

Madhya Pradesh Chief Minister Inaugurates Tata-ICRISAT-ICAR Project Launching Workshop

Shri Digvijay Singh, Honourable Chief Minister of M.P., inaugurated Tata-ICRISAT-ICAR Project Launching Workshop on Combating Land Degradation and Increasing Productivity in Madhya Pradesh and Eastern Rajasthan at the IISS, Bhopal on June 20, 2002.

While inaugurating the workshop, Chief Minister called upon the agricultural scientists, planners, politicians as well as the farmers to make sincere and concerted efforts to meet the challenge of increasing land productivity. He also exhorted them to develop a strategy to ensure sustenance of one family from one acre of land. He said that water conservation is an important factor to increase productivity and efficient water management is the key to success in this regard. Mr. Singh also highlighted the successful cases of water conservation measures being undertaken in the state through community participation under Rajiv Gandhi Watershed Management Mission.



Dr. C.L. Acharya, Director, IISS welcoming the delegates. Seen on the dias are (L to R) Dr. M. Gorakshkar from Dhuru Bhai Tata Memorial Trust; Dr. Panjab Singh, Secretary (DARE) & DG (ICAR); Dr. William D. Dar, DG (ICRISAT); Sh. Digvijay Singh, CM, Madhya Pradesh; Dr. M.S. Swaminathan, Chairman, MSSRF; Sh. Mahendra Singh, Minister of Agriculture, M.P.

Renowned agricultural scientist Dr. M.S. Swaminathan, Chairman, M.S Swaminathan Research Foundation, Chennai, stressed the need for development of watershed programme as a major employment generating activity to improve the livelihood status of poor in the country. Dr. Panjab Singh, Secretary DARE & DG, ICAR, emphasized the importance of rainfed agriculture. Dr. William Dar, DG, ICRISAT, highlighted the existence of vast potential to increase the productivity of rainfed and dryland agriculture in Madhya Pradesh and called for sincere efforts to develop the state as a model for the world. Dr. M.Gorakshkar from Dhuru Bhai Tata Memorial Trust highlighted the role of private sector participation in agricultural research.



Dr. M.S. Swaminathan speaking on the occasion

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National seminar organized

Dr. Panjab Singh, Secretary, Department of Agricultural Research and Education (DARE), Govt. of India and Director General, ICAR, New Delhi, inaugurated the two-day National Seminar on "Indigenous Nutrient Management Practices" and 'Brain Storming Session on Organic Farming' on January 30—31, 2002. Dr. J. S. Samra, DDG (NRM), ICAR, New Delhi presided over the function. Delivering the inaugural address, Dr. Panjab Singh called upon the scientists to strike a judicious

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balance between the use of organics and inorganics in agriculture and asked them not to be swayed by the mere slogans of organic farming. He reminded that India is rich resource wise but poor management wise and, thus, called upon the scientists to judiciously manage the organic resources. On this occasion, a publication "*Indigenous Nutrient Management Practices - wisdom alive in India*", by C.L. Acharya, P.K. Ghosh and A. Subba Rao, was also released.



Dr. Panjab Singh, Secretary (DARE) & DG (ICAR), releasing the book

Research Highlights

Water-logging causes yield loss in soybean

Field studies showed that the peak vegetative growth stage of soybean was more sensitive to water-logging than the seedling emergence or reproductive stages (peak flowering) as evident from the extent of yield loss and impairment of soil biological processes. Water stagnation even for 4 days during the peak vegetative stage reduced seed yields by 30%. Provision of surface drainage particularly during vegetative growth of soybean, therefore, becomes crucial to prevent adverse impact of water-logging on soybean productivity.

Mechanical harvest-borne wheat residue management

Mechanical harvesting of crops like wheat leaves behind the entire crop residue and the common practice in vogue is to burn such residue in-situ. Some alternate wheat residue management options for soybean viz., incorporation and surface retention vis-à-vis burning alone or coupled with fertilizer or organic N sources (FYM, Poultry manure and *Leucaena leucocephala* loppings as GLM) were evaluated. Two year results demonstrated that either soil incorporation or surface retention of mechanical harvest-borne wheat residue coupled with N supplementation through fertilizer-N (28 kg N ha⁻¹) or organic manures (4 t FYM or 1 t poultry manure ha⁻¹) resulted in a significant improvement in productivity of soybean and in the status of soil organic carbon and available N and P.

Wheat benefits from INM practices of preceding crops

A field study on a Vertisol demonstrated that the wheat crop grown under limited irrigation benefited from the residual effect of farmyard manure, phosphocompost and poultry manure applied in combination with 75% NPK to previous *kharif* soybean and sorghum crops. The yield gains in wheat as a result of the INM practices followed in preceding season were relatively greater in soybean-wheat system than in sorghum-wheat system.

Methods for tracking inoculated bacteria standardized

Methods for assessing the survival of inoculated diazotrophs *Azospirillum* and *Azotobacter* in soil were standardized using stable genetic markers *lac Z*, *gus A* and *gfp* by the Hisar centre of AICRP on BNF. Since *lac Z* is widely present in other heterotrophic soil bacteria and *gus A* assays are expensive, using "*gfp*" (green fluorescent protein) was found more useful for ecological studies

Carbon sequestration under different land uses

Horticulture based cropping systems are more effective in carbon restoration as compared to cereal-cereal or cereal-legume systems. In contrast, the cotton based cropping system, even with high fertilizer inputs, is least effective in C sequestration.

Productivity and profitability of pulse based systems

Field experiments on different pulse based cropping systems conducted at farmers' fields in the target districts of Bhopal, Raisen, Kanpur, Rewa and Satna (under NATP, RPPS-11) revealed the possibility of improving crop productivity by adopting integrated nutrient management practice coupled with soil moisture conservation. Application of 75% recommended NPK + 2.5 t FYM ha⁻¹ with dead end and furrow as the soil moisture conservation measure proved most profitable. Soybean-chickpea system was more productive and remunerative as compared to soybean-lentil system.

Productivity of soybean based intercropping systems

Results of a field experiment revealed that in the absence of N application, intercropping of soybean either with maize or sorghum gave higher productivity in terms of soybean equivalent yield (SEY) and maximum economic returns in terms of benefit-cost ratio (B: C ratio). In contrast, the sole maize crop resulted in the higher SEY and B: C ratio when N was applied at 75 or 100% recommended rate. However, maize or sorghum as sole crops resulted in higher runoff and soil losses compared to that of their intercropping with soybean. Wheat yield in following *rabi* season was lowest when sorghum was its preceding crop.

INM for rainfed oilseed based cropping system

Integrated nutrient management involving different sources of organic manure has been found to increase the yield as well as income of farmers in different rainfed oilseed based cropping systems. Use of inorganic fertilizers along with organic materials like FYM in soybean-chickpea system at Bhopal and in fallow-sunflower system at Raichur and Latur; lime along with FYM in groundnut + pigeonpea intercropping system in Ranchi; green manuring in safflower at Parbhani, in castor at Palem and in mustard at Bharatpur has improved the yield as well as income over the farmers' practice of nutrient management and the recommended dose of fertiliser.

Sulphate sorption of a Kandic Paleustalf under long-term fertilizer treatments

Sulphate sorption behaviour of Kandic Paleustalf (Bangalore) fertilized differentially under Long-Term finger millet-maize-fodder cowpea rotation revealed that the sulphate sorption was maximum in S-free NPK treated soil suggesting

the exhaustion of native S. In contrast, the 150% NPK(+S) treated soil showed minimum sorption due to larger accumulation of residual S. Continuous addition of farmyard manure with optimum dose of NPK(+S) reduced the sulphate sorption by soil

Heavy metal contamination in sewage irrigated soils of peri-urban Hyderabad

The sewage waters from Hyderabad city have been found to contain heavy metals like Cd, Pb, Ni, and Co. The soils in peri-urban areas irrigated with sewage water showed heavy metal accumulation. Excess accumulation of Pb, Ni, Cd, Fe and Cu was observed in 32, 22, 10, 66 and 56% sites, respectively. Fodder grass grown on such polluted soils and the urine, blood serum and milk samples of milch animals fed with this grass were found to contain high amounts of heavy metals.

Potential availability and use of manure in M.P.

Socioeconomic and biophysical survey of four villages (*viz.*, Dhankhedi and Geelakhedi in Rajgarh district and Rangai and Hansua in Vidisha district) brought home the fact that only 43-54% of animal dung is recycled as FYM with the rest being used for fuel purpose in rural M.P. The factors such as competing uses of dung, number of animals, crop rotation, irrigation facility, and rate, frequency, method and season of application are primarily responsible for the kind of FYM management at the farm level. Integrated use of FYM and fertilizer for soybean has been found to give a net margin of Rs.6106 ha⁻¹, a gain of Rs. 1045 ha⁻¹ over the fertilizer use alone.

Trainings

- Dr. K. M. Hati and Dr. K. K. Bandyopadhyay, attended a training programme on "Systems Analysis and Crop Growth Simulation in Agriculture" at the Centre for Application of Systems Simulation, IARI, New Delhi; March 27 -April 17, 2002.
- Dr. D. Damodar Reddy attended a Summer School on Recent Advances in Agriculture Research Project Management at NAARM, Hyderabad; April 15 – May 5, 2002.
- Dr. T.R. Rupa attended a refresher course on "Information Technology in Agriculture" at NAARM, Hyderabad; June 12 - July 2, 2002.
- Dr. Ashwani Kumar Sharma and Dr. K Sammi Reddy attended a training programme on "Data Analysis and Interpretation under ICAR-ACIAR Project at Queensland Department of Primary Industries, Toowoomba, Australia; June 23-29, 2002.

Seminars/ Workshops/Meetings attended

- Dr. A. Swarup, Dr. M.C. Manna and Dr. R.H. Wanjari attended Annual workshop of the AICRP (LTFE), Birsa Agricultural University, Ranchi; January 14-16, 2002.
- Dr.C.L. Acharya, Dr. D.L.N. Rao, Dr.T.K. Ganguly and Dr. K.P. Raverkar participated in the AICRP (BNF) workshop at TNAU, Coimbatore, February 7-11, 2002.

- Dr. M.V. Singh attended Annual Workshop of NATP, RRPS 19, CRRI, Cuttack; March 19-21, 2002.
- Dr. M.C. Manna attended NATP workshop (RNPS-25), NBSS & LUP, Nagpur; April 11-12, 2002.
- Dr. C.L. Acharya and Dr. A.K. Misra participated in the Group Meeting on Straw Management in Combined Harvested Rice-Wheat Fields, at PAU, Ludhiana; May 6-7, 2002.
- Dr. D.L.N. Rao presented an invited status paper "BNF Research in India" in an international workshop on "Biological Nitrogen Fixation for Increased Crop Productivity, Enhanced Human Health and Sustained Soil Fertility" at ENSA-INRA, Montpellier, France; June 10-14, 2002.

Events

- Annual Workshop of AICRP (LTFE) was organised at BAU, Ranchi to review the research achievements and discuss future technical programme; January 14-16, 2002.
- Republic Day was celebrated with great enthusiasm by all the staff members and their families: January 26, 2002.
- The 12th Workshop of the AICRP (BNF) was held at TNAU, Coimbatore to review the IXth plan achievements and formulate Xth plan programme for "Network on Bio fertilizers"; February 8-10, 2002.



- Staff Research Council meeting; April 2-3, 17-18, 2002
- Annual Workshop of NATP/ RCPS-11 was held at IISS, Bhopal to review the progress of the project; April 23-24, 2002.
- QRT (1997-2002) meeting; June 13-14, 2002.



QRT meeting in progress

Visits abroad

- Dr. D.L.N. Rao, PC (BNF); ENSA-INRA, Montpellier, France; June 10-14, 2002.
- Dr. Ashwani Kumar Sharma, Sr. Scientist and Dr. K Sammi Reddy, Sr. Scientist; QDNR, Brisbane and QDPI, Toowoomba, Australia; June 23-29, 2002.

Staff news

- Dr. M. V. Singh, PC (Micronutrients): appointed as In-charge PC (LTFE); March 14, 2002.
- Dr. Anand Swarup, PC (LTFE): left to join as Head (Soil & Crop Management), CSSRI, Karnal; March 14, 2002.
- Miss Kirti Rathore: joined as stenographer Gr-III; March 18, 2002.
- Dr. A.K. Tripathi, Scientist; Dr. K. Sammi Reddy, Scientist: promoted to Sr. Scientist w.e.f. August 5, 2000.

Distinguished Visitors

- Dr. Panjab Singh, Secretary (DARE) & DG, ICAR, New Delhi, January 30, 2002.
- Dr. J.S. Samra, DDG (NRM), ICAR, New Delhi, January 30, 2002.
- Sh. O.P. Rawat, IAS, Secretary (Agriculture), Govt. of M.P.; January 30, June 20, 2002.
- Dr. H.P. Singh, Director, CRIDA, Hyderabad, February 23, 2002.
- Dr. R.K. Gupta, Director of Research Services, JNKVV, Jabalpur, May 3-4, 2002.
- Dr. I.P. Abrol, Director, Center for Advancement of Sustainable Agriculture, New Delhi, May 22, 2002.
- Shri Digvijay Singh, Honourable Chief Minister, M.P., Dr. Panjab Singh, Secretary (DARE) & DG, ICAR, New Delhi, Dr. M.S. Swaminathan, MSSRF, Chennai, Shri Mahender Singh, Honourable Agricultural Minister, M.P. and Dr. William D. Dar, DG, ICRISAT, Andhra Pradesh; June 20, 2002.



Dr. Panjab Singh, Secretary (DARE) & DG (ICAR)



Dr. William D. Dar, DG (ICRISAT)

From Director's Desk..

Multi-institutional Research Consortium for Natural Resource Management

The soil, water, vegetation and weather constitute the natural resource base that forms the basic foundation of agricultural development of a nation and are central to the well being of human society. In management parlance, when natural resources for agriculture are considered, we are primarily referring to soil and water assets. In the optimum use and rational management of soil and water resources lies the key to the 'well talked about but least bothered' sustainability of agricultural production. The fact that there exists an array of complex interrelationships and interactions among different components (aspects) of a resource and between resources requires inputs from diverse disciplines for sound management of natural resources. Unfortunately, different disciplines concerned with management of soil and water resources have been moving fast in different orbits, independent and ignorant of what each other is doing and for what purpose. Application of component-based technologies in the past may have yielded short-term gains, but proved ineffective in the long-term as is evident from the inescapable disastrous realities. Emergence of widespread multiple nutrient deficiencies, depletion of soil organic carbon stocks, development of secondary salinity and water logging in canal irrigated areas, low input-use efficiency (nutrient and water use efficiency) and declining factor productivity etc., are all direct or indirect creations of the single component focused technologies. All of these essentially indicate imperiled sustainability in agricultural production.

Development of appropriate and cost-effective integrated resource management technologies for wider adoption, however, represents a daunting task and is beyond the capacity of a single institution. Establishment of a sort of 'Multi-institutional Research Consortium' with effective linkages between research institutions concerned with soil and water resources becomes an essential step in our march to attain sustainability in agriculture. There is an unqualified assurance in the inter-institutional multidisciplinary approach for natural resource management – as working together of different institutions with individual scientists drawn from various backgrounds becomes a real winning formula.

- C.L. Acharya