



# Agricultural Human Resource Development

A mutually shared goal and commitment on improving the agricultural education binds the ICAR, State Agricultural Universities and other institutions together in a close professional relationship. Strengthening and development of agricultural education is being done primarily to make agricultural education better through Centres of Advance Studies, professional chairs, infrastructure upgradation, faculty competence building, scholarships to students, and their practical training in laboratory and real life field situations.

## CAPACITY DEVELOPMENT

### State agricultural universities

*Chaudhary Charan Singh Haryana Agricultural University, Hisar:* The recommendations made by a Committee headed by Dr A. L. Chaudhry (formerly Chairman ASRB) have been implemented. Accordingly, necessary reorientation and adjustments have been made to avoid duplication across faculties and colleges. Not only the courses have been restructured but also the research programmes have been revamped and surplus staff redeployed to enhance efficiency of inputs and effectiveness of their output. Workload of teachers was reviewed and revised. In order to better curricular delivery, the faculty prepared and published 20 manuals for practical aspects of education and skill development. Faculty members received partial or full financial support to participate in international and national conferences/seminars/workshops and training programmes. Additionally, 238 faculty members received refresher training in diverse subjects of teaching in agriculture and allied subjects.

- With the new arrangement, every Professor is required to teach at least one UG course during a calendar year. The practical component across degree programmes has been strengthened and facilities provided in terms of laboratory supplies and repair and replacement of old equipments.

The University organized an All-India Interstate Agricultural University Festival. More than 600 participants from 25 SAUs participated in this 4-day mega-event to foster deeper understanding of diverse cultures, inculcating a spirit of national integration.

A series of training programmes were organized to improve student communication skills and personality development. During the year, laboratories, library and instructional farms were strengthened to build practical training, a strong component of teaching and learning. As a consequence of distinct emphasis on skill improvement, 115 graduates got placements through campus interviews.

*Bidhan Chandra Krishi Viswavidyalaya, Mohanpur:* In order to bring overall academic improvement, the existing laboratories were renovated and developed with all modern equipments and infrastructures. All the departments were linked by establishing Local Area Network (LAN) and also making Agricultural Research Information System (ARIS) operational through internet connectivity. A Mustard Oil Producing Plant has been established under the Revolving Fund Scheme. This facility apart from producing good quality mustard oil and revenue for the University would also be utilized for training of students and small-scale private entrepreneurs.

*Chandrashekhar Azad University of Agriculture and Technology, Kanpur:* Some significant achievements of the university have been:

- Admissions in the newly established Departments of Forestry, Agri-Business Management and Vegetable Science in the College of Agriculture were made for the first time.
- Post graduate teaching in three new departments viz., Home Science Extension Education, Human Development and Clothing and Textiles in College of Home Science began during 2002-03 session.
- On the basis of number of students selected for ICAR JRF, CSUAT ranked fifth on the all-India basis.
- College of Agriculture organized three training programmes on mushroom production, multimedia and integrated pest management.
- During 2002-2003, 34 graduate and postgraduate students were selected by private firms through campus interviews organized by the Directorate of Placement.
- Two Assistant Professors in the Department of Plant Pathology have been awarded with the Young Scientist Award by UPCAR, Lucknow for her outstanding contribution in the field of Plant Pathology.

*Chaudhary Sarwan Kumar Himachal Pradesh Krishi Vishwavidyalaya, Palampur:* In its silver jubilee year, the University has released 15 varieties of different crops for the farmers of Himachal Pradesh. A building named Trilokinath Bhawan was inaugurated for the benefit of



farming community of the area. Five regional Research and Extension Centers viz., Hill Agricultural Research and Extension Centre, Dhaulakuan, Hill Agricultural Research and Extension Centre, Bajaura, Highland Agricultural Research and Extension Centre, Kukumseri, Mountain Agricultural Research and Extension Centre, Sangla and Shivalik Agricultural Research and Extension Centre, Kangra were established during the year under report.

*Govind Ballabh Pant University of Agriculture and Technology, Pantnagar:* The University has taken up coordination of RAWE activities with stress on overall development of women. Propelled and facilitated by faculty and students, 60 Self Help Group (SHG) were constituted. Renovation of PG lab for the students/scientists in the department of Aquaculture was undertaken during the year. University established Model Circulatory Hatchery for the experimental trials by students on fish breeding and seed production. During the year, more than 90% of the final year B. Sc. students were selected for ICAR – JRF on all-India basis competitive examination.

*Gujarat Agricultural University:* The University implemented the recommendations contained in the third Deans Committee Report for bringing uniformity in admission procedures and course curriculum with other SAUs. It also introduced Common Entrance Test for admissions at M. Sc. and Ph.D. levels and established new departments of microbiology, tissue culture, biotechnology and computer application. For enhancing the scope and facilities for literature search, library was upgraded in terms of books, journal, networking for online access, digitization etc.

*Kerala Agricultural University, Thrissur:* The PG programme on Forest Management and Utilization was started at College of Forestry, Vellanikkara, Thrissur with two seats. In addition, the CPBMB, College of Horticulture, Vellanikkara, Thrissur received the Biotech Product and Process Development and Commercialisation Award for the year 2003.

- The Kerala Agricultural University ranked first by securing 61 JRF in the All-India Examination held in Agriculture and allied subjects to fill the 25% seats through a combined entrance examination conducted by the ICAR in 2002.

*Maharashtra Animal and Fishery Sciences University, Nagpur:* The MAFSU has established under Prime Minister's Jai Vigyan Technology Mission the country's first Veterinary Nuclear Medicine Centre at the Bombay Veterinary College to facilitate research in new drug development, drug delivery, radio-pharmaceuticals and new prosthesis.

A pilot project to develop training modules and the software has been taken up with financial support from 'Commonwealth of Learning', Canada to produce IT-

enabled continuing education material for field veterinarians.

The University has developed software (Breed Com) for breed herd registration in collaboration with a private industry. As a part of educational strengthening programme, with the funding under NATP I, the University has taken up an intensive programme for library modernization and automation and also provided internet facilities to the students and teachers for global interaction and documentation.

The prestigious Jawaharlal Nehru Award for Post Graduate research for the year 2002-2003 was awarded to Dr M.D. Deore, Assistant Prof., Department of Pharmacology at BVC, Mumbai. The Vasantao Naik Smruti Pratishthan Award for the year 2002 was awarded to Dr N.P. Dakshinkar in recognition of his significant contribution in Animal Sciences.

*Narendra Dev University of Agriculture and Technology, Faizabad :* The university established a College of Agricultural Engineering and Technology. The admissions were made and teaching of first batch of B. Tech. Programme has already started at the main campus at Kumarganj from July 2003 with 30 students.



Ninth Convocation of NDUAT held on 8 March, 2003

*Punjab Agricultural University, Ludhiana:* The PAU revised the B.Sc. Home Science (Hons) curriculum in accordance with the guidelines of ICAR and introduced a new M. Sc. programme in Post-Harvest Technology. During 2002-03 a total of 747 students were admitted to undergraduate, postgraduate and diploma programmes and 515 students successfully completed their degrees.

- Besides academics, university students also excelled in various sports and co-curriculum activities. PAU Badminton team (men & women) was the winner of the 4th All-India Inter Agricultural Universities Games for 2002-2003 held at Parbhani, Maharashtra. The students participated in North Zone Inter University Youth Festival at Allahabad University and won third position each in group folk dance, clay modeling and miming events.

A number of faculty members got recognition through prestigious awards and honours at National / International levels. The notable ones included



membership of World Food Prize Nominating Academy for 2003 by World Food Prize Foundation Iowa, U.S.A.; Chairmanship of International Union of Soil Sciences; Fellowship of National Academy of Agricultural Sciences; Visiting Professorship to Hiroshima University; Japan, Rafi Ahmed Kidwai Award; Gurdev Singh Khush Distinguished Professor Award; and Punjab Government *Parman Patars*.

*Tamil Nadu Veterinary and Animal Sciences University, Chennai:* The University offered technical expertise to fish and shrimp farmers in the formation of fish and shrimp farms and their maintenance and disease identification in finfish and WSSV (White Spot Syndrome Virus). Diagnosis in shrimps was done in samples brought by fish and shrimp farmers; and water and soil samples from fish culturists, ornamental fish farmers, sea food processors and industries concerned with environmental management were tested for physio-chemical characteristics on charge basis.

Through the Students Placement and Career Guidance Cell the graduates of TNVASU have been guided for their employment soon after graduation. The Cell has been functioning in this University for the past five years. The Cell also advises and helps the students in their search for higher studies in and out of the country.

*University of Agricultural Sciences, Dharwad:* During the academic year 2002-03, University of Agricultural Sciences, Dharwad admitted 239 students in B.Sc. (Agriculture), 57 in B.V.Sc. & AH, 25 in B.H.Sc., 33 in B.Sc. (Forestry), 34 in Ag. Engineering, 45 in B.Sc. (Horticulture) and 31 in B.Sc. (Ag. Marketing and Cooperation) programmes. In addition, 264 students joined various Master's degree and 58 joined doctoral degree programmes. During the year, 37 postgraduate students and 50 undergraduate students from other States including one from Mauritius were also admitted in various programmes.

Students of the University not only excelled in academic activities, but did well also in co-curricular activities. They participated in the fourth All-India Agricultural Universities Sports and Games Meet held at Parbhani, and in All-India University Debate competitions organized by National Cooperative Union of India at New Delhi, and secured two medals and one prize, respectively.

Dr M.B. Chetti, Department of Crop Physiology, was awarded the J.J. Chinoy Memorial Gold Medal for outstanding research and D Subramanyam Award for being an outstanding teacher. Dr K.A. Kulkarni, Department of Entomology was awarded National Environmental Science Academy Award as Scientists of the year 2002. Dr B.V. Patil was awarded Sir C.V. Raman Award for Young Scientist and Putta Ruddaraiah Memorial National Award for outstanding contribution in the field of Plant Protection. Dr B.M. Khadi was awarded Sir C.V. Raman Award and Dr A.B. Joshi received National Award for outstanding achievements in the field of cotton development. Dr (Mrs.) Sarojini Karakannavar was

awarded Jawahar Lal Nehru Award by ICAR for outstanding Ph.D. thesis.

*University of Agricultural Sciences, Bangalore:* The students of the university performed well in JRF examination conducted by ICAR and secured 46 fellowships. The university had deputed 49 teachers to attend workshops/seminars/training programme within and outside the country. It identified and recognized eight institutes (ICAR and GoI) for PG collaborative research. The training programmes were conducted on-Forestry resource economics, Medicinal and aromatic crops and seed quality testing and marketing for the staff of SAU and ICAR institutes.

## MANPOWER DEVELOPMENT

### Accreditation of Agricultural Universities

In the continuing process of accreditation of 16 SAUs and 3 DUs, the Peer Review Teams visited 7 SAUs and one DU after receipt of their self study report. Six Peer Review Teams have submitted their reports. The comments of the CIFE, Mumbai and KAU, Thrissur on their Peer Review Team Reports have been received from the Director and Vice Chancellor, respectively. NDRI, Karnal and IVRI, Izatnagar have submitted draft of the self study report.

Implementation of UG and PG Curricula and Syllabi, Model Course Curricula and Syllabi of 8 UG and 44 PG Programmes were developed and provided to all SAUs, DUs and CAU along with the academic regulations. Majority of the SAUs and DUs have implemented these courses since academic year 2002-03.

Norms for UG and PG Colleges offering different academic programmes were developed. Details desired by the Sectoral Committee on Norms and Standards about the department, faculty members, building space, equipments, library and quantifiable standard have been obtained from the experts. The reports on Agriculture, Agricultural Engineering, Horticulture, Home Science and Fisheries have been compiled.

### Admission of Foreign Nationals

ICAR jointly with SAUs has developed a strong agricultural education system in the country and is facilitating human resource development by offering undergraduate programmes in 11 major disciplines, and post-graduate and Ph.D. programmes in 65 disciplines to the overseas students. In the year 2003-04, 127 students from 22 countries have been provided admissions in ICAR Deemed-to-be Universities and State Agricultural Universities.

### Summer/ Winter Schools/ Short Courses

To enhance the faculty competence in new and emerging areas as a part of skilled human resource development and recognizing the need for training of large number of scientists, the ICAR over the years has supported substantially increased number of training programmes. This year 90 Summer/Winter School and



Short Courses were organized through which approximately 3000 scientists were trained in diverse subjects of agriculture and related fields. Courses on Biotechnology and Information Technology received

- Efforts are underway to place all the instructional course material on ICAR website. Once operational, this facility will enable both scientists and students to have easy accessibility to the latest literature in the specialized areas of agricultural science and technology

### Summer/Winter Schools and Short Courses Organized

Discipline	Number
Crop Science	14
Natural Resource Management	10
Agricultural Economics	3
Statistics	6
Extension	7
Animal Science	14
Agricultural Engineering	8
Horticulture	9
Fisheries	8
Education and Home Science	11

special preference. Likewise, a course on water quality monitoring and surveillance was a highlight of this year's Summer/Winter Schools.

### All India Entrance Examinations for Agriculture and Allied Science

To reduce inbreeding and enhance a spirit of national integration, Education Division, ICAR conducts an All-India Entrance Examination to admit students across all SAUs, DUs and Central Universities in undergraduate (UG) and postgraduate (PG) courses. Like in the previous years, this year also this entrance examination was conducted in a highly successful and professional manner to fill 15% of the total available seats in ten diverse subject groups of

- For award of NTS based on the students' merit and those desirous of studying in States other than that of their domicile, 218 candidates were recommended for the award

UG programmes including award and selection of candidates for National Talent Scholarships (NTS). Through this combined entrance test out of a total of 12,881 candidates, 970 were admitted. Of these, 52% belonged to rural areas and 48% were from urban areas. Among the admitted candidates, 76% were boys and 24% were girls. For candidates belonging to the SC, ST and

Physically Handicapped category, 15, 7.5 and 3% seats were kept reserved for admissions.

For admissions to 25% seats in postgraduate programmes, 8,786 candidates appeared for the common entrance test. Of these 2,663 qualified for counseling and of which 1,177 were admitted. Four hundred thirty eight candidates were awarded Junior Research Fellowships (JRF). Based on the merit performance of eligible candidates in the All-India Competitive Examination conducted by the ICAR, 202 Senior Research Fellowships were awarded for a period of three years. Among the admitted candidates, 42.5% belonged to rural areas, and 57.5% came from urban territories. The percentage of girl students among the admitted candidates was 24. The Council thus contributed in facilitating multicultural shade in educational institution and provided opportunity to meritorious students for seeking education in an institution of their choice.

### CENTRES OF ADVANCED STUDIES

The 31 Centres of Advanced Studies (CAS), sponsored by the Council, offer facilities for continuing capacity building of faculty engaged in teaching at UG and PG levels. Each Centre conducts at least two trainings each year in the area of its recognized competence and in subjects of topical and emerging relevance. Each training lasts for three weeks and admits 20 participants drawn both from SAUs and ICAR institutes. In all, 62 programmes, conducted during the year, trained 1250 scientists and faculty members in several diverse and upcoming disciplines of agriculture and allied subjects. Following are the major areas in which trainings were conducted:

- Biochemical and molecular techniques for plant pathogen characterization
- Advances in horticulture plant resistance to insects
- Undergraduate teaching of agricultural meteorology
- Emerging trends in medical nutrition therapy
- Breeding plans for genetic improvement of farm animals
- Techniques in biochemistry and molecular biology
- Multimedia teaching of clinical medicine
- Recent concepts in management of diseases of farm animals
- Management of microbes as an instrument of sanitary and phyto sanitary compliance and international livestock trade.
- Efficient designing of experiment and analysis of experimental data
- Impact assessment of technologies for sustainability in agriculture via econometric empiricism

### PROFESSIONAL EXCELLENCE RECOGNITION

#### University Level Textbook Writing

This year six books were completed and sent to DIPA



for publication. Once these publications are available for teaching and learning, these will be a boon for both teachers and taught to impart and gather knowledge, respectively with Indian background, experience and data.

### National Professor and National Fellow

- The report of the Project of the Census of Scientific Manpower in Agriculture undertaken by Dr D Jha revealed that average age of ICAR scientists is now 45 years, and 43% are above the average age. The high average age necessitates induction of young scientists in the research cadre. In ICAR 12% are women scientists. About two-thirds of them are below 40 years of age and only 5% are in 50 to 60 years of age. There are very few women scientists in management positions. Crop sciences (including horticulture) account for about 45% of total scientists. Each institute has on an average 48 scientists.
- Professor Anupam Verma, IARI has developed an *in-vitro* translation system which provides an alternative mechanism of producing such molecules like-trichosanthin, an inhibitor of viruses, and epitopes for vaccine production. Dr Varma has demonstrated that

- Four of the ICAR institutes share about 22% of the total scientific strength, with an average size of about 300 scientists. These numbers suggest the need for some rationalization in allocation of scientists to improve research efficiency. Further analysis has been in progress

sandal spike is caused by a phytoplasma, mango malformation by *Fusarium moniliforme* var. *subglutinans*, brown blast by a viroid and bunchy top by a very small multi component DNA virus. These findings have been very useful in developing diagnostic procedures and management strategies. The other major areas of work relate to viruses transmitted through seeds, which are of considerable economic importance and ecological relevance particularly in grain legumes like urdbean, cowpea, pea, etc. even when present in small amounts (less than 100 ng/seed). Serological and electron microscopical techniques for the detection of viruses like chickpea mottle, cowpea aphid-borne mosaic, cowpea (vein) banding, cowpea chlorotic spot, pea seed-borne mosaic and others in seeds of different grain legumes have been developed, and R-PAGE method developed for detecting viroids in seeds of plant like coleus. These technologies are very useful for the seed industry in producing virus-free certified seeds. Similarly, ELISA based technology has been developed to detect cassava mosaic virus infection even in apparently healthy plants, which are used for propagation. Methods have also been developed to cure the virus-infected seeds of cowpea by heat and chemotherapy.

- Professor B R Yadav at IVRI established a laboratory

genome analysis in Animal Sciences. The outcome of his researches has been: (i) In the DNA repository over 870 DNA samples of different breeds and types of animals from three species has been made. Molecular markers viz. DFP, RFLP, RAPD, and microsatellites and the sequence of primers were selected and synthesized. Methodology was standardized and used in these to characterize various breeds in three species.

- Professor B.P Singh, IVRI developed the first millennium embryo culture chick-2000. He has also reported success in developing the world's first guinea fowl culture chick. The other salient findings in his project include: Development of single stage *ex-vivo*

- Chicken, guinea fowl and turkey chicks were produced using double window embryo culture system and protocols for the above were also developed

embryo culture system, success in developing world's first turkey embryo culture chicks in laboratory, development protocol for single stage embryo culture system to minimize the losses, development of caribro-naked neck (caribro-mritunjai) commercial broiler stock (naked neck), experimental comparison of feed efficiency versus high growth rate selection program in broiler sire line (SG and SF Lines) for 11 generations, introgression of heat tolerant naked neck gene in specialized broiler male and female population, broiler stocks exceeded the targets in performance in term of growth rate, feed efficiency, livability and economic return at home farm, farmers door and at different RSPPT centres.

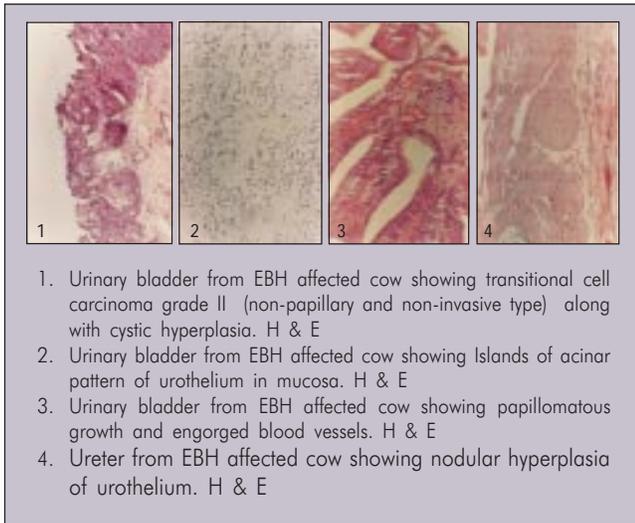
- Dr I.M. Santha, National Fellow, IARI isolated and characterized some of the major genes in the lipid biosynthetic pathway from *Brassica juncea*. Omega-3 desaturase is the enzyme responsible for the conversion of linoleic acid (18:2) to linolenic acid (18:3). Using designed gene specific primers 3 partial cDNA sequences corresponding to three fatty acid desaturase (*fad*) genes namely *fad 3*, *fad 7*, and *fad 8* have been PCR amplified, cloned and sequenced. By screening a cDNA library of *B.juncea* developing seed with *fad 3* cDNA sequence recombinant clones have been identified.

- In the work done by Professor I M Santha, a full length genomic clone corresponding to *fad 7* has been isolated from a genomic library of *B. juncea* prepared in laboratory and characterised along with its promoter sequences.

- The National Fellow Dr R. Somvanshi, IVRI studied etiopathology and development of ameliorative measures in bovine haematuria, and a high prevalence of EBH was recorded in hill cattle in Uttranchal. Young fronds of *O. contiguum* collected from Joshimath,



district Chamoli contained 498.5 mg/kg ptaquiloside. Bracken fern samples collected from Coonor and Kothagiri, Tamil Nadu, Pauri-Garhwal and Phata, Uttranchal revealed 1028, 399, 94.3 and 61mg/kg.



1. Urinary bladder from EBH affected cow showing transitional cell carcinoma grade II (non-papillary and non-invasive type) along with cystic hyperplasia. H & E
2. Urinary bladder from EBH affected cow showing Islands of acinar pattern of urothelium in mucosa. H & E
3. Urinary bladder from EBH affected cow showing papillomatous growth and engorged blood vessels. H & E
4. Ureter from EBH affected cow showing nodular hyperplasia of urothelium. H & E

ptaquiloside, respectively, which was higher than samples collected from Mukteswar (2.55mg/kg). Freeze dried samples of young fronds of *P. squarrosus* collected from Mukteswar and *C. dentata* collected from Izatnagar failed to show ptaquiloside by HPLC method. High level of ptaquiloside showed positive correlation with high incidence of EBH in these areas.

- Professor K. Naskar, CIFRS, Kolkata studied the impact of mangrove ecosystems of the Sundarbans (West Bengal) in estuarine fisheries development with special reference to identification and estimation of different mangroves and algae. On survey of the floral diversity of all the 15 blocks and 71 compartments of the Sundarbans Tiger Reserve, 78 species of mangroves, mangrove associates and back mangroves were encountered. When classified according to Raunkier's Abundance Classes 44.9% of the 78 species belong to Class A, 7.7% of the species belong to Class B, 3.8% of the species belong to Class C, 10.3% of the species belong to Class D and 33.3% of the species belong to Class E. These 78 species were also classified according to their relative abundance.

#### Emeritus Scientist

Eleven diverse species of VAM fungi were screened for their symbiotic efficiency involving two medicinal plants under glasshouse conditions. With plant biomass, P and alkaloid as the criteria, *Glomus bagyarajii* was selected as the most efficient strain for inoculating both *Coleus forskohlii* and *Piper longum*.

- Liming of pepper growing acid soils @ half the lime requirement enhanced the dehydrogenase activity, microbial population and nutrient availability in soil and crop productivity.

- A cost free surge irrigation design was found feasible for cassava, groundnut and cassava-groundnut comrade cropping. On-farm demonstrations proved the simplicity and feasibility of cost-free surge irrigation.

- Of the 28 currently filled positions of emeritus scientists, 5 are in Plant Sciences, 6 in Plant Protection, 5 in Horticulture, 4 each in Natural Resource Management and Animal Sciences, 3 in Fisheries and 1 in Agricultural Engineering

- Fifteen genotypes of boro rice were identified as highly cold-tolerant with more than 90% survival.
- A refined design of manually pulled, walk backward type, pre-germinated paddy seeder for wet field conditions was developed suiting small rice fields of eastern India or of other regions where farmers use animal power and human labour for raising rice crop. The unit weighs 11 kg and costs merely Rs. 750/.

### ALL INDIA COORDINATED RESEARCH PROJECT ON HOME SCIENCE

AICRP on Home Science aims to conduct research in the areas of nutritional security, value addition to low quality fibrous materials, comprehensive childcare and reducing drudgery of farmwomen. Important findings of different scientists in these areas of research were compiled.

#### Sustainable Approaches for Nutritional Security

- A total of 6,387 food samples representing diverse food groups along with water samples were collected from at least three different agro-climatic zones of each state and analyzed for their fluoride content.
- Fluoride content of food sample was generally higher in rural areas compared to that from urban areas. Even among the urban areas, fluoride content was found to be highest in Rajasthan and Himachal Pradesh and lowest in Punjab.
- Within food groups, cereals, pulses and legumes exhibited maximum fluoride content in rural and urban areas of all states. In comparison, nuts and oil seeds from rural areas of Rajasthan had relatively higher fluoride content.
- The fluoride content of water samples in rural and urban areas were highest in Punjab and lowest in Karnataka.

#### Value Addition to Agro and Animal Based Fibres

- Around 1296 fast shades and wide variety of shades that can fill the gaps in the spectrum were produced on wool and silk.
- The dyeing procedure involving thirty-six dyes was standardized for wool and silk. Results demonstrated good to excellent colourfastness and perspiration-



tolerance on wool and silk. The pigments present in barks, leaves, seeds, pods etc. were found to be faster than pigments present in flower dyes. Bark sources proved most effective for producing darker shades. Based on colour analysis of natural dyes, shade cards were prepared both for wool and silk separately.



Value added products with natural dyes

Dyeing fabric with natural dyes

- Mordant concentration of 5 – 15 % was found to be effective dye with alum on wool and silk. In comparison, their concentrations in the range of 1-3% proved effective in case of chrome, copper sulphate and ferrous sulphate.
- Software and a compendium were developed on the data of 36 natural dye sources and the technologies developed with regard to dyeing by using natural dyes. These findings are being transferred to weavers, interested women groups and handicraft makers. The extension activities have been undertaken in adopted village to train adolescent girls and women groups to use the technologies of natural dyes for textile handicrafts.

### Comprehensive Child Care through Farm Crèche

- The impact of educational intervention to mothers in providing conducive home environment to infants was studied for different parameters. The consequence of intervention revealed a significant impact on a sample of 397 infants.
- The case studies were simultaneously conducted on six infants each in the category of regular, irregular and poor intervention with the follow up of infants over a period of one-and-a half to three years. The intervention revealed that the stimulation programmes were effective in enhancing the psycho-motor, mental, social and emotional development as there was a positive change in the temperament of the infants.
- Situational analysis of 13,100 girl child through focus group discussion with the school and non-school group/ married girls revealed a need to empower the



Conducive home environment for infants in the farm creche



Group discussion with the school and non-school group and married girls revealed a need to empower the girls

girls for quality life because of lack of encouragement opportunities and callous attitudes on the part of parents, traditional gender role, more idealism among male children, low socio economic status of the family and lack of knowledge on vital issues like health, nutrition, ill effects of consanguinity, ideal child bearing age, menarche and hygiene during menstruation.

- The prevalence and causes of exceptionalities in children was higher in males than females and the percentage of congenital cases was higher than acquired cases.
- An awareness of preferal services had been created by

- The women and rural girls have been empowered with scientific child care through establishment of early childhood education centers. They have been economically empowered by encompassing activities such as candle production, *agarbati*, *rotis*, mushroom cultivation, making of foot mat, chalk, manufacture of office stationary etc



supplying handouts to the children with special needs and a software on child status has been developed by utilizing the data/ observations collected between 1980 – 2003.

### Ergonomics of Farm Women's Drudgery

- Physiological, cardio-vascular and muscular stresses of farmwomen involved in the performance of drudgery prone activities showed that ergonomic cost while performing the activities was very high and above the acceptable limits for the women.
- Impact of improved technologies in drudgery reduction was studied for multi-purpose decorticator, cotton stalk puller, trolley for carrying fertilizer to the field, tubular maize sheller, foot operated maize sheller, improved cotton bag and improved sickle. On the whole, use of improved tools proved beneficial for increasing the work efficiency of the farmwomen. The impact of the improved tools in reducing the postural changes, angle of deviation of the back, grip fatigue and musculo-skeletal pains was also found positive and significant.



Cotton stalk pulling activity with the help of cotton stalk puller

### Data Base On Rural Women and Indigenous Knowledge

- The qualitative database, generated through 630 case studies representing large, small and land less categories of households from 42 agro-climatic zones, revealed the clear role of women in ecology regulated farming systems. A fidelity of partnership exists when women work as joint partners with men in various farming activities.

• The properties of plant have been correlated with specific action and method of preparation of indigenous medicine, form of use as liquid, paste, juice, decoction, collirium etc. and the dosage has been documented

- Women of differing land size groups and across diverse ecological locations and seasons carry out strenuous and health hazard prone farming activities where age does not restrict the participation of females. The women workers and managers in agriculture reflected the capacity to articulate and envision their multidimensional roles for creating role homogeneity and building self-actualization.
- The database on indigenous knowledge focused on Medicinal Plants for Health Security, has revealed the wide scale use of medicinal plants, for instance treatment of respiratory disorders involved 72 diverse plants; digestive disorders depended on 160; ailments and diseases covered 110; and general health care involved 106.

## NATIONAL ACADEMY OF AGRICULTURAL RESEARCH MANAGEMENT (NAARM), HYDERABAD

NAARM is entrusted with the primary responsibility of inculcating professional management in agricultural research and education, through innovative human resource development (HRD) programmes and by providing appropriate policy support to the NARS.

The curriculum of the foundation course was revised and updated taking into account the recommendations of the 4th QRT. The updated training programme lays special emphasis on sensitizing the ARS probationers on the status of contemporary agriculture, new opportunities arising from international free market access, issues pertaining to IPR management techniques, as well as policy planning for food security and nutritional adequacy. The new-look curriculum also includes modern management methods on qualitative and quantitative methods of decision making, conceptualization of research projects and their prioritization, monitoring, project based budgeting for infusing excellence in scientific endeavour. Beside, training lays special emphasis on skill development through hands-on training and experiential learning through exposure to real life situations. A distinguishing feature of this year's training was a week long interaction with the senior agricultural policy makers, administrators and managers of research and development at New Delhi. This format provided the young scientists an insight into the current and emerging priorities and obligations of R&D initiatives and the activity roadmap to achieve the goals.

• As part of its HRD activities, NAARM organized 36 programmes through which 828 scientists were trained in various aspects of agricultural research and education management



The Academy hosted three Summer/Winter Schools in the areas of Agricultural Research Project Management, Educational Methodology and Instructional Technology and Management of Human Resources in Agriculture. A total of 70 scientists from ICAR institutes and SAUs benefited from these Summer/Winter Schools.

In collaboration with the National Academy of Agricultural Sciences (NAAS), New Delhi, NAARM organized a two-day policy planning brainstorming session on export potential of dairy products. The discussions were held against the backdrop of liberalization of world economies coupled with the emergence of WTO and their potential impact on the Indian dairy industry. The deliberations recognized that India produces milk at the most competitive prices and possesses tremendous possibilities for enhancing milk availability for exports. The brainstorming discussions came out with recommendations suggesting guidelines for export of milk and milk products, infrastructure development, R&D support and building human resource capacity. Various recommendations are being published as a policy document by NAAS.

Towards realizing sustainable performance and enhanced accountability of agricultural research organizations, a methodological framework was developed with the support received through NATP. In order to

validate the applicability of methodology thus developed, it was tested on a pilot scale in selected ICAR institutes and Research Stations belonging to State Agricultural Universities. Results revealed that organizational effectiveness is possible to sustain by laying greater stress on critical areas like development and management of human resource, internal finance mobilization, infrastructure development and research project management. Though the methodology essentially assesses performance through self-introspection, it can also complement the externally commissioned evaluation by bodies like QRT.

In recognition of the expertise available at NAARM, international programmes on Agricultural Research Management were held for training of the scientists and officers belonging to administrative and financial cadres of Sri Lanka. Organization of these training programmes was in fulfillment of a part of the ICAR and CARP approved Work Plan.

