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भाकृअनुप
ICAR

Indian Council of Agricultural Research
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Indian Council of Agricultural Research

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Foreword

Agricultural research has the power to decide the course of agriculture and concurrently of India. After realizing the potential of agriculture in changing socio-economic condition of millions of Indian, it has been considered one of the central elements of the planning efforts in the 11th Five Year Plan. It is widely accepted that concomitant with high growth rate in our economy, agriculture must grow at 4%. Improvement in productivity is the most important option to raise production. During the current year thrust has been on developing techniques for productivity enhancement through hybrid technology, genetic modifications, precision farming, and addressing concerns of entire value chain.

Efforts of ICAR scientists resulted in overall development of agricultural research. Accessions (12,607) of crops and their wild relatives were collected; 70 varieties and hybrids of crops were identified for release. During the year 5,026 tonnes of breeder seeds of major crops have been produced. A user-friendly, window-based and easy to access software Micro NBAIM was developed for digitization of microbial data available at the National Bureau of Agriculturally Important Microorganism. Endophytic bacteria *Bacillus* spp, *Erwinia herbicola* and *Enterobacter agglormerons* have been isolated for the first time from the healthy chickpea. A National Pesticide Residue Monitoring Project has been launched through the AINP on Pesticides. A prototype disease forecasting software for powdery mildew management in grape was developed. Brinjal genotypes were used for regeneration and transformation. A highly sensitive PCR technique was developed to detect potato leaf curl. High-yielding triploid hybrids of cassava were recommended for industrial areas of Tamil Nadu. Organic farming of elephant-foot yam gave higher corn yield. Pusa Gaurav rose was found best for cut flower production. Aluminium sulphate along with sucrose increased vase-life of roses. Aromatic crops in arecanut garden were more remunerative. A technology for making window shades from oil palm frond rachis was standardized. Black peppers stored in vaccum showed good quality even after 8 months of storage. Sequence analysis has confirmed the identity of virus causing mild chlorotic mottle and streaks on leaves of vanilla. Minimum tillage with crop residue treatment proved beneficial in conserving natural resources and increasing productivity under rainfed conditions in Doon Valley. In Western Rajasthan, surface run-off and soil loss due to water erosion could be reduced with the help of grass barriers (*Veteveria/ Saccharum/ Cenchrus/ Dichanthium*). Resource conservation technologies, viz. double no-till, leaf colour chart and brown manuring, were found effective in increasing profitability of rice-wheat system. The impact of water harvesting and recharge filters in Antisar Watershed, Vasad (Gujarat) was enormous and resulted in mitigating drought impact, and in improving crop productivity. A low energy water application technology was developed specifically for small farm holder and close growing crops. Bio-drainage species of *Acacia* and *Casuarina* can be grown for reclamation of waterlogged wasteland.Drought tolerance was enhanced in greengram through *in vitro* shoot regeneration.

Basic data on production traits and physical characterization was completed on several cattle, sheep, goat, and poultry. Kenkatha cattle was identified as a valuable source of genetic material for meeting demands of future breeding programmes. Under *ex-situ* conservation programme a model was developed for conservation of indigenous cattle in *gaushalas*. Species specific molecular markers were developed for use in wild life forensic. Under synthesis breed development programme cloned buffalo embryo were produced from nucleus transfer of somatic cells.

Breeding efforts improved the productivity of cows, buffaloes, sheep and goats. In poultry birds fertility, hatchability and survivability till laying improved over the preceding generations. Krishibro broilers has become popular for intensive farming on low input, in areas having demand for colour broiler.

H5N 1 strain of influenza A virus was detected in poultry for the first time in country, and a suitable vaccine was also developed. *In-ovo* vaccination in broiler chickens was standardized. Thematic maps depicting district-wise information on feed and livestock resources were prepared. Supplementation of 2% activated charcoal in the diet of lactating cattle reduced residual pesticide in milk. Efforts are being

made to produce designer egg through nutritional manipulation of diet. Embryos of transferable stage were successfully produced using oocytes derived from *in-vitro* grown prenatal follicles—apparently first report in buffaloes. First yak calf was born through embryo transfer technology. A test was developed for detecting adulterations of milk with synthetic milk by testing detergent in milk. Herbal ghee was prepared; it has sensory response similar to market ghee.

In marine sector, nearly 77 species of non-conventional deep-sea demersal finfishes, shell fishes and other organisms were recorded. Indian mackerel showed signs of recovery from the progressive decline in catches experienced since 2001.Under inland sector, different management practices were suggested for each zone in the river Ravi vis-à-vis fishery restoration due to the impact of changes in water flow. Mabe pearl production technology was extended to the blacklip pearl oyster *Pinctada margaritifera*. DNA barcodes of 32 marine fish species was prepared for the first time in India. The gasification of jute caddies briquettes may provide a new avenue for cogeneration of heat and power to meet industrial need by waste recycling and management. A prototype of an improved 45 saw ginning machine was developed. Educational Technology Cell at ANGARU, Rajendranagar, first of its kind in the country, was inaugurated. Placement of the passed-outs in Dairy Technology and Food Technology was 100%, Engineering and Technology 90% and a spectacular increase was observed in placement of students of Agriculture and Home Science. Bilateral collaborative programme was established between TANUVAS and Michigen State University, USA.

Study on seed system revealed that proper farm level seed management and supply chain could fulfill the quality seed requirement. The information and communication technology (ICT) saves 90–95% farmers time as well their money spent on acquiring agricultural technology information. A method was developed for estimating acreage under important crops in difficult terrains of Meghalaya. Role of balanced nutrition in long-term sustained productivity was studied. Efforts have been made to identify available farm technologies/ programmes/ policies from women perspective. A training module for gender sensitization in agriculture was prepared.

Activities organized at KVKs were—frontline demonstrations, training programmes for farmers, skill-oriented programmes for rural youth and in-service personnel; creating awareness about improved agricultural technologies; production of seeds, biofertilizers, biopesticides, baculoviruses, neem oil and bioagents for availability to the farmers.

At the ICAR Research Complex for NEH Region, Umiam, climatic atlas was prepared covering all growing seasons. Abbot, a kiwi fruit variety was propagated in Sikkim and Arunachal Pradesh. At Vivekananda Parvatiya Krishi Anusandhan Sansthan, Almora, a low cost light trap was designed for efficient mass trapping of White grubs. At the Central Agricultural Research Institute, Port Blair, Plant growth promoting *Rhizobacteria* (PGPRs), i.e. *Pseudomonas* spp and *Bacillus* spp were isolated and characterized biochemically. Turkey birds were found highly suitable under hot and humid climate of the Islands ecosystem. The Council has taken several initiatives to improve working environment and to make research effective, efficient and relevant. During this year, 57 awards have been conferred,and out of 42 scientists, there are 11 women scientists and one farm woman. DARE/ICAR signed a Memoranda of Understanding between the Republic of India and Republic of Uzbekistan and Republic of Argentina in the field of Agricultural Research and Education. Work Plans were signed between ICAR, and European Union, Dubai etc. during 2006–07, and were implemented during the reported period. DARE/ICAR has signed Collaborated Projects. First edition of *Handbook of Fisheries and Aquaculture*, which fulfilled the long felt need of handbook in fisheries sector, was released.

Realizing the vital importance of a visionary approach to planning process, the Council has developed Perspective Plan–2025 individually for all of its 95 institutes/ NRCs/ Directorates/ Bureaus. The Governing Body of the ICAR Society approved the ICAR Guidelines for Intellectual Property Management and Technology Transfer/ Commercialization. The Indian Council of Agricultural Research in its endeavor to accomplish set target has moved quite forward, and the *DARE/ICAR Annual Report 2006–07* provides the necessary information on its achievements. I hope the agricultural policy makers and planners will find it useful.

(SHARAD PAWAR)
President, ICAR Society

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The Mandate of the Indian Council of Agricultural Research

(i) To plan, undertake, aid, promote and coordinate 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 fields 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 the universities.

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