of milk in the country as well as enhance the share of milk handled by the organised sector. In the coming years, Indian dairy products will have to compete not only globally but with the imported products in the domestic market as well.

** Among the writers, RS Khanna is an International Dairy Consultant and Director General of Ganesh Scientific Research Foundation, New Delhi and and Sharad Gupta is the Editor and Publisher of Dairy India, New Delhi*

Institutional Changes in Indian Agriculture

By **Suresh Pal, Mruthyunjaya, P. K. Joshi and Raka Saxena ***

Agriculture will continue to play an important role in the economic development and poverty alleviation in India, even in the era of economic liberalisation and globalisation. Generation of gainful employment and income for the rural poor, strengthening of household food and nutritional security and sustainable use of natural resources shall continue to be the main objectives of agricultural development in the country. However, there will be a paradigm shift in the development strategy. Market forces will now greatly guide agricultural production, and private sector will be a useful ally of public sector in the development process.

Knowledge will be the key catalyst of growth, besides the traditional sources of growth like land and other resources. These developments will require significant changes in a majority of the existing institutions to keep them relevant in the present context. In some cases, obsolete institutions may have to be replaced with the new ones. This institutional change will be guided by expected impact in terms of increasing economic efficiency, strengthening incentives like protection of intellectual property, providing level-playing field to development agents, encouraging participation of stakeholders, enhancing accountability, etc.

The institutions for management of land, water and other common resources should involve their users and other stakeholders for efficient, sustainable and equitable use of these resources. The institutions dealing with agricultural marketing and credit should reach and protect the interests of small farmers, besides increasing economic efficiency. The most significant change will, however, be witnessed in the institutions dealing with creation, protection, exchange and application of new knowledge and technologies. This is because the governance, management and organizations of public research system will have to change to improve their effectiveness and efficiency.

The public system will also be required to encourage private research through appropriate incentives and regulatory mechanisms. In particular, protection of intellectual property will be critical; it will determine the linkages between investment, technology and trade, which shall further reinforce the need for institutional change. A strong intellectual property regime will encourage private investment both domestic and foreign

and improve access to internationally competitive technologies and make an agricultural economy vibrant. The government may have to play a greater role to monitor such developments and respond accordingly. The government has enacted a number of legislations and amended some others to facilitate development and use of technologies. The present volume discusses provisions in and appropriateness of these institutional reforms. It also covers the institutional changes needed for agricultural marketing, credit and management of natural resources. These institutions may not directly affect technology uptake, but facilitate technology adoption, and therefore, are indispensable for evolving knowledge-intensive agriculture in the country

Preface

Technological advancements favouring better utilization of land and water resources fuelled agricultural growth in India since the mid-1960s. Technologies were generally embedded in inputs (seed, fertilizer, pesticide, etc.), and therefore, were simple in the beginning to disseminate and adopt. However, in future, there will be a paradigm shift—productivity growth would be largely driven by technological advancements, which would be highly knowledge-based and information intensive. This shift requires new approaches to development, management and dissemination of technologies. The need for change is further heightened by evolving incentive system, ownership of intellectual property, restricted flow of research material, international treaties and conventions, globalization, challenges of the World Trade Organization, changing role of the state, etc. Thus, a new set of institutions should emerge to provide the growth impetus and synergy to optimally harness technological advances. In fact, benefits of technological change will be maximum when efficient and responsive institutions are in place.

In the wake of economic reforms, the institutional change should involve re-examination of the roles of the state, markets and collective actions in the management of natural resources and provision of goods and services to farmers.

The challenging question is that the Indian agriculture has reached a stage where public sector may have to largely focus on the roles of facilitation, guided regulation and social welfare. Honestly put, the baggage of public organisations in their current form, functioning and accountability will be a big liability to the society in future. Thus, there is a need for phasing out, merging, remandating and may be establishing need-based new organizations. Further, active involvement of the private sector in national development has become a dire necessity. Therefore, strengthening public-private interface should engage our attention. This volume addresses some of these issues in the contributed papers

and synthesis of the available evidence. In particular, efforts are made to analyze the role of hierarchy, incentives, laws and regulations in promoting relevance and efficiency of institutions.

Introduction

Economic and technological systems are changing rapidly all over the globe. However, intensity and impact of these changes are more pronounced in developing countries. Although trade liberalization and integration of developing economies with rest of the world have opened new avenues for growth, these have also exposed the domestic systems to intense competition and a new regime of incentives and institutions is emerging. There is a greater reliance on market forces, and competition and incentives are largely going to be influenced by trends in the world markets. Under this emerging scenario, we need efficient organisations to link the domestic system with the world market, and a highly developed information system to monitor developments in the world markets and provide right signals for efficient organization of economic activities and allocation of resources. The main objective is that the domestic players in the developing countries should have easy access to global markets and resources, including technology, and the domestic institutions should improve the access to the markets.

On the scientific front, the recent advancements in molecular biology, information communication technology (ICT), space sciences, etc. have profound implications on economic development. These scientific developments, on the one hand, have enhanced the growth potential significantly and have increased the chances of harnessing this potential due to better precision in research methodologies and reduction in research and development (R&D) lag. On the other hand, with the advancements in ICT and space technology, it has become easier to have access to improved technologies and their attributes

(characteristics, sources, potential benefits, etc.). What is needed is that appropriate policies and institutions are in place to promote and harness these

scientific advancements for developing a knowledge-based society.

In India, although the reforms of economic liberalisation and structural adjustments initiated in 1991 were not explicitly directed to agriculture, these are expected to impact agricultural sector significantly. The impact, however, will be more visible with the completion of second phase of the reforms, covering financial sector, public organizations, protection of intellectual property and labour regulations (Vyas 2001). This, coupled with harnessing technological revolutions, is expected to transform Indian agriculture significantly. It is now a fact that further growth in the agriculture could be achieved through increase in productivity, which is possible only through accelerated development and dissemination of improved technologies. Since most of the cutting-edge technologies are knowledge intensive, new institutions and organisations are needed for their development, management and use. In particular, the participation of private sector in agricultural R&D and the protection of intellectual property, including plant varieties, require reorientation of the existing R&D institutions.

The experience of the Green Revolution has also shown that besides technological advancements, supporting institutions like credit, land reforms, etc., as well as incentives like prices, are of paramount importance for technology-led growth in agriculture. Therefore, the development of knowledge-based modern agriculture would require changes in all these institutions. The past experience has clearly shown that full potential of some of the technologies, e.g. hybrids, integrated crop management, watershed development, bio-inputs, etc., could not be realized due to lack of proper institutions (Pal et al. 1998; and Kolavalli and Kerr 2002). These were information-intensive technologies, while the existing institutions were tuned to transfer of input-based technologies like seeds of open pollinated crops and fertilizers. The above facts grossly point towards the need and direction of institutional reforms in Indian agriculture. Though the main emphasis in this volume is on the institutions relating to agricultural R&D

— technology development, management, transfer and use, regulations, etc., other institutions, such as credit, agrarian and marketing and trade affecting adoption and impact of technologies, are also discussed.

The Concept and Application

The New Institutional Economics

The burgeoning literature on institutional economics is being increasingly applied to understand and accelerate the process of economic development. Conceptually, institutions are different from organizations; the former refer to the 'rules of the game', while the latter refer to the group of individuals bounded by some common objectives. The institutions could be formal (e.g. laws) or informal (social norms, traditions, customs, etc.); these govern behaviour of economic agents or individuals and determine incentives in political, social and economic relations (North 1990). However, these concepts are often used interchangeably in the literature as is the case in this volume. But, the use of these terms against each other maintains the distinction between them.

The principles of neo-classical economics, usually applied to explain the behaviour of economic agents, hold that individuals make rational choices and the market forces satisfying the marginal conditions ensure economic efficiency in the system. It considers the role of state in the event of market failure. However, market failures or imperfections due to real world intricacies, and opportunistic human behaviour, do not always result into the Pareto-optimal solutions, envisaged in the neo-classical economics. This theory also failed to explain uneven performance of the economies over space and time. As a result, the focus shifted on the role of political and individual ideologies, institutions and incentives in explaining the economic performance.

The basic premises of 'rationality' and 'competition' facilitating market equilibrium were questioned. It was argued that individuals are 'bounded rational' (rationality within information available) and the incentive structure determined by the institutions affect the behaviour of economic agents. Therefore, institutions are as important as market forces in determining economic performance (for detail discussion, see Williamson 1985).

The developments in the institutional economics draw on a number of disciplines, notably economics, sociology, anthropology, law and organisation theory, and do not converge to a unified theory to study the institutions and their determinants. The early work in this area,

commonly referred to as the 'old institutional economics', was successful in highlighting the importance of institutions and their development in specific contexts. The work, however, lacked theoretical foundation. The path-breaking work of Coase (1937 & 1960), North (1990) and Williamson (1975 & 1985) laid the foundations of what is popularly known as the 'new institutional economics (NIE)'.

The NIE maintained that transaction, rather than market, is an appropriate unit of analysis, as economic agents try to minimize the transaction cost. The transaction cost was defined as 'the economic equivalent of friction in physical systems' by Williamson (1985), while others defined it as 'losses due to imperfect information' and further divided into 'search and information costs, bargaining and decision costs, and policing and enforcement costs' (Dahlman 1979). The concept has been increasingly used to explain how organizations evolve in market economies, or efficiency of hierarchy and markets. In case the cost of market transaction is higher than that of internal transaction, firms bring new but related economic activities under them, which is known as vertical integration. Conversely, a higher cost of internal transaction or hierarchy leads to greater dependence on market-based transactions. Further applications of this concept provided an understanding of the roles of state (hierarchy), private sector (markets) and voluntary agencies in economic development (Picciotto 1995).

Other important theoretical approaches followed in the NIE are: Political economy and public choice theory, property rights, path dependence, quantitative economic history, and principal-agent theory. All of these, though important contributions, sometimes compete amongst themselves and therefore, are difficult to put on the trajectory of conceptual developments. Williamson (2000) has tried to put them into a perspective by describing four levels of analysis in the NIE.

The first level is embeddedness of informal institutions, which are often considered as given as they change over a very long period of time. Their analysis draws inputs from social theory. The second level of analysis is broad institutional environment or 'setting formal rules of the game', especially property rights. At this level, property rights and political theory are more useful. The third level is 'play of the game or aligning governance structure with transactions', and is largely guided by the transaction cost economics. At this level, enforcement of the property rights and contract laws is critical. The governance process should ensure order to resolve conflict and realize mutual gains (Commons 1934). The extreme cases where assigning property rights is difficult, or transaction cost of the enforcement of property rights is high and distribution of the benefits is highly skewed, the theory of collective actions assumes significance (Olson 1965; and Ostrom 1990). The fourth and final level of analysis deals with resource allocation and incentive alignment, drawing on the principles of neoclassical economics and the agency theory. At this level, setting of the marginal conditions right, *ex ante* incentive alignment and efficient risk bearing are important, rather than *ex post* governance. This description of the economics of institutions, thus, clearly indicates that the NIE does not neglect or replace the neo-classical economics, but it broadens the scope of analysis by bringing additional useful insights into the process of understanding economic development.

The NIE is increasingly being applied to study economic and agricultural development. The evidences suggest link between quality of institutions and investment and growth

Application in Agriculture

The NIE is increasingly being applied to study economic and agricultural development. The evidences suggest link between quality of institutions and investment and growth (for review of evidence, see Aron 2000). Some notable examples of institutional failure or weak institutions are the break up of former Soviet Union, economic crisis of east Asia, and low growth of African economies.

Weak financial institutions are responsible for the East Asian crisis, while lack of incentives demolished the production system in the Soviet Union. The economic growth in African and other developing countries is poor because structure of institutions (property rights and other rules) and their enforcement do not provide incentives and encouragement to productive or wealth maximizing activities of individuals and organizations (North 1990). The investment level is low

and the firms are small scale, using low capital-intensive technology (often inefficient). In other words, there are not enough incentives to innovate and invest. Advancements in the NIE have also been applied to agricultural development and change. The most notable applications are in the field of agrarian structure, management of common pool resources, technology systems, including provision of improved seeds, marketing and trade, and micro-institutions for credit and poverty alleviation.

The focus of analysis has been on describing the existing institutions, institutional change and impact on agricultural development with an overall objective of indicating appropriate form of institutions. Another significant contribution of these studies has been that they successfully underscored the intimate interactions between institutions and technology to influence economic performance. For example, micro-level agrarian institutions, such as share-cropping, lower the cost of labor supervision in the field and reduce risk by spreading it among landlord and share-cropper (Bardhan 1989).

At the same time, agrarian institutions like tenancy and labour contract change because of technological interventions and allow productivity gains of improved technologies (Hayami and Ruttan 1985). Some analysts maintain the key role of ideology in making the society receptive to technological change, in particular and agricultural development, in general. Furthermore, it is found that 'social capital' significantly influences the absorption of technology (David 1997). The study of technology systems (research and extension) also reveals that a pluralistic system with active partnerships between various actors emerges only when appropriate institutional framework (property rights and regulations) is in place.

This coupled with nature of technology, incentives and information flow greatly affects the provision of the technologies embedded in inputs (e.g. seed) to farmers (Morris 1998; and Tripp 1997, 2001). It is thus evident that institutions are as important as technology for economic development, and they evolve together interactively during the development process. It is this link between institutions

and technology which is getting increasing attention of researchers in recent years.

In the context of Indian agriculture, the recent studies on institutional change are mainly influenced by the change in economic policies, which, in turn, is the result of internal crisis of the balance of payment and external shock of the new trade regime. In the new policy regime, emphasis shifted to a greater role of markets in economic development, and a receding role of the state to facilitation and social welfare. Vaidyanathan (1996) visualized continued dominance of the state in irrigation, research and extension and infrastructure development, but he underlined the need for reforms in the public organizations for their financial viability and efficiency.

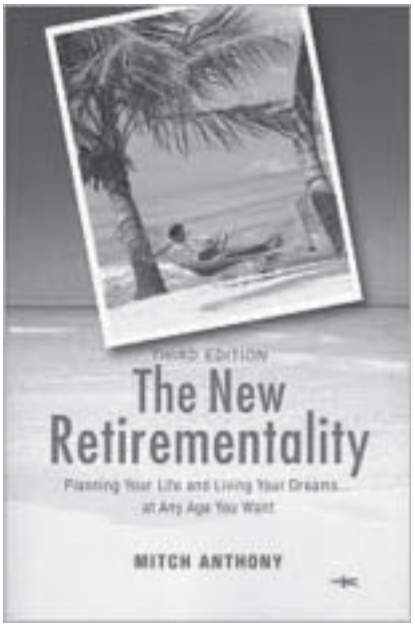
On the other hand, some other researchers consider institutional reforms *sine qua non* for sustainable agricultural development and poverty alleviation (Gandhi 1998; and Saleth 2000). In particular, sustainable use of common pool resources and management of surface irrigation have received much greater attention, and the need for institutional reforms ensuring stakeholders' participation and equitable distribution of benefits is reiterated time and again (Jodha 1992; Chopra et al. 1990; Kerr et al. 1997; and Marothia 2002). The issues highlighted in the context of technology systems are: (a) Reforms in the public sector organizations to ensure accountability; (b) aligning incentives with performance, and reducing transaction cost by decentralization; (c) enforcing property rights (such as IPR) and other regulations; and (d) improving information flow in the seed systems (Pal and Singh 1998; and Tripp and Pal 2001). All these studies have made important contributions in terms of their objectives and scope of the analysis, but the critical link between institutions and technology was however not accorded due importance. This volume revisits some of these works to search for the evidence of these interactions. Our assumption is that the role of technology in accelerating agricultural development through steady growth in productivity would be central in the years to come, paving the way for emergence of knowledge-intensive agriculture. Since most of the new technologies would be knowledge-intensive, the interplay between technology and institutions would be much stronger. Another related concern is that how best small holders can be served with the intensification of technology institution links and increase in the capital and knowledge intensity of technologies. All these aspects need an in-depth analysis.

** The writers are Research Scholars Deptt. of Agriculture, Delhi University*

The New Retirementality
(Third Edition)

Planning Your Life and Living Your Dreams...At Any Age You Want!

By **Mitch Anthony**



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Stop Making A Living And Start Making A Life!

When The New Retirementality was originally published, dot-coms were still darlings, terrorism was not a daily reality, and corporate corruption had not sapped our trust. I wrote about being more reflective concerning our working lives and life in general. The world events that ushered in this millennium caused us all to make such an examination. I wrote about the need for a more realistic approach toward retirement funding and how the market events and corporate scandals that followed led us all down that path. I wrote about the need to find fulfilling work because we may be working longer than we originally planned. The ensuing pension crises only confirmed what we had already suspected about most corporations: they aren't really looking after us first.

While previous generations looked forward to retiring with pensions and peace of mind, the rest of us face a much different reality. Whether by choice or not, most of us now realize that we probably won't experience the same retirement our parents did—that's not necessarily a bad thing. The New Retirementality is the ability to achieve the freedom to pursue your own goals, at your own pace, on your own terms...regardless of your age.

With the newest edition of The New Retirementality, you'll discover how to achieve the freedom to pursue your retirement goals—at your own pace, on your own terms—regardless of your age. I'll show you how new opportunities will enable you to create a tailor-made life that is both fulfilling and flexible. This latest edition includes new research and studies and introduces you to important concepts, such as "wealth care" and "return on life," that will guide you on your journey.

I've filled The New Retirementality with real-life and inspirational stories, as well as suggestions to inspire you to take action. My goal is that you will be motivated to rethink the meaning of retirement and put yourself in a better position to enjoy the new retirementality you deserve: retiring on purpose, with purpose—and change your life.

"Mitch Anthony's energizing ideas about retirement are positive, hopeful, and visionary. I can't recommend this book enough. If you want to know what your future should look like and make the most of your Power Years, read The New Retirementality."

Ken Dychtwald, PhD, author of Age Wave, Age Power, and The Power Years

"The New Retirementality is a must-read guide for the baby boomer generation. Finally, here is an investment book that goes beyond the numbers of retirement planning and looks at the meaning of 'living a full life.' This book is all about a new way of thinking—where you not only finish rich, but you live rich as well! I highly recommend it!

David Bach, bestselling author of The Automatic Millionaire.

Don't Change the Tail That Wags the Dog

What is stopping us from focusing on our strengths and moving on in our leadership journey?

By **Santhosh Babu**

Can you train my Labrador to become aggressive?. This was the request from a senior HR professional who was part of a culture change intervention I did for his organisation. As my interest in dog training is known to most participants, I do get one or two dog-related requests after every workshop.

"Labs are very loving, people-friendly dogs. Why did you buy a Lab if you wanted an aggressive dog?" I asked the obvious question. He said casually: "You see I wanted a black, good looking, heavy dog that is very intelligent, also ferocious and aggressive."

Lots of people want to make their Labrador behave like a Doberman and vice-versa. If we look at organisations, we can see how each organisation is trying to change a Labrador into a Doberman or vice-versa using their current competency framework. So what ensues is an employee who has almost started demonstrating the behavioural traits of a high potential leader in his organization, say a Doberman, leaves and joins another organisation where they try to make him another dog, say a Labrador, based on their competency framework.

There are enough studies and examples to prove that each one of us has unique strengths and one can leverage the strengths to accomplish the task and be successful. All personality type theories and tools like MBTI (Myers-Briggs Type Indicator) and Enneagram maintain that all types have the capability to be a leader using their own unique strengths.

Gallup consulting and their research have proven that the best way to develop

employees — and net the greatest return on investment — is to identify the ways in which employees most naturally think, feel, and behave, then build upon those talents to create strengths, the ability to provide consistent, nearperfect performance.

One can really resonate with this. When I was in class four, aged 9, I realised that I had a penchant for public speaking, observing people and reading books. I also got a lot of opportunities to observe people and read as I had asthma, which did not allow me a daily school routine and also ruled out sports. By the time I was in college, psychology turned into a personal interests and that put me on the road to public speaking. By focusing on my strengths I went on to become a teacher in Bhutan instead of becoming a probationary officer in a bank (the norm in Kerala in those days).

Since then my journey from teaching students in a primary school in Bhutan to a visiting faculty for the Transformation Leadership Program at ISB (Indian School of Business) for their executive education has been by focusing and developing those strengths.

This is not really rocket science as Bill George, Harvard Business School professor and former Medtronic CEO, in his book Authentic Leadership writes: "During my career, I got lots of feedback to modify my leadership style

so as to fit in with the organisation's norms. Several supervisors and human resource specialists urged one to be a different kind of leader. One listened carefully to their advice but quietly rejected it. Had one followed their advice one would have become a plain vanilla manager or even been seen as a phony".

Then what is stopping us from focusing on our strengths and moving on in our leadership journey?

One feels the challenge lies in the mindset that only certain kind of competencies will help an individual move up in the corporate ladder in his organisation even though there are enough exceptions.

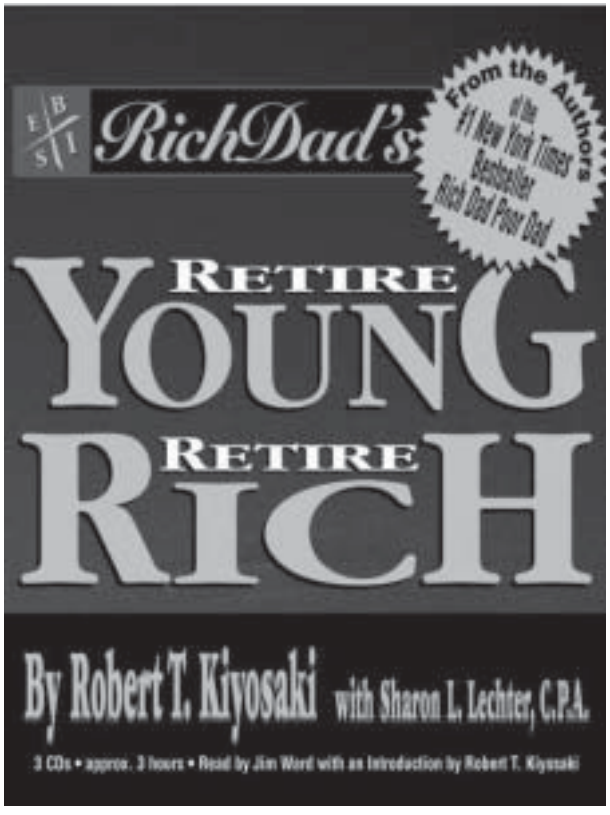
A CEO, whom I happened to coach, is extremely methodical, practical, pays attention to detail, is focused on the task, empowers others and collaborates to get things done and he has been in the organisation for the last 15 years. Now the organisation wants him to be more charismatic, outgoing and to have more "executive presence" — a term that can be defined in several ways. The fact is that he could be a powerful leader in his organisation and get things done in his current role and in his future roles using his strengths if others around him stopped bothering about how charismatic he is.

While it is important to have a competency framework that is unique to the organization and assess people and give feedback about where they stand in the organisation's leadership competencies, it is also important to acknowledge and appreciate the strengths each one has. More importantly, we need to develop a mindset in the organisation that by leveraging their strengths, leaders could move to the next role even if they are not equally excelling in all the leadership competencies of that organization. There are enough examples, research and evidences. A Labrador that is trained to behave like a Doberman is not a happy dog.

(The author runs a boutique focusing on transformation of organizations and communities using behavioral skills knowledge) ***www.odalternatives.com***

Retire Young, Retire Rich

By **Robert Kiyosaki**



Starting out on your success/wealth journey its good to have a partner and also have a small team of likeminded people – Kiyosaki had his wife Kim, and three other people, a lawyer, an accountant, and another business person. It is important to have meetings to discuss business books and educational tapes with each other – discuss the lessons learned in these resources.

Partners are important for idea generation, motivation, and goal setting.

You need to survive in the short term but much more important is to think and plan for the future. Plan to retire early – write down the goal, create a plan, then focus on the idea. Most people don't plan for retirement until it is too late.

Do you want to just be able to pay your bills or do you want to be rich? Self doubt and laziness define and limit who you are. They keep you small. It's easy to stay the same; it's not easy to change. Freedom begins when you tackle self doubt and laziness and determine not to be there.

Keys to wealth:

Increase Business Skills

Increase Money Management Skills

Increase Investing Skills

If you know the "why" behind why you want success/wealth – this will empower you beyond self doubt and laziness (fear). Easy roads to wealth/success are generally dead ends.

You must stop thinking about why you can't succeed and start determining why you want to succeed and why you will succeed.

Do you deny yourself the things you want in life?

Self confidence must trump self doubt.

Really define "why" you want to succeed: at business, wealth, investing, early retirement, life etc. What is your dream lifestyle – define a perfect day.

Why do you want to be rich – by having and understanding your answers to this question you'll be empowered to find out "how" to get rich.

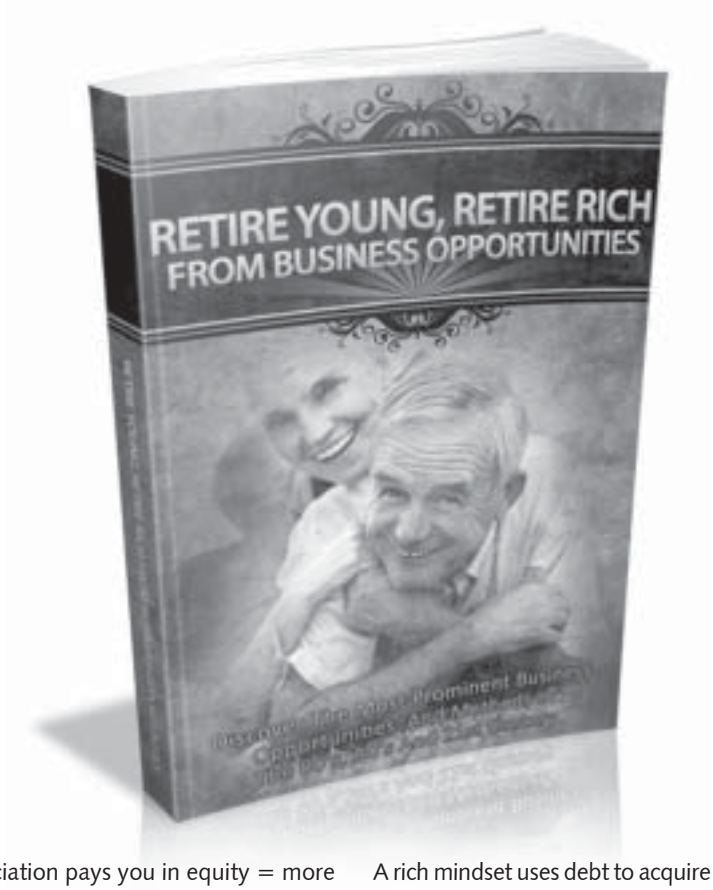
You need passion or to find passion for why you want to succeed.

List what you love – list what you hate.

Put your dreams and goals (wants/desires) on one page of paper – look at your dreams and goals regularly, talk about it, ask for support, be willing to continually learn and then you'll see and begin to succeed. Money might not make you happy – but can buy you time to do what makes you happy and you can pay others what you hate doing. Many people want to live their dreams, but many people are just too busy at work – they have no free time to investigate their real dreams, goals, and passions. If you are able to retire young or younger you have the chance to start your life over.

Take an hour each month and reflect on your life.Take time to appreciate where you have been and plan where you should go (dreams). Real Estate is one of the best assets.You use the banks money (credit) to buy an asset (RE), if done right this RE produces a cash flow and also appreciates in value.

Cash flow pays the mortgage = asset



Appreciation pays you in equity = more asset

$100,000 appreciating at 4 per cent is $4000 per year.

Debt (mortgages) can be good debt.So if you believe that all debt is bad – you will not use this good debt to build assets (RE = cash flow + appreciation). Poor thinking = thinking that all debt is bad.

Rich thinking = debt in RE = Cash flow + appreciation

If you want wealth/success you normally have to use other people's money (OPM) not your own to get rich. Bank mortgage = OPM

One key leverage that the wealthy have is – financial education. They invest their time and money to learn and continue to learn. People with leverage dominate people without leverage. Leverage is power.

Leveraged tools = computers, the internet, info on wealth creation, tools that provide faster and more efficient work. "Physical Leverage" is hard work. The rich use the financial tools of leverage.

A rich mindset uses debt to acquire assets.

If you want wealth/success you normally have to use other people's money (OPM) not your own to get rich. Bank mortgage = OPM. A poor mindset simply tries to use their own money (not OPM) and save it – not a wealth or asset creation method.The rich use more and more leverage by using financial education. Financial education (learning) is something you must do continually – it's a habit throughout your life. The rich think in terms of getting more and more (assets or work done) – with less and less (physical work). This is leverage defined. The million dollar question: "How can I do what I do for more people with less work and for a better price?" Your mindset is always key. If you think investing is risky or buying more RE is risky or that starting a business is risky – you fail to learn the lessons and financial lessons that can make you wealthy. You need to expand your reality to escape a poor mentality and learn how the rich became rich (financial education and financial practice). You have to dream of possibilities and dream of greater possibilities otherwise you'll be stuck in the status quo.

AGRI NEWS

AP Govt opens Paddy Purchase Centers

The State Government agencies of the Andhra Pradesh State Civil Supplies Corporation and the IKP groups have opened 1080 paddy purchase centres in the State to ensure Minimum Support price (MSP) for paddy of Rs 1030 per quintal for Grade A and Rs 1000 per quintal for Common varieties, the Civil supplies Department said in a release here today. he Food Corporation of India has also opened 168 centres and so far during this Rabi season from May 1, a quantity of 8,29,876 tonnes of paddy has been purchased by the State agencies compared to 2,27,909 tonnes procured on the corresponding day last year.

Similarly, the FCI has also procured 1,37,447 tonnes of paddy during this Rabi season compared to 1,03,926 tonnes of paddy procured on the corresponding day last year.

Total quantity of paddy so far purchased by the Government agencies is 9,67,323 tonnes against 3,31,835 tonnes purchased on the corresponding day last year. On May 24, the Government agencies procured 62,843 tonnes.

All the arrangements have been made to procure the paddy throughout the season at the MSP and already 207.47 lakh gunnies have been placed at the disposal of the paddy purchase centres.

Arrangements have also been made to procure more number of gunnies so that there is no dearth of gunnies for procuring the paddy offered by the farmers at the MSP.

The farmers were also informed that the Government agencies would purchase any quantity of paddy that is offered at the purchase centres at MSP and they need not resort to distress sale of paddy, the release added.

Rio distributes Tractors

Nagaland Chief Minister Neiphiu Rio distributed 65 power farm machines with 33 tractors and 32 power tillers to progressive farmers at Dimapur. In his address, Mr Rio said about 75 per cent of population of the state is living in the villages and they depend on agriculture.

Stating that the domestic production of the state is 24 per cent and the overall production is still below 20 per cent running at diminishing returns, Rio said, ''More labour and man power have been engaged in agriculture sector, but income generated in this sector was less then 20 per cent.'' He said states like Haryana and Punjab which has got two per cent of land under wheat cultivation, produces around 20 per cent of the country's total and opined that the state which has also got land, manpower could produce more when the farmers take the responsibilities.

The beneficary of the scheme were entire eleven districts of the state.

₹ 271 cr projects approved in Haryana by RKVY panel

Ambitious projects involving investment of Rs 271 crore for the current financial year were approved by State Level Sanctioning Committee of Rashtriya Krishi Vikas Yojna (RKVY) which met under the chairpersonship of Haryana Chief Secretary Urvashi Gulati here today.

These projects related to Agriculture, Horticulture, Animal Husbandry and Fisheries, CCS Haryana Agriculture University, Hisar and Haryana State Seed Certification Agency.

The major projects approved included Rs 75 crore project of On-Farm Water Management, Rs 18 crore project of subsidy on distribution of certified seeds of wheat, Rs 12.70 crore project for Comprehensive Sugarcane Development and Rs 11.21 crore project of Promotion of Resource Conserving Technologies, Rs 15 crore project of Reproductive health management to optimise fertility and Rs 2.75 crore project of mobile veterinary diagnostic and Emergency Services.

The other such projects included Rs 1.05 crore project for Assistance on Mushroom Product Units, Rs 2.02 crore project for Integrated Post Harvest Management and Rs three crore project for the strengthening of Fish Seed Production Farms, strengthening of State Level Diagnostic Labs and Training Infrastructure.

AGRI NEWS

Karnataka signs MoU with GOI for Rs 603 Cr project

Karnataka Government has signed an MoU with the Government of India for a Rs 603 Crore desalination project in the State, Minister for Major and Medium Irrigation Basavaraj Bommai said today.

He told newsmen here under the MoU, the Centre's share would be 50 per cent and balance would be borne by the State.

Besides, NABARD would also contribute Rs 80 crore. It is a five-year programme and this year, Rs 160 crore would be spent.

Under the MoU, the works to be taken up included building main drainage, de-silting, restoring choked natural drainage and other works for making the land cultivable.

"In most of the land, due to blocking of natural drain, the water flow has stopped in these lands.

"This has to be rectified in more than one lakh hectare of land," he said.

He said the farmers were given training in usage of water at Water and Land Management Institute (WALMI), Dharwad.

He said it was decided to distribute Soil Health Cards to farmers to provide information about condition of the soil and how much water had to be supplied depending upon the crop.

Kissan Raja Launched

Plastindia Foundation, in association with NABARD, launched 'Kisaan Raja', first-of-its-kind mobile demonstration-cum-exhibition activity at Varudi village in Badnapur tehsil of Jalna district, about 50 km from here today.

Under the activity a drip irrigation system along with mulch films will be installed as a demonstration for a whole crop year, along with an exhibition where best agricultural practices will be displayed. According to a release here, Jalna District Collector Vilas Thakur inaugurated this unique initiative.

In his inaugural speech he said, "It is the need of the hour to go for advanced technology and I appreciate the Plastindia Foundation for their efforts to promote such technology in saving every drop of water and putting it to optimum use in agricultural activities." "Farmers should come ahead to get the knowledge and expertise made available by Plastindia Foundations Plasticulture drive through these programmes," he added.

Foundation President Ashok Goel also expressed his views on this occasion.

Varudi site is the first of eight sites of Kisaan Raja, a pilot project aimed at creating awareness for conservation of natural resources like water and increase of yield through use of such practises.

The pilot project is being implemented in Jalna district where 'Kisaan Raja' will be conducted in eight tehsils over the next fortnight.

After Varudi village, this set up will move to Pagirwadi (Ambad taluka), Antarwali Dai (Ghansawangi taluka), Shrsiti (Partur taluka), Meskheda (Mantha taluka), Ghetuli (Jalna taluka), Hiwarakawali (Jafarabad taluka) and Chandai Thombari (Bhokardan taluka).

The whole activity is being conducted with active participation of the farmer clubs of NABARD, who have taken ownership of the activity to promote, monitor and also select the land for 'Kisaan Raja'.

The demonstration activity will be promoted through the Farmers Clubs of each village and expects over 50,000 farmers from across Jalna district to visit the demo sites during the fortnight.

Farmers would even be able to take up an extra crop due to the benefit of drip irrigation which saves more than 70 per cent water compared to flow or flood irrigation methods being currently used by them.

Banks were also expected to participate in making the farmers aware about the various schemes that they can avail since many of them have very limited access to various schemes in terms of finance.

'Kisaan Raja' with the support of NABARD plans to roll out the project across other states in the country, the release added.

The Editor
Financing Agriculture
Agricultural Finance Corporation Ltd.
Dhanraj Mahal, 1st floor
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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.

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