

PROCEEDINGS

31st IAUA VCs ANNUAL CONVENTION ON



“ROLE OF SAUs IN USHERING SECOND GREEN REVOLUTION”

DECEMBER 9-10, 2006



**C. S. Azad University of Agriculture & Technology,
Kanpur - 208 002 (UP), INDIA**



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FOREWORD

Agriculture is one of the most crucial sectors in the Indian economy and along with its allied activities, it contributes around 27 per cent of the Gross Domestic Product (GDP) and it provides around 65 per cent employment of the total work force. The growth of agriculture sector has also a direct impact on poverty eradication. In order to achieve these targets, the agriculture development strategy is essentially on the food security, doubling the food production and making hunger free India in 10 years for which an Action Plan has been drawn.

Indian economy on the eve of the 11th Plan is in a much stronger position than it was a few years ago. An important source of strength is that the economy has matured in several important respects responding to the economic reforms implemented over the past two decades. In contrast, there are some of the important challenges to be faced. One of the major challenges of the Plan must be to reverse the deceleration in agricultural growth from 3.2% observed between 1980 and 1996-97 to a trend average of only 1.5%. This deceleration is undoubtedly at the root of the problem of rural distress that has surfaced in many parts of the country. What is more, the problem is also not a purely distributional one, arising out of the special problems of small and marginal farmers and landless labour. In fact, the deceleration is general affecting all farm size classes. To reverse this trend, corrective policies adopted must focus not only on the small and marginal farmers, who continue to deserve special attention, but also on middle and large farmers who too suffer from productivity stagnation arising from a variety of constraints. The transition towards faster and more inclusive growth calls for significant new initiatives in many sectors. In some, we need to build on policies that are working well but need further strengthening in critical areas to build the additional momentum needed. In others, we need a more comprehensive restructuring since it is evident that business as usual, will not do.

A second green revolution is thus urgently needed to raise the growth rate of agricultural GDP to around 4%. This is a difficult task since actual growth of agricultural GDP, including forestry and fishing, was only 1% per annum in the first four

years of the 10th Plan and even the most rosy projection for 2006-07 would limit this below 2% for the full five year period. In the longer run, growth in agricultural productivity can be sustained only through continuous technological progress. This calls for a well considered strategy for prioritized basic research which is now all the more urgent in view of mounting pressure on scarce natural resources, climate change and also the shrinking availability of spill-overs from international public research. The 11th Plan will have to focus the National Agricultural Research System (NARS) to strengthen its basic research component through properly anticipated identification of strategic research pathways. This must go hand in hand with clearer demarcation of responsibilities within NARS between such basic research, which may not contribute immediately to growth, and the more immediate requirement to adapt and disseminate existing technology and provide region-specific, problem solving capacity. New generation technologies based on rapidly evolving scientific developments will play a pivotal role in achieving new levels of productivity in agriculture. The country's large agricultural research system, which successfully launched the green revolution in the past will now be called upon to address newer and more formidable challenges. In this endeavour, business as usual, has no place whatsoever.

The best way to ensure that income growth in the 11th Plan is broad-based and extends to rural areas is to achieve a doubling of the growth rate in agriculture from less than 2% achieved in the 10th Plan to around 4% in the 11th Plan period. This requires action on several fronts by both the Centre and the States.

- The rate of public investment in sectors such as irrigation, watershed development in rainfed areas, rural road connectivity and rural electrification have to be increased. Effective prioritisation is also important so that available resources are not spread too thinly, as happens with irrigation projects in many states. A major challenge is how to ensure convergence of the substantial central resources which flow from different channels with available resources from the

states, to maximize effectiveness on the ground.

- The National Farmers' Commission (NFC) has identified the knowledge deficit in agriculture as an important reason why productivity is much lower than what is achievable even with existing technology. This problem needs to be tackled by revitalizing the agricultural extension system, which has collapsed in most states. Part of the problem is that the expenditure on extension is non-plan expenditure and this has been squeezed in most states. The extension effort should be linked with the KVKs in each district so that farmers can access relevant advice suited to their specific circumstances.
- It is necessary to shift from a focus on productivity of individual crops to a focus on productivity enhancement of the farm incomes, recognizing that the farm is multi-product system. Viable packages have to be evolved for individual agro-climatic zones, putting together knowledge of what is likely to work the best in each zone and tackling critical constraints, which are different from zone to zone.
- Modern marketing and the involvement of corporate entities buying directly from farmers or retail domestic marketing, agro-processing and exports will have to be encouraged if agricultural diversification is to take place.
- Several problems facing agriculture today are the direct result of distortions introduced by policy. The policy of providing free or highly subsidised power to agriculture for example, encourages excessive drawl of water contributing to a fall in the water table. Similarly, the present system of fertiliser subsidy is not well balanced across different types of fertilisers and leads to an excessive application of nitrogenous fertilizer, which actually reduces productivity over the longer-term. These are politically sensitive issues but ignoring them will only make the problem worse. There is a need to revisit these policies to reduce the distortions. This should be done with a clear understanding that the resources released in the process

should be ploughed back into agriculture in a more productive manner.

- Inadequate access to credit is a major problem affecting most farmers often pushing them into the hands of money lenders who charge exorbitant rates. The cooperative credit system needs to be revitalized. The Central Government has indicated its willingness to provide resources to recapitalise the system provided state governments agree to a framework in which the credit co-operatives are effectively depoliticised. These changes must be introduced urgently.
- Over the longer term, agricultural research must be revitalized to ensure full exploitation of scientific advances which make it possible to improve productivity in our agro-climatic conditions.

I take this opportunity in thanking IAUA for choosing the University for this important Convention and for providing financial assistance. I express my sincere thanks to Dr. Ashok Bajpai, Agriculture Minister, UP Government for kindly consenting to be the chief guest; Dr. R.B. Singh, Ex-Member, NCF for accepting our request to be the Guest of Honour; Dr. Chandrika Prasad, D.G. UPCAR, Lucknow for accepting our request to be the special Invited Guest; for the inaugural function and Dr. M. P. Yadav, President IAUA and Vice Chancellor, SVBPUA & T, Meerut for being the president of the function. I also thank to all the Honourable Vice-Chancellors, Deans & Directors of all the SAUs and executive staff of IAUA and other participants for their overwhelming response to make this Convention a grand success. I also place on record my sincere thanks to the ICAR personnel for providing all sort of encouragement in attaining the desired objectives. I am sure, that the recommendations will be useful for policy makers engaged in shaping the next plan for achieving the desired growth rate. I also thank to the members of the Editorial Board of the Souvenir and Proceedings, who in a very short span, compiled the valuable documents nicely.



V. K. Suri
Vice Chancellor

TECHNICAL PROGRAMME

9.12.2006

Technical Session I: SELF-EMPLOYMENT GENERATION THROUGH IMPARTING NEED BASED EDUCATION

Chairman Dr. R. B. Singh, Ex-Member, NCF, New Delhi
Co-Chairman Dr. M. P. Yadav, VC, SVBPUAT, Meerut
Rapporteur Dr. S. S. Chahal, Dean, PG, PAU, Ludhiana
Dr. A. N. Tewari, Dean Agriculture, CSAUA&T, Kanpur
Keynote Address Dr. S. N. Puri, VC, CAU, Imphal 12.00-12.40
Invited Lectures Dr. P. L. Gautam/ Dr. VPS Arora, Dean PG 12.40-13.15
GBPUA&T, Pant Nagar
Views of Panelists and discussion Dr. Vijay Mehta, VC, DBSKKV, Dapoli 13.15-14.15
Dr. RPS Ahlawat, VC, NAU, Navsari, Gujarat
Dr. J. H. Kulkarni, VC, UAS, Dharwad

Technical Session II: PROMOTION OF EXPORT ORIENTED AGRICULTURAL AND HORTICULTURAL COMMODITIES

Chairman Dr. G. Kalloo, Ex-DDG (Horticulture & Crop Science),
ICAR, New Delhi
Co-Chairman Dr. Dr. D. S. Rathore, VC, CSKKV, Palampur
Rapporteur Dr. VPS Arora, Dean PG, GBPUA&T, Pant Nagar
Dr. R. P. Katiyar, Director Research, CSAUA&T, Kanpur
Keynote Address I : Dr. C. Ramaswami/ Dr. K. Ramamoorthi 15.00-15.30
Dean Agriculture, TNAU, Coimbatore
II : Dr. R. C. Maheshwari, VC, SDAU, Sardarkrushinagar 15.30-16.00
View of Panelists and discussion Dr. K. N. Tiwari, Director, PPICIP, Gurgaon 16.00-17.00
Dr. S. N. Puri, VC, CAU, Imphal, MANIPUR
Dr. Manmohan Singh, VC, SVVU, Tirupati, A.P.
Prof. C. S. Chakrabarti, VC, WBUAF&S, Kolkata

IAUA General Body Meeting 17.05-18.05

10.12.2006

Technical Session III: DEMAND DRIVEN TECHNOLOGY DISSEMINATION

Chairman Dr. S. S. Baghel, VC, AAU, Jorhat
Co-Chairman Dr. K. N. Tiwari, Director, PPICIP, Gurgaon
Rapporteur Dr. G. S. Jadhav, Director Extension, MPAU, Parbhani
Dr. G. Eshwarappa, Director Extension, GKVK, Bangalore
Keynote Address I: Dr. Manmohan Singh, VC, SVVU, Tirupati, A.P. 9.00-9.40
II: Dr. K. S. Aulakh/ Dr. S. S. Chahal, 9.40-10.20
Dean, PG, PAU, Ludhiana
Invitee Lectures Dr. G. S. Jadhav, Director Extension, MPAU, Parbhani 10.30-11.15
Dr. G. Eshwarappa, Director Extension, GKVK, Bangalore 11.15-12.00

Views of Panelists and discussion	Dr. Sushil Kumar , Director, NDRI, Karnal Dr. M. L. Madan , VC, Pt. DDUPCVVV, Mathura Dr. M. N. Sheelavantar , VC, UAS, Bangalore	12.00-13.00
Technical Session IV:	<u>RIGHT TO INFORMATION</u>	
Chairman	Dr. Anwar Alam , VC, SKUAST, Srinagar	
Co-Chairman	Dr. N. N. Singh , VC, BAU, Ranchi	
Rapporteur	Dr. B. S. Dhillon , Director Research, PAU, Ludhiana Dr. ASRAS Shastri , Director Research, IGKV, Raipur	
Keynote Address	I: Dr. Anwar Alam , VC, SKUAST, Srinagar	13.00-13.30
	II: Dr. M. L. Madan , VC, DDUPCVVV, Mathura	13.30-14.00
Views of Panelists and discussion	Dr. M. P. Yadav , VC, SBVPUA&T, Meerut & President IAUA Dr. R. B. Deshmukh , VC, MPKV, Rahuri Dr. M. C. Varshneya , VC, AAU, Anand	15.00-15.40
Technical Session V:	<u>FARMER'S SCIENTISTS INTERACTION</u>	
Chairman	Dr. R. B. Singh , Member, NCF, New Delhi	
Co-Chairman	Dr. S. N. Puri , VC, CAU, Imphal	
Rapporteur	Dr. A. M. Sheikh , Director Research, AAU, Anand Dr. K. D. Kakate , Director Extension, MPKV, Rahuri	
Keynote Address	I: Dr. K. N. Tewari , Director, IPNI, Gurgaon	16.00-16.20
	II: Dr. N. N. Singh , VC, BAU, Ranchi	16.20-16.50
Views of the farmers	(5 min each)	16.50-17.30
Views of Panelists and discussion	Dr. S. R. V. Reddy , VC, ANGRAU, Hyderabad Dr. R. P. S. Ahlawat , VC, NAU, Navsari Dr. B. K. Kikani , VC, JAU, Junagadh Prof. C. S. Chakrabarti , VC, WBUAS&F, Kolkata	17.30-18.00
Technical Session VI:	<u>PLENARY SESSION</u>	
Chairman	Dr. M. L. Madan , VC, PDDVU, Mathura	
Co-Chairman	Dr. V. K. Suri , VC, CSAUA&T, Kanpur	
Rapporteur	Dr. T. B. Singh , Director Research, NDU&T, Faizabad Dr. ASRAS Shastri , Director Research, IGKV, Raipur	
<u>THEME WISE PRESENTATION OF RECOMMENDATIONS</u>		
Technical Session	I: Self-employment generation through Imparting need-based education.	18.00-18.10
Technical Session	II: Promotion of export oriented agriculture and horticulture commodities	18.10-18.20
Technical Session	III: Demand driven technology dissemination	18.20-18.30
Technical Session	IV: Right to information	18.30-18.40
Technical Session	V: Farmer's scientists interaction	18.40-18.50
Chairmen's-Remarks		18.50-19.00

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53. Dr. A. N. Tewari, Dean Agriculture, CSAUA&T, Kanpur
54. Dr. B. R. Gupta, Dean Home Science, CSAUA&T, Kanpur
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70. Sardana Singh Chauhan, Kanpur
71. Sri Balwan Singh, Kanpur
72. Sri Shanker Pratap Singh, Kanpur

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**ROLE OF SAUs IN USHERING
SECOND GREEN REVOLUTION**

ROLE OF SAUs IN USHERING
SECOND GREEN REVOLUTION

Shaping our Agricultural Future

M. S. Swaminathan

Chairman, M S Swaminathan Research Foundation, Chennai-600113

A major challenge before our Agricultural Universities is bringing about a technological, ecological and managerial upgrading of small farm agriculture. This is where training, retraining, re-tooling and redeployment of both farmers and farm graduates become important. Fortunately, we have 47 Agricultural and Animal Husbandry (including Fisheries) Universities. Nearly 20,000 farm graduates including about 7000 postgraduates become available each year. There is a vast chain of National Research Institutes and Centres, National Bureaus and All India Coordinated Projects under ICAR. There are also a growing number of R & D institutions in the private sector and a number of civil society organisation working on agricultural issues. The Indian National Agricultural Research System (NARS) is thus a formidable one.

The National Commission on Farmers (NCF) has recommended the following steps:

- Promote farmer to farmer learning by establishing **Farm Schools** in the fields of outstanding farmer-achievers.
- Revitalize and upgrade **Krishi Vigyan Kendras** by adding a post-harvest technology wing.
- Organize 60,000 Lab to Land demonstrations in the areas of post-harvest processing, marketing and value addition to primary produce all over the country.
- Establish *Gyan Chaupals* in every village based on the integrated use of the internet, cable TV, community radio, cell phone and local language community newspapers. If Mission 2007 : Every Village a Knowledge Centre is accomplished, the knowledge deficit currently prevailing in villages can be removed and the “know-how — do how” gap can be bridged.
- Establish Capacity Building Centres for those operating **Gyan Chaupals**.
- Train one woman and one male member of

every Panchayat as **Farm Science Managers**.

- Establish at the District level a **SHG Training and Monitoring Centre**, in order to build a local level cadre of SHG catalysts, capable of organizing Sustainable Livelihood Banks based on micro-credit.
- Establish in coastal areas **Fish for All Training Centres** to provide training in all aspects of fisheries ranging from capture/culture to consumption.

Training of farm and home science graduates also needs revamping. NCF has proposed that the **major mission of our Agricultural, Veterinary, Fisheries, Rural and Womens' Universities should be to help every scholar to become an entrepreneur**. They can then organize Service Co-operatives, Stakeholder companies, Agri-clinics, Agri-business centres, Bio-Parks, Food-Parks and other enterprises which can help to improve the efficiency and economics of farming. **Home Science Colleges could be restructured as College of Human Sciences, where both men and women learn the science and art of nutrition, agro-processing and home economics**. This is why NCF has included farm and home science graduates in the definition of farmers. They should be proud to belong to the dominant vocation of India, namely farming and farm-based enterprises. The cover of the last report of NCF has an extract from the Visitors' Book of the National Dairy Research Institute, Bangalore, showing that the father of the Nation **Mahatma Gandhi chose to describe himself a “Farmer”**. Only youth can revive the glory of Indian farming.

Service cooperatives by farm and home science graduates can help to upgrade speedily the efficiency and economic viability of small farms, since they can facilitate highly productive decentralized production supported by key centralized services. Cooperatives should be organized on a stakeholder rather than on a shareholder principle.

A reorientation in the mindset of farm graduates can be brought about only by innovative changes in curricula and courses. In all applied areas, business and financial management should be added to the disciplinary training. For example, a course in Seed Technology can be restructured and designated as "Seed Technology and Business". Similarly, nutrition courses could be reorganized as 'Food Safety and Nutrition Security Programmes'. Courses in Agronomy could be developed into Agronomy and Agri-business Programmes. If the business, financial and trade aspects are integrated with disciplinary training, **such courses will give the farm / home science graduates the self-confidence essential for embarking upon a career of self-employment.** We recommend that attention be given to impart a business orientation to all the applied courses in Agricultural Universities. A large number of graduates are now being trained in the field of biotechnology. However, many of them are not able to utilize their training after taking degrees due to lack of appropriate employment opportunities. Agricultural Biotechnology is an area where there are considerable opportunities for remunerative self-employment. It would therefore be appropriate that support be extended for creation of a **National Association of Genome Entrepreneurs** which could be supported with Venture Capital Fund in order to enable them to convert the rich knowledge available in Government institutions in the field of functional genomics into commercially viable products. They could also undertake work for other countries in the area of preparation of genome maps of the crops of interest to those countries. The National Centre for Plant Genome Research set up by the Department of Biotechnology at New Delhi could organize short term courses on Functional Genomics and Business Development. **Mainstreaming entrepreneurship and business skills in all applied courses, rather than keeping Business Management Course as a separate entity is essential,** if small farm agriculture is to become economically sustainable and educated youth are to be attracted to take to a career in agriculture.

Another urgent need is the establishment of a chain of Regional Institutes for Food Safety and Security. They can be established in appropriate Agricultural, Veterinary

or Fisheries Universities. To begin with seven such Centres may be established during the 11th Plan period. Home Science Graduates can be employed in such Regional Institutes to launch a movement for food safety including awareness of codex alimentarius standards. They should also spread quality literacy among farmers through Gyan Chaupals.

Training of all engaged in agricultural administration in the basic principles and economics of farming is essential. In the United States, practicing farmers often occupy leading positions in Agricultural Departments for specific periods. It would be useful to begin posting active and accomplished farm/fisher women and men as Directors in State Departments of Agriculture, Horticulture, Animal Husbandry, Fisheries, etc on a 5 year tenure. **Unless there is an up gradation in the practical knowledge of those responsible for developing agricultural programmes and policies, there is no hope for Indian agriculture in a globalised economy.**

The other urgent task is to sensitize the policy maker on the ground realities of farm economics. It will be useful to request the Sixth Pay Commission to familiarize itself with the "net take home income" of farm men and women who constitute the genuine majority of our population. A comparative study of the positions of the salaried class and of the self-employed farmers working in sun and rain to feed the small elite salaried class, is in the broader interest of the Nation, particularly in the context of a commitment to inclusive growth. **Understanding the economics of farming will help the Sixth Pay Commission to appreciate the social context** in which the salaries and privileges of a small section of the population need to be fixed.

There is need to complete the unfinished agenda in land reforms. Kerala, West Bengal and now Tamil Nadu have set good examples on the distribution of both ceiling surplus land and appropriate Government land to the landless poor. Tamil Nadu's recent step in providing 2 acres of land to the landless labour families is commendable. This should be emulated by all States. **We should revive the spirit of Acharya Vinobha Bhave.** In addition, **there is need for aquarian reform** for the equitable and efficient utilization of all community and government water bodies.

Aquarian reform is also needed in respect of marine fisheries and coastal aquaculture. This should be high on the agenda of the National Fisheries Development Board. Because of population pressure, both land and aquarian reforms alone may not be adequate to provide productive assets. **Land and aquarian reforms could form part of an integrated asset reform system** designed to provide some productive asset to everyone in the village. Livestock rearing, training in market driven skills or any other form of income security could all form part of an Integrated Asset Reform Policy. Livestock provide good opportunities for strengthening both income and nutrition security.

A Livestock Development Council would help to promote integrated attention to all aspects of Livestock Care and Sustainable use. Every Veterinary and Animal Sciences University should establish a **Vidya Dairy** on the model of the one at Anand, and a **Vidya Abattoir** to promote the efficient use of the entire animal biomass like skin, bones and blood.

We should build a new vision for agricultural research and education for the 21st century based on the emerging challenges arising from a globalised economy. This is where the State Agricultural Universities will have to play a catalytic role.

Second Green Revolution : Role of SAUs

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Agriculture has always been and will always remain a core sector of Indian economy being key to rural development and critical to economic growth in the country. The importance of Agriculture is evident from its contribution to the country's GDP (almost one-fourth), employment (close to two-third), in overall industrialization and in global trade. The national growth rate is dominated by the trends in agricultural production and profitability thereof. A minimum four per cent growth in agriculture sector is considered pre-requisite to the double digit growth rate in the country that is necessary to make Indian economy self-reliant.

India's agro-sector with 144 million hectares net farm area, favourable sun-shine, diverse soil texture, extensive irrigation system, varying agro-climate situation, highly skilled human resource, extensive R&D and extension network, a vast and buoyant domestic markets and above all hard working farmers are engine to better future for agriculture. India will be a formidable force to reckon with in near future by harnessing opportunities that are offered by globalization and economic reforms, being vigorously pursued. However, issues of stress on natural resources, nutritional security and frustration among farmers are being noticed that are very relevant with the issues of sustainability of agriculture.

Limitations of the Green Revolution

Even though the (First) Green Revolution in India contributed a lot to enhance the production and supply of farm products, save as well as earn more foreign exchange, and create more jobs through industrialization, yet a number of complications emerged. Some of these are as follows:

1. Even today, India's agricultural output sometimes falls short of demand. The Green Revolution, however impressive, has thus not succeeded in making India totally and permanently self-sufficient in food. In 1979 and 1987, India faced severe drought conditions due to poor monsoon;

this raised questions about the sustainability of Green Revolution. In 1998, India had to import onions. This year, India imported wheat and is likely to import rice in coming year. However, in today's globalized economic scenario, 100 per cent self-sufficiency is not considered as vital a target as it was when the world political climate was more critical due to the cold war.

2. India has failed to extend the concept of availability of quality seed and other planting material of high yielding varieties to all crops and/or all regions. In terms of crops, it remains largely confined to food grains only. In general terms, only well endowed regions (like Punjab, Haryana, Western Uttar Pradesh, etc.) showed the best results of the Green Revolution including the eastern plains of the River Ganges in West Bengal. But results were less impressive in other parts of the country.
3. Nothing like the Bengal Famine can happen in India again. But it is disturbing to note that even today, there are places like Kalahandi where famine like conditions have been existing for many years and where some starvation deaths have also been reported. Of course, this is due to reasons other than availability of food in India, but the very fact that some people are still starving in India (whatever the reason may be), brings into question whether the Green Revolution has failed in its overall social objectives though it has been a resounding success in terms of agricultural production.
4. Since early nineties deceleration in total factor productivity, over stress on natural resources (land, water, biodiversity, etc.) and squeeze in net income of farmers have been reported. This has caused discontentment amongst farming community.

Along with a numerous accomplishments in Indian Agriculture, there has been significant resource degradation, culminating in number of other constraints. To address these challenges, it becomes essential to produce crops with high inputs use efficiency, improvement in nutritional quality, and stability in storage. While pursuing for higher productivity levels, there is need to redesign the crop-mix and add value to the farm produce so as to make agriculture more rewarding to the farmers. Therefore, to meet twin challenges of second generation problems, globalization and economic reforms, there is an urgent need for revamping Green Revolution into Green Revolution-II.

Second Green Revolution: Sustainable Agriculture

In the recent years, world wide, there is an increasing awareness about sustainable agriculture, in view of energy shortages, food safety and environmental pollution arising out of chemical farming. The alternate agricultural systems known as organic or ecological or regenerative farming systems, having long-term durability and being truly sustainable, are gaining much attention. Therefore, Sustainable Agriculture is considered to be economically viable to meet the human needs for food, to be environmentally positive, and to be concerned with the quality of life.

The major objective of sustainable agriculture and rural development is to increase the food production in an appropriate manner and enhance food security on a long-term basis. This will obviously involve education initiatives, utilization of economic incentives and the development of appropriate and innovative technologies. Such steps will ensure stable supplies of nutritionally adequate food access to vulnerable groups and markets, will generate employment and income to alleviate poverty, will reduce pressure on natural resources, and will protect environment. It is believed that the Sustainable Agriculture, synonymous to the Second Green Revolution has three main goals viz. attaining sound environmental health, enhancing profitability, and ensuring socio-economic equity. A systematic process is to be adopted to ensure smooth and effective transition to sustainable agriculture. The process involves several steps including the following:

- ♦ Rationalization of land use and resource system in various agro-climatic zones.

- ♦ Move towards market-led crop diversification.
- ♦ Extensive use of ICT (information and communication technologies) in agriculture.
- ♦ A bias towards organic inputs including vermi-composting.

It is quite clear that a comprehensive framework needs to be evolved to address the specific problems of agricultural sector. Further diversification of Indian agriculture should take place rapidly so as to better utilize the available resources. There is sufficient evidence that poverty and malnutrition are the grim realities facing India even in the 21st century. Under the prevailing circumstances, it is vital for India to ensure sustainable livelihoods such that adequate resources are provided to this sector and it is able to gather the necessary growth momentum. There is need to bring meaningful institutional reforms domestically with an eye to reaching the benefits to the lower rungs of the farming communities.

Recently, attention is focused towards developing a system that would give thrust on a common minimum programme with quantifiable targets on a time scale in identified priority areas. The important areas can be

- ♦ Developing short duration varieties;
- ♦ Production of quality seed and propagation materials;
- ♦ Improving the health and nutrition;
- ♦ Management of natural resources; etc.

The commercialization of technologies is an important concern, which has to be addressed to generate income for the institution and the inventors and also to enhance resource availability. Further, there is a need to identify the weaknesses in the existing farming systems to speedily convert them into our strengths. There is also need to convert threats into opportunities. We will have to work in a partnership mode so that our collective strength could be capitalized upon.

Role of SAUs

The agricultural sustainability which is of paramount importance in present context can be achieved only by following a system approach. A sound and customized policy support would also

go a long way. It is assumed that our National Agricultural Research System (NARS) will be responding to the emerging concerns and take remedial measures in the years ahead. The NARS including SAUs is responsible for creating a pool of teachers, scientists and extension personnel and for generating and transferring technologies. Thus the role of SAUs in ushering Second Green Revolution can be identified in the dimension of teaching, research and extension.

Education

The agricultural education system has not kept pace with the rapid technological development taking place globally. During the early part of the establishment of SAUs the academic programmes were structured to produce graduates who became primarily technology agents. In the present era of specialization and development in modern science, it is necessary that we restructure our agricultural education in a manner that the graduates coming out are analytical, technology oriented, sensitive to social and economic issues of farming in India, and able to meet the challenges of new millennium with determination, zeal and commitment. Majority of them should become job providers rather than job seekers.

The future strategy for agriculture is going to be very different in view of increased population, increased demand for food and other commodities *vis-a-vis* over exploitation of natural resources, depleting land and water resources, and depleting genetic diversity. With the liberalization of economy, a number of multi-national companies with high-tech agriculture are entering into agriculture sector and the competitiveness is increasing. The challenge before us is how to reorient our agricultural education to make our graduates competitive nationally and internationally. Of late, there has been widespread consensus that quality of graduates in various disciplines of agricultural sciences does not match with the changing needs. Hence, there is urgent need for upgrading the quality and standards of higher agricultural education.

Sustainable agriculture presents a deeper and more fundamental challenge than many researchers, extension personnel and policy makers previously assumed. Sustainable agriculture needs more than new technologies and practices. It needs agricultural professionals willing and able

to learn from farmers; it needs supportive external institutions; it needs local groups and institutions capable of managing resources effectively; and above all it needs agricultural policies that support these features.

Everyone recognizes the critical role played by agricultural professionals in transferring the new technology to end-users. They are involved in assessing farmers' technology needs, and technology development, evaluation and transfer. But there is growing concern whether today's agricultural professionals have adequate knowledge and skills to be effective in the current situation. It is clear that if we as agriculturists are to make effective progress, we must change the way we plan, conduct, and communicate about research. Any component of a farming system can become the limiting factor to sustainability. It is therefore essential that those who work with farmers to develop sustainable systems are knowledgeable about the systems with which they work.

It follows that capacity building and professional development are fundamental prerequisites for achieving the widespread adoption of sustainable agricultural practices. Particularly important targets for these efforts are those agricultural professionals that are so vital in bridging the 2-way farm technology gap - the gap between what is known about sustainable agricultural practices and what is being applied at the farm level, and between what farmers know about sustainable agriculture and what researcher needs to learn.

The universities have to develop and strengthen for both formal and non-formal education programmes to bring academic excellence relevant to future needs. Though, the curricula have been modified, physical facilities, equipment and teaching aids have been updated to some extent and facilities have been made for training of teachers in educational technology at National Academy of Agricultural Research and Management (NAARM), Hyderabad and Academy of Agricultural Research & Management (AARM) in some SAUs, they are far from adequate. Teachers in SAUs are selected mainly on the basis of their professional degree and experience. The problem of inbreeding in the faculty in SAUs has assumed an alarming

proportion. Further more, the beginner teachers do not have any formal pedagogical preparation. Training of faculty was greatly aided during the decades of sixties through various faculty developments and exchange programmes auspices of US Technical Co-operation Mission and the later the USAID. Six American land grant universities participated in the faculty exchange programme with eight SAUs in India. Similar arrangements under Indo-US Knowledge Initiative are on anvil.

Curriculum design is the foundation for teaching. There is need to continuously revise curriculum according to the needs of the market. Participatory curriculum design should be practiced to gauge market and bring consensus among stakeholders. The curriculum must focus on development of employable skills, and strategies should be designed to develop those skills. This calls for innovations in teaching methodology. The following subjects need to be included in the curriculum of agriculture graduates:

- ✓ Good agricultural practices for field crops, fruits and vegetables
- ✓ Biotechnological tools for crop improvement
- ✓ Organic farming
- ✓ Micro irrigation and fertigation
- ✓ Agribusiness
- ✓ International marketing, WTO and IPR
- ✓ High-tech agriculture and precision agriculture
- ✓ Value addition and post-harvest processing
- ✓ Expert system and ICT applications
- ✓ Hands-on training in agri-entrepreneurship such as quality seed production, mushroom production, apiculture, commercial horticulture, floriculture, biofertilizer production, biological methods of plant protection, food processing.

Experiential learning: Now that professionalism calls for performance and problem solving students must be prepared to perform. This is possible only when students work in simulated environment with similar tools and techniques, which are to be used in real life. This calls for more of hands-on experiences and discussion in classes. Regular interaction with industries and employers should be held to get ready for the desired roles.

Interactive teaching: Teaching is not about delivering lecture but making learners aware

of the concepts and practices in a manner that they get interested to explore the literature and learn on their own. It is a participatory approach in which students can directly apply what they are learning. In order to achieve this, professors must first design the active learning exercises and then facilitate the learning. A teacher should now make the transition from a teacher-centered approach to a more student-centered approach where they become a facilitator of student learning.

Distance learning: Teachers must get ready to write teaching packages for distance learners. This will help them learn the ways to prepare on line materials and in turn such materials can be used by face-to-face learners. Besides, students can be encouraged to use on-line materials available on internet.

E-learning is the most recent evolution of distance learning - a learning situation where instructors and learners are separated by distance, time or both. E-Learning is - Internet-enabled learning or use of network technologies to create, foster, deliver, and facilitate learning, anytime and anywhere. Nevertheless, even with these new tools, the job of keeping agricultural professionals updated is too big for the academic sector alone. Other actors have both a stake in seeing this effort succeed and a role to play in achieving it.

Partnership with other institutions: Not all the SAUs are endowed with vast infrastructure to provide practical education of relevance to the job market. This means that liaison needs to be created with the government and private organizations to forge working relationship for meaningful association.

Continuing Education: In today's world of rapid and radical change, the fast pace of knowledge development and increased availability of information has fundamental implications for education. In the past, the knowledge a professional acquired through formal training could last a lifetime. Now, getting a degree has to be just the beginning of a professional's learning career. The problem of professional obsolescence is already serious and becoming more so as the "information explosion" accelerates. But all the information does not equate to knowledge unless it is processed and synthesized into useful form. Achieving this transformation requires a great deal of effort by the educators and educational institutions. They must accept the

responsibility not only for helping the enrolled students understand and synthesize the vast body of information but also for helping the working graduates to keep up-to-date.

In order to be competitive and to meet the present demand in changing scenario, we may have to provide focus on the following:

- ✓ Development of the ability of students to apply knowledge for solving problem
- ✓ Analytical and diagnostic skill up gradation for enhancing decision making ability
- Development of imaginative and innovative solution to deal with the situation
- ✓ Harnessing the potential of leadership and team members for handling of the problem
- ✓ Generation of entrepreneurial skill and motivation for self-employment.

The students in agriculture require competencies in group discussion, panel discussion, analytical ability, which have received less attention. They also require confidence and techniques to deal with the situation. To inculcate the soft skill the faculty with above skill and experience would be needed. Coordinating seminars, workshops, panel discussions, organizing inter-institute competitions, conducting research, conducting trainings, supervising projects, developing case studies are some of the approaches to improve the soft skill of the faculty, who can provide the skill to the students.

Research

The agricultural research to be conducted for second green revolution should have different orientation. Due consideration is to be given to ecology (i.e. environmental issues), biodiversity, climate change, IPRs, global competitiveness, energy requirement, changing consumer taste and preferences, health and nutrition issues, etc. The focus of agricultural research should now be on cutting edge technologies including bio-technology, nanotechnology, precision farming, soil less cultivation etc.

Ecology: Ecological sustainability of high productivity will be an important determinant in relation to the choice of technologies. For example if hybrid wheat can enable us to produce 8 to 10 t/ha, the crop will need over 300 kg of nitrogen. It is obvious that if the nutrient needs of hybrid or

other high-yielding wheat varieties are to be met entirely through mineral fertilizers, there will be serious environmental problems including nitrate pollution of ground water. Hence, success in achieving high productivity on a sustained basis will depend upon our ability to develop new methods of feeding the plant.

Concerns relating to genetically modified organisms (GMOs): There are growing public and political concerns relating to GMOs. The concerns relate to food and environmental safety and bioethics. It is essential that these concerns be carefully addressed through a mechanism for risk-benefit analysis, which inspires public confidence. An integrated disease management strategy will have to be developed to ensure that GMO's with novel genetic combinations for disease resistance do not break down due to the emergence of new physiological strains of pathogens.

Expansion of Proprietary Science: The world is witnessing an expansion of proprietary science governed by Intellectual Property Rights (IPR). Public good research supported from public funds, in contrast, is shrinking. Is the golden age of cooperative research coming to an end? How can we find a balance between public good and private profit?

Climate change and safeguarding Genetic Diversity: Will molecular breeding resulting in "super wheats" lead to a high degree of genetic homogeneity in farmers' field? We know that genetic homogeneity will enhance genetic vulnerability to biotic and abiotic stresses. Hence, we should foster an integrated programme of pre-breeding and participatory breeding. Numerous location specific varieties can be developed in this manner. This will be the most effective method of meeting challenges arising from potential changes in temperature, precipitation and sea level as a result of global warming arising from the growing imbalance between carbon emissions and absorption.

Strategies for Increasing the Yield Potential: The problems to be tackled are the problems poor farmers are facing. These are drought, salinity, poor soil fertility, toxicity in the soil, etc. Biotechnology is the key to solve such problems. The approaches envisaged are: (1) conventional hybridization and selection

procedures, (2) ideotype breeding, (3) heterosis breeding, (4) wide hybridization, (5) tissue culture to cross species which would only very rarely cross in nature, (6) marker aided selection, (7) genetic engineering.

Soil degradation: These developments, encouraging as they are, could well be offset, however, if current patterns of soil degradation and damaging agricultural practices continue.

Organic agriculture: The need of the hour is to turn towards the organic agriculture (though selectively), the natural fertilizer of the dung (Gober) and to grow maximum neem trees around the fields that would do the job of protecting the pesticides quite harmlessly for any kind of crop. The organic way of agriculture also gives fantastic results in the form of huge heaps of crops and lots of profits to the small as well as big farmers. De facto, agriculture is the backbone of any economy, which should always be the strongest one and also the sufficiently protected one.

Hi-tech horticulture and contract farming: Focusing on fruits and vegetables can double agricultural growth to 4% per year. Contract farming with corporate contract to provide hitech farm inputs on credit and lift the output at guaranteed prices would be very important. The biggest rural initiative comes from ITC, whose e-choupals will cover 100,000 villages by 2010, accounting for two-thirds of rural GDP. e-choupals are electronic buying and selling centers, which also provide information to farmers on prices, weather, and scientific farming practices.

Extension and Communication

Presently the extension work carried out by the agricultural universities is designed to:

1. Plan, organize and conduct production and problem oriented training of various types and durations for extension personnel.
2. Collect, process and disseminate latest research findings to extension personnel and extension clientele through appropriate methods and media.
3. Produce information materials and teaching aids for extension personnel, trainers and farmers.
4. Carry out limited frontline demonstrations based on latest research findings and to

identify field problems as feedback to research departments.

5. Provide effective farm advisory service to farmers, farm women, farm youth, extension personnel, bankers, input dealers and manufacturers, voluntary farm organizations and others concerned with agricultural development, and
6. Undertake special surveys and carry out operational research projects, to test the applicability of findings under different agro-climatic and socio-economic conditions in different parts of the state.

In order to meet the challenges of 21st century, the extension system of the country needs restructuring to include extension work in partnership mode with public and private sector duly integrated with Panchayats. Self help group and multi-agency approach would help smaller and poor farmers. However, modern technologies in extension and communication can be exploited for the betterment of the society.

Various studies and experiences reveal that ICT, Local Information Centre and Para Extension Workers can revolutionize the entire extension scenario. New ICTs have the potential to penetrate unserved and under-served areas and enhance extension education through distance learning, facilitate development of relevant local content, faster delivery of appropriate information and technical assistance. The Internet can also enable the remotest village to access regular and reliable information from the Web. Internet could be used as central point (tele centres) for online broadcasting and for exchanging information from developing countries. The tele centres will also provide a stage for rural communities to address their training and development needs. There is evidence that telecentres have played a major role in mobilizing communities to address their development problems. Telecentres can be used as information hubs that capture, repackage and disseminate information to rural communities. Multi-purpose community telecentres could play a key role in the "information renaissance" in developing countries and ensuring universal access. Para Extension Workers (PEW) can play a vital role in disseminating information and message through meeting/training. More accountable to the group and when properly trained can be very

effective in transferring technology and helping farmers to access a wide range of services. PEW needs to be assisted with more knowledge intensive and quality practical training.

- ◆ There is need to strengthen the extension system to make it more vibrant and assertive to cope up emerging demands. The farmers in knowledge led agriculture is required specific and time bound information on cultivation of agriculture and allied areas, marketing information and export potential.
- ◆ The rapid change in the technologies and also the introduction of computer related technologies in Agriculture and extension have thrown up challenges to innovate and translate it into the reality for the benefit of millions of farmers to have easy access to information and communication. Village KIOSKs for speedy transfer of technologies through information portal and internet access for farmers is being practiced so farmers can act as a super highway in getting quickest and reliable up to date information from any corners of the earth.
- ◆ New package should be developed, in which IPM, IPNM and resource conservation should be included to reduce the cost of cultivation. Technologies are there but need to be translated in action. Similarly, the diversification has also proved very effective in increasing farm economy of peasants. There is no set module in different enterprise combination in terms of identification of technology and their application with different enterprise combination.
- ◆ KVK should assume the responsibility as nodal agency at district level for training to extension functionaries in agriculture, horticulture, plant protection, farm machinery, soil conservation and allied areas in relation to agriculture. Technical updating should be done in the KVK itself.
- ◆ We have bulk of experience of innovative farmers in holistic management for farm resources and enterprise. Since, there is no adequate research experience in farming system. The experience may be validated with other farm and necessary

modification can be done and multiplied in large scale.

- ◆ Agriculture entrepreneur may start as Kisan Seva Kendra in Panchayat for input supply as well as diagnostic farm advisory services should be given. The agriculture entrepreneur may also facilitate in marketing of outputs.
- ◆ It is the information and communication technology that can make it possible and to make the farming more remunerative, employment generated and export oriented. The fast changing scenario of agriculture calls for revitalization of extension system so as to make effective use of ICT and transfer of knowledge based inputs, which are essential for productivity of farm and agri-business at various level.

Following approaches can also be adopted for making the agricultural extension system deliver effectively.

1. Using Unemployed Agricultural

Graduates: The Government of India has already announced the scheme of “**Agri-clinics and Agri-business centers**” by providing financial assistance to unemployed Agriculture graduates to launch these. **Agri-clinics** will provide expert services and advice to farmers on cropping practices, technology dissemination, crop protection from pests and diseases, market trends and prices of various crops in the markets and also clinical services for animal health etc. which would enhance productivity of crops / animals.

Agri-business centers are envisaged to provide input supply, farm equipments on hire and other similar services. Agriculture graduates may also take up the projects in agriculture and allied areas along with Agri-clinics / Agri-business centers. Projects eligible for financing under this scheme are as follows:

- ◆ Soil and water quality cum input testing laboratories,
- ◆ Pest surveillance, diagnostic and control services,
- ◆ Maintenance, repairs and custom hiring of agricultural implements and machinery including micro irrigation systems (sprinkler and drip),

- ◆ Agri service centers including the three activities mentioned above (group activity),
- ◆ Seed processing units,
- ◆ Micro propagation through plant tissue culture labs and hardening units,
- ◆ Setting up of sericulture units, production of bio-fertilizers, bio-pesticides, bio-control agents,
- ◆ Setting up of Apiaries (bee keeping) and honey and bee products processing units,
- ◆ Provision of extension consultancy services,
- ◆ Facilitation and agency of agricultural insurance services,
- ◆ Hatcheries and production of fish fingerlings for aquaculture,
- ◆ Provision of live stock health cover, setting up veterinary dispensaries and services including frozen semen banks and liquid nitrogen supply,
- ◆ Setting up of Information Technology kiosks in rural areas for access to various agriculture related portals,
- ◆ Feed processing and testing units,
- ◆ Value addition centers,
- ◆ Setting up of cool chain from the farm level onwards (group activity),
- ◆ Post harvest management centers for sorting, grading, standardization, storage and packing,
- ◆ Setting up of metallic / Non-metallic storage structures (group activity),
- ◆ Retail marketing outlets for processed agri-products, Dealerships of farm inputs and outputs in rural areas.

If properly implemented, this project can create a huge impact on the extension activities in the country. This may also create healthy competition between private and public or private and private extension services providers.

2. Agricultural consultants / firms: At present only big farmers growing commercial crops like coffee, tea, spices, flowers, grapes, having big Poultry, diary farms and landscaping avail the consultancy services. To promote consultancy, there is need for national level institutes to take up

training of Agriculture graduates in consultancy. Certified consultants may form professional bodies at district, state and national level taking over bigger agricultural projects reducing burden on government.

3. Training of Para technicians: Para technicians, are professionals who may not have professional degree but they possess necessary skills to perform one or more agricultural activities. Para technicians charge for service in the area of artificial insemination, grafting etc. The limitation of these technicians is that they are capable of providing services in one or few areas. However, a group of trained technicians can cover a group of villages by providing integrated services. Para technicians, encouraged by governments in the states of UP and Rajasthan, should be trained through KVK at district level and University and respective department at state level. An independent certifying agency can issue certificates then, based on the efficiency of para technicians after training.

4. Progressive farmers: Progressive farmers make use of best technologies and innovative methods in processing, soil fertility management, farm mechanization, inter cropping, postharvesting technology, dairying, agro-forestry etc. and have a good understanding of profit accruing out agricultural activities. Progressive farmers in each village are often consulted by fellow farmers and are accepted as opinion leaders by farmers. It is possible to utilize them as demonstration farmer / contact farmer by public or private extension service providers.

5. Farmers' Organizations/Cooperatives: Functioning of farmers' organizations /cooperatives indicates that due to many social, economical, technical and political reasons, majority of the farmers organizations/co-operatives failed but few organizations indicate that organizations /co-operatives have very good potential to bring a change in the life of farmers like the Kaira district co-operative milk, having brand name AMUL for its product range. AMUL has a turn over of 500 crores, covering 9,70,000 farmers of one district serving with just 150 extension workers. The products are milk powders, butter, cheese, ghee, chocolates and brown beverage. Popular extension approaches adopted are live contact, newsletter, and gram sabhas.

6. Non-Governmental Organizations: In India, more than 19000 NGO's are actively engaged in rural development. Proper understanding of problem and place, missionary zeal, involving local population, bottom up approach are some of the factors responsible for the success of NGO's in rural development in general and agriculture in particular. They operate in a small area majority of the times and make very significant impact.

7. Agribusiness Companies: Agribusiness companies cover wide areas, operate in different sectors of Agriculture, reach large number of farmers with less number of extension functionaries, adopt variety of extension approaches and have good financial turn over. Agribusiness companies operate mainly in seeds, fertilizers, pesticides, machineries, information, finance, processing and trading. Extension approaches adopted were road shows, seminars, intensive personal contact, village level meetings, VIP meetings, harvest days, wall paintings, crop tours, newsletters, institutional visits, participatory approaches, working through self help groups, demonstrations, field days, mass media campaign, training, exhibitions, dealers / distributors training, mailers, reminders, jeep campaigns, mass contact

programmes, posters, stickers and banners. Through effective linkage with the Government more farmers can be reached with the same less extension workers. Most agri-business companies, these days are providing integrated services to farmers instead of concentrating on selling their products only.

8. Input dealers: Farmers consult agri-input dealers more often than other sources because:

- ♦ Difficulty in meeting VL W' s for field visit.
- ♦ Ability of input dealers to give credit
- ♦ Knowledge and experience based learning of input dealers.
- ♦ Input dealers mayor may not be technically qualified but competent institutes should train them gradually. Preference should be given to technically qualified people in agriculture while issuing dealership.

9. Mass-media: Mass media consisting of newspapers, magazines, traditional media, radio, TV and information technology are powerful opinion makers as they cover more people in less time and cost.

Technical Session I

**SELF-EMPLOYMENT GENERATION
THROUGH IMPARTING NEED
BASED EDUCATION**

Self-employment Generation through Imparting Need Based Education

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1. Introduction

There has been substantial growth in the higher educational system in India and we are generating over 3 million graduates every year. Also after 10th class and Ten plus Two, nearly 7 million youth seek employment. However, our employment generation system is not in a position to absorb the eligible candidates. Such a situation in the long run will lead to instability in the social structure. There is a large mismatch between the skills required for the modern economy and the education imparted to most of these students. We need higher education focused on and oriented towards productive employment opportunities.

An important factor contributing to continued unemployment at very low levels of productivity as well as incomes in the country is the absence of productive skills as demanded by the market and the ability to update the existing skills in tune with changing needs. The situation is graver in the case of educated in general and rural educated poor in particular. The rural population does not have even accessibility for such skill development and upgradation. The fact that about

95 per cent of the labour force has no marketable skills cannot be ignored. It is, therefore, essential that the labour forces are equipped with demand based skills. As a long-term measure, there is an urgent need to initiate a paradigm shift in society away from formal employment' opportunities to self-employment, which requires development of not only technical skills but also entrepreneurial skills. Obviously such a massive skill development effort cannot be in the formal traditional inflexible system. The informal system of skill development and upgradation has to be established to facilitate the rural poor for sustainable productive employment and/or self-employment. There is a need to tap opportunities and talents at local level and match them with a strong supportive system.

2. Status of Education and Training in India vis-à-vis Developed Countries

Human resources are the most important resource and need to be made world class by relevant education and training. The importance of education and training is highlighted in terms of **six vital parameters**, as detailed below :

SN	Parameter	Indian Educational System	Developed Country Educational system
1	% Literacy	40% {as per UNDP} 63% {as per GOI}	93 TO 99%
2	Enterprise Skills Development, (ESD in schools)	Practically NIL in India, Pakistan, Bangladesh, Nepal & Burma	Educational System changed to incorporate this, from Class 1 st to 12th
3	Vocational Education & Training (VET)	<ul style="list-style-type: none"> ◆ Hardly 0.1 to 0.3% of the population take VET at any given time. ◆ Local Certification not recognised outside India, ◆ Range of Courses not enough. 	<ul style="list-style-type: none"> ◆ About 3 to 5% of the population is under training at any given time. ◆ World Class and internationally recognized. ◆ Nearly 1800 courses available

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SN	Parameter	Indian Educational System	Developed Country Educational system
4	Drop out rate up to 10+2	90 to 94%	3 to 6%
5	Unemployment rate in the country	30 to 60%	4 to 10%
6	Use of TV, Radio and media for education & social causes	Hardly used	Extensively used.

Enterprise Skill Development will pre-prepare the youth as to which area of work they should devote their lives.

3. Human Resource Development in India since 1947

In Germany and the Central European countries, nearly 90 to 95 per cent of the children entering the age of 14 to 25 go in for vocational education & training. About 5 to 10 per cent go ahead for higher studies. The same is also true for the Asia and USA. At a later stage, out of those who have completed Vocational Education and Training, at an earlier stage, go in for relevant higher studies between the ages of 25 to 60.

People in India between the ages of 15 to 30 are nearly 300 million. There are 550 million people in India, who are less than 30 years of age and 770 million who are less than 35 years of age. Thus India is a very young country. This is a big strength and advantage of India, which needs to be fully energized and strengthened, by the use of **Enterprise Skill Development (ESD) and Vocational Education and Training (VET)** for better employment as well as self-employment.

The total number of unemployed in India is estimated at about 300 million. About 300 million live below the Poverty Line and number of employees in the unorganized sector is 380 millions, who have little or no skills. The employees of the organized sector, numbering about 27 millions, complain that they are working in an unsafe environment.

About 29 million are born every year and enter the present educational system at different stages. As per the figures, nearly 94 per cent drop out at different stages and only 1.6 million make it through the present educational system, which lays emphasis only on higher education. The balance,

27.4 million are left on their own to feed for themselves, who depend on others. for their livelihood. For such people, creating awareness about vocational education and training for self-employment should be taken up on priority.

4. Employment in the Organized Sector

Out of the total 407 million people who are employed in India, about 27 million, or 7 per cent of the workforce work in the *organized sector* (2 m in PSU's + 17 m with Central & State Governments + 8 m with the organized private sector). In the Indian context, this sector is 'high cost' and 'overstaffed' leading to high cost and inefficiency. We could do with lower costs with higher quality and efficiency. This also hampers India's export potential in world markets. The present education system seems to be preparing the youth for this sector. This is the *rich or elite* sector of India and needs no form of subsidy whatsoever.

5. Importance of Need -Based Education and Training

Need based education and training is required because:

- ♦ Enterprising young people are an asset to the Nation.
- ♦ Through enterprise education, students and youth will develop alternative options of economic careers.
- ♦ Enterprise education would enhance the personality of youth.
- ♦ It would prepare the youth to face economic uncertainties of life.
- ♦ Further, it would give youth a positive outlook of life and a positive belief in them.

Need based education and training benefits the people of our country as follows :

- ♦ Generation of employment,
- ♦ Improvement in quality of life,
- ♦ Improvement in GDP,
- ♦ Eradication of poverty,
- ♦ Building Indian World Class enterprises, and
- ♦ Improvement in the quality and productivity of all existing enterprises.

6. Existing Skill Development Programme – Shortcomings

There are a number of schemes and programmes of the government in vogue which have skill development inputs also. The evaluation of some of the schemes such as PMRY, TRYSEM, etc., shows certain shortcomings. Some of the shortcomings are imparting limited range of skills to large number of people without taking into account the market demands; inappropriate targeting of trainees; poor quality of training including lack of training in soft skills vital for self-employment; lack of after-training services such as credit linkages, marketing services and placement; lack of coordination among the agencies imparting training and inadequate monitoring system to take corrective measures in time.

7. Economic Practices that Restrict Employment Generation

- ♦ **Reservation of some Industries under Small-Scale sector:** The size of a manufacturing unit is decided by International market forces and by the cutting edge technology and processes, which would be required to produce the product with the best quality at lowest cost, to be able to make it world class.

A large number of units would be keen to start world class manufacturing units, for the domestic markets, but are forced to follow these guidelines, which are very restrictive in nature. Indian organizations must be allowed the freedom to have a 'level playing field' similar to their counterparts and competitors in other countries of the world.

- ♦ **Labour Laws:** Indian companies are migrating to high Capital Cost Technologies since Indian Labour Laws encourage Indian business to employ the

lowest number employees and use very expensive technologies, rather than have the freedom to use the lowest cost technology and use the largest number of employees. This is the saddest testimony of what we have achieved in the last 58 years and how we have systematically deformed our manufacturing sector.

- ♦ **Not recognizing that Enterprises means all types of business and not only Industry!** In USA, Europe, Japan and most countries of the world, SME's account for nearly 80 per cent of economic activity and employment. In India, sadly, this fact is also prevalent but is NOT recognized. For example banks will lend to an Industry but not to a firm in trading, agriculture, services or non industrial activity.

- ♦ **Enterprise means all types of economic activity and not only industry.** A SME In USA, Japan, Taiwan, Europe means enterprises with about Rs. 150 to Rs. 250 Crores turnover and about Rs. 80 to 100 Crores investment. *How can an Indian small unit ever compete with such enterprise?*

8. Some Policies Options

A. The importance of ESD and VET in 'Holistic Human Development'

The present school education in India hardly uses 5 to 10 per cent of the Human Brain of the youth. The purpose of education should be such that the youth are prepared not only to satisfy their economic needs, when they become adults. The system must impart such 'education' to the youth that they are able to cope up and contribute to the social requirements of the society. A number of studies has clearly shown that by imparting *Enterprise Skills Education* (ESD) and by imparting *Vocational Education and Training* (VET), the human brain of the youth is energized by nearly 90 per cent, in the same manner as by 'Yoga', 'Art of living', 'Vipasana', etc. resulting in a more holistic development of the youth.

B. India should be a 'Power-House' for Human Resources.

With 17 per cent of the world population, India should be a supplier of trained manpower in the entire range of skilled manpower. Excepting in Information Technology, which hardly accounts for 1.5 per cent of the World's GDP, Indians are not able to take advantage of shortage of skilled human resources at reasonable international prices and costs.

We do not train Indians to world class standards in ESD and VET, required for the balance 98.5 per cent of the world economy. There is a tremendous scope for trained man power in several skills in the areas of manufacturing, trading, healthcare, hospitality and catering, foreign languages and services.

While our IIT's and IIM's are World Class, the total number of people coming out of these systems is hardly 6,000 per year, out of which probably 50 per cent leave India' for overseas assignments.

C. Indian companies will have to look at 'World Markets' in order to grow

In India, there is a large demand for goods and services, about 17 per cent of the world demand based on our population. But the buying power is limited to our GDP, which is only 1.72 per cent of world GDP.

All developed countries realized this a long time ago. Japan and Germany went in for large exports after the 2nd World War. The Asian Tigers have been growing based on export growth. Look at Singapore, Taiwan, Hong Kong, Korea and recently China.

Indian companies in order to grow fast and at a rapid rate are forced to look at world markets as their customer base, since the world markets are nearly **58 times** greater than the Indian market. This is the trend today with almost all world class companies in the areas of Pharmaceuticals, Textiles, Garments, Footwear, Automobiles, Auto Components, Food Processing, Books and printed materials, Aluminum, Steel and Stainless products, etc.

World class companies would require world class trained manpower in different fields of the economy. Money and materials are easily available. The presence of trained manpower will make the difference for promoting new enterprises and expansion of existing units.

D. To tap the vast potential in different sectors of the economy

a. Tourism & Travel Industry:

The **travel and tourism industry** (about US\$ 3800 billion per year) is nearly **7 times** the size of the Information Technology industry (about US\$ 530 billion per year). However we do not give it seven times the importance that we do to I.T. If we did, we would be earning more than US\$ 70 billion per year from this sector during 2003-04. India's market share is only **0.38 per cent** of the total world tourism industry; there is no reason why this cannot be expanded to ten times the present operations.

India is a Tourist's Paradise as far as our 10,000 year old Heritage, History and Cultures are concerned. We only get 3.0 million tourists per year, the same as the city countries of Dubai, Singapore and some small cities of Europe and North & South America. Even small countries like Malaysia and Thailand get nearly 10 million tourists per year. China gets nearly 47 million tourists per year. One tourist results in the employment generation of nearly 2 to 4 jobs!

There are hundreds of vocations connected for the requirement of tourist related' activities, starting from the travel industry, transport companies, airlines, road transport, hotel and hospitality, tourist guides, shopping and leisure. activities, language guides, etc.

b. Manufacturing Industry:

The **manufacturing industry** (about US\$ 9600 billion per year) is nearly **18 times** the size of the Information Technology industry (about US\$ 530 billion per year).

c. Education and Training Sector:

The **education & training industry** (about US\$ 2500 billion per year) is nearly

5 times the size of the Information Technology industry.

d. Health Care Industry:

The **health care industry** (about US\$ 2700 billion per year) is nearly **5 times** the size of the Information Technology industry.

e. Organized Sector:

In India, Poverty line is at Rs. 10 per day or Rs. 300 per month per capita. The World Bank's old definition is about Rs. 44 per day per capita (US\$ 1/day/capita). Minimum wages in the organized sector are at Rs.50 per day or Rs.1250 per month. To improve its cost competitiveness, this sector needs *enterprise skills development (ESD)* and *vocational education & training (VET)*, so that they get either employment in organized sector or will be self-employed.

f. Unorganized Sector:

Nearly 93.5 per cent of the work-force (i.e., 380 millions) works in the unorganized sector. In agriculture, trading, wholesaling, retailing, services, construction and manufacturing with Small Medium Enterprises (SMEs). They are the ones who need help in Primary & Secondary Education (P&SE), *Enterprise Skills Development (ESD)* and also *Vocational Education & Training (VET)*. This is the dynamic sector of the economy where more than 97 per cent of new employment is being generated.

9. Potential Areas in Agriculture for Self-Employment

A. Diploma Courses

Course Title	Duration (Years)
Agribusiness Management	2
Bio-fertiliser production technology	2
Biological Control of Diseases	2
Bio-pesticide production technology	2
Horticulture Nursery	2
Mushroom production technology	2

Post Harvest Management of Horticultural Crops	2
Organic Farming	1
Precision farming	1
Integrated Farming System	1
Establishment and maintenance of Medicinal and Aromatic plants	1
Scientific Crop Production under Rainfed Conditions	1
Scientific Dairy and Poultry Farming	1

Course Title	Duration (Years)
Seed Production Technology	1
Soil and Water Testing/Analysis	1
High-tech (Green house/glass house/shade net) cultivation	1

B. Certificate Courses

Course Title	Duration (Months)
Bio-pesticide production technology	6
Processing and preservation of fruits and vegetables	6
Vermicompost production	3
Dairying	6
Fisheries	3
Poultry Farming	3
Sericulture	3
Grafting technology	3
Mushroom production technology	3

10. Conclusion

Nearly 3 million people graduate in India every year. The employment generation' in public and organized private sector is limited. Even the 'number of school drop-outs is highly alarming in the country. Hence, there is a vast scope for need based and vocational education and training for the youth in the country. This will have a long lasting effect on the economy by generating employment on one hand and poverty eradication on the other.

Self Employment Generation through Need Based Agricultural Education in India

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Dr. Abdul Kalam, President of India visualises India as a "Developed Nation" by 2020. As development of any country depends 20% on natural resources, 16% on infrastructure and 64% on human resources and social factors. We have strong base to realize his dream into reality. Agriculture being the hub of Indian economy (contributing 25% of GDP and 17% of export earning) and the only source of livelihood of large chunk of population (59%), the foremost priority was assigned to human resource development in this sector since independence. We built up a very strong network of National Agricultural Education set up. As a result, the growth in agricultural production is phenomenal. The quantum jump in foodgrain production has made possible not only to attain self sufficiency but export of foodgrains to nearby countries and maintain buffer stock also. There is fourfold increase in oilseed production. Our progress in horticultural production has been spectacular. We have made greater strides in animal and fisheries production too.

Features of 21st century and challenges ahead :

No doubt, trained human resource developed through agricultural education system has helped prosper our country agriculturally and economically. However we are now confronted with more complex challenges of decreasing annual growth rate of agriculture (4.7% in VIII FYP to 1.8% in X Plan), heavy pressure on finite natural resources, unsustainable production, ecological imbalance, malnutrition, high level of poverty, increasing educated as well as uneducated unemployment (0.2% growth of jobs in farm sector from 1993-94 to 1999-2000), spread of free market economy, globalization of agriculture, etc.

Since establishment of human civilization, the society has been governed by muscle power, mass power and till recently by money power. However, mind driven or knowledge driven society

is the special feature of 21st century. Hence key of agricultural development in 21st century would be the digital knowledge management system. Therefore agricultural universities have a strong sense of responsibility of moulding their products to suit to address the challenges in right perspective and achieve the growth rate of more than 4% per annum as envisaged in National Agricultural Policy through efficient use of natural resources and conservation of soil-water and bio-diversity. The growth has to be balanced, sustainable, technologically and economically in all the regions. Further, the growth should be multipronged and should generate adequate employment opportunities. In view of this, human resource development in agriculture and applied sectors would be the continued thrust.

Human resource development:

Agriculture requires trained manpower in different sectors of agriculture for planned development. Human resource is knowledge capital and strength of the nation. We have a stock of over 3 million scientific and technical manpower of which about 10% is in agriculture sector. The present Agricultural Education System consisting of 34 SAUs, 5 DUs, 1 CAU, 3 central universities, 1 IIT and 16 general universities produce about 21000 agrotechnocrats annually. Average number of trained agricultural manpower is about 290 per million population. The growth rate in agricultural education is about 2.5% (Katyal, 1999) as against population growth rate of 2% per year. However, the growth in agricultural education needs to be improved to keep pace with the social and developmental demands. It is necessary that growth rate in agricultural education has to be around 6.5% per annum to attain agricultural productivity growth rate of 4% and overall economic growth rate of 8% in the coming decade. The estimated requirement of farm graduates is over 0.7 million (Swaminathan, 1999).

Employment opportunities for trained manpower:

In starting agricultural degree programmes, it was expected that the human resource trained would go for farming rather than for white collared jobs and would generate self employment. But it utterly failed as could be seen from the present employment profile. According to IAMR (1998), the present annual production (21000) of agrotechnocrats is about 60% more than the requirement (8550). Out of total agricultural graduates produced, 50% found place in Government, followed by 20% in private, 5% in research, 7% in academic, 6% in financial institutes, 2% self employed and the rest 10% are either economically inactive or migrated. Thus, there is potential annual unemployment of 10% for agrigraduates (Rama Rao, 2004). The study conducted by IAMR (2000) indicated that 43% of agricultural graduates and 23% of the post graduates were unemployed in the country. Further, there is declining trend in jobs in public sector and no significant efforts are made for entrepreneurship development. Moreover, only 2% graduates are self employed. Of all new employment generated, 1% are in Govt. jobs, 2% are in organized sector and 97% in unorganized sector (Damle, 2005).

Reason for poor self employment:

The foregoing employment analysis puts forth a number of serious questions as

- ♦ is the agricultural profession not remunerative?
- ♦ is the technology generated not economically viable and practically feasible?
- ♦ does the trained human resource lack self confidence in taking farming on sound footings?
- ♦ is the present agricultural education system need based?

These questions need to be addressed on priority as job opportunities and agriculture dependent strata are declining. We consider agriculture as main source of livelihood of rural people but, farmers commit suicides. The situation is paradoxical. To tie over the situation, it is our prime concern to generate self employment in farm as well as non farm sector through need based agricultural education.

Assessment of occupational needs for self-employment:

Diverse agroclimatic conditions, socio-economic conditions, crops and cropping pattern, indigenous technology and stakeholders' perspective drive occupational needs for self employment. It is well known that about 80% farmers are small and marginal whereas remaining 20% are medium and large. The average land holding is 1.4 ha. Average per capita annual income is Rs. 23241, showing poor purchasing power. About 300 million people live below the poverty line of Rs. 10/- per day (Damle, 2005). India has only 1.35% of the world GDP and is 17% of the world population. As per international definition, 650 million are illiterate. Agriculture is mainly rainfed. Post harvest losses are very high. Our share in world trade is very poor (0.8%). Globalisation of the economy necessitates need for integration and interdependence of all realms of economic life. All these issues would be the guiding indicators in identification of occupational needs for self employment. This requires region specific surveys to assess needs and tune up our educational programmes. For example, in the Konkan region (coastal hilly and plain zone No. 12) of Maharashtra requires rice based, horticulture based, forest based, animal and fishery based needs for self employment. In general, self employment generating areas are application of advances in technology like genetically improved seeds, modern agricultural practices including microirrigation, plasticulture, nursery, organic and inorganic fertilizer production, post harvest technology, testing of agricultural produce, soil, water, fertilizer, waste and waste water analysis, biofertilizers, pesticide, veterinary services, livestock production, fishery production, agroecotourism, environmental impact methods and analysis, renewable and non-renewable energy, biotechnology, marketing, etc.. Knowledge in weather forecast, water management, satellite imagery, commercial information, market information, Govt. schemes, policy on agriculture and agribusiness can be made available through agriclincs, agribusiness centres, biotechnology parks, food processing parks, veterinary pharmaceuticals, computer aided rural knowledge centres, lab testings, etc. It has been postulated that in Maharashtra, all above activities can create employment opportunities to the tune of 400 million

mandays per annum, improvement in yearly production of 11.54 million tons and saving of water of 38235 lakh cubic meters per year. This means more than one million jobs in near future (Swaminathan, 2003).

Focal point of employment generation:

For self employment generation, our main focus should be rural youth, which is knowledge capital. The rural youth if given assured employment opportunities, income round the year, good infrastructural facilities and favourable working environment could cheer brain to cities in the country and even abroad and they would like to stay in rural areas and in turn would help develop agricultural process. The agriculturists should have ability and confidence to modernize agriculture and related industries and create more jobs for others unemployed. They should have entrepreneurship quality, ability to take up contract farming or production on co-operative lines, setting up agriknowledge centres / enterprises, etc. In view of this, development of this human resource calls for appropriate changes in the present agricultural education system.

Reorientation of agricultural education system :

“Service to society” has been the philosophy of our agricultural education system. It has shown need based changes in course curricula, system of education, mode of admission, uniformity in courses and course contents, examination, system, organizational system, faculty development programmes, etc. over the years. However, keeping in view widening knowledge base, our system has to be much more vibrant and knowledge intensive. It is likely that due to GATS, the foreign universities would be very strong competitors to India agricultural universities and would capture our market of agricultural education. Greater emphasis has therefore, to be on improving standard of education and attracting meritorious students to this profession.

Agricultural graduates need to be equipped with greater skill, more expertise and to be more dynamic, so that they would take to a career of self employment. They need to understand the global system, dynamics of international economy, interaction among environmental and economic systems, etc. The globalization favours homogenization of academic programmes and

internationalization of the course contents at least at P.G level. The ICAR has now formulated model course curricula and syllabi for P.G. programme to be run uniformly in all SAD's. This would help improve the quality of agricultural graduates. Further academic programmes have to be flexible and modular based. The restructuring of course curricula to facilitate a 'cafeteria type approach' is essential.

The diversified and new emerging areas which need attention in restructuring of course curricula are education in frontier technologies (biotechnology, information technology, remote sensing, post harvest and packing technology, energy technologies), commercialization of agriculture (management technology, IPR, marketing expertise, banking expertise), natural resources conservations and protection, agroecotomism, etc. Basic science courses including mathematics, molecular biology can be given due emphasis. Duplication of courses across the colleges / departments should be avoided. Further, course curricula could recognise relative rules of women and men in farming and then are equally empowered technologically. It is suggested to set up a National Agricultural Council to review and improve course curriculum periodically through interaction with universities, other institutes, banks, state departments, industries, business organization, etc. The council may make special efforts to prepare students for competitive examinations. This council would give recognition to agricultural graduates as “Registered Farm Practitioners” to provide agroservices. In the university, employment and business advisory services and single window service for generating awareness on self employment opportunities could be established.

Lower tier agricultural education :

It is our experience that most of the professional agriculturists (graduates / postgraduates) prefer white collared jobs. However, paraprofessionals (diploma / certificate holders) are the interface between farmers and knowledge centres. There is demand from organized sector for such vocationally trained diploma holder for farm management, processing industries, aquaculture, animal production, product manufacturing, agricultural tools and implements, seed production, etc. It is possible to run region specific need based specialized courses at agro-polytechnic levels to generate self employment. This calls for growth

of this lower tier of education as that of higher agricultural education.

Generally handicapped / disabled individuals are pushed to agriculture. Training of disabled in self employment generating areas is a challenge. We may fit this group in lower tier agricultural education. It requires sufficient trained human resource, training policies, programmes and courses. With the assistance of "Rehabilitation Council of India", we can develop special programmes.

Entrepreneurship development :

There is a change in job requirement. The graduates coming out from the college do not fulfill the requirement of private sector. They also fail to take up agriculture as a profitable profession. Entrepreneurship attitude amongst the students is necessary for self employment and business as a career. There exists opportunities in micro and macro enterprises for income generation in economic and social sectors. Therefore, entrepreneurship skills such as innovativeness, risk taking, commitment, self confidence, decision making ability and business skills such as operational, managerial, organizational and financial need to be infused in agricos. The universities could start P.G. Diploma courses in selective potential areas of employment to encourage graduates towards entrepreneurship and self employment options (Singh, 2004). With the help of entrepreneurship development organizations, courses an entrepreneurship could be included in the agriculture course curriculum and is necessary to make our programme more practical. More time of the teaching programme can be devoted for gaining professional competence by way of on job/skill / entrepreneurship training. In plant training would be useful to provide confidence to the students. Hands on training or operation of earn while you learn programmes would be of immense utility to build up self confidence amongst the students. Close linkages with the public and private sector organization or stakeholders would help understand better their requirements and train our graduates accordingly. Based on aptitude of the student, they can be placed with different agro-industries, banks, dairy industries, cooperatives, etc.

Integrated agricultural education system:

In India, majority of the farmers are small and marginal and follow mixed farming involving

crop production, animal production, fisheries production, apiculture, sericulture, forestry, etc. It is well known that livestock including poultry is the second major land based livelihood, contributing 26% of agricultural GDP in 2004-05 (Swaminathan, 2006). Further, coastal and inland fisheries provide employment and livelihoods to millions of families. Our country is rich in bioresources and it forms the third important natural resource available to farmers. However, weightage given to these appendages of agriculture in course curricula of basic degree in agriculture is practically negligible. In fact, crop-livestock-forestry-fisheries is the most employment oriented intensive farming system leading to farmers' well being. Hence, it is dire need to formulate integrated agricultural degree programme. Further, sectoral bifurcation of universities will be counter productive. In recent years, there is separation of agricultural branches and independent universities for animal sciences, fisheries sciences, forestry, horticulture, etc. are being formed. This disintegration will badly affect agricultural production due to lack of coordination mechanism, lack of interdisciplinary, interfaculty approach in problem solving and division of limited resources including finance. This degradation needs to be curbed. This sectoral division of agriculture faculty has been increasing burden on available resources without any quality improvement. As against, it dilutes the quality of education. It is also suggested to develop integrated agricultural production systems for different agroclimatic zones for better utilization of available resources and to increase income per unit area.

Quality of education:

Deteriorating quality of agricultural education is very often mentioned, which does not hold good. In recent years SAUs and ICAR have taken a number of steps to improve quality of education. This includes accreditation of the SAUs, building up infrastructure, improvement of faculty competence, restructuring of course curricula, measures to reduce inbreeding, restricting intake for higher education to match demand supply, computerization and library networking and so on. However, agricultural programmes run in private colleges suffer from lack of quality and uniformity due to inadequate infrastructure, financial constraints and lack of co-ordination with ICAR institutes and SAUs. The privatization of agricultural education has been a wrong move and

has adversely affected the very purpose of education i.e. Service to Society. Proliferation of such private agricultural colleges should be outrightly discouraged so as to maintain standard to education. Revolution in information and communication technology has brought fundamental changes in agricultural education system. There is very easy flow of process of teaching and training across the nations and continents. This has made possible distance education as a tool to improve under graduate and post graduate programmes and widen the vision of student. The internet based education would help share modern technologies in various areas and promote continuing education. Faculty training abroad has to be promoted and liberalized. New Pedagogic methodologies could be introduced to promote a learning revolution among the students.

Centres of advanced studies :

The country shows tremendous diversity with regard to climate conditions, crops and cropping pattern. In view of this, depending upon the nature of problem and availability of infrastructural facilities, development of centres of advanced studies in various disciplines should be given a serious consideration. This would help develop region-specific skills, expertise, capabilities in frontier areas of science and local employment options. The concept of establishment of "Virtual University" to meet all information needs of farmers could be considered.

Technological empowerment of women :

In most of the agricultural operations (84%) the involvement of farm women is very high. Hence their training in technological advances is required. National policy on agriculture, therefore aims at mainstreaming gender concerns in agriculture. Appropriate structural, functional and institutional measures will be initiated to empower women and build their capabilities and improve their access to inputs, technology and other farming resources. For self employment support services such as credit, technical support for self help group are needed. The Government of Maharashtra has reserved 30% seats for girls in admission to various degree programmes in agriculture in the state. This is the most welcome step and other states may follow in line with this.

Vocational education :

The base of agricultural education can be

widened and interest in agriculture can be inculcated right from school level. This need was felt by NCA (1976), In the country, at present, a network of more than 82000 secondary and senior secondary schools is built up which could be effectively used to introduce job oriented tea agriculture based vocational courses. This would help meet middle level skilled manpower requirements. The present education policy should attach importance to this sector. It is also necessary to give attention to provide adequate facilities, trained manpower, instruction material, proper monitoring, proper coordination among school administration, Government industries, agricultural institutes, etc.

Planned and functional linkages with different institutes :

With a view to avail the most effectively expertise and facilities available in national and international public and private organizations, industries, NGOs, farmers groups, co-operatives, etc., functional and collaborative linkages need to be developed. This would give new direction and speed to the process of problem identification designing, refinement and solving. The technological advances in communication can be effectively used to improve interrelated programmes substantially. In order to prevent over production and/or under production, there is a need to establish linkages of educational institutes with users departments. Development departments, research institutions, Govt departments, agro processing industries, Food processing industries, dairy industry, veterinary pharmaceuticals, etc. can be the potential areas of partnership to allow students to visit work on projects during vacation to learn from such organisation. This would also facilitate interactions in the areas such as curriculum development, exchange of faculty members on tenure basis, training of students during long term vacations, project funding, sharing of infrastructural facilities, intellectual property rights, market intelligence service, etc. In order to realise the effective symbiotic relationship among these sectors creating a 'National Cell' for promotion of coordination appears to be the logical approach. The cell would also estimate future manpower requirements related to occupational composition of employment.

Autonomy to Agricultural Universities :

The ICAR Model Act (1994) for State

Agricultural Universities is to be followed in letter and spirit. However, there exists deviations of Acts and Statutes of various SAU's from those provided in ICAR Model Act. As a result, autonomous functioning of the SAU's is affected. In fact, there should be adequate autonomy and academic freedom for efficient and effective working of SAU's. There is a need to consider legal empowerment of ICAR not only to ensure implementation of Model Act but also Model Code of Statutes for University functioning to regulate agricultural education (Katyal, 2004).

Financial management :

Agriculture is often said to be a priority area in our planning. However, there has been decreasing allocation to agriculture due to competitive demands for development of other sectors. Agriculture contributes 25% of GDP but budgetary provision for agricultural research and education is less than 1 % of GDP.

The agricultural universities in the country adopted land grant model of USA. The land grant Act provided public financial support for higher education to each state with a grant of land of 30,000 acres to create an endowment fund for support and maintenance of at least one college in each state. However, this could not happen in our country. In fact, education is considered to be the state subject and as such required to provide 100% financial support for development of these universities. The Govt. now finds it difficult to finance these universities adequately. Govt. further hammers on universities for commercial agriculture which dilutes the mandatory activities of education, research and extension education. The support of the state government for research and extension education is meager. It is therefore, absolutely essential that both from the State and Central Govt. adequate funds flow to the university to strengthen the mandatory activities and in turn, face the emerging challenges of the 21st century.

It has been observed that in absence of valid criteria of allocation of financial resources, due consideration needs to be given to the *size* of enrolment, the nature and the level of courses, infrastructural facilities, escalation in prices etc. A nominal ad-hoc increase over the previous year's budget allocation is inadequate for meeting the financial liabilities of the universities. The committed funds are also not released in time which created problems for financial administration.

There should be a mechanism for providing additional funds for education wherever required. The concept of ad-hoc schemes for research can be extended to education as well. The teachers may be encouraged to prepare innovative schemes and finance be provided to such educational projects. There should be adequate allocation of funds for writing of textbooks, preparation of teaching aids and for conducting examinations.

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Self Employment Generation Through Imparting Need Based Education

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The veterinary education in India is undergoing major transformation over the last decade with the introduction of a uniform curriculum by the Veterinary Council of India at the undergraduate level and limited entrepreneurship and service orientation in the postgraduate curriculum. The ultimate goal of this curriculum is to impart the necessary knowledge, skills and capacities related to livestock production, management and clinical care among the professionals. The objective hitherto was seldom to enter into livestock business enterprises or to create a new venture. Majority of the courses in veterinary sciences are production and/or technical oriented with little emphasis on value addition or towards requirements in the market environment. Furthermore, there is a little or no exposure to the functional disciplines of management. Instead of imparting the learning process in veterinary science as an integrated system, it is reduced to different disciplines and left to the student's ability to integrate the different disciplines, wherever necessary. In the context of globalization and privatization, there is a dire need to reorient the veterinary curriculum to inculcate management, entrepreneurship and service outlook in veterinary science graduates and postgraduates.

In the developed countries, competence-based education, management, entrepreneurship, and private practice orientation have been important components of education and lifelong learning policies. This competency based training is usually developed in four steps: determine what the appropriate competencies are, devise training programmes, devise appropriate assessment methods, and set minimum pass standards. Compared with the traditional approach, the competency-based approach potentially leads to individualized flexible training, transparent standards, and increased public accountability among graduates.

The Dutch Ministry of Economic Affairs, inspired by the EU and countries like Scotland,

Sweden and the United States launched a funding programme, 'Entrepreneurship and Education', to guide, stimulate and support education in promoting entrepreneurship.

In vocational education of developed countries, curricular attention to entrepreneurship is not new. Traditionally, this focuses on managerial knowledge and, to a lesser degree, skills. In Dutch vocational education, specific courses or modules are available, explicitly aiming at entrepreneurship, diverging from trade and commerce training to entrepreneurial qualifications and specializations in training systems. Several schools in Europe, USA and UK are identifying entrepreneurship more clearly in specific learning objectives and developing more integrated curricula. There are interesting projects aimed at the intensification and enrichment of traditional activities around business plans, as included in many trade training courses. In Europe and other developed countries, there are also management, entrepreneurship and private service oriented innovations in higher education courses, as well as support for students in starting their own businesses.

There is a greater need today to reorient the learning objectives of veterinary education in India to prepare the professional graduate and postgraduates for self-employment and entrepreneurship on par with their counterparts in developed countries.

In the Indian scenario, the provision of livestock services to farmers has essentially been the responsibility of the state. However, in recent years the emphasis has shifted to cost recovery due to cuts in budgetary allocations. The steering group constituted by the Indian government observed that free veterinary and artificial insemination services have resulted in an infrastructure that is vast and expansive, which the State Animal Husbandry Departments are finding extremely difficult to sustain. Therefore rationalization in the delivery of services can be achieved by transferring the curative and

productive services to the private sector while retaining the preventive, public health and outreach aspects under state control. This may lead to a reduction in employment opportunities for graduates in the public sector. Therefore, the present veterinary undergraduate education, which is primarily designed to meet the needs of State Animal Husbandry Departments, has to be restructured with the introduction of management, entrepreneurship and service orientation. We must move beyond traditional veterinary education *per se*. What is needed is a quantum leap, perhaps a parallel track, in the VCI curriculum with management, entrepreneurship and service orientation.

In developed countries, 50-75% of veterinarians are employed in private practice and the rest in government service, teaching, research and industry. In developing countries, the reverse is the case, where only 10-20% of them are engaged in private practice and rest in government service.

The National Commission on Agriculture recommended a graduate veterinarian for every 5,000 livestock units (NCA, 1976). However, the ratio today is over 1: 10,000. The annual intake of veterinary undergraduates in India is approximately 2,000. By 2010, with an annual growth rate of 2.5% (based on the current trends), the annual intake is expected to be nearly 2280. On the other hand, the livestock sector is growing at a rate of 6% and some subsectors like poultry by 10-15%. So the desired intake of the undergraduates should be 3,000 per annum. This is high when compared to the expected growth rate of 2.5% per year.

The contribution of the agriculture sector to the Gross Domestic Product (GDP) has been gradually decreasing from 40% in 1960s to 26% in 1990s. The contribution of livestock to the Agricultural GDP (Ag. GDP) however, increased from 18% in 1980s to 22% in 1990s. Since 1980, livestock GDP has been growing at an annual rate of about 6%, which is higher than the growth in Agricultural GDP and GDP. The livestock and fisheries sector is emerging as an important contributor to the growth of the agricultural sector with employment opportunities for veterinary and fishery sciences graduates.

Veterinary education today has limited or no opening to the private sector and is well protected

by the state. The participation of private sector in veterinary education is essential for two reasons. Firstly, India has an agrarian economy and animal husbandry contributes to more than 9% to its GDP and nearly a quarter of Ag. GDP, whereas trained manpower in veterinary science constitutes less than 1% of the total science and technology manpower. Therefore the economy has a higher absorption rate than the present veterinary student's growth rate. Secondly, the state sector needs to conserve its resources and the entry of the private sector, if allowed has the potential to fill the gap and to provide healthy competition.

Veterinary Education: Managerial Orientation

Flexibility is the key to survive and grow in a market-friendly way, therefore, curriculum restructuring should receive greater attention to meet the demands of public and private sectors. Various concepts such as competencebased education, total quality management and total quality education are to be introduced in veterinary schools to aim for BS -5750 and ISO - 9000 series standards in order to market the graduates for national and international opportunities.

The management of veterinary education by and large lacked the appreciation of the role of the faculty in the overall development of the institutions. The quality improvement programmes aimed at veterinary human resource development have undoubtedly improved the qualifications of the faculty, but it has not largely benefited the academic or research programmes of the institutions understandably due to lack of peer pressure on such individuals. The management system has to undergo a drastic re-orientation in respect of recognition of achievements, empowerment of individuals, identification of talent, respect for one's capabilities and motivation for continuous upgrading of skills of veterinarians.

The educational system and the employment opportunities in the public sector in India have slotted veterinary and animal husbandry as an applied science far from realizing its true potential as a profession with management orientation. There are three main reasons for this:

1. Veterinary education in India has a major orientation towards animal production and very little attention is paid to value addition. Therefore, market research into

demand projections, exploring niche markets and export potential were not considered for the choice of animal production technologies as well as establishing backward and forward linkages to make them commercially viable from the farmers' and importantly from the industries point of view.

2. Veterinary education has worked within the paradigm of transfer of technology from the scientist to the end-user through an outreach officer. The emphasis has been on awareness creation and dissemination of new technologies through extension and communication techniques, with a weak effort at skill upgrading. There has been very little effort to create a cadre of veterinary professionals to provide technical and professional services to farmers on a commercial scale.
3. Employment opportunities in the public research and extension systems in India have a major influence on the curricula in the veterinary institutions during the last five decades. Even at the postgraduate level, greater emphasis is laid on research rather than applied. management.

Therefore, veterinary graduates/postgraduates are offered only middlelevel management positions in the private sector due to lack of managerial orientation. Other professionals from the field of marketing, finance, production, etc., are occupying the key managerial positions in livestock and veterinary pharmaceutical industries, while veterinary professionals are relegated down the ladder as field functionaries. This calls for better preparation of these professionals to develop a management perspective that would evenly balance veterinary and animal husbandry as a science and as a profession for the emerging market demand.

Veterinary Education: Entrepreneurship Orientation

The entrepreneurship orientation in the curriculum is to change the student's dependence on government jobs which has a bearing on the structural organization of undergraduate curricula leading the graduates to take up private practice,

consultancy services, start animal oriented businesses and industries. The challenge now for the curriculum should be to train veterinarians as 'job givers', not as 'job seekers'. They in turn should influence the farmers to make a transition from the former 'isolated' environment of being 'livestock producer' to 'livestock entrepreneur' in a market-led outreach environment. Direct assistance to graduates and support to farmers for making this transition is currently part of Indian government policy under agribusiness and agri-clinics scheme. The other way of assistance however, is through the teaching learning process by introducing courses/modules with an entrepreneurship orientation in the curriculum.

Veterinary Education: Private Service Orientation

The complex and rapid development of the international livestock and livestock products trade is coupled with increasing societal demands for the production of not only abundant and inexpensive but also safe animal food that has been raised in a humane and environmentally friendly manner. The new global trade agreements of the WTO calls for massive changes and increasing integration of public and private service sectors. Private service is a huge growth area for veterinary professionals with adequate skills which are not provided sufficiently in the present veterinary education system. More flexible method such as a basic science course with principles and practical teaching in compulsory basic subjects, livestock production, pre-clinical and clinical subjects, followed by specialized elective courses for public and private practice may merit consideration

Elective Curriculum for Public Service

As standards of living increase, consumers are demanding quality at every point in animal food production chain from guarantees of environmental preservation and humane treatment of animals to anti-microbial and other residue controls. The long coastline coupled with, diverse agro-climatic conditions in India increases the chances of natural disasters in the form of cyclones, floods and droughts and a contingency planning and adequate professional training to meet these situations is yet another challenge.

The majority of the end users of the public service in India are the small and marginal farmers,

and, therefore, an appropriate curriculum on small holding livestock production systems and its interaction with mixed farming is greatly essential.

General competencies such as outreach methodologies, Indian rural sociology, communication skills and staff supervision and motivation skills need to be covered at length in the curricula. These integrated concepts need to be addressed sufficiently by academics especially for the veterinarians with public sector service orientation.

Curriculum revision and development for imparting skills such as, animal welfare and standards, animal behaviour, international laws and standards governing chemical and animal food residues and its impact on trade, quarantine related to imports and exports, TOM and public accountability, disaster management and hazard analysis, management of wildlife and endangered species, environment, waste management and preservation of global biodiversity and information and communication technology for public service is the key to success.

The elective curriculum for private services needs greater focus on livestock economics, commerce and international trade, entrepreneurship, farming systems, environment management, pet animal husbandry and clinical care, laboratory diagnosis with emphasis on pathology, parasitology and microbiology, computer-based ration formulation for livestock and pet animals, extension methodologies including group dynamics and bookkeeping and record keeping.

Elective Curriculum for Private Practice and Industry Service

In India, majority of the livestock holders are small and marginal farmers and pet animal rearing is gaining momentum in small towns on par with the growth in economy. Further most livestock industries are small to moderate and therefore to facilitate profitable and efficient practice in this setting, the veterinarians will have to equip to be competent and versatile farm and pet animal practitioners, as well as consultancy service providers to industry with training in farming systems, clinical and companion animal aspects.

Management, entrepreneurship and service orientation

Management, entrepreneurship and service orientation in veterinary education is the need of the hour and in the first place, the Veterinary Council of India should create a new department to deal with these specialized aspects. The SAUs in the country should adopt the concept of core and visiting faculty members followed in Indian Institutes of Management. The new department with the help of visiting faculty-members from industry should provide insights to real life on-the-job experiences and practical assignments to encourage private service and entrepreneurship.

Revamping of the veterinary curricula by introducing functional management disciplines in the curriculum and integrating entrepreneurship into each of the production, para-clinical, clinical and elective subjects to instill entrepreneurship is desirable.

Technical Session II

PROMOTION OF EXPORT ORIENTED AGRICULTURAL AND HORTICULTURAL COMMODITIES

Promotion of horticultural commodities for export in Himachal Pradesh

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Like other states of the country, seventy one per cent population is dependent on agriculture in Himachal Pradesh. Hence, progress of the state means the welfare of the farmers. However, the farmers are under distress due to their small holdings and increasing cost of agricultural inputs and family needs. Unemployment of rural youth aggravates the situation further. Welfare of farmers can, therefore, be achieved only by enhancing their income and providing employment to rural youth. Export of agricultural produce can help a great deal in this regard because the prices are generally higher in international market than national market. High price serves as an incentive to farmer to produce more in order to earn more. It also helps in earning or saving foreign in India under WTO Agreement. Australia, China, New Zealand, Italy and South Africa have already put their apples in Indian market.

Himachal Pradesh is a small state in view of its smaller geographical area and only about ten per cent of it is cultivated. Due to small, scattered and uneven land holdings, agricultural crops cannot be grown on large scale to make a viable proposition for export. But it has tremendous potential for export of horticultural commodities which incidentally have great demand nationally and internationally, as these are grown in its prevailing temperate climate whereas most other parts of the country have tropical and subtropical climatic conditions.

Himachal has as many as nine agro-ecological zones which have been characterized on the basis of prevailing temperature, rainfall, snowfall, topography and other geographical parameters comprising plains, valleys, low hills, high hills and alpine (dry temperate) zones. This makes it possible to grow almost all temperate crops of the world on one hand and at different periods of the year on the other making it possible to maintain a continuous supply to the market. A list of various commodities which can be grown in different zones is given in Table 1.

Intensive agriculture which is practised in the plains of the country has degraded the natural resources due to the excessive use of chemicals and water. Fortunately, use of agro-chemicals is negligible in many parts of the state making it most suitable for organic agriculture. Demand for organic food is increasing about twenty per cent annually making its adoption more remunerative besides maintaining soil health, human health, environment protection and sustainability of agriculture system. Further organic horticultural produce of the state will have great demand in western countries because it consists of mostly temperate fruits, vegetables and ornamentals.

Strategies for export of horticultural commodities from H.P. :

- ♦ Identification of commodity-specific niche areas as Export Promotion Zones (EPZs).
- ♦ Providing infrastructure support like packing yards, cold storage, pre-cooling, refrigerated transport and mechanical handling/packaging. The role of institutions like Department of Horticulture, HPMC, HIMFED can be harnessed in this direction.
- ♦ Encouraging producers' consortia or cooperatives to achieve operational and organizational efficiency in production and export on the pattern of MAHA Grapes Society (Maharashtra), Anand Dairy Coop (Gujarat).
- ♦ Thrust on organic farming, value added products and quality management giving more thrust on quality rather than quantity. The State Govt. has already accorded top priority to popularize organic farming.
- ♦ Identifying potential export markets and developing efficient supply chains.
- ♦ Linking the farmers of Himachal Pradesh with MNCs for export, Le., public-private linkage.

Table 1 : Potential Horticultural Commodities in Different Hilly Regions of H.P. for export.

Commodities	Low hills	Mid hills	High hills	Alpine (Dry Temperate)
Vegetables	okra, bittergourd, cucumber	cauliflower, broccoli cabbage, capsicum	capsicum, pea, cabbage	pea, cabbage
Fruits	mango, litchi, citrus	stone fruits, peacanut, kiwifruit	apple, walnut, cherry	almond, dried apricot, pinenut, apple
Floriculture	roses, gladiolus, gerbera	lillium, tulip, roses, planting materials	gladiolus, tulip	—
Spices & condiments	turmeric, ginger	chillies, garlic and large cardamom	—	kalazeera (growing under natural condition), saffron
Medicinal herbs	—	ashwagandha, mentha, stevia and OCimum	podophyllum, valeriana and lavender	hops, pushkar and seabuckthorn
Miscellaneous	honey	tea, mushroom	mushroom	—

Promotion of Export Oriented Agricultural and Horticultural Commodities

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Agriculture in India today :

India is the largest producer of wheat, pulses, sugarcane, milk, cocount, spices, cashew and tea, it stands at the second position in rice, fruits and vegetables. India can boast of a record food-grains output of 208.9 million tonnes including 89.5 million tonnes of rice and 75.6 million tonnes of wheat. Oilseeds production is at 20.9 million tonnes, sugarcane at a new peak of 299.2 m tonnes. India is the largest producer of milk in the world at 78.1 million tonnes.

Status of Food Processing Industry :

- ♦ Size of food market in India – Rs. 8,60,000 crore
- ♦ Primarily processed food market – Rs. 2,0,000 crore
- ♦ Value added processed food market – Rs. 1,80,000 crore
- ♦ Investment during the 10th plan is estimated at Rs. 62,105 crores
- ♦ Industry growth rate during the last five years at 7.14% against GDP on 6.2%
- ♦ Investment required during next ten years – Rs. 1,10,000 crore
- ♦ Low level of processing – 2% in the case of fruits and vegetables, 14% in milk, 4% in fisheries, 1% in meat and poultry products
- ♦ India's share in world's processed food production – 1%
- ♦ Value addition 20% against 45% in Philippines.

Market Potential for Processed Foods in India (Rs. billion)

	2003-'04	2009-'10	2014-'15
Fruits and vegetables	49	155	345
Dairy	1160	1730	2450
Edible oil	500	692	925
Meat and poultry	27	64	129
Non-alcoholic beverages	101	151	198
Grains	1802	2227	2668
Marine foods	18	30	51

Sugar and sugar based	285	383	492
Alcoholic beverages	232	513	1106
Pulses	402	605	809
Malted beverages	12	19	27

Agriculture in India today - The other side

Away from the specter of a famine stricken nation of the 1950's, to one with huge buffer stocks of food grains, largest producer in most of the agricultural products with some of the lowest yields, an impressive figures achieved, without full resource utilization. Productivity is quite below world average - an insight to actual potential. This yield gap represents the untapped production reservoir.

Why increased focus on food processing?

The second green revolution will be centered on the concept of 'farm to plate'. Low share of processed foods in the country will open doors to other countries to tap the emerging market for processed food triggered by a burgeoning middle class with increased purchasing power. The Horticulture Mission targets to increase the production of fruits and vegetables to 260 MT from the current 140 MT through several interventions.

Vision 2015 of Govt. of India envisages to raise agro/food processing from 6% to 20%, value addition from 20% to 35% and the global trade from 1.5% to 3%, the estimated requirement of funds for achieving this being Rs. 100,000 crore. The current wastage is 35% in fruits and vegetables and in certain cases as high as 60%.

Agriculture Scenario in Gujarat today :

Major crops cultivated are :

- ♦ Food crops : Wheat, rice, maize, jowar, bajra
- ♦ Oil seeds : Groundnut, sesame, castor, rapeseed, mustard
- ♦ Commercial crops : Cotton, sugarcane, tobacco
- ♦ Horticultural crops : Manago, banana, guava, tomato, potato, onion, cumin, fennel, isabgul.

Production of grains, oilseeds and spices in Gujarat :

Crop	Area ('000 ha)	Production ('000 tons)	Yield (tons/ha)
Wheat	727	1806	2.5
Rice	879	1197	1.8
Bajra	915	1089	1.2
Jowar	122	134	1.1
Groundnut	2003	4478	2.24
Sesame	402	241	0.60
Castor	290	541	1.86
Cumin seed	200	64	0.32
Garlic	8.5	46.4	5.46
Chillies	12.1	10.5	0.87

Production of Fruits and vegetables in Gujarat:

Crop	Area ('000 ha)	Production ('000 tons)	Yield (tons/ha)
Banana	35.2	1403	39.86
Potato	35.8	780	21.79
Onion	25	717	2.70
Brinjal	36.5	531	14.56
Tomato	1.8	321	17.08
Mango	69.9	495	7.10
Chiku	20.1	195	9.71
Papaya	4.9	191	39.04
Guava	7.8	110	14.14
Lime	22.3	224	10.04
Aonla	4.5	41	9.11
Dates	10.5	65	6.19

Investment Opportunities in Gujarat for Agro and Food Processing :

The state has a clear competitive advantage in castor, fennel, cotton, tobacco, groundnut, sesame, sapota, onion, banana, isabgul, guar seed and cumin. It has the potential to develop competitive advantage in mango, potato, papaya, guava, turmeric and garlic.

Investment Friendly Policy Initiatives :

Some of the investor friendly policy initiatives for export promotion are :

- ♦ Automatic approvals for foreign investment up to 100%, in major areas. Foreign investment also allowed in sectors reserved for small-scale sector, subject to certain conditions.
- ♦ Export earnings exempted from corporate tax - likely to be phased out in next five years.
- ♦ QRs on all food products removed. Customs duty on majority of the products at 35%.
- ♦ All fruit and vegetable products exempt from central excise duty.
- ♦ New Exim Policy to set up exclusive agro export processing zones with fresh incentives.
- ♦ Ministry of Food Processing Industries promoting food parks - an integrated processing

concept with common facilities and marketing.

- ♦ Specific concessions for EOUs.
- ♦ Full duty exemption on all imports.
- ♦ Tax holiday for any 5 consecutive years.
- ♦ Permissions to have up to 100% foreign equity.
- ♦ Use of foreign brands freely permitted.
- ♦ Allowed to sell 50% in domestic area.

Problems - Unique as they come

Leading Indian food players focus entirely on the processing end - ignoring procurement, quality of raw materials and farming practices. Much larger number of intermediaries exist in the system than one would see in food chains elsewhere. It is necessary to amend the APMC Act with the objective of directly linking corporates and farms. Further de-reservation of small-scale sector is also warranted.

Areas seeking solutions :

A substantial amount of fresh produce estimated at around Rs. 7000 crore is wasted every year due to lack of proper post harvest management, storage and transportation facilities. Domestic demand for processed foods is low due to high costs in comparison to the fresh produce. Low level of processing and packaging technologies impend acceptance of "Made in India" brand. Weak marketing linkages and insufficient financial support also affect organized retailing.

Reforms needed in farm segment to accelerate exports :

- ♦ Competitiveness - Improve agricultural efficiency viz., productivity and return on investment with better technology, seeds and mechanization.
- ♦ Rural infrastructure - Improve connectivity, warehousing etc.
- ♦ Port based infrastructure - Grain storage silos, mechanized handling, gamma irradiation facility, logistics support etc.
- ♦ Air-fright terminal - Center for perishable cargo.
- ♦ Rural and agri. credits - Reduce interest rates.
- ♦ Agri Export Zones - Accessibility and enabling exportable quality.
- ♦ Integrated Agro-Food Parks - Organized, high-tech, demand-led.
- ♦ Cold Chain - Cold storages, refrigerated transport.
- ♦ Irrigation projects - River linking, micro irrigation.
- ♦ Public Private Partnership (PPP) - In processing, marketing, R&D, HRD.

- ◆ Contract Farming – Firming up laws.
- ◆ Land Leasing – Enable corporate farming.
- ◆ Modern Terminal Markets – Price discovery, risk hedging.
- ◆ Farm level value addition – Organic farming, cleaning, grading, packing.
- ◆ Produce quality – Quality standards, certification and enforcement.
- ◆ Venture Capital – Government / Financial Institutions / Banks.
- ◆ Market Intelligence System – Vital price, production and supply information for demand linked farming and processing.

Paradigm Shift in Marketing :

Setting up nation wide online multi-commodity exchanges enable producers / processors / traders / exporters to sell with full transparency, buy in advance and protect themselves against possible price fall / rise. These exchanges enable price discovery, risk management and better price for quality. Farmers enjoy insurance cover, price hedging facility and bank finance.

Present Status of Farm Produce Marketing:

The present marketing is supply driven, rather than demand led, with very high wastage (25% of production), with innumerable intermediaries, lacking storage, grading and sorting infrastructure facilities. Pricing is not transparent.

Modern terminal markets :

Terminal markets can be catalysis for transformation. A professionally managed competitive structure to provide market services to farmers at their door steps with comprehensive solutions to meet needs of stakeholders viz; auction, processing and export facility. Terminal markets can be infused by private enterprise.

The desired value chain :

Reduces intermediaries and increase food safety and quality. With value chain, the farmer's price realization is up; consumer price is down and trade volume is up. Supply chain can be optimized by enabling better infrastructure, refrigerated transport and faster communication resulting in reduced losses and costs.

National Horticulture Mission :

National Horticulture Mission aims to double the national horticulture production to 300 million tones by the year 2011-2012. The focus areas are:

- ◆ Enhanced production and productivity of horticultural crops.
- ◆ Strengthening of infrastructure facilities such

as analytical laboratories, survey and surveillance, micro-irrigation etc.

- ◆ Building infrastructure for on-farm and post harvest handling.
- ◆ Production of high value horticultural products for export.
- ◆ Strengthening infrastructure facilities for marketing and export.
- ◆ Enhanced production of high value processed products.
- ◆ Enhancement of efficiency in adoption of technologies.

Micro-irrigation: Why?

Current water use efficiency in agriculture is, 30-40%. With market size of 500 crore, past growth rate of 15-20% per annum, proposed area for adoption for X plan – 3 m ha and XI plan – 14 m ha (potential of 72 million ha), Govt. support through National Horticultural Mission to cover 60% of area under horticultural crops, Govt. budget outlay for 2006-07 at Rs. 520 crore under MI and Rs. 1000 crore under National Horticulture Mission, water use efficiency and agricultural productivity is bound to go up.

Medicinal and aromatic Plants :

Global trade in medicinal plants is USD 80 billion. Leading importers are Hong Kong, USA, Germany and Japan. Major exporter is China, India's exports is worth 447 crore (9% of world market). Market is growing at the rate of 15-25% annually.

Integrated agro-parks :

Unlike traditional agro-parks, Integrated agro-parks provide common infrastructure; pack house, cold storage, cold-chain, irradiation facility, marketing infrastructure, common facilities, management service, R&D support, quality control and certification infrastructure. They ensure backward and forward linkages, facilitate convergence of services, are operated by SPVs, and works on PPP mode (involving stakeholders; Govt. entrepreneurs and farmers).

Contract Farming :

Contract farming satisfies an important food processing business requirement – assured supply base. Quality aspects gaining importance, the processor introduces new crops / varieties / technology as per the suitability for processing. Farmer's risk is reduced—he gets guaranteed and fixed price. He also has easy access to crop finance and insurance.

Promotion of Export Oriented Agricultural and Horticultural Commodities

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Preamble

The value of world agricultural exports in 2005 accounted for around US \$ 650 billion, an increase of over 50 per cent from US \$ 400 billion in 2000. The unit value of world agricultural exports continues to rise as export prices increase at a greater rate than the volume of agricultural goods produced. According to WTO figures, in 2004 the value of world agricultural exports increased by 15.3 per cent from the previous year compared to 3.7 per cent in the volume of world agricultural goods exported for the same period. In 2005 the annual increase in world agricultural export values fell to 8.1 per cent, but was still higher than the 5.6 per cent increase in volume of agricultural exports. This reflects currently, there is fall in average unit value realization of agricultural exports globally.

There is an increase in volume and value of Indian agricultural exports from 2001-2002 to 2004-2005 with 7.5 million tons to 11.1 million tons in terms of quantity and 10169.41 crores to 16254.88 crores in terms of value.

Agricultural exports from India

S. No.	Year	Quantity (million tons)	Value ('000 crores)
1.	2001-2002	7.5	10.0
2.	2002-2003	1.2	14.0
3.	2003-2004	3.9	14.0
4.	2004-2005	11.1	16.0

But however, the share of agricultural and allied products exports in India's total exports during the last four decades has, however, been declining continuously. It came down from 44 per cent in 1960-61 to 14 per cent now. This implies there is

tremendous growth in the exports of secondary and tertiary sectors than primary sector. Though it is a healthy sign of development, considering country's agriculture endowment, the exports growth of agriculture has to be viewed under different perspectives complementing secondary and tertiary sectors.

The prime aim of this paper is to address the commodity-wise export / import profile, constraints and remedial measures in juxtaposition with exim policy. In addition to that the possibility of reducing the imports in some of the commodities which are deficient in supply is also explored.

Exports of rice

Rice trade in 2007 is currently forecast at 28.1 million tons down from 28.7 million tons in 2006 and from the record 29.8 million tons in 2005. However global trade in rice is growing at a faster rate than other major cereals, such as wheat and corn. Much of the decline in world exports is currently foreseen to result from smaller shipments by China, Pakistan, Egypt, the US and Australia. In contrast, Cambodia, India and Thailand could export more.

FAO has forecast India's rice exports in 2007 at 3.6 million tons, slightly more than 3.5 million tons exported in 2006, but much below the record 5 million tons exported in 2005. However, India's actual paddy production could be less than 140 million tons forecast by FAO. But still India's adoption of more trade - friendly policies during 1990s led to a dramatic increase in rice exports by more than 40 per cent.

Issues in the rice trade:

- ♦ Paradigm shift in the consumption pattern of major rice consuming economies. Per capita consumption of rice was declining

in most Asian economies due to rising income and rapid urbanization. .

- ◆ Global trade in rice - often distorted by subsidies in developed and even developing countries - increased from four to seven per cent between 1992 and 2004.
- ◆ Rising rice production had led to a decline in real prices. However, with the greater integration of the country into global markets, the key question was how India should deal with the rising price volatility in rice.
- ◆ The non-institutional non-market access like the decline in soil health and water quality in rice-based systems is a major global issue.
- ◆ Exports of basmati rice from India might, however be affected by a recent decision by exporters to establish a minimum export price level to prevent firms from undercutting each others prices.
- ◆ Rice patents may hamper research. Swiss bio-tech giant syngenta has tightened its monopoly control over rice by seeking global patent rights over thousands of gene sequences. The rice DNA contains 37, 544 genes roughly one-fourth more than the genes in a human body. With the multinational all set to 'own' the worlds' most important staple crop, there may be serious implications for future research.
- ◆ Global warming - a threat to rice production in India. Scientist called for developing agronomic practices and new varieties that are better adapted to the climate change and atmosphere.
- ◆ The rice market in the neat future would be complex due to the proposed commercialization of genetically modified (OM) rice. Hence development of transgenic crop is only one of the many options.
- ◆ According to FAO experts, "in future rice will become an inferior commodity in Asia, but its importance will grow in Africa. In sub-saharan African (SSA) countries rice

consumption will touch 19.9 million tons by 2015 from the 13 million tons in 2005.

The demand for rice there is growing at the rate of 6 per cent annually - faster than anywhere else in the world. Even in eastern and southern Africa, where rice is not a traditional foodiannual per capita consumption increasing and has reached 15 kg. In the SSA region almost half the rice needs are met from imports. Imports have been on the rise by 8.4 per cent annually, and would continue to rise. About 20 per cent of the total world rice imports are now by the SSA countries. These countries are spending more than \$ 1.2 billion a year to import rice.

- ◆ Through special mission mode programmes, not only the long grain basmati which is an immense foreign exchange earner but the short grain aromatic and speciality rice along with the wealth of medicinal rice of India also deserve attention from researchers, market opportunities in domestic and world markets.

Wheat global scenario

Projected at 112 million tons for 2006-07, world wheat trade will be 4 million tons higher than in the previous year. But at the production front wheat output is set to decline by a whopping 30 million tons from previous year (588 million tons). This has resulted in wheat prices moved higher in response to several bullish features including a large cut in Australia's forecast crop, while other factors included active buying by a number of countries, notably India, tightening European and black sea market supplies. Global wheat consumption estimated at 607 million tons is decidedly higher than the year's forecast production although a slowdown in use is discernible. EU feed users are likely to switch to relatively cheaper barley and oil seed meals, while high prices will limit feed use in North America, and *more* wheat will be used for ethanol in Canada (as per International Grains Council).

Issues in the trade of wheat:

- ◆ As far as wheat is concerned, India is presently a net importer though we have

productivity on par with global standard.

- ♦ World wheat market has turned a seller market with tightening supplied and rallying prices, something that should cause concern in India. Imports are likely to become more expensive, pushed further by firming ocean freight rates.
- ♦ High cost imports would operate as a floor for the domestic market.
- ♦ India's imports may exceed 6 million tons.
- ♦ On current reckoning, India is likely to continue to remain in the global import market in 2007-08 too.
- ♦ Can India avert imports?

Production of 77-78 million tons and procurement of 15-16 million tons can possibly help save the blushes next year. But such a large increase in output is a tall order and appears to be beyond the known capability of the country.

The soils in the country's main north-western wheat bowl have become fatigued due to exhaustive cultivation. This has lowered input-use-efficiency as reflected by the poor response to higher doses of fertilizers. Besides, the soils have been depleted of vital secondary and micro plant nutrients. Hence, the problem is wheat trade should be addressed on non-institutional non-market angle. At the first step the production has to be generated to curtail imports and increase productivity.

Pulses

Country in short supply

Despite being the largest producer in the world, the country is in short supply of pulses. During 2004-05 the pulses production in the country was 13.38 million tons from 22.47 million hectares area. This is below the domestic requirement leading to import of pulses to the tune of 1.47 million tons. Indispensability of rice and wheat vis-a-vis urgency of increasing pulses production calls for a paradigm shift in crop planning with major attention on diversification of cropping systems involving pulses. Besides generation of improved production technologies, their effective transfer to farmers is equally important. A large number of field demonstrations conducted in farmers fields amply showed that existing technologies developed during the past decades have the potential to bring at least 30-35 per cent improvement in pulse production.

Export promotion of pulses

According to commerce ministry data, the country exported 4.6 lakh tons pulses in 2005-06, of which Kabuli chana and masur accounted for nearly 311. But however the export of pulses is banned. If we are not allowed to export pulses, neighbouring countries like Myanmar, Pakistan and Sri Lanka will develop their pulses export market and domestic exporters will be losing their markets gradually. The government should relax the export restrictions on Kabuli Chanaas "we mostly consume desi chana".

Oil seeds

The major trade in oil seeds is in their derivative-edible oils, hence we look at the trade in edible oils. In terms of vegetable oils, India is the fourth largest oil economy in the world after the U.S. China & Brazil. Besides, India is the second largest producer of rice and cotton, which yield valuable rice bran oil and cotton-seed oil.

Declining dependence on imports

During the early 1990s, India notably improved both its production performance and met consumption requirements with a significantly reduced and declining dependence on imports of edible oils. Till early 1990, minimum support price (MSP) for foodgrains was kept in check in relation to oil seeds. The total effort led the increased production of oilseeds at the rate of 6.19 per cent per annum with annual growth in area by 2.99 per cent and productivity by 3.13 per cent a during 1986-98. But the mid-1990s saw a significant turn around in terms of cheaper edible oil availability in the international market and a faster economic growth, resulting in increased demand for edible oils.

This increased demand was met mainly through imports as production of oilseeds had fallen to 0.68 per cent per annum, far below the domestic growth (4.85 per cent) in demand of edible oils per annum. After mid 1990's oil seed prices declined relative to other crops, mainly due to liberalization of edible oil imports initiated in 1994. One factor, which has contributed to insufficient domestic supply of oilseeds, is the country's MSP program, which has often favored production of crops that compete for area with oil seeds. During 1999-2004, the production of oil seeds declined annually by 1.2 per cent with decline in area under oil seeds by 2.56 per cent.

Sugar

Sugarcane is yet another cash crop in the country. There can't be international trade in sugarcane but sugar is an important internationally traded commodity and the market for sugar affects the interests of growers, factories and the consumers. Therefore, we also look at international trade in sugar.

The world sugar market is considered as one of the most distorted international commodity markets. Although international price of sugar is generally lower than that in the domestic market, but it should be kept in mind that world sugar is highly subsidized by major exporting countries like USA, Cuba and Brazil. International price of sugar remains lower than that in India not because India's cost of production is higher but because of the element of subsidy. As far as real cost of production is concerned, India is a competitive producer of sugar. During 1984-85 and 1986-87, the country had to import 37.94 lakh tons of sugar. In 1989-90, sugar season also, the imports of sugar were more than the exports. During 1990-91 to 1991-92, the availability of domestic production was comfortable and import was not needed. In fact, country could export sugar in these three years. However, India imported (net) 10.38 lakh tons of sugar during 1993-94 and 1994-95. India was net exporter in four years and importer in three years between 1995-96 and 2001-02.

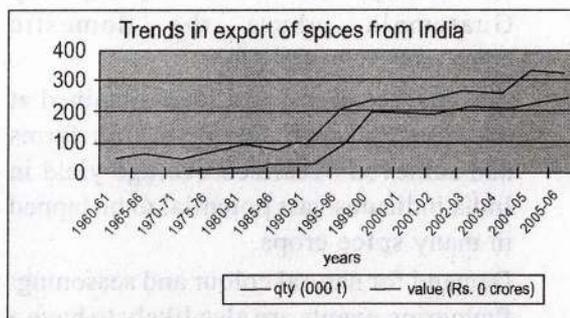
Issues in the sugar market

Reduction in the rate of sugar consumption and rise in open market price forced the government and sugar manufacturers to take adhoc decisions about sugar production. Even then we have potential to grow up to 200 lakh tons mark per annum in sugar production. As our domestic market can't absorb the entire production, we have to plan for a continuous export of 35 per cent of total production. But at present our performance in the export front is also not good because of ad hoc policies followed. Apart from uncertainties associated with supplies, price has also become less competitive. The decline in world sugar prices due to entry of surplus Cuban sugar and existing surplus in the range of four million tones poses challenge to our sugar export.

Spices

More than 90 per cent of spices produced

in India are for domestic consumption and the remaining exported in raw and value added terms. According to world spices production statistics 2003-2004 by FAO, India's was 86 per cent by volume followed by China (4 per cent), Bangladesh (3 per cent), Pakistan and Turkey (2 per cent each) and Nepal (1 per cent). Share of spices in total agriculture export of India is around 6 per cent. India's share in world spices trade is 45-50 per cent by volume and 25-30 per cent by value.



With respect to export, quantity exported registered a 45 per cent increase during the four years (2.30 lakh tons in 2000-2001 to 3.35 lakh tons in 2004-2005). Average export earnings during the aforesaid period were Rs.1,690 crores and Rs.2,200 crores which recorded an increase of 30 per cent. Chilli fetched the highest export earnings (Rs.99 crores) followed by oils and oleoresin (Rs.64 crores) and mint oil (Rs. 408 crores) during 2004-05.

Export demand

The global spice trade demands for high quality varieties in tune with international demand for diversified uses (medicinal and nutraceutical). Piperine rich varieties of black pepper, high curcumin varieties of turmeric, bold capsuled variety of cardamom (Nallani green gold, PV 2), low fibre variety of ginger (11 SR Varada) and capsaicin and Capsanthin rich chilli are now selectively grown by farmers for export market. Recent demand in spices market is for organic spices.

Issues in spice trade

- Value addition through suitable post harvest technologies is one of the thrust areas in spices research.
- Mechanical processing is now adopted by large farmers as a result of fabrication of mechanical driers and polishers for

cardamom, threshers for black pepper, peeling and polishing machine for ginger and turmeric. Invention of kerosene / LPG / solar energy based curing system was a boon to small farmers of cardamom who can't afford investment on traditional firewood based curing chambers. Besides, it prevented destruction of trees in cardamom ecosystem.

- ◆ Indian cardamom is superior in quality, but has always been out - priced by Guatemala where the domestic consumption is negligible.
- ◆ The gap between yield level obtained at experimental and demonstration farms and achieved / realized average yield in India indicates vast potential to be tapped in many spice crops.
- ◆ Demand for natural colour and seasoning/ flavouring agents are also likely to have a surge in export of spices. especially in the light of demand for Indian culinary specialties in Europe, U.S. and the Far East.
- ◆ Spices are also promoted as medicine, Indigenous and traditional knowledge on pharmaceutical uses of spices are being verified and validated. Fungicidal and bactericidal properties of spices are made use of in IPM.
- ◆ Pepper and Chilli extracts have uses in crowd management. Available technologies and traditional knowledge are farmer friendly, cost effective and globally competitive for enhanced production of spices in India.

Cotton

World cotton situation

Particulars	(in million tons)		
	2004-05	2005-06	2006-07
Production	26.29	24.80	24.80
Consumption	2.38	24.90	25.80
Exports	7.79	9.30	9.40
Ending stocks	10.96	10.90	9.90
Cot look A-Index*	52.20	56.00	63.00

* Forecast price in US cents / Pound

Source: ICAC, Washington

World cotton exports are forecast to set a new record at 9.4 million tons driven primarily by Chinese cotton demand. The U.S. would be the largest beneficiary with exports expected to set a new high of 3.7 million tons i.e. 40 per cent of world exports (International cotton Advisory Committee). As a result of rising consumption and stagnant output, world ending stocks of cotton are sure to decline to a recent low of 9.9 million tons for 2006-07, cot look A-index representative of the level of offering prices on the international raw cotton market - is forecast to average 63 cents a pound, up sharply from the previous year's average of 56 cents.

Positive on cotton

Unsurprisingly, at the New York Board of Trade, investors have turned positive on cotton, buoyed by expectations of further growth due to a large import demand from China to meet its textile sector raw material needs. While world cotton consumption in 2006-2007 is estimated at 25.8 million tons (up from 24.9 million tons), world production is likely to remain unchanged from the previous year at 24.8 million tons according to the International Cotton Advisory Committee.

Export opportunity

World cotton market fundamentals are turning producer friendly. The market is poised to witness strong prices. Tightening world supplies robust export market and strong prices are sure to open up attractive export opportunity for Indian Cotton. Achievement of 50 lakh bales export during 2006-07 season is within reach. Obviously, a big opportunity is coming India's way in the form of favourable world market conditions with higher exports and firm prices. This should prove positive for growers, addition to the relief package announced by the government. Policy makers and trade must together seize the opportunity.

Jute and Mesta

Manmade or natural fibres have always occupied an important place in the trade sector. The production of man made fibres has increased by 7.9 per cent (37.98 million tons), comprising a 56.3 per cent market share at the global level.

Key export factors

- ◆ In order to boost the export status of these items further, it is desirable that fine jute and jute blended yarns are manufactured in

bulk so that light fabrics are available for manufacturing different diversified products.

- ♦ New processing systems have to be identified for producing other jute blended yarns especially of count 4 Ib and below.
- ♦ The term 'quality' for jute fiber should be viewed in terms of specific end use of jute based fabrics in order to suit suitability for ultimate end uses.
- ♦ Dimensional stability, compressibility and recovery, light fastness, wash fastness, fiber shedding and thermal resistance of jute based fabrics must also be improved for quality goods with higher value addition.
- ♦ Jute is primarily cultivated by marginal and small farmers. Therefore, any positive impact of the adoption of improved and particularly, cost effective production technologies which will result in higher yield will directly benefit these groups of farmers.

New initiatives in jute industry

In view of rising global concern about environmental issues, jute is poised to produce favored range of products because of its eco-friendly and biodegradable characteristics. The government of India has formulated a comprehensive National Jute Policy, which can:

- ♦ Ensure remunerative prices to the jute farmers in the country.
- ♦ Produce good quality fiber and products to meet the growing needs of the country and international buyers.
- ♦ Increasingly contribute to the provision of sustainable employment and the economic growth of the nation and
- ♦ Compete with confidence for an increasing share of the global market.

Jute Technology Mission (JTM), which has been approved in principle by the planning commission, will be operationalised with the appropriate sub structure of mini missions. The objective is to consolidate the gains from past efforts in the jute sector, and help it to emerge as a intrinsically competitive and integrated entity. The

JTM will encompass the sub systems pertaining to agricultural research and seed development, agronomic practices, harvest and post harvest techniques, the primary and secondary processing of raw jute, diversified product development, market development, marketing and distribution.

Export of coffee

Indian coffee is exported to over 40 countries. Between the periods 1998-99 and 2000-01 exports registered growth rate of 8 per cent p.a. which has declined to -1.56 per cent p.a. during the period 2001-02 to 2003-04 mainly due to fall in exportable production. And the overall growth in volume of exports was -1.85 per cent p.a. because of prolonged drought prevailed in major growing areas. However in 2003-04 and 2004-05, due to slight recovery in international prices coupled with the increase in total quantity exported, export value increased marginally of about 10 per cent compared to previous years. During the last five year period, Robusta Parchment shown an impressive growth rate of about 10.40 per cent p.a. followed by instant coffee 15.73 per cent.

Issues in coffee trade

The Coffee Board analysed the competitive strength of various coffee producing countries in the global market place. In the specific context of India, the extent of gain and loss in key consuming markets has highlighted the urgent need to review the marketing and promotion policies and strategies for Indian Coffee in all the major markets keeping in view the quantity, quality, logistics and pricing requirements in these markets. Reinforcing this analysis with a detailed market preference study of coffee roasters and traders in the major import market will enable India to retain and gain its lost market shares.

Tea export

India with production touching 927.98 million kg in 2005 and accounting for 27.74 per cent of the global tea production is the largest producer of tea in the world. Substantial foreign exchange earnings (around Rs.1,850 crores) with negligible import content, and contribution to the state and central exchequers (around Rs. 1,000 crores) are the other significant economic features of the India tea industry.

At that time, Indian tea exports at 200 million kg accounted for the bulk of our production while domestic consumption was insignificant. Since then

there have been tremendous strides in production - reaching a figure of 928 million kg in 2005. What is significant is that almost the entire increase in production has gone towards satisfying the rising domestic demand while exports have remained constant at around 200 million kg, which in itself is a no mean achievement in view of the pressure of domestic demand.

Current trends

- ♦ In tune with the current trends, the programmes of tea research have been diversified towards fundamental and more application oriented research to give effective scientific inputs to the producers and exporters of tea.
- ♦ Research is not confined only to the improvement of production and productivity, but also to develop value added products like instant tea, flavoured tea and allied fields like tea packaging.
- ♦ There has been an all round qualitative change. Unlike other industries, the tea industry does not have to import technology, machinery and technical manpower.

Cashew exports

India exports annually over 1.27 lakh tons of cashew kernel earning over Rs.2,709 crores as foreign exchange. India is the largest producer, processor, exporter and consumer of cashew in the world. India's contribution in world's cashew production is 24.88 per cent. Vietnam and Brazil are emerging as the *major* competitors to India in cashew export. Hence, it is imperative for India to produce and process cashew at internationally competitive price.

Constraints of cashew

- ♦ The volume of industrial growth facing shortage of raw nuts.
- ♦ Decline in productivity due to over aging and senility of plantations.

These aspects are inter-linked. Once the production buildup takes place, the first constraint automatically gets solved. To bridge the gap of industrial demand and present trend in production, steps are needed to increase the production two folds.

This can be achieved by amalgamating scientific inputs of high yielding varieties and production practices, and their adoption always in combination.

Export promotion of fruits and vegetables

Currently, the export of fresh and processed fruits and vegetables is of the order of 25,830 million rupees (2003-04), a jump of 295 per cent during last decade. Technological support to increased exports are

- ♦ Tailoring the production to fit into the available slot.
- ♦ Quality improvement required by the importing countries
- ♦ Attaining the stipulated phyto sanitary standards
- ♦ Production of pesticide free produce
- ♦ Evolving harvesting and post harvest protocols for retaining the freshness and overcome the spoilage during long duration transit by sea because air freight is highly expensive

Export of fruits & vegetable-seed

An annual export of fruit and vegetable seed and planting material for the year 2004-05 was in tune of 63.94 crores. Major importers are Bangladesh, Egypt, Indonesia, Japan, Malaysia, Pakistan and China. Each importing Country has its own requirement that seed be free from objectionable pests, disease and weeds. The new seed policy, 1988, allowed to take up of custom seed production for export purpose on long term basis in suitable agro climatic conditions, which would enable earning more foreign exchange and conviction as well.

Custom seed production would also benefit in getting better price for the seed. A good co-ordination between public and private sector agencies should be established through their research and development to seed multiplication / production, storage and appropriate seed testing procedure to export. Accordingly leading seed producers and exporters should be encouraged to form consortium of seed traders/ exporters to offer an ideal environment for fixing and achieving targets, quality evaluations and assurance and seed import and exports.

Natural rubber (NR)

The Indian rubber Plantation industry, which had its commercial beginning in 1902, was characterized by export-oriented production with the dominance of large estates, mainly owned by the British companies. The growth in expansion of area under cultivation of rubber was rather slow during the period up to the early 1950s. However, the period from 1955 to 1963 witnessed substantial growth in area on account of various factors such as the proposal under the agrarian in Kerala.

Issues in NR

Given the strategic importance of cost competitiveness in a free - trade regime, the importance of technology as a tool for cost reduction merits special mention. It is a paradox that the cost of production of NR in India is the highest among the major producing countries despite having the highest productivity. This is because of the following reasons.

- ♦ Agro-climatic conditions in the regions identified as suitable for rubber cultivation in the country are only approximately favourable for growing rubber as compared to the ideal conditions prevailing in Thailand, Indonesia and Malaysia. This results in additional cost in India towards application of fungicides
- ♦ Rubber holding size in India is relatively smaller with the average size below 0.50 ha compared to 2 -:- 3 ha in the first three major producing countries. This disadvantage in economies of scale is another cost-pushing factor in India.

FLORICULTURE

Export profile

From being a small-scale industry to being a major player in the export market. from a cultivation area of 53,00 hectares in 1993-94 to 103,000 hectares in 2001-2002, from an export market of Rs.18.83 crores in 1993-94 to Rs. 305 crores in 2005-06, the floriculture industry in India is certainly blossoming. According to the Agricultural and processed Food Products Export Development Authority (APEDA), the fallout is the expansion in area under cultivation from 53,000 ha to 103,000 ha in less than a decade. Flower

varieties too have changed. A large number of cluster unit have come up around Bangalore, Pune, Delhi and Hyderabad to produce cut flowers, primarily for export markets. Though viability has become an issue in northern India because of high costs, Bangalore and Pune, with 40 units between them, are sustaining the export impetus.

Obstacle in flower trade

- ♦ Transportation and adaptation to fickle market trends.
- ♦ Farmers are not able to respond quickly to the changing demands.
- ♦ Flowers can be transported only by air, freight charges are very high.
- ♦ The average land holdings for flower cultivation still just four hectares - compared to 40 hectares in Kenya - the balance is hard to achieve.
- ♦ The lack of infrastructural facilities like a cold chain for storage is another constraint.
- ♦ Floral wealth in soil based container medium are not imported by most of the European and West Asian markets. This is a limiting factor as sphagnum and peat moss is scarce and expensive.
- ♦ Critical market surveys and pricing information are not available.
- ♦ Sales promotion activities are negligible.
- ♦ There is no streamlined quality control mechanism and co-ordination between government agencies.

Potential markets/or flowers

South-East Asia and Europe especially the Warsaw Pact countries have become important Potential markets. Recent estimates indicate a large-scale expansion in floriculture product consumption particularly in Eastern Europe, Japan, China, South Korea, Thailand, Indonesia and Pacific rim countries. There is a possibility of making use of the Dutch trading channels to the rest of the European markets. Apart from this Hong Kong and Singapore and also expected to be important. Quality flowers can be sold in Japan and Europe, particularly in winter. They can be

exported throughout the year to Singapore, Hong Kong, South Korea and West Asia. The flower seed exports have tremendous possibilities especially to US. Similarly tissue cultured plants and protected cultivated plants have good scope in Europe.

Medicinal plants

Globally, plant derived medicines, essential oils and products are worth about Rs. 360,000 crores (US \$ 72 billion) worldwide, which include global business of medicinal herbal material of Rs. 300,000 crores (US \$ 60 billion). India's total export earnings from crude drugs, herebal extracts and finished products stands at mearge Rs. 800 crores (US \$ 160 million).

Issues in medicinal plant export promotion

- ◆ Irreparable losses from disappearing undocumented knowledge of treatment with herbs and extinction of herbs as a result of human activities and over harvesting have generated fears among conservationists.
- ◆ In India, about two million ha area of forests on intensive management can provide regulated niche to conserve and produce medicinal plants for domestic use and exports.
- ◆ Local collectors need training on proper identification of quality material and sustainable harvesting, reducing wastage, conservation, processing and marketing. Local communities specially need support and encouragement to protect these resources.
- ◆ Industry – farmer agreement for demand driven cultivation may facilitate private companies to develop a close interaction with farmers with backup of technology from Public R & D organizations like CIMAP for uniform quality inputs technological guidance, post harvest processing facilities and importantly marketing and assured cash returns.

Organic products

The world market for organic product in U.S. dollars 35 billion and growing at 7-15 per cent. U.S. alone accounts for 11-13 billion followed by EU

(10-11 billion US \$) and Japan (350-450 million US \$). Nearly 130 countries produce organic products. Total area under certified organic farming is 24 million ha. Australia is the largest organic producer with 11.3 million ha under organic cultivation followed by Argentina (2.8 million ha) and strong growth is found especially in more countries that have an active organic sector. In India export sales of organic products amount to 11,925 tons. These account for 85 per cent of the total production and are likely to reach export sale of 21,525 tons during 2006-07.

- ◆ One of the factors that promote growth in organic markets worldwide is consumer awareness about health, environment issues and food safety,
- ◆ Another factor that influences development of organic farm ing is marketing strategies used by key players much as retailers.
- ◆ Developing countries like India are expanding their organic market into developed countries and in parallel are building a domestic market.

However, in order to help developing countries improve their sale opportunities in export markets trader: need to know for general conditions that exist in the developed countries.

Implications & conclusions

1. There is need.for investment in the agricultural sector for the exports of farm produce which has been declining in recent years and a large number of items relating to farm sector should be removed from the negative list of exports. Ceiling and conditional lists of exports also need revision.
2. The areas of efficient production and procurement should be demarcated and strategy be devised to ensure efficient cropping system.
3. Value added products should be exploited for export rather than raw materials. Required R and D support for value addition should receive high priority.
4. To protect our items from the international market forces of demand and supply and prices, we should provide the items a branded status. Branding ensures protection

to customers when it identifies the sellers and it adds to customers' psychological satisfaction and sense of security, helps in development of customer loyalty and checks the dominance of the dealer. The true marketing credit manifests itself and finds its true expression in brands where consumer's needs and wants, likes and dislikes, life styles and habits become the focal point.

5. There is a need for efficient post harvest handling system for the perishable crops. Improved technology like pre cooling units, use of paper guard in grapes packing. use of pbistic crates, improved packaging replacing wooden boxes etc., should be encouraged.
6. Green houses for growing high value flowers and vegetable crops in the off season should be promoted. The processed fruits and vegetables like fruit juices, pulps, jams, pickles and chutneys, hydrated, vegetable frozen fruits, frozen pulps, freeze dried green pepper have a vast scope for exports. Therefore, improved processing is called for to tap the export potential of these items.
7. Fixation of differential procurement prices for durum wheat will go a long way in increasing the procurement of durum wheat. The existing ban on the export of wheat products too, would have to be lifted as wheat products have better marketing opportunities than wheat because of growing trend in favour of fast foods the world over.

8. Minimum Export Price of rice should be decreased to enable the exporters to compete in international market and stock limits imposed under Essential Commodity Act should be increased.
9. The farmers should be given incentives in the form of compensation for sacrificing yield over quality, whenever needed through appropriate pricing policy. (Eg.) Organic farming.
10. Incentives for export, training of personnel involved in export business, ensuring the continuous flow of trade, collection of the information, availability of the finance, arrangement for publicity in international trade fairs can also help in boosting of agricultural commodities.

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Promotion of Export Oriented Agricultural and Horticultural Commodities in India

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Agricultural and Horticultural Commodities in India

Agriculture is a key sector of India's economy. Although the industry has become the leading sector of the economy, agriculture still plays an important role in economic development. It accounts for 21.6 percent of the country's GDP. The agricultural products have occupied a prominent position in the export trade. As a consequence of rapid

agricultural development, India has been able to provide more and more agricultural products not only for domestic consumption but also for export with trade liberalization; agricultural exports have also become an important national goal. The present export scenario of agricultural and horticultural commodities is presented in Table-1.

Table-1: Agricultural Exports in India

S.N.	Particulars	2001-02		2002-03		2003-04		2004-05	
		Million US Dollar	Per cent share of Agri-export	Million US Dollar	Per cent share of Agri-export	Million US Dollar	Per cent share of Agri-export	Million US Dollar	Per cent share of Agri-export
1	Tea	360.5	6.1	343.6	5.1	356.3	4.7	397.1	5.0
2	Coffee	229.6	3.9	205.5	3.1	236.3	3.1	224.3	2.8
3	Rice	665.5	11.3	1238.1	18.4	907.0	12.0	1478.2	18.5
4	Wheat	278.9	4.7	363.6	5.4	520.4	6.9	322.3	4.0
5	Sugar & Molasses	373.6	6.3	375.1	5.6	269.0	3.6	33.2	0.4
6	Tobacco	169.3	2.9	212.5	3.2	238.6	3.2	277.5	3.5
7	Spices	313.9	5.3	342.8	5.1	336.1	4.5	399.3	5.0
8	Cashew	375.1	6.4	424.2	6.3	370.0	4.9	520.0	6.5
9	Sesame & Niger seed	127.9	2.2	93.2	1.4	164.2	2.1	147.5	2.0
10	Guar gum Meal	84.5	1.4	100.6	1.5	110.5	1.5	159.5	1.8
11	Oil Meals	474.5	8.0	308.8	4.6	728.7	9.7	690.1	8.6
12	Fruits & Vegetables	262.8	4.5	300.2	4.5	378.2	5.0	361.7	4.5
13	Processed Fruit & Vegetable	107.5	1.8	118.8	1.8	368.6	4.9	344.2	4.3
14	Meat and Meat Preparation	250.2	4.2	284.6	4.2	373.1	5.0	386.0	4.8
15	Marine Product	1236.8	21.0	1431.6	21.3	1328.7	17.6	1267.6	15.8
16	Others	590.4	10.0	611.1	9.1	1066.1	14.2	993.2	12.4
17	<i>Agricultural Exports</i>	<i>5901.0</i>	<i>100</i>	<i>6734.0</i>	<i>100</i>	<i>7533.0</i>	<i>100</i>	<i>8001.7</i>	<i>100</i>
18	Total Export	43826.7		52719.4		63843.0		78205.3	
19	Agri. Exports as percent of Total Export		13.5		12.8		11.8		10.2

Source:- Ministry of industry and Commerce

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It can be observed from the table - 1 that the share of agricultural export in total merchandise exports came down from 13.5 per cent in 2001-02 to 10.2 per cent in 2004-05. The decline in the share of Agri-exports to total export, notwithstanding the growth in its volume was because of much faster growth in the volume of merchandise exports. In agricultural commodities Rice continued to dominate the Agri-export.

Strategies for export of agricultural and horticultural commodities:

A comprehensive strategic plan required to be formulated and more so implement for chancing the export of agricultural and horticultural commodities. The plan should be based on studies/surveys of selected markets having good demand prospects for Indian commodities, selection of commodities for these markets, development of production and marketing strategies and monitoring of relevant developments in the target markets and international markets. The APEDA and NHB (National Horticulture Board, Gurgaon) have already chalked out such strategic plans with regard to marketing, but the production plans are yet to be prepared. Some suggestions are made here for development of production strategies for export of agricultural and horticultural commodities.

Production of export:

A paradigm shift is required in the mindset of the producer that agricultural and horticultural production is to be done for export ensuring quality, quantity and reliability to meet the export schedule. Subsistence farming is to give way for commercial farming.

Selection of varieties for export:

Depending on market surveys, indigenous strength and economic agricultural crops should be selected judiciously for export. For instance, our production of sugar, cashew, tea, & spices is quite high, so there is scope for increasing the production of these crops.

Development of Agri-Export Zones:

The Agricultural and Processed Food Products Export Development Authority (APEDA), Ministry of Commerce & Industries, Government of India, has been doing commendable service in the export promotion of agricultural and horticultural commodities and their value-added

products for more than a decade. The agricultural commodities and their products have been identified for export after surveying various world markets and assessing the demand. Special promotion campaign for export of Indian mangoes was carried in Dubai (UAE), Kuala Lumpur (Malaysia), Hong Kong, London and Frankfurt (Germany) during May 2002. The varieties of mangoes promoted during the campaign were Alphonso, Kesar Totapuri, Banganpalli and Suvamarekha. Favourable response was elicited for export of North Indian varieties like Deshehari, Chausa and Langra and also for mango pickle, chips and jam.

The APEDA has innovated an excellent concept of Agricultural Export Zone (AEZ) adopting a holistic approach by integrating all the stages of farming of produce right from production till it reaches the market. The principles of convergence, partnership and focusing of important issues have been used. A product / produce located in a contiguous area are identified for the purpose of developing and sourcing the raw materials, their value addition leading to final exports. Till today, 45 AEZ's have been sanctioned including 19 on fruits.

Standardization of export protocols:

In order to ensure both productivity and quality, it is essential to standardize export protocols for various agricultural and horticultural crops selected for export purpose. It should include both package of cultural practices and post harvest management leaving nothing for chance. The export protocols are already available for various export varieties of agricultural and horticultural crops. The standard protocols may be obtained from abroad, but these are to be adopted.

Adoption of package of cultural practices for quality production:

Since production of quality product is very important for export purpose, adoption of package of cultural practices are to be ensured which involves demonstrating the technology at field level, training of farmers and monitoring. Progressive farmers and research institutions may be associated for demonstration of technology because seeing is believing.

Provision of infrastructural facilities:

A large number of infrastructural facilities are required to meet the international requirement

of quality and safety against health hazards for export of agricultural and horticultural products. Depending upon kind of products, infrastructural facilities include packaging facility and grading chambers, refrigerated vans, cold storage/controlled atmosphere storage, cargo handling facilities at airports and seaports, pesticide residue analyzing laboratories, good roads and communication system are required. Needless to point out that it is not possible to meet the codex alimentarius without these facilities.

Encouragement of farmer's association:

International marketing is a costly venture involving corporate sector of advance countries, whereas majority of our farmers are poor with small land holdings. They can only compete in global market when they unite themselves in the form of associations of cooperatives. Such organizations can decide about the acreage for growing crops in order to avoid market glut, bargain the price, and quality of inputs, obtain and utilize market intelligence for getting maximum price of the produce.

Providing credit and insurance cover:

Since, more and costly inputs are required to produce agricultural commodities for exports, it is necessary to ensure credit availability to the concern persons. Credit availability at reasonable interest rate without much hassle is very critical in sustaining competitiveness. In its absence, the production of quality products for export will be very difficult. Likewise an insurance cover will be necessary to safeguard farmers against natural calamities such as outbreak of pests and diseases, hailstorm, frost and heavy rain etc.

Organic farming:

Organically produced agricultural and horticultural commodities are sold at a premium price all over the world justifying the cause of organic farming. Organic farming is a crop production system in which chemicals are not used at all. Major components of organic farming are the use of bio-fertilizers, bio-pesticides, organic manure, increasing soil fertility through nitrogen fixation and crop rotation. Most of the agricultural and horticultural crops can be grown successfully in India by adopting organic farming practices. It is much easier to practice in those regions where chemicals are not used for raising of crops such

as tribal regions and the fruits in which chemicals are not applied traditionally like guava and sapota. India can relatively earn more foreign exchange by exporting organic commodities than non-organic ones. APEDA will grant a trade mark of "Indian Organic" on the basis of compliance with the national standard of organic production (NSOP).

Information dissemination:

This is an information era signifying the role of information and communication technologies in transforming our agricultural export. Providing farmers with relevant, timely information about different export oriented crop varieties, rootstocks, planting densities, integrated water and nutrient application, integrated pest management, maturity indices and market intelligence can help a great deal in increasing their productivity and profitability. Establishment of information centers in Agri-Export Zones will be a right step in this direction.

Adoption of high technology for production

Competition in global market can only be faced by improving productivity and quality of our agricultural and horticultural commodities which will make imperative the adoption of various technologies of hi-tech agriculture, like genetically modified crop varieties, micro propagation, fertigation, integrated pest management, high density planting, cold chain and modified atmosphere storage. Application of biofertilizers and biopesticides will be necessary to reduce the use of chemical safeguarding against pesticide residues, environment degradation and to sustain the productivity.

Export promotional research:

Emphasis in research has to be focused on export-oriented research instead of commodity / discipline-based research. The research is required to be user friendly with the greater participation of private sector. Priority is to be given to adaptive research by borrowing advanced technologies wherever available in world.

The Relationship of Agricultural Exports to Agricultural Development and Economic Growth:

Exports and agricultural production complement each other. The quantitative and qualitative improvements in agricultural production form a basis on which export expansion takes

place, which in turn stimulates further production. The production of those crops which are mainly for export is changing in response to the changing situation on the international market, the higher the proportion of export in the international market will have greater effect on production.

The expansion of the agricultural export trade has made some contribution to the development of agriculture. First, the commercialization rate of agricultural products has become higher and higher as more and more are produced for export. Statistics show that agricultural products which are mainly for export have a greater commercialization rate than other products. Farmers are more responsive and sensitive to market conditions when

they produce agricultural products with high commercialization rates. Second, agricultural products for export are usually required to be of good quality. This means the need for successive improvement of production techniques, and production technologies is a critical factor for increasing the productivity of agriculture. By means of agricultural foreign trade the economy may specialize in the production of these crops with comparative advantages. As a large proportion of food commodities are used for exports increases in the exports of the products certainly can stimulate the development of processing industries. Agricultural exports have been, and still are, of major importance to Indian economy.

Technical Session III

DEMAND DRIVEN TECHNOLOGY DISSEMINATION

Demand Driven Technology Dissemination

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The development of agriculture in India has seen tremendous changes in the last 60 years. Although India achieved self sufficiency in food production but the contribution of agriculture sector to GDP which was 56% during 1950s has come down to 24% during 2005 which is a serious concern. The start of Community Development Programme (1952) and National Extension Service (1953) accelerated the phase of flow of agricultural and allied technology to farmers. Several specific programmes were introduced from time to time to address location specific and client based developments. More specifically Intensive Agriculture Development Programme (1960), Intensive Agriculture Area Programme (1964), High Yielding Variety Programme (1966), Drought Prone Area Programme (1969), Community Area Development Programme (1972), Marginal Farmers and Agricultural Labourers Development Agency and Small Farmers Development Agency (1969) programmes were introduced across the country. There was steady progress towards technology transfer aimed at increased food production attaining green revolution. The public research as well as extension system in the country has contributed significantly for enhanced food production.

The entire domain of agricultural development was under the purview of public extension systems till late nineties. The introduction of 'T' and 'V' system during late eighties across the country had contributed for the speedy transfer of farm technology to farmers. However, it has some inherent limitations of top down approach and hence anticipated dissemination of technologies did not take place as envisaged. Of late Mass media, such as AIR and Doordarshan are playing an important role in transfer of technology.

The major breakthrough in the demand driven transfer of technology took during early 2000 with the participation of private extension service. This was sequel to change in cropping pattern i.e. a shift from the traditional subsistence crops to commercial crops/hi-tech crops. Globalisation and

economic liberalisation have also contributed for shift in the cropping pattern. GATT further accelerated the shift and many motivating farmers moved to high value crops. Commercial agriculture was mainly associated with resource rich and enterprising farmers. This segment of farmers demand the technology which provides higher profits. This aspect becomes essential in view of continuous decline in GDP from agriculture sector. The public extension system will not be able to cater to the needs and expectations of these farmers for two reasons. First of all there are no exclusive specialised persons to deliver such complex technologies which generally address the end issues. Secondly, the public extension system is more service oriented but not market driven.

What is Demand Driven Technologies (DDTs)

Over the years production systems adopted by farmers have undergone perceptible change. The farmers who grow for market have increased considerably over years. Besides, sizable farmers are growing high value commercial crops to meet both domestic and as well as export demand.

A technology which is sought by clientele having high profit, fairly assured market, scope for tapping both domestic and export markets, involves high investment and risk are categorised as demand driven technology. Since this segment of farmers wanted to realise high profit, such technologies involve certain amount of risk which cannot be practiced by all farmers, they specifically look for specialized technologies. In order to improve GDP contribution from agriculture, which is alarmingly declining year after year, giving due attention to DDTs arises now than ever before.

Mechanism to identify DDTs

The DDTs varies from across states, regions and across agro-climatic zones. But, progressive and well informed farmers, scientists, bankers, corporate body representatives, promoters of contractual farming and marketers together can identify location specific technologies that can be commercially exploited for the benefit of farmers.

Technologies are dynamic and vary with the passage of time. Constant reviewing of the relevant of DDT is essential to meet the market demands. There is a need to develop a mechanism to identify viable DDT and modify suitably to sustain these to maximise economic returns. This warrants establishment of a dynamic DDT dissemination cell with Extension specialist, Economists, Scientist and the stake holders.

However, there are some technologies like organic farming, value addition, packaging tools etc., with fairly assured domestic as well as export market are increasingly accepted by larger clientele for which a mechanism have to be evolved for large scale dissemination.

DDT clientele

The DDT dissemination mechanism depends on the clientele. This necessitates to identify diverse clientele who can absorb the DDT. Enterprising and progressive farmers, corporate bodies (such as Food world, Namdhari), agencies undertaking contractual farming (Gharkins), major marketing agencies (SAFAL, HOPCOMS) are the major players for DDTs. Assured and accessible market linkage and improved storage facilities can bring even less motivated farmers into the fold.

Dissemination of DDTs

At present, there are no exclusive mechanisms to disseminate DDTs. But, there are isolated efforts in this direction hither to have been made by some SMS and scientists from SAUS besides corporate bodies and contractual agencies. Apparently the dissemination models depend on the target clientele and the nature of the technology.

While the training programmes to update the knowledge base and technical skills form the basis, these dynamic DDT demand novel approaches involving modern electronic tools and communication systems. Interaction of the clientele with marketing groups and consumers is crucial to build confidence and greater acceptability of the DDT.

There is scope and need to develop specific models to provide hands as experience to handle the DDT. Crucial aspect is the expertise of the resource persons associated in the dissemination modules. Such modular training programmes can be extended not only to the clientele but also to

training personal (personal involved in extension activities), students and other private and public extension agencies. While several such models can be effective, there is an urgent need to have dialogue between experts and clientele to develop efficient dissemination system in the background of the emerging concept of DDT.

How to enhance the dissemination of DDTs

It is evident that there is no organised arrangement or establishment to promote DDTs. Therefore, the following opportunities are open for enhanced promotion of DDTs:

- 1) Constitution of Expert Committee at the University level to identify, update and revise DDTs. It should include all stakeholders for the sustained promotion of DDTs. Zone wise constitution of committees may be formulated wherever necessary. Specific guidelines may be formulated for the effective functioning of Expert committees.
- 2) Participation of both public and private extension system besides extensive use of MM, ICTs and SATCOM are essential for effective dissemination of DDTs. Higher participation of private extension services is desirable. Service charges to the technology dissemination programme would bring in greater accountability.
- 3) It is necessary that the public sector extension system continue to play central role in technology dissemination. To take care of needs of farmers special scientific teams have to be constituted at KVKs who can provide specialized extension services to farmers. To accomplish this task, KVKs have to be equipped with on-line connectivity to respond to farmers' needs. Extension has to view farmers as partners in the technology generation process, rather than as simply recipients. Extension service should facilitate farmers to become more actively embedded in the agricultural knowledge and information system. Group extension approach through formation and mobilization of farmers' interest groups, farmers' cooperatives and Self-Help Group (SHGs) would enable extension workers to address specific group demands. This approach is more suitable for high value commodities.

- 4) Training and acquisition of skills by farmers is central part of technology transfer system under demand driven regime. Use of information technology for improving the quality and accelerating the transfer and exchange of information, organization of training programs, preparation interactive - CDs, establishment of agriculture-Kiosk and arranging Video conference with specialists and farmers' group will help in capacity building of farmers to handle the tasks more efficiently.
- 5) Include the concept of DDT and DDT dissemination in the curricula of UG and PG programme.
- 6) Agri- Clinics involved in training unemployed agricultural graduates can also train

graduates in certain important areas like export of agricultural commodities, specialization in specific crops including exposure to marketing and value addition which can help them provide specialized consultancy required by the farmers in specific areas/crops.

- 7) The major concern of higher education has been the linking Universities with industries and other market forces. The University – Industry interaction are yet get established in case of agricultural universities. This would help universities to undertake research on problems identified by industries and develop products required by the industries and in turn help in providing necessary backward linkage.

Demand Driven Technology Dissemination

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State Agricultural Universities have contributed enormously in bringing about green revolution in India. These Universities are further going to play a pivotal role in bringing second green revolution or evergreen revolution through their dynamic teaching, research and extension programmes based upon national and international agricultural and market demands. The State Agricultural Universities provide a platform for scientist-farmers interaction through a unique system of technology transfer. To cater to the needs of the farmers, the universities have well developed set-up of extension functionaries like Farmers Advisory Service/*Krishi Vigyan Kendras* (Agricultural Science Centres) at district head quarters. The new technology developed is usually tested in adaptive trials at farmers' fields with the active collaboration of extension functionaries both from the university and field extension functionaries of concerned departments of state government.

The universities have strong linkages with various organizations/departments particularly the beneficiary departments, private input dealers and semi-government organizations. The well established Directorates of Extension Education of these institutes are instrumental in organizing various activities for the benefit of farmers, farm women and unemployed youth. These Directorates also organizes various programmes for refreshing and updating the knowledge and to get feedback from field functionaries of different government and semi-government departments.

However, in the post green revolution era, when we are moving towards evergreen revolution, public extension in its present form finds itself unable to meet the changing demands of farming community, trapped in out-dated centralized, top down institutional arrangement and constrained in terms of financial and human resources lacking skill and capacities. The extension machinery designed about four decades back with the objective of increasing food grain production could not keep pace with the changing national priorities and changed assumptions and understanding on how to bring about sustainable agricultural development.

One of the alternatives in this direction could be the development and efficient use of demand driven technology dissemination system. Demand driven technology dissemination includes an increased emphasis on private service providers and a change of attitude towards agricultural producers, who are seen as clients capable of demanding the information, and services they need, rather than being mere beneficiaries. Demand driven technology dissemination concept provides policy guidelines on how best to support demand driven agricultural technology development and dissemination and also on the appropriate roles of the different partners.

Concept of Demand Driven

Demand Driven means that the information, advice and other services offered by extension professionals should be according to the expressed demands of the clients or recipients of the service; not just to their "needs" as identified by various stakeholders (government, corporations, scientists, extension professionals). (Garforth 2004)

'Demand' can be defined as what people ask for, need and value so much that they are willing to invest their resources, such as time and money, in order to receive the services. (Chipeta, 2006)

Implementation of demand driven technology development and dissemination needs institutional changes, which will lead extension service providers to be more responsive to what clients want. It involves changing the distribution of power and responsibilities among clients, those who provide the service, and government.

The framework of demand driven technology dissemination rest on these three key sets of actors. This need an elaborate analysis of demands of the farmers (clients) and fixing the responsibility of different departments/agencies involved in technology generation and dissemination. The following principles can be used as guidelines for development of demand driven technology dissemination system.

Principles of Demand Driven

- Technology dissemination shall be driven by users demand

- Technology providers shall be accountable to the users
- Users should have a free choice of technology providers (Chipeta, 2006)
- Technology generation should be driven by demands of farming system, society, national and global market
- All categories of farmers and consumers should be considered for development of programmes and policies
- Support of strong backstopping institutions

When farmers choose to use and pay for technology and services, it is the best indicator that the services reflect the content and quality that they require.

Objective of Demand Driven

The main objective of demand driven technology dissemination is to improve the agricultural income and household food security of small and medium farmers by providing them access to technology and services that have the content and quality they ask for. It has been found that extension activities in which farmers are directly involved in analyzing, defining, planning, executing and evaluating them are more accepted than the others. Extension should be seen as an investment like any other, where the driving force should be the potential for increased income for both service providers and their clients.

Requirements of Demand Driven

1. Policy framework

Demand driven technology dissemination requires that policies should create an environment for pluralistic development of extension services and the public sector should make clear the different roles of the public and the private sectors to provide different extension services. The public sector must stop the free supply of extension services that can be delivered through the private sector, and instead strengthen its efforts in taking care of public interests and long-term interventions, (e.g. Environment and sustainable natural resources) which are usually untouched by private sector investments.

2. Identification of farmers demands

All farmers do not have similar demands, they differ according to their farm size, crops cultivated, macroclimatic conditions, family

requirements and market accessibility etc. The farming family and the farm should be considered as an integrated unit for analyzing demands of the farmers. Every farm family has its own demands from farm for food grains, fiber, pulses, oil seeds, fruits and vegetables for their home consumption. After meeting their demand they can think about the demand of their local market, national and international market. The demand of farmers for technology also depends upon type of produce, volume or quantity of produce and quality demanded by the market.

3. Motivation of farmers for demanding technology and services

Farmers demand technical information and services when they are motivated to increase their agricultural production and raise their income for better standard of living. Their motivation is closely linked to the existence of market opportunities and prospects for improved working conditions. When farmers have the motivation and potential to increase their production, they develop capacity to demand technology, training and services from different departments and can negotiate with potential technical service providers.

4. Availability of technical information and service providers

Farmers need a good amount of technical information and input services in agriculture production system and these can only be demand driven if there is good scope of provision of these services. The farmer may demand these services from those service providers who offer quality services at competitive price. The technical information and input service providers will come forward if they find it financially viable as business. It is only possible if farmers are well informed about the different services and service providers.

5. Sustainability of technology and service providers

Long-term sustainability of demand driven technology and service providers requires continuous capacity building of farmers, their organizations and their advisers. Institutions are required which can offer training to farmers and advisers. Professional backstopping is also needed for information analysis and to transform research results into practical recommendations for production system.

6. Availability of marketing opportunities and resources

Market opportunities will bring service providers and farmers together. This happens when farmers are well informed and the delivery of services is economically attractive for both providers and their clients. Unfortunately, many small scale farmers are unable to take advantage of market opportunities partly because they are constrained by lack of resources, and also because they do not have the knowledge and the resources to formulate and express their demands for appropriate advisory services.

7. Strong farmers' organizations / groups

Development of demand from small farmers is closely linked to organisational development to which they belong. Every farmer has different demands, but groups and organisations of farmers with similar interests can get better services from various service providers and make efficient use of public resources than individuals. They have stronger negotiation power with private service providers than individual small farmers just as their capacity to purchase technical information/service as groups make them economically more attractive as customers.

8. Farmers aspirations for commercial production

The demand of small and medium farmers for technical information/service depends on their relation with orientation to market. On the basis of their market relations, they can be divided in three groups i.e. small and medium commercial farmers well integrated in the market, small farmers with potential for commercial production but with different degree of market constraints and subsistence farmers.

The first group is most likely to demand agricultural technology information services, whereas, the second group of farmers will demand services if they get the necessary market opportunities. The last group i.e. subsistence farmers mostly see farming as a strategy for survival and might rather seek alternative employment than develop their farms. Based on local assessment of conditions and opportunities, realistic priorities must be set that take into account the likelihood of the farmers who will actively seek out advisory services.

9. Need for empowerment of poor farmers for demanding services

Experience of different extension programmes have shown that poor farmers have limited resources which influence the demand for technical information and other services. For this purpose, the policies should be framed to empower farmers through creating environment to assist them to demand the particular kind of technical information/ services that they require. They must be empowered by strengthening their voice and negotiating power towards service providers and policy makers. The poor farmers can be empowered by organizing training courses, on and off the campus for promoting technical knowledge and skill in different fields of agricultural production system by SAUs, ICAR research institutions and *Krishi Vigyan Kendras* (KVKs).

10. Demand of produce in market

Access to market is obviously a precondition for succeeding in development of demand driven agricultural advisory services. Improvements of access to market as well as increasing the farmers' share of benefits from commercial agriculture are the key issues. Improvement of accessibility of farmers to markets requires access to market information, availability of infrastructure, appropriate credit facilities, developing improved bargaining power and appropriate market regulation, risk management measures etc.

Agricultural universities and other line departments should make efforts to educate the farmers regarding market opportunities available locally, at national and international level for different types of farm produce, about their quality parameters for international market, governments' policies for export of farm produce and facilities available for that.

11. Facilitating farmers to demand services

Policies should facilitate the emergence of farmers demand through building self confidence and capacity of resource-poor farm families, to enable them to focus their demands on services that will contribute to poverty reduction, gender equity and environmental restoration. Since farmers demands vary from region to region across village and district, policies should encourage the emergence of different approaches to service delivery including farmer-to-farmer operations.

Promoting Demand Driven Technology Dissemination

In demand driven technology dissemination, it is essential that information providers are accountable to the users/government. This is possible only where the income of the service providers is linked to the profits and the priorities of the users. Different types of information dissemination systems have different possibilities for demand orientation.

1. Public extension services

Public extension services have been criticized on several grounds such as being supply driven, technically weak, insufficient coverage, providing general advice, practising top-down extension approach and dilution of impact. Services provided by the public sector have difficulties in terms of demand orientation. The staff members may use participatory methodologies, to find out the demands of the farmers and start thinking them as service seekers, not beneficiaries. A decentralized system where the staff members are accountable to local government or a local committee representing small and medium farmers may improve this situation.

Since there is a declining trend in allocation of funds for extension services at the center and state level making it difficult to provide extension services to the farmers under those conditions. These departments can only survive if they also start charging for the services either fully or partially.

2. Private service providers

Private service providers are directly accountable to farmers and get their income from them. This information and input delivery system is therefore, well suited for demand driven services. Their main constraint is that they only exist where there is a favourable market for their services and they are absent in many remote rural areas unless the services are subsidized.

Agri-clinic centers are working on the demand-driven concept and providing services to farmers on cropping practices, technology dissemination, crop protection from pests and diseases and market trends etc. Agri-business centers are envisaged to provide inputs at nominal prices, farm machinery /farm equipments on hire basis. These are gaining popularity among the farmers and the agriculture graduates to opt as a

business.

3. Community based services

The farmers trained in different enterprises/ agriculture /subsidiary occupations can be used as information providers to the fellow farmers either free or on payment basis. This farmer-to-farmer service can be viewed as an initial step towards the development of private advisory services in remote rural areas. The price and the transaction costs are appropriate for subsistence and small farmers. They are relatively inexpensive because they provide the services for their neighbours on a part-time basis.

Successful community based services require that the local advisers become linked to professional backstopping institutions i.e. State Department of Agriculture, research institutions, KVKs and nearest State Agricultural Universities to update knowledge. However they provide technical information and are bound by law to provide correct information. These farmers can also act as key communicators for agricultural and rural development agencies. The members of different farmers' organizations and clubs such as Punjab *Kisan* Club/ Punjab Young Farmers Forum can perform this job easily. The public departments can act as catalysts for preparing these farmers to disseminate the latest agricultural technology.

4. Farmer organizations

Farmer organisations with good financial management capacities can provide services to their members by charging reasonably. They can either employ staff or contract private professionals to provide various services. The service providers are accountable to the elected representatives of the farmers and their income depends on the farmers. Providing information and other services through farmer organisations is very appropriate but it requires strong and well organized groups. The services provided by these farmers' organizations include credit for input supply, facilitation of negotiations between producers and local contractors of different produce, farm management advice, machinery and equipment for farmers (tractors on hire and a stock of spare parts). The institutions like KVKs, ICAR Research Institutes and State Agricultural Universities can play an important role in formation of Farmers' Organisations at different levels. Some of the successful farmers' organizations functional in Punjab are Punjab Bee Keepers' Association,

Dairy Farmers' Association and Punjab Farmers' Club. Formation of self help groups is an appreciable step towards achievement of this objective of demand driven technology dissemination, empowerment of the poor in the rural areas for attainment of self sufficiency in different areas of life.

5. Marketing and input supply companies

Private companies dealing in fertilizers, insecticides-pesticides, seeds and nurseries often deliver free advice along with their supply of input or marketing. They get their income from farmers, but the costs of the advice are included in the price of the inputs. Similarly companies engaged in contract farming too provide technical information to their clients. Extension workers/representatives of these companies should be technically trained and their knowledge updated regularly so that correct and timely information reaches the farmers. State Agricultural Universities, KVKs and ICAR research institute also provide inputs on payment basis i.e. improved seeds, vegetable and fruit nurseries.

6. More accountability of paid services

Services that are fully or partly paid for by the users are more likely to be driven by demand than services provided free of charge. First of all, user payment guarantees that the demand is genuine and that the users are committed to receive the service in question. Moreover, user payment for services is a powerful tool to increase the accountability of the service providers towards the users.

7. Provision of subsidized services

Many agricultural services are already paid for by the users. This is the case with services that bring an immediate benefit to the users, such as input supply, artificial insemination, animal health services, market information, advice on crop protection, etc. Advisory services are normally services, which have long-term benefits and experience shows that it is sometimes necessary to supply public funding to supplement the users' own contribution for a period until the farmers themselves feel that the benefits of the advisory services outweigh the costs involved. State Department of Agriculture, Horticulture and Animal Husbandry in most of states provide subsidized services and inputs to the ultimate users.

Punjab Agricultural University moved a step forward for demand driven technology by imposing a nominal fee for selected services i.e. soil and water testing, plant sample analysis, farm machinery testing, feed analysis training etc. University also provides some service on no loss no profit basis like farm literature, cassettes and video films on agricultural information etc.

8. Involving Non-Governmental Organizations

Many NGOs deliver advisory services in rural areas. In remote areas, they are often the only service providers apart from the public extension services. Since their funding is usually external, their accountability and demand orientation are not automatic but depend on the policy and practices of the particular NGO. In India, many KVKs and farmers training centres are being run by NGOs successfully with good results. These NGOs should be backed by research institutes and State Agricultural Universities to update the technical knowledge of their staff.

Promote Capacity Building and Supporting Institutions

1. Meeting the cost of capacity building

There is a need for investment in development of capacity building and backstopping institutions that can ensure maintenance of the services. This investment has a long-term perspective and can be helped by providing loans to service enterprises on commercial conditions, assuming that the maintenance and running of the institutions will be covered through user payments. It is difficult, however, to finance all costs by user payment. In order to remain innovative, institutions need funds for development of tools and new competencies. One option could be to introduce a system of levies on agricultural products. This could raise funds to be channeled towards innovative development of tools and recommendations for common use by agricultural technology dissemination institutes.

2. Development of institutions for farmers' training

There is solid evidence that well informed farmers with adequate knowledge and skills for commercial production are strong 'demanders' of agricultural services. Institutions for farmers' training are therefore essential and should build on principles of ownership by the farming community and demand driven training and curriculum

development. In India, all most all Agricultural Universities, ICAR research institutes and KVKs organize training courses on specific demands of the area and emerging trends in agricultural marketing keeping in mind the regional, national and international demands for different commodities.

3. Institutional links between research and farmers

Advisory service providers need links with relevant research institutes in order to attract the farmers. At the same time, there should be institutional links between researcher and farmers in order to ensure that research is focused on relevant issues relating to farming and market demands. Transforming research findings into practical recommendations for farmers, research institutions require strong communication capacities along with facilities for on-farm testing and adaptation. These institutions must reorient themselves towards the main principles of demand driven service provision, and their institutional arrangements must be responsive and accountable to advisory services' and farmers' demands. PAU has strong links with the farmers and other stakeholders through different advisory committees i.e. PAU farmers committee, PAU fruit and vegetable growers' committee, animal husbandry farmers' committee, agricultural equipment manufacturers' committee, advisory committee for getting their feedback on research system.

4. Developing curricula of universities and colleges according to the demands at the field level

Current professionals working with agricultural extension services are generally well skilled in terms of technologies, because they deal with the curricula for agricultural universities and colleges. In order to make graduates to be able to meet the demands from small commercial farmers, the curricula should be modified and developed in such a way as to provide the professionals with a broader range of skills, including facilitation and communication skills—participatory methodologies, technical skills, production management skills and tools, agricultural business and marketing skills, quality service management and partnership, market orientation, organisational development, 'soft skills', gender awareness, understanding of poverty and vulnerability aspects.

5. Educational programmes for agricultural experts

Educational programmes should be arranged for leaders in agricultural services in planning and managing demand driven services. This can contribute to the required change of mind-sets and to the transformation of their institutions. Punjab Agricultural University undertakes the responsibility of organizing training programmes, workshops and seminars for promoting professional competency of the officials and extension personnel working in different development departments of Punjab like agriculture, horticulture, animal husbandry, soil conservation, panchayat and rural development and dairy development department, quasi-government organizations, banks etc. The University also has strong linkage and disseminates demand driven transfer of technology to the ultimate users.

The State Agricultural Universities play crucial role in disseminating demand driven technology through KVKs, FASS, and refresher training courses, exhibitions, *Kisan Melas*, campaigns, field days, demonstrations and non-institutional training courses to empower the farmers to bring about second green revolution. Till date the State Agricultural Universities, ICAR Institutes, State Development Departments were providing technical information free of cost to all categories of farmers. Now with the changing agricultural scenario like commercialized agriculture, contract farming, globalization and the changing demands of farmers, there is a strong need to re-orient the information generation and dissemination approaches by involving all the stakeholders of agricultural production system.

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Demand Driven Technology Dissemination

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Abstract :

Agriculture is not only the back bone of Country's economy but also a way of life and provides livelihood to Country's 2/3rd population, accounts nearly to 24% of GDP, contributes 15% of total exports and supplies of raw materials for major industries. Indian Agriculture has undergone many phases of changes in the past five decades wherein the emphasis was on food production. National policies and programmes were aimed at achieving rapid agricultural growth, through optimum utilization of resources like land, water, soil, plant resources, research and extension services. Since beginning of 20th century, several approaches were attempted to streamline the public extension systems with a view to make it more dynamic and efficient in meeting the needs of the farmers.

Past 50 years experience in agricultural education, research and extension realized that, the technology development was excellent, but the technology transfer remained quite weak and could not satisfy the clinal groups. Though the research and extension played a major role in bringing Green Revolution in the Post-Green Revolution era, however, extension faces important challenges in the areas of relevance, accountability and sustainability. The current institutional framework for technology transfer with its institutional and operational constraints, severely limits the effectiveness of the public extension system to disseminate location specific technologies to different socio-economic groups of the farmers.

With a view to increase the quality of the extension system, and to over-come the limitations posed by the previous forms of technology dissemination, the Indian Council of Agricultural Research (ICAR) launched National Agricultural Technology Project (NATP) in 1999. Under this project, Innovations in Technology Dissemination (ITD) component has been planned, which aims at developing a Transfer of Technology (TOT) system that is demand driven, well integrated with

research and financially sustainable and accountable to stakeholders of agricultural development.

The research and extension organizations were unable to focus on farmer's problems due to the lack of effective feedback systems. The majority of small and marginal farmers, especially women were unable to express their voice in influencing, research and extension priorities. Under the new policy agenda (National Agricultural Policy 2000) a demand-driven extension system is created, by providing farmers linkage mechanisms through which they can provide all relevant information to help them articulate their problems and needs. Farmers' functional groups, such as Self-Help Groups (SHGs), Farmer Interest Groups (FIGs), Farmer Organizations (FOs), Commodity Associations (CAs), etc. will be a key factor in improving the feedback systems. These farmers' organizations can provide an effective channel for both the dissemination of technologies to large number of small and marginal farmers with emphasis on women and resource poor and feedback to research and extension. Specific nodules viz. Participatory Approach, Empowerment of Farmers specially women, Farming System Approach, Intensive use of Information Technology, Capacity Building of Extension Functionaries will go a long way in strengthening of Public Extension system. The linkage mechanisms will also ensure meaningful farmers' influence in planning, implementation and monitoring of public extension at local, regional and national levels.

The strengthened research and extension linkage will improve quality and effectiveness of research and extension systems. The extension system should be broad based and revitalized. Innovative and decentralized institutional framework will make the extension system farmer-responsible and farmer-accountable. The increased role of policy reforms under NATP viz. KVks, ATICs, ATMAs and NGOs, FOs, Cooperatives,

Corporate Sector and para-technicians in agriculture extension will encourage development of demand driven production systems.

With the implementation of these approaches in right perspective, it is expected that future agricultural growth would largely accrue from improvements in productivity of diversified farming systems with regional specialization and sustainable management of natural resources specially land and water.

Green Revolution

- Concern
- Increase the productivity
- Production – wheat, rice
- Food self sufficiency
- Means
- HYVs Technology = research effort
- Irrigation Policy = Support
- Fertilizer Farmers = Enthusiastic

- Plant protection
- Results
- Food Security at National level

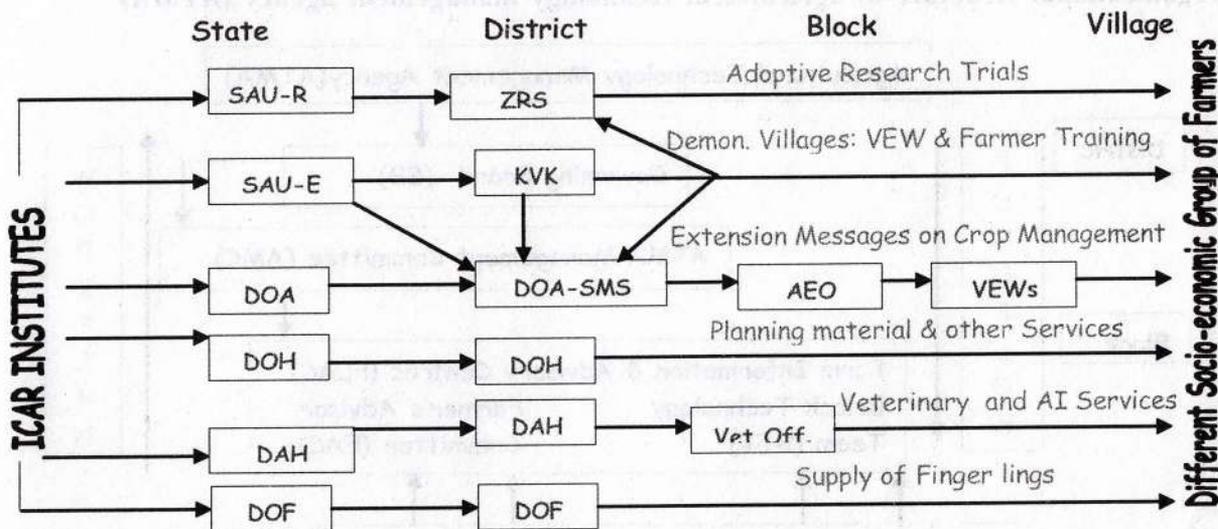
GR – Not Delivered Disired Results In

- Resource poor rainfed area
- Livelihood support to majority rural population
- More 250 million below poverty line
- Slow pace of growth in agriculture
- Stagnation in agricultural production

Phases of TOT

I-Phase	1948-1960	Production	Food Self Sufficiency
II-Phase	1960-1971	Productivity	Food/Nutritional security
III-Phase	1971-90	Resource Use efficiency	Pressure on resources
IV-Phase	1990	Farming system approach	Livelihood security

The Current Technology System



Constraints of the Present system

- Narrow focus of the Agricultural Extension System.
- Lack of Farmer-Driven and Farmer-Accountable System.
- Inadequate Technical and Managerial Capacity of Extension Functionaries.
- Inadequate Farmer Training.
- Weak Research Extension Linkages.
- Inadequate Communication Capacity.
- Financial Constraints to Sustainability of Public Extension System.

Liberalisation of economy and WTO provisions

- Nutrition and Environmental security along with FS
- Enhancing Farmers Income
 - Crop diversification
 - Resource conservation
 - Improving quality of farm produce
 - Processing and value addition
 - Cost reduction
 - Organised marketing
- Productivity
- Quality
- Profitability
- Sustainability
- The art and science of Agriculture made much more complex

Low Rate of Technology

- Farmers are lazy to adopt new technologies
- Farmers do not want to take risk
- Technologies developed are not relevant/appropriate
- Technologies developed are cumbersome to practice
- Technologies developed are not cost-effective (Chandra, 2004)

Top Down 'Take it or Leave it' Approach

- Technology development and transfer
 - Need based, demand driven
 - Bottom up, in problem solving mode
 - Speedy, efficient and cost effective
- Transfer of Technology (TOT)

New Initiatives

- Krishi Vigyan Kendras (KVKs)
- Agricultural Technology Management Agency (ATMA)
- TAT – Institute Village Linkage Programme
- Agril. Technology Information Centre
- Technology Development and Assessment Network Strengthened
- Technology dissemination - weak

Organizational structure of agricultural technology management agency (ATMA)

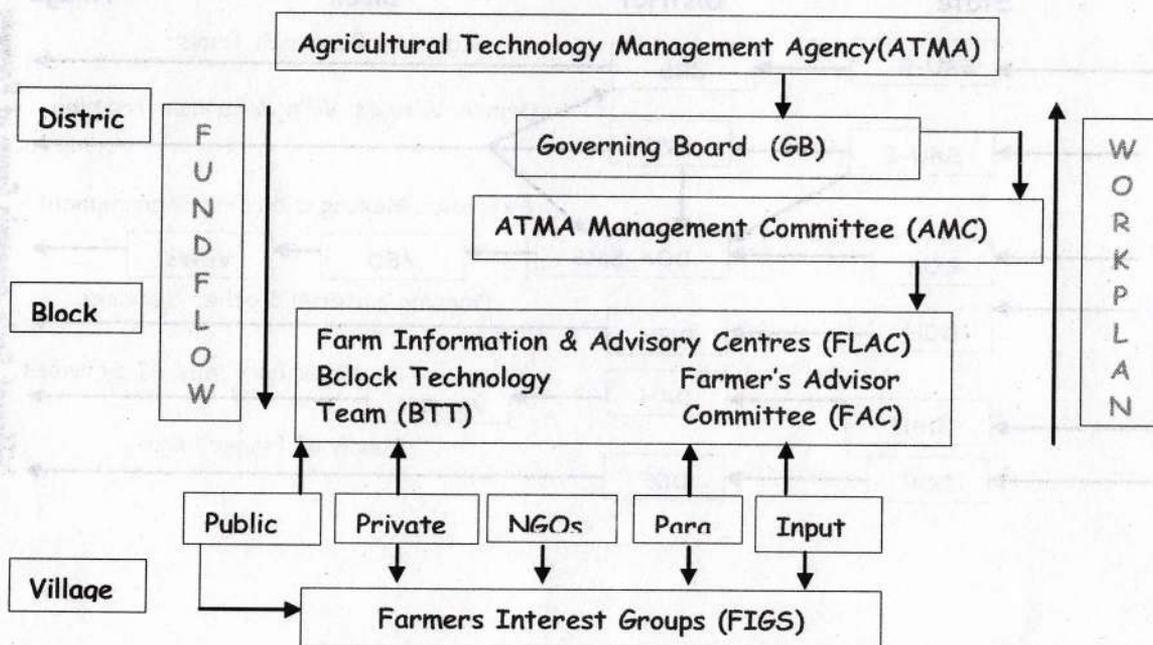


Table: Present Agricultural Extension System and NATP - Comparative Analysis

Features	Present Agricultural Extension System	NATP (ITD)
Goal	Building a professional extension service to assist the farmers to raise their production	Improve the management by making it farmer drive
Target	Small and marginal farmers	Small and marginal farmers with emphasis on resource poor
Approach	Top down	Bottom up
	Centralized	Decentralized
Agencies involved	Department of Agriculture Single line of technical and administrative command	Integration of extension activities of all line departments including (KVKs, ZRS, FTCs) Involvement of Private firms, credit institutions and NGOs
Linkages	Envisaged two-way communication between farmers, extension workers and researchers	Strengthening linkage between farmers, extension workers and researchers. Establishment of FIAC for farmers' feedback
Staffing and Financial Sustainability	At field level, VEW supported by AEO and SMS. High cost due to recruitment of large number of field extension staff. Poor financial sustainability	Increase the financial sustainability by strengthening the professional competencies of the existing extension staff. Replacing VEW cadre with farm advisors
Communication	Poor use of communication technologies	Use of information technologies
Attitude of Functionaries	Professionals	Facilitators

ICAR Extension

- “On farm” testing refinement and documentation of technologies
- Organizing long-term vocational training courses in agriculture and allied subjects
- Organizing front line demonstrations
- Organizing regular training for state extension personnel

SAUs Extension

- The SAUs has provided vital technical support to the T& V system of the State Department of Agriculture through conducting monthly district workshops on regular basis in each district of Marathwada.
- The SAUs has emphasized upon the Print media to disseminate the technological knowledge to clientele groups.
- The electronic media like All India Radio and Television have been used on a large scale for broadcasting/ Telecasting lectures, group discussions and interviews of University scientists.
- Internet facilities are being used to provide current information support to farming community including market intelligence.
- Internet facilities are being used to provide current information support to farming community including market intelligence.
- The *Telephone Help Lines and Kisan Call Centre* for answering the queries of farmers

and entrepreneurs has helped a big mass of farmers.

- The SAUs has reached to the doorsteps of the farmers in real terms by the way of mobile crop polyclinic wherein the facilities are available for soil testing and diagnosis of pest and diseases.
- The SAUs has also reached to the mass of the farmers through exhibitions, farmers' rallies, crop demonstrations, field trials, group discussions, field days, field visits and correspondence services.
- The SAUs has brought out publications focusing various aspects of organic farming.

National Agricultural Policy 2000 (Extension Policy Frame work)

- Farming System Approach
- qMulti-Agency Extension Services
- Public Extension Services
- Farmers Participatory Approach
- Demand-driven and farmers-accountable extension.
- Marketing Extension

Multi-Agency Extension Services (Public Extension Services)

- Line Departments of State Governments
- State Agriculture of State Governments
- ICAR Institutes

Private Extension Services

- Farmer's Organizations, Farmer's Cooperatives, SHGs
- NGOs, Private Foundations & Trusts
- Para-extension Workers
- Agri-Clinics
- Corporate Sectors, Input Dealers

Mass Media & Information Technology

- Print Media-Vernacular Press
- Radio & Television
- FM Radio & Cable Television
- Electronic Connectivity- Computers, Internet
- Public & Private Information Shops

Capacity Building of Extension Functionaries

- Formulation of HRD Policy by states
- Formulation of Training plan for extension Functionaries.
- One time Cash up Grants for Training Infrastructure
- Reforms in State level Agricultural Management & Extension Training Institutes
- Strengthening Role of MANAGE
- Developing Professionalism in Cost Effective Manner
- Training Institutes & SAUs to Train Private Extension Agents
- Networking among state level institutes

Empowerment of Farmers

- Involving farmers in setting extension agenda
- Implementation of programme through farmers user groups
- Acquisition of skills by farmers

Mainstreaming the women in Agriculture

- Self-Help-Group (SHG) approach to reaching women farmers
- Convergence among women groups
- Media & IT gender neutral instruments of extension

- Redesign of Extension Services to Reach Women Farmers
- Expanding the sphere of women extension workers.
- Redesigning/renaming "Home Science" courses to make them more responsive to changing rural scenario

Use of Information Technology

- Wider use of Electronic Mass Media (Radio & Television)
- Separate channel for Agriculture
- Use of Videos/CDs document success stories
- Aggressive Use of Print Media/Vernacular Press
- Support to States for IT up to Block level
- Private information Shops/Web Box

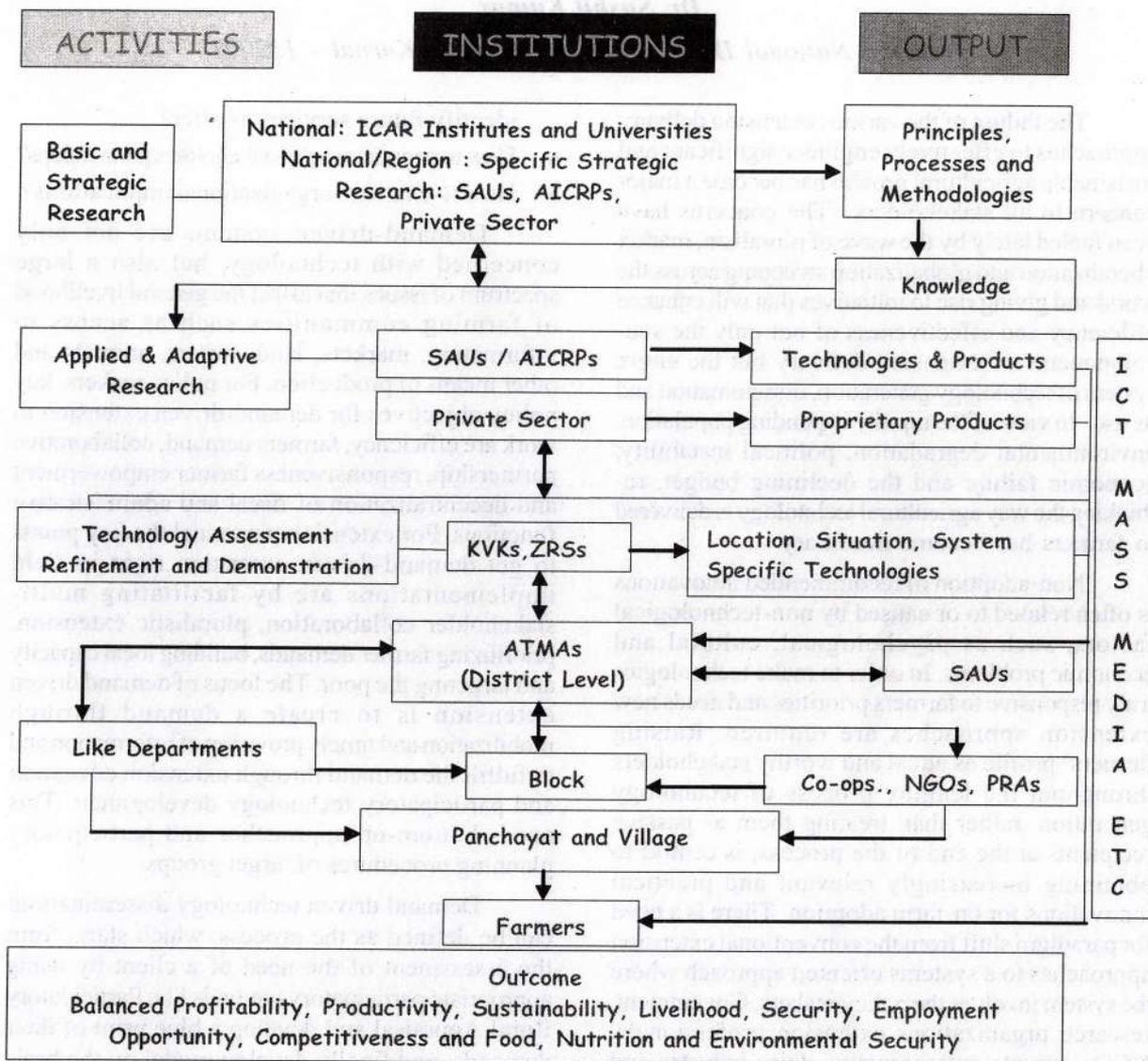
Towards Financial Sustainability

- Cost Cutting Mechanisms
- Efficient Use of available resources
- Further privatization of agro-services
- Realistic cost recovery of agro-inputs and agro services in phases
- Do away with "Grant and Subsidy" elements unless demonstration of new technology and replace by revolving fund
- Initiating new financial systems (revolving funds etc)
- Linking farmer groups with credit institutions
- ATMA institutions which can accept private funds, membership fees, donations, sponsorships
- New audit mechanisms of FIGs, SHGs are empowered.

Agricultural Renewal Year 2006-07 (National Commission of Farmers)

- Soil health enhancement
- Rain water harvesting and recharge of aquifers
- Credit and Insurance compact
- Technology generation and dissemination

A FRAMEWORK FOR TECHNOLOGY DEVELOPMENT AND DELIVER SYSTEM



Demand Driven Technology Dissemination

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The failure of the various extension delivery approaches to effectively engineer significant and sustainable agricultural growth has become a major concern to all stakeholders. The concerns have been fueled lately by the wave of pluralism, market liberalization and globalization sweeping across the world and giving rise to initiatives that will enhance efficiency and effectiveness of not only the sub-components of extension delivery but the entire system of technology generation, dissemination and its use. In view of the rapidly expanding population, environmental degradation, political instability, economic failure and the declining budget, re-thinking the way agricultural technology is delivered to farmers has become necessary.

Non-adoption of recommended innovations is often related to or caused by non-technological factors, such as psychological, cultural and economic problems. In order to make technologies truly responsive to farmers priorities and needs new extension approaches are required. Raising farmers' profile as equal and worthy stakeholders throughout the lengthy process of technology generation, rather than treating them as passive recipients at the end of the process, is central to obtaining increasingly relevant and practical innovations for on-farm adoption. There is a need for paradigm shift from the conventional extension approaches to a systems oriented approach where the system involves the policy makers, Government, research organizations extension professionals, NGOs, private entrepreneurs, dairy industry and farmers. All actors of the system are equal partners in the dairy knowledge and information system (DKIS) and engaged in the process of technology generation, dissemination and feedback, which can bring in synergy.

Demand-driven extension approach

There is increasing demand on dairy research and development to address the needs of marginalized groups such as resource poor farmers and women which are usually constrained by predominance of a "supply driven" agenda that can not address the demands of such valuable groups.

In order to make all round development of dairy sector, there is a need to understand the various system dimensions which includes,

- How farmers demand for services?
- How private and public service providers

identify future services to offer?

- How to negotiate multi-stakeholders partnerships?
- How to examine organizational implications?

Demand-driven systems are not only concerned with technology, but also a large spectrum of issues that affect the general livelihood of farming communities such as access to information, markets, land, waters, animals and other means of production. For policy makers, key policy objectives for demand-driven extension to work are efficiency, farmers demand, collaborative partnership, responsiveness farmer empowerment and decentralization of fiscal and administrative functions. For extension personnel the key points to get demand-driven extension right in field implementations are by facilitating multi-stakeholder collaboration, pluralistic extension, prioritizing farmer demands, building local capacity and targeting the poor. The focus of demand driven extension is to create a demand through mobilization and timely provision of information and to fulfill the demand through extension education and participatory technology development. This needs bottom-up approaches and participatory planning procedures of target groups.

Demand driven technology dissemination can be defined as the process, which starts from the assessment of the need of a client by using appropriate participatory methods like Participatory Rural Appraisal and develop a blue print of their demands, and finally develop model on the basis of available resources and technology in the relevant field.

In demand-driven technology transfer model an intermediary is created to clarify demand and orchestrate transfer to meet demand. This model has five steps:

Customer needs: Identification of needs of customers/end users.

Target markets: Identification of target markets e.g. specific market and cross-industry market.

Commercial potential: Work out market size.

Technologies: A search of available technologies to discover the core of possible commercial products.

Vendors: Finally, commercial partners are sought to "adopt" the technologies, develop products, and

serve the needs. Vendors respond eagerly because demand had already been established and core technologies found.

There are number of programmes, which were started on the basis of demands of special group of clients on dairy, fishery, beekeeping etc. based on these demands. There are also numbers of programmes started by central, state as well different NGOs with same interest e.g. Agricultural Technology Management Agency (ATMA), Agriculture Technology Information Center (ATIC), Farmers call center, etc. At the same time demand driven technology dissemination is the field of ICAR, SAUs, NGOs and state and central government departments.

There is a need to Promotion of demand-driven and farmer-accountable extension. Under the Training & Visit (T&V) system the technology dissemination regime was more supply-driven. The T&V system of extension had really made an important contribution to agricultural development, but it needed to be overhauled in meeting the technology needs of farmers during the 21st century. Gradually it was recognized that the extension should be broad based on farming system approach basis. Also issues like financial sustainability, lack of farmer's participation in programme planning and weak research – extension linkage are some of the important constraints of the present extension system. There is also a growing consensus on the changed characteristics that extension system ought to have in the future, if it is to respond adequately to the challenges emerging on the context of exchanges in the external environments, following policy adjustments relating to privatization, deregulation and globalization of the economy. Further more, given the challenges now confronting extension the top down, face to face delivery of prepackaged advice exclusively by Govt. functionaries is any way, decreasingly appropriate.

Research and extension agendas were pre-set based on technologies for high-yielding varieties of wheat and rice. An important reason why research and extension organizations have not focused on farmer problems is due to the lack of an effective feedback system. The vast majority of small and marginal farmers in India, especially women, lack an effective voice in influencing, research and extension priorities.

It is timely and appropriate that we reflect upon the strengths and weaknesses of the various players in the field of Agricultural Extension. We recognize that there exist outside the public domain not only vast financial resources but a whole

universe of talent and wisdom, which can meaningfully serve the agrarian community. We believe, that the task of managing agriculture in the future cannot be adequately addressed by the public extension agencies alone, but will require the combined strengths and synergies of a pluralistic, multi-agency system in which the private corporate sector, farmers' organizations, cooperatives, NGOs, para-professionals, small agribusinesses, self-help groups, input dealers and suppliers, electronic and print media and Information Technology will each contribute; according to its own strength and capabilities.

Under the new policy agenda a demand-driven extension system will be created, by providing farmers with access to linkage mechanisms through which they would be provided all relevant information/data to help them articulate their problems and needs with reference to their production & marketing plans. A key factor in improving these feedback systems is to organise farmers into functional groups, such as Self-Help Groups (SHGs), Farmer Interest Groups (FIGs), Commodity Associations (CAs), and/or other types of farmer organisations (FOs). These FOs can provide, an effective channel for both the dissemination of technology to large number of small and marginal farmers and feedback to research and extension. Linkage mechanisms would also ensure meaningful farmer representation in the governing bodies of public and private extension services, farmer influence on decisions on the planning, implementation and monitoring of public extension at local, regional and national levels and farmer influence on the incentives of extension staff, including supervisors and subject matter specialists.

Conclusion

If scientific research is to achieve a real impact on farm productivity and livelihoods, new methodologies for dissemination of information have to be developed or adapted. The main direction of reform in agricultural extension is towards learning rather than teaching paradigm. This learning approach should incorporate new methodologies and approaches that are demand-driven and increase the real, interactive participation of local people at all levels of decision making in an extension delivery network. These methods require that the roles and responsibilities of researchers, extension workers, and local people be re-defined and shared. Demand driven technology dissemination is the need of time and concerted efforts are required to fulfill this requirement by the policy makers, extension functionaries and developmental agencies.

Demand Driven Technology Dissemination – Policies and Approaches

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Introduction

Agriculture is the primary sector of Indian economy. During the post-independence period, Indian agriculture has experienced many ups and downs, starting with 'ship to mouth' era of early 60's, following with Green Revolution era which brought food sufficiency from food deficiency. Within a span of forty years the country could reach at a stage of self sufficiency from hunger. The productivity gain since 1950 has been 3.3 times in food grains, 1.4 times in fruits, 1.9 times in vegetables, 6.0 times in fish, 2.2 times in milk and 5.5 times in egg production. All these could be possible because of the impact of green revolution. On the other hand 35 % of cultivated land with better resource endowment, produce 55 % of total food grains. Further we can not afford with high post-harvest losses which are about 25-30 %, negligible agro-processing of about 2 %, small scale value addition of 7 %, slower growth rates, declining total factor productivity and compounded with natural resource degradation of land water and air.

There has been inter-state and inter-region disparity in overall achievement in agricultural production and productivity. Sixty per cent of cultivated area is rainfed and the complexity of rainfed area is categorized by a large number of land holdings belonging to 80 % small and marginal farmers, who are ecologically and economically disadvantaged. Further, the farmers of rainfed areas have poor investment capacity, low risk bearing ability and low level of technological uptake ultimately making agriculture a non-remunerative proposition. It indicates that agriculture is in the state of crisis which needs identification of specific constraints and appropriate intervention.

Technology dissemination

Principally the mandate of technology generation relating to agriculture is in hands of public sector research organizations like ICAR and SAD's, whereas the technology assessment and refinement are mostly taken care by 588 KVKs

spread over this country. The agriculture and allied-government departments are keenly involved in technology - dissemination. Since 1974 the training and visit (T & V) system of extension was in operation for agricultural development till mid '90s. Over a period of time its effectiveness has been weakened on account of repetitiveness of pre-determined and generalized package of practices, failing to respond to location specific and diversified needs of farmers. Mainly because of the top-down approach the system did not work satisfactorily. Several other shortcomings include the poor participation of farmers in decision making, contact farmer focus, production focus, component technology focus and input intensive approaches.

In addition there has been a multiplicity of organizations like private companies, NGOs, input dealers, commodity groups, etc., which are also involved in the process of technology dissemination.

Over a period of time the inputs such as seeds, fertilizers, pesticides etc., are in the hands of private organizations and the public sector extension has become non-existence coupled with the changing needs of farming community. Our farmers look at the extension personnel not only as an information provider but also as a competent person with capacity to guide them beyond production, facilitation in value addition, processing and marketing equipped with business skills and credit facilitation.

Of late, under innovations in Technology Dissemination (ITD) a component of National Agricultural Technology Project (NATP) an Agricultural Technology Management Agency (ATMA) model of extension system was pilot tested in 28 districts of seven states of the country. Subsequently, in Xth plan period under Extension Reforms Scheme of Government of India this ATMA model has been replicated in 252 districts in 30 states and union territories.

Demand driven technology dissemination Policy:

National Agriculture Policy highlights the need to

achieve the growth of 4 % in agriculture sector through efficient use of resources, area specific planning, focus on specific commodities, improving inputs use efficiency and promoting appropriate growth in resource poor regions. The policy resolution emphasizes to achieve the growth through sustainable agriculture, food and nutritional security, generation and transfer of location specific technology, efficient input management, incentive in agriculture, investment in agriculture and proper risk management. The policy proposes to accord high priority to diversification of production, increasing protein availability in the food basket and generation of exportable surpluses. All these can be ensured through an overhauling of extension system with decentralized institutional mechanism at district level. Each district will have one KVK as the centre of excellence on need based technology generation and one ATMA, which would function as the decentralized decision making body for integrating farmers input into programme planning and implementation. KVK will be responsible for technical backstopping to extension functionaries of different organizations, whereas ATMA will provide the requisite platform for establishing R-E-F linkage and meaningful transaction at district level. ATMA will institutionalize the participation of private organizations for development of farming community. Such reform in extension will ensure the broadbasing of technological options with holistic and system based focus.

APPROACHES

Decentralized system approach:

In the present context, there has been a need to promote decentralized system of decision-making initiating from farmers' group, village, block and district level to state level so as to directly involve stakeholders in the process. In ATMA districts of the country, the key institutional mechanisms for such decentralized system may be the ATMA Governing Board at the district level and Farm Information Advisory Centre (FIACs) in each block. In addition, each of the key line departments and the directors of the Zonal Research Station (ZRS) and/or Programme Coordinator of Krishi Vigyan Kendra (KVK) are represented on the district-level ATMA Management Committee (AMC) and technical officers from the line department (e.g. agriculture,

animal husbandry, horticulture, fisheries and soil conservation) are represented on a Block Technology Team (BIT) within each block.

Strategic approach:

The planning process at district level needs to be revived with long term focus, at least with 3-5 years perspective. In each district ATMA/KVK may be mandated to prepare a Strategic Research and Extension Plan (SREP) involving all stakeholders with agro-eco situation based problems and priorities so as to develop a workable agricultural development plan for the district. This plan document will also set a developmental goal with farmer's involvement and would try to bring in convergence among programmes and schemes across agriculture and line departments and build team work among developmental functionaries at district level.

Bottom-up approach:

In order to promote a demand-driven and farmer-accountable extension system, participatory planning (PRA) may be carried out, so as to assess the needs, resources and strength of the farming community. Instead of target-driven programme, need based location-specific programmes may be drawn, so as to develop partnership mode in programme implementation. A bottom-up planning process maybe initiated and institutionalized at each district level. The ATMA, KVK and NO's can play avital role in this type of approach.

Group approach:

There is need for providing facilities to the disadvantaged small and marginal farmers to establish commodity based or interest based groups. This is likely to help them in minimizing the cost of production, making easy access to inputs and making the enterprises more competitive. Group approach would also facilitate the technology transfer easier. Successful experiments on group based planning and implementation have already been attempted by ATMA, different KVKs and NGO's which need to be accelerated.

Farming system approach:

There has been sectorial planning and implementation without much coordination among different line departments involved in agriculture and allied sectors. Most of our research work discipline based and component based leading to

duplication and repetition of works. There is need for development of inter - and intra-institutional mechanism models involving a team of resource persons, developmental functionaries from the fields of agriculture, horticulture, animal husbandry, fisheries, soil conservation, etc. who would consult the farming community and prepare the action plan with farming system focus. This would not only complement and supplement departmental interventions but also increase farm level income with diversification and intensification of farming systems, minimizing risk and would be most appropriate for the complex, diversified and risk prone small farm production system.

Market led approach:

It has been felt that market demand and supply have great effect on the realization of benefits from agri-based enterprises. Under the WTO regime its significance has increased significantly. Farmers should be made aware of the market information, storage, transportation, value addition, processing and other related quality parameters. Efforts, should therefore, be made to aware farmers about the needs, trends and priorities of market, which would help them in getting better profit. In order to get higher benefit from live stock sector farmers need to understand the requirement of consumers, seasonal variations in demand, quality of produces, packaging and utility of products. They should also be aware of competitive price range. The public sector functionaries including NGOs should facilitate the process and enable the farmers in acquiring these knowledge, skill and information on agri-business.

Public - Private partnership approach:

During the present decade it has been realized that the public sector alone would not be able to meet the demands of the farming community, private sector may not protect the farmers interest and there may be monopoly. However, public sector would remain central in providing the services and protect the interest of resource poor and disadvantaged farmers. In the competitive areas like material and input oriented technologies private sector must have to take active role. Adequate scope has to be provided to private sector for its involvement in seed, fertilizer, pesticide, etc. production and supply so as to manage and deliver the goods to the farming community timely and more effectively.

Private delivery approach:

In the country like India we have gained experiences in respect of effective delivery of extension services through a group of disorganized para-professionals. Well trained para-professionals would help in providing technical services to the farmers. They can effectively serve as link between the farmers and scientists. These trained para-professionals may be created through appropriate skill training at KVKs and other training institutes. This type of facility can be developed below block level for effective transfer of technology. The para-professionals would supplement public extension services in a cost effective manner and can overcome the constraints of absentee public extension functionaries. This would also help in generating livelihood opportunities for these para-professionals.

IT enabled approach:

During the last decade there has been rapid development of information technology and it has changed the shape of all economic activities world over. Its effective use in rural sector would bridge the gap between Research-Extension-farmer-market and enhance the process of information flow among the stake holders. An effective e-connectivity would overcome many bottlenecks that constrain the flow of technological information, market information and other facilities to remote part of our country. The better informed farmers will definitely develop their capability to handle the challenges in an effective manner.

CONCLUSION

The public extension system in public sector would continue to play a prominent role in technology dissemination for a larger section of farming community including small and marginal farmers and the landless agricultural labourers. The NOOs, farmers organizations, private sectors and para-workers would also be involved in the process of transfer of technology. Hence it has become imperative to institutionalize and operationalize an innovative demand driven technology dissemination system keeping in view the needs and priorities of the farming community in one hand and market focus in other hand that would benefit the longer section of the population involved in the process of agricultural development.

Paradigm Shift in Demand Driven Technology Dissemination

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1. Introduction:

The Green revolution, ushered in the country in 1968, has been heralded as one of the most important achievements in the post Independence era. It helped India almost triple its food grain production, mostly through yield increases. But it is also reported that green revolution technologies are scale neutral but not resource neutral. India is blessed with vast and varied resources and positive steps are being taken towards an evergreen revolution in agriculture. One of the important steps in this regard is demand driven technology dissemination.

At the outset technology as we understand is defined to comprise hardware (such as seeds, feeds, vaccines or machinery), management practices and techniques (such as soil and water conservation practices, post-harvesting), and increases in knowledge (whether traditional, modern or some combination of the two) that strengthen local capacity for experimentation, communication and general resource management.

But the issue which needs attention is that in agriculture, technology dissemination for the farmer/target group is relatively easy as resource base is there. In the fisheries sector, empowerment of community is more necessary for making the use of the technology. Sometimes, like in the case of marine capture fisheries, the technology per se may not promote production. In fact, the advice on restraining fishing for the sustainability of resources may discourage production. The need is to convince the fishers that the tools/gears etc. are destructive. For undertaking this kind of activity, investments required are high and there are no immediate visible gains. However, this is beneficial in the long run.

2. Technology dissemination:

In the Indian context, technology dissemination is done by central and state governments, SAUs, ICAR through various programmes, Krishi Vigyan Kendras (KVK), Trainers' Training Centres (TTC), ATIC, Non-

Governmental Organizations (NGOs) and universities.

Effective technology dissemination is a "demand pull" as opposed to a "technology push" process. The demand is created by some functional need from a class of users. Review of many methodologies makes clear that in spite of best efforts, most of the state departments have not been able to lay more emphasis on technology dissemination. Particularly, in the case of fisheries, emphasis in most of the state departments of fisheries has been on revenue collection and distribution of government subsidies. The extension activities of the departments in the last 30 years revolved mostly around FFDA and BFDA. The main thrust in these programmes was enhancing production and products through identification of beneficiaries, distribution of subsidy and to a certain extent towards conduct of training programmes. Fish production estimate of states are usually based on FFDA/BFDA productivity levels. This has led to inflated fish production figures of the state.

This process is a 'technology push' process where the technology is pushed through packaging it with subsidies/incentives. But with this approach the technology dissemination can continue only till the time subsidies/incentives will be there.

For any organization, the objective is wider technology dissemination and the technology is to be disseminated to a large number of farmers, fishers. But with this approach of 'technology push' process with subsidies/incentives, adequate number of resources and logistics are required which is not always possible and thus dissemination is difficult, wider technology dissemination is not possible, hence selected groups are catered in the technology dissemination process.

3. Paradigm shift:

Within this framework new technology dissemination approach or a paradigm shift is suggested in this paper and it focuses on involving farmers, fishers and other stake holders as partners in dissemination and implementation process. In

'demand pull' process of technology dissemination, the demand is created by some functional need from a class of users.

The paradigm shift suggested in this paper focuses on involving farmers, fishers and other stake holders as partners in technology dissemination.

Main focus of this approach is that, no incentive/monetary benefit/material subsidy is to be included. But, a lot of importance is to be given to preparatory work to motivate and volunteer people. This is a service that is required to be done at the field level. Convincing people is a great amount of work and skill is required in this but once they are convinced they are encouraged to adopt/apply the technology entirely with their own resources. Care has to be taken that the technology is well within the reach of farmers, fishers and it is simple enough. By this, they are able to apply and draw benefits. Once it is demonstrated in their area, other farmers/fishers see that he/she has adopted/applied the technology within his/her own resources. This motivates others to adopt the technology and the technology dissemination is wider.

Invariably, there is a trend that certain progressive well off farmers/fishers are brought to the forefront. These farmers are involved in farming/fishing as well as they get income from other sources too. In a way they have achieved the economic solvency and they aspire for social recognition. It is a common practice for transfer of technology/technology dissemination organizations to bring these farmers/fishers in the forefront and project them as successful farmers/fishers. It is a 'win win' situation for the organization performing the technology dissemination as well as for the farmers/fishers aspiring for social recognition. Farmers/fishers speak high of the technology as well as the agency which is promoting the technology.

The results from this approach can be misleading. The result of technology dissemination should be taken from an average and should not be individual focused. The technology per se may be good but with this approach only few farmers/fishers achieve benefit. Large numbers of poor farmers/fishers are unable to achieve benefit from the technology. Wider technology dissemination is not possible in this case.

When a farmer/fisher takes a decision to adopt/apply a technology the most important

parameter for him/her is the production yield improvement. They are interested that from a given amount of their expenditure, maximum benefit is achieved with least risk. When the technology is packaged with subsidies/incentives the farmer/fisher is not adopting the technology using his/her own resources but because of the subsidies/incentives. Technology dissemination organizations also portray these farmers/fishers to be successful who have adopted/apply the technology. In this, success is attributed to the package of subsidies/incentives which is not good in the long run.

Efforts on capacity building of department of fisheries and farmers have almost been missing. Visits and result oriented demonstration have also been rare. One of the reasons is shortage of extension personnel. There is usually one 'Fisheries Extension Officer' (FEO) at block level. It is not possible for one officer to cover the vast area. Unlike agricultural farms, fish farms are scattered and wide spread. Further, the extension needs of pond aquaculture are different than riverine capture fisheries or marine capture fisheries. FEOs have to perform conflicting duties such as enforcing regulations and tendering extension advice. Moreover, there are issues related to subsidy which should be a temporary incentive and not a permanent solution. There is a debate at international level under WTO on reduction of subsidies. In India even after 30 years of launching of FFDA's / BFDA's farmers look for a subsidy, which is not a good sign and is not sustainable in the long run. Based on this, paradigm shift in the technology dissemination process are discussed under following heads:

- ♦ Participatory knowledge based technology dissemination
- ♦ Greater congruence between technology disseminators and community
- ♦ Public-Private Community Partnership: (PPCP)

3.1 Participatory knowledge based technology dissemination: The shift has to be towards 'participatory knowledge based technology dissemination.' Stake holders should be made to understand and realize various issues of technology, environment and natural resources management, common property resource which requires collective action. For any technology dissemination system to be

successful, winning the confidence of the community is essential. It is necessary to organize the community for ensuring timely availability of finance, critical inputs and other resources so that they do not look for the subsidies/incentives but apply the technology using their own resources.

3.2 Greater congruence between technology disseminators and community: There is a need to change the mindset of the technology disseminators who are basically service providers. They have the technical know how but should also master the art of entering a society, to mix with the people and organize people as a group for sustainable development. As this has not been incorporated till now there is a need to initiate measures in this direction. The training design of the officers needs to be drastically changed. Capacity development of the staff undertaking the task of technology dissemination is required in this direction for greater congruence between technology disseminators and community.

3.3 Public-Private Community Partnership (PPCP) Public-Private Partnership (PPP) is a concept which is being encouraged at present. It is agreed that it has the potential to bring efficiency and flexibility of the private sector with the accountability and social interest of the public sector. However, it is observed in many instances that private sector has been insensitive towards maintaining the health of the natural resource which resulted in over capacity and over investment as well as conflicting situations. The private entrepreneurs may shift their operation to other business sector but the agriculture and fishing communities who traditionally depend on such resources for their livelihood have no other option. This creates difficult situations for them. Under these circumstances, community has to be integral part of PPP. In this reference, there is a need of PPCP approach even in technology dissemination to make the second green revolution equitable and sustainable.

4. Strategy and approaches for demand driven technology dissemination: Based on these paradigm shifts, this paper stresses on the need of knowledge based participatory technology dissemination which is not subsidy or incentive based. The time has come to review

this, so that the development strategies and approaches are such where people / farmers are involved, as effective partners so that they themselves become the implementing agency. This is an issue, which has largely been ignored. The need is to develop participatory extension system, which is knowledge based in which participatory technology dissemination is an integral part. This should not done with a mono focus on the technology as such but with the participation of farmers/fishers where they are made to realize the issues, and are brought forward for planning and actions. This paradigm shift will require changes in the strategy and approaches too. The basic principles of the new approach are discussed below and these have been adopted from Kumar *et. al.* (2006).

- ◆ Knowledge driven
- ◆ Equitable
- ◆ Professional
- ◆ Cost-effective service

Kumar (1999) proposed Trickle Down System (TDS) of extension under Food and Agricultural Organization (FAO) project. It is participatory farmers to farmers transfer of technology approach. In this approach initial bottom-up participatory planning of extension programme is adopted and ensures lateral spread of knowledge and skills of improved culture technology. The approach envisages active flow of information from the Result Demonstration Farmers (RDFs) to the Fellow Fish Farmers (FFs) by association both categories of participating farmers in the extension programme. This TDS approach has been developed and successfully demonstrated in Bangladesh.

5. Gender-responsive policy framework for technology development and dissemination:

Gender analysis in the agriculture and fisheries sector shows that women participate substantially in most agriculture, fishery and fishery related enterprises in the organized as well as the unorganized sector. But, their little recognition is limited to processing and marketing. Appropriate technologies have to be designed for women and care has to be taken not to overburden them.

Usually, technology and related technical information and training are targeted at men and women are targeted for training in traditional female task areas such as food processing and health care

reinforcing traditional divisions of labour based on gender. As a consequence, women tend to lack equal access to technologies that are affordable and appropriate to their needs.

There is a need to assess these issues, identify gender gaps and to design participatory capacity building strategies, take actions to reduce these gaps. Gender responsive technologies are needed which can be defined as a set of technologies that pay due attention to gender-differentiated needs and constraints, reduce drudgery among women, release time for alternative activities, and promote labour efficiency and sustained household economic and welfare gains.

6. Role of organizations:

To implement the approaches discussed above and for mainstreaming the gender concerns various stakeholders like institutions, government, NGO, CO, academic institutions and private sector has to play important role as effective partners.

6.1 Institutional role: As a first step, a stakeholder inventory can be made to identify the types of institutions involved in the transfer of information, technology and other inputs, as an institutional directory. Institutions that play a major role in technology identification transfer, dissemination and capacity building should be strengthened and capacity building of NGO's also should be done in this aspect with due concerns and participation from both men and women.

6.2 Government's role : Greater need for coordination, removal of institutional constraints and a holistic policy framework.

6.3 NGOs role : NGOs often tend to offer a holistic approach, integrating technology change with nutrition, education, marketing, processing, and so on. Given their social proximity to the communities they serve, NGOs also tend to be more knowledgeable about, and place greater emphasis on, indigenous knowledge, local culture and community values. Their capacities also need to be strengthened.

6.4 Role of community organizations (CO): Existing CO as new COs should be established with the initiative and partnership of local people to respond to their problems encouraging them towards mobilization and participation of local people in development. Sustainability of COs should be ensured by capacity development.

There are also local organizations - formed by people within the community who play an important role in facilitating linkages between the community and external institutions, disseminating information and allocating available resources to villagers like SHGs, co-operatives, informal groups which should be involved for active participation.

6.5 Role of academic and research institutions: Based on the technical expertise of the academic and research institutions they can play an important role in technology dissemination. Academic institutes can provide consultancy services, help to undertake research, develop and implement science and technology projects and programmes.

6.6 Role of private bodies: Under the corporate social responsibility, efforts should be strengthened for effective partnerships.

To improve information exchange and coordination, and strengthen the delivery of demand-driven and gender-responsive technology dissemination effective partnerships should be fostered with different types of organizations like government organizations, NGOs, academic and research institutions, private sectors and COs.

7. Conclusion:

The second phase of green revolution is just to begin where the main focus is on sustainability, renewal of resources and equitable development. According to Swaminathan (1994) development may not be sustainable if it is not equitable. We need to focus on the community participation so that disadvantaged groups who were denied the benefits of green revolution are not missed in the second phase and they play an important role. This time their involvement / participation are imperative.

One of the important steps in this regard is demand driven technology dissemination. The paradigm shift to strengthen demand driven technology dissemination suggests that there should be focus on people and involvement of farmers, fishers and other stake holders as effective partners in dissemination and implementation process. Technology need not be pushed through packaging it with subsidies/incentives as this is not beneficial to people in the long run. People have to be encouraged to apply the technology using their own resources.

Technical Session IV

RIGHT TO INFORMATION

Right to Information Act

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The Right to Information Act came into effect from October 12, 2005. It covers Central, State and local governments and all bodies owned, controlled or substantially financed. It also covers executive, judiciary and legislature. "It is an act to provide for setting out the practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority." The constitution of India has declared that fundamental right to speech and expression and also the fundamental right to life and liberty should include the right of citizen to access information. Every public authority must try to implement the provisions of the Right to Information Act under this spirit of implementing the fundamental rights of the citizen. In context of RTI, the information means any material in any form, including records, documents, memos, e-mails, opinions, advices, press releases, circulars, orders, logbooks, contracts, reports, papers, samples, models, data material held in any electronic form and information relating to any private body which can be accessed by a public authority under any other law for the time being in force.

Our Father of the Nation, Mahatma Gandhi has said that, "The real Swaraj will come not by the acquisition of authority by a few but by the acquisition of capacity by all to resist authority when abused". Since, the democracy requires an informed citizenry and transparency of information which are vital to its functioning and also to contain corruption and to hold Governments and their instrumentalities accountable to the governed. This will lead to make India a highly participative democracy.

The key concepts of RTI include; Transparency and Accountability in the working of every public authority, the right of any citizen of India to request access to information and the corresponding duty of Govt. to meet the request, except the exempted information. The duty of Govt. is to make available key information to all and this should be a responsibility on all sections, citizens, NGO's and media.

The RTI includes, the right to inspect works, documents and records, take notes, extracts or certified copies of documents or records, take

certified samples of material and to obtain information in form of print outs, diskettes, floppies, tapes, video cassettes or in any other electronic mode or through print outs. Certain information's are exempted from disclosure. The important ones are :

- The information, which would affect the sovereignty and integrity of India, the security, strategic, scientific or economic interests of the State.
- Information received in confidence from foreign governments.
- Cabinet papers including records of deliberations of the Council of Ministers, Secretaries and other officers.
- Information which would impede the process of investigation or apprehension or prosecution of offenders.
- Information, the disclosure of which would cause a breach of privilege of Parliament or the State Legislature.
- Intelligence and security agencies except the cases of corruption and human rights violation.
- Information including commercial confidence, trade secrets or intellectual property, the disclosure of which would harm the competitive position of a third party.

However, notwithstanding any of the exemptions listed above, a public authority may allow access to information, if public interest in disclosure outweighs the harm to the protected interests.

There are certain obligations on public authorities also. Every public authority shall maintain all its records duly catalogued and indexed in a manner and the form which facilitates the RTI. They shall also ensure that all records that are appropriate to be computerized within a reasonable time, subject to availability of resources, and are connected through a network all over the country on different systems so that access to such records is facilitated. The time limit for providing information's varies with the kind of case being dealt. For general cases time limit is 30 days, 48 hours where life or liberty is involved, 35 days where request is to Assistant Public Information Officer, 40 days where third part% - is involved and 45 days for human rights violation information from listed security/intelligence agencies.

To make RTI more effective, public awareness and educational programmes has to be launched at large scale. The public authorities should be encouraged to participate in programmes; promote timely/ effective dissemination of accurate information on activities. The relevant training materials, user guide and related matter be prepared and distributed.

The President, His Excellency Dr. APJ Abdul Kalam in his Inaugural Address at the 1st National Convention on RTI on October 13, 2006 said that sometimes the information sought lead to suggestions for improving the functioning of certain institutions, if the information is sought properly and the provided information is understood by the receiver. He also said that after all, every right has to have checks built in to prevent its misuse which is sure to lead to the certain failure of the very system.

In the Valedictory Address at the First National Convention on RTI on October 15, 2006, our Hon'ble Prime Minister, Dr. Manmohan Singh said " I have heard with interest what has been concluded at the end of this 1st Annual Convention. What is of particular satisfaction is that it has become clear that the citizens of our country have owned this Act with their arms wide open. This has become, if anything, a "Peoples Law". He also said that the right to know is the most important fundamental of all those rights, which are critical for upholding human dignity. He also cautioned that we must guard against the growth of professional middlemen in the use of this Act as seen in some other countries. The Prime Minister expressed his satisfaction over the positive manner in which all stakeholders have responded to the challenges posed by this Act. It encourages me to imagine that a time may come when a citizen may not have to make an application for seeking information under this Act. Public authorities could place on their own more and more information in the public domain, with easy access as mandated by the Act.

The awareness and training programme among the masses especially the disadvantaged group must be conducted by the Commission to inform them who deals with what in the Indian Federal Set up. The Commission could also find out how many applications are received by various departments and ministries and how much time is lost in doing so. To overcome this problem Dr. APJ Abdul Kalam, President of India have suggested that the website of the Commission (cic.gov.in) could have a search engine, where Central Public Information Officers (CIPOs) can quickly look up

the decisions of the Commissions on cases which have come-up before them. Presently the Commission's website has a section " Decisions of CIC" which gives the text of the decisions arrived at in cases which come to them in appeal. The text is a scanned image and are stored Quarter wise and therefore if a CPIO wants to consult a case decision , it is a time consuming process as he has to go through every case decision to find one, which has a reference to the point of law which is sought. A search engine will be able to assist.

In context of agriculture, two workshops on Right to Information Act, 2005, were organized at the National Academy of Agricultural Research Management, Hyderabad from April 18-19 and April 25-26, 2006, respectively. These were essentially organized with a view to sensitize Public Information Officers (PIO) and Assistant Public Information Officers (APIO) of ICAR system, on the provisions of Right to Information Act, 2005. During the first workshop, it has been pointed out that this law can bring transparency, accessibility and accountability and can combat chronic disease of corruption, if the citizens use it intelligently and effectively.

During the second workshop it has been said that the Right to information is vital for the survival of democracy. With the right to information, collective concern should be at the survival of our democratic nation.

In agricultural research, the limited ability of stakeholders for interaction and transaction has been identified as one of the key constraints in the generation and dissemination of knowledge. Keeping this in view, NAIP has introduced "consortium" approach (i.e. public private partnership of service providers that collaboratively addresses production systems constraints) as the principal modality for project implementation. The basic problem in Indian agriculture is illiteracy amongst the poor farmers. For instance, how many Indians are aware of the details of field trials being conducted on genetically modified crops. These crops are no longer food that will be consumed by cattle but brinjal and other food that will be directly consumed by the human being. The change in the genetic pool has the potential to change plant, animal, and human life forever. Therefore, the awareness programme of RTI among the masses especially the marginal farmers and disadvantaged group must be conducted on large scale which may help directly or indirectly in achieving the 2nd Green Revolution.

Right to Information and Obligations of Public Authorities

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Right to information – Subject to the provisions of this Act, all citizens shall have the right to information.

Obligations of public authorities

(1) Every public authority shall-

(a) maintain all its records duly catalogued and indexed in a manner and the form which facilitates the right to information under this Act and ensure that all records that are appropriate to be computerized are, within a reasonable time and subject to availability of resources, computerized and connected through a network all over the country on different systems so that access to such records is facilitated;

(b) publish within one hundred and twenty days from the enactment of this Act.-

- the particulars of its organization, functions and duties;
- the powers and duties of its officers and employees;
- the procedure followed in the decision-making process, including channels of supervisions and accountability;
- the norms set by it for the discharge of its functions;
- the rules, regulations, instructions, manuals and records, held by it or under its control or used by its employees for discharging its functions;
- a statement of the categories of documents that are held by it or under its control;
- the particulars of any arrangement that exists for consultation with, or representation by, the members of the public in relation to the information of its policy or implementation thereof;
- a statement of the boards, councils, committees and other bodies consisting of two or more persons constituted as its part or for

the purpose of its advice, and as to whether meetings of those boards, councils, committees and other bodies are open to the public, or the minutes of such meetings are accessible for public;

- a directory of its officers and employees;
 - the monthly remuneration received by each of its officers and employees, including the system of compensation as provided in its regulations;
 - the budget allocated to each of its agency, indicating the particulars of all plans, proposed expenditures and reports on disbursements made;
 - the manner of execution of subsidy programmes, including the amounts allocated and the details of beneficiaries of such programmes;
 - particulars of recipients of concessions, permits or authorisations granted by it;
 - details in respect of the information, available to or held by it, reduced in an electronic form;
 - the particulars of facilities available to citizens for obtaining information, including the working hours of a library or reading room, if maintained for public use;
 - the names, designations and other particulars of the Public Information Officers;
 - such other information as may be prescribed.
- (c) publish all relevant facts while formulating important policies or announcing the decisions which affect public;
- (d) provide reasons for its administrative or quasi-judicial decisions to affected persons.
- (2) It shall be a constant endeavour of every public authority to take steps in accordance with the requirements of clause (b) of subsection (1) to provide as much information *sou motu* to the public at regular intervals

through various means of communications, including internet, so that the public have minimum resort to the use of this Act to obtain information.

- (3) For the purposes of sub-section (1), every information shall be disseminated widely and in such form and manner which is easily accessible to the public.
- (4) All materials shall be disseminated taking into consideration the cost effectiveness, local language and the most effective method of communication in that local area and the information should be easily accessible, to the extent possible in electronic format with the Central Public Information Officers or State Public Information Officers, as the case may be, available free or at such cost of the medium or the print cost price as may be prescribed.

Explanation - For the purposes of sub-sections (3) and (4), "disseminated" means making known or communicated the information to the public through notice boards, newspapers, public announcements, media broadcasts, the internet or any other means, including inspection of offices of any public authority.

Designation of Public Information Officers - (1) Every public authority shall, within one hundred days of the enactment of this Act, designate as many officers as the Central Public Information Officers or State Public Information Officers, as the case may be, in all administrative units or offices under it as may be necessary to provide information to persons requesting for the information under this Act.

(2) Without prejudice to the provisions of sub-section (1), every public authority shall designate an officer, within one hundred days of the enactment of this Act, at each sub-divisional level or other sub-district level as a Central Assistant Public Information Officer or a state Assistant Public Information Officers, as the case may be, to receive the applications for information or appeals under this Act for forwarding the same forthwith to the Central Public Information Officer or the State Public Information Officers or senior officer specified under sub-section (1) of section 19 or the Central Information Commission or the State Information Commission, as the case may be :

Provided that where an application for information or appeal is given to Central Assistant Public Information Officer or a state Assistant Public Information Officer, as the case may be, period of five days shall be added in computing the period for response specified under sub-section (1) of section 7.

(3) Every Central Public Information Officer or State Public Information Officer, as the case may be, shall deal with requests from persons seeking information and render reasonable assistance to the persons seeking such information.

(4) The Central Public Information Officer or State Public Information Officer, as the case may be, may seek the assistance of any other officer as he or she considers it necessary for the proper discharge of his or her duties.

(5) Any officer, whose assistance has been sought under sub-section (4), shall render all assistance to the Central Public Information Officer or State Public Information Officer, as the case may be, seeking his or her assistance and for the purposes of any contravention of the provisions of this Act, such other officer shall be treated as a Central Public Information Officer or State Public Information Officer, as the case may be.

Request for obtaining information - (1) A person, who desires to obtain any information under this Act, shall make a request in writing or through electronic means in English or Hindi or in the official language of the area in which the application is being made, accompanying such fee as may be prescribed, to -

- (a) the Central Public Information Officer or State Public Information Officer, as the case may be, of the concerned public authority;
- (b) the Central Assistant Public Information Officer or State Assistant Public Information Officer, as the case may be, specifying the particulars of the information sought by him or her:

Provided that where such request cannot be made in writing, the Central Public Information Officer or State Public Information Officer, as the case may be, shall render all reasonable assistance to the person making the requests orally to reduce the same in writing.

- (2) An applicant making request for information

shall not be required to give any reason for requesting the information or any other personal details except those that may be necessary for contacting him.

- (3) Where an application is made to a public authority requesting for an information-
- which is held by another public authority; or
 - the subject-matter of which is more closely connected with the functions of another public authority, the public authority, to which such application is made, shall transfer the application or such part of it as may be appropriate to that other public authority and inform the applicant immediately about such transfer :

Provided that the transfer of an application pursuant to this sub-section shall be made as soon as practicable but in no case later than five days from the date of receipt of the application.

Disposal of request

- (1) Subject to the proviso to sub-section (2) of section 5 or the proviso to sub-section (3) of section 6, Central Public Information Officer or State Public Information Officer, as the case may be, on receipt of a request under section 6 shall, as expeditiously as possible, and in any case within thirty days of the receipt of the request, either provide the information on payment of such fee as may be prescribed or reject the request for any of the reasons specified in section 8 and 9:

Provided that where the information sought for concerns the life or liberty of a person, the same shall be provided within forty-eight hours of the receipt of request.

- (2) If the Central Public Information Officer or State Public Information Officer, as the case may be, fails to give decisions on the request for information within the period specified under sub-section (1), the Central Public Information Officer or State Public Information Officer, as the case may be, shall be deemed to have refused the request.
- (3) Where a decision is taken to provide the information on payment of any further fee representing the cost of providing the information, the Central Public Information

Officer or State Public Information Officer, as the case may be, shall send an intimation to the person making the request, giving –

- (a) the details of further fees representing the cost of providing the information as determined by him, together with the calculations made to arrive at the amount in accordance with fee prescribed under sub-section (1), requesting him to deposit that fees, and the period intervening between the dispatch of the said intimation and payment fees shall be excluded for the purpose of calculating the period of thirty days referred to in that sub-section;
- (b) information concerning his or her right with respect to review the decisions as to the amount of fees charged or the form of access provided, including the particulars of the appellate authority , time-limit, process and any other forms.
- (4) Where access to the record or a part thereof is required to be provided under this Act and the person to whom access is to be provided is sensorily disabled, the Central Public Information Officer or State Public Information Officer, as the case may be, shall provide assistance to enable access to the information, including providing such assistance as may be appropriate for the inspection.
- (5) Where access to information is to be provided in the printed or in any electronic format, the applicant shall, subject to the provisions of sub-section (6), pay such fee as may be prescribed:

Provided that the fee prescribed under sub-section (1) of section 6 and the sub-sections (1) and (5) of section 7 shall be reasonable and no such fee shall be charged from the persons who are of below poverty line as may be determined by the appropriate Government.

- (6) Notwithstanding anything contained in sub-section (5), the person making request for the information shall be provided the information free of charge where a public authority fails to comply with the time-limits specified in sub-section (1).

- (7) Before taking any decision under sub-section (1), the Central Public Information Officer or State Public Information Officer, as the case may be, shall take into consideration the representation made by a third party under section 11.
- (8) Where a request has been rejected under sub-section (1), the Central Public Information Officer or State Public Information Officer, as the case may be, shall communicate to the person making the request,-
- (i) the reasons for such rejection;
 - (ii) the period within which an appeal against such rejection may be preferred; and
 - (iii) the particulars of the appellate authority.
- (9) An information shall ordinarily be provided in the form in which it is sought unless it would disproportionately divert the resources of the public authority or would be detrimental to the safety or preservation of the record in question.

Exemption from disclosure of information-

(1) Notwithstanding anything contained in this Act, there shall be no obligation to give any citizen -

- (a) information, disclosure of which would prejudicially affect the sovereignty and integrity of India, the security, strategic, scientific or economic interests of the state, relation with foreign State or lead to incitement of an offence;
- (b) information which has been expressly forbidden to be published by any court of law or tribunal or the disclosure of which may constitute contempt of Court;
- (c) information, the disclosure of which would cause a breach of privilege of parliament or the State Legislature;
- (d) information including commercial confidence, trade secrets or intellectual property, the disclosure of which would harm the competitive position of a third party, unless the competent authority is satisfied that larger public interest warrants the disclosure of such information;
- (e) information available to a person in his fiduciary relationship, unless the competent authority is satisfied that the larger public

interest warrants the disclosure of such information;

- (f) information received in confidence from foreign government;
- (g) information, the disclosure of which would endanger the life or physical safety of any person or identify the source of information or assistance given in confidence for law enforcement or security purposes;
- (h) information which would impede the process of investigation or apprehension or prosecution of offenders;
- (i) cabinet papers including records of deliberations of the Council of Ministers, Secretaries and other officers:

Provided that the disclosure of Council of Ministers, the reasons thereof, and the material on the basis of which the decisions were taken shall be made public after the decision has been taken, and the matter is complete, or over:

Provided further that those matters which come under the exemptions specified in this section shall not be disclosed;

- (j) information which relates to personal information the disclosure of which has no relationship to any public activity or interest, or which would cause unwarranted invasion of the privacy of the individual unless the Central Public Information Officer or State Public Information Officer, as the case may be, is satisfied that the larger public interest justifies the disclosure of such information :

Provided that the information, which cannot be denied to the Parliament or a State Legislature shall not be denied to any person.

- (2) Notwithstanding anything in the Official Secrets Act, 1923 (Act No. 19 of 1923) nor any of the exemptions permissible in accordance with sub-section (1), a public authority may allow access to information, if public interest in disclosure outweighs the harm to the protected interests.
- (3) Subject to the provisions of clauses (a), (c) and (i) of sub-section (1), information relating to any occurrence, event or matter which has taken place, occurred or

happened twenty years before the date on which any request is made under section 6 shall be provided to any person making a request under that section:

Provide that where any question arises as to the date from which the said period of twenty years has to be computed, the decision of the central Government shall be final, subject to the usual appeals provided for in this Act.

Grounds for rejection to access in certain cases. without prejudice to the provisions of section 8, a Central Public Information Officer or a State Public Information Office, as the case may be, may reject a request for information where such a request for providing access would involve an infringement of copyright subsisting in a person other than the State.

Severability: (1) Where a request for access to information is rejected on the ground that it is in relation to information which is exempt from disclosure, then notwithstanding anything contained in this Act, access may be provided to that part of the record which does not contain any information which is exempt from disclosure under this Act and which can reasonably be severed from any part that contains exempt information.

- (2) Where access is granted to a part of the record under subsection (1) the Central Public Information Officer or State Public Information Officer, as the case may be, shall give a notice to the applicant informing,-
 - (a) That only part of the record requested, after severance of the record containing information which is exempt from disclosure, is being provided;
 - (b) The reasons for the decision, including any findings on any material question of fact, referring to the material on which those findings were based ;
 - (c) The name and designation of the person giving the decision;
 - (d) The details of the fee calculated by him or her and the amount of fee which the applicant is required to deposit; and
 - (e) his or her rights with respect to review of the decision regarding non-disclosure of part of the information, the amount of fee charged or the form of access provided, including the particulars of the senior officer specified under sub-section (1) of section 19 or the Central Information Commission or the State information Commission, as the case may be, time-limit, process and any other form of access.

Right To Information Act and SAUs

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INTRODUCTION

Right to Information (RTI) Act is directed at bringing transparency and openness in the working of public authorities. SAUs for that matter and all universities are autonomous institutions. However, RTI does not exempt them nor do they fall in the category of organization exempted. It is applicable on us demanding compliance. It has good intentions. It compels competent authorities in our case Vice-Chancellors, Registrars, Deans and Directors empowered to take decisions to evolve and follow sound decision making processes and follow them in all earnestness with justice and fair play without favour or prejudice. Citizens aware of the provisions of the Act can play a positive role. It leaves little room for adhocism or fancy of the individuals, overrules certain existing administrative rules like confidentiality. Provisions of the RTI Act in certain cases can slowdown decision making processes, procrastination and shirking. There are time bound projects whose execution involves recruitment and mobilization of resources in fastest possible manner. Act brings additional vulnerabilities to decision making officers, CEOs and officers under him, accountability and extra responsibility without bringing any major improvement in individuals or organizational working. Developing societies even the developed ones are full of individuals who do not engage in productive work, they derive satisfaction in making mountain out of mole, raise trivia in self righteous manner, often taking shelter of court proceedings which officers hate to get involved which helps the trouble makers achieving their objectives of harassment and establishing their nuisance value.

RTI is a nationwide with the exception of State of Jammu and Kashmir (J&K) at this point of time. Central Government / CIO may catalyze a parallel Act in J&K as well. It includes right to:

- I. inspect works, documents, records
- II. take notes, extracts or certified copies of documents or records

- III. take certified samples of material
- IV. obtain information in form of printouts, diskettes, floppies, tapes, video cassettes or in any other electronic mode or through printouts. File notings however, are excluded.

Obligations of a Public Authority under RTI Act

It shall publish within 120 days of the enactment

1. the particulars of its organization, functions and duties
2. the powers and duties of its officers & employees
3. the procedure followed in its decision making process, including channels of supervision and accountability
4. the norms set by it or the discharge of its functions
5. the rules, regulations, instructions, manuals and records used by its employees for discharging its functions
6. a statement of the categories of the documents held by it or under its control
7. the particulars of any arrangement that exists for consultation with or representation by the members of public in relation to the formulation of policy or implementation thereof.
8. a statement of the boards, councils, committees and other bodies consisting of two or more persons constituted by it. Additionally information as to whether the meetings of these are open to public, or the minutes of such meetings are accessible to the public
9. a directory of its officers and employees
10. monthly remuneration received by each
11. the budget allocated to each of its agency
12. the manner of execution of subsidy programme

13. particulars of concessions, permits or authorizations granted
14. details of information available to, or held by it reduced in an electronic form
15. the particulars of facilities available to citizens for obtaining information, including working hours of a library or reading room, if maintained for public use.
16. the names, designations and other particulars of the Public Information Officer (PIO).

Public Information Officers (PIO)

The PIOs are officers designated by the public authorities in all administrative units or offices under it. They have responsibilities to provide information in a time bound manner, within 30 days of receipt of the request. However, if information relates to life and liberty of a person, the information is required to be provided within 48 hours. If allowing only partial access PIO has to inform the applicants with all relevant particulars. PIO will also give details of the fee to be deposited. If the information is provided by a third party or is treated confidential PIO will give a written notice to the third party within 5 days of the receipt of the request. Third party has 10 days for any representation.

Exemptions / Exclusions

Exemption from disclosures are provided in the Act on matters that affect sovereignty and integrity of India, the security, strategic, scientific or economic interest of the state; information forbidden for disclosure by a court of law, a judicial process or information that amounts breach of privilege of Parliament or State Legislature; information that is a commercial confidence, trade secrets or IPR related; information received in confidence from a foreign government; information that would endanger physical safety of a person, information that would impede the process of investigation / prosecution; information that would cause unwarranted invasion of the privacy of the individual. Central Intelligence and Security

Agencies specified in the Second Schedule are exempted. The exclusions are however, not absolute, they are required to provide information in the event of corruption and human rights violation.

Procedure for Request of Information

Act very clearly provides procedure for requesting information which includes payment of prescribed fee. However, people below poverty line are exempted from the fee. Applicant can seek review on the fee charged applying to the appropriate appellate authority. Request for information can be rejected if the information sought is exempted from disclosure or if it infringes copyright of any person.

Impact of RTI on SAU Working

Vice-Chancellor as Competent Authority has to designate a university officer as PIO. As per Act and Statutes of most of the SAUs Registrars have function of PIO. RTI Act is demanding greater openness, transparency and accountability. We are required to immediately prepare a public notification in the light of respective SAUs' Act and Statutes and guidelines of Resident Instruction fulfilling the obligations prescribed by the RTI Act. Most often contested issues are recruitments, promotions, posting of Heads, Deans and Directors, transfers, admissions to different degree programmes, award of degrees, and extensions in academic programmes, post superannuation, retention, engagement or re-employments. As per RTI Act there should be well laid out procedures which are to be followed in decision making by the competent authority. In recruitments invariably scoring should be there if not already in place because of the many claimants to a particular post the offer should be made strictly on merit basis. Numerical scoring easily establishes relative merit, hence desirable. Promotional channels available to an employee in the organization should be clearly defined and ratified by appropriate body of the university.

An Insight into Right to Information Act

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The **Right to Information Act 2005** (Act No. 22/2005) is a law enacted by the **Parliament of India** giving Indians (except those in the State of Jammu and Kashmir who have their own special law) access to Government records.

Any person may request information from a “public authority” (a body of Government or instrumentality of State) which is expected to reply expeditiously or within thirty days.

Requires every public authority to computerise their records Proactively publish certain categories of information. Citizens need minimum recourse to request for information formally.

- Scope
- Provisions
- Information defined
- Right to information
- What is not open to disclosure?
- Exclusions
- Record maintenance

Scope

The Act covers the whole of India. It is applicable to all constitutional authorities, including the executive, legislature and judiciary;

Any institution or body established or constituted by an act of Parliament or a state legislature or by order or notification of appropriate government. In special circumstances bodies “**owned, controlled or substantially financed**” by government, or non-Government organizations “**substantially financed, directly or indirectly by funds**” provided by the government are also covered.

Private bodies are not within the Act’s ambit directly. However, information that can be accessed under any other law in force by a public authority can also be requested for.

Process

The person making the request is not obliged to explain why the information is needed. The Act

specifies timeframes for complying with the request.

- If the request has been made to the PIO, compliance is expected within 30 days.
- If the request has been made to an APIO, compliance is expected within 35 days.
- If the PIO transfers the request to some other department better concerned with the information requested), the time allowed is 35 days.
- Information about Human Rights violations by Security agencies have to be provided within 45 days.
- However, in any of the above cases, if life or liberty is involved, the PIO has to comply within 48 hours.

Since the information is to be paid for, the time between the reply of the PIO and the time taken to deposit the further fees for information is excluded from the time allowed.

If information is not provided within this period, it is treated as a refusal. Refusal with or without reasons may be ground for appeal.

For Central departments as of 2006, there is a fee of Rs. 10 for filing the request, Rs. 2 per page of information and Rs. 5 for each hour of inspection after the first hour. States fix their own rules.

Provisions

- Obligations of public authorities [S.4(1)]
- Designation of Public Information Officers and Assistant Public Information Officers[S.5(1) and 5(2)]
- Constitution of Central Information Commission (S.12 and 13)
- Constitution of State Information Commission (S.15 and 16)
- Non-applicability of the Act to Intelligence and Security Organizations (S.24)

- Power to make rules to carry out the provisions of the act(S.27 and 28).

Relevant provisions in the Act:

information means- **any material in any form, including**

records, documents, memos, e-mails, opinions, advices, press releasess.2(f)

...information means- circulars, orders, logbooks, contracts, reports, papers, samples, Models, data material held in any electronic form s.2(f)

...information means- information relating to any private body which can be accessed by a public authority under any other law for the time being in force.....s.2(f)

record includes-

- any document, manuscript and file;
- any microfilm, microfiche and facsimile copy of a document; s.2(i)
- any reproduction of image or images embodied in such microfilm (whether enlarged or not)
- any other material produced by a computer or any other device; s.2(i)

right to information means- the right to information accessible under this Act which is held by or under the control of any public authority ...s.2(i)

...right to information includes the right to-

- inspection of work, documents, records;
- taking notes, extracts or certified copies of documents or records; s.2(i)
- taking certified samples of material; s.2(i)
- obtaining information in the form of diskettes, floppies, tapes, video cassettes or in any other electronic mode or through printouts where such information is stored in a computer or in any other device; s.2(i)

Obligations of public authorities -

Every public authority shall maintain all its records duly catalogued and indexed in a manner and the form which facilitates the right to information under this Act ... s.4(1) (a)

...and ensure that all records that are appropriate to be computerised are, within a

reasonable time and subject to availability of resources, computerised and connected through a network all over the country on different systems so that access to such records is facilitated; s.4(1) (a)

The Right to Information Act

Exemptions from Disclosure of Information

There shall be no obligation to give any citizen-

- information, disclosure of which would prejudicially affect the sovereignty and integrity of India, the security, strategic, scientific or economic interests of the State, relation with foreign State or lead to incitement of an offence. s.8 (1)(a)
- information which has been expressly forbidden to be published by any court of law or tribunal or the disclosure of which may constitute contempt of court.
- information, the disclosure of which would cause a breach of privilege of Parliament or the State Legislature.
- information including commercial confidence, trade secrets or intellectual property, the disclosure of which would harm the competitive position of a third party, unless the competent authority is satisfied that larger public interest warrants the disclosure of such information;
- information available to a person in his fiduciary relationship, unless the competent authority is satisfied that the larger public interest warrants the disclosure of such information
- information received in confidence from foreign Government.
- information, the disclosure of which would endanger the life or physical safety of any person or identify the source of information or assistance given in confidence for law enforcement or security purposes.
- information which would impede the process of investigation or apprehension or prosecution of offenders; ...but the

decisions of Council of Ministers, the reasons thereof, and the material on the basis of which the decisions were taken shall be made public after the decision has been taken, and the matter is complete, or over.

- (j) information which relates to personal information the disclosure of which has no relationship to any public activity or interest, or which would cause unwarranted invasion of the privacy of the individual unless the PIO is satisfied that the larger public interest justifies the disclosure of such information: The information which cannot be denied to the Parliament or a State Legislature shall not be denied to any person. Notwithstanding anything in the Official Secrets Act nor any of the exemptions permissible in accordance with s.8 (1), a public authority may allow access to information, if public interest in disclosure outweighs the harm to the protected interests. s.8(2)

Subject to the provisions of clauses (a), (c) and (i) of s.8(1), any information relating to any occurrence, event or Matter which has taken place, occurred or happened twenty years before the date on which any request is made shall be provided to the requester...

...the decision of the Central Government shall be final on questions as to the date from which the said period of twenty years has to be computed, subject to the usual appeals. s.8(3)

Grounds for Rejection

PIO may reject a request for information where such a request for providing access would involve an infringement of copyright subsisting in a person other than the State. S.9

Where a request has been rejected, the PIO shall communicate to the requester-

- the reasons for such rejection;
- the period within which an appeal against such rejection may be preferred; and
- the particulars of the appellate authority. s.7(8)

Severability (Partial Disclosure)

Access may be provided to a part of the record which does not contain any information which is exempt from disclosure under this Act and which can reasonably be severed from any part that contains exempt information. s.10(1)

The PIO shall give a notice to the applicant informing reasons for partial disclosure, fees, appellate authority details. s.10(2)

Third Party Information

Where the PIO intends to disclose any information, which relates to or has been supplied by a third party and has been treated as confidential by that third party... s.11

...the PIO shall, within five days from the receipt of the request give a written notice to such third party and invite the third party to make a submission in writing or orally, and such submission shall be kept in view while taking a decision. s.11

Exemptions

Except in the case of trade or commercial secrets protected by law, disclosure may be allowed if the public interest in disclosure outweighs in importance any possible harm or injury to the interests of such third party.

Third Party

the third party shall, within ten days from the date of receipt of such notice, be given the opportunity to make representation against the proposed disclosure.

The PIO shall, within 40 days after receipt of the request, make a decision and give in writing the notice of his decision to the third party.

The third party to whom the notice is given is entitled to prefer an appeal.

Records Management for effective implementation of the Right to Information Act

Pro-active Information Disclosure Section 4(1)(b)

Obligation on part of Public Authorities

- (1) Maintain all records duly catalogued and indexed, computerise and connect records through a national network - on different systems
- (2) Publish within 120 days
 - Particulars of Organisation, Functions and Duties;

- Powers and Duties of Officers and Employees;
- Procedures followed in Decision-making Process including channels of Supervision & Accountability;
- Norms for Discharge of Functions;
- Rules, Regulations, Instructions, Manuals, Records held or used by Employees;
- Statement of Categories of Documents held;
- Mechanisms of Public Consultation on Policy Formulation/ Implementation;
- Boards, Councils, Committees etc. and their Meetings;
- Directory of Officers and Employees;
- Monthly Remuneration of Officers and Employees & System of Compensation;
- Budget Allocated to Agencies along with Plans & Disbursements Made;
- Details of Implementation of Subsidy Programmes, including Beneficiaries Details;
- Particulars of Recipients of Concessions, Permits or Authorisations granted;
- Details of Information available to, or held, reduced in an electronic form;
- Particulars of Facilities available to citizens for obtaining information, including the working hours of a library or reading room, if maintained for public use;
- Names, Designations and other particulars of the Public Information Officers;
- Such other Information as may be prescribed.

Information Management (Records Management)

Records = Information: The effectiveness and efficiency of the public service across the range of government functions depends upon the **availability of and access to information** held in records. Badly managed records adversely

affect the broad scope of public service reforms, and development projects are often difficult to implement and sustain effectively in the absence of good **record management practices**.

Quality Information Delivery - Key Issues

- Building Robust Information System – Contents, Cataloguing and Indexing;
- Classification of Data/Meta-Data & Information – e-Enabling;
- Data & Meta Data Dictionary and Standards;
- Designing of Information Systems (Section 4 (1));
- Organisation, Procedures & Decision-making Systems
- Human Resource Management Information System;
- Financial Management Information System;
- Schemes, Projects & Works Management Information System;
- Legal Caseload Management System;
- Performance Management System: Input-Output-Outcome-Impact Linkages;
- Citizens Governance – Citizen’s Charters, Grievances, Library, Web Sites, Manuals, Brochures, Information Access Facilities etc.
- Technology Management Information System (Process Re-engineering & e-Governance Tools)
- Record Management Systems – Classifying, Storing, Retrieval & Getting Access;
- Clarity in Responsibility for Information Creation, Maintenance & Record Management;
- Quality of Requests – Identification of Source, Objectivity, Clarity, Completeness;
- Channels for Verification of Information Supplied by Public Authorities;
- Competence, Motivation & Behaviour of Public Information Officers and Appellate Authorities;
- Training of Officials – Supply Side Management;

- Awareness Building among Citizens – Demand Side Management.

Designing Information Systems: Examples Human Resource Management System

- Proper human resource management systems need to be put in place that enable complete information on
 - Human resources functions
 - Recruitment, transfer, promotion etc.
 - Payroll system
 - Performance appraisal & analysis
 - Career planning and development, capabilities, skills and talent management; training
 - Compensation planning
 - Service litigation

Financial Management Information Systems

- Need for a robust Financial Management System which will enable systematic flow of information on:
 - Strategic & Financial Planning
 - Budget Allocation to Departments/ Agencies/Schemes/Projects
 - Funds Flow
 - Expenditure Management
 - Budget Utilization
 - Accounting
 - Auditing

- Tracking of Financial Accountability

Legal Case Load Management System

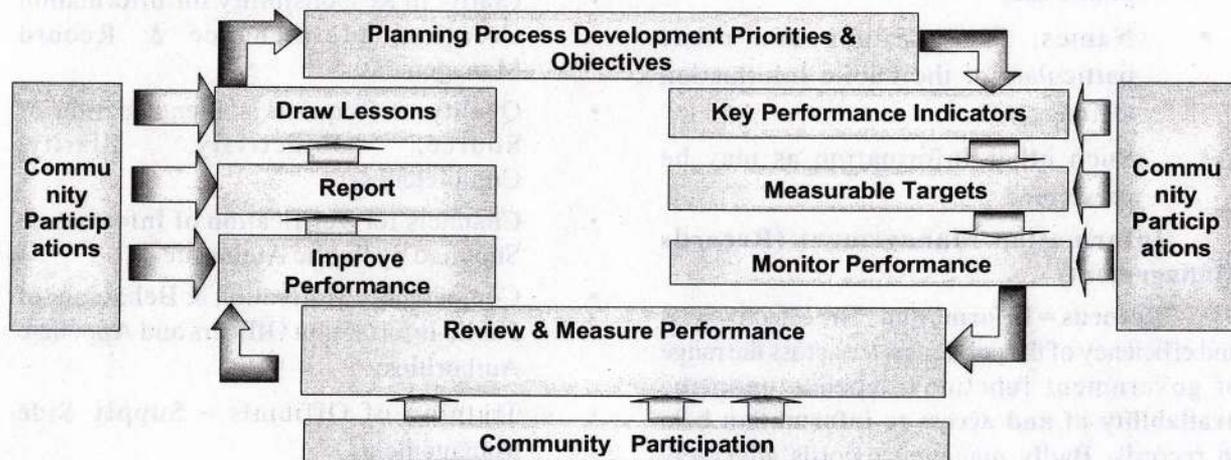
The legal caseload management system enables the Government

- To monitor legal cases
 - Department-wise
 - Subject-wise
 - Court-wise
 - Government Pleader-wise
 - Stage-wise
 - Pendency-wise
- To fix responsibilities for delays and non-action

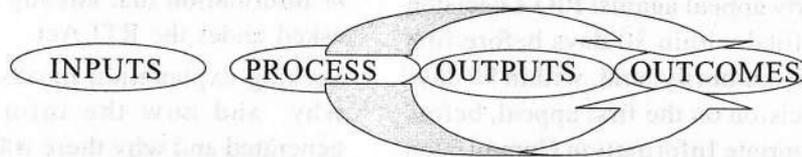
Customer Relationship Management

- Formulation and implementation of Citizen's Charters by all the Government organizations;
- Citizen Charter implementation tracking system;
- Grievances redressal tracking system;
- Involvement of citizens in all government processes;
- Setting up of an effective institutional mechanism for time-bound disposal of requests, applications, etc, of citizens;
- Change management for all public functionaries to address issues of public service and mindset blocks

Performance Management System



Input-Output-Outcome Linkages



Issues of Metadata – Data about Data

- Structuring of Database Systems necessary for better management, reach, accessibility and easy search:
- Precise Identification
- Classification
- Structuring
- Management
- Retrieval mechanisms
- Utilisation
- Combined, Linked & Coordinated Databases required for effective decision-making and smooth supply of information to citizens
- Information Framework (4-f – Functions, Functionary, Finance, Field), Standards and Inter-operability aspects need to be addressed for effective Database Management System

Records Management : Key Issues

Why Records Management?

- To support decision-making by making information easily available to all staff when they require it in order to perform their actions and take decisions;
- To assist citizens in accessing records when they want;
- To provide reliable evidence on an organisation's activities and focus, to explain and justify decisions, actions and use of resources by the organization;
- To allow an agency to make best use of available information resources and help minimize costs;
- To minimize risks associated with non-availability of information;
- To ensure that a record of significant government functions and activities is

permanently preserved in the Public Record Office.

In the Context of RTI Act, Records Management and Archiving need to be reviewed and improved as necessary through appropriate legislation & training

What is the fee?

- (i) Application fees to be prescribed which must be reasonable;
- (ii) If further fees are required, then the same must be intimated in writing with calculation details of how the figure was arrived at;
- (iii) Applicant can seek review of the decision on fees charged by the PIO by applying to the appropriate Appellate Authority;
- (iv) No fees will be charged from people living below the poverty line.
- (v) Applicant must be provided information free of cost if the PIO fails to comply with the prescribed time limit.

What could be the ground for rejection?

- (i) If it is covered by exemption from disclosure. (S.8)
- (ii) If it infringes copyright of any person other than the State. (S.9)

Who are the Appellate Authorities?

- (i) First Appeal: First appeal to the officer senior in rank to the PIO in the concerned Public Authority within 30 days from the expiry of the prescribed time limit or from the receipt of the decision (delay may be condoned by the Appellate Authority if sufficient cause is shown).
- (ii) Second Appeal: Second appeal to the Central Information Commission or the State Information Commission as the case may be, within 90 days of the date on which the decision was given or should

have been made by the First Appellate Authority. delay may be condoned by the Commission if sufficient cause is shown).

- (iii) Third Party appeal against PIO's decision must be filed within 30 days before first Appellate Authority; and, within 90 days of the decision on the first appeal, before the appropriate Information Commission which is the second appellate authority.
- (iv) Burden of proving that denial of Information was justified lies with the PIO.
- (v) First Appeal shall be disposed of within 30 days from the date of its receipt. Period extendable by 15 days if necessary. (S.19)

What are the penalty provisions?

Every PIO will be liable for fine of Rs. 250 per day, up to a maximum of Rs. 25,000/-, for :-

- (a) not accepting an application;
- (b) delaying information release without reasonable cause;
- (c) malafidely denying information;
- (d) knowingly giving incomplete, incorrect, misleading information;
- (e) destroying information that has been requested and
- (f) obstructing furnishing of information in any manner.

The Information Commission (IC) at the Centre and the State levels will have the power to impose this penalty. The Information Commission can also recommend disciplinary action for violation of the law against an erring PIO. (S.20)

Who has the Rule making power?

Central Government, State Governments and the Competent Authority as defined in S. 2(e) are vested with powers to make rules to carry out the provisions of the Right to Information Act, 2005. (S. 27 & S. 28).

What is the difference between 'Right to Know' and 'Right to Information'?

'Right to Know' is a natural right. 'Right to Information' is a privileged given by the constitution to the people.

What is the difference between 'seeking information' and 'seeking explanation'?

Seeking information means asking for records or information that already exists. This can be asked under the RTI Act.

Seeking explanation means asking the reason why and how the information has been generated and why there was delay in the work etc. This cannot be asked under the RTI Act.

Are fees same in all states in India?

No, fees are prescribed by each state and differ from state to state e.g. In Maharashtra application fee is Rs. 10, same in Gujarat is Rs. 20. So also differ other fees i.e. for inspection, providing copies etc. However same have to be reasonable as provided in the Act (see FAQ 15). For details, refer the rules of the relevant state, e.g. Maharashtra Right to Information Rules, 2005.

Is the Act A Sword or a shield? NEITHER Just simple information flow ***** not a place to settle score. This law was passed by Parliament on 15 June 2005 and came into force on 13 October 2005.

Information disclosure in India was hitherto restricted by the Official Secrets Act 1923 and various other special laws, which the new RTI Act now overrides.

Right to information

Under the Act (section 2 (j)), right to information includes the right to -

- inspect works, documents, records.
- take notes, extracts or certified copies of documents or records.
- take certified samples of material.
- obtain information in form of printouts, diskettes, floppies, tapes, video cassettes or in any other electronic mode or through printouts.

Information

The Act specifies that citizens have a right to:

- Request any information (as defined)
- Take copies of documents
- Inspect documents
- Inspect works
- Take samples of materials of work

Right to Information Act 2005 - Prospects and Problems

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Introduction

The Right to Information Act 2005 came into operation from 1st October 2005. The Act was published in the Gazette of India, Extraordinary, Part-II, Section I, dated 21 June 2005 pp 1-22.. The Right to Information(RTI) Act is an Act to provide for setting out the practical regime of right to information (RTI) for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, the constitution of a Central Information Commission and State Information Commissions and for the matters connected therewith or incidental thereto.

Thus, the RTI Act 2005 was brought into operation to make the working of government and semi-government functionaries transparent as well as to make them accountable to the public. In true sense it is good for the country as a whole where the public servants take action strictly as per existing rules and make it public if demand comes. However there are some cases where some information made public may create security problems to the country. An applicant making request for information shall not be required to give any reason for requesting the information or any other personal details except those that may be necessary for contacting him. But, some irrelevant information, if sought by any body which does not have any relation to him either directly or indirectly may be restricted. In order to facilitate this the Act provided some exemptions for making the information public.

No obligation information:

The information where there is no obligation for providing to any person is

- 1) Information, disclosure of which would prejudicially affect the sovereignty and integrity of India
- 2) Information which has been expressly for- bidden to be published by any court of law or tribunal or the disclosure of which may constitute contempt of court
- 3) Information, the disclosure of which would cause a breach of privilege of Parliament or the State Legislature

- 4) Information including commercial confidence, trade secrets or intellectual property, the disclosure competitive position of a third party
- 5) Information available to a person in his judiciary relationship warrants the disclosure of such information
- 6) Information received in confidence from a foreign government
- 7) Information, the disclosure of which would endanger the life of or physical safety of any person
- 8) Information which would impede the process of investigation or apprehensions or prosecution of offenders
- 9) Cabinet papers including the records of deliberations of the Council of Ministers, Secretaries and other officers
- 10) Information which relates to a personal information the disclosure of which would cause unwarranted invasion of the privacy of the individual

Back date Information

Any information relating to any occurrence, event or matter which has taken place occurred or happened twenty years before the date on which any request is made under section 6 shall be provided. In the other words any information occurred more than twenty years ago need to be provided by the Information Officer. It is left on his discretion.

Hierarchy for RTI

The RTI Act provides a provision of Chief Information Commission at Central level and State Chief Information Commission at each state. It is the duty of the Central Chief Information Commission or State Chief Information Commission to receive complaint and inquire into a complaint ITom any person.

At the University level Indira Gandhi Agricultural University appointed Public Information officers at each research station and college. The Public Information Officer, at Raipur campus shall act for the University level information too. The Vice-Chancellor is the appealing authority and the cases, for not providing

the required information are to be referred to the appealing authority.

Some problems encountered at the University during one year period

- 1) *Misconception that it is grievance cell:*
Most of the people, especially employees of the university, feel that it is a procedure to redress their grievances through RTI. They seek lot of information which in fact does not help to remove their grievances. Sometimes they are instigated to go to court of law for justice using these papers. Because of this their trouble increase and perhaps they end at nowhere. Some casual workers ask their muster rolls of 15-25 years back hoping that they can claim their seniority for employment etc.
- 2) *Mischievous intensions*
Some persons ask information in the name of public interest which has no direct relation to him or her. Some people ask information and they expect that they would get Rs 25,000 in case the information is not provided within the stipulated period of 1 month.
Some are determined to embarrass the university authorities with mere malafied intentions. For example, one asks a question that what is the budget allocation to the university from various sources etc., the objectives were only to embarrass the authorities.
- 3) *Matters pertaining court of law*
The University received some queries regarding the score card numbers given in a particular interview. As the case is pending in court the university rejected to provide the information. But the applicant appealed to the state chief Information Officer. During the time of hearing, the Chief Information was told that the numbers given by a selection committee are secret and the matter is pending in the court of law. Then a decision was given that the interview numbers may not be given but other numbers in the score card which are generally know to every one could be given and the university acted accordingly.
- 4) *Problems pertaining students*
The students now wish to look at their

answer sheets in case they get fewer marks and fail their examination. However, showing the answer sheets every time to the large number of students through RTI may be a very difficult task. Especially for IGAU which had 17 private agriculture and allied colleges, the student strength is very large. It was decided in the Coordination Committee meeting of all state universities in Chhattisgarh state to provided photo copies of the revalued answer sheets.

Payment for providing information

Any information sought by an applicant is to be provided on payment basis. Any information that already exists in record could be provided to the applicant charging Rs 2 per page for photocopy charges. But if the information need to be compiled, typed and provided to the applicant, then the authorities can charge @ Rs 100 per page.

Sometimes an applicant seeks such information that need to be complied and typed. If the authorities reply to them to deposit the charges as per the rule they do not turn up. The whole exercise that was done goes waste.

Suggestion for improvement of RTI

Right to Information Act 2005 is definitely a very important Act and in large democratic countries like India such Act will definitely help the citizens in getting the required information and make the administration transparent. However, some measures are needed to make RTI Act 2005 more powerful and useful to the public. Some suggestions in this regard are as follows :

- 1) Photocopies need to be taken only after getting the consent from the applicant. In some cases, it is understood that the government departments prepared photocopies costing more than Rs 1.0 lakhs and the applicant did not turn.
- 2) Any information to be compiled for the applicant it is to be charged @ Rs 100 per page. In this case also, the consent of applicant must be taken before compiling. Otherwise, there must be some action, if found that the applicant is mischievous.
- 3) There must be separate cell for RTI in each department which should have facilities for typing, photocopying and budget for correspondence and for other incidentals / logistics.

Right to Information

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Right to Information Act and Freedom of Information Act :

The freedom of Information Act 2002 was enacted to provide freedom to every citizen to have access to information under the control of public authorities, consistent with public interest, in order to promote openness, transparency and accountability in administration and related matters. Incorporating necessary changes, the Government has legislated the Right to Information Act 2005. This Act came into force from 12.10.2005.

Necessity of Right to Information :

The right to get information is recognized as a natural right flowing from the concept of democracy. It promotes openness, transparency and accountability in administration. Every citizen has a fundamental right to impart and receive information (Sec. 19 (1) (a)) of Constitution.

Scope and Extent :

The Right to Information Act 2005 extends to the whole of India except Jammu and Kashmir. It covers all Public authorities whether falling under jurisdiction of Central / State Government. It entitles every citizen to seek information from a public authority in the prescribed manner.

Objective :

The Act primarily envisages to set out a practical procedure of the right to citizens to secure access to information under the control of public authorities in order to promote transparency and accountability in the working of the every public authority.

Salient features :

The Act, in brief provides for the following matters:

- a) It entitles every citizen to the right to information. Information means material of almost all types and in any form including records, contracts, reports, samples, documents, memos, emails, circulars, press releases, etc.
- b) Certain information are exempt from disclosure.
- c) The information is to be provided within the specified period.

- d) The act also places redressal mechanism in the form of appeals and complaints.

Request for obtaining Information :

A person who desires to obtain information under this Act shall make a request in writing or through electronic media accompanying such fees as may be prescribed to the Central Public Information Officer of the State Information Officer.

Fees :

A request for obtaining information shall be accompanied by an application of Rs. 10/- by way of cash against proper receipt or demand draft or bankers cheque payable to the Accounts Officer.

Disposal of Request :

- a) The Central / State Public Information Officer as the case may be on receipt of the request under Sec. 6, shall as expeditiously as possible and in any case within thirty days of the receipt of the request either provide the information on payment of such fee or reject the request by giving specific reasons thereof.
- b) Where a request has been rejected under Sub. Sec. (1), the applicant shall be communicated :-
 - i) reasons for such rejection
 - ii) period within which an appeal against such rejection may be preferred.
 - iii) particulars of the appellate authority.

Exemption from Disclosure of Information :

Sec. 8 (1) Notwithstanding anything contained in this Act, there shall be no obligations to give any citizen information, disclosure of which would affect the sovereignty and integrity of India, the security, strategic, scientific or economic interests of the State ; relations with foreign State, or which leads to incitement of an offence.

Information related to Third Party :

Sec. 2(1) defines "third party" to mean a person other than the citizen making a request for information and includes a public authority. Thus

when a makes a request for information, which is not related to himself, he is requesting for an information related to a third party.

Rights of Third Party :

The Act bestows upon the third party a right of being heard before any information related to him or supplied by him and treated as confidential, is disclosed on request by any person.

Public Information Officer :

Every public authority shall designate as many Public Information Officers and Assistant Public Information Officers as may be required for each of its administrative units or offices.

Role of Public Information Officer :

A Public Information Officer has been assigned to dispose the request expeditiously, within maximum 30 days from its receipt (35 days in case of an APIO forwarding to PIO) either by providing information or rejecting the request.

Public Authority :

Sec. 20 (h) defines public authority as Government departments, Statutory bodies, Govt. undertakings, Public Sector Undertakings (Govt. owned or controlled) shall fall within the ambit of Public Authority.

Role of Public Authorities :

Every public authority is required to discharge the functions under this law as below:

Maintaining Records: A public authority shall

Offences and Penalties :

Offence	Penalty
1) The Central / State Information Officer, without any reasonable cause - a) refuses to receive an application for information or b) does not furnish information within the time specified u/s 7, or c) malafidely denies the request for information, or d) knowingly gives incorrect, incomplete or misleading information, or e) destroys the information which is the subject of the request, or f) obstructs in any manner for furnishing of information.	Rs. 250/- for each day till application is received or information is furnished, subject to a maximum of Rs. 25000/-
2. The Central / State Public Information Officer is found persistently committing any of the aforesaid defaults.	Recommendation for disciplinary action under the Service Rules applicable to him.

Authority Competent to Levy Penalty :

The penalty shall be levied by the Central / State Information Commission at the time of deciding any complaint or appeal.

maintain all its records duly catalogued, indexed and computerized wherever appropriate and connected through a network all over the country so as to facilitate access to such records.

Constitution of the Central Information Commission :

Sec. 12 (1) : The Central Government by notification in the official Gazette constitute a body to be known as "Central Information Commission" to exercise the powers conferred and to perform the functions assigned to Commission.

Term of Office and Conditions of Service :

13 (i) : The Chief Information Commissioner shall hold office for a term of five years from the date from which he enters upon his office and shall not be eligible for reappointment.

He shall not be a Member of Parliament / Member of Legislative Assembly of State / Union Territory or hold any office of profit or be connected to a Political party.

Personal Presence of the Appellant :

The appellant or the complainant shall in every case be informed of the date of hearing at least a week earlier.

Order of the Commission :

Order of the Commission shall be pronounced in open proceedings and in writing duly authenticated by the Registrar / any other Officer authorized by the Commission for the purpose.

Before imposing any penalty, the Central / State Information Officer shall give a reasonable opportunity of being heard.

Technical Session V

FARMER'S - SCIENTISTS INTERACTION

Farmer's-Scientist Interaction

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Abstract

Indian agriculture is presently facing many challenges, particularly in complex, diverse and risk-prone situations, with novel technologies presenting a range of options to help address them. However, appropriate communication between farmers and scientists is vital for research and development as well as acceptance and adoption of the new technologies. A traditional model of one-way information flow from the laboratory to the field is being replaced by a contextual model involving two-way dialogue. This paper attempts to present the relevance and importance of two-way models and means/methods to promote the interaction between farmers and scientists.

Introduction

The Brundtland Commission (WCED, 1987) identified three types of agriculture, viz., industrial or commercial agriculture, green revolution or well-endowed agriculture and resource poor or complex, diverse and risk-prone (CDR) agriculture. The new challenge to agricultural research and development can be understood in terms of these types of agriculture. Several factors have contributed to the success of normal agricultural research and development with commercial and green revolution agriculture. In contrast, the resource poor farm families of the third CDR agriculture have not benefited as much, because the farmers have been slow or unable to adopt many of the recommendations flowing from agricultural research.

In the 1950s and 1960s, non-adoption was often attributed to ignorance. In the 1970s, it was more often attributed to the yield gap due to farm-level constraints. In 1980s and 1990s, however, a new interpretation, more challenging to the agricultural research and development gathered support i.e. the problem is neither the farmer nor the farm, but the technology; and that the faults of the technology can be traced to the priorities and processes which generate it. Thus, the next 'gap' that we need to bridge is the farmer-scientist gap, or we will remain in the situation one Nigerian described in his own country that "the scientist is as distant to the farmer, who the scientist claims to be benefiting by his research, as the moon is from the earth" (Alao, 1980). Here lies the relevance and importance of farmer-scientist interaction.

Rationale of Farmer-Scientist Interaction

Effective research and development by, with and for the resource-poor farmers requires understanding and interactions of many types and at many stages. This includes social relationships, exchange of ideas and information, linkages between people and institutional dimensions. Among these the most vital is interaction between farmers and scientists. The scientists, now-a-days acknowledge the need for a shift away from the traditional model of communication, where the science simply needed explaining for the relatively less educated or illiterate farmers to understand, accept and apply it. Instead communication is moving more towards a dialogue format where scientific issues are addressed within the context of the resource-poor farmers (Gregory and Miller, 1988). Engaging stakeholders in such two-way dialogues about scientific developments has been strongly advocated (House of Lords, 2000). An example of this is the public debate held during 2003 in an attempt to engage members of the British public in discussions about genetically modified (GM) seeds of different crops, prior to decisions by the Government about commercialization of the technology. Local decision group supported by educational videos and printed materials, have been held across the country aimed at encouraging debate and dialogue.

The need for better communication between farmers and scientists has been widely documented; the failure of farmers in developing countries like India to adopt majority of the new technologies has been attributed, in part, to a lack of appreciation by scientists of the farmers' needs (Wambugu, 2001), and the value of end users' inputs in the development of innovations is also generally recognized (Merrill-Sands and Collion, 1994). A recent U.K. Government report also called for closer interaction between scientists and farmers for research agendas to focus more closely on the needs of the end users (Policy Commission on the Future of Farming and Food, 2002).

Research - Extension - Farmer Linkage

Technology transfer refers to a change in the way people think and behave. Successful technology transfer should take into consideration the expected behavioural changes of the farmers rather than only the physical impact of the new

technology in a new environment (Shearer and Vomocil, 1982). Agricultural Extension is vital to the development of agriculture in general and CDR agriculture in particular. The agricultural extension service is mandated to simplify research information and deliver it to the farmers in an effective and easy to understand manner. This also provides a feedback mechanism to researchers on problems faced by the farmers (Bhuiyan, 1978). Therefore, the research-extension-farmer relationship should be viewed as an interdependent and inter-related continuum. The extension workers must be devoted and be in close liaison with the farmers they serve. Confidence of the farmers is achieved by well planned and gradual introduction of proven new technology. Useful means of their interaction include demonstration, field tours and instructional meetings. Knowledgeable and innovative farmers tend to seek advisory help on their own initiative. Unfortunately this is not the case with less skilled farmers. Ironically, it is this group which badly needs extension support (Sne, 1988).

Reasons for Limited Participation' by Farmers

Thornley (1990) suggests that farmers' involvement in agricultural research has been limited by inadequate funding, institutional policies and hierarchies, specialization and incompatible personalities. He suggests that priorities for agricultural research using public funding should be identified through a democratic process involving farmers in order to provide a better balance between basic/applied research and demonstration. Simultaneously better communication among the researchers, extension workers and farmers is an essential component for improving transferability of technology.

The experiences gained from the operation of various models of farmer-scientist interaction indicate that culturally it is difficult for scientists; they are more familiar with the traditional "chalk and talk" format, but it is vital that opportunities are presented where they can move away from this and engage themselves in more informal interactions. One of the main challenges of the dialogue approach is providing a venue and format in which such interactions can take place. The venue itself gives out a message to the prospective audience. Generally the farmers' fields/farms provides the novel stimulus, but interaction with other stakeholders requires equal care in the selection of venue.

The above generalizations lead to the thesis that farmers have an important role in agricultural research. This logically leads to two questions. First,

what is the empirical, as opposed to emotional, basis for elevating farmers to an equal partnership in the research process? Second, how do we match up the comparative advantages of the two classes of specialists i.e. scientists and farmers in a truly meaningful way? In answer these questions, two kinds of evidences can be used to demonstrate the importance of matching farmers' concerns and innovative capabilities with scientific methods. One kind pertains to long term contributions of farmers to modern agriculture and the other is specific recent innovations in which farmers have played a part. This indicates that farmers have contributed a lot to agricultural research, however, passively, which requires to be converted into active participation for more meaningful research outcomes.

Major Concerns for the Scientists

Changes to the more traditional way of conducting research have raised concerns with majority of the agricultural scientists. Scientists in their search for universal truth, tend to overlook situations at the farm level. Further, scientists are inclined to design their research projects with the view of producing publications, rather than answering on farm problems. This is due to the fact that under the current set up their career advancements are based mainly on publications and not their contribution to farming. Farmers on the other hand want immediate answers to production problems and are not concerned with the career achievement goals of the scientists. Farmers are not interested in experimental details, such as treatments and replications. Some farmers are satisfied with decisions based on one year's data. Many researchers, however, are not prepared to allocate time to the projects that are not statistically viable and does not withstand peer review. In many cases, lack of communication between farmers and researchers is a major concern.

According to Francis *et al.* (1989), the characteristics of a research project useful for the farmers are as follows:

- ◆ Plots large enough to provide clear visual results
- ◆ Treatments that require minimal investment or modifications to equipment
- ◆ Focus on yield, profitability and risk reduction
- ◆ Results that can be utilized on their own farm

By contrast according to Gerber (1992) characteristics of research projects that are useful to a scientist are as follows:

- ♦ Pots designee for statistical validity
- ♦ Treatments that allow control of non-treatment variables
- ♦ Focus on publishable results
- ♦ Experimental conditions representative of relatively well endowed areas
- ♦ Results that yield universal truth

Issues Related to Matching Comparative Advantages

In order to match the comparative advantages of the two partners i.e scientist and farmers, it has been suggested that a shift must occur away from the top down hierarchial approach, criticized by farmers as elitists, to an egalitarian and participatory approach in which farmers, researchers and extensionists serve as peers (Watkins, 1990). In this direction, Thornley (1990) suggests that if we want more farmer and scientist involvement, the following should be examined:

- ♦ Basic research is viewed as more important than applied research in the promotional system.
- ♦ Researchers are specialized with often a reductionist view, therefore, researchers should take a systems approach.
- ♦ Lack of communication between farmers and researchers (Some researchers display a sense of superiority which enrages farmers and farmers conversely feel researchers simply do not understand their problems).
- ♦ Researchers should work on issues of priority established by a democratic process.

In the backdrop of the above mentioned issues, it is required to support the farmers so that they could help set the course and have some decision-making authority and monetary reward. A mechanism is required to satisfy the needs of both the groups. Communication is the key to successful participation and interaction of farmers, scientists and extension personnel. Only through improved communication of these groups that any agricultural research and development methodology developed will be utilized effectively.

Overcoming Barriers and Improving Communication

In order to improve communication between farmers and scientists the following methods may be used :

1. Farmers' groups and workshops
2. Visual- aided dialogue

3. Manual discriminant analysis
4. Biographic analysis
5. Adaptive trials
6. Knowledge network transformation

Farmers' Groups and Workshops

Farmers' groups and workshops are one useful way to help elicit farmers' ideas, to improve communication, and to foster local initiatives. They can be a good means of overcoming barriers between scientists and farmers, e.g. experiences gained from "innovators workshop" experimented in Bangladesh, which helped farmers to reveal their discoveries and knowledge and researchers to break down their prejudices (Abedin and Haque, 1987).

Visual-aided Dialogue

Visual-aided dialogue is another effective method for scientists with farmers and farmers with scientists. This involves discussing items which are in fomt of the participants, e.g. insect-pests can be shown to farmers to elicit comments on pest control, or farmers can display and discuss the varieties of seeds in their stores and discuss their preferences and reasons for them. Using such visual aids has been found useful at the beginning of a research process, to break the ice and establish rapport, to stimulate interest, curiosity and discussion and to enable researchers to learn from farmers.

Manual Discriminant Analysis

This can be used in group discussions among farmers and researchers about farming practices and constraints. The basic concept is to compare and contrast. Farmers are asked to describe their management practices. Data are collected to find out the range of plot wise practices. The researcher then contacts the farmers whose practices are at the two contrasted ends of the distribution. Each group is asked to explain the behaviour of the other. This calibrates the frame of reference and makes clearer to farmers the distinctiveness of their own behaviour. Only after hypothesizing why the others behave differently in the group are asked to explain the reasons for their own practices

Biographical Analysis

This type of analysis helps in reconstructing cultivators' biographics with respect to a particular crop, thus learning about the discontinuities in crop cultivation and the experiments done to adapt to changing circumstances or improve the available technology.

Adaptive Trials

This refers to translating cultivators' experiments into scientific designs as well as

adapting scientific trials to local conditions.

Knowledge Network-Transformation

This is done by constructing interfaces (a term inspired by Long's work, 1986) between existing networks. Through this local knowledge about a crop is transformed into more general statements, the local knowledge networks are articulated with more general ones.

In all the above mentioned formats of interaction, it would be advisable that the scientists should avoid asking leading questions, or using the categories of rich or poor farmers when asking questions. If practices differ on the basis of class, it will become apparent from the data. Secondly the social scientists can provide effective and efficient complementary techniques to standard agricultural research wherever social distance between farmers and scientists is large. Social distance can be reduced by linking networks points where networks meet, as in the case of the cultivator who exchanges information with extensionist the researcher or the trader.

To Sum Up

To summarise, the training that research scientists receive at university helps them to develop into excellent subject matter specialists, however, one component of training usually missing is problem identification. In order to bridge this gap there is urgent need for organizing various kinds of interfaces and more importantly promoting the farmer-scientist interactions. In this context it is noteworthy that in real sense the persons as such do not interact, it is their behaviour and attitude which facilitate the interaction. This implies that the scientists should bring about desirable changes in their behaviour complex to make interactions with farmers through suitable methods for understanding the farmers' perspectives, needs, problems and priorities to decide the research agenda and design the research projects.

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Farmer's-Scientist Interaction

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There is increasing acceptance that farmers should be involved in technology development and transfer resulting in new approaches where farmer participation in research and extension is receiving increasing attention. Participation aims at bringing about an increasingly critical attitude on the part of the involved people towards their environment and the intention to change it. In recent years, there have been a number of developments in participatory approaches not only in the innovations of new and refinement of existing methods but also in the understanding of principles to be adhered to if they are to be successful. Participatory approaches aim at integrating farmers' ideas and opinions in technology generation and transfer. These approaches range from support for farmers experimentation to participation of farmers in research and development programmes. Farmer-Scientist interaction is one such approach wherein scientists provide information and farmers provide experiences for betterment of technology developed and its transfer.

Farmer participation in agricultural research is more than talking to six farmers or putting ten experiments in their fields. Above all, it is a systematic dialogue between farmers and scientists to solve problems related to agriculture and ultimately increase the impact of agricultural research.

Farmers and scientists have different needs, worldviews, knowledge systems, methods, and tools. When it is successful, dialogue between farmers and scientists can lead to more productive, stable, equitable, and sustainable agricultural systems. Achieving this goal should be good for farmers, because it enhances their welfare; for scientists, because it increases their job efficiency; and for society in general, because it adds to the food supply and encourages the conservation of natural resources for future generations.

Farmer-Scientist Interaction defined as "the collaboration of farmers and scientists in agricultural research and development for better understanding of information and experiences". The four

approaches to Farmer-Scientist Interaction described by:

- ♦ **Contractual:** Scientists contract with farmers to provide land or services. Eg: FLDs.
- ♦ **Consultative:** Scientists consult farmers about their problems and then develop solutions. Eg: Rythusadassu
- ♦ **Collaborative:** Scientists and farmers collaborate as partners in the research process. Eg: Technology Refinement
- ♦ **Collegiate:** Scientists work to strengthen farmers' informal research and development systems in rural areas. Eg: Verification of ITKs/farmers innovations

As anyone who has worked closely with farmers knows, they possess knowledge about their crops, their farming environment, and their socioeconomic conditions. It is a key reference point that farmers use to make decisions and to communicate among themselves. Scientists need to understand farmers' knowledge if they want to contribute to farmers' welfare by providing new information to them, by developing appropriate technologies with them, or communicating effectively with them.

Farmers' knowledge should not be dismissed or, conversely, idealized. As mentioned previously, farmers know many things about farming and their conditions, but there are many other aspects of farming that they do not know or misunderstand. Their knowledge of soils and potential productivity is usually well developed, as is their knowledge of weeds and their impact on crop development.

In participatory research, we are particularly interested in how knowledge affects behavior and how behavior affects knowledge. When interacting with farmers, scientists should always ask themselves, "If what they are telling us is true, what should we expect to see in their behavior?". This attitude of scientists towards farmers should not

be interpreted as arrogant and distrustful but rather should be seen as a desire to understand farmers better.

It should be pointed out that farmers' knowledge is dynamic. Farmers incorporate new information and concepts from extension, schools, input suppliers, the media, and others into their knowledge base and abandon other knowledge.

The fact that small-scale farmers in the developing world conduct experiments on their own is well-documented (ITKs) and has become a pillar of farmer participatory research. Farmers' experiments are important because they promote knowledge and evaluation of new and unproven technologies without jeopardizing farmers' livelihoods or scarce resources.

Farmers conduct different types of experiments

- ♦ curiosity experiments-just to see what happens;

Eg: Use of combination of pesticides

problem-solving experiments-to address a specific problem they face; Generally drudgery reducing Eg: Instead of markers farmers used which were knotted at 25x25 cm distance

- ♦ adaptation experiments-to adapt new technologies to known environments or known technologies to new environments;

Eg: Adoption of SRI and Alleys to control BPH

- ♦ Fortuitous experiments-chance events that lead to changes in practices, which in turn lead to a new learning experience.

Eg: In SRI, modification of spacing with the age of seedlings transplanted in the main field.

In the farmer-scientist interaction, the adaptation and problem-solving experiments are, respectively, the most relevant.

Farmers and scientists' experiments often differ. Three key differences of Farmers and scientists' experiments are:

1. Farmers' experiments commonly lack a control treatment. The farmer may carry the control "in the head."
2. In the fields where farmers' experiments are located, many factors may be modified simultaneously, or extraneous factors may not be controlled for.
3. Farmers usually do not replicate an experiment, although it is often said that they do so over time. For example, they may compare the current season's results with those of previous seasons.

Farmers and scientists can have different degrees of interaction or involvement in the design, management, and analysis of experiments.

Table 1. Levels of interaction between farmers and scientists and possible output

Degree of Interaction		
Scientist	Farmer	Possible output for which interaction is appropriate
Designs, manages, analyzes	Provides the field	An understanding of processes, components of new technology under farmers' biophysical conditions
Designs, analyzes	Manages, provides input into the analysis	An understanding of processes, components of new technology under farmers' biophysical conditions and their management
Designs, manages, analyzes	Designs, manages, analyzes	Joint evaluation and modification of a new technology
Training, guidelines, technical support	Designs, manages, analyzes	Capacity building, empowerment

ANGRAU SUCCESSFUL MODELS OF FARMER-SCIENTIST INTERACTION

Acharya NG Ranga Agricultural University had developed farmer-scientist interaction models among which DAATT Centres, AMC level training programmes, Kisan Mela and RPS proved to be successful models.

a. DAATT Centres-Reorganised Extension Service by University

ANGRAU believes in the concept that every research scientist should also be an extension worker, when serving the farmers and thus work in active association and close cooperation with the farmers. The farmer-scientist interaction, which takes place frequently, has brought high degree of confidence among farmers. District Agricultural Advisory and Transfer of Technology (DAATT) Centres were established in 22 districts with a multidisciplinary team in the year 1998 with the following objectives:

- ◆ To develop database for developing action plans
- ◆ To assess and refine technologies generated by the research scientists for suitability to different farming conditions
- ◆ To conduct diagnostic surveys, identify field problems and provide scientific solutions
- ◆ To organize kisan melas
- ◆ To extend scientific expertise to the line departments in training programmes and preparation of information materials
- ◆ To establish liaison with the stakeholders in the district
- ◆ To assist in implementation of RAWEP
- ◆ To maintain an useful agricultural information center
- ◆ To coordinate with AIR, TV and print media for dissemination with line departments To implement any other extension programme in coordination with the line departments.

Major problems addressed by DAATT Centres.

- ◆ Leaf Webber, Spodoptera, RHC, leaf spot, and PSND in Groundnut
- ◆ Sucking pests, Helicoverpa and angular leaf spot in Cotton
- ◆ Woolly aphid and yellow mite in Sugarcane
- ◆ Hopper in Mango
- ◆ Root grub and rhizome rot in Turmeric
- ◆ Mites, Helicoverpa and thrips in Chillies

b. AMC level Training Programmes

Government of Andhra Pradesh selected Agricultural Market Committees (AMC) as the venues for continuous training of the farmers as a follow up of Karshaka Vignana Vedika organized during 1999. The scientists of ANGRAU actively involved in AMC level trainings. The objective is mainly to educate the farmers on reducing cost of cultivation by 15% on at least three major crops grown in the market area. 30 farmers were trained in each programme every month at each of the 276 AMCs in the state to reach about 1,20,000 farmers per year and sensitizing farmers for profitable agriculture in the wake of WTO is the objective

c. Kisan Melas

ANGRAU has been organizing kisan melas at various research stations and colleges throughout the state to create awareness and educate farmers on latest technologies and developments. Kisan melas provides an opportunity to see the latest technologies under live demonstrations, informative agricultural exhibitions, and interaction with the scientists, input agencies, and get the habit of visiting research stations frequently for timely advices. During kisan melas farmers exchange experiences with other progressive farmers and participate in quiz competitions. Publications on agriculture and allied areas, seeds and planting materials are sold to the farmers. More than 30,000 farmers benefited every year.

d. Farmer Scientist Interaction Meeting on Drought Management

Farmer Scientist Interaction Meeting was held at Palem, Jagityal, Nandyal, Ongole and Miryalguda in collaboration with Eenadu, a leading

daily news paper in Andhra Pradesh, on drought for the benefit of farmers during August 2001. The scientist of ANGRAU have actively participated in the meetings and educated the farmers on drought mitigation and contingency crops. Farmers were also educated on cost reduction practices concentrating on IPM, INM, Crop diversity and FAQ requirement for agricultural produce. Over 1500 farmers were benefited from these meetings.

e. Rythu Polallo Saastravettalu (RPS)- An Innovative Programme for Higher Productivity

To strengthen the research, extension linkages for effective transfer of technology to the doorsteps of the farmers, to reduce the yield gaps, lessen the cost of cultivation, optimum use of the resources and ultimately increase the farm income, an innovative programme of visiting the farmers fields "Rythu Polallo Saastravettalu" is being launched by the university

Implementation jointly by DOA and ANGRAU

Objective effective transfer of technology to the door steps of the farmers through appropriate crop interventions to reduce the yield gaps, reduce the cost of cultivation, optimum use of the resources and ultimately increase the farm income

Frequency Friday of every month. The scientists deployed for a particular ADA division should be in the fields of the farmers, at least on one Friday in a month in that division

Season Kharif and rabi seasons

Resource Persons 2-3 scientists/teacher/extension specialist of the university in each ADA division

Convener ADAs of respective agricultural division. Responsible for arranging transport for visits

Timings visit should start in the morning at least by 9.00 am

Tasks assigned To monitor pests, diseases, seasonal aberrations, their impact and nutritional problems etc., and suggest suitable remedial measures and on spot timely advices

Make aware of the farmers on

- ◆ Integrated Nutrient Management
- ◆ Integrated Pest Management
- ◆ Water Management
- ◆ Drip Irrigation
- ◆ Vermicompost
- ◆ Organic Farming
- ◆ Cost saving technologies
- ◆ Hybrid Seed Production Technologies
- ◆ Own Seed Production
- ◆ Summer Vegetables

Farmers'-Scientists Interaction

Prof. C. S. Chakrabarti

Vice-Chancellor, West Bengal University of Animal & Fishery Sciences, Kolkata-37

By this time we have made rapid strides in the development of improved technologies, it is often expressed that the pace of its transfer to the end-user i.e. farmer, is not up-to the expectations. By no mechanism it would be possible to contact and teach every individual farmer in a vast country like India. Future extension function could be made easier and faster through the exploitation of modern IT and Communication Technologies. Non-Government Organizations and regular arrangement of farmers' scientists interaction programme under the aegis of Agricultural Universities, KVKs, farmers clubs, organizations, cooperatives and associations should be fully exploited to reach the unreached effectively and speedily in organizing demand driven production systems. The extension and research linkages need to be constantly improved and strengthened to the mutual advantage – feed back of problems and transfer of solutions.

Farmers' scientists interaction programmes may be organized systematically at regular intervals in specific areas and zones. This is also facilitate transfer of technology to the farmers effectively. The Transfer of Technology system of each agricultural university needs to be re-organized in the context of the emerging needs and challenges more effectively. Regular interactions with the farmers has a great responsibility in guiding the farmers on the use of need based inputs to cut down the cost and make their products competitive enough and earn better returns. Qualified and trained extension personnel at grass-root level are required. Diploma and Certificate courses are expected to be more useful in this regard.

Universities/Institutions will need to play a more pro-active and participatory role, serve as knowledge/information agents. Farming systems approach taking farm household and off-farm activities in a holistic way would be rewarding. Multi-agency extension service has to be promoted through favourable policy changes and environment. The skill development / capacity building of the extension staff should receive due

attention. The individual farmer approach has to be replaced by group approach. Agricultural extension should result in enhancing productivity on a sustainable basis, with due care of environment protection and profitability to the farmer.

Interaction programmes at regular intervals will enrich on-station research – adaptive research – extension is a continuum culminating in the generation of profitable technologies for the farmers. Agricultural extension is largely a public sector activity. Agriculture being a state subject, the responsibility for agricultural research and development and transfer of technologies rests on the State governments and on the State. Agricultural Universities. Extension and research should be working in tandem and remain inseparable and continue to remain in public domain for some time to come.

The interaction programmes will have to be made farmer – responsive shall receive special attention. The linkages between the SAUs and the Industry, NGOs, Co-operative etc. should be strengthened further for collaborative effort and mutual benefit. This may be effective if research works can be divided in the following manner for the benefit of the farmers.

- 1) Local need based research at the SAUs may be in association with small scale industries.
- 2) University-Institute collaborative researches.
- 3) Institute-Industry collaborative researches.
- 4) University-Institute-Industry collaborative researches.

Regular Farmers' Scientists Interaction Programmes will facilitate the farmers to become self-sufficient in the production of marketable agriculture and livestock produces and we need to enhance productivity through agri & livestock.

- I. Introduction of **composite farming technology**.
- II. Improved, modified and extensive **technologies**, which are ecofriendly shall be evolved and farmers be trained accordingly.
- III. Fishermen and women should be trained for sustainability of production of Table fish as well as Brood fish for quality seed production.
- IV. Well defined interaction programme to arrange for assisting the farmers with assured and remunerative marketing opportunities, particularly in perishable

- livestock and fishery commodities. In dairy industry, **cooperative farming** in dairy sector as adopted by NDDDB has been found ideal for small and marginal dairy farmers. There is also a good possibility for encouraging **Contract farming** in livestock and poultry sector where individual/group of farmers contract with large producers/processors for regular supply and pre-determined prices.
- V. Village level integrated livestock farming utilizing the women folk can be one of the most effective method for the economic solvency of the farmers.

Farmers'– Scientists Interaction

Dr. B.K.Kikani

Vice Chancellor, Junagadh Agricultural University, Junagadh, Gujarat

There are innovative farmers, who have spent many decades and gained experience in a particular crop- cropping pattern- mix farming etc. whose valuable ideas /views should be dully acknowledged. Such farmers are to be invited to the research forum where the scientists are made equal partners to share their views and opinions so that scientists can design a viable, feasible and sustainable research project to generate need based technology to help the farming community. The scientists should make this a mandatory to begin their experimentation. In order to strengthen the farmers scientists interaction following strategies should be adopted.

1. Scientists at doorsteps of the farmers:

A team of the scientists goes for the problem oriented interaction at the common place in the village. The solution related to agriculture and its allied enterprises is sought with the help of respective scientists in the team. The feedbacks are also recorded for future strategies. Such effort is made by J.A.V. in the year from 2004 to 2005 in which 1445 farmers of 41 villages were given problem based solutions and farmers have actively participated in this campaign.

2. Krishi Mahotsava:

Govt. of Gujarat has started an innovative programme Krushi Mahotsava from 2005 in entire state. In this programme all villages of the State are covered. The main objective of the programme is to disseminate the latest agricultural technological know how by agricultural scientists to the weaker sections of the society. This programme is comprises of agriculture, Horticulture, Animal husbandry, Forestry, Health, Irrigation and all other government line department personnel. This campaign is in form Krushi Rath from village to village as per the schedule for a month.

Through Krushi rath the latest agricultural know how is transferred to the farmers by exhibition, models, demonstrations and audio visual aids. At the same time a team of three scientists

interact with the farmers and discuss the prevailing problems on the spot. The critical inputs are distributed to the five farmers of agriculture, five farmers of horticulture and five farmers of animal husbandry to motivate the farmers for adoption.

3. Farmer as a scientist and tiller:

Farmer can take an experiment on his own experiences with participatory research at his own field. Such improved methods/ innovations evolved by experimentation by them should be dully acknowledged by the research scientists for its verifications and supplementation of information if any. The scientist may also find out the sustainability of innovation practice.

4. Innovative workshops:

Besides scientists conducting research in the laboratory and testing them in farmers field, organizing farmers themselves in a forum is also to be initiated, since they posses a long and accumulated experiences, their continued scientific thrust to test something for change in farm technologies can be updated and further subjected to test. In many occasions they increased production by controlling or preventing unwanted environmental conditions. If a group of farmers is practicing improved methods of farm technology based on their experiences, such farmers are to be invited as resource persons to address the researches and extension workers. At the end, suggest propositions for next adaptive research for its further verification at farmers field.

5. Recognition of the innovative farmers:

The State Agricultural Universities should organize the farmers convention inviting the resourceful farmers and those who have already adopted the technologies evolved by the scientists. This includes organizing forum so as to facilitate constructive interaction/discussion among the farmers themselves about the technology released for them, so as to derive productive out come, comments to address the scientists to undertake or modify the research findings suitability.

6. Participatory Rural Research Forum:

This forum involving group of well-experienced innovative farmers to organize themselves in the village is an ideal one. This group will conduct experimental trials from the research station under the monitoring of respective research scientists and act as representatives to express their opinions about formal research conducted in their agro-climatic situations. Such forum needs to be formed and recognized in the villages by the research system.

7. Establishment of Farmers' Council:

With a view to accelerate the rate of adoption, it is prime time to establish the farmers council in the State Agricultural University's (SAUs). This council will aware and encourage the farmers regarding agril. innovations. It is a live avenue with scientist for the farmers to discuss their unsolved agril. problems. The scientist will regularly visit and monitor the activities for latest technological know-how. Kisan Council is existing in JAU since 2004. There is a Kisan Council in each Taluka (Tehsil) of the district to explore the

agricultural information and technologies with the help of the agricultural scientist. The problems of the farmers are identified and channelised for further research.

8. Representative group for Participatory Research:

A selected experienced core group of farmers according to their agricultural and its allied profession / enterprises in a particular agro-climatic conditions should be formed and research plan should be prepared in such a way that at each stage they should be involved in decision making and feed back should be recorded accordingly.

9. Forum for Small and Marginal Farmers:

Small and marginal farmers occupy 3/4 th of the total cultivable land in India. These categories of peasantry are not given ample opportunity to vent their views to address their problems to extension workers and to the scientists about crop husbandry methods and setting research priorities for them. Thus, it is worthwhile to address them in detail for which a separate forum should be setup.

Technical Session VI

PLENARY SESSION

THEME WISE PROCEEDINGS & RECOMMENDATIONS OF PRESENTATION

- Technical Session I** : Self-employment generation through imparting need-based education.
- Technical Session II** : Promotion of export oriented agriculture and horticulture commodities
- Technical Session III** : Demand driven technology dissemination
- Technical Session IV** : Right to information
- Technical Session V** : Farmer's scientists interaction

PROCEEDINGS

PROCEEDINGS:

Technical Session-I

SELF EMPLOYMENT GENERATION THROUGH NEED BASED EDUCATION

Chairman : Dr. R.B. Singh, Ex-Member, NCF, New Delhi

Co-Chairman : Dr. M.P. Yadav, President, IAUA&VC, SBVPUA&T, Meerut

Rapporteurs : 1. Dr. S.S. Chahal, Dean PGS, PAU, Ludhiana

2. Dr. A.N. Tewari, Dean Agriculture, CSAUA&T, Kanpur

This session was chaired by Padam Vibhushan Dr. R.B. Singh who strongly felt that there was need to revamp the agricultural education such that it may be helpful in capacity building and confidence of agricultural graduates for self employment. He observed that 93% employable people in India are unemployed. The proportion being larger in rural area. About 40% Indian agril. graduates are unemployed and it is most important as to how they can be employed or self-employed.

Dr. S.N. Puri, VC, CAU, Imphal, presenting his paper stressed that RAWE programme should be modified to more experimental learning with effective involvement students in the actual work and they should get remuneration of their work. For making the proposition a gainful venture there should be market availability whether in the country or outside the country. He suggested several ventures in horticulture, seed production, soil testing, sugarcane single bud seedling production and marketing and many others which might provide self-employment.

Dr. V.P.S. Arora Dean Agriculture GBPUA&T, Pantnagar, suggested several areas of agri-business for self-employment of agricultural graduates. Some of these are being practice with project at Pantnagar like vegetable production, floriculture, contract farming, consultancy service, soil testing input supply, food processing and value addition, vermi composting.

Intervening the discussions, the Chairman Dr. R.B. Singh remarked that male and female farmers in this country are 50% each. Therefore, there need to increase the number of girl students in agricultures education.

The panelist, Dr. Vijai Mehta, Vice Chancellor, DBSKKV, Dapoli, Dr. S.P.S. Ahlawat, Director, IVRI, Izatnagar, Dr. J.H. Kulkarni and Vice Chancellor, UAS, Dharwad suggested the vocalization of agricultural education and stressed the need for specialized education. Dr. M.L. Madan stressed the need of agriculture course at pre-high school level. Dr. C. Prasad, DG, UPCAR expressed concern over low priority to agriculture graduates over others. The Chairman also remarked that the state government side line agricultural graduates and get the agricultural jobs from those who are non-agricultural graduates.

Technical Session-II

PROMOTION OF EXPORT ORIENTED AGRICULTURAL AND HORTICULTURAL COMMODITIES

Chairman : Dr. G. Kalloo, Ex. DDG, Horticulture Crop Sciences, ICAR, New Delhi

Co-Chairman : Dr. D.S Rathore, Vice Chancellor, CSKHPKV, Palampur

Rapporteurs : Dr. V.P.S. Arora, Dean, CABM, GBPU&AT, Pantnagar

Dr. R.P. Katiyar, Director Research, CSAU&T, Kanpur

Dr. R.C. Maheshwari, VC, SDAU, Sardar Kushinagar and Dr. K. Ramamoorti, Dean Agricultural College and Research Institute, TNAU, Madurai made keynote presentations on the topic and Dr. D.S. Rathore, VC, CSKHPKV, Palampur as a panelist presented the expert views on presentations and on the theme as such. Dr. Maheshwari while analyzing the status, potential and prospects of food processing industries in India, highlighted the agriculture scenario in Gujarat from the view point of agro and processing. He was of the view that the state of Gujarat has competitive advantage in a number of commodities in the groups of oilseeds, fruits, vegetables and spices. He identified investment opportunities in supply chain. Procurement of raw product from open market, huge post harvest losses, concentration of food players only on the processing end, large number of intermediaries, in supply chain overly descriptive food laws, poor rural credit and insurance facilities, and high taxes on processed products are reported as major problems in the state.

He stressed on amendment in APMC Act, re-look in the multiplicity of food laws and authorities, and de-reservation of small sector. The areas of reforms to accelerate exports according to him are improvement in agricultural efficiency and rural infrastructure, provision of adequate rural credit at reasonable rate; establishment of cold chain, AEZs and integrated agro-food parks, encouragement to public-private partnership; provision of contract farming, land leasing, modern terminal markets and market intelligence system; and value addition at farm level.

Dr. Ramamoorthy in his presentation reviewed the issues and solutions to boost exports of rice, wheat, pulses, oilseeds, sugar, spices, cotton, jute & mesta, tea, cashew, fruits and vegetables, natural rubber, floriculture, medicinal plants and organic products. Dr. Ramamoorthy stressed on the needs for raise in investment for exportable products, R&D support for value addition, branding of exportable products, need for efficient post harvest handling, protected cultivation. reduction in minimum export price and incentive to farmers going for organic farming.

Technical Session-III

DEMAND DRIVEN TECHNOLOGY DISSEMINATION

Chairman : Dr. S. S. Baghel, VC, AAU, Jorhat

Co-Chairman : Dr. K.N. Tiwari, Director, IPNI, Gurgaon

Rapporteurs : Dr. G.S. Jadhav, Director Extension, MAU, Parbhani

Dr. G. Eshwarappa, Director Extension, GKVK, Bangalore

At the outset Chairman welcomed the delegates and briefly narrated the purpose of organizing this particular session on demand driven technology dissemination in the light of changed scenario in agriculture.

In this session three papers were presented:

1. Dr. S.S. Chahal, Dean PG, PAU, Ludhiana presented the paper on demand driven technology generation and technology transfer. He briefly narrated changing needs of the farmers of Punjab both in pre-green

revolution and post-green revolution periods. He also presented the initiatives taken by the universities in meeting the new requirement of farmers on precision farming, processing and value addition and promotion of allied occupation. The technology generation capacity in value chain system linkage with market and industries for mechanization was presented. He said that only 2% food products are processed in India as against 50-60% in other countries. He stressed the use of water saving technologies for water economy in crop production as the ground level of water in Punjab is falling at an agonizing pace.

2. Dr. Manmohan Singh, Vice Chancellor, Sri Venkateshwarlu Veterinary University, Tirupati in his presentation briefly outlined the development of lead based technology and constraints in adoption of these technologies by the farmers. He suggested to have large number of demonstrations of technology on the farmer's fields.
3. Dr. G. S. Jadhav, Director Extension, MAU, Parbhani, in his presentation briefly narrated the changing needs of demand driven technology transfer in the light of changed scenario in world agriculture and the resultant changing needs.
4. Dr. Ishwarappa, Director Extension, UAS, Bangalore made the presentations in various technology transfer programmes initiated by the University and demand driven technologies evolved/promoted by the university on the basis of needs of the farmers.

The presentation of papers was followed by views of panelist and discussion. Dr. Sushil Kumar, Director NDRI, Karnal, Dr. M.L. Madan, Vice-Chancellor, Pt. DDUCVV, Mathura express the critical views on the topic and the suggestion for initiating new direction in the development and transfer of demand driven technologies. Several delegates participated in the discussion and gave valuable suggestions.

Technical Session-IV

RIGHT TO INFORMATION

Chairman : Dr. Anwar Alam, Vice Chancellor, SKUAST, Srinagar

Co-Chairman : Dr. N.N. Singh, Vice Chancellor, BAU, Ranchi

Rapporteur : Dr. B.S. Dhillon, Director Research, PAU, Ludhiana

Dr. Anwar Alam, VC, SKUAST, Srinagar and Dr. M.L. Madan, VC, PDDUV ASU, Mathura made presentations on the various provisions of the RIGHT TO INFORMATION (RTI) ACT.

The Government has passed the Act to bring out open-ness, transparency and accountability in decision making; and it needs to be implemented by all concerned in letter and spirit. They covered information that can be asked for, fee to be paid (varying case to case), procedure to be followed (including the situation when a third party is involved), situations when cost can be asked for etc. for 16 points (Act, Statutes, academic rules, proceedings of the Board of Management, Academic, Research and Extension Committees, budget allocation, policy formulation and consultation mechanisms, recruitments-numerical score card, promotions, transfers, admission, conferment of degrees etc.), the information is to be computerized and connected through a network all over the country. They also discussed the record/data management.

The Act requires the Universities to designate Public Information Officer(s) (PIO), Assistant PIO(s) and Appellate Authority.

They informed that the information asked for is to be supplied in time bound manner (30 days). The request for information can be rejected (with or without giving the reasons) or there may be partial disclosure; and the penalty provisions (the penalty is personal) if the information is not supplied within the specified time @ Rs. 250 per day subject to maximum of Rs. 25,000/-.

Dr. Madan specifically discussed the concept of information, procedures, exclusions, record keeping and record maintenance issues. He also brought out certain frequently asked question and the information on them provided through the

Central Information Commission (CIC).

Apprehension was also expressed that some individuals may raise some trivial issues; which may slow down the decision making process but there was consensus that RTI Act will certainly improve the system as there will be transparency and no room for ad-hocism and favoritism. There was also discussion on the officer who should be appointed as PIO and Appellate Authority. Many participants were of the views that PIO should be Registrar or some other officer from his office as this office has most of the records, which may be asked for. However, some others informed that their Universities have appointed other(s) as PIO and that system is working well.

Technical Session-V

FARMERS SCIENTISTS INTERACTION

Chairman : Dr. R.B. Singh, Ex-Member, NCF, New Delhi

Co-Chairman : Dr. S.N. Puri, V.C., CAU., Imphal

Rapporteur : Dr. A.M. Sheikh, Dean Agriculture, AAU, Anand

Dr. K.D. Kakade, Director extension, MPKV, Rahuri

The Chairman welcomed the progressive farmer

In order to make the convention more meaningful, Vth technical session included the farmer-scientist interaction. The session was chaired by Padmvibhushan Dr. R. B. Singh and Dr. S.N. Puri, V.C., CAU. Imphal. The farmer's representatives present on the occasion were Sri D. Ramakrishna Reddy, Dr. R. Prabhuram, Sri Kulbhushan Khajurai, Sri Shankar Pratap Singh, Srimati Sarana Singh Chauhan, Sri Balram Singh, Sri Jai Narain, Sri P.S. Mauriya, Sri Samar Singh Bhaduria and many others. All the farmers were felicitated by the chairman and president of IAUA, subsequently farmers opinion were obtain for upliftment of the farmers. The Major demands of the farmers were as under :

- ♦ Farmers need latest technology for cultivation for chili and other vegetable crops.

- ◆ The marketing setup of vegetable is not proper and need modification in order to catch up higher price.
- ◆ The package of practices for cultivation of medicinal and aromatic plant should be developed and delivered to the farmers. The value addition in M&A should be strengthen giving and example of marigold. The extract from the marigold plant vary from 70 gm to 220 gm. The research should be initiated to study the variation.
- ◆ Government policy should be pro-agriculture in order to improve the economic level of the farmers.
- ◆ Revenue on land should be abolish.
- ◆ Post harvest management and rain water harvesting should be strengthen village level.
- ◆ Knowledge of progressive farmer should be utilized for transfer of technology among the farmer.
- ◆ Cost of farm produce should be based on cost of cultivation including depreciation of land revenue labor charge etc.

After the presentation of farmers chairman explain a need for farmer's scientists linkage in order to transfer the technology from laboratory to the farmers field. This is required due to the fact that the agriculture growth rate was decline from 3.2 percent to 1.8 percent and to achieve 4% growth rate this gap should be narrow.

Dr. N.K. Tewari, Director, IPNI Gurgaon, presented his deliberation and outline various point which are inadequate in transfer of technology and suggested the remedies.

He elaborated the inadequate supply of the input, substandard input and inadequate research. He also explained nutrient deficiency in the soil

which is not known to the farmers. The present infrastructure facilities in soil testing laboratories are insufficient which needs to be special attention.

Dr. N.N. Singh, Vice-Chancellor, BAU, Raichuri, stated the lack of appreciation by the scientists of the farmers need. He elaborated the problems of the farmers like involvement and adoption of the new technology of the farmers, inadequate fund with the farmers, institutional policy and hierarchy, cultural difference between the farmers and the scientists. Farmers should encourage for the farms trial.

Penalist Dr. R.P.S. Ahlawat, V.C., NAU, Navsari, presented the farmers and scientist linkage in the Gujrat and explained the Krishi Mahotsav that was implemented in Gujrat. He also highlighted the soil health card which was distributed to the farmers in the Gujrat. Looking to the importance of Krishi Mahotsav in transfer of technology chairman suggested to submit the success story of Krishi Mahotsav to the president IAUA.

Another Penalist Dr. B.K. Kikani, VC, JAU., Junagadh explained the soil health card, e-card, farmers training programme, farmers club, interactive participation of scientist with the farmer once in a week, inviting a farmers at the agriculture university in the Gujrat. He explained that these activities has increase agricultural income of the state from 9 thousand crore in 2001 to 32 thousand crore in 2004. He also explained distribution of input kit by the Govt. of Gujrat to the BPL farms which helped in acceleration of transfer of technology. Prof. C.S. Chakrabarti, VC, WBUS&F, Kolkata explained the importance of animal husbandry fisheries in the West Bengal. He explained the revenue generation from pig, duck, goat etc. to the farmers and stress the need to consider the agriculture and animal science component as combine for success of 2nd green revaluation.

RECOMMENDATIONS

RECOMMENDATIONS:

Technical Session-I

Self Employment Generation Through Imparting Need Based Education

1. The Goal of SAUs and other agricultural educational institutions should be "every scholar an entrepreneur" integrating business management principles with major applied courses, viz Seed Technology and Business Management.
2. Farm universities should engender their curricula in a manner that the relative roles of women and men in farming are recognized and women and men are equally empowered technologically, The Home science Colleges may be restructured as College of Human Sciences with both male and female scholars mastering. disciplines like nutrition and post-harvest technology.
3. Agriculture should be introduced at school and up to ten plus tow level. A three-pronged strategy is called for: First, land owning graduates should be encouraged to take to faiming as a profession, Farm Schools, Farm Gate Processing and Value Addition, Organk Farming, Energy Farming; Pharma Farming etc. are strong possibilities. Second, graduates not owning land should be engaged in providing services through Agri-clinics, Agribusiness Centres, Technology parks, Food Parks, etc., Third, needs and prospects of college drop outs should also be addressed.
4. A system for according recognition to farm graduates to provide extension and other services by recognizing them as Registered Farm Practitioners should be developed. An All India Agricultural Council or a provision in the ICAR on the model of the Medical and Veterinary Councils is required to give such accreditation, which will also be an oversight mechanism to ensure the quality and credibility of the services provided by farm practitioners.
5. University centers should also establish employment and business advisory services and promotion centers and a special one-stop window for generation awareness of self-employment opportunities.
6. There is an urgent need to upgrade the overall capability of teacher's and research and extension managers to be able to deliver the desired knowledge and training to upgrade overall skill of the graduates. The Central and State Governments should provide adequate funds to the SAUs for retraining the teachers and creating necessary training facilities including incubation parks for entrepreneurial capacities. Governments, NABARD and other development oriented banks may consider providing to Farm Graduated low interest loan, a form of venture capital funds to facilitate business establishment. The needs of private and non-university agricultural colleges and their graduates should be internalized in the national effort.
7. Self Help Groups and Producer Companies of Farm graduates could be formed to avail of the new credit facilities for undertaking production of several horticulture, livestock and fisheries products, high quality hybrid seeds, bio-fertilizers, etc. This will render India as a leading international outsourcing hub. A National Alliance should also promote Public-Private Industries-NGO. Partnership to converge various initiatives towards this cause.

Technical Session -II

Promotion of Export oriented agricultural and Horticultural Commodities.

1. SAUs and ICAR institutes should upscale their research activities in export oriented agricultural and horticultural commodities in terms of
 - ♦ Developing varieties having exportable qualities;
 - ♦ Improving input-use efficiency for cutting down the cost of production;
 - ♦ Developing production and post harvest techniques/technologies so as to reduce post harvest loss, and increase shelf life;
 - ♦ Identifying target country wise commodities with export potential;
 - ♦ Scanning global markets and developing efficient marketing strategies including branding.
2. Grower's associations should be formed and involved in production, post-harvest management and export decisions to ensure sustainability.
3. R&D efforts are needed not only on product development (of desired quality traits) but also in packaging, farm level value addition and marketing
4. Economic, exports and employment security considerations are to be stressed for long-term sustainability of exports.
5. SAUs may step up efforts for capacity building of Grower's Associations on various issues related to exports.
6. Export protocols should be developed for various farm produce.
7. Focus must shift on export of value added & high value agricultural products from export of only raw materials.
8. Protected cultivation should be encouraged by attracting enhanced investment in agricultural production.

Public private partnership should be encouraged for this purpose.

9. Appropriate amendments in APMC Acts by State Governments on the pattern of Model Act and minimization of multiple food laws and authorities should be carried without further delay.
10. Land reforms in various states including consolidation, ceiling limits and lease markets should be accomplished on priority basis.
11. For promoting exports of farm products infrastructure should be created under public-private partnership mode including cold chains, pack houses, transport, credit and insurance.
12. Promotion of ICT is also recommended in agriculture sector for modernizing farming sector.

Technical Session-III

Demand Drives Technology Dissemination

1. Technology generation and technology dissemination activities should be based on farmer's need and their, changing demands in the light of WTO regimes.
2. Different technology dissemination methods like model demonstration, use of ICT in TOT and other innovative approaches may be used to narrow the gap between technology generation and its adoption.
3. To create awareness among the farmers about new technology, more stress should be given on participatory approach.
4. Technology generation, technology transfer and commercialization of technologies with the participation of all the stake holders should be strongly promoted.
5. The technology transfer system must concentrate more on cost effective technologies for maximizing net returns of farmers.

Technical Session-IV

Right to Information

1. There is an urgent need to have more information flow and knowledge regarding Act particularly to fine-tune the mechanism to quickly supply the information and take other relevant decisions.
2. The Universities need to develop mechanisms for record keeping harmonized to the demands of RTI Act.
3. The Association may be kept informed by the universities about various issues arising out of the requests received under RTI Act, and the relevant/useful information should be published in the IAUA Newsletter. Further interpretations of the cases by CIC or its subsidiary offices should be collected and collated for the benefit of the Universities.

Technical Session-V

Farmers Scientists Interaction

After the presentation of invited speakers and panelist subject was discussed thoroughly by the delegates and following recommendations were emerged out.

1. Strong linkage should be established between farmers and scientists.
2. Social engineering should be geared up in order to improve economic status of the farmers by adopting a new technology.
3. Gape between scientists and farmers should be reduced.
4. Krishi Mahotsav which was adopted by the Gujarat, the other states should be implemented in order to educate farmers.
5. Success story in Krishi Mahotsav in Gujarat should be circulated all SAUs and the Govt. of different states in India.

The technical session was concluded with the vote of thanks by the organizer.

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FARMERS' YEAR-2006



31st IAUA Vice Chancellors' Convention
"ROLE OF SAUs IN USHERING SECOND GREEN REVOLUTION"

December 9-10, 2006

CHANDRA SHEKHAR AZAD UNIVERSITY OF AGRICULTURE & TECHNOLOGY, KANPUR

