

Economics of nuclear power is a very complicated subject because it depends on many factors such as interest rate, duration of construction, lifetime of plant, decommissioning and fuel cycle costs. For the last 32 years, India was isolated from the world's development of this industry. During this period nuclear technology has passed two generations. At present, third generation power plants are being built in Europe and Asia and research and development is being carried out on generation IV plants.

If the Indo-US nuclear agreement materializes, India would be in a position to take benefit from the developments in other countries. It is high time India makes a comprehensive study of the developments which have taken place in heavy water reactors as well as in light water reactors. It may be even worthwhile that for this study, apart from the DAE, IITs, other institutions and industry may be involved.

Economics of power is fundamental for development, whether nuclear, coal,

gas, oil, hydro, wind or solar. It is also a function of space and time. One hopes some of our institutions would take up such studies, which would help in decision-making.

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NEWS

MEETING REPORT

Nematology and plant parasitic nematodes*

Delegates from 16 centres representing 15 states of the country participated in the workshop and group meeting of the All-India Coordinated Research Project (AICRP) on plant parasitic nematodes, to cater to overall development of science of Nematology in the country. The mission of the programme is to enhance crop production in the country through nematode management. The mandate of the project is to conduct coordinated trials for reducing crop losses caused by nematode pests and to demonstrate the nematode management technologies through on-farm trials.

Mathew C. Kunnungal (Agricultural Production Commissioner, Government of Kerala) inaugurated the workshop and group meeting. In the inaugural address, he highlighted the need for location-specific research, including organic farming in addition to coordinated trials of national importance. He also emphasized that major thrust is to be given to export-oriented crops like pepper, cardamom and other spices for Kerala and also pesticide-free vegetables, legumes and fodder production. He released a compilation of nematological investigations in Kerala, *Nematode*

Pests of Crops in Kerala – An Overview, and also its Malayalam version.

The keynote address was delivered by T. P. Rajendran (Assistant Director General of Plant Protection, Indian Council of Agricultural Research, New Delhi). He explained the objectives of AICRP in research, training and extension. The prime research objectives are to develop state-wise distribution maps of important plant parasitic nematodes, to validate and document crop losses and nematode management technology in irrigated and rain-fed cropping systems, to conduct multi-location on-farm testing of nematode management options for major nematodes, to select out suitable cropping systems for nematode management, to identify sources of resistance and develop nematode-resistant cultivars and pest risk analysis for major nematode pests in Indian agriculture. He also emphasized the need to update the knowledge of scientists through specialized short-term training programmes. He highlighted that in extension activities, priority should be given to the demonstration of nematode management technology in rice, vegetables, pulses and oil seeds and video demonstration of nematode damage symptoms, biology and management technology.

R. K. Jain (Project Co-ordinator AICRP on Plant Parasitic Nematodes, Indian Institute of Agricultural Research) delivered an exploratory talk, explaining the current

research programme and also the future thrusts. In current research he explained the needs to include identification of hot-spots and agro-ecologically conducive areas for key nematode pests, documentation of the state-wise distribution maps of agriculturally important nematode fauna of India, identification of sources of nematode resistance in different agricultural and horticultural crops and their testing under nematode-infested conditions, dynamics of community structure of nematodes for their management in need-based cropping systems (vegetables, pulses and horticultural crops) in different agro-climatic ecosystems, impact of nutrient supply system on major nematodes in cereals, pulses and vegetable-based cropping systems in different zones, pest risk analysis for major nematode pests in Indian agriculture, development and demonstration through on-farm testing of cost-effective, eco-friendly integrated nematode management technologies against key nematode pests, organization of short-term training programmes in nematology and demonstration of latest nematode management technologies and finally the organization of national campaign and country-wide public awareness drive against key nematode problems.

Jain also dealt with several future thrust areas for projects: farmer participatory on-farm research trials on nematode management technologies, strengthening nematode taxonomy and providing identification

*A report on the fourteenth National Nematology Workshop and Biennial Group Meeting of AICRP on Plant Parasitic Nematodes held at College of Agriculture, Vellayani, Kerala Agricultural University between 7 and 9 November 2005.

services, front line demonstration to demonstrate and validate the most effective low-cost, eco-friendly nematode management technologies generated in the project, researches on use of diazotrophic rhizospheric bacteria for their antagonistic role against plant parasitic nematodes, incorporation of nematode-resistant genes into agronomically suitable crop cultivars through plant breeding or biotechnological tools, pest risk analysis to address phytosanitary needs of international trade in agricultural commodities and designing nematode management technologies for organic farming systems.

He explained the status of the project based on the reviews of four Quinquennial Review Teams of ICAR for the periods 1977–83, 1984–88, 1989–94 and 1995–2001. Prof. H. K. Jain Committee, in its extensive review of all ICAR projects has recommended this project, in class A for further continuation.

There were four technical sessions followed by a meeting of group leaders of

the project with the Project Coordinator, AICRP and technical experts. In the first technical session, consolidated report on the salient research findings of the different groups was presented by respective group leaders. The significant achievements on the identification of hotspots and nematode-conducive areas, nematode problems of crops like cereals, pulses, vegetables, fruit crops and their management were highlighted. Decisions were taken on the quantification of nematode population from areas/locations for qualifying them, supply of raw data to the coordinating cell for further compilation, compatibility of nematicides with bio-agents to be studied before their concomitant application in integrated management technology and computation of C : B ratios in demonstration trials.

In the second technical session, there were reviews on research work of cooperating centres after presentation of results by the Principal Investigators (16 nos). Suggestions for modification of the

existing technical programme and new proposals based on the field problems were discussed and finalized.

Recommendations that emerged during discussions were finalized in the third technical session.

In the fourth technical session, technical programmes for the next biennial were presented by the respective group leaders. There were basic studies as well as applied aspects of integrated nematode management in different crop scenarios, with special emphasis on biological control agents, organic amendments, botanicals, host resistance, etc. Biotechnological interventions were also included in chalking out the technical programmes for the next biennial.

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MEETING REPORT

Need for science–policy linkages for river basins and coastal zone management*

Research on various facets of coastal sciences in India is burgeoning. However, scientific writings rarely make it to the public. The reason: missing links between science and society. This issue was debated at a workshop on science–policy interactions on river basins and coastal zone management held at the National Institute of Oceanography, Goa. Sugandha Sardesai had convened this workshop with an overall objective of bringing together relevant research findings on the river basins of Goa for policy makers and administrators, so that solutions for effective and sustainable management of precious water resources could be proposed. In all, there were 29 presentations in five technical sessions. They highlighted

current and changing scenarios mainly in Mandovi and Zuari basins, coastal zone and its resources, including salt production. Current levels of air, water and land pollution, an economic analysis of fisheries and management of freshwater resources in the state were also discussed.

Studies from Goa's large rivers, Zuari and Mandovi, clearly highlighted that the ecosystems of these basins are under pressure from mining, beach tourism, sewage outfall, coastal construction and indiscriminate dumping. These activities have been ascribed, through long- and short-term studies to the deteriorating quality/negative impacts on water, sediments and aesthetic quality. For example, the average nitrogenous nutrient levels have increased substantially from their 1980s levels post-2000. Anoxic environs are more frequent and have become undesirable for the near-shore fish and fisheries in recent years. High nutrient loading during the monsoon is seen as one of the

factors for this phenomenon. The quality of benthic environment is declining steadily, if not rapidly as yet. Both these rivers, the economic lifelines of Goa, are experiencing increasing trends in the concentrations of toxic heavy metals (viz. Cd, Pb, Zn). Their bio-magnification and ascendance through the aquatic food-chain can bring down the quality of fish as food, if their environmental releases are not checked.

Sewage pollution indicating microbial loads and many groups of human pathogenic bacteria are on the rise in lower stretches of both these rivers. Similar is the situation with dinoflagellates (now totaling 78), some of which (about 12) are toxic to fishes and to human beings through consumption of certain shellfishes harbouring the toxic forms. There are indications of invasion of some alien marine invertebrates. Long-term monitoring, spanning 30 years (1972–2002), has indicated that there is drastic reduction in

*A report on the workshop on 'Science–policy interactions on river basins and coastal zone management, Goa' held at the National Institute of Oceanography, Goa during 7–8 March 2006.