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Employment Potential

for Agricultural and Allied Graduate as Self Employers

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EDITORIAL

With increasing awareness and knowledge, India has begun realising the importance of organic farming sans utilisation of any type of chemicals. Tracing the evolution of agriculture practice in India, we have presented a SWOT analysis of organic farming and how it has triggered increased export demands.

Focusing on diversified methods of farming, we have also highlighted how Biotech farming and Biotech crops have contributed significantly in sustainability and mitigating climate change. India is among the five principal developing countries growing biotech crops. Similarly, Emu farming in India is proving to be a lucrative agri-business activity and a variety of emu products are being sold in.the market as well as exported to various countries. Amongst all, a relatively less popular practice in India is Biodynamic farming. We have briefly highlighted the benefits and methodologies for adopting Biodynamic farming.

Emphasising the need for investments for better crop production,we show how crop production technology has lead to an increase in credit requirements for farm inputs and expenses. Another essential facet of investment for agricultural development in India is in the education domain to empower an individual to become an entrepreneur.

In cold arid regions like Ladakh, widely practiced irrigation methods prove highly ineffective. We present a detailed report on the success of drip irrigation and its scientific management strategy to ensure sustainable and economic crop production.

For implementing change in the economic scenario of agriculture, primary analysis is conducted in the assessment of issues and challenges in Indian agriculture. To counter the issues and challenges, E-agriculture is popularly emerging as a much sought after resolution.

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

A.K. Garg
Editor-in-Chief

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Employment Potential for Agricultural and Allied Graduate as Self Employers

By **G.M. Wani** *

In the past few years the growth of Agricultural Universities has increased to more than forty. The enrolled students increased from a mere 500 to nearly 20,000. As of today, we have 260 colleges in India imparting educational degrees in agriculture alone. They consist of various disciplines including veterinary, horticulture, sericulture, forestry, floriculture and a number of other sub-disciplines such as plantation crops, medicinal herbs, mushroom, seed production, dairy production, agri-management and the likes. A number of Government departments in India employ agricultural and allied graduates. The mode of recruitment is through respective State & Central Govt. public service commissions.

Beside professional employment, agricultural graduates can compete in the national or state administrative or financial and allied services. NGOs also employ agricultural and allied graduates.

Currently, we have positions vacant in SAU and ICAR Institutes, for which the annually ARS examination is being held by Agriculture Scientists Recruitment Board. The recruitment to scientists and assistant professors is open to all M.Sc/M.V.Sc or allied post graduates and Ph.D holders. Ministry of Agriculture in collaboration with NABARD and other banks have launched Agri-business Agri clinic courses. They are 3 month courses and provide on-the-job training to agri-graduates free of cost. In fact, all the expenses are borne by the Agri-business school. A network of such training schools has been established. There is a strong future for agri-graduates in the private sector. They can set up crop, fruit nurseries or open seed sale and production centres. We have a number of successful agri-graduates earning more than Rs. 20,000 per month in various parts of the valley. The whole agricultural and allied sector has a strong employment generation potential. We have identified 15 such agri business ventures, which can be profitable employment ventures. A great potential of employment is hidden in nursery plants for fruits and vegetables. An investment of Rs. 30,000 per year may give a net profit of Rs. 2 lakhs per annum.

New ventures financed by banks are agri-biotechnologies and precision farming for organic agriculture.

Entrepreneurship Concept

Entrepreneurship adds economic profits and cost-benefit ratios to agricultural output. Entrepreneurship is dominated by four factors like:

- Social changes
- Support system availability
- Resource base and its utilization
- Self confidence, exploration work capacity and intellectual potency

Farm Business

A potential entrepreneur must strive from getting maximum output. Decades back agricultural development and industrial setup was a public sponsored and heavily subsidized event, but over time 'knowledge' explosion in Indian Agriculture, has brought us on the threshold of a system, where wide distances exist between industries and farm business. The farmers who use fertilizers or agro-chemical are crushed under economic pressures. The gaps

between technology generated and technology use is increasing day after day.

The use of information and communication technology (ICT) for reducing the gaps and increasing productivity is the need of the hour (Wani, 2005). Modern technology and knowledge flow is fast expanding and bringing change. It demands more educated and trained farmers. Our education system has produced more literates, but not educationally trained youth to earn their own bread. There is practically little interaction between universities, banks or employers.

Success of Agribusiness

In a small village in Papchan, agri-graduate Mr. Iqbal Shah earns Rs. 10,000 per month. At a distance of few kilometres in the same district, Mr. Khyatlani owns a big poultry farm and earns around Rs. 20,000 per month. Both these entrepreneurs employ 2-3 persons at present. Similarly, the success shown by Mr. Shah at Malangam in agri-products and pesticide sale is noteworthy. All these agricultural graduates have started their own business concerns without a bank loan or university help.

Farmer as Entrepreneur

Indian farming and farmers have to change if proper WTO recommendation and GATT agreements are to be followed. The present day poultry scenario is emerging as a high profile agri-business in India. The introduction of rural based Vanraja, Gramapriya, Giriraja, Cari Gold and other locally grown varieties of poultry have adopted well to our agri-rural base. The market acceptability is higher than exotic poultry concerns.

Poultry as Agri-business

Dr. Gordon Butland, president of Global Poultry Strategies presents 'Backyard poultry production' as a tool of alleviating poverty and malnutrition. We have tried to distribute 'birds under a free-range system in all our KRISHI VIGYAN KENDRA's; our results were excellent and income generation was totally in favour of agri-business and agri-clinics.

This will need the involvement of Agri-Veterinary and food processing technocrats to develop rural-based establishments so as to foster export and fast returns.

Holistic Vision for Livestock Enterprise

Rural-based backyard poultry subscribes to all these norms and could be a rich resource for developing agri-entrepreneurship. Govt. of India is liberally financing such agri-business ventures. Some of the success stories in animal husbandry section can be reproduced as follows:

Backyard Poultry and Incubation

Vanrajas are the most suitable for backyard poultry. Every month 15-20 farmers are benefited by purchasing chicks for backyard poultry. There are

200 backyard poultry units of Vanraja. Each farmer is rearing 10 to 25 in the backyard. There is a good demand and response for the chicks and eggs of Vanraja. Krishi Vigyan Kendras are now planning to expand this entrepreneurship with Agri-graduates.

Semi-stall-fed Goat Rearing

Krishi Vigyan Kendra's made an intervention to improve this enterprise by conducting short duration training programmes for rural youth. Similarly, exposure visits were organized on goat feed, breed and health management. More emphasis was given on Osmanabadi goat and upgradation in selected non-descript goat breed by osmanabadi pure buck and given the knowledge about semi stall-fed goat rearing concept.

Broiler Production

Krishi Vigyan Kendra has conducted training programmes for 165 trainees about contract farming in broiler production with private sector, which provide chicks, feed and medicine. There are 27 poultry units having capacity of 5000-10000 poultry birds on contract farming basis.

A seminar-cum-farmer's meet was arranged at Jammu & Kashmir on 26-27th of October 2007. The knowledge–sharing session with farmers by agricultural graduates and scientists was presided by His Excellency the Chancellor and Governor of Jammu & Kashmir. A vision of poverty alleviation through backyard poultry intervention was the theme of the seminar. Many belts in Gurez, Tangdar, Tillail and Zanskar are rearing native livestock species. They are better suited and need improvement and identification. The cooking methods

will need more expansion and scientific intervention for export. More emphasis should be laid on:

- Safe feed and food
- Organic fodder and food
- Operational excellence and modern mechanization to improve quality of indigenous enterprises
- Local family management to farm business management and seller-buyer mode adoption

This will need graduate farmers who are trained.

High Value Agri-business

Rapid growth rate in high value commodities in Indian agriculture promises 40 percent total output. The sectors assuming importance for export earnings are fruits, milk, vegetable and poultry. Thus, Agri-clinic training centres should focus on these commodity oriented trainings. The sector may need more than 1 lakh young agri-graduate entrepreneurs to achieve national goals and not the mere 14000 unemployed agriculture graduates.

Technological Prospective

The technological gaps between research yields and farmer yields are wide. The technological knowhow over the years is on the shelf. Much of it has remained frozen if not dead within the walls of the institutions. Traditional agriculture existing still in remote areas encompasses the use of farm yard manure, vormiculture and use of agricultural waste materials. The present problems of low soil fertility, reduction in yields and soil salinity have arisen due to excessive use of chemical inputs in farming with little care for the soil.

Our researchers blindly advocated more and more use of fertilizers, pesticides and fungicides, which helped to gain grain revolutions, but left behind polluted water, air and environment with degraded soils. These revolutions debarred future sustenance. This was due to poor perception.

Thus immediate need is to make researchers akin with information technology and advanced communication. The rapid evolution of information science demands quick and speedy transfer of technologies, awareness and even subject reviews to farmers for speedy application. The productivity would be better if technological advances are adopted and their impact is known. The knowledge of computer hardware, software as well interlinking the information dissemination channels and outlets is essential. This will consume hundreds of Agri-graduates in mass media, information and communication.

Mixed Farm University Culture

Higher productivity gains can be achieved through application of technology and production recommendations at farmer's fields. We have 65 percent small and marginal farmers whose awareness potential is low. The production system prevailing with these farmers is mixed farming or composite farming. In contrast to USA and European agriculture, our necessity is to increase crop-livestock-fish-plant integrated production system with multiple livelihood opportunities. Therefore, we need our own innovative educational and training policies.

Higher Productivity Concerns

Our agricultural growth rate (AGR) needs to be equal if not more to population growth rate (PGR). Our AGR target ought to be double the PGR.

This is important as consumption rates, purchasing power and employment prospects increase. An estimated food grain of 210 million tons at present may need to be doubled in the next 10 years. We have to achieve high targets of productivity by vertical expansion as horizontal land expansion is just not possible.

Climatic disasters, earthquakes, tsunami and floods have affected our agricultural production in the past and additional requirements need to be kept in mind while planning food security. We need to increase per capita consumption expenditures of Rs.600 per month. We need to bridge the gaps between potential and actual yields at farmers' level. The chemical farming hazards of poor soil fertility, low water availability, pollution and environmental concerns impede our agricultural development. Thus, refined technology, participatory research and educational modules, are needed. The new pressures of Global marketing, world trade and tariff regulations have to be accommodated. All this will need incorporation of new themes like post-harvest management, value addition, packaging, communication, credit and market information services in the course curricula. Thus, a new multidimensional change in academic curriculum is envisaged, which may open new opportunities for agricultural and allied graduates.

Quality Assurance

Our prime agenda should be quality agricultural education, accreditation, knowledge, assessment, skill, competence-building and academic audit. Quality assurance, means strengthening resources, information and maintenance of educational infrastructure. Thus, we need to regulate grants and centre-state

relations rationally. This will open golden opportunities to our graduates across the borders.

Employment Opportunities

We have 36 state/deemed or central agricultural universities and 20 general universalities with 48 agricultural faculties. The total disciplines needing grants may be strengthened in 5 years. New faculty development in all the universities and colleges is to be executed in the coming five years, which will include:

- Pest information and survey;
- Risk management analysis;
- Decision support system; and,
- Geographic information system.

A new trust is to be given to course curriculum integrating field practices in a partnership mode with farmers. A teacher-student-farmer-industry, interaction and cooperation is to be developed. A new model of mechanics in agricultural and allied curricula is to be integrated, unified and fine tuned to end results. This will demand inter and intra faculty harmony and synchronized course curricula at UG, PG and Ph.D level. This has to be fine tuned to our field requirements and location orientations and employment opportunities will be the end result.

Asia Specific Agricultural Education

Indian Economy is an agri-centric economy which supports 70 percent of our population for direct rural employment. Forty-five percent of the income generated by industries comes from Agri-based (Agro) Industries. Therefore, a vast potential and resource is hidden in it. If we think of Asia specific agriculture, we have to play a significant role in the region which has 60 percent of the world population. The remodelling of curriculum will need incorporation competitive global marketing, technology use, restrictions, sustainability, environment, water resource conservation, remediation factors etc.

Agri-educational reforms are needed so that ICAR (Indian Council of Agricultural Research) parallels USDA (US Department of Agriculture) in governing grants in aid to the whole agriculture sector. New

educational policies so drafted shall be non-discriminative, comprehensive, transparent and accountable.

Access to Education and Training

Access to education and training to people below the poverty line, rural youth and women is to be ensured. This will need a total restructured education infrastructure. A three tyre model is envisioned which consists of:

- On-the-job training opportunities on farm mechanization and agriculture
- Training skills, upgradation and rural orientation at University level, refinement and more innovative participatory mode at farmers' field.
- Teacher-student-farmer-industry-interaction-work and planned-self-learning by living with farmers. It will ensure quality training and job improvement of skilled manpower for use in Asian-Agri development market. The utilization of 'Rehbar-e-Zerat' paid Agri-services to farmers shall provide them job and money.

Informal-Flexible Agriculture Information Services

A flexible curriculum model should have many options at B.Sc level. For example:

- Natural science
- Agri science
- Production system
- Agri-business
- Social science
- International Agriculture
- Natural Resources
- Agri-business management
- Biological engineering
- Dietetrics
- Landscape Architecture

These inclusions at B.Sc or Post graduate level shall help in graduate employment.

Export Orientation in Agri-Education & Employment

In the present era, bio-safety, phyto and zoo sanitation have assumed tremendous importance. Web and web designing have made invisible teachers to unknown students. New targets for future educational planning and policies need to have more information and communication technology. Therefore, courses on information and communication with computer applications are a must. However, a total connectivity is needed with farmers, farm organizations and utilization departments to harvest the gains of technological reforms to increase our exports. Training of these graduates in management, mass media, export-import ventures, industry and related agro-based ventures like sale of fertilizers, pesticides, seeds etc. is needed.

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Organic Farming
A Swot Analysis

By **K.M. Deepa***

The production of all agricultural products organically is called Organic Farming. This includes agriculture products such as grains, meat, dairy, eggs, fibres, cotton, flowers and processed food products. Organic farming means farming in the spirit of organic or integral relationship between the soil, water atmosphere, plants, soil microbes and waste products from vegetables and animals.

The great Indian civilization thrived on organic farming and India was one of the most prosperous countries in the world. In traditional India, agriculture was practiced using organic techniques, where the fertilizers, pesticides, etc., were obtained from plant and animal products. Organic farming was the backbone of the Indian economy and cow was worshipped (and is still done so) as God. The cow, not only provided milk, but also provided bullocks (for farming) and dung (which was used as fertilizers).

Shift to Chemical Farming in 1960s

During the 1950s and 1960s, the ever-increasing population of India and several natural calamities lead to a severe food scarcity in India. As a result, the government was forced to import food grains from foreign countries. To increase food security, the government had to drastically increase the production of food in India. The green revolution (under the leadership of M.S. Swaminathan) became the government's most important program in the 1960s. A large amount of land was brought under cultivation. Hybrid seeds were introduced. Natural and organic fertilizers were replaced by chemical fertilizers and locally made pesticides were replaced by chemical pesticides. Large chemical factories such as the Rashtriya Chemical Fertilizers were established.

Characteristics of the Organic Farming System

- Protecting the long term fertility of soils by maintaining organic matter levels, encouraging soil biological activity and careful mechanical intervention;
- Providing crop nutrients indirectly using relatively insoluble nutrient sources which are made available to the plant by the action of soil micro-organisms;
- Nitrogen self-sufficiency through the use of legumes and biological nitrogen fixation, as well as effective recycling

of organic materials including crop residues and livestock manures;

- Weed, disease and pest control relying primarily on crop rotations, natural predators, diversity, organic manuring, resistant varieties and limited (preferably minimal) thermal, biological and chemical intervention;
- The extensive management of livestock, paying full regard to their evolutionary adaptations, behavioural needs and animal welfare issues with respect to nutrition, housing, health, breeding and rearing;
- Careful attention to the impact of the farming system on the wider environment and the conservation of wildlife and natural habitats.

Options in Organic Farming

There are three options for Organic Farming to alleviate the problems caused by conventional inorganic farming systems. They are:

Pure Organic Farming: This accounts for complete exclusion of inorganic fertilizers and pesticides, but involves the use of organic manures and biological pest control methods;

Integrated Green Revolution Farming: The basic trends of the green revolution such as intensive use of external inputs, increased irrigation, development of high yielding and hybrid varieties are involved;

Integrated Farming System: This option involves low input organic farming in which the farmers have to depend on local resources and ecological processes, recycling of agricultural wastes and crop residues.

Main Principle of Organic Farming

The main principles of organic farming are the followings:

- To work as much as possible within a closed system and draw upon local resources;
- To maintain the long-term fertility of soils;
- To avoid all forms of pollution that may result from agricultural techniques;
- To produce foodstuffs of high nutritional quality and sufficient quantity;
- To reduce the use of fossil energy in agricultural practice to a minimum;
- To give livestock conditions of life that confirm to their physiological need;
- To make it possible for agricultural producers to earn a living through their work and develop their potentials.

Benefits of Organic Farming

- Organic farming proves to be more profitable than the age-old traditional farming methods;
- It has been found that organic farming reduces the production cost by about 25-30 percent, as it does not involve the use of synthetic fertilizers and pesticides, which makes organic farming cost effective;
- Soil is the most important component in farming and organic farming preserves soil by reducing soil erosion to a large extent;
- Organic farming also enables the farmers to use the soil for a longer period of time to grow crops as soil fertility is maintained for a long time;
- Organic farming has a positive effect on the ecosystem, as it proves vital in supporting the survival of wildlife in the lowlands. It even provides safe pasture lands for grazing;
- Organic farming is not only beneficial for farmers, but it has also proved useful for the dairy industry. Cattle grazing on organic farmlands have been found to be less prone to diseases and they yield more milk;
- Products or foodstuffs produced from organic farming contain neither any sort of artificial flavours or preservatives, nor do they contain any harmful chemicals;
- The original nutritional content of food is preserved due to the absence of synthetic fertilizers and pesticides;
- Organic products moreover are tastier than the products yielded from traditional farming.

Organic Farming in Indian Rural Economy

By-products such as oil cakes, cow dung, neem leaves, etc. are still used in India to ward off pests and as preservatives. The use of chemical fertilizers for increased productivity was implemented during late 1850s. In India, the first use of chemical fertilizers for increased agriculture productivity was implemented in 1960.

The main advantages of organic farming in Indian rural economy are as follow:

- Organic fertilizers are completely safe and do not produce harmful chemical compounds;
- The consumption of chemical fertilizers in comparison to organic fertilizers is always more, especially in unused cultivable lands;
- Moreover, chemical fertilizers need huge quantities of water to activate its molecule whereas organic fertilizers do not need such conditions;
- Further, chemical fertilizers almost always have some harmful effects either on the farm produce or on the environment;
- Furthermore, it can also produce harmful chemical compound in combination with chemical pesticides, used to ward-off harmful pests;
- It is estimated that there is around 2.4 million hectare of certified forest area for collection of wild herbs;
- The actual available area for cultivation of organic agriculture in India is much more than what is identified and certified so far;
- India has around 1,426 certified organic farms;

- India produces approximately 14,000 tons of output annually;
- It is estimated, that around 1,90,000 acres of land is under organic farming in India;
- The total annual production of organic food in India in the last financial year was 1,20,000 tons.

Swot Analysis of Organic Farming

Strengths	Weakness
Indigenous farming systems	Poor image marketing
Large labour force	Lack of awareness of benefits of organic agriculture
National organic movements	Education and extension system oriented towards conventional agriculture
Low cost of production	Institutional weaknesses such as certification
Availability of technologies for organic production	Lack of reliable data and information on organic agriculture
Agro-bio diversity in India	Poor local market opportunities and infrastructure
Strongly motivated and committed organic sector	Small quantities and irregular supply limit market opportunities
Opportunities	**Threats**
Availability of uncontaminated land	Push Agrochemicals
Increasing interest in organic agriculture	Market threats e.g. Food miles
Increasing global demand for organic produce	Incoherent government policies
Increasing local awareness of benefits of organic foods	Pressure from commercial forces to lower standards of organic agriculture
Increasing support from international communities	International competition
Governmental support in policy programmes for organic agriculture	Isolation

Land Area of Major Countries under Organic Agriculture during 2007–08

Country	Area under organic agriculture (ha)	Percentage of total agricultural	Number of land organic farms
Australia	12,294,290	2.8	1550
China	2,300,000	0.4	1600
Argentina	2,220,489	1.7	1486
USA	1,620,351	0.5	8493
Italy	1, 148,162	9.0	45,115
Uruguay	930,965	6.1	630
Spain	926,390	3.7	17,214
Brazil	880,000	0.3	15,000
Germany	825,539	4.8	17,557
UK	604,571	3.8	4485
Canada	604,404	0.9	3571
France	552,824	2.0	11,640
India	528,171	0.3	44,926
World total	30,418,261	0.65	718,744

(Source: CURRENT SCIENCE, VOL. 98, NO. 9, 10 MAY 2010)

Government Support to Organic Farming

The Ministry of Agriculture is promoting organic farming in the country under the following schemes:

- National Project on Organic Farming;
- National Horticulture Mission;
- Technology Mission for North East; and,
- Rashtriya Krishi Vikas Yojana.

The National Project on Organic Farming has been implemented since October 2004 through the National Centre of Organic Farming at Ghaziabad and six regional centres located at Bangalore, Bhubaneswar, Hissar, Imphal, Jabalpur and Nagpur. The project supports organic input production infrastructure, technical capacity building of stakeholders, human resource development through training, statutory quality control of organic inputs, technology development and dissemination, market development and awareness. Two new innovative components were added in the project since the last financial year. These are:

Biological Soil Health Assessment: Traditionally, soil health is assessed through physio-chemical soil test and addressed mainly through chemical nutrient supplementation. It is now proposed to assess the soils also from biological health angle for making appropriate interventions to restore the fertility through organic and biological means.

PGS (Participatory Guarantee System) Certification: For quality assurance of organically grown crops so far the available system is third party certification which is not only cumbersome but also very costly. To address the issue, a new system is being introduced. In this method, farmers in a group collectively pledge for adopting organic farming, maintain necessary records and regular inspection.

PGS will also serve as preparation to third party certification and farmers can easily switch over from PGS to other forms of certification.

Under the National Horticulture Mission and Technology

Mission for North East, assistance is provided at 50 percent of cost subject to a maximum of Rs. 10,000 per hectare (up to 4 hectares per beneficiary) for organic horticulture cultivation. Assistance is also provided for setting up vermi-compost units at 50 percent of cost up to Rs. 30,000 per beneficiary. Assistance of Rs.5 lakhs is provided to a group of farmers covering an area of 50 hectares for organic farming certification.

Rashtriya Krishi Vikas Yojana: Under the Rashtriya Krishi Vikas Yojana, states are being assisted for area expansion of organic food crops, capacity building of farmers and organic input production.

Besides the efforts of Central Government, Karnataka, Kerala, Andhra Pradesh, Maharashtra, Madhya Pradesh, Nagaland, Sikkim, Mizoram and Uttarakhand have already drafted policies for promotion of organic farming. Nagaland, Sikkim, Mizoram and Uttarakhand have decided to go 100 percent organic in due course of time.

Network Project on Organic Farming: The Indian Council of Agricultural Research (ICAR) took an initiative during 10th Plan in the form of Network Project on Organic Farming to study productivity, profitability, sustainability and quality.

The project came into existence in 2004 with the main centre at project directorate for farming systems research, Modipuram. It comprises 13 cooperating centres spread over 12 States. Based on results of past years, several significant achievements have been made and good yields/profits have been achieved in many crops at some of the centres under organic farming system. Since these results are only indicative and need a mid-term and long-term validation, their response to new environment would take some time to stabilise. The ICAR has continued the project with 13 centres and a budgetary provision of Rs. 5.34 crores for five years.

Tamil Nadu Government urged to Promote Organic Farming

With farmers gradually switching to organic farming, the Indian Organic Farming Movement has urged the Central and State Government to frame policies to promote organic farming in Tamil Nadu. In Erode district; about 12,000 hectares of paddy cultivation have now been brought under the System of Rice Intensification (SRI). This method helps in increasing the yield and reducing the cost of production, said Indian Organic Farming Movement president-G Namalvar. Similarly, over 15,000 hectares are under SRI in Nilgiris, while in Nagapattinam district, it is about 54,000 hectares and in Thanjavur district, it is about 100 hectares.

They also sought the establishment of a university or higher education platform in the state, which could offer specialisation in organic farming. Additional facilities like issuance of organic farm inputs were also sought from the State Government.

Limitations of Organic Farming:

- Less food being produced approximately one-third lower than those produced in conventional farming;
- Uncertainties in ensuring farms;
- Farm profits react very sensitively to changes in product prices;
- Organic product prices are high: This may be because the production is less as the farmers growing organic food are less;
- In organic fields there is a greater percentage of weed counts when compared to conventional ones;
- Organic manures have low nutrient content and therefore, need to be applied in larger quantities. The nutrient content of organic manures is highly variable from place to place also in the method of preparation;
- Absence of defined package of practices;
- Non-availability of organic seed or seed compatible to organic management;

- Labour intensive;
- Cumbersome due to requirement of multiple cropping.

Productivity of Crops (t/ha) In Organic versus Conventional Farming

State/Crops	Organic Farming	Conventional Farming
Maharashtra		
Vegetables	11.0	13.0
Fruits	11.4	13.6
Rice	2.0	2.5
wheat	1.2	1.5
Tamilnadu		
Cotton	0.6	1.0
Cashew	1.3	30.0
Banana	25.0	0.6
Mango	8.0	6.0
Guava	20.0	23.0
Coconut	28250 nuts	28750 nuts
Kerala		
Pepper	1.38	1.40
Banana	23.8	27.2
Coconut	31000 nuts	30500 nuts
Coffee	1.23	1.31
Turmeric	22.5	25.0
Karnataka		
Soybean	0.9	1.1
Fruits Crops	8.0	0.8
Groundnut	1.2	1.4
Sugarcane	120	140

(Source: Current Science, Vol. 98, No. 9, 10 May 2010)

Organic Food Exports from India

Organic food exports from India are increasing with more farmers shifting to organic farming. With the domestic consumption being low, the prime market for Indian organic food industry lies in the US and Europe. India has now become a leading supplier of organic herbs, organic spices, organic basmati rice, etc.

Exports are Driving Organic Food Production in India

The increasing demand for organic food products in the developed countries and the extensive support by the Indian government coupled with its focus on agri-exports are the drivers for the Indian organic food industry.

Organic food products in India are priced about 20-30 percent higher than non-organic food products. This is a very high premium for most of the Indian population where the per capita income is merely US$800. Though the salaries in India are increasing rapidly, the domestic market is not sufficient to consume the entire organic food produced in the country.

The Indian government is committed towards encouraging organic food production. It allocated Rs. 100 crores during the Tenth Five Year Plan for promoting sustainable agriculture in India.

APEDA (Agricultural and Processed Food Export Development Authority) coordinates the export of organic food (and other food products) in India. The National Programme for Organic Production in India was initiated by the Ministry of Commerce. The programme provides certain standards for the organic food industry in the country. Since these standards have been developed taking into consideration international organic production standards such as CODEX and IFOAM, Indian organic food products are being accepted in the US and European markets. APEDA also provides a list of organic food exporters in India.

Organic Food Products Exported from India

Organic Cereals: Wheat, rice, maize or corn;

Organic Pulses: Red gram, black gram;

Organic Fruits: Banana, mango, orange, pineapple, passion fruit, cashew nut, walnut;

Organic Oil Seeds and Oils: Soybean, sunflower, mustard, cotton seed, groundnut castor;

Organic Vegetables: Brinjal, garlic, potato, tomato onion;

Organic Herbs and Spices: Chilli, peppermint, cardamom, turmeric, black pepper, white pepper, tamarind, ginger, vanilla, clove, cinnamon, nutmeg, mace;

Others: Jaggery, sugar, tea, coffee, cotton, textiles.

Given below are the sales of various organic food products that were exported from India in 2009-2010.

Organic Food Item	Sales (tons)
Tea	3000
Coffee	550
Spices	700
Rice	2500
Wheat	1150
Pulses	300
Oil Seeds	100

Fruits and Vegetables	1800
Cashew Nut	375
Cotton	1200
Herbal Products	250
Total	11,925

Source: FAO

Conclusion

Organic farming is not only about farming without chemicals. It is also about the environment, agricultural traditions, traditional seeds, animal welfare, farming communities, sensible energy use, soil and water conservation.

One of the main advantages of organic food is that it can help you sleep better and improve blood circulation. It boasts of higher amounts of vitamins and minerals, which help provide good health, and beautiful skin and hair. Consumption of products obtained from organic farming minimizes the risks of physical ailments such as heart attacks. Scientific studies have proven that organic foods are healthier than the inorganic foods.

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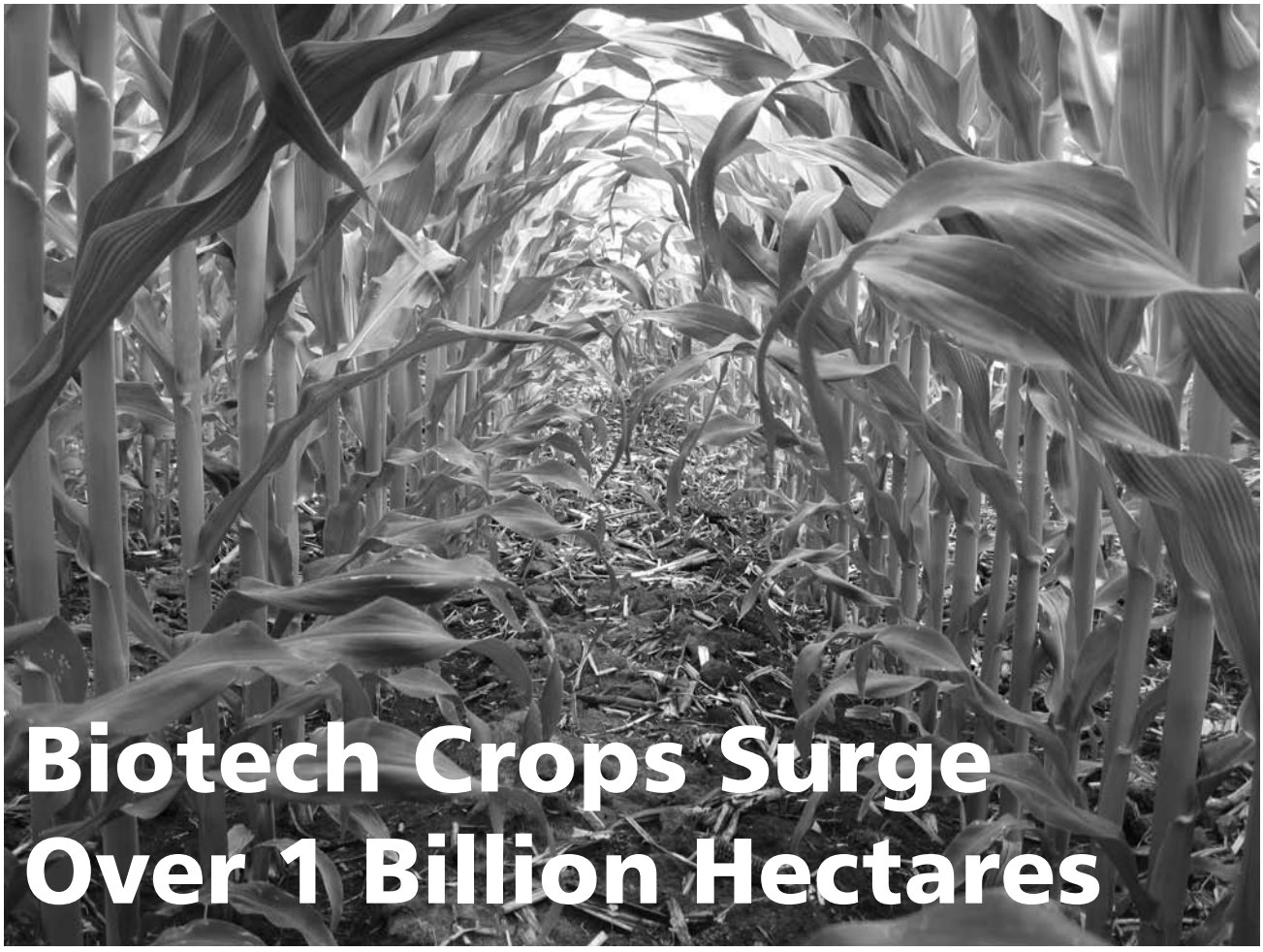


Biotech Crops Surge Over 1 Billion Hectares

Developing nations drive growth at adoption rates exceeding industrialized countries

In just 15 years after commercialization, accumulated biotech crops exceeded 1 billion hectares in 2010, a milestone that signifies biotech crops are here to stay, according to Clive James author of the annual report recently released by ISAAA (International Service for the Acquisition of Agri-biotech Applications).

The one-billionth hectare was planted in 2010 by one of the 15.4 million farmers in 29 countries who now benefit from the technology. For comparison, 1 billion hectares is roughly equivalent to the vast land area of China, or of the United States. With an unprecedented 87-fold increase between 1996 and 2010, biotech crops are the fastest-adopted crop technology in the history of modern agriculture, according to James, chairman and founder of ISAAA.

"Growth remains strong, with biotech hectarage increasing by 14 million hectares or 10 percent between 2009 and 2010," said James. "That's the second highest annual hectare growth ever, bringing 2010 global plantings to 148 million hectares."

For the first time, in 2010, the ten largest biotech crop growing countries all had more than one million hectares in production, providing a broad and stable base for future growth. In hectarage rank order, they include: USA (66.8 million), Brazil (25.4 million), Argentina (22.9 million), India (9.4 million), Canada (8.8 million), China (3.5 million), Paraguay (2.6 million), Pakistan (2.4 million), South Africa (2.2 million) and Uruguay (1.1 million).

For the second consecutive year, Brazil had the world's largest year-over-year increase in absolute biotech crop plantings, adding 4 million hectares in 2010 – a 19 percent increase – to grow a total of 25.4 million hectares. Only the United States leads Brazil in total cropland devoted to biotech crops. Australia, which recovered from a multi-year drought, saw the largest proportional year-on-year increase in biotech crop plantings at 184 percent. Burkina Faso followed at 126 percent growth with 80,000 farmers planting 260,000 hectares, a 65 percent adoption rate.

According to Dr. Anderson Galvão Gomes, director of Brazilian-based Celeres and contributor to the ISAAA report, maintains that Brazil, after expediting approvals of biotech crops (a total of 27, and 8 in 2010 alone) and

securing export trade agreements, now plants 17 percent of the world's biotech crops. Productivity increases attributed to biotech crops helped fuel Brazil's ability to double its annual grain production since 1990 while increasing cropland by only 27 percent. The benefits from biotech crops are spurring strong political will and substantial new Research and Development investment with speed and effectiveness increasing access to technology, Gomes noted. With an ability to bring up to 100 million more hectares of cropland with water into production, Brazil will continue to be a driving force in the global adoption of biotech crops and is investing in infrastructure to support that growth.

"Developing countries grew 48 percent of global biotech crops in 2010 and will exceed industrialized nations in their plantings of biotech crops by 2015," said James. "Clearly, the countries of Latin America and Asia will drive the most dramatic increases in global hectares during the remainder of the technology's second decade of commercialization."

The five principal developing countries growing biotech crops – China, India, Brazil, Argentina and South Africa – planted 63 million hectares of biotech crops in 2010, equivalent to 43 percent of the global total. Nineteen (19) of the 29 countries that have adopted biotech crops are developing nations, which grew at a rate of 17 percent or 10.2 million hectares over 2009 compared to only 5 percent growth or 3.8 million hectares in industrialized countries.

More than 90 Percent of Biotech Crop Growers are Small-Scale Farmers

Of the 15.4 million farmers using the technology in 2010, 14.4 million were small-scale, resource-poor farmers in developing countries. These farmers are some of the poorest people in the world and biotech crops are contributing to the alleviation of their poverty, according to James. China and India now have the most small-scale farmers using biotech crops, with 6.5 million Chinese farmers and 6.3 million Indian farmers planting biotech crop seed. Remarkably, over the last 15 years, farmers worldwide have made 100 million independent decisions to plant biotech crops.

China and India now have the most small-scale farmers using biotech crops, with 6.5 million Chinese farmers and 6.3 million Indian farmers planting biotech crop seed. Remarkably, over the last 15 years, farmers worldwide have made 100 million independent decisions to plant biotech crops

More than one billion people throughout Asia, who are members of the 250 million small-scale rice-producing households cultivating about one-half hectare, are potential beneficiaries from the expected commercialization of insect-resistant Bt rice expected to be introduced before 2015, James noted.

"This is important progress," said James. "Up to 6,000 deaths a day can be prevented with Golden Rice for Vitamin A deficient populations, which is expected to be available for planting in the Philippines by 2013 followed by Bangladesh, Indonesia and Vietnam."

Countries New to Biotech Crop Production, Additional Crops on Horizon

In 2010, three nations grew biotech crops commercially for the first time, and one nation resumed planting biotech crops. Approximately 600,000 farmers in Pakistan and 375,000 farmers in Myanmar, planted insect-resistant Bt cotton, and Sweden (the first Scandinavian country to commercialize biotech crops) planted a new biotech high-quality starch potato approved for industrial and feed use. Germany also planted the same biotech potatoes in 2010, resuming its place among the eight EU nations now growing either biotech maize or potatoes.

James said he expects an additional 12 countries to adopt biotech crops by 2015 to bring the list of adopting nations to 40 (the number predicted by ISAAA in 2005), the number of farmers to double to 20 million, and global hectarage to double to 200 million hectares. Up to three or four additional countries are expected to grow biotech crops from each of the three regions of Asia, West Africa, East/Southern Africa and fewer from Latin/Central America, and Western and Eastern Europe. Mexico, the centre of biodiversity for maize, successfully conducted its first field trials of Bt and herbicide tolerant maize in 2010. Mexico has already successfully grown biotech cotton and soybean for many years.

James said there is considerable potential for increasing the biotech adoption of

the four current large hectarage biotech crops – maize, soybean, cotton and canola – which represented almost 150 million hectares in 2010 from a global potential of double that hectarage at over 300 million hectares. In the next five years, the timing of commercialized biotech rice, and drought tolerance as a trait in maize and several other crops are seminal catalysts for the future adoption of biotech crops globally. Drought tolerant maize is expected in the U.S. as early as 2012, and importantly, in Africa by 2017. The decision, four years ago, to delay biotech herbicide tolerant wheat is also being revisited and many countries are fast-tracking the development of biotech wheat with a range of traits including drought tolerance, disease resistance and grain quality – the first of which are expected to be ready for commercialization as early as 2017. James expects several medium hectarage crops to be approved for commercialization by 2015, including: biotech potatoes resistant to the most important disease of potatoes in the world; sugarcane with improved agronomic and quality traits; disease-resistant bananas; Bt eggplant; tomato; broccoli; and cabbage, as well as some pro-poor crops, such as biotech cassava, sweet potato, pulses and groundnut. The 29 countries that planted biotech crops in 2010 already represent 59 percent of the world population, and James is cautiously optimistic about the contribution that biotech can make to the 2015 Millennium Development Goals of food security and poverty alleviation.

"Biotech crops have played an under-appreciated role in progress toward attainment of the 2015 Millennium Development Goals," said James. "Their impact by 2015 will be more universally recognized."

Furthermore, biotech crops have contributed to sustainability and are helping mitigate climate change, said James. "Biotech crops have helped reduce carbon emissions and save land, while helping alleviate poverty for some of the poorest people in the world."

To provide more of the world's small and resource-poor farmers access to biotech crops, James says that there is an urgent need for appropriate regulatory systems that are responsible and rigorous – but not onerous – for small and poor developing countries.

For more information on the executive summary, log on to www.isaaa.org.

SOURCE: The report is entirely funded by two European philanthropic organizations: the Bussolera-Branca Foundation from Italy, which supports the open-sharing of knowledge on biotech crops to aid decision-making by global society; and a philanthropic unit within Ibercaja, one of the largest Spanish banks headquartered in the maize growing region of Spain.
The International Service for the Acquisition of Agri-biotech Applications (ISAAA) is a not-for-profit organization with an international network of centers designed to contribute to the alleviation of hunger and poverty by sharing knowledge and crop biotechnology applications. Clive James, chairman and founder of ISAAA, has lived and/or worked for the past 30 years in the developing countries of Asia, Latin America and Africa, devoting his efforts to agricultural research and development issues with a focus on crop biotechnology and global food security.

Emu Farming in India
A Flourishing Agribusiness Venture

By **Vikram Saini***

The emu farming industry in India is growing at a very fast rate. To sustain the profits, emu farmers must enter the export market. Emu Farming India was started by a group of experienced professionals with a vision to make a name for India in the global market of emu oil and other emu related products.

Emu farming is a well-established business in Australia, which has an international market of about US$4.1 million. It is a new and flourishing business in India, which is presently very well established in the states of Maharashtra, Tamil Nadu, Gujarat and Andhra Pradesh, and is now rapidly spreading to the northern states of Punjab, Himachal Pradesh, Haryana and Uttaranchal. It is estimated that currently there are about 2,500 emu farms in India and they are growing in larger numbers. Emu farming is also being supported by various government organizations in India, which are providing farmers with lucrative subsidies and schemes for this business.

Emu Farming India is the first online website especially developed keeping in mind the new and existing players in the emu farming business in India who require authentic information and resources about emu farming that help in diversifying the business into newer dimensions. It provides consultancy services by a team of experienced scientists, bio-technologists and international marketers who have vast knowledge of international quality standards and regulations. They provide the Indian emu farmers with all the technology and the resources required to achieve a place for themselves in the international market. The main objective of the website is to make a place for the Indian Emu Industry in the International market.

Emu farming in India is a very lucrative business and a variety of emu products are being sold in the market as well as exported all over the world. Emu oil has many medicinal properties and has been used by the Australian aborigines for years due to its pain relieving properties. Currently there is negligible export of emu oil and emu meat from India. In order for emu farming to survive in India, international export market standards must be met. This can only be achieved with the help of highly skilled technical consultants who have thorough knowledge of the international market rules and regulations related to emu products. These services are being offered by the website.

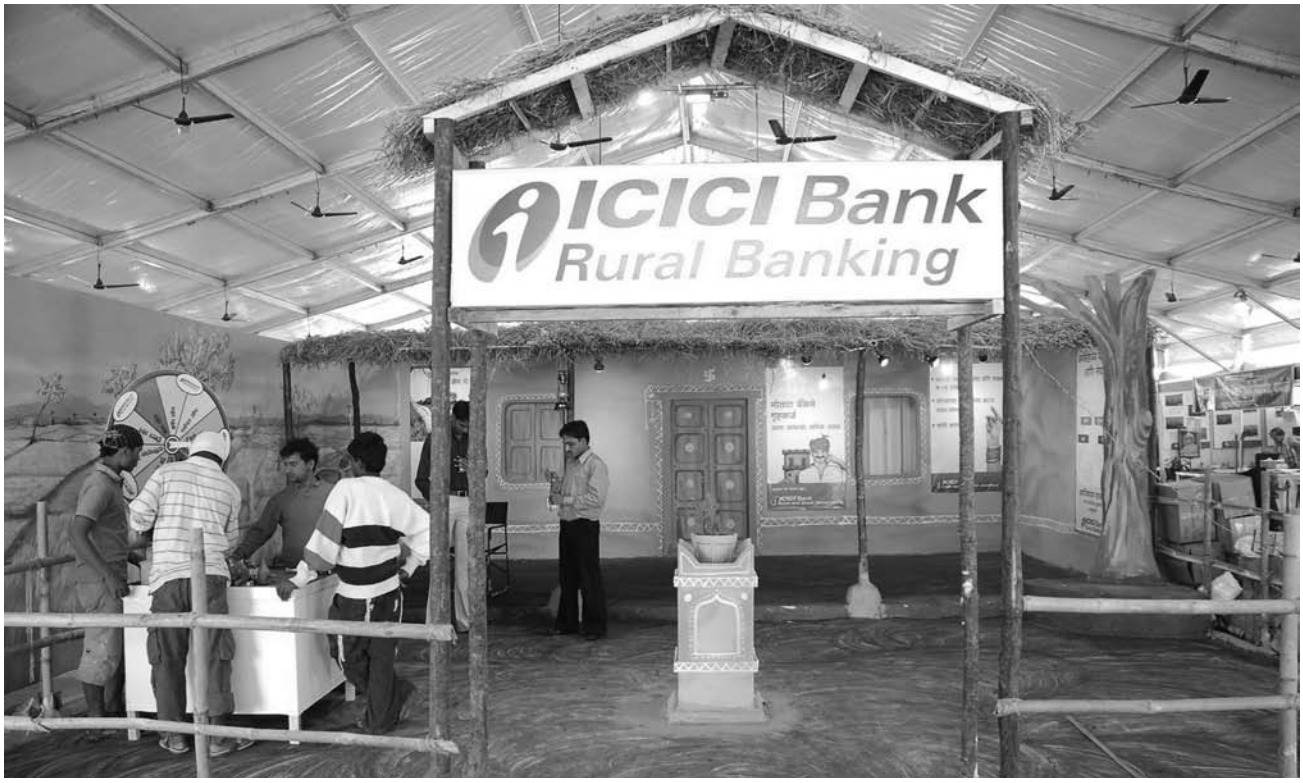
While talking about the introduction of this unique and first-of-its-kind service, Gurinder Pal Singh, the International Marketing Head of the company said, "We came up with the idea of offering consultancy services after extensive research regarding Emu Farming and its growing popularity in India. We have been contacting many companies in Europe and the Middle East. They have shown a keen interest in sourcing emu oil from India. I believe that with the right type of facilities and proper guidance, we can conquer a major share of the International Emu oil and meat market."

www.EmuFarmingIndia.com is the first online website especially developed keeping in mind the new and existing players in the emu farming business in India who require authentic information and resources about emu farming.

Contributor: Technical Head, Emu Farming India

Cost of Institutional Agricultural Credit to Farmers

By **B.K. Sharma & Dr. R.C. Kumawat ***



The Agricultural sector plays a strategic role in the progress of economic development of a country. It provides basic necessities of life to mankind and raw materials to industries. At present, agriculture in India is the source of livelihood for more than 52 percent of the population and contributes about 16 percent to GDP. This way, agriculture is not a business but a way of life to majority of the population. To meet the requirements of the rapidly growing population of the developing economy, agriculture has to grow at a faster rate and get modernized. But, the agricultural sector of the Indian economy is labour intensive, land poor and capital scarce. Hence, it is very difficult to get the modern benefits in agriculture without adequate credit to the farmers. Credit is an important instrument in enabling farmers to acquire essential inputs for agriculture and some consumable goods for domestic purposes. After the advent of the green revolution, there have been overtime changes in crop production technology leading to increase in credit requirement for farm inputs and investment.

Like other sectors, the development of agricultural sector is also dependent on credit, because most of the farmers are small and marginal who are unable to save and invest due to their low levels of income. The institutional credit system started in India with the passing of the Co-operative Credit Societies Act in 1904. At present, agricultural credit is being disbursed through a multi-agency network consisting of Commercial Banks, Regional Rural Banks (RRBs) and Cooperative Banks. In availing of agricultural credit from the financial institutions, farmers incur various types of expenditures like travelling expenses, incidental expenses, charges on getting various records and certificates, processing fees, inspection charges, insurance charges, etc. Therefore, in view of the above facts, the present study was designed to estimate the various cost components incurred by the farmers in getting credit.

Methodology

The present investigation was conducted for the agricultural year 2005-06 in Jaipur district of Rajasthan. Out of thirteen panchayat samitis of the district, only two namely Govindgarh and Sambhar Lake were randomly selected for the study purpose. From each panchayat samiti, two gram panchayats were selected at random. These were Kisanpura and Jaitpura from Govindgarh panchayat samiti and Badhal and Lalasar from Shambhar Lake panchayat samiti. All the villages falling within each gram

panchayat were selected for further investigation. From the selected villages, a list of all the farmers who acquired loans from institutional agencies during 2005-06 was obtained from the records of financial agencies.

The farmers were segregated into five standard categories on the basis of their size of land holdings viz., marginal (less than 1 hectare), small (1-2 hectares), semi-medium (2-4 hectares), medium (4-10 hectares) and large (10 hectares and above). From each category, 15 percent of farmers were selected randomly for detailed study. Thus, a sample of 221 borrowers consisting of 55 marginal, 51 small, 45 semi-medium, 52 medium and 18 large farmers were selected. The primary data were collected from borrowers by survey method through personal interviews with the help of a set of pre-tested schedules and the secondary data were collected from the records maintained by the financial agencies of the study area. Simple percentages and averages were computed to arrive at the conclusions. The information pertaining to the costs of credit was divided into the following three heads.

Expenses incurred on personal visits made for obtaining credit: The travelling and incidental expenses incurred on the trips made to the bank and opportunity cost (at the rate of Rs. 150 per man-day of 8 hours spent in getting the loan sanctioned) were included in this head.

Expenses incurred on procuring various records for obtaining credit: The expenses incurred on obtaining nil encumbrance certificate, no dues certificate, animal health certificate, revenue records, photographs and other related records/ documents were included in it.

Charges paid to lending/credit agencies: In this head, loan processing fees, inspection charges and insurance charges paid by the farmers were included.

The actual or net credit availed by the farmers was worked out by using the following formula

$C = F - X$

Where,

C = Actual or net credit availed (in rupees)

F = Face value of the loan, i.e., amount of loan granted (in rupees)

X = Cost incurred in getting the loan sanctioned (in rupees)

Results and Discussion

As discussed above, in availing of agricultural credit from the financial institutions, borrowers had to incur expenses on various items. The cost items have been categorized and discussed under the following heads:

Expenses incurred on personal visits made by farmers for obtaining credit: The details of category-wise average expenses incurred on personal visits made for obtaining credit are given in Table I. The table reveals that the per farm average expenses incurred on personal visits made by farmers varied from Rs. 626 by marginal farmers to Rs. 1,532 by large farmers. It increased with the increase in the size of holdings because the borrowed amount of loan was positively associated with the size

Table I: Average expenses incurred by different categories of borrowers on personal visits made for obtaining credit

(In rupees)

Size groups Particulars	Marginal	Small	Semi-medium	Medium	Large	Overall
1	2	3	4	5	6	7
Number of trips made to the banks	3.98	4.95	5.02	6.06	7.14	5.16
Number of hours spent on each trip	6.18	8.58	9.14	8.48	4.24	7.96
Total hours spent on various trips	24.60	42.47	45.88	51.39	51.69	41.07
Incidental expenses on each trip	25.95	32.59	41.24	42.81	55.88	37.00
Travelling expenses on each trip	15.62	17.84	23.22	25.92	23.01	20.70
Total travelling expenses (A)	62 (9.91)	88 (8.42)	116 (9.80)	157 (11.39)	164 (10.71)	110 (10.12)
*Opportunity cost for total hours spent (B)	461 (73.64)	796 (76.17)	860 (72.70)	963 (69.83)	969 (63.25)	779 (71.66)
Total incidental expenses (c)	103 (16.45)	161 (15.41)	207 (17.50)	259 (18.78)	399 (26.04)	198 (18.22)
Total (A+B+C)	626 (100.00)	1045 (100.00)	1183 (100.00)	1379 (100.00)	1532 (100.00)	1087 (100.00)
Cost of credit per Rs. 100.00 of loan	2.14	1.79	1.10	0.77	0.58	1.02

Figure in parentheses are the percentages by the total

** Opportunity cost was worked out @ Rs. 150 per man-day of 8 hours for total time spent in getting the loan sanctioned*

of land holdings. The overall average cost was estimated at Rs. 1,087 of which, 71.66 percent was covered by opportunity cost which was highest among all the items such as incidental expenses (18.22%) and travelling expenses (10.12%).

The cost of credit incurred by marginal, small, semi-medium, medium and large borrowers per Rs. 100 of loan was 2.14 percent, 1.79 percent, 1.10 percent, 0.77 percent and 0.58 percent, respectively with an overall cost of Rs. 1.02. This indicates that the cost of getting loan worth Rs. 100 decreased with the increase in the size of land holdings.

Expenses incurred on getting various records required for obtaining credit: Table II reveals that the average expenses incurred on getting various records for obtaining credit by marginal farmers was Rs. 520 as against Rs. 859 by large farmers. It showed a rising trend with the rise in the size of holdings. The overall average cost was estimated at Rs. 637 of which, 28.73 percent was covered by nil encumbrance certificate charge, which was highest among all the charges and 5.65 percent by photograph expenses, which was lowest among all the expenses.

The expenses incurred on per Rs. 100 of loan by these farmers were Rs. 1.78, Re. 0.95, Re. 0.60, Re. 0.42 and Re. 0.32 in that order. This table also shows that all the charges were positively associated with the size of holding except animal health certificate charges. These decreased with increase in the size of holdings because the loan for purchase of livestock also decreased with the increase in the size of holdings.

Table II: Average expenses incurred by different categories of borrowers on getting various records required for obtaining credit

(In rupees)

Size groups Particulars	Marginal	Small	Semi-medium	Medium	Large	Overall
1	2	3	4	5	6	7
Nil encumbrance certificate charges	155 (29.81)	161 (28.96)	165 (25.50)	227 (30.07)	246 (28.64)	183 (28.73)
No dues certificate charges	45 (8.66)	51 (9.17)	73 (11.28)	81 (10.73)	89 (10.36)	64 (10.05)
Animal health certificate charges	97 (18.65)	102 (18.35)	107 (16.54)	118 (15.63)	129 (15.02)	108 (16.95)
Revenue records charges	136 (26.15)	140 (25.18)	196 (30.29)	208 (27.55)	236 (27.47)	174 (27.32)
Photograph expenses	31 (5.96)	35 (6.29)	36 (5.57)	42 (5.56)	44 (5.12)	36 (5.65)
Other expenses	56 (10.77)	67 (12.05)	70 (10.82)	79 (10.46)	115 (13.39)	72 (11.30)
Total	520 (100)	556 (100)	547 (100)	755 (100)	859 (100)	637 (100)
Cost of credit per Rs. 100.00 of loan	1.78	0.95	0.60	0.42	0.32	0.60

Figures in parentheses are the percentages by the total

Processing, Inspection and Insurance Charges Levied by Banks for Processing of Credit

Table III reveals that the per farm average processing, inspection and insurance charges received by the banks from the large farmers amounted to Rs. 1,354. It was about six times higher than the charges received from the marginal farmers (Rs. 227). On the basis of per Rs. 100 of loan, it was estimated at Re. 0.78, Re. 0.85, Re. 0.56, Re. 0.54 and Re. 0.51 for these farmers. These charges were negatively associated with

increase in the size of land holdings for all the categories expect marginal farmers. The overall processing charges were estimated at Rs. 631 with processing fees (39.62%) as the main constituent followed by insurance charges (38.19%) and inspection charges (22.19%). These charges were positively associated with increase in the size of holdings.

Total Costs of Credit

The average total cost of credit incurred by the farmers is presented in Table IV. The table shows that the average total cost of credit incurred by the farmers tended to increase with the size of holdings. It was highest (Rs. 3,745) incurred by large farmers and lowest (Rs. 1,373) by marginal farmers. The total cost of credit per Rs. 100 of loan received by the farmers varied from Rs. 4.70 by marginal farmers to Rs. 1.42 by large farmers. It is apparent from the table that the average percent share of expenses incurred on personal visits made by the farmers for obtaining credit, cost incurred on for getting various records for obtaining credit and charges received by the banks for sanctioning credit were 46.16 percent, 27.05 percent and 26.79 percent, respectively. The high amount of expenses on personal visits for obtaining credit was mainly due to high opportunity cost of work foregone by them for getting credit. The per farm total cost of credit increased with increase in the size of land holdings and for per Rs. 100 of loan it decreased with increase the size of land holdings (Fig. I).

The high amount of expenses on personal visits for obtaining credit was mainly due to high opportunity cost of work foregone by them for getting credit

Actual Credit Availed by the Farmers

Average actual credit availed by large farmers was highest (98.58 percent) as compared to others. It was also positively associated with increase in the size of land holdings.

Table III: Processing, inspection & insurance charges levied by the banks on different category of farmers for processing of credit

(In rupees)

Size groups	Processing fees	Inspection charges	Insurance charges	Total charges	Cost of credit per Rs. 100.00 of loan
1	2	3	4	5	6
Marginal	103 (45.37)	56 (24.67)	68 (29.96)	227 (100.00)	0.78
Small	218 (43.95)	101 (20.36)	177 (35.69)	496 (100.00)	0.85
Semi-medium	231 (38.18)	133 (21.98)	241 (39.84)	605 (100.00)	0.56
Medium	375 (38.90)	220 (22.82)	369 (38.28)	964 (100.00)	0.54
Large	479 (35.38)	297 (21.93)	578 (42.69)	1354 (100.00)	0.51
Overall	250 (39.62)	140 (22.19)	241 (38.19)	631 (100.00)	0.59

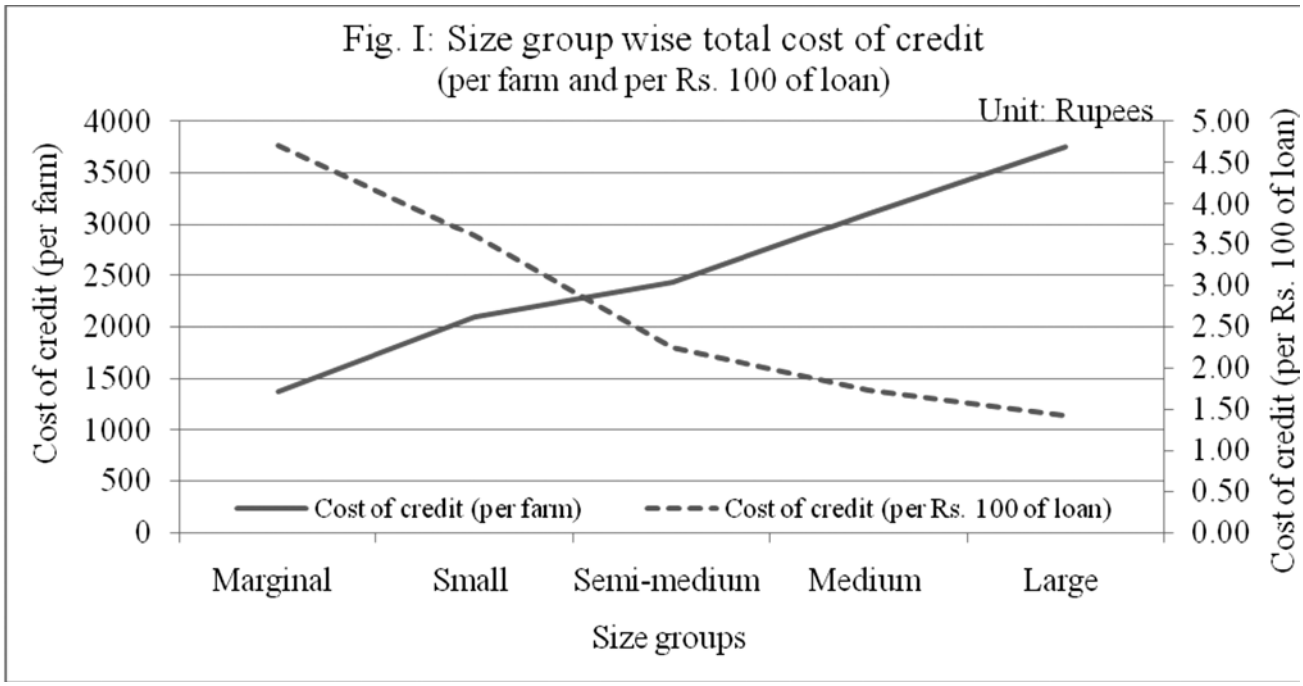
Figures in parentheses are the percentages by the total

Table IV: Total costs of credit borne by the different categories of farmer borrowers

(In rupees)

Size groups Particulars	Marginal	Small	Semi-medium	Medium	Large	Overall
1	2	3	4	5	6	7
Average expenses incurred on personal visits made by the farmer borrowers for obtaining credit	626 (45.60)	1045 (49.83)	1183 (48.58)	1379 (44.51)	1532 (40.91)	1087 (46.16)
Average expenses incurred on getting the various records required for obtaining credit	520 (37.87)	556 (26.52)	647 (26.57)	755 (24.37)	859 (22.94)	637 (27.05)
Processing, inspection & insurance charges levied by banks on different categories of farmer borrowers for processing of credit	227 (16.53)	496 (23.65)	605 (24.85)	964 (31.12)	1354 (36.15)	631 (26.79)
Total cost of credit	1373 (100.00)	2097 (100.00)	2435 (100.00)	3098 (100.00)	3745 (100.00)	2355 (100.00)
Total cost of credit per Rs. 100.00 of loan	4.70	3.60	2.25	1.73	1.42	2.22

Figures in parentheses are the percentages by the total



The average cost of credit incurred by marginal farmers was highest (4.70%) and lowest (1.42%) by large farmers (Table V). The amount of actual credit availed by the farmers was positively associated with the size of land holdings. The table also indicates that the farmer borrowers actually got only 97.78 percent of the total credit borrowed. In other words, it can be said that 2.22 percent of total credit was spent by the borrowers in advance for obtaining credit.

Conclusion

It may be concluded that the average cost incurred on personal visits by farmers for obtaining credit was estimated at Rs. 1,087. The opportunity cost was higher among the items such as travelling expenses and incidental expenses. On the basis of per Rs. 100 of loan, it came out to Rs 1.02. Similarly, the average cost incurred by them on getting various records for obtaining credit was Rs. 637. The expenses incurred on getting nil encumbrance certificate ranked first among all the other items of cost such as no dues certificate charges, animal health certificate charges, revenue records charges, photograph expenses, etc. Per Rs. 100 of loan it was Re. 0.60. The average processing cost received by the banks from the sample borrower was Rs. 631. The processing fee was higher among other items such as inspection charges and insurance charges. On the basis of per Rs. 100 of loan, it came out to Re. 0.59. The study results also revealed that the average total cost of credit incurred by the farmers was Rs 2,355. The overall actual credit availed by the farmer borrowers was Rs 1,03,903. The farmer borrowers got only 97.78 percent of total credit borrowed. 2.22 percent of total credit was spent by them in advance for obtaining credit.

Table V: Average actual credit availed by different categories of borrowers

(In rupees)

Size groups	Average face value of credit	Total cost of credit	Average actual credit availed
1	2	3	4 (= 2 –3)
Marginal	29231 (100.00)	1373 (4.70)	27858 (95.30)
Small	58287 (100.00)	2097 (3.60)	56190 (96.40)
Semi-medium	107968 (100.00)	2435 (2.26)	105535 (97.74)
Medium	178713 (100.00)	3098 (1.73)	175615 (98.27)
Large	263955 (100.00)	3745 (1.42)	260210 (98.58)
Overall	106259 (100.00)	2355 (2.22)	103903 (97.78)

Figures in parentheses are the percentages by the total

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Drip-Irrigation: A Potential Micro-Irrigation System for Sustainable Cold Arid Agriculture

By **P. Ishfaq Akbar, M.S. Kanwar, Kunzang Lamo and M. Saleem Mir***

Agriculture sector is considered as the backbone of Indian economy contributing directly and indirectly to the growth and development of our country. Since independence, our country has attained significant achievements standing self sufficient in food grain production. The achievement is because of the scientific technological interventions and the utilization of the available natural resources, which were in abundance. Hence, irrigation water availability, predominantly being the major contributing factor in this regard. With advancement in the agriculture sector, it now becomes imperative to utilize the available natural wealth of resources in a manageable way for sustaining agricultural production and productivity. Efficient utilization of water resources forms the basis of survival of the ever-increasing population of our country.

Ladakh region of India is a cold arid desert placed on high altitudes with scarce water resources, uneven availability of irrigation water, high evapo-transpirational losses, harsh dry winds, undulated terrain and totality of climatic conditions harsh and tough, hindering the agricultural advancement. The annual precipitation is between 100 to 150 mm, which is quite inadequate to meet the average moisture requirements of the crop plants. Thus, supplementary irrigation becomes essential to raise food crops. The only source of irrigation water available is the glaciers placed on high altitudes, which melt and flow during summer. This available natural resource needs scientific management strategy to ensure sustainable and economic crop production. For sustainable advancement of agriculture in Ladakh region, some specialized interventions for the utilization of resources in a manageable way need to be incorporated to attain long-term benefits.

Fig.1: A View of the Agriculture Fields in Ladakh

Irrigation

The term Irrigation implies the artificial application of water to land for the purpose of agricultural production and to meet the partial evapo-transpirational requirements. Effective irrigation will influence the entire growth process from seed germination, root growth, nutrient utilization, plant growth and re-growth, yield and quality. Irrigated agriculture plays a major role in the livelihood of nations all over the world. Although irrigation is among the oldest known agricultural techniques, improvements are still being made in irrigation methods and practices. In Ladakh, irrigation water is a costly and scarce input. Therefore, it is essential to optimize the use of water according to availability on sustainable basis and to allow minimum water losses by efficient water management techniques.

Irrigation Types

Various types of irrigation techniques differ in how the water obtained from the source is distributed. In general, the goal is to supply the crops uniformly with water, so that each plant has the amount of water it needs, neither too much nor too little. No single irrigation system is the solution for all kinds of crops grown. Each producer needs to examine a range of factors for each crop type including soil type, crop density and layout. Future planting or re-planting should also be considered.

Fig.2: Drip Irrigation in an Apricot Orchard

Fig.3: Drip Installed in an Apricot Plant

Micro Irrigation System

Micro-irrigation is an irrigation method that applies water slowly to the roots of plants, by depositing water either on the soil surface or directly to the root zone, through a network of valves, pipes, tubing and emitters. Micro irrigation system is panacea in irrigation related problems. In this irrigation system water is applied in the vicinity of the crop plants without losses. It reduces irrigation water losses occurring through evaporation, conveyance and distribution. Therefore, high water use efficiency can be achieved. The use of micro-irrigation technologies could become a potential source for food production in arid high altitude desert agro-ecosystem of Ladakh.

Micro-Irrigation System for Ladakh Region: The micro-irrigation systems may vary with the type of crop selected, climatic conditions prevailing in the area, topography and the amount of water available for irrigation. The potential micro-irrigation systems compatible with the geography and climatic conditions for cold arid region are being detailed as follows:

Need For Micro-Irrigation in Ladakh

- The non-availability of water during peak periods in the region calls for scientific water management to ensure sustainable availability.
- The meager water resources available for irrigation in the high altitude desert need proper utilization.
- Undulating terrain hinders the proper water available to the plants and even distribution in the crop fields.
- The poor water holding capacity of the soils in the region and the frequent irrigation requirements through flooding practices increases cost of production.
- The traditional agricultural practices are no longer remunerative and the commercialization needs advanced technologies.

Drip Irrigation

In Drip irrigation the water is applied near the root zone of the plants drop by drop. This system has been proved as the most water saving and easy micro-irrigation technology for efficient water utilization in areas of scarcity and constraints. System Drip irrigation (sometimes called trickle irrigation) works by applying water slowly, directly to the soil. The high efficiency of drip irrigation results from two primary factors. Firstly, water soaks into the soil before it can evaporate or run off and secondly, water is applied where it is needed.

Layout and Design of Drip System

Drip irrigation system is laid out as per the type of crop and recommended spacing. The value is opened and the water flows through pressure regulator into the filter. The main function of the filter is to arrest the dirt present in the irrigation water to prevent chocking of the emitters. Water after filtration moves through the drip tubing towards the emitters placed on the laterals. The emitters place the water in the root zones drop by drop. The laterals are laid out as per the crop spacing requirements, e.g., the vegetable field needs a spacing of 30 to 60 cms apart while the spacing in the fruit orchards comes in meters. The emitters in the laterals are fixed on the required distance. The drip irrigation can be run both on gravity by placing the

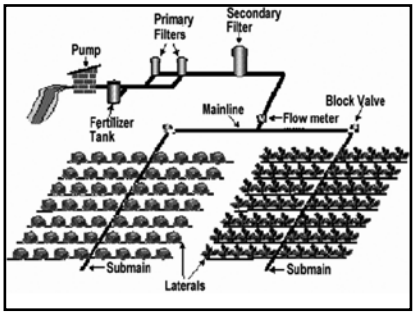

Fig.4: Layout Design and Functioning of a Drip System

storage tank above the ground level or it can be atomized with an electric motor. The water is applied at an appropriate time, preferably in the morning or evening hours for a fixed time as per the standardized requirements. One or two emitters per plant are enough to irrigate a normal plant, however depending on the size of the plants; they can be increased or decreased. Fruit trees and large perennials may need more number of emitters. Using two emitters allow for a backup if one clogs up (which happens now and then, even on the best designed and maintained drip systems.) However, more emitters also wet more soil area. This results in more roots and a healthier plant. If the plants are very close, you may need to use less than two emitters per plant in order to maintain minimum spacing between emitters.

loses and the minimum essential water requirement of the crop.

- Soil erosion of top fertile soil caused otherwise due to flooding is minimized, which in turn helps in efficient nutrient utilization and their management.
- The irrigation water is uniformly distributed in the root zones of the plants.
- Fertigation techniques can be applied for quick and economic fertilizer usage and sustainable availability of nutrients.
- The risk of disease prevalence and pathogen attack is minimized which otherwise frequently occur due to water logging and contact of foliage with the water.

Precautions

Drip irrigation systems require periodic maintenance throughout the growing season. These activities may require system operation at the initial stage to ensure that the system is ready when needed. In addition, drip irrigation systems may require periodic maintenance to prevent clogging and system failure. Typically, cleaning agents are injected weekly, but in some instances more frequent injections are needed.

Promotion of Drip Irrigation in Ladakh

In Ladakh, drip irrigation needs to be promoted through various scientific and extension approaches including research, demonstrations and implementing various awareness cum training programmes at

Fig.5: Drip Irrigation in an Tomato Crop

Fig.6: Drip Irrigation in an Cabbage

Advantages of Drip Irrigation

- Drip irrigation provides the advantage of minimizing the nutrient losses, which occur due to runoff and leaching, common in flood irrigation in the soils of Ladakh.
- High water use application efficiency is achieved.
- This system can be applied on the undulated and uneven fields without the requirement of leveling; more particularly in fruit crops. Most of the plantation of fruits in the region is on undulated land.
- The moisture content in the root zones is balanced leading to efficient and economic production and productivity. This creates a balance in evaporational
- It reduces input costs otherwise utilized in various cultural operations like weeding, watering and other practices.

Limitations in Drip Irrigation

- Initial cost of installation is very high. Marginal and small farmers are unable to afford it.
- It requires technical expertise and management. Farmers are illiterate and have least access to resources.
- The frequent clogging and choking of the pipes and emitters in certain cases becomes hectic to manage.
- It needs regular vigil for its proper functioning.

mass level. Since its inception in the year 2009, the Precision Farming Development Centre Leh Ledakh (SKUAST-K) has been working on the standardization practices of various micro-irrigation systems for potential crops and simultaneously promoting the evolved potential techniques among growers and progressive farmers through print media, trainings and demonstrations.

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Biodynamic Farming & Methods of Preparation

By **Sneha Chawla***

Biodynamic Farming is a view of agriculture based on a holistic and spiritual understanding of nature and humans role in it, which considers a farm as a self-contained evolving organism, relying on home-produced feeds and manures with external inputs kept to a minimum.

Preparation

The first group of preparation material includes different herbal substances, which are added in small amounts to manures and composts. They are collectively called compost preparations. These numbers are arbitrary, having been chosen by those who first produced the preparations. The second group includes the sprays; they are numbered 500 and 501. Although not considered one of the eight main preparations, a ninth preparation, sometimes referred to as 508, is made by boiling the horse tail plant and is applied only in excessively wet years to prevent fungal diseases.

BD 504 Himalayan Stinging Nettle (Urtica Parviflora)

Method of Preparation

- Fill the dried leaves into terracotta pipes or mud pots;
- Press well into the containers;
- Ensure that the lid is on;
- Place the pot under the influence of Mars.

  (Moisten dry leaves with juice of leaves before filling if found dry)

Time of Burial to Lifting

- Harvest leaves in May and September;
- Lift the preparation in September after a year,

BD 505 Himalayan Oak Bark (Quercus Glauca)

This is prepared by combining bark of the oak tree with the skull of an animal.

Method of Preparation

- Crush the oak bark;
- The skull of any domestic animal may be used;

- The link between the skull and bark is their calcium properties;
- Further, it is the Ca formation and the skull formation that takes place first in the case of the development of the embryo;
- Place the crushed oak bark in the brain cavity of the skull. Block the opening with a well shaped bone piece;
- Place the skull in a watery environment with weeds and plant muck which would have been damaged by the local diseases that affect the crop. This helps to build up the resistance of the plants and follows the principles of Homeopathy;
- It should be placed in a location where there is exchange of water such as rain drain/swamp;
- It should be noted that a foul smell is emitted on lifting the preparation and removing it from the skull;This gradually reduces with drying after removal in a dark dry place;
- Fungus may form; Turn over frequently to correct the same.

Time of Burial to Lifting: The preparation is placed in September and lifted in March.

BD 507 Valerian (Valeriana officinalis)

The juice of valerian flowers is used for this preparation.

Method of Preparation

- Place the clipped flowers into a mortar and pestle and grind into a paste;
- This paste is added to water in the ratio of 1:4 in a bottle;

- Ensure storage in a cool place;
- Use 1 gram each (502-506) for every 5 cubic metres of compost and 10 ml of 507 at 5 percent in 2-5 litres of water. These could also be added to liquid manures and cow pat pits.

BD 508 (Equisetum Arvense)

- It is very high in silica; it can be used as a tea to control fungus in the early season;
- It should be sprayed at full Moon (2-4 days before) and at Moon opposition Saturn, the same as BD 50.

Materials

- 1 kg Equisetum arvense (Horsetail herb) or Casuarina;
- 10 litres water.

Preparation Process

Make a strong tea/tincture by boiling the Equisetum arvense or Casuarinain hot water for 2 hrs. Let it sit for 2 days.

Application Process

Dilute the tincture with 50 grams tincture to 10 litres of water. Spray onto the soil or over the plants in the early growing stages. For mild fungus problems BD 508 is often sufficient, but for more severe problems BD 501 is more effective.

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SWOT Analysis of E-Agriculture Prospects in India

By **Pawan Shanker Sharma ***

E-Agriculture involves the conceptualization, design, development, evaluation and application of innovative ways to use Information and Communication Technologies (ICT) in the rural domain, with a primary focus on agriculture. Monsoon driven agriculture sector itself, is in loggerheads with its traditional styles and financial crunch. Proper dissemination of the technology can serve as a blessing in disguise to revive Indian agriculture sector.

It is a multi-faceted problem of ineffective knowledge exchange, management of information content, lack of human resources, institutional capacity and the diverse needs of different groups. Problems are many and solutions are few, but there is still a ray of hope in this collaboration.

History

E-Agriculture is one of the action lines identified in the declaration and plan of action of the World Summit on the Information Society (WSIS) through Geneva (2003) and Tunis conventions (2006).

India, like others, is facing a rising demand for food grains that may not be fully met by the supply side. The situation is becoming more alarming due to the alternative uses of food crops for bio-fuels. The rising oil prices led to exploring alternatives like bio-fuels that are being seen in many quarters as attractive substitutes for imported hydrocarbon fuels. India needs to shift to a higher pedestal of the Green Revolution.

Need of ICT in Agriculture

The occupational structure of India is dominated by the 'agricultural sector'. This shows that India is predominantly an agricultural economy and hence, it requires protection and development of its 'agricultural resources'. India is facing certain 'Agricultural Challenges' that must be resolved as soon as possible.

Information and Communication Technologies have the potential to make a fundamental difference to the lives of people all over the world. By creating access to information, enabling communication and facilitating transactions, technical solutions can help reach development objectives in various sectors. But there are a lot of gaps and loose links that can be seen in the existing system. Even after allocating funds, energy and focus, we have not been able to achieve the desired results. The per capita productivity and production is not at par with world standards.

Strength & Support for ICT Success in Agriculture

Government of India had come up with 'Suitable Policies' and 'Incentives' for farmers so that they may be motivated and encouraged to give their best. There is a 'Digital Divide' that is hindering the capacity and productivity of rural agricultural activities carried out by the marginalized farmers in India. The situation of marginalized farmers of rural India can be improved on the basis of governmental support towards capacity development initiatives:

- Unbiased Legal Framework;
- Simple and Farmer Friendly Governmental Regulatory Measures;
- Governance and Institutional Reforms through banks and various governmental bodies;
- Transparency in democratic dealing;
- Fixing of Accountability and strengthening of local body system of governance;
- Policy and Strategy Reforms in India.

ICT can play a significant role in maintaining the above mentioned properties of information as it consists of three main technologies – Computer Technology, Communication Technology and Information Management Technology. These technologies are

applied for processing, exchanging, and managing data, information and knowledge. The tools provided by ICT have the ability to:

- Record text, drawings, photographs, audio, video, process descriptions, and other information in digital formats;
- Produce exact duplicates of such information at significantly lower cost;
- Transfer information and knowledge rapidly over large distances through communications networks;
- Develop standardized algorithms to large quantities of information relatively rapidly;
- Achieve greater interactivity in communicating, evaluating, producing and sharing useful information and knowledge.

Opportunity with ICT Usage

Some of the benefits of ICT for the improvement and strengthening of agriculture sector in India are:

- Timely information on weather forecasts and calamities;
- Better and spontaneous agricultural practices;
- Better marketing exposure and pricing;
- Reduction of agricultural risks and enhanced incomes;
- Better awareness and information;
- Improved networking and communication;
- Facility of online trading and e-commerce.

We need creative and imaginative solutions that increase agricultural productivity, increase farm incomes, and increase food production etc.

Weakness to Idea of ICT Introduction in Agriculture Sector

The issues that stand as challenges are as follow:

- Insufficient agricultural infrastructure and support facilities, and lack of planning;
- Insufficient institutional will power and capacity to deliver farmers specific services;
- Lack of awareness regarding suitable agricultural methods among the farmers;
- Too much dependence on monsoon;
- Insufficient use of ICT for agricultural purposes, etc.;
- Lack of education and learning.

ICT can be used to improve the lives of the rural communities by leveraging agriculture outputs through technological interventions. ICTs play an important role in agricultural value chains, with different types of ICT having different strengths and weaknesses when applied to particular interventions. The impacts of ICT are diverse, and they influence market competitiveness in different ways. However, technology should not overshadow people and institutions involved. While the positive impacts of ICT are being catalogued and discussed, many rural farmers still do not have access to or the capacity to use ICT.

Threats Associated with Success of Agricultural Association with ICT

It is clear that the impact of ICT in Agriculture Value Chains is diverse, and influences market competitiveness in different ways. Given the importance of context and the rapid development technology, it can be difficult to determine whether the appropriate tool now will persist in being the appropriate tool for the future.

India is still facing the power problem. Illiteracy and ignorance are major hurdles in the path of growth.

The rapid growth of mobile phones in developing countries offers several advantages over other alternatives in terms of cost, geographic coverage and ease. However, the fruits of technology can be witnessed in urban areas only. Radios, TV and FM can be used across all segments of the population but they generally provide a limited range of information. Newspapers are primarily concentrated in urban areas, are expensive and are inaccessible to the illiterate. Access to other search mechanisms, such as fax machines, e-mail, and Internet, is similarly low, primarily due to their dependence upon landline infrastructure. And finally, personal travel to different villages and markets to obtain information not only requires transport costs, but also the opportunity costs of an individual's time. This can be substantial in the context of unpaved roads and vast distances.

All stakeholders of the agriculture industry need information and knowledge about the phases of value chain to manage them efficiently. Any system applied for getting information and knowledge for making decisions in any industry

should deliver accurate, complete, and concise information on time. The information provided by the system must be in user-friendly form, easy to access, cost-effective and well protected from unauthorized accesses.

Tribal farmers generally understand and communicate in local tribal dialects, making it extremely difficult for the visiting trainers to train them. Large number of dialects, very limited infrastructure, natural calamities, and security issues, all require location specific e-initiatives. Infrastructure, capacity building, and content creation are matters of primary concern.

Most tribal farmers are financially very backward and may not support the idea of user-payment to the advisory services. Many tribal farmers feel that while these e-agriculture initiatives are very useful for the villagers and need to be scaled-up, it should continue with the government support for a few more years.

Indian Perspective

Agricultural Strategy for Eleventh Plan, Planning Commission, Government of India, has pointed out that with the availability of land and water fixed, the goal of 4 percent growth in agriculture can be achieved only by increasing productivity per unit of scarce natural resources through effective use of improved technology. It is planned that alternate delivery channels spanning Rural Knowledge Centres (RKCs), ICT-based extension, farmer-to-farmer extension, NGOs and the private sector should also be promoted simultaneously. The scheme 'Mass Media Support to Extension' aims to utilise the impressive infrastructure of Doordarshan (DD) and All India Radio (AIR) for producing and broadcasting agricultural programmes for supporting other extension efforts. The National Agriculture Policy emphasizes upon the use of Information Technology (IT) for achieving more rapid development of agriculture in India. The Department of Agriculture and Cooperation, therefore, is in the process of preparing a National e-Governance Plan in Agriculture (NeGP-A) for a more focused implementation of e-governance activities in the agriculture sector. In order to promote e-governance in agriculture at the centre and provide support to States/UTs for the same, the Department of Agriculture and Cooperation is implementing a central sector scheme, 'Strengthening/Promoting Agricultural Information Systems' during the Tenth Plan with a budgetary provision of INR 100 crores.

The scheme has the following components: Development of agricultural informatics and communication; Strengthening of IT apparatus in agriculture and cooperation in states and UTs (AGRISNET); IT apparatus at Department headquarters and its field offices; Agricultural Resources Information Systems (AgRIS); and, Kisan Call Centres. The Department of Agriculture and Cooperation is supporting e-governance activities at the state agriculture and allied departments through AGRISNET, a state sector mission mode project, that aims at providing improved services to the farming community using Information and Communication Technology. Agricultural Resources Information System (AgRIS) project has been launched for implementation in two pilot districts of Rohtak (Dairy Typology) in Haryana and Banaskantha (Arid Typology) in Gujarat. The Kisan Call Centres initiative aims to provide information to the farming community through toll-free telephone lines. FASAL is a countrywide project funded by the Ministry of Agriculture and Cooperation and executed by DOS along with various State Remote Sensing Applications Centres, State Departments of Agriculture and Agricultural Universities. Crop production forecasting of major crops in the country namely wheat, rice, cotton, sugarcane, mustard, groundnut and sorghum was done for 2007-08. Radarsat ScanSAR multi-date data for rice acreage estimation and meteorological data based model for yield forecasting was used to give two forecasts for the 2008 kharif season. Crop acreage estimation and production forecast at the district level using LISS-III data has been completed for sugarcane in UP, cotton in Gujarat, ajasthan, MP, Punjab, Haryana, and mustard in MP.

Conclusion

One of the mechanisms is sharing information via agricultural extension, which has long been plagued with problems related to scale, sustainability, relevance and responsiveness. Pilot programs need to be assessed using rigorous impact evaluations, which not only assess the causal impact, but also its mechanisms that shall determine whether such approaches complement or substitute traditional extension. The need is to identify the types of information which are best suited for these programs and calculate the demand for such services.

Challenges are many but the need of the hour is to formulate a customized approach while keeping vested interest at bay. Importance of Organic Farming, Food Safety, Food Security, Water Management, Resource Management, Weather Forecasting and Education should be extended.

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Agriculture in India: Issues and Challenges

By Ramaiah Bheenaveni *

"Agriculture is the backbone of the Indian Economy" – said Mahatma Gandhi decades ago. Even today, the situation is still the same, with almost the entire economy being sustained by agriculture, which is the mainstay of the villages. Not only the economy, but also every one of us looks up to agriculture for our sustenance.

Significance of Agriculture

Although agriculture contributes only 21 percent of India's GDP, its importance in the country's economic, social and political fabric goes well beyond this indicator. The rural areas are still home to some 72 percent of the India's 1.1 billion people, a large number of whom are poor. Most of the rural poor depend on rain-fed agriculture and fragile forests for their livelihoods.

The sharp rise in food grain production during India's Green Revolution of the 1970s enabled the country to achieve self-sufficiency in food grains. Agricultural intensification in the 1970s to 1980s saw an increased demand for rural labour that raised rural wages and, together with declining food prices, reduced rural poverty.

Sustained, although much slower, agricultural growth in the 1990s reduced rural poverty to 26.3 percent by 1999/2000. Since then, however, the slowdown in agricultural growth has become a major cause of concern. India's rice yields are one-third of China's and about half of those in Vietnam and Indonesia. With the exception of sugarcane, potato and tea, the same is true for most other agricultural commodities.

The Government of India places high priority on reducing poverty by raising agricultural productivity. However, bold action from policymakers will be required to shift away from the existing subsidy-based regime that is no longer sustainable, to build a solid foundation for a highly productive, internationally competitive and diversified agricultural sector.

Issues and Challenges

The need of the hour is not application of technology, but the adoption of appropriate technology, which would suit the particular level of the global community. In India, the farming practices are too haphazard and non-scientific, and hence, need some forethought before implementing any new technology.

Applications of agricultural inputs at uniform rates across the field without due regard to in-field variations in soil fertility and crop conditions does not yield desirable results in terms of crop yield. The management of in-field variability in soil fertility and crop conditions for improving the crop production and minimizing the environmental impact is the crux of precision farming.

Thus, the information on spatial variability in soil fertility status and crop conditions is a pre-requisite for adoption of precision farming. Space technology including global positioning system (GPS) and GIS holds good promise in deriving information on soil attributes and crop yield. It allows seasonal monitoring of variable soil and crop characteristics, namely soil moisture, crop-phenology, growth, evapotranspiration, nutrient deficiency, crop disease, weed and insect infestation, which, in turn, help in optimizing inputs and maximizing crop yield and income. Though widely adopted in developed countries, the adoption of precision farming in India is yet to take a firm hold primarily due to its unique pattern of land holdings, poor infrastructure, lack of farmers' inclination to take risk, socio-economic and demographic conditions.

Factors Contribution to Decline of Agriculture

Some of the factors hampering the revival of growth are as follow:

- **Poor composition of public expenditures:** Public spending on agricultural subsidies is crowding out productivity-enhancing investments such as agricultural research and extension, investments in rural infrastructure, health and education of the rural people. In 1999/2000, agricultural subsidies amounted to 3 percent of GDP and were over 7 times the public investments in the sector.
- **Over-regulation of domestic agricultural trade:** While economic and trade reforms in the 1990s helped to improve the incentive framework, over-regulation of domestic trade has increased costs, price risks and uncertainty, undermining the sector's competitiveness.
- **Government interventions in labour, land, and credit markets:** More rapid growth of the rural non-farm sector is constrained by government interventions in factor markets – labour, land and credit – and in output markets, such as the small-scale reservation of enterprises.
- Inadequate infrastructure and services in rural areas.

Weak Framework for Sustainable Water Management and Irrigation:

- **Inequitable allocation of water:** Many states lack the incentives, policy, regulatory, and institutional framework for the efficient, sustainable, and equitable allocation of water.
- **Deteriorating irrigation infrastructure:** Public spending in irrigation is spread over many uncompleted projects. In addition, existing infrastructure has rapidly deteriorated as operations and maintenance is given lower priority.

Inadequate Access to Land and Finance:

Stringent land regulations discourage rural investments: While land distribution has become less skewed,

land policy and regulations to increase security of tenure (including restrictions or bans on renting land or converting it to other uses) have had the unintended effect of reducing access by the landless and discouraging rural investments.

Computerization of land records has brought to light institutional weaknesses: State government initiatives to computerize land records have reduced transaction costs and increased transparency, but also brought to light institutional weaknesses.

Rural poor have little access to credit: While India has a wide network of rural finance institutions, many of the rural poor remain excluded, due to inefficiencies in the formal finance institutions, the weak regulatory framework, high transaction costs, and risks associated with lending to agriculture.

Weak Natural Resources Management: One quarter of India's population depends on forests for their livelihoods.

A purely conservation approach to forests is ineffective: Experience in India shows that a purely conservation approach to natural resources management does not work effectively and does little to reduce poverty.

Weak resource rights for forest communities: The forest sector is also faced with weak resource rights and economic incentives for communities, an inefficient legal framework, participatory management, and poor access to markets.

Low bureaucratic accountability and inefficient use of public funds: Despite large expenditures in rural development, a highly centralized bureaucracy with low accountability and inefficient use of public funds limit their impact on poverty. In 1992, India amended its Constitution to create three tiers of democratically elected rural local governments bringing governance down to the villages. However, the transfer of authority, funds, and functionaries to these local bodies is progressing slowly, in part due to political vested interests. The poor are not empowered to contribute to shaping public programs or to hold local governments accountable.

Measures

1. Enhancing agricultural productivity, competitiveness and rural growth

Enhancing productivity: Creating a more productive, internationally competitive and diversified agricultural sector would require a shift in public expenditures away from subsidies towards productivity enhancing investments. Secondly, it will require removing the restrictions on domestic private trade to improve the investment climate and meet expanding market opportunities. Thirdly, the agricultural research and extension systems need to be strengthened to improve access to productivity enhancing technologies. The diverse conditions across India suggest the importance of regionally differentiated strategies, with a strong focus on the lagging states.

Improving Water Resource and Irrigation/Drainage Management: Increase in multi-sectoral competition for water highlights the need to formulate water policies and unbundle water

resources management from irrigation service delivery. Other key priorities include: (i) modernizing Irrigation and drainage departments to integrate the participation of farmers and other agencies in irrigation management; (ii) improving cost recovery; (iii) rationalizing public expenditures, with priority to completing schemes with the highest returns; and (iv) allocating sufficient resources for operations and maintenance for the sustainability of investments.

Strengthening rural non-farm sector growth: Rising incomes are fuelling demand for higher-value fresh and processed agricultural products in domestic markets and globally, which open new opportunities for agricultural diversification to higher value products (e.g. horticulture, livestock), agro-processing and related services. The government needs to shift its role from direct intervention and overregulation to creating the enabling environment for private sector participation and competition for agribusiness and more broadly, the rural non-farm sector growth. Improving the rural investment climate includes removing trade controls, rationalizing labour regulations and the tax regime (i.e. adoption of the value added tax system), and improving access to credit and key infrastructure (e.g. roads, electricity, ports, markets).

2. Improving access to assets and sustainable natural resource use

Balancing poverty reduction and conservation priorities: Finding win-win combinations for conservation and poverty reduction will be critical to sustainable natural resource management. This will involve addressing legal, policy and institutional constraints to devolving resource rights, and transferring responsibilities to local communities.

Improving access to land: States can build on the growing consensus to reform land policy, particularly land tenancy policy and land administration system. States that do not have tenancy restrictions can provide useful lessons in this regard. Over the longer term, a more holistic approach to land administration policies, regulations and institutions is necessary to ensure tenure security, reduce costs, ensure fairness and sustainability of the system.

Improving access to rural finance: It would require improving the performance of regional rural banks and rural credit cooperatives by enhancing regulatory oversight, removing government control and ownership, strengthening the legal framework for loan recovery and the use of land as collateral. It would also involve creating an enabling environment for the development of micro-finance institutions in rural areas.

3. Strengthening institutions for the poor and promoting rural livelihood

Promoting Community-Based Rural Development: State Government efforts in scaling up livelihood and community-driven development approaches will be critical to build social capital in the poorest areas as well as to expand savings mobilization, promote productive investments, income generating opportunities and sustainable natural resource management. Direct support to self-help groups, village committees, user's associations, savings groups, loans groups and others can provide the initial 'push' to move organizations to a higher level and access new economic opportunities. Moreover, social mobilization and particularly the empowerment of women's groups, through increased capacity for collective action will provide communities with greater "voice" and bargaining power in dealing with the private sector, markets and financial services.

It would require improving the performance of regional rural banks and rural credit cooperatives by enhancing regulatory oversight, removing government control and ownership, strengthening the legal framework for loan recovery and the use of land as collateral

Conclusion

As decentralization efforts are pursued and local governments are given more prominence in the basic service delivery, the establishment of accountability mechanisms becomes critical. Local governments' capacity to identify local priorities through participatory budgeting and planning needs to be strengthened. This, in turn, would improve the rural investment climate, facilitating the involvement of the private sector, creating employment opportunities and linkages between farm and non-farm sectors.

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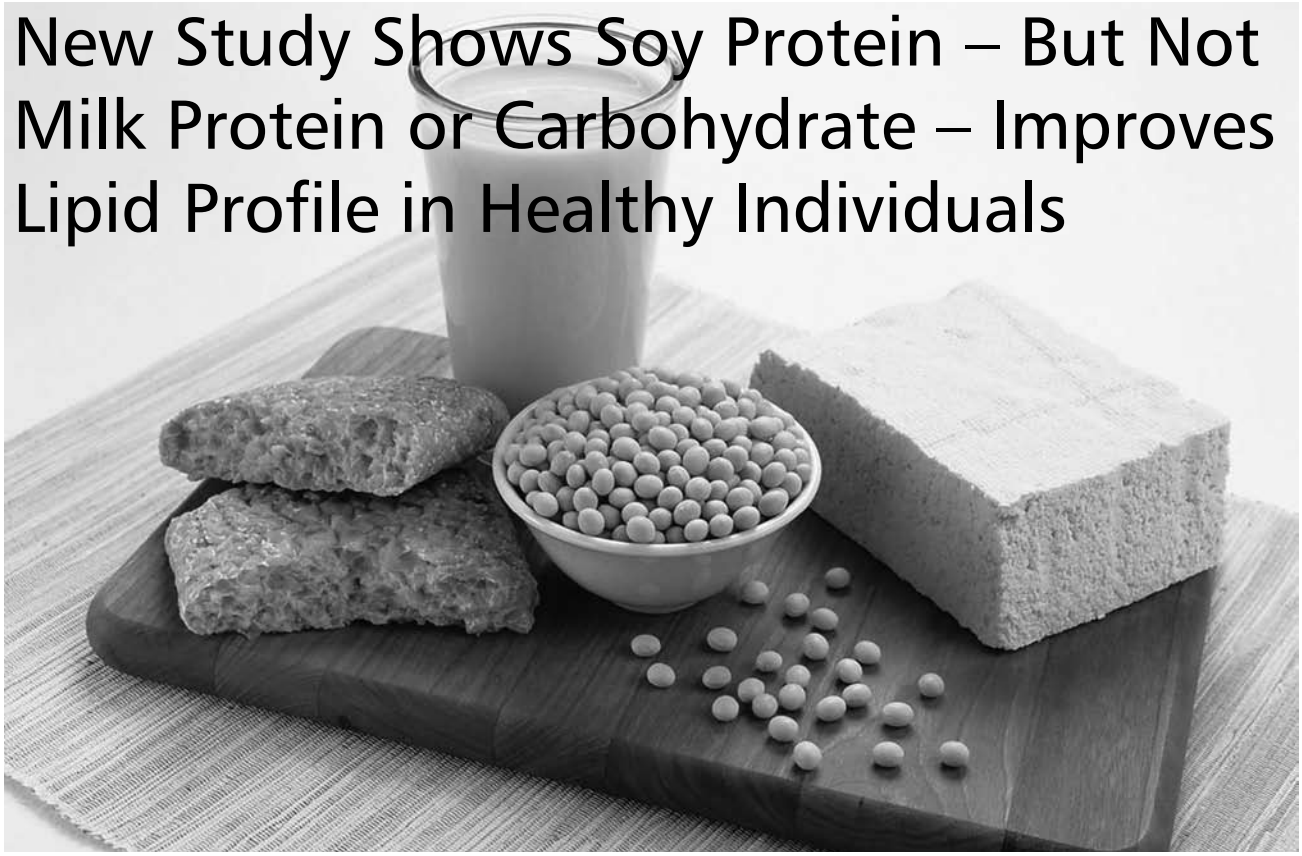
New Study Shows Soy Protein – But Not Milk Protein or Carbohydrate – Improves Lipid Profile in Healthy Individuals



Study Published in the European Journal of Clinical Nutrition

By **Lysa Wang** *

Mumbai, Oct. 21, 2011 – A new study published online in the European Journal of Clinical Nutrition shows that soy protein compared to dairy milk protein supplementation improves the lipid profile in healthy individuals. This study investigated the effect of soy and milk protein supplementation on lipids compared with carbohydrate among healthy adults. Numerous research studies have demonstrated that soy protein reduces LDL ('the bad') cholesterol and increases HDL ('the good') cholesterol, supporting the soy protein heart health and cholesterol-lowering claim that is approved in 12 countries around the globe.

"Coronary heart disease (CHD) is a major health epidemic, as the No. 1 killer of women and men globally. Research has shown that lowering blood lipids reduces the risk of coronary heart disease and stroke. The results of this study reveal that soy protein supplementation intake can help lower blood lipids, thus helping to reduce the risk of CHD in healthy individuals." said Elaine Krul, Ph.D., nutrition discovery lead at Solae

In this study, total cholesterol reduction as well as the total/HDL cholesterol ratio reduction was statistically significant with soy protein supplementation compared with carbohydrate. Compared with milk protein, soy protein supplementation significantly increased HDL and significantly reduced total/HDL cholesterol ratio as well as lowered LDL cholesterol.

The National Cholesterol Education Program emphasizes the importance of therapeutic lifestyle changes for primary prevention of high cholesterol. This includes dietary modification, body weight reduction and increased physical activity. There is increasing evidence that consumption of soy protein in place of animal protein lowers blood cholesterol levels and may provide other cardiovascular benefits. The results of this study are intriguing in that these risk reduction benefits were observed in healthy (non-hypercholesterolemic) individuals.

"It's the simple lifestyle changes, such as including soy protein in your diet that can often have a positive impact on your health. Research continues to demonstrate that soy protein can help lower LDL cholesterol, an important biomarker for coronary heart disease." said Krul.

This study was a randomized, controlled trial that included 352 U.S. healthy adults. It was conducted from September 2003 to April 2008. Participants in the study were assigned to 40 g/day supplementation of soy protein, milk protein or complex carbohydrate for 8 weeks in random order. Solae provided the supplements used in this study.

Given below is the detailed report on the effect of soy and milk protein supplementation on serum lipid levels by M.R. Wofford, C.M. Rebholz, K. Reynolds, J. Chen, C-S Chen, L. Myers, J Xu, D.W. Jones, P.K. Whelton and J. He.

Background/Objective: Previous clinical trials have documented that soy protein reduces low-density lipoprotein cholesterol and increases high-density lipoprotein (HDL) cholesterol compared with milk protein. However, the effect of soy protein on lipids compared with carbohydrate has not been not well studied. An examination of the effect of soy and milk protein supplementation on lipids and lipoproteins compared with carbohydrate among adults without hypercholesterolemia was conducted.

Subjects/Methods: A randomized, double-blind, 3-phase crossover trial among 352 US adults with serum total cholesterol level of <240 mg/dl was conducted from September 2003 to April 2008. Trial participants were assigned to 40 g/day supplementation of soy protein, milk protein or complex carbohydrate from wheat each for 8 weeks in random order with a 3-week washout period between interventions. Overnight fasting blood samples were collected at the termination of each intervention phase.

Results: Compared with carbohydrate, soy protein supplementation was significantly associated with a net change (95% confidence interval (CI)) in total cholesterol and total/HDL cholesterol ratio of −3.97 mg/dl (−7.63 to −0.31, P=0.03) and −0.12 (−0.23 to −0.01, P=0.03), respectively. Compared with milk protein, soy protein supplementation was significantly associated with a net change (95% CI) in HDL and total/HDL cholesterol ratio of 1.54 mg/dl (0.63 to 2.44, P=0.0009) and −0.14 (−0.22 to −0.05, P=0.001), respectively. Compared with carbohydrate, milk protein supplementation was significantly associated with a net change (95% CI) in HDL of −1.13 mg/dl (−2.05 to −0.22, P=0.02).

Conclusion

This randomized controlled trial indicates that soy protein, but not milk protein, supplementation improves the lipid profile among healthy individuals.

Solae, LLC is a world leader in developing soy-based ingredients for nutritious, great-tasting products. Solae provides solutions that deliver a unique combination of functional, nutritional, economical and sustainable benefits to our customers. Headquartered in St. Louis, Missouri, USA, the company was formed through a joint venture between DuPont (NYSE: DD) and Bunge (NYSE: BG) in 2003. Solae is a recipient of 2011 Ethisphere's Ethics Inside Certification and was recognized as one of 100 'World's Most Ethical Companies' in 2011.

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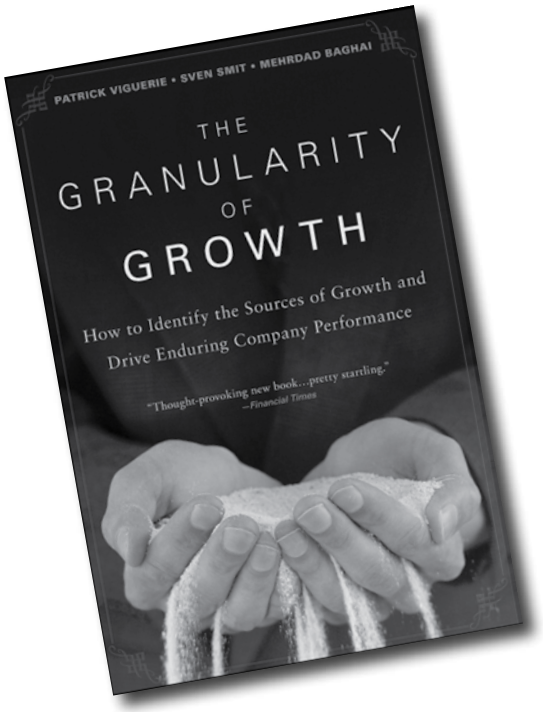
Granularity by Patrick Viguerie

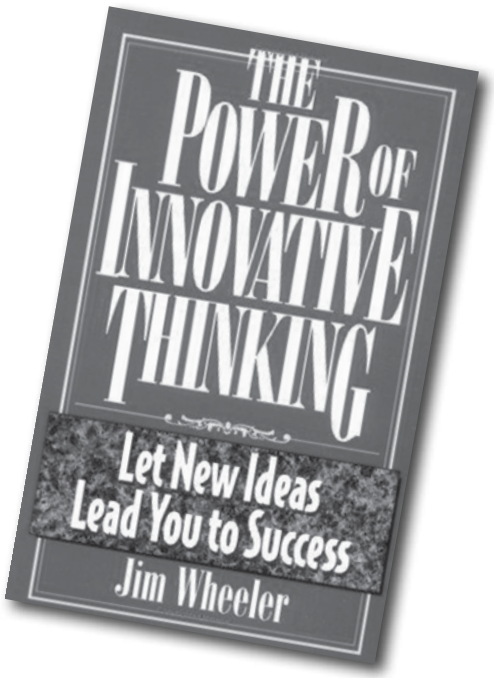


While growth is a top priority for companies of all sizes, it can be extremely difficult to create and maintain—especially in today's competitive business environment. The Granularity of Growth will put you in a better position to succeed, as it reveals why growth is so important, what enables certain companies to grow so spectacularly, and how to ensure that growth comes from multiple sources as you take both a broad and a granular view of your markets.

The Power of Innovative Thinking by Jim Wheeler

By taking the time to think about the way you think, you can actually become a better, or at least a more effective thinker. That is the main premise of Jim Wheeler's brief book, which despite being somewhat simplistic, still manages to convey some valuable insights into thinking patterns. Readers who are new to the study of mental processes will be well pleased with Wheeler's work, which is written in a non-intimidating, conversational tone. He takes a methodical approach in examining human thought and offers clear suggestions as to how to change your thinking habits to encourage positive results.

- How to understand the mental filters that dictate the way you think
- How adaptive and innovative thinkers contrast and complement one another
- How to develop power thinking skills



AGRI NEWS

It's On: MFN Status for India by December Next Year

New Delhi: Taking the first step towards granting the most favoured nation (MFN) status to India, Pakistan has agreed to allow import of all items, barring a few hundred on the negative list that will be ready by February 2012. This list, too, will be phased out by the end of the year, resulting in grant of MFN status.

"MFN status is part of the normalisation process that is to happen gradually," Pakistan commerce secretary Zafar Mahmood said. "It is not a degree or award that I will award to Dr Khullar," Mahmood said, referring to his Indian counterpart Rahul Khullar who got the MFN ball rolling in April this year.

Grant of MFN status would require Pakistan to put India on a par with other countries and allow import of all items, instead of just 1,933 items currently in the positive list. India had given MFN status to Pakistan in 1996.

Mahmood said that the negative list would have a few hundred items. This means that India will be allowed to export more than 7,000 items next year instead of less than 2,000 items at present. "We have put in new timelines for everything and would move according to it," Khullar said.

Both sides have also agreed to move towards, enhancing the preferential trading arrangements under the SAFTA process by extending tariff concessions on products of commercial interest.

Pakistan's Commerce Secretary Zafar Mahmood (R) speaks as his Indian Counterpart Rahul Khullar looks on during the 6th round of talks on Commercial and Economic Cooperation between Commerce Secretaries of India and Pakistan, in New Delhi on November 14, 2011

Both India and Pakistan are signatories of SAFTA, but have not given significant concessions to each other under it.

Govt Agrees on Sugar Output, May Allow Exports Soon

New Delhi: India could produce 24.7 million to 25.0 million tonnes of sugar in the new season, minister of state for agriculture K.V. Thomas said in November, a figure agreed with the agriculture ministry which had previously forecast 26 million tonnes.

The agreement between the farm and food ministries over the 2011-12 output paves the way for the first tranche of sugar exports in the new season.

The latest forecast is above an annual demand of 22 to 23 million tonnes and is slightly above Thomas' estimate in September of 24.6 million tonnes. Two top producer bodies believe the 2011-12 output could be as high as 26

million tonnes, leaving 4 million tonnes of exportable surplus.

India, the world's biggest consumer and second-biggest producer of the sweetener after Brazil, allowed 1.5 million tonnes of exports under open general licence (OGL) in three tranches in the year to 30 September, 2011. Sugar prices in Kolhapur, a key market in the top producing state, western Maharashtra, have gone up by 3 percent to Rs. 2,734 ($56.25) per 100 kgs. On 1 September sugar stocks were at 8.83 million tonnes against 6.4 million tonnes in the previous year and equivalent to some four months of domestic demand.

"The government may allow sugar exports on a monthly basis," Pawar said on 19 October.

Traders said global sugar prices may fall further with the arrival of the new season sugar in India and Thailand, the world's second-biggest sugar exporter.

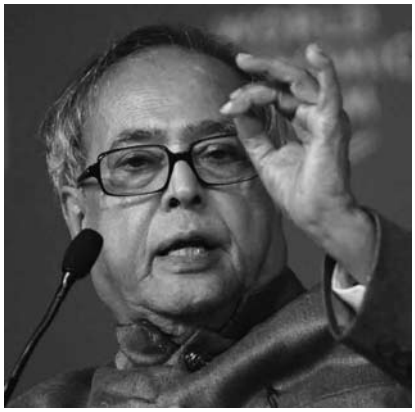
Currently, a sugar trader can hold stocks up to 500 tonnes until 30 November.

AGRI NEWS

Distribution Problems Causing Agriculture Inflation, Says Pranab

New Delhi: Finance minister Pranab Mukherjee recently blamed the supply side constraints in agriculture products for the rising inflation in the country. India's inflation has topped nine percent for nearly a year, prompting its central bank, the Reserve Bank of India to recently lift its policy-lending rate for the 13th time since March 2010.

Mukherjee said that the inflationary pressures in India are being driven by supply-side factors, but added that he expected inflation to moderate from December 2012.



"The current inflationary pressures are mainly from the supply side constraints of the agricultural products. Therefore, we shall have to improve the supply side constraints, necessary steps have already been taken. I hope it will have its impact and from November-December onwards, the rate of inflation will be moderated," Mukherjee told media persons.

India Places Focus on 'Mechanization of Agriculture'

The Indian government's focus in the 12th Plan will be 'mechanization of agriculture' to match the growing need for higher production of food grain and to tackle labour shortages in the farm sector. The government is targeting around 6 percent annual growth in food grain yields.

"To keep pace with the present population growth and consumption pattern, an average 6-7 percent annual growth in food grain production can be targeted. But with the labour shortage especially during sowing and harvesting, this can be achieved only by farm mechanization," an official said.

The government has been trying to push for mechanization since 2005, but so far the initiative has been on a small scale. "With a view to enhance the pace of agricultural mechanization, the government has stressed on providing financial assistance to farmers and other target groups for purchase of different kinds of farm equipment, demonstration of new equipment for spread of new technology, human resource development in operation," the official said.

This would get a renewed thrust in the 12th Plan, he said, adding that with successful implementation of MG-NREGA and other anti-poverty programs there is "now pressure on availability of farm labour."

India's agriculture minister, Sharad Pawar, has made a pitch for innovatively utilizing MG-NREGA to augment activities that add to farm productivity. During the recently held Economic Editors' conference, Pawar had said that whenever he goes to states and discusses issues with chief ministers, a general complaint is about "non-availability of labour, particularly, at the time of sowing and harvesting."

Agricultural mechanization is being stressed upon to achieve sustainable increase in yields and cropping intensity so that planned growth rates in agricultural production are achieved and maintained.

The Farm Machinery Training & Testing Institutes at Budni (MP), Hissar (Haryana), Garladinne (Andhra) and Bishwanath Chariali (Assam) established by the government have been playing an important role so far.

India's food-grain production in the 2011-12 crop year would surpass the previous year's record of 241.56 million tons and four percent targeted growth in the farm sector is likely to be achieved. "But the challenges remain. Millions of additional jobs need to be created every year in the rural areas. Therefore, in the coming years, agricultural engineering has to play a major role in increasing the production and productivity, minimizing losses at production and post-production levels, creating avenues for value-adding to the agricultural produce at catchment levels," an official said.

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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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