ICAR
Annual Report
1994-95

भाकृअनुप
ICAR

Indian Council of Agricultural Research
New Delhi

Indian Council of Agricultural Research

President	Dr Balram Jakhar Minister of Agriculture
	Shri S. Krishna Kumar Minister of State for Agriculture (DARE)
	Dr V.L. Chopra (up to 5.8.1994) Secretary Department of Agricultural Research and Education
Director-General	Dr R.S. Paroda (from 21.9.1994 to till date) Secretary Department of Agricultural Research and Education
Secretary	Sunil Sud (up to 24.8.1994) Joint Secretary Department of Agricultural Research and Education
	G.S. Sahni (from 24.8.1994 (AN) to till date) Joint Secretary Department of Agricultural Research and Education
Financial Adviser	Shri N. Parthasarathy

Foreword

The Indian Council of Agricultural Research is charged with the responsibility of setting an agricultural research and education agenda for the country and is continuously engaged in developing farmworthy, agro-production and protection technologies for enhancing productivity and production of the agricultural sector. Over the decades, the Council has grown from strength to strength, and has ushered in agricultural development with its two strong pillars— technology back-up and essential human resources. The ICAR has contributed substantially to the overall agricultural growth of the country, and this has been acknowledged globally. During 1994-95, the Council developed a number of improved, high-yielding varieties and hybrids, having inbuilt resistance to a number of pests and pathogens.

Hybrids of rice have been developed for the first time in the country. Potentials of new durum wheat varieties have opened new vistas for accelerated wheat export. Multi-cut sorghum hybrids have paved the way for augmenting fodder production for the ever-growing livestock populations. Development of new sugarcane varieties and perfection of techniques of developing test-tube sugarcane plantlets have helped in mass multiplication of promising varieties.

Accelerated programmes on germplasm conservation, utilization and addressing biodiversity issues with much-needed diversification of agriculture and technological development in fruits, vegetables and flowers have augmented their supply to the domestic and external markets. High-yielding varieties of grapes with top grade wine-making qualities have resulted in accelerated production and diversification. Production of true potato seed has helped greatly meet the seed requirement. Technological developments for diagnostics and vaccines have put the national programmes regarding animal health on a sound footing.

Coastal as well as inland fisheries is progressing with considerable pace. It is hoped that technology developed for processing, product development and value addition would go a long way in harvesting, preserving, conserving, storing and supplying value-added products.

Human resource development is considered crucial, and the present efforts in strengthening libraries, laboratories, training and communication facilities with newly launched programmes is expected to pay rich dividends. The international co-operation and development of partnerships with sister organizations are progressing well. Keeping in view the market demands to bring much-needed efficiency and effectiveness, programmes are channelized to meet the existing and emerging opportunities in the process of economic liberalization and globalization. Initiatives taken on human resource

development, information management, long-term perspective planning, policy reforms, developing incentive-and-reward system, etc. are steps considered to be in the right direction.

The report gives an account of accomplishments on research, education and frontline extension activities of the Council. It is the essence of the achievements on reforms, financial utilization, resource mobilization, capacity building and fund utilization.

It is hoped that the report would give an insight of the developments and would be useful to all those who are engaged in agricultural research and development.

Jagannath Mishra
19-2-96

(Jagannath Mishra)
President, ICAR Society and
Minister for Agriculture

Contents

THE MANDATE OF THE INDIAN COUNCIL OF AGRICULTURAL RESEARCH

(i) To plan, undertake, aid, promote and co-ordinate education, research and its application in agriculture, agroforestry, animal husbandry, fisheries, home science and allied sciences.

(ii) To act as a clearing house of research and general information relating to agriculture, animal husbandry, home science and allied sciences and fisheries through its publications and information system, and instituting and promoting transfer of technology programmes.

(iii) To provide, undertake and promote consultancy services in the field of education, research, training and dissemination of information in agriculture, agroforestry, animal husbandry, fisheries, home science and allied sciences.

(iv) To look into the problems relating to broader areas of rural development concerning agriculture, including post-harvest technology, by developing co-operative programmes with other organizations such as the Indian Council of Social Science Research, Council of Scientific and Industrial Research, Bhabha Atomic Research Centre and Universities.

(v) To do other things considered necessary to attain the objectives of the Society.

1. Introduction

Introduction

THE Indian Council of Agricultural Research (ICAR) is the apex organization at national level for the promotion of Science and Technology Programmes in the areas of agricultural research and education. The ICAR was set up on 16 July 1929 as a Registered Society under the Societies Registration Act, 1860. The Minister for Agriculture is the President of the ICAR. Its principal executive officer is the Director-General. He is also the Secretary to the Government of India in the Department of Agricultural Research and Education (DARE).

The General Body is the supreme authority of the ICAR. It is headed by the Minister for Agriculture, Government of India. Its members include the Ministers for Agriculture, Animal Husbandry and Fisheries, and senior officers of various state governments, representatives of the Parliament, industry, educational institutes, scientific organizations and farmers.

The Governing Body is the chief executive and decision-making authority of the ICAR. It is headed by the Director-General. It consists of eminent agricultural scientists, educators, legislators and representatives of farmers. It is assisted by the Standing Finance Committee, Norms and Accreditation Committee, Regional Committees, several Scientific Panels and a Publications Committee.

The ICAR receives funds from the Government of India and from the proceeds of the Agricultural Produce Cess.

The Director-General of the ICAR functions as the Principal Adviser to the Government of India in all matters concerning research and education in agriculture, animal husbandry and fisheries.

In scientific matters, the Director-General is assisted by 8 Deputy Directors-General—one each in charge of (i) Crop Sciences, (ii) Soils, Agronomy and Agroforestry, (iii) Animal Sciences, (iv) Agricultural Education, (v) Transfer of Technology, (vi) Fisheries, (vii) Horticulture and (viii) Agricultural Engineering. The DDGs are responsible for the institutes and projects in their respective fields.

Presently the Society has 141 members (Appendix 1). The Governing Body of the Society has 26 members (Appendix 2). The other important bodies and committees of the ICAR are the Standing Finance Committee, Norms and Accreditation Committee, and Regional Committees. Their present composition is given in Appendices 3-5. The senior officers posted at the Headquarters are listed in Appendix 6.

It is the endeavour of the ICAR to develop technologies and to disseminate knowledge to the farming community not only for increasing yield levels of crops but also for alleviation of its economic status. The ICAR has established 9 National Research Centres during the Eighth Five-Year Plan, upgraded the Directorate on Pulses to an Institute and the All-India Co-ordinated Research Project (AICRP) on Biological Control to a Project Directorate, initiated the National Institute of Animal Nutrition and Physiology, Network on Animal Genetic Resources, Crop-based Animal Production System and Embryo Transfer. The National Research Centre for Women in Agriculture for developing and testing women-specific technologies attuning to the New Economic Policy was also approved.

The research set-up includes 46 Central Institutes, 4 National Bureaux, 10 Project Directorates, 29 National Research Centres and 80 All-India Co-ordinated Research Projects and Networks. The details of these institutions are given in Appendices 7 to 11. Apart from financing a number of ad-hoc research schemes located at various places, the ICAR also finances research schemes through the United States-India Fund. The details

of such schemes are given in Appendix 12.

Under the National Agricultural Research Project (NARP) aided by the World Bank, the ICAR sanctioned new sub-projects with a view to strengthening the regional research capabilities of the state agricultural universities. The complete list of all the new and old sub-projects is given in Appendix 13.

The ICAR also takes the help of retired scientists for its research projects by appointing them as emeritus scientists. The existing strength of emeritus scientists, national fellows and national professors is indicated in Appendix 14. Research programmes are given the required thrust by holding workshops, seminars, summer institutes etc. The details of the summer institutes are given in Appendix 15.

For higher education in agriculture and allied fields, the ICAR has 4 deemed universities, viz Indian Agricultural Research Institute, Nationa Dairy Research Institute, Indian Veterinary Research Institute and Central Institute o Fisheries Education which undertake specialized training mainly at the post-graduate level. The National Academy of Agricultural Research Management (NAARM) of the ICAR imparts training to new entrants in the Agricultural Research Service (ARS) and orientation to scientists and administrators.

In addition to the above, the ICAR also promotes research education and extension education through 27 State Agricultural Universities and 1 Central Agricultural University for North-Eastern Hills Region by providing financial assistance in different forms. The list of these universities is given in Appendix 16.

Overview

RESEARCH ACHIEVEMENTS

The year under review has reinforced the firm belief in our capability of keeping pace with the population growth of 2.1% per annum, as the country realized foodgrain production of 192 million tonnes during 1994-95. It resulted in a buffer-stock of over 36 million tonnes. There can be no other befitting compliment to the agricultural research and development system of our country than this. It is further reassuring that, although we are trying to industrialize at a fast pace, the agricultural sector still contributes 32% to the gross domestic product (GDP) of India with 70% of its population engaged in agriculture, compared with 2-7% in the contemporary developed world.

Presently, the National Agricultural Research System (NARS) has 46 Central Institutes, 4 National Bureaux, 29 National Research Centres, 10 Project Directorates and 80 All-India Co-ordinated Research Projects/programmes. This whole system has a symbiotic relationship with 27 State Agricultural Universities and 1 Central Agricultural University established during 1994-95 in the North East Hills Region.

Hybrids to Break Yield Barriers

During the year, our earlier efforts of starting

a mission-mode approach to develop rice hybrid resulted in the release of 4 rice hybrids: APHR 1 and APHR 2 for Andhra Pradesh; KRH 2 for Karnataka; and MGR 2 for Tamil Nadu. More are in the pipeline. Recently West Bengal has released 1 hybrid of rice. India has emerged as the second country after China to develop its own hybrid rice varieties. In addition, 17 new rice varieties were released by the State Variety Release Committee.

Production of more than 65 million tonnes wheat during the year has created a new record. Six new improved varieties of wheat including 2 of *durum* wheat were released. For the first time an improved variety of *triticale* was also released.

The research efforts to increase the productivity of coarse cereals resulted in the release of 2 hybrids of maize and a new hybrid of sorghum. For the first time, a multi-cut sorghum hybrid PCH 106 was developed yielding 20% higher than the most popular variety. Sorghum variety 'Hara Sona' was released as multi-cut material for the entire country. To help tribals, the research for improving small millets has been stepped up. Two varieties of foxtail-millet were released for Andhra Pradesh and Rajasthan.

The ICAR is providing research support to the National Technology Mission on Pulses. This year 7 varieties of fieldpea and 1 of lentil were identified for pre-release multiplication. These 8 varieties will further strengthen the pulse-development programme in the country.

Our pulse as well as oilseed sector is primarily rainfed. We have had a spectacular achievement in the oilseeds, where export of oilmeal and minor oil is now twice that of the edible oil. Two yellow-seeded varieties of soybean, 3 high-yielding varieties of groundnut, an open-pollinated variety of sunflower and 2 white-seeded varieties of sesame are the highlights of the varietal improvement programme in oilseeds. In addition, 2 castor hybrids were identified for pre-release multiplication.

Among the cash crops, sugarcane production regained the lost ground and surged ahead to a record production of 259.38 million tonnes. A number of new varieties were identified to replace the old sugarcane varieties in different agro-climatic zones. These varieties have high yield potential with higher sucrose content and resistance to diseases and pests. The success achieved in producing 77,760 test-tube plantlets from a single explant in 5 months and 15 days is an indicator of the potential of distributing elite planting material to sugarcane growers for breaking earlier records of productivity.

Several new hybrids of cotton have given very promising results to step-up the production of cotton. An intra-specific hybrid (CSHH 29) of upland cotton (*Gossypium hirsutum*) developed at the Regional Station of the Central Institute of the Cotton Research, Sirsa, recorded a yield of 2.49 tonnes/ha and ranked among the first 5 top entries at 3 locations under trials of the All-India Coordinated Cotton Improvement Project. The seed inoculation with *Azospirillum brasilense* at the rate of 100 g/kg of seeds resulted in 33% more yield of jute in jute-rice sequence. The yield of rice also increased by 35%. A new flue-cured variety of virginia tobacco, resistant to black-shank disease, was released for cultivation in the northern light soils of the West Godavari district of Andhra Pradesh.

In our effort to increase forage production, 1 multi-cut hybrid and 1 multi-cut variety of sorghum were released in addition to a new variety of lucerne, Anand 3, which proved suitable for growing in Himachal Pradesh and Gujarat. Forage yield of pearlmillet and oat increased significantly with the application of *Azospirillum* and *Azotobacter*.

Conservation and Utilization of Plant Biodiversity

A total of 130 indigenous accessions were collected and 260 exotic accessions were introduced in underutilized crops like grain-amaranth, rice-bean, faba-bean, buckwheat, *Chenopodium* spp., adzukibean and wingedbean.

The varietal improvement by the plant breeders of the NARS is being supported continuously through the availability of indigenous and exotic collections of the most valuable germplasm. The National Bureau of Plant Genetic Resources (NBPGR) made 30 explorations in 1994-95 to different parts of the country. A total of 2,696 germplasm accessions were collected during these explorations. More than 53,500 accessions were introduced from 47 countries, and 42,000 accessions of various crops were exported. A total of 123,745 samples of germplasm and materials were processed for quarantine inspection and clearance. Over 18,690 accessions in different agri-horticultural crops were grown for preliminary evaluation, characterization, maintenance and multiplication. A dwarf compact oilpalm was

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identified from the Nigerian collection. Resistant strains of cumin, fenugreek and coriander were identified from the exotic germplasm and 76 wild piper lines were collected from forest areas of Karnataka and Kerala. Total germplasm accessions stored in the National Gene Bank till 31 March 1995 were 144,409.

The concern of conserving our plant wealth and efforts to utilize the biodiversity for crop improvement have to match the sustainability of crop production and its profitability is established. Protection of environment and the basic national assets is at the core of national productivity cycle. The main idea is to adopt and promote environmentally safe and cost-effective plant protection techniques such that they harmonize with other segments of crop husbandry for achieving higher crop productivity. With this in view, researches for developing biocontrol agents like *Trichogramma chilonis*, *T. pretiosum*, *Epiricania melanoleuca* and *Bacillus thuringiensis* were further stepped up. Sugarcane borer and leafhopper were effectively controlled through biological measures. Successful experiments led to biological suppression of pests of rice, pulses, oilseeds, vegetables and tree crops. Several weevils and beetles were found to suppress various weeds. Plant-based pesticides developed from extract of neem-seed kernel and from the oil of castor, *pongam* and *mahua* seeds were found effective in controlling several pests. These are being utilized to fight pests through Integrated Pest Management (IPM). Same approach is being applied to weed management. *Cuscuta* plant residue was found phytotoxic for aquatic weeds. Multi-locational trials are being conducted to find pesticidal residues in different crops, keeping in view the strict quality regulations of different countries to facilitate export of the Indian agricultural produce.

Export orientation

Export orientation has become quite visible in our horticultural research. Several new hybrids and varieties of fruits, vegetables and flowers were developed for export purpose. New mango hybrids are undergoing trials and new methods to improve the quality of mango varieties like Totapari and Alphonso have proved fruitful.

Six superior high-yielding varieties of grapes were developed for table purpose, juice purpose and wine-making and two of these hybrids evolved by the IARI rearing release. A banana hybrid has

been developed, in addition to several promising selections. A promising variety of litchi (Swarn Roopa) was released. New improved methods are being investigated to increase production of apple, guava, *ber* and pomegranate. Experiments to increase the shelf-life of pomegranate and sapota have proved successful. This will certainly increase the export potential of these fruit crops.

With the production of vegetables crossing 60 million tonnes, we are heading for a vegetable revolution. Five high-yielding varieties and 2 F_2 hybrids were added to the earlier varieties of brinjal and 1 more variety (Swarna Shree) was released for cultivation in Chhotanagpur region of Bihar. 'Swarn Poorna' cucumber, PH 1, NDVP 4 and Arkait pea, a high-yielding variety and 4 T_1 hybrids of tomato were also recommended for release. One F_1 hybrid of cabbage and a variety of okra resistant to yellow-vein mosaic were also released for cultivation.

Three hybrids of potato developed at CPRI, Shimla, were included for multi-locational trials. Two more hybrids proved promising and are being considered for release. Thirteen more hybrids are being tested. Three hybrids of TPS (true potato seed) family have yielded 12% more tubers than the standard variety. Also support for TPS seed production was extended to private sector.

Research on other tuber crops has also resulted in development of better varieties and improved technology of production. For example, in cassava 3 early-maturing clones could be harvested in 6 months, giving 35-37 tonnes/ha. Four lines of sweet-potato proved promising. Eleven dwarf clones of *Dioscorea rotundata* are being evaluated.

The ornamental crops have attained a new importance due to export potential. A new variety of rose (Chitra) was developed at the IARI, New Delhi. Hunting Song, a variety of gladiolus has been released for cultivation to be exported as cut-flower. Two varieties of chrysanthemum were recommended for commercial cultivation in the eastern region and in Rajasthan. Six more varieties with varied colours were also recommended for different regions including Varsha for Pune and Shyamal for Udaipur. Four cultivars of carnation were found suitable for commercial cultivation. Two promising hybrids of tuberose were released.

As a source of protein, mushroom is catching up fast in the diet of the middle class people. The National Centre for Mushroom Research and Training, Solan, has developed 7 new strains of *Agaricus bisporus*. Coconut waste such as coir-dust, bunch waste, leaf stalk and leaflets were found suitable substrates for cultivation of oyster mushroom, *Pleurotus sajorcaju*. Spawn and cropping was done in a low-cost mushroom-house built exclusively of coconut materials such as coconut wood and pleated coconut leaves inside a coconut garden.

Two F_1 hybrids of cashew gave higher yield of up to 28 kg/tree. More than 300,000 grafts of cashew produced at different co-ordinating centres were distributed during 1995 planting season. Protocols were standardized in black pepper to regenerate plants from callus in 100 days. Thirty tonnes of seed rhizomes of high-yielding turmeric varieties, 23,800 seedlings/grafts of tree spices, 26,000 cardamom seedlings and 1,800 kg cardamom seed capsules were distributed as nucleus planting material. Several new varieties and hybrids of spices are being tested before releasing to the farmers.

Five new varieties of medicinal and aromatic plants were released, including the ayurvedic herb *pipali* (*Piper longum*), for which ICAR scientists have developed a high-yielding variety Cheemathipally for the first time. Other 4 varieties belonged to aromatic plants of palmrosa and vetiver. For the first time, a large number of successful crosses were made in betelvine and the hybrid seedlings are being evaluated further.

Soils Health, Irrigation and Mechanization

To mitigate effect of degenerating soil health, the ICAR is continuously monitoring the state of soils in the country and also stepping up research for improving soil-health and restoring fertility in problem areas. A human-induced soil degradation map of the country was prepared using the GLASOD approach. About 187 million ha area is having different kinds of soil-degradation problems, which is quite alarming. Water erosion is causing loss of top soil in 140 million ha. Terrain deformation covers 13 million ha, wind erosion accounts for 10 million ha, and chemical deterioration 15 million ha. It causes salinization in 11 million ha and loss of nutrients and organic matter in 4 million ha. The total affected area demanding immediate attention is 145 million ha, representing 45% of the total area under cultivation.

The various technologies of Integrated Nutrient Management developed by the ICAR system

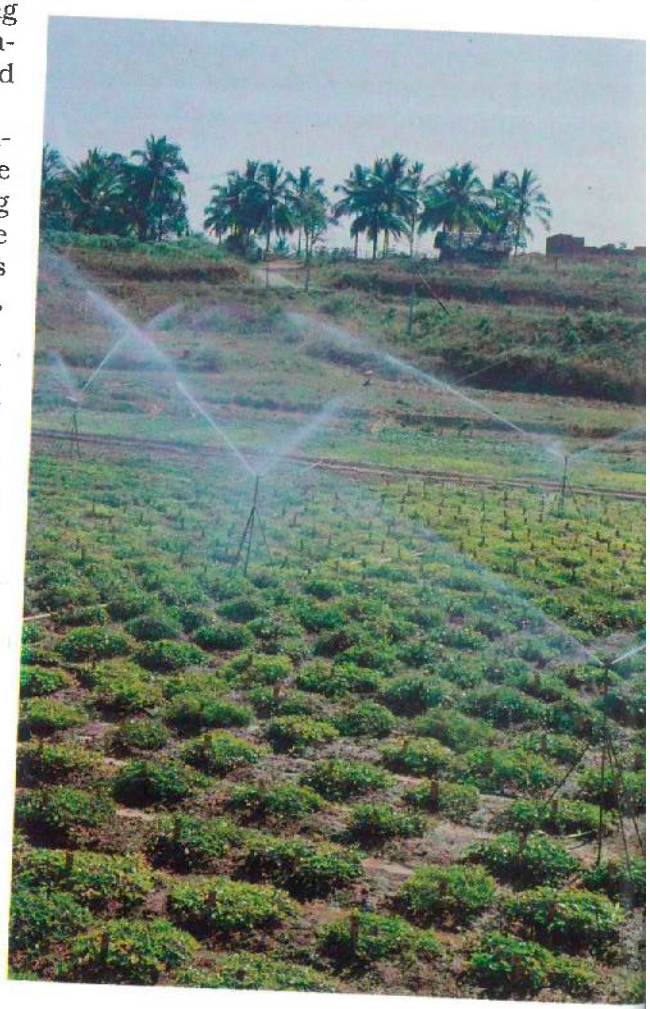
have proved that the soil health can be improved through nutrient application. Alternative land-use systems were successfully applied to stop degradation in different agro-climatic areas. The package includes improved cultural practices, multi-storey cropping models and mixed plantations to increase biomass cover, creating vegetative barriers to check erosion and induce stabilization of soil movement and water channels, microbiological transformation of nutrients, organic, green-manuring and biofertilization. Promising agroforestry tree species are being added for increasing biomass and providing fodder, fuel and food.

A method was developed to recommend fertilizers based only on 1-time soil test. Periodic change of the micronutrient status of the soils is being monitored. The results indicate that regular use of zinc sulphate by the farmers in northern states has improved zinc status in Haryana, Punjab, Uttar Pradesh and Gujarat.

Our effort to develop nitrogen-fixing organisms even for cereals has started yielding fruitful results, although the strains of *Azospirillum* for rice and *Azotobacter* for wheat found so far are location-specific. Suitable spraying and coating techniques are being developed. Combined inoculum of *Trichoderma viride* and *Rhizobium* spp. in pea resulted in maximum yield through biocontrol of pests and increased nodulation.

A succulent weed, *Eupatorium adenoforum* (locally known as forest killer), was utilized successfully for green-manuring to increase yield of wheat in western Himalayas, where it grows profusely. This is a new addition to low-cost nutrient sources being explored to supplement chemical fertilizers.

Micro-irrigation methods, though initially capital-intensive, are highly efficient for horticultural and plantation crops. Drip irrigation in sugarcane increased yield at Rahuri, by 20% and saving water up to 44%. Banana yield was also improved by 13%, saving 24% of water. Performance evaluation of solar photo voltaic pumping systems for irrigation showed that 800 watts pump was able to pump about 60,000-100,000 litres water/day, depending on solar insolation and depth of water-table. Water-utilization efficiency can be further improved by combining the system with micro-sprinklers/drips for fruit orchards and vegetable crops.



Research in developing renewable energy sources has resulted in developing a method of biphasic anaerobic fermentation of farm residues, rice husk gasifier, wind mill for fish pond aeration and biogas from bagasse and press-mud.

The highlights of research achievements for facilitating agricultural mechanization include development of several cost-effective drudgery-removing and time-saving machines and implements. An animal-drawn puddler, manual rice planter, bullock-drawn planter for bold seeds, self-propelled high clearance sprayer, reaper for tall crops and multi-crop thresher are ready to help farmers.

The globalization of markets requires competitiveness in our food products. This can be achieved through adoption of improved post-harvest technologies. The ICAR is running an All-India Coordinated Project on PHT at Bhopal and has started the Central Institute of Post-harvest Engineering and Technology at Ludhiana. This has resulted in various technologies that can be adopted even at village level. Some of the post-harvest technologies developed during the year under report are: cleaner-cum-grader for spices, fruit grader, fruit and vegetable dehydrator, fluidized bed dryer for mushroom, pedal-operated dal-mill, *gur* drying-cum-storage bin and gur-moulding frames. Several new developments in post-harvest technologies of cotton, jute and other fibres are also noteworthy. These include mote grooving device for cotton gins and foot-operated ginning machine. Fabric suitable for Safari suiting was developed from cotton warp and ramie/acrylic-blended weft yarn. For producing kusmi lac, a new host *Flemingia semiulata* was found suitable. It is an erect shrub growing throughout India and particularly in Andamans islands. This can help introduce lac cultivation in newer areas. A new variant of Kusmi strain of lac was found having high potential for resin production. An improved method for preparing lac dye from lac-waste effluent was developed. A compound releasing musk-like odour was isolated from lac for use in the perfumery industries and technology was transferred to a company.

Animal Sciences

We have made phenomenal progress in animal production. Dairy sector alone in India has grown to Rs 200,000 million annually. We are the second largest producer of milk and by the turn of the century about 16 million crossbred cows with high productivity potential would add to the growth of dairy industry.

Efforts are being made to preserve indigenous breeds, and a new-data bank has been prepared for recording various performance traits of the indigenous breeds. Thousands of semen straws belonging to Hariana and Ongole bulls and others have been frozen for future breeding programmes. Analysis of muzzle prints of Tharparkar, Sahiwal, Karan Swiss, Karan Fries cattle and Indian breeds of buffaloes as well as of some exotic breeds has been completed. Animal science research has been stepped up to improve breeds of rabbit, goat, sheep, camel, and horse. The morphology and biometric attributes of somatic chromosomes of Rathi and Hariana cattle, Surti and Bhadwari buffaloes, mithun, Indian single-humped camel, indigenous horse, Marwari goats and Magra sheep were established. It was hypothesized that yak and cattle have been domesticated simultaneously from the common ancestor, *Aurchos*, which has now become extinct. The red-cell antigens of yak were investigated to explore the possibility of sharing of physiological traits of red cells between yak and cattle. In poultry, several studies were made to locate genes in birds carrying naked neck and other genes. These genes will be used as a source of sex-linked recessive dwarfing gene for use in research for broiler dwarf dam line populations.

In animal health the major achievements were the large-scale production of vaccine for monovalent and polyvalent foot-and-mouth disease virus by fermentor technology using BHK-21 cell-suspension system. Diagnostic techniques are being developed using monoclonal antibodies, western plot technique, dot-ELISA test, haemolysis and haemagglutination. Laboratory evaluation of 3 prototype immunodiagnostic kits for foot-and-mouth disease (FMD), viz, sandwitch-ELISA antigen capture, PCR and DIG labelled hybridization, showed significant results. The technique for estimating ribose nucleic acid (RNA) and preparation of RNA profiles 1.8 million were standardized. A cell-culture vaccine was developed to control theileriosis. During 1994-95, the doses of different vaccine adjuvants were produced and supplied by the IVRI, Izatnagar. At its Bangalore campus, 2.8 million doses of the monovalent FMD vaccine were produced, fetching Rs 1.6 million. Monoclonal antibodies were also raised for controlling rinderpest virus. A very useful technique for production of monoclonal antibodies with frozen and thawed splenocytes was developed.

Many traditional methods of feeding are being evaluated scientifically. The age-old practice of feeding mustard-cake proved beneficial. It avoids the use of external source of thiocyanate for milk preservation, which may pose risk of iodine deficiency in milk consumers, particularly in infants. *Leucaena* leafmeal can replace groundnut-cake, cottonseed-cake and soybean-meal as protein source in the rations of ruminants. It is more economical and has the advantage of acting as a natural by-pass protein. A process technology for increasing by-pass protein value of groundnut-cake without affecting digestibility was developed. From semi-arid regions, 89 species of plants were collected and classified according to their nutritive values. Research undertaken to screen feedstuffs for poultry revealed that the rice bran (*kani*) has high metabolizable energy equivalent to maize and can be used as alternative feed.

Antisera against progesterone 7-alpha-carboxyethyl thioether was produced from rabbit serum. It can detect hormone concentrations as low as 8 pg/tube. Development of this antiserum will save considerable foreign exchange.

In buffaloes, 2 pregnancies were confirmed through IVF embryo transplantation. Another major achievement in endocrinology was the development of a highly sensitive immunoassay fo progesterone estimation in buffalo follicular fluid The assay requires only 0.05 microlitre (µl) o follicular fluid. The technique of deep freezing o buck semen was standardized with a post-thaw mortality of 56%. This is comparable to results from the developed countries. A ready-reckoner chart was developed to judge age of small, medium and large-sized breeds of Indian goats by examination of teeth.

Technology was standardized for the preparation of whey-based mushroom soup powder, ultrafiltration cheese powder, carrot-milk spray-dried powder, low-cholesterol mozarella cheese, an instant mix for pizza, plain, fruit and flavoured *kefir*, spray-dried and roller-dried skim-milk powder from milk concentrated by reverse osmosis and a high quality Mishtidoi. All these nutritious milk products can generate income in rural areas and have export potential.

Fisheries

Remote-sensing technology is being used for short-term forecasting of potential fishing zones along the Kerala coast. Satellite data on prospective fishing zones are being supplied. Tagging experiment on hilsa revealed its movement from downstream to upstream during flood season at Farakka (West Bengal). Eco-based studies of the Himalayan river, the Kosi and the lake Nau Kuchiatal, were undertaken to identify suitable potential for development of cold-water fisheries. Hazards to fisheries due to environment and commercial fish farming are being monitored continu-

ously. A vaccine for white-spot disease of shrimps is under trial. This disease caused large-scale mortality in shrimp farms.

The pond-breeding technique for pearlspot was perfected through environmental change in salinity and provision of nesting material. A microparticulate feed of 200-500 micron size was prepared with indigenous feed ingredients containing 50% protein. This was successfully tested on the post-larvae of the tiger prawn. Shrimp-feed pellets made of *maida* and wheat flour (15%), processed in combination with clusterbean gum (3%), proved stable under water for 6 hr.

Induced breeding in an air-breathing catfish, Singhi was achieved in the laboratory. In a significant breakthrough, technology was standardized for intensive raising of fingerlings of the golden mahseer in farm. This will help conserve this endangered fish of cold-waters. Cryopreservation of the milt of mahseer, Indian major carps and hilsa was undertaken at the Mini Fish Gene Bank at the NBFGR. Spermatophore from an adult male of tiger prawn was transferred artificially to a female of the same species, which subsequently spawned viable 1 million eggs. This successful experiment of artificial insemination will go a long way in overcoming failure in spawning. A low-cost technology for broodstock maintenance and seed production of *Penaeus semisulcatus* was perfected.

A new semi-pelagic trawl with 51 m long wing was designed and finalized for operation. Technique for preserving minced fish for 22 weeks at room temperature was perfected. A method was worked out for partial smoking and drying of freshwater fishes. Under a collaborative project a commercial dehydration plant at Agatti island of Lakshadweep is being set up to handle 2 tonnes of tuna/day and 500 kg waste material for production of fish-meal. Fish farmers and farm women were trained in different operations related to fish farming.

Education

During the year under report Rs 135 million were allocated by the ICAR to support 27 state agricultural universities for strengthening their infrastructural facilities including laboratories, libraries, housing, sports, training, communication etc. Agricultural facilities of the central university and of 4 deemed university of the ICAR are also being supported. The Central Agricultural University for the NEH Region started functioning with its headquarters at Imphal, Manipur. The programmes of scholarships, fellowships and sum-

mer institutes were carried out for human resource development; 36 centres of advanced studies are being established in the agricultural universities in addition to 11 centres in frontier areas.

Ten centres for development and use of hybrid rice technology are functioning at 8 SAUs with the UNDP contribution of US$ 3,010,650. Phytotron building at the IARI, New Delhi, is nearing completion.

The assessment of nutritional adequancy of composite diets of rural families, food-consumption pattern of farm families and their nutritional status continued under the All-India Co-ordinated Project on Home Science which utilized Rs 5.1 million out of Rs 6.5 million allocated.

The National Agricultural Research Project launched with the assistance of World Bank helped in strengthening regional research capabilities of 27 SAUs and provided infrastructural support to 343 research stations in 120 agroclimatic zones. The scope of the project was enlarged in Phase II by including new areas. Training programmes for national and international agricultural community were conducted at the NAARM. Directors of the Agricultural Research Institute of Nigeria received training in the management of agricultural research during the year.

Under the NARP II, basic research project on livestock biotechnology and a subproject to establish databases and information systems to support biotechnology research in crops, livestock, poultry, fishery, and agroforestry, are being implemented. Programmes of training in computing and information technology will also be conducted.

International Co-operation

The major thrust in co-operation with international institutions and under bilateral co-operation with other agriculturally developed countries is in new emerging technologies such as biotechnology, information technology and remote sensing in addition to rainfed agriculture, water-use efficiency, development of drought-resistant varieties, more efficient use of inputs, nutrient management and integrated pest management (IPM). The ICAR has close collaboration with CGIAR system, UNDP, FAO, SAARC, SAREC, CABI, ACIAR and Swedish Academy for Research Co-operation among Developing Countries. Among the CGIAR system ICAR has entered into partnership with the ICRISAT, CIMMYT, IRRI, CIP, ICARDA and WARDA. In agroforestry the ICAR has entered into an

agreement with the International Centre for Research in Agroforestry (ICRAF). For nutrient management the ICAR signed a Memorandum of Understanding with the International Fertilizer Development Centre (IFDC). A workplan for scientific and technical co-operation was also signed with Cuba. A project on 'Plant genetic resources' is being implemented by the NBPGR through the support of the USAID. Sixty-nine United States-India Fund Projects by the USA are in operation in various ICAR institutes and SAUs. Indo-China workplan for co-operation in the field of agriculture was also signed. Twenty slots for training Indian scientists in various disciplines were signed under the Colombo Plan under Indo-UK collaboration. Other countries actively seeking India's expertise in agriculture for mutual benefit are Mongolia, Syria, Arab Republic of Emirate, Bangladesh, Nepal, Bulgaria, Mauritius, the Philippines, and Iran. A workplan between the ICAR and the Rockfeller Foundation of the USA was signed for promoting rice biotechnology.

Publications and Information

Two quarterly newsletters were added during the year to the 9 periodicals already being published by the Publications and Information Division of the ICAR. These are *ICAR Reporter* and *ICAR News*. The former is acting as a bridge to close the communication gap between the ICAR headquarters and its institutes, whereas the latter disseminates activities and achievements of the National Agricultural Research System in science and technology. The Publications and Information Division also supported actively the newly started reforms in administration and management system of the ICAR by publishing the *Revised Rules of Technical Service, Delegation of Powers, Mandates of ICAR Institutes* and other publications. A process of revamping the Publications and Information Division of the ICAR through modernization and adoption of new information and communication technologies was also started.

Reforms

The National Agricultural Research System (NARS) of India has so far served our nation well in order to meet the food needs of ever-growing population. Now is the right time for revamping the system so as to re-orient it to meet the increasing internal and global challenges. To exist as a forceful orgnization, we will have not only to compete but also attain the required excellence in frontier agricultural technologies. We now need to have perspective planning and policy directions for the next 25 years to ensure better output, visibility and sustainability. A document on 'Perspective Plan of Research till 2020 AD' is under preparation. A National Agricultural Technology Project with an outlay of Rs 8,000 million with World Bank assistance was initiated. A committee under the chairmanship of Dr S.S. Johl, former Chairman, Agricultural Prices Commission, was constituted to devise suitable guidelines for undertaking partnership, resource generation, training, consultancy, contract research/contract service, and incentives and reward systems.

The on-going efforts to liberalize policies, rules and regulations to facilitate globalization of agriculture, formation of World Trade Organization (WHO) and opening up of markets require fresh initiatives to have a new Agricultural Policy and Plant Variety Act. This is an indication of change for the better. The new wave of change has already started. Indian agriculture has all the advantages of capitalizing on the new opportunities of globalization. We have good cultivable land, agroclimatic conditions, trained scientific and development-related manpower, required infrastructure for input generation, hard-working farmers, committed NGOs, innovative private sector as well as cheap labour.

The ICAR is aiming to grasp this golden opportunity to capitalize on our strengths and to indicate appropriate actions to overcome our deficiencies. Also we intend to strengthen our market intelligence studies and the international co-operation. Time is ripe for an aggressive approach and see no reason why we cannot be competitive to take advantage of globalization process in the world of agriculture. This annual report of the Council provides an insight into various programmes and activities undertaken during 1994-95.

ADMINISTRATION AND FINANCE

In administration, the Director-General is assisted by the Secretary (who is also the Joint Secretary to the Government of India in the DARE), Directors of Personnel, Finance and Works, and other administrative officers and staff at different levels. The Joint Secretary (Finance) in the DARE is also the principal financial adviser in matters of finance of the ICAR. In matters relating to publications, publicity and information, the Director-General is assisted by a Director (Publications and Information).

Reservation of Posts for Scheduled Castes and Scheduled Tribes

The following are the reservations in force in respect of scheduled castes/scheduled tribes in filling up vacancies.

Recruitment	Scheduled castes	Scheduled tribes
Direct recruitment on an all-India basis:		
a) by open competition	15%	7.5%
b) otherwise than at (a) above	16.66%	7.5%
Direct recruitment to Group C and Group D (Class III and IV) posts normally attracting candidates from a locality or a region	Generally in proportion to the population of SC and ST in the respective states/territories	

These reservations have been made applicable to the ICAR and its research institutes and centres. The position regarding the percentage of scheduled castes and scheduled tribes in the ICAR headquarters and its research institutes/national research centres/project directorates is indicated below :

Category of posts	Scheduled castes (%)	Scheduled tribes (%)
Scientific	6.25	0.60
Technical	17.9	5.02
Administrative posts (excluding *safaiwala*)	1.7	5.6
Supporting staff	25.2	4.9
Auxiliary	0.11	6.5

The position regarding reservation of posts in the category of scheduled castes is satisfactory except in scientific posts. This is because scientific posts for conducting research or for organizing, guiding and directing research are exempted from the purview of reservation orders. The Indian Council of Agricultural Research has made specific provisions for scheduled castes and scheduled tribes in scientific posts in consonance with the social commitment of the Government, but it is not possible to make up the backlog because each scientific position in the system has specific qualifications, both at the M.Sc. and Ph.D. levels, along with the experience relevant to the job to be handled, and it may not be desirable to keep the scientific posts vacant for very long time as this will hamper research.

A statement showing the total number of employees in the ICAR and its research institutes and the number of scheduled castes and scheduled tribes among them is given in Appendix 17.

Progressive Use of Hindi

Since the ICAR is a registered society, the Official Language Act, 1963 and the Official Language Rules, 1976 were not applicable to the ICAR. However, in the wider interest of the nation, they have been adopted by the ICAR with the approval of the Governing Body and in addition to 24 of its institutes, the headquarters of the ICAR has also been notified in the gazette of India under Rule 10(4) of the above said Rules and 4 sections, viz., Personnel-II, IA-IV, Establishment-V and General Administration-I, have been specified under rule 8(4) of the above Rules for doing their cent per cent work in Hindi. Similarly, 2 sections each of the Central Institute of Fisheries Education (CIFE), Bombay, 5 sections each of the Indian Agricultural Research Institute (IARI), New Delhi, and Indian Agricultural Statistics Research Institute (IASRI), New Delhi, and 7 sections of the National Bureau of Plant Genetic Resources, Pusa, New Delhi, have also been specified under Rule 8(4) for the same purpose.

The Joint Implementation Committee of the Department of Agricultural Research and Education (DARE) and the ICAR constituted under the Chairmanship of the Joint Secretary, DARE/ICAR is meeting every quarter regularly. Instructions have been issued to all the institutes for similar action and 46 institutes have so far constituted such committees and are holding their meetings regularly. Remaining institutes have also been asked to do so.

Rosters have been prepared to impart Hindi training to the non-Hindi knowing officers and staff, typists and stenographers and they are being

deputed for training in respective classes in a phased manner.

Posts of 30 Assistant Directors (OL) and 75 Hindi Translators have been provided to various institutes for the implementation of the OL (Official language) policy. Similarly, the DG ICAR has sanctioned Hindi posts for the ICAR headquarters, for the same purpose. Necessary action has been initiated to fill up these posts.

The Hindi Week was celebrated during 14-19 September 1994 in the ICAR and its institutes. In a printed message issued on this occasion, the Hon'ble Agriculture Minister appealed to all the officers and staff of the ICAR to strictly adhere to the Official Language Policy and ensure compliance of the statutory provisions related to it. Cash awards were given away to the officers and staff for doing maximum possible work in Hindi and it was pledged to use Hindi to the maximum possible extent in official work in a meeting held on this occasion.

The Director (Hindi) visited a number of the ICAR institutes to review the progress made and ensure compliance of the Official Language Policy of the government and to provide guidance in this regard. He also represented the ICAR before the Committee of Parliament on Official Language during their visits to the ICAR institutes and their offices.

"*Rajbhasa Shield*" and "*Commendation Certificate*" were awarded to CMFRI, Cochin (Kerala), and CIHNP, Lucknow (Uttar Pradesh), respectively, by the Regional Official Language Implementation Committee during 1994-95 for excellent work done in Hindi, while "*Chal Vaijayanti*" (Rolling Shield) was awarded to NAARM, Hyderabad, by the City Official Language Implementation Committee, Hyderabad.

Keeping in view the importance of implementation of the Official Language Policy in the ICAR, an apex body of agricultural research and education in the country, a separate Hindi Salahakar Samiti has been constituted under the chairmanship of the Hon'ble Minister of Agriculture to suggest ways and means for proper compliance of the policy. The first meeting was held on 12 December 1994.

Vigilance

The Secretary, ICAR, and Joint Secretary, DARE, functions as Chief Vigilance Officer (CVO) in respect of the ICAR employees. The Chief Vigilance Officer is assisted by Director (DARE), who also functions as Director (Vigilance), Under-Secretary (Vigilance) and Desk Officer (Vigilance). During the year disciplinary cases against 20 scientists and 15 staff members of Administrative (Technical category) were initiated. Out of these, 1 case culminated into imposition of a minor penalty and in 1 case charges were dropped. In addition, out of 57 cases initiated during the previous years, major penalty in 3 cases and minor penalty in 6 cases were imposed during the year, besides dropping of disciplinary proceedings in 6 cases.

Appeals/review petitions in respect of 17 disciplinary cases, were received and 10 cases received during earlier year were taken up. Out of these 27 cases only 17 cases were finalized resulting into enhancement of penalty in 2 cases, reduction of penalty in 1 case and exoneration in 1 case.

During the year, disciplinary proceedings were initiated against 4 Scientists and 2 Administrative/ Technical staff. One case of major penalty initiated during earlier years culminated in imposition of major penalty. Similarly, 1 case of minor penalty culminated in imposition of minor penalty, whereas 1 more minor penalty case was dropped. Further, 2 appeals against earlier penalty orders were rejected. In addition to the above, 11 enquiries for major penalty action and 2 for minor penalty are in progress.

Financial Outlay

The Ministry of Finance approved the following Budget Grant for the Indian Council of Agricultural Research as reflected in Demand No. 3-DARE.

The total allocation of Rs 473.50 crores for 1994-95 was significantly higher by Rs 46.60 crores than the allocation for 1993-94.

The ICAR is allowed to utilize its internal resources such as revenue receipts and recoveries of loans and advances for meeting the Non-Plan expenditure. These are taken into account for formulating the Non-Plan budget.

(Rupees in crores)

S. No.	Item	Budget estimates 1993-94	Revised estimates 1993-94	Budget estimates 1994-95
(i)	NON-PLAN (excluding A.P. Cess Collections)	163.15	192.95	184.80
(ii)	PLAN	249.75	249.75	274.70
(iii)	A.P. CESS COLLECTION	14.00	14.00	14.00
	TOTAL (i to iii)	426.90	456.70	473.50

The break-up of the ICAR's internal resources available as additional resources for 'NON-PLAN' expenditure are given below:

Resources for Non-Plan Expenditure	Budget estimates 1993-94	Revised estimates 1993-94	Budget estimates 1994-95
(i) Revenue receipts *Income from interest on short-term deposits of surplus funds in SBI as per Ministry of Finance instructions	9.50	10.00 *5.66	10.50
(ii) Recoveries of loans and advances	3.00	3.00	4.00
Total (i to ii)	12.50	18.66	14.50

The Budget estimates were approved by the Standing Finance Committee on 30 March, 1994 and the Governing Body on 30 March, 1994.

Audit Observations

A total of 2,992 Audit Reports with 1576 Audit Paras relating to 83 ICAR institutes, including its Hqrs. office, were outstanding as on 31.3.95. The zone-wise break-up details of the outstanding Audit Reports/Audit Paras are as given below:

S. No.	Name of Zone	Number of institutions	Number of Audit Reports	Number of paras
1.	West Zone	8	32	206
2.	South Zone	26	86	256
3.	East Zone	12	67	269
4.	North Zone	37	107	845
	Total	83	292	1576

2. Directors/Project Directors of the variou institutes/NRCs/PDs have been urged to take u clearance of the pending Audit Reports/Paras o priority basis.

Awards

In order to give incentive to scientists and t encourage them for conducting outstandin research in the field of agriculture, carry cas prizes, certificates, citations and scrolls of honour The details of these awards for 1994 are given i Appendix 19.

Agricultural Scientists Recruitment Board

1. *Agricultural Research Service Examination/ National Eligibility Test - 1992:* The result o ARS Exam./NET-1992, which was conducte in October 1993 for filling up 332 vacancies fo Scientist Grade I of ARS, was declared by th Board in September 1994.

   On the basis of written examination an viva-voce a total of 263 (208 General, 46 S and 9 ST) candidates were finally selected; 52 candidates (453 General, 60 SC and 10 ST were found qualified for NET. The result of ARS was sent to the ICAR for making appointmen of selected candidates to ARS. NET certificate were issued to all candidates who qualified th National Eligibility Test and the list o successful candidates was also forwarded t various State Agricultural Universities for thei record. It is pertinent to mention that the ARS Exam. 1992 was a special drive to recruit ARS scientists for the ICAR institutes located i difficult and far-flung areas of the country. As such, the vacancies were also notified Institute wise and discipline-wise.

2. *Agricultural Research Service/Nationa Eligibility Test/Senior Research Fellowshi Examination - 1994:* The Agricultural Scientist Recruitment Board (ASRB) conducted Combined Competitive Examination for fillin up vacancies of Scientists of the Agricultura Research Service (ARS) in the pay scale o Rs 2200-4000 in the ICAR Institutes combine with National Eligbility Test (NET) fo recruitment of Lecturers and Assistan

Professors by the State Agricultural Universities (SAUs) and for award of Senior Research Fellowship from 16-19 October 1994 at 24 Centres in India. In all, 8,756 candiates applied under various professional subjects, out of which 4,266 candidates appeared. Reservation for OBC candidates has also been given in ARS for the first time. The viva-voce of ARS candidates, who secured the minimum qualifying marks in the professional papers, started on 2 March 1995 and continued beyond 31 March 1995.

3. *Direct Recruitment by Advertisements*: The ASRB issued 3 advertisements during the period under report.

These advertisements included 48 Scientific posts, 4 Technical posts, 1 Administrative post and 2 Auxiliary posts as per details given below :

(i)	Deputy Director-General and Directors of National Institutes (Rs 7600/- fixed)	2
(ii)	Assistant Directors-General, Directors of Institutes, Project Directors and Joint Directors of National Institutes (Rs 4500-7300)	17
(iii)	Project Co-ordinators and Zonal Co-ordinators (Rs 4500-7300)	18
(iv)	Heads of Divisions/Regional Stations (Rs 4500-7300)	11
(v)	Technical Posts	4
(vi)	Auxiliary	2
(vii)	Administrative	1

The Board conducted interviews for 120 posts during the period under report and forwarded the recommendations to the ICAR. The details of these posts are given below :

(a) Scientific	Pay Scale	No. of Posts
(i) Deputy Directors-General/Directors of National Institutes	Rs 7600/- (fixed)	4
(ii) Directors/Joint Directors of National Institutes/Assistant Directors-General/ Project Directors	Rs 4500-7300	19
(iii) Zonal Co-ordinators/ Project Co-ordinators	-do-	12
(iv) Heads of Divisions	-do-	81
(b) Technical		
(i) T-6	Rs 2200-4000	1
(ii) T-8	Rs 3000-5000	1
(iii) T-9	Rs 3700-5000	1
(c) Auxiliary	Rs 3000-4500	1
	Total :	120

A summary of this statement is presented below :

(i)	No. of posts for which interviews were held during the period	120
(ii)	Total No. of candidates applied	1 471
(iii)	No. of candidates called for interview after screening	870
(iv)	No. of candidates actually appeared for interview	571
(v)	No. of posts reserved for SC candidates	1
(vi)	No. of candidates selected from SC candidates	1
(vii)	No. of posts reserved for S.T. candidates	-
(viii)	No. of S.T. candidates selected	-

In addition, there were 9 posts where no candidate was found eligible at the screening stage itself. One post was withdrawn by the ICAR.

4. *Assessment/Review Assessment/Induction*: Twelve cases of scientists at various levels were assessed during the period. Two cases of assessments were also reviewed during the period. Three cases of induction were considered during the period under report and recommendations sent to the ICAR. Out of these, 2 cases related to Research Management Position and one to 'S' grade.

5. *Examination for Administrative Posts:* During the period under report, the following administrative examinations were conducted/ notified to fill up the posts of Administrative Officers, Finance and Accounts Officers, Section Officers and Assistants.

A. Combined Competitive Examination for Recruitment of Finance and Accounts Officers and Administrative Officers: A third All-India Competitive Examination for recruitment to the posts of Finance and Accounts Officers and Administrative Officers in the pay scale of Rs 2200-4000 was conducted from 16-19 June 1994, at 6 centres for filling up 9 posts (2 General, 4 SC and 3 ST) for Finance and Accounts Officers and 12 posts (9 General, 1 SC and 2 ST) for Administrative Officers.

In all 5,800 candidates applied for the examination, out of which 1,310 finally appeared. A total of 105 (85 General, 17 SC and 3 ST) candidates qualified in the written examination and called for interview. Two lists were prepared by the Board in order to merit for both the categories and forwarded their names to the ICAR for appointment as under:-

S.No.	Name of the post	General	SC	ST	Total
1.	Finance & Accounts Officer	2	4	1	7
2.	Administrative Officer	9	1	2	12

The result was sent to the ICAR on 10 January 1995.

B. Limited Departmental Competitive Examination for Recruitment of Section Officers at the ICAR Headquarters : A limited Departmental Competitive Examination for recruitment to the post of Section Officers in the pay scale of Rs 2000-3500 for filling up 6 vacancies (3 General and 3 ST out of which one was inter-changeable with SC candidate) was conducted from 6 to 10 February 1995. Twenty-five candidates applied for the examination and 14 finally appeared. Five candidates (3 General, 1 SC inter-changeable with ST and 1 ST) were declared successful. The result was sent to the ICAR on 28 April 1995.

C. Limited Departmental Examination for Recruitment of Assistants at the ICAR Headquarters : A limited Departmental Competitive Examination for filling up 11 vacancies of Assistants (8 General, 2 SC and 1 ST) in the pay scale of Rs 1400-2600 was conducted by the Board on 16 and 17 January 1995. Out of the 27 candidates, who applied for the examination, 20 finally appeared. Candidates were recommended to the ICAR for appointment, as per the applicable reservations for all the 11 vacancies.

6. *Revision of Syllabus for ARS/NET/S examinations:* A massive exercise w undertaken for revising and updating t syllabus for ARS/NET/SRF examinations the 65 disciplines. Suggestions and views we sought from various experts of all disciplin under ARS/NET/SRF for developing comprehensive syllabus for each disciplir Subsequently, core groups were constituted discuss and revise the syllabus for all the disciplines based on the suggestions receiv from various sources. The Board successful completed this marathon job, and syllabi of a 65 disciplines were given a modern and update shape. The ARS/NET/SRF Examination - 199 has been conducted on the basis of revise syllabus. Publications Division, ICAR, has bee requested to publish a booklet containin syllabi of all 65 disciplines which is propose to be circulated to State Agricultura Universities/Deemed Universities and the ICA Institutes for the guidance of students prespective candidates for ARS/NET/SR examination.
7. *Functional and Finance Autonomy :* Based o the recommendations of G.V.K.Rao Committe which were accepted by the President, ICAR ASRB has been allotted a separate budge under Non-Plan and Plan with effect fro 1.1.95. This has considerably facilitated th Board in planning and executing it programmes.
8. *Research and Analysis Wing :* Since one of th activities of the ASRB is to continuously monito the performance of the scientists related t productivity in their area of specialization, has been decided to set up a Research an Analysis Cell which will maintain a Personn data base of all the scientists, periodical update them and study their performanc Further, based on analysis of the youn scientists entering the ARS, it will be able t draw conclusions on the quality of trainin provided by specific institutions, which wi ultimately help to improve the training an curriculum of the universities. The Cell wi also be helpful in planning Human Resource Development Programme of the Nationa Agricultural Research and Education Syste

and encompassing the State Agricultural Universities and the ICAR.

9. *Assessment Committees for Technical Personnel under Rule 6.6 and 6.7 of the ICAR Handbook of Technical Service Rules:* The Chairman of ASRB constituted 108 Assessment Committees under Rule 6.6 of *The ICAR Handbook of Technical Service Rules* for categories I and II for the ICAR Institutes/Headquarters and nominated 214 experts to act as Chairman on the Assessment Committees for merit promotions/grant of advance increments for the technical personnel. Similarly, Chairman, ASRB, constituted 47 Assessment Committees under Rule 6.7 of *The ICAR Handbook of Technical Service Rules* for category III and nominated 89 experts to act as Chairman and 145 experts to act as Members on the Assessment Committees for merit promotion/ grant advance increments for the technical personnel.
10. *Career Advancement of ARS Scientists :* As a follow up action on the adoption of the UGC pay package for the career advancement of ARS scientists, the Chairman, ASRB, nominated 161 experts to act as Chairman on the Departmental Promotion Committees of the ICAR Institutes/Headquarters for assessing the cases of scientists for promotion to the next higher grade.
11. *Data Base of Experts :* The Board has compiled a data base of experts with their macro/micro specialization and the field of their persuit in all the disciplines of Agricultural Sciences—Plant Sciences, Animal Sciences, Physical Sciences, Social Sciences, Engineering and Technology, etc. The services of these experts are utilized by the Board for its various Selection/Assessment Committees. During the period under report services of 555 experts of various disciplines were utilized.
12. *Physical Facilities Developed :* To improve the working conditions and make ASRB a most modern and efficient organization a number of physical facilities have been improved/ developed in the Board which include renovation and furnishing of 2 Interview rooms, 1 Committee room, which serves as a multi-purpose room for meetings and other examination work.
13. *Computer Facility :* To carry out various functions in the Board effectively and efficiently it has been decided to develop a multicomputer system linked through LAN (Local Area Network). Two Desk Top Printing Units (DTPUs) will also be added to the system to facilitate production of professional documents that can be easily reproduced for examinations and other purposes.

    To start with computers, 4 PCs have already been procured in the office for the use of Senior Officers.
14. *Analysis of the ARS/NET Examinations :* For the first time the Board attempted to critically analyse the results of ARS/NET examinations to identify the trends of the successful candidates and the institutions they studied. This information has been circulated to Vice-Chancellors of various agricultural universities to help them in evaluating their own programmes, identifying deficiencies and make improvements, wherever necessary.

(R.S. Paroda)