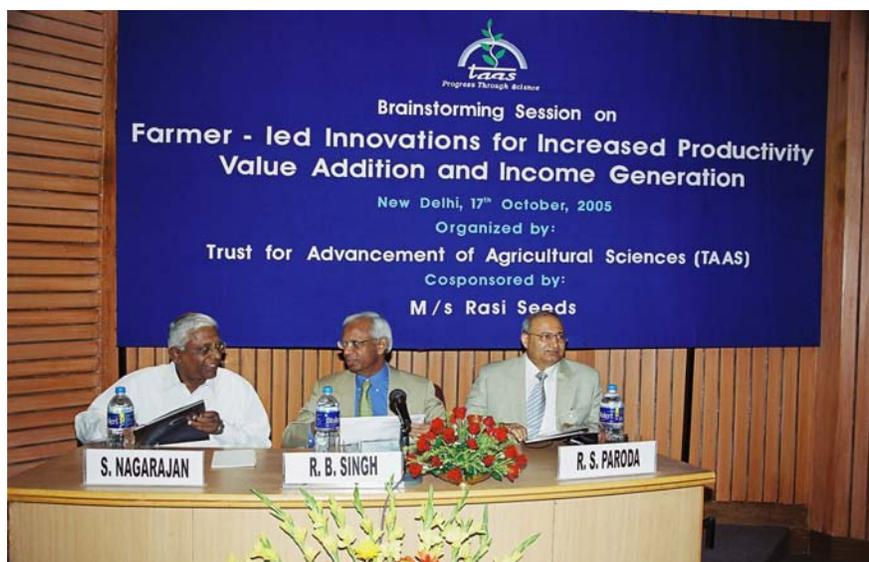


**BRAINSTORMING SESSION ON FARMER-LED INNOVATIONS
FOR INCREASED PRODUCTIVITY, VALUE ADDITION
AND INCOME GENERATION
17 October 2005, New Delhi**

HIGHLIGHTS AND RECOMMENDATIONS



Inaugural Session in progress. Seen on the dais are (L to R) Dr. S. Nagarajan, Prof. R.B. Singh and Dr. R. S. Paroda

Farming has been the main occupation of Indians for over 5000 years. In the process of evolution, farmers have come out with numerous innovations which brought them good returns and made farming a sustainable practice. A number of farm implements were designed to increase farm efficiency. The lift irrigation system, the pitcher irrigation and khadin cultivation in Thar desert are some examples of such innovations. Over the years, farmers also selected several varieties that had higher productivity and better quality. Farmers have also developed new and low cost technologies to preserve, process and package various farm products both for increased shelf life and better market opportunities.

Despite these, the innovations made by farmers have not received the recognition, which they deserve. Also the propriety rights on the innovations made by the farmers have often been ignored. In order to promote development of farmer-led skills as well as protect their rights, it is necessary that we recognize and further promote these innovations. It is also desirable to blend the existing traditional wisdom with the modern scientific knowledge for ensuring sustainable agriculture.

In order to discuss these issues, a one-day brainstorming session was organized by the Trust for Advancement of Agricultural Sciences (TAAS), under the convenorship of Dr. S. Nagarajan, the then Director, Indian Agricultural Research Institute , New Delhi, on 17 October, 2005. All deliberations were held in Hindi. About 40 participants, comprising scientists, farmers, entrepreneurs, legal experts, extension workers and policy makers attended. Innovative farmers from different regions were invited to make presentations. They highlighted their innovations and spelt out both successes and constraints. Also they interacted with the scientists to seek solutions on various issues and problems that require further refinements.

The Inaugural Session was chaired by Prof. R. B. Singh, Member, National Commission on Farmers and earlier Assistant Director General, FAO, Bangkok. In all, there were four sessions: Inaugural Session, Session I on “Indigenous knowledge”, Session II on “Value Addition”, and the Plenary Session.

A summary of the proceedings and the main recommendations are presented here:

Inaugural Session

In his welcome remarks, **Dr. R. S. Paroda**, Chairman, TAAS stressed that, since, a large number of farmers did not understand English, there was need to hold discussions in Hindi. He reminded that in the past also, National Seminar on sustainable agriculture were held in Hindi at this Institute. The proceedings of these seminars were also published and circulated widely. He desired that more of such conferences be held in Hindi, so that farmers could participate and derive greater benefit from them.



Dr. R.S. Paroda welcoming the participants

Welcoming the delegates, Dr. Paroda, appreciated the role of various ICAR Institutes, in working with 'TAAS' towards its goal i.e., "Taking Science to Society". The institutes like IARI, IASRI, NBPGR had actively participated in the recent past and he hoped that similar participation from all quarters will be forthcoming in future. He thanked Prof. R.B. Singh and Dr. S. Nagarajan for their active role in this dialogue. Dr. Paroda emphasized the importance of the subject of this brainstorming meeting in the present context, especially to link farmers to markets using innovations evolved by farmers themselves and to blend traditional wisdom with modern science. This "bottom up" initiative is critical for linking science with society, being the main goal of TAAS.



Dr. S. Nagarajan addressing the delegates

Elaborating on the spirit behind the workshop, **Dr. Nagarajan** reminded that in the early years of Green Revolution, the farmers were in possession of improved varieties of rice and wheat, but they were not knowing the package of practices for growing these varieties. Scientists demonstrated new package of practices to the farmers which made all the difference. After the success of “Green Revolution”, a stage came when the yield of crops stagnated and some adverse effects of excessive use of inputs became visible. He also cited some examples of the farmers adopting value addition technologies on their own, without guidance from the scientists. He narrated how some of the agricultural implements and machines were developed by the local artisans. This showed that the farmers were competent to develop innovative technologies for increasing their crop yield and income. Similarly, he cited the example of Kerala State, where, the local farmers developed a large number of multipurpose products from banana and its plant. He felt the need of documentation of such innovations so that indigenous knowledge could be blended with the scientific innovations.

Farmers, however, shared this wisdom freely and never protected their innovations in the past. Dr. Nagarajan emphasized that the purpose of this brainstorming was to see as to how we could both protect the rights and use our traditional knowledge in an appropriate manner. He also cited an example of an entrepreneur, Mr. Ramasami, who though from an ordinary family, established a Seed Company, which brought progress to a remote village of Salem district in Tamil Nadu. He stated that one of the objectives of TAAS was to encourage more and more farmers to use their traditional knowledge for bringing forth innovations to increase productivity, value addition and income generation. He also spoke of another example of dairy farming by one of farmer from Rajasthan, who developed a network of crossbred cows and brought about tremendous change in the area through ermin-composting and organic farming. Dr. Nagarajan said, “the journals of different disciplines of agricultural science should allocate some space for publishing farmer-led innovations, that are mainly based on traditional knowledge”. Dr. Nagarajan further cited another example of Andhra Pradesh, where farmers started mushroom cultivation in the dryland area leading to overall prosperity. Since, this was being done by women of that area, it brought about women’s empowerment too. He also reminded that traditionally most of the agricultural practices were carried out by the women in our country. They possess wealth of knowledge, which

could be used for future innovations. Finally, he emphasized the need of protecting farmer led innovations through patenting and other means of copyright, IPR etc.



Prof. R. B. Singh addressing the audience

In his address, **Prof. R.B. Singh** said that we will have to protect our traditional knowledge by appropriate means. He praised the role of progressive farmers in the development of agriculture and desired that these farmers should guide other farmers in their areas, in adopting improved technologies. Scientists should also derive benefit from the knowledge of these progressive farmers. He appealed to the participating farmers to realize their responsibility and capability. He informed that the National Commission on Farmers had recently organized a meeting where farmers narrated their experiences which could be beneficial to other farmers in India. He desired that the bio-diversity should become a source of livelihood. He said, soil conservation is one of the most important aspects, on which attention must be given. He appreciated the need for both the protection and utilization of traditional knowledge. Plant Variety Protection Act and Intellectual Property Rights Act are now in existence and we should take full advantage of these for the betterment of our farmers. If we do this, we will be able to face the challenges of WTO successfully. He wanted that the matter of Geographical Indication of Basmati Rice should also be taken up and settled on priority basis before it is too late. Finally, he appreciated the efforts of TAAS, under the dynamic leadership of Dr. Paroda for organizing brainstorming session on various important issues of great national importance.



A view of the audience

Session I: Indigenous Knowledge: Some Experiences

Chairman: Prof. Anil Gupta, Chairman, National Innovation Foundation, IIM, Ahmedabad, Gujarat

Native Intelligence in Water Harvesting:

Dr. Hanuman Prasad, Head, Krishi Vigyan Kendra (KVK), Jhunjhunu (Rajasthan)

Dr. Hanuman Prasad emphasized the need for conserving water. He drew attention of the participants to the fact that, 75% area of the earth is covered with water, out of which 97% is brackish. Only 3% water is fresh. Areawise, Rajasthan is one of the largest states of the country. Its population is 5 crores and its livestock population is also 5 crores. Keeping in view sustainable agriculture, we will have to pay more attention to dryland agriculture. He was of the view that through watershed management, we could enhance our agricultural production. There was no scope of increasing irrigated area, therefore, he urged to use water judiciously. There was a need to change the utilization pattern of natural resources. He narrated the example of Krishi Vigyan Kendra, Jhunjhunu (Rajasthan) where substantial work was being done in the area of water harvesting which increased both availability of water and crop yields. This had also boosted the seed production programme in the area. A model has also been developed which encouraged other farmers to adopt the water conservation technology. These activities were conducted under a watershed development program. The KVK organized training programme to develop such models and many farmers were trained in this

technology. He also spoke of a model of fish rearing in the desert area of Rajasthan. He demonstrated how water conservation could be helpful in growing wheat crop in Jaisalmer district of Rajasthan, which is completely under desert. He also informed about the awareness programme for water harvesting started by the KVK, which had given very encouraging results.



An example of innovative water conservation device; A Covered Kund

Readjusting Tropical Pomology in the Light of Liberalized Fruit Exports: Scope & Difficulties:

Shri Ravinder Chauhan, President, Apple Growers' Association, Kothai, Shimla (Himachal Pradesh).

Shri Ravinder Chauhan said that Himachal Pradesh was known for horticulture and tourism, and apple was its main fruit. The contribution of horticulture to the economy of the state was significant. He, however, felt that there was considerable scope for exploiting the potential of apple farming, particularly in the wake of trade globalization. He highlighted the following issues which needed to be attended to in order to make horticulture a profitable proposition:

- Horticulture should be given a special status
- A farmers' exchange programme should be given due priority
- Water harvesting models in hilly areas need to be encouraged
- Genetic improvement of plants through modern biotechnology is needed

- Priority should be given to check deforestation and damage to the local ecology by adopting means developed in advanced countries
- Market intervention schemes suited to hilly areas need to be developed
- Vocational training and rehabilitation avenues for the youth in hilly areas is needed
- A germplasm repository to conserve root stocks and propagules in different forms is essential
- Support in terms of technology and financial aid to set up small processing units is most critical

Shri Chauhan emphasized that the myth that the people of hilly areas were conservative is no more true. “In fact, they are more progressive and developed now. This is the country of Mahatma Gandhi where every hand needs work today. High-tech vision of Jawaharlal Nehru has to be followed. How best we pursue and synchronize both is a big challenge for all of us to face,” he concluded.

Value Addition to Agri Products:

Ms Sabitha, Proprietor, SABEES, Mahabalipuram (Tamil Nadu)

Ms. Sabitha emphasized the importance of value addition in agricultural products. She said, “Nowadays, our social and economic conditions are so different that we like readymade value added products”. Agri products can be classified as Bulk Agri Products, Intermediary Agri Products and Consumer Agri Products. Bulk Agri Products are the products harvested and sent straight to the market. These products can be made value added by growing organically or by producing various value added products from them. Ms. Sabitha gave a number of examples of value added products of cereals, pulses, oilseeds, fruits, vegetables, etc. “When we think of Bulk Agri Products, Agri Tourism is also to be kept in mind. Intermediary Agri Products are those for which little processing is done in advance,” she said. She also narrated the success of her readymade sambhar curry and several products which she invented and successfully marketed. These products are more welcomed by the employed youth who want ready food products to save cooking time.

Value Addition to Agricultural Products:

R. Sivasubramanian, DorVen's Agro-Eco-Bio Ventures, Kanchipuram (Tamil Nadu).

Shri Sivasubramanian informed that their organization was engaged in producing novel value added products from banana. The products developed by them were: banana flour, banana pickle, banana juice, banana jam and sauce, dehydrated banana, banana candy, and banana fibre biscuits. The products produced by them had received wide acclaim locally. Attempts were underway to popularize these products in other parts of the country and abroad also. Shri Sivasubramanian elaborated on some of the initiatives taken by them to further broaden their product base covering other fruits like chikoo (sapota), mango and pineapple. They had also launched Value Addition Centres to train rural people in producing value added food products.

He said that their plans were to extend their activities to dairy products, food supplements and neutra-ceuticals. He also wished to develop agro-tourism models and cultural exchange programmes. In conclusion, he said that the goal of their organization was not only to produce novel and quality food products but also to usher in an era of a sustainable, happy and healthy living for our resource poor farmers.

Organic farming:

Shri Ramesh Dagar, Farmer from Sonapat (Haryana)

Shri Dagar said that although we attained self sufficiency in food grain production as a result of “Green Revolution”, now after 40 years the adverse effects of high input based (especially the use of chemical fertilizers and pesticides) technologies were quite visible. It had adversely affected our environment for which remedies were urgently needed.

He said, “Nowadays, organic farming and value addition are becoming more and more important.” He narrated his experiences on organic farming at his farm in Sonapat district of Haryana. He informed that he was getting an income of 10-12 lakh per year from 1.0 ha of land, and 12-15 people got employment out of this activity. He belonged to a medium class farmers’ family and held 6 ha of land. He had to drop the idea of higher education after 10th standard due to economic compulsions, and had to start farming at an early age. He started cultivation of pearl millet. He was encouraged to grow

vegetables as his neighboring farmers were getting better returns, particularly exotic vegetables which are more popular with the high class society of Delhi, and which fetched higher price. He thus grew broccolli, red cabbage, leek, lettuce, etc. He cultivated mushroom, strawberry and babycorn also which gave him better returns. He earned more than 1 lakh rupees from one acre of land just by growing babycorn. He started all this in 1985. Later, he also started Floriculture. By 1994, he owned 30 ha of land. This was because he could generate more income by adopting diversified farming and linking products to markets. In 1998, after realizing the adverse effects of pesticides and chemical fertilizers, he started organic farming on 1.0 ha of land. He had to keep in mind the status of soil, water and environment, because organic farming ensures this. Accordingly, he established his own dairy and the dung of cattle was used for biogas production. The slurry was utilized as manure in the fields. He started vermiculture also. According to him, organic farming was an old method of farming with scientific approach and new technologies. The left over fodder by the cattle and the dung were used for producing biogas. The biogas was used for different purposes. In organic farming, he used the biomass of the crops as manure. He grew mushrooms throughout the year, which increased his income and helped him in recycling the organic waste.

Shri Dagar also adopted beekeeping. He said “the foremost advantage of beekeeping is that the crops around the area give higher yield due to better pollination. Thus beekeeping becomes more and more profitable. Beekeeping is very simple and any ordinary farmer can adopt it”. In some of his land, he also started a nursery and became the supplier of seedlings of different fruits and vegetable crops. This not only increased his income but also helped him to provide more employment. According to him, a farmer intending to adopt organic farming should go in for a market study and grow crops as per the need of his area. “If one farmer demonstrates the effectiveness of organic farming, other farmers in adjoining areas will automatically adopt it”.

Chairman’s Remarks

Insert photo of Prof. Anil Gupta from yearbook NAAS and insert his name below the photo

In his concluding remarks, Prof. Anil Gupta, Chairman, NIF first of all congratulated TAAS for organizing this useful interface among farmers (as innovators) and the scientists. He felt that such brainstorming meetings were needed more and more in different parts of the country. NIF and TAAS under the able leadership of Dr. R.S. Paroda, could take this dialogue further. He then narrated the dismal story of very few patents in the agriculture sector and desired more aggressive approach on priority, citing examples of patents filed on haldi, neem, pigeonpea, basmati rice etc. NIF has been able to document thousands of rural based innovations, which are made public and disseminated through “Honey Bee” – a periodic news bulletin. He desired that the tremendous wealth of traditional knowledge and rural based innovations in agriculture be explored and documented before the same is lost forever. He also reminded the audience about the commendable role played by Prof. Y.P. Singh, former Deputy Director (Agriculture Extension) at IARI, who realized the capability and wisdom of Indian farmers in developing new agricultural technologies almost forty years ago. Perhaps he was the first who did a remarkable job in highlighting the role and importance of agricultural innovations by the farmers of India and pleaded for their due recognition and rewards in the interest of our agriculture.

Session II, Value Addition:

Chairman: Prof. V. P. Gupta, Former Vice Chancellor, Rajendra Agricultural University, Bihar.

Innovations in seed production:

Shri G. Ranganathan, Rasi Seeds Private Limited, Salem (Tamil Nadu)

Praising the presentation of Shri Ramesh Dagar, Shri Ranganathan pointed out that organic farming was more knowledge based than financial input based being highly management intensive. He informed that he had collected information from more than 51,000 farmers who had reported their experiences from 350 districts of the country. These farmers had developed their own technologies and new varieties of different crops. He gave an example of Mr. Yusuf Khan of Sikar, who had developed a groundnut digger implement for which he was awarded by the Wall Street Journal for this innovation, he being one of the 20 awardees from Asia. He informed that he has formed a Forum which encourages such farmers. Some of them recognized by his Forum, got international

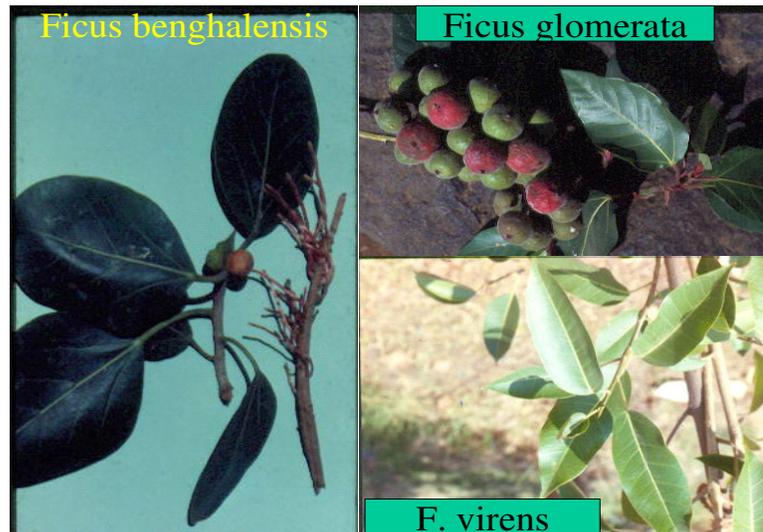
recognitions. Three of them got patents from USA and six more were in the pipeline. He gave examples of how other countries of the world were making use of the wisdom of Indian farmers while unfortunately we were lagging behind. He said that we have got only one patent for coriander, while there are 400 patents of various coriander products all over the world. "Similarly, castor is used traditionally for preparing various indigenous medicines but no systematic research has been done on castor's medicinal use and no patent has been filed so far." He was of the view that several possibilities of value addition of different products exist on the basis of traditional knowledge of our countrymen. The share of ICAR in filing the patents was negligible. More attention needs to be paid towards this. He pointed out that five aspects namely, IPR, geographical identification, value addition, business development and target group identification need to be undertaken. These sectors should be organized systematically. According to him, innovation, investment and incubation should be harmonized for getting the best results. IARI students should coordinate with the farmers in establishing their business. He gave a few examples of farmer oriented innovations and desired that more and more farmers should come out with such innovations on the basis of their experiences and wisdom. Value addition may be done at the farm and village levels, where less financial investment is required. In designing farm implements, the skill of farmers and local artisans, can be utilized. Improved varieties of crops are to be covered under IPR to protect farmers varieties from being exploited elsewhere. He quoted an example as to how a farmer developed a new variety of pigeon pea having red flowers which is resistant to insects. He said "Such a variety has not been developed by any breeder so far. This farmer should have right on his variety and must be benefited through the proposed Gene Fund under the PVPFR Act, which is a unique Act implemented in our country." He desired that such innovative farmers should get due recognition. The farmer-led innovations should be included in the syllabus of different agricultural disciplines so that students could learn more about the wealth of our traditional wisdom.

Medicinal & Aromatic Plants:

Dr. M.H. Parabia, South University, Surat (Gujarat)

Dr. Parabia presented results of a project awarded to his group, to compile traditional knowledge of tribal people of India. About a year back, the Department of

Science & Technology assigned a Herbal Anti Malaria project to him. Their main objective was to compile traditional knowledge of tribal people of the country. He observed that the health and hygiene status of tribal people was very poor. They did not get proper nutrition.



Some indigenously occurring medicinal plants in tribal areas

Dr. Parabia's group studied some common diseases of tribal people and found that skin diseases, ear diseases, lung and kidney disorders, and the digestive diseases were very common in them. He narrated his program of training tribal groups of about 40-50 persons in the management of the above mentioned diseases. For treatment of these diseases, emphasis was given to utilize local herbal resources as far as possible. Giving examples, he mentioned about a common herb called Ratti (*Abrus precatorius*), the leaves of which could be used in the treatment of Mouth Ulcers or Stomatitis. The local people could sell these leaves and thus generate additional income. Its seeds have some medicinal value but these are poisonous, so cannot be taken directly. Some process is required to make them useable. The roots of this plant have the properties similar to Mulethi. At present, Mulethi is being imported for medicinal purpose. Hence, these roots could provide a better alternative to Mulethi. Much more in the field of medicinal plants and the use of traditional knowledge was urgently needed.

Experiences of Progressive Farmers from State of Jharkhand

1. *Shri Vijay Ranjan Prasad*

Shri Ranjan Prasad said that Indian soils were very well suited for medicinal plants like Safed Musli, Satavar and Ashvagandha. If these were to be cultivated through organic farming, the foremost requirement was to have a quality testing laboratory in Jharkhand either by the Government of India or ICAR. Medicinal plants could also be grown in Jharkhand, provided suitable procedure to evaluate the medicinal value of the product, was developed. He said that he was growing medicinal plants on 8 ha of land. He obtained a certificate of organic cultivation from one of the most prestigious organizations of Europe, Leckons' Institute. He said that all farmers were not able to grow medicinal plants. Govt. or voluntary organizations should come forward to help and advise farmers in this field. Many countries in the world were protecting their natural wealth in some way but we in India were lagging behind. He quoted some examples of this and stressed the need to cultivate medicinal plants through organic farming for getting good recovery of chemical components of medicinal value. "For the farmers, who are ready to adopt organic farming, the foremost requirement is the certification by an authentic organization", he said. Quoting the interest of local population in organic farming, he pointed out that recently when the Directorate of Horticulture and the Directorate of Agriculture initiated a program of organic agriculture in tribal areas of Jharkhand, some 100-150 tribal youth applied for it within 3 days.



Shri Vijaipal Singh examining his vermi-compost production site

He narrated the role of vermicompost, oilcake of neem and karanj in organic farming, and desired that a comparative economic evaluation should be done on the yield of various crops through organic farming and modern farming, as practiced today.

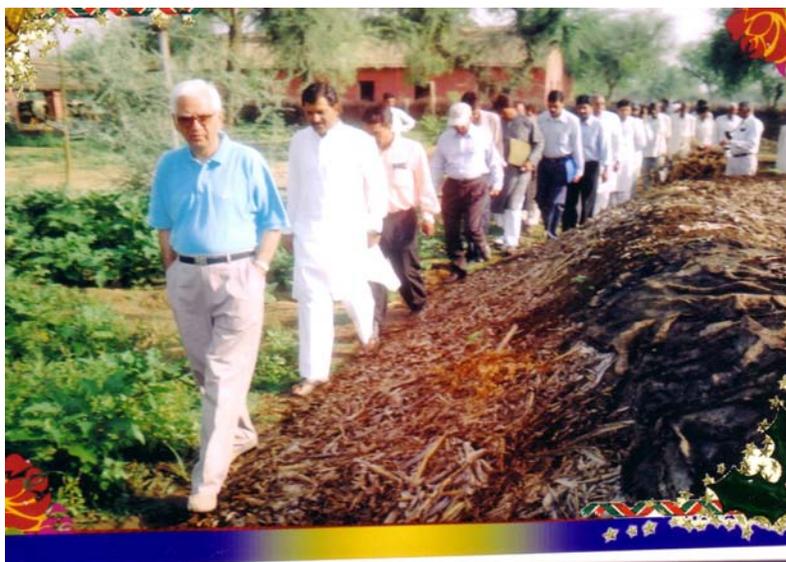
2. Shri Champa Bhagat

Shri Bhagat started his presentation with the information that most of the land of Jharkhand was undulated and was under rainfed and rabi cropping. To create irrigation facility, the farmers of his village were trying, through community effort, to bring river water that is flowing down the nearby mountain. They had started this work in the year 2000 and aimed to complete it by 2006. He informed that after diverting the river water, it would be possible to provide irrigation to about 400 ha of land.

Experiences on Dairy Farming:

Shri Vijai Pal Singh, A Farmer from Jhunjhunu (Rajasthan)

Shri Singh said that he belonged to an ordinary farming family which owned only less than half hectare of land among five brothers. He had to drop out from school after 11th standard. He chose the occupation of dairy farming on a very small scale with minimum investment. He started purchasing milk from the village and selling it in the local market, at a profit of Rs 1 per litre. He also started selling vegetables to earn some more income, which got doubled. Later on, he expanded his vegetable shop into a grocery shop, and started purchasing items for the shop from the farmers, thus avoiding the middlemen. This way, he and the producers could get more profit.



Shri Som Pal Shastri visiting Shri Vijaipal Singh's vermi-compost unit

Later, he started his dairy with only two cows. Today, he owned a dairy farm of 150 cows which he acquired within last 13 years. He developed a full-fledged dairy at his small farm. He dug a well for meeting the requirement of water. All his brothers were also engaged in the dairy business. Instead of selling the milk, he decided to prepare and sell milk products for which he started a sweet shop using milk of his dairy. To utilize the dung profitably, he started producing vermi-compost and selling it in Delhi market. Today, he was getting an income of Rs. 5 lakh per year by selling vermi-compost, and producing around 2000 litres of milk per day. He purchased two hectares of land out of the earnings from dairy products and vermi-compost. Now he was growing Ber, Bel, Papaya and roses, through organic farming. This was the best example of integrated farming. He told that he was encouraged by the Department of Agriculture, Rajasthan and KVK, Jhunjhunu, in this venture. Now, he was providing regular trainings to other farmers. This job had been entrusted to him by the District Authority (Zila Parishad). He has by now established different units on the farms of about 2500 farmers and trained them in similar profession. Like this, he could generate good opportunities of employment for youth in Jhunjhunu district of Rajasthan, where a number of them are currently unemployed.

Experiences on Social Forestry:

Shri Sunda Ram Verma, A Farmer from Sikar (Rajasthan)

Shri Sunda Ram Verma said that he came from an area which was very cold in winter and very hot in summer. His work included dryland agriculture and forestry. He developed some good varieties of crops like chilli, moth, guar, kabuli chana, etc., through selection from local germplasm. He adopted crop rotations which formed an integral part of organic farming. He also worked for the National Innovation Foundation (NIF) for which he collected about 8000 innovative ideas from his region. About 400 types of plants of his area are now documented, and 95% of these have been identified and named in the databank of NIF.

He said “For dryland forestry, water has to be conserved. Before planting, a deep ploughing is done 3-4 days after the first rain of the monsoon. Before the recession of monsoon, one more deep ploughing is done. This destroys weeds and conserves water. For planting, a ditch 1.5 ft deep, 4-6 inches in diameter is dug. The sapling is transplanted

and watered using 1 litre of water. The transplanting should be done after recession of the monsoon so that plants survive better because of the availability of sufficient moisture. The survival rate is around 80% and this method is economical also. In this system, the trees giving fodder for the animals have also been planted thus solving the problem of fodder for the cattle. Other crops can also be grown under these trees. For example, moong can be grown under the Ber tree.” His work on social forestry was appreciated by different authorities of Rajasthan, and the farmers of the state had benefited from his work. Some of the varieties developed by him showed resistance to diseases, and gave good yield in adverse conditions also. He collected more than 700 local varieties of 15 different crops and handed them over to the Gene Bank of NBPGR. For his innovative work in dryland agriculture, he also received “Best Innovative Farmer Award” from the ICAR with a cash prize of Rupees 1 lakh.

Experiences on Diversified Agriculture:

Shri M.S. Grewal, A Farmer from Ludhiana (Punjab)

Mr. M. S. Grewal, an ex-serviceman, had adopted farming after serving the Navy for a number of years. He owns 4 ha of land and his main activities cover crop production, foundation hybrid seed production, floriculture, cash crops production, fresh vegetable cultivation, relay crops production, and research and development for scientific and innovative farming. He is basically a seed producer and innovative farmer. He is also a social worker, who had won many prizes at the state, national and international levels. He has written two books on agriculture and published 49 articles in Indian and foreign magazines. He is engaged in disseminating technologies through print media as well as multi-media.

As regards problems and prospects in trade of vegetable seeds, he felt that they were closely related with diversification of agriculture. The farmer needs assured market and remunerative prices for his produce. According to him, better prices of wheat and rice do not permit the farmers of Northern India to adopt crop diversification. He presented a comparative statement of wheat-rice system with other diversified rotations. Despite some rotations being more remunerative, the farmer did not adopt them mainly owing to lack of marketing opportunities, variation in prices, and exploitation by the traders.



Shri M. S. Grewal examining his potato field

He concluded by saying “Vegetable seed production is directly related to fresh vegetables’ availability. If the prices of fresh vegetables are remunerative, farmers will purchase vegetable seed; otherwise, not. Minimum support price should be paid to encourage vegetable seed production. Some other points to be kept in mind are maximum land use, better plantation and relay cropping. Before adopting relay cropping, one has to ensure the compatibility of relay crops to be adopted. Their water requirement is to be assessed and it is to be seen if there is any common method of harvesting both the crops.”

Plenary Session

Chairman: Dr. S. Nagarajan, Chairman, Protection of Plant Varieties and Farmers’ Rights Authority, Government of India, New Delhi

In the Plenary Session, extensive discussions followed the interesting presentations made in the technical sessions. The lively deliberations resulted in the following important recommendations:

Recommendations:

1. It is highly essential to document innovations and traditional knowledge and disseminate them further by various organizations such as Indian Council of Agricultural Research (ICAR), National Academy of Agricultural Sciences (NAAS), Trust for Advancement of Agricultural Sciences (TAAS), National Innovation Foundation (NIF) etc. Also regional and international organizations such as FAO, GFAR, APAARI could be involved to promote and popularize various successful innovations by the farmers to link them to markets for better income and livelihood opportunities.
2. Involvement of Research Institutions is quite critical to understand and blend the traditional innovations with scientific refinements for their large scale adoption and popularization.
3. Innovative technologies identified in one region need to be popularized in similar eco-regions elsewhere, through publication, documentation and dissemination of “Success Stories”.
4. Risk management with focus on market opportunities through value addition is required. The farmers are to be protected from varying and often declining prices. Export potential has to be explored and procedures streamlined in order to take full advantage of globalization of agriculture.
5. Aggressive programmes for training of rural youth, especially farm women for post-harvest handling and value addition of the locally available agri-products, will help in linking rural communities to markets for better income opportunities.
6. Setting up of a quality testing laboratory in each region to test and certify farm products (such as organic foods, medicinal plants etc.) produced by the local entrepreneurs is an essential requirement for which Government, Private Sector and the NGOs support is critical.
7. It is necessary to develop processes for producing drugs from locally available medicinal plants especially to treat common ailments. Also patenting and popularizing these value added products in the local markets will benefit both the producers and the consumers. In this context, the available valuable knowledge relating to medicinal uses of local herbal plants need to be gathered and

- documented through appropriate incentive and reward mechanisms before same is lost for ever or remains unknown/hidden.
8. Concept of tree plantation as social activity has to be promoted, especially in dry, desert and hilly areas, which will help in the development of agro-forestry and horticulture in these regions and also ensure better returns for the resource poor communities, beside improvement in our environment.
 9. Agro-tourism around farmers innovative efforts would not only generate greater public awareness but would also help in revenue generation and greater community involvement in protecting our rich biodiversity.
 10. Creation of a “Farmers Innovation Promotion Board” by the Ministry of Agriculture, Government of India would obviously accelerate the process of innovations in agriculture to link farmers to markets. Sooner it is done, better it will be in the national interest. Best example of this kind already exists in the dairy sector, namely “National Dairy Development Board (NDDB)”, which has not only helped in achieving “White Revolution” but has organized small and even landless dairy farmers to form rural cooperatives, thus linking them to markets as well as consumers while ensuring regular cash income.
 11. A regular mechanism of scientist – farmer dialogue would certainly accelerate the process of agricultural innovations and hence, be put in place at the national level by the organization such as ICAR.
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Acronyms

APAARI	Asia Pacific Association of Agricultural Research Institutions
FAO	Food and Agriculture Organization
GFAR	Global Forum on Agriculture Research
IARI	Indian Agricultural Research Institute
IASRI	Indian Agricultural Statistics Research Institute
ICAR	Indian Council of Agricultural Research
IIM	Indian Institute of Management
IPR	Intellectual Property Rights
KVK	Krishi Vigyan Kendra
NAAS	National Academy of Agricultural Sciences
NBPGR	National Bureau of Plant Genetic Resources
NDDB	National Dairy Development Board
NGOs	Non-Governmental Organizations
NIF	National Innovation Foundation
PPVFR	Protection of Plant Varieties and Farmers' Rights
TAAS	Trust for Advancement of Agricultural Sciences
USA	United States of America
WTO	World Trade Organization