ICAR

ICAR International Training Programmes 2008







सत्यमेव जयते

Department of Agricultural Research and Education
New Delhi

Indian Council of Agricultural Research
New Delhi

ICAR
International Training Programmes 2008

Indian Council of Agricultural Research
Krishi Bhavan
New Delhi 110 001

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Foreword

In the present era of globalization, human resource development has emerged as a major aspect of critical importance for the organizations committed to the development of agriculture. The manpower available with scientific organizations has to be trained and the knowledge of the scientists should be updated so as to keep pace with the latest developments in agriculture particularly in the frontier areas of technologies. With this end in view, the Indian Council of Agricultural Research (ICAR) and State Agricultural Universities (SAUs) organize training programmes/courses in most of the disciplines each year. Requests are received from different parts of the world especially from Asian and African countries for participation in these programmes.

The training programmes listed in this publication include selected short-term training courses in specific areas. Apart from several on-going programmes in frontier areas including Molecular diagnosis of Plant Viruses, FMD-Diagnosis and Serotyping using Molecular techniques, Bt resistance management in insects, crop production and quality, IPM in selected field crops, integrated watershed management, frozen semen technology and artificial insemination, animal tissue culture technology, animal and fish disease diagnosis and management, fishing gear design and fabrication, techniques and application of remote sensing and GIS in agriculture, post-harvest supply chain and quality management of horticultural and arable crops, hybrid purity assessment using molecular markers in sunflower, safflower and castor, tropical viticulture, protected cultivation in vegetable and ornamental crops, value added products technology in banana and plantain, hatchery and culture technology of freshwater prawns, project management and capacity building for rural management, several new programmes like Rural Entrepreneurship Development, Production of Disease Free Planting Material for Citrus, Fisheries Co-Management for Sustainable Development, Trickle Down System (TDS) of Aquaculture Extension, Open Source Based e-learning development, Computer based multimedia development, Rain water harvesting & Ground water recycling, Land scape and Turf Irrigation – Design and Management, Micro-irrigation system, Buffalo meat processing have also been planned during 2008. For each course, a brief information on the host institution, course content and duration, faculty and important instructions including application form is provided in this publication.

I hope that this publication will prove useful to all those willing to develop the human resource cost-effectively by relevant programmes to suit specific conditions that exist in the developing countries.

(Mangala Rai)
Secretary, DARE and
Director-General, ICAR

26 December 2007
New Delhi

Indian Council of Agricultural Research

The Indian Council of Agricultural Research, has built one of the world's largest national agricultural research systems which consists of 48 Central Research Institutes including 5 multi-disciplinary National Institutes with deemed-to-be University Status, 5 National Bureaux, 32 National Research Centres, 12 Project Directorates, 62 All India Co-ordinated Research Projects and a large network of multi-disciplinary projects. In addition, ICAR has helped in establishing 39 State Agricultural Universities based on the land grant pattern of education in the United States of America, and 1 Central Agricultural University and 4 Central Universities. The major effort of the ICAR is directed towards human resource development besides planning, coordinating and undertaking research in various disciplines of agricultural sciences.

The ICAR organizes international training programmes for developing trained human resource to take up research, education and extension activities in emerging areas of agricultural sciences. These training courses are organized in various ICAR Institutes and the State Agricultural Universities. This brochure provides information on various international training programmes.

The persons interested in attending any of these courses may apply for admission to the course, by sending his/her application in the proforma provided at the end of this brochure. A copy of the application should also be sent directly to the contact person identified for each course. Further details of the course may be obtained from the contact person or Director or Dean of the institute or university, where the course will be offered.

Contents

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GENERAL INSTRUCTIONS

1. Last date of receipt of application for the training will be at least 3 months in advance from the date of start of the course.
2. Application should be sent in triplicate to Deputy Director-General (Education), Krishi Anusandhan Bhavan II, ICAR, Pusa, New Delhi 110 012, India.
3. The remittance should be sent in the form of Demand Draft drawn in favour of Secretary, ICAR, payable at New Delhi and sent along with the application to Deputy Director-General (Education), or deposited in Account No. 440624, ICAR, Krishi Bhavan, New Delhi, India.
4. The boarding and lodging charges during the course of training will be approximately US $ 25 per day per participant.
5. Medium of instruction will be English.

IARI

Indian Agricultural Research Institute
New Delhi

The Indian Agricultural Research Institute was established in 1905. It is the flagship of agricultural research, education and extension in India.

Contact Person

S A Patil
Indian Agricultural Research Institute
Pusa, New Delhi 110 012, India

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Courses

1. Project Management for Research and Development
2. Capacity Building for Rural Resource Management
3. *Bacillus thuringiensis* (*Bt*) Resistance Management in Insects
4. Post-harvest Supply Chain and Quality Management of Horticulture and Arable Crops
5. Research Techniques in Cyanobacteria
6. Improving Managerial skills for Extension and Development Personnel
7. Rural Entrepreneurship Development

Post-graduate Education

The Indian Agricultural Research Institute (IARI) is a deemed-to-be University since 1958. It awards MSc degree in 22 disciplines of agricultural sciences and PhD degree in 19 disciplines. So far, IARI has awarded MSc degrees to 2,325 students and PhD degrees to 3,118 students. Many

students from countries like Afghanistan, Bangladesh, Brazil, Nepal, Pakistan, Philippines, Rhodesia, Singapore, Sierra Leone, Sri Lanka, Somalia, Sudan, Tanzania, Thailand, UAE, Uganda, UK, Vietnam, West Indies and Yemen have also received degree from IARI, New Delhi.

Training Programmes

The Institute organizes refresher and short-term training courses in various areas of agricultural sciences for the benefit of teachers, research scientists and extension scientists working in public and private sector organizations. During the last two decades more than 400 training courses have been organized by the Institute in which over 12,000 scientists received training in advanced areas like molecular biology, biotechnology, IPM, mushroom cultivation, advances in communication, bioinformatics, soil health, agricultural development and policies, medium range weather forecasts, modelling for land use, detection of plant pathogens, biological control of pests and diseases, commercial floriculture and horticulture, seed certification, irrigation and water management, quantitative techniques for policy analysis, research evaluation and impact assessment, processing of horticultural produce, energy management, entrepreneurship development, protected horticulture, microbial biodiversity, insect biodiversity, plant genetic resource conservation, water management, bio-fertilizers, etc.

1. Project Management for Research and Development

Course Director	:	Dr Baldeo Singh and Dr K Vijayaragavan
Duration	:	2 weeks (15-29 November 2008)
Course fee	:	US $ 1,150 per trainee (exclusive of travel cost, boarding and lodging)
No. of trainees per course	:	20
Accommodation	:	Will be provided at a very reasonable cost at the Institute's guest house
Eligibility	:	Junior and middle level research workers, teachers and extension personnel in the field of agricultural and natural resource management

Faculty

A group of 13 highly qualified and experienced faculty having vast exposure in the area management are available.

Training Programme

The training programme has the objective of improving the skills of the participants in overall planning and management of research and development projects in the field of agriculture and natural resource management.

Course Content

- Project planning process, strategic planning, setting project goals and objectives, management by objectives, project scheduling and network techniques, project management information system, project leadership, motivation of project personnel, organizational communication, team building and conflict management and project evaluation. The training course has been designed to provide an experiential learning to the participants through practical exercises, simulation games, apart from providing theoretical understanding through lecture and discussions.

2. Capacity Building for Rural Resource Management

Course Director : Dr Baldeo Singh

Duration : 3 weeks (3–22 September 2008)

Course fee : US $ 1,250 per trainee

No. of trainees per course : 20

Accommodation : Will be provided at a very reasonable cost at the Institute's guest house

Eligibility : MSc Extension (Agriculture, Home Science, Veterinary Science etc.)

Faculty

Qualified, experienced and trained scientists constitute the faculty.

Course Content

- Sense of personal efficacy: Psychological empowerment, energizing workplace for human development, developing skills for effective communication, exploiting new communication technology, self-help groups, HRD and training in agricultural development, understanding training evaluation, ICTs, rapid rural appraisal, participatory rural appraisal, group methods in rural development, gender issues in agriculture, leadership and adult learning principles.

3. *Bacillus thuringiensis (Bt)* Resistance Management in Insects

Insecticide resistance has been reported in more than 650 insect and mite species over the years. The American bollworm, *Helicoverpa armigera*, an important pest of cotton and many pulses in India and elsewhere, has developed resistance to most of the conventional insecticides and even newer insecticides. Similarly, the diamondback moth, *Plutella xylostella* has developed resistance to more than 37 insecticides including *Bacillus thuringiensis* Berliner.

Hence, *Bt* resistance management has become an integral part of development of *Bt* transgenic crops. *Bt* resistance management needs provision of insect baseline susceptibility standard for detection and monitoring of resistance in the field population of target insects. It also requires high expression of *Bt* gene, provision of refuge crops or alternate hosts of target insect pests, dual stacked genes crops, and integration of these *Bt* resistance management tactics into integrated pest management and crop management. This course will thus help us in providing a good information to the researchers and policy makers in the countries where *Bt* transgenic crops are in the developmental stage and sharing the experiences with those from other countries.

Training Programme

Bt resistance management needs provision of insect baseline susceptibility standard for detection and monitoring of resistance in the field population of target insects. It also requires high expression of *Bt* gene, provision of refuge crops or alternate hosts of target insect pests, dual stacked genes crops, and integration of these *Bt* resistance managment tactics in to integrated pest management and crop management. This course will thus helps in providing a good information to the researchers and policy makers in the countries where *Bt* transgenic crops are in the developmental stage.

Faculty

Highly educated trained faculty in the field are available

Course Director : Dr G T Gujar

Duration : 8 days (15-22 October 2008)

Course fee : US $ 850 per trainee

No. of trainees per course : 10

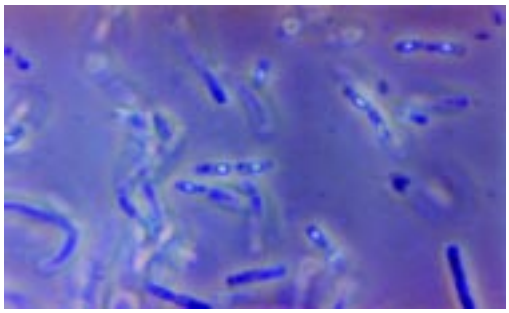
Accommodation : Will be provided at a very reasonable cost at the Institute's guest house

Eligibility : Graduates with specialization in entomology, IPM or zoology with entomology specialization with interest in xenobiotic resistance management

Course Content

- Importance of xenobiotic resistance in Integrated Pest Management (IPM)
- Role of *Bacillus thuringiensis* (*Bt*) or insect protective transgenic crops for the control of insect pests: A world-wide view with special importance to the developing countries
- *Bt* bioassays and discriminating dose assays for baseline susceptibility and monitoring
- *Bt* resistance characterization and management options in the context of IPM
- Regulatory status of *Bt* transgenic crops with special reference to *Bt* resistance management
- Visit to *Bt* transgenic crop fields; discussion with farmers, IPM researchers and other stakeholders and visit to the research institutions.

Helicoverpa armigera



Bacillus thuringiensis var. *kurstaki*

Bt cotton (fore) and non-*Bt* cotton (hind) near Khandwa (MP)

4. Post-harvest Supply Chain and Quality Management of Horticulture and Arable Crops

IARI has a strong programme in Post-harvest Technology with the best equipped manpower having vast exposure in international courses in developed countries like UK, USA, Netherlands and Australia who are experienced in training international participants.

Training programmes

The Institute conducted as many as 10 international training programmes in various fields of post-harvest technology with the financial assistance from DANIDA, FACO, British Council, International Potato Centre (CIP), DST, NHB, etc.

Faculty

Qualified, experienced and trained scientists of the division will constitute the course faculty.

Course Director : Dr Abhijit Kar

Duration : 3 weeks (9-28 April 2008 or 26 November to 15 December 2008)

Course fee : US $ 1,250 per trainee (exclusive of travel, boarding and lodging)

No. of trainees per course : 15

Accommodation : Will be provided at a very reasonable cost at the Institute's guest house

Eligibility : Graduate in Agriculture/Engineering/Food Science/ Food Technology/Science or any other degree with relevant field experience

Course Content

Post-harvest technology of cereals, pulses and oilseeds

- Importance
- Basic principles
- Methods of storage
- Equipment and their maintenance
- Innovative techniques

Post-harvest technology of fruits, vegetables and flowers

- Basic principles and practices
- Different technologies
- Important considerations
- Recent developments

Total quality and safety management

- Theories
- Statistics in quality control
- Quality management techniques
- National and international standards

Supply chain management

- Types of supply chain
- Management techniques
- Role of different stake holders/chain players

Agribusiness development

- Project development techniques
- Stake holder analysis

5. Research Techniques in Cyanobacteria

Faculty

Qualified experienced and trained scientists constitute the faculty.

Course Director : Dr P K Singh

Duration : 3 weeks (7–27 March or 11 September–1 October 2008)

Course fee : US $ 1,200 per trainee (exclusive of travel, boarding and lodging)

No. of trainees per course : 6–10

Accommodation : Will be provided at a very reasonable cost at the Institute's guest house

Eligibility : Bachelors/Masters degree in Biology/Life Science/Biosciences/Microbiology

Course Content

- Isolation, purification and preservation of cyanobacteria
- Enumeration, maintenance and growth of cyanobacteria
- Biochemical and molecular characterization
- Mass production of cyanobacteria and its use as biofertilizer quality control

6. Improving Managerial skills for Extension and Development Personnel

Faculty

Qualified experienced and trained scientists constitute the faculty.

Course Director : Dr K Vijayaraghvan

Duration : 15 days (1–15 November 2008)

Course fee : US $ 16,200

No. of trainees per course : 20

Accommodation : Will be provided at a very reasonable cost at the Institute's guest house

Eligibility : Scientists/Professors/Technical persons actively engaged in the field of Plant Pathology for disease diagnosis.

Course Content

- The aim of this management development programme is to improve the managerial skills of the participants .This will follow a participatory approach with emphasis on experiential learning. The contents will include management skills such as project planning, organizing, leadership, motivation, communication skills, team building, stress management, time management, techniques of human resource development, modern training technology and techniques, monitoring and evaluation skills.

7. Rural Entrepreneurship Development

Faculty

Qualified experienced and trained scientists constitute the faculty.

Course Director : Dr K Vijayaraghvan

Duration : 15 days (1–15 December 2008)

Course fee : US $ 16,200

No. of trainees per course : 20

Accommodation : Will be provided at a very reasonable cost at the Institute's guest house

Eligibility : Scientists/Professors/Technical persons actively engaged in the field of Plant Pathology for disease diagnosis.

Course Content

- Exposure of the participants to various components of rural entrepreneurial development. This will follow a participatory approach with emphasis on experiential learning. The contents will include rural entrepreneurship in developing countries, entrepreneurial motivation, assessment of risk and achievement motivation, training of rural youth and women, preparation of projects to start enterprises, linkage with financial institutes, successful cases of rural entrepreneurs in Asia.

CICR

Central Institute of Cotton Research
Nagpur

The Central Institute of Cotton Research (CICR) was established at Nagpur in 1976. It has emerged as a pioneer in conducting basic and strategic research on various problems confronting cotton production.

Contact Person

Dr B M Khadi
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Courses

1. Insect Resistance to *Bt* and Insecticides
2. Advances in Hybrid Cotton Seed Production Techniques
3. Integrated Cotton Production Technology

The Central Institute of Cotton Research has trained a large number of scientists at different levels through a variety of programmes.

The Institute has excellent residential facilities for participants of its various programmes.

1. Insect Resistance to *Bt* and Insecticides

Course Director : Dr K R Kranthi

Duration : 3 weeks
(1-20 August 2008)

Course fee : US $ 1,250 per trainee

No. of trainees per course : 10

Accommodation : To be provided at a reasonable cost in the Institute's well furnished Trainees Hostel

Eligibility : Degree/Diploma in Agriculture with some field experience in pest management

Insecticide resistance has emerged as a serious problem to crop protection programmes world over especially as a potential threat to pest management programmes in cotton. After the introduction of *Bt* cotton, IPM perspectives have changed dramatically. To ensure sustainability of the powerful transgenic technology, it is imperative that the phenomenon of development of insect resistance to *Bt* toxins understood properly.

Training Programme

This international course is developed:

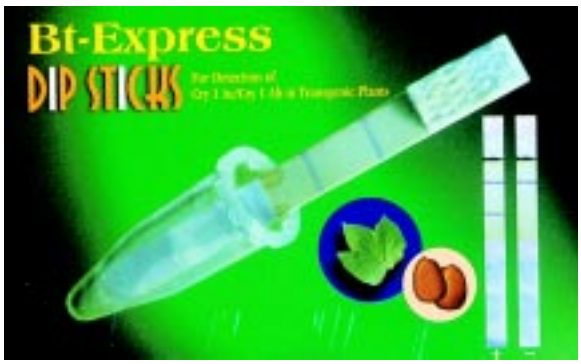
- to provide hands on experience of monitoring methods of insect resistance to *Bt* cotton.
- diagnosis of all major mechanisms including enzyme assays, neuro-physiological assays, immunoassays, DNA based assays, simple diagnostic kits to detect mechanisms and
- to formulate Insecticide resistance management strategies based on all available information.

Faculty

The faculty consists of very well trained entomologists, plant pathologists, biochemists, molecular biologists, agronomists and geneticists working with the institute.

Course Content

- History of insecticide resistance, current world scenario and future implication
- Fundamental aspects of resistance development, principles, genetics, variability and factors influencing resistance
- Methods of resistance detection, bioassays, monitoring methods, field resistance assessment and resistance dynamics
- Methods to detect and quantify *cry* toxins in transgenic plants
- *Mechanisms underlying resistance:* biochemical, toxicological and molecular methods. Extraction and partial purification of enzymes, enzyme assays, isozyme analysis, measurement of kinetics. *In vitro* assays of esterases, cytochrome p450, glutathione transferases, acetyl choline esterases and O-demethylases. Electrophoretic assays. Role of proteases and altered BBMVs in *Bt* resistance.
- Assessment of knockdown resistance through neurophysio-logical assays, use of molecular probes, dot blot assays, immunoassays and PCR techniques.
- Laboratory selection for resistance and its implications for management strategies.
- Factors influencing tolerance or resistance to insecticides.
- Resistance management strategies-the available options.
- Insecticide and *Bt* resistance: a view point of the agrochemical and seed industry.



2. Advances in Hybrid Cotton Seed Production Techniques

The area under hybrid cotton is rapidly increasing all over the world. However, the basic constraint in cultivation of hybrid cotton is the availability of seed. This short-term course is designed to prepare the participants in most modern techniques of hybrid cotton seed production. The specific objectives are

- to update knowledge on latest hybrid seed production techniques in cotton.
- to enhance the skills of participants in emasculation/ pollination, maintenance of purity of parental lines, isolation distance etc.

Faculty

Faculty consists of highly trained scientists in seed technology, agronomy, plant physiology, plant pathology, and plant breeding.

Course Director : Dr Phundan Singh

Duration : 3 weeks (25 August to 14 September 2008)

Course fee : US $ 1,250 per trainee

No. of trainees per course : 10

Accommodation : To be provided at a reasonable cost in the Institute's Trainees' Hostel

Eligibility : Degree/Diploma in Agriculture with some field experience preferably in seed production

Course Content

- Hybrid cotton genetics, basis of heterosis, type of cotton hybrids, main features of released hybrids, steps involved in hybrid development
- Methods of hybrid seed production, quality maintenance of hybrid seed and storage of hybrid seed
- Identification of suitable areas for hybrid seed production, selection of sites, identification of suitable flower bud and their relationship with yield
- Emasculation techniques, identification of male sterile lines
- Method of protection from out-crossing, rouging, and visit to cotton seed-producing companies.

3. Integrated Cotton Production Technology

Several changes are taking place in the world in cotton production. These include reduction in productivity, development of resistance in cotton pest population, consumer preference for ecofriendly cotton, quality conscious buyers and call for sustainable agriculture. This short term training course has been designed to address these issues in changing cotton production scenario.

Training Programme

The specific objectives are:

- to update knowledge of participants on latest cotton production and protection including new varieties and hybrids
- to enhance their skills in increasing production
- to sensitize them to the integrated approach of cotton production which is more ecofriendly.

Course Director : Dr M P K Rao

Duration : 3 weeks (6-25 October 2008)

Course fee : US $ 1,250 per trainee

No. of trainees per course : 10

Accommodation : To be provided at a reasonable cost in the Institute's Trainees' Hostel

Eligibility : Degree/Diploma in Agriculture with some field experience preferably in seed production

Faculty

Faculty consists of highly trained scientists in agronomy, plant breeding, soil science, entomology, plant pathology, plant physiology, biotechnology, seed technology and agricultural economics.

Course Content

- New varieties and hybrids of cotton spread all over the world
- Integrated pest management including mass multiplication of bioagents, integrated disease management, integrated nutrient management
- Advances in cotton agronomy, organically produced cotton, physiological manipulations, biotechnological approach, production of quality seed and economics of cotton production

CTRI

Central Tobacco Research Institute
Rajahmundry

Contact Person

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Central Tobacco Research Institute
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website: http://www.ctriindia.com

Courses

1. Agro-technology for Maximizing Quality FCV Tobacco Production
2. Tobacco Quality Evaluation
3. Integrated Pest Management in Tobacco

1. Agro-technology for Maximizing Quality FCV Tobacco Production

Production of quality FCV tobacco meeting the internal/ international market requirements fetches maximum economic returns to the farming community, excise revenue and foreign exchange to the country. In this context, adoption of appropriate agro-techniques at every stage of the crop production is a prerequisite. The objective of the training is to impart knowledge on the scientifically proven production practices including Good Agricultural Practices (GAP).

Faculty

Scientists of CTRI, Retired Scientists and Guest speakers from trade and industry

Course Director : Dr V Krishnamurthy

Duration : 15 days

Course fee : US $ 1500

No. of trainees per course : 10

Accommodation : To be provided in hotels

Eligibility : Managers/ Scientists, Extension Personnel involved in tobacco research and development

Course Content

- New vistas in varietal development
- Soil management
- Scientific nursery management for production of quality seedlings
- Cultural practices like land preparation, planting, intercultures, irrigation etc.
- Nutrient deficiencies, fertilization and Integrated Nutrient Management
- Management of insect pests and diseases in the nursery and field crop
- Topping and sucker control
- Harvesting and curing
- Post-harvest product management including bulking, grading, baling and storage
- Leaf quality appraisal
- Seed production technology
- Cropping/ Farming systems for sustainable tobacco production

2. Integrated Pest Management In Tobacco

Course Director : Dr V Krishnamurthy
Duration : 15 days
Course fee : US $ 1,500
No. of trainees per course : 10
Accommodation : To be provided in hotels
Eligibility : Managers/Scientists, Extension Personnel involved in Tobacco research and development

In view of the growing awareness on the threat to eco-system due to usage of pesticides and other agrochemicals, there is an urgent need to encourage Integrated Pest Management (IPM). The objective is to impart knowledge about identification and diagnosis of pest problems and their management in tobacco. The programme covers To acquaint the participants with sampling methods and decision making for pest management with emphasis on cultural, biological methods and need based application of insecticides and management of pesticide use in tobacco for residue free tobacco production.

Faculty

Scientists of CTRI, Retired Scientists and Guest speakers from trade and industry

Course Content

- Analysis of tobacco pest problems
- Concepts of IPM and IDM approaches
- Diagnosis of pest problems
- Bio-ecology and management of key pests
- Biological control
- Production of NPV
- Use of botanicals in pest management
- Insecticide resistance monitoring and management with special emphasis on H. armigera.
- Pesticide management methods for effective and safe use of pesticides
- Management of pesticide residue and residue analysis in tobacco

3. Tobacco Quality Evaluation

Course Director : Dr V Krishnamurthy
Duration : 15 days
Course fee : US $ 1,500
No. of trainees per course : 10
Accommodation : To be provided in hotels
Eligibility : Managers/Scientists, Extension Personnel involved in Tobacco research and development

Quality evaluation is an important facet of tobacco production as the leaf is used in the manufacture of smoking products like cigarettes, *bidis* and cigars and chewing products like zarda, *quimam* etc. Analysis of physical and chemical parameters is an important aspect of quality evaluation. Now, analysis of tobacco specific nitrosamines (TSNA), smoke constituents like tar, nicotine and carbon monoxide, residues of agrochemicals and heavy metals has gained importance. The objective of this training programme is to impart practical knowledge on collection of leaf samples and analysis of samples for different quality characters, smoke constituents, TSNA, pesticide residues, etc.

Faculty

Scientists of CTRI, Retired Scientists and Guest speakers from trade and industry

Course Content

- Importance of quality in tobacco
- Factors influencing tobacco quality
- Collection of leaf samples for analysis
- Analysis of chemical quality characters viz. sugars, nicotine, chlorides and total nitrogen
- Analysis of physical quality parameters viz. Equilibrium Moisture Content (EMC), filling value, leaf burn and stem lamina ratio
- Analysis of TSNA and smoke constituents viz. tar, nicotine and CO
- Analysis of organochlorine pesticide residues
- Anlaysis of nutrient composition, N, P, K Ca, Mg, S, Fe, Zn, Mn and Cu

4. Soil and Water Analysis for Tobacco Production

Optimum and balanced N, P, K, fertilization holds the key for obtaining higher yields and superior quality tobacco. Soil test based fertilizer recommendations would not only optimize the use of non-renewable resources like chemical fertilizers but also sustain the tobacco production on a long-term basis. Further, soil testing allows the farmer to know the fertility and suitability of his soil for tobacco cultivation and to avoid any excess or deficient supply of nutrients to the crop. Any saving on fertilizer bill will add to the profit of the farmer. The objective of this training programme is to impart theoretical and practical knowledge on different aspects of water, soil and plant analysis.

Faculty

Scientists of CTRI, Retired Scientists and Guest speakers from trade and industry

Course Director : Dr V Krishnamurthy
Duration : 15 days
Course fee : US $ 1,500
No. of trainees per course : 10
Accommodation : To be provided in hotels
Eligibility : Managers/Scientists, Extension Personnel involved in Tobacco research and development

Course Content

- Importance of soil and water testing in FCV tobacco Production
- Acquaintance with the laboratory facilities and personnel
- Properties of glassware and its maintenance, Analytical reagents, Cleaning solution, Laboratory apparatus, Filter papers, preparation of standard solutions
- Soil and water sample collection
- Maintenance of soil testing equipment
- Theoretical and practical knowledge on estimation of soil pH and electrical conductivity, chlorides, organic carbon, available P, available K, available N in soil
- Theoretical and practical knowledge on water analysis
- Theoretical and practical knowledge on plant analysis
- Theoretical and practical knowledge on micronutrient analysis
- Fertilizer recommendations

IISR

Indian Institute of Sugarcane Research
Lucknow

The Institute was established in 1952 for conducting research on fundamental and applied aspects of sugarcane culture as well as to co-ordinate the research work done on this crop in different states of the country.

Contact Person

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Indian Institute of Sugarcane Research
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Courses

1. Agro-technology for Maximizing Sugarcane Production
2. Protection Technology for Sustaining Sugarcane Productivity
3. Manufacturing and Storage of Jaggery

The Institute has 6 divisions, viz Crop Improvement, Crop Production, Crop Protection, Plant Physiology and Biochemistry, Agril. Engineering and Social Sciences. In addition, there are 4 sections, viz Radio Tracer Lab,

Economics and Statistics, Jaggery Unit and ARIS Cell. The Institute has a large farm (190 ha) and several research support facilities. For seminar, group meetings and training, there are well equipped auditorium, conference hall and seminar rooms. It has guest house and farmers' hostel.

1. Agro-technology for Maximizing Sugarcane Production

In all the sugarcane growing countries, land resource is a limiting factor. In order to increase sugarcane and sugar productivity, the only alternative is to increase the sugarcane productivity and effectively sustain high sugar varieties. A number of technologies have been developed and perfected at this Institute which can be gainfully employed by sugarcane growing countries. For example, agro-techniques for low input conditions, marginal lands, waterlogged and drought conditions, late planted conditions etc.

Training Programme

It consists of lectures on various subjects, practical classes using laboratory techniques, field visit, study tour to sugar factory and sugarcane research stations, seminar by trainees, preparation of project report, etc.

Faculty

There are about 90 scientists in the Institute having vast experience in various fields of sugarcane cultivation.

Course Director : Director

Duration : 4 weeks (15 October to 15 November 2008)

Course fee : US $ 1,500 per trainee (exclusive of travel, boarding & lodging)

No. of trainees per course : 5–20

Accommodation : This will be provided at a very reasonable cost at the Institute's guest house

Eligibility : Graduate or higher level preferably in Agriculture; Research and Development personnel in sugar industry.

Course Content

- Scenario of sugarcane and sugar production in India
- Three-tier seed programme
- Intercropping in sugarcane, germination and tillering management, weed management in sugarcane, biological N-fixation, integrated nutrient management, organic manuring in sugarcane, water management, sugarcane ratoon management
- Sugarcane cultivation in rainfed areas, sugarcane cultivation in waterlogged areas
- Sustainable sugarcane-based production systems
- Amelioration of micro-nutrient deficiency in soil and plant
- Forage crops in sugarcane-based cropping systems
- Weather interaction in sugarcane production system and post-harvest sugarcane management
- Mechanization of sugarcane cultivation

2. Protection Technology for Sustaining Sugarcane Productivity

The climatic conditions, which favour sugarcane growth, also support build-up of diseases and insect pests in the crop. To sustain sugarcane productivity, management of these diseases and insect pests is a primary requirement. The Institute has developed a number of protection technologies for containing the problem. These technologies can be gainfully employed by sugarcane growing countries. For example, integrated disease management, disease-free seed production, integrated pest management, biocontrol of insect-pests, integrated weed management, etc.

Training Programme

It consists of lectures on various subjects, practical classes using laboratory techniques, field visit, study tour to sugar factory and sugarcane research stations, seminar by trainees, preparation of project report, etc.

Faculty

There are about 90 scientists in the Institute having vast experience in various fields of sugarcane cultivation.

Course Director : Director

Duration : 4 weeks (15 October to 15 November 2008)

Course fee : US $ 1,500 per trainee
(exclusive of travel, boarding & lodiging)

No. of trainees per course : 5-20

Accommodation : This will be provided at a very reasonable cost at the Institute's guest house

Eligibility : Graduate or higher level preferably in Agriculture; Research and Development personnel in sugar industry

Course Content

- Current scenario of sugarcane disease—red rot, smut, wilt. Grassy shoot disease (GSD). Leaf scald and ratoon stunting, mosaic stubble decline, Nematodes
- Integrated management of sugarcane diseases
- Current scenario of insect pests of sugarcane. Cane borer and their management, *Pyrilla* and sucking insect-pests and their management, sub-terranean insect-pests and their management, scale insects and their management
- Rodents and their management
- Insecticides in the management of insect pests
- Biological control of sugarcane insect-pests and Integrated pest management in sugarcane
- Three-tier seed cane production

3. Manufacturing and Storage of Jaggery

Course Director	:	Director
Duration	:	1 month (15 November to 15 December 2008)
Course fee	:	US $ 1,500 per trainee (exclusive of travel, boarding & lodging)
No. of trainees per course	:	5–20
Accommodation	:	This will be provided at a very reasonable cost at the Institute's guest house
Eligibility	:	Graduate or higher level preferably in Agriculture; Research and Development personnel in sugar industry

Manufacturing of jaggery from sugarcane has been as old as human civilization. Even at present about 30% of sugarcane produced is processed for jaggery manufacturing. Jaggery in different forms, is an eco-friendly and natural sweetener which is used as energy producing food and sweetening base by rural and urban masses. It contains common cane sugar as well as glucose, fructose and minerals like calcium, iron and phosphorus coupled with micro-nutrients like copper, zinc and mangnese and also serves as good source of vitamins. Improved technologies have been developed and perfected for producing quality jaggery and different jaggery based value added products which can be fruitfully utilized by different sugarcane growing countries in the world for the benefit of the mankind. Some of the examples are the technology for production of solid jaggery, granular jaggery, juice concentrate, chocolate and snacks etc.

Training Programme

It consists of lectures on various aspects, practical classes, operation and maintenance training, field visits, study tour to local jaggery manufactures and jaggery research centres, seminar by trainees, evaluation and preparation of project report, etc.

Faculty

There are about 50 scientists having vast experience on various aspects of production and processing of sugarcane for manufacturing of jaggery and related products.

Course Content

- Sugarcane and jaggery production in India
- Agronomy of sugarcane suiting to the requirements of jaggery production, harvest and post-harvest management of sugarcane, post-harvest losses
- Scenario of juice extraction, evaluating techniques of juice extraction, clarification and concentration, properties of cane juice and juice products, heating and concentration techniques
- Development of efficient furnaces, striking point device and development of semi-automatic jaggery plant
- Development of processes for different forms of jaggery and value-added products
- Storage and packaging of jaggery, feasibility of cold storage and economic analysis

SBI

Sugarcane Breeding Institute
Coimbatore

This Institute, established in 1912, is the World Leader in sugarcane breeding and genetics. It carries out research and development activities also that are related to varietal improvement. The novel idea of using the wild species *Saccharum spontaneum* in sugarcane breeding with the objectives of incorporating gene complexes for biotic and abiotic stresses and for high biomass production emanated from this Institute. The Co-canes developed from here are being cultivated through out the world. The Institute is one of the two world centres to serve as repository for sugarcane germplasm and is maintaining more than 1700 collections in various species and genera related to sugarcane. The place is endowed with all the ideal natural conditions, necessary for sugarcane flowering and seed set.

Contact Person

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Courses

1. Breeding Sugarcane for Use in Sugar-Industrial Complex
2. Abiotic Stresses and their Management including Cultivar Screening
3. Advances in Sugarcane Disease Management

1. Breeding Sugarcane for Use in Sugar-Industrial Complex

Course Director : Dr U S Natarajan

Duration : 2 weeks (8-22 October 2008)

Course fee : US $ 1,250 per trainee

No. of trainees per course : 20

Accommodation : Trainees will be accommodated in Scientists' home

Eligibility : Graduate or higher level preferably in Agriculture

Pesonnel of sugarcane research institutions and industry

The course can be offered most suitably at this institute, given its world reputation for sugarcane breeding and genetics. The teachers and R&D personnel world wide connected with sugarcane improvement activities, are expected to be well equipped to pursue their work much more professionally once they complete this training. Countries, especially in Africa and Asia with very large sugarcane growing tracts, but with no strong R&D wings would benefit immensely from this programme.

Training Programme

The programme would start during October first week to coincide with flowering season of Coimbatore so that the participants would have the benefit of acquiring knowledge on all aspects of sugarcane hybridisation. The training course would consist of lectures/practicals given by the institute scientists. In addition, it would also include visits to outreach stations and to sugar industries that are involved in diversifying their product profile.

Faculty

The institute has a very strong contingent of 20 scientists in breeding, genetics, biotechnology, seed technology and botany besides 40 other scientists in various other disciplines in support of varietal development work. Besides, we have retired scientists with vast experience in sugarcane, who can be co-opted to be the resource persons.

Course Content

- Sugar and Sugarcane–International and National scenario and the role of Sugarcane Breeding Institute in varietal improvement
- Taxonomy and floral biology of *Saccharum* complex members
- Sugarcane genetic resources: Collection, Conservation and Utilization
- Origin and evolution of cultivated sugarcane
- Flowering behaviour and hybridization techniques
- Selection in sugarcane
- Nobilization of *Saccharum spontaneum* and *Erianthus arundinaceus*
- Hybridization facility in India for development of location specific sugarcane varieties and an overview of flowering and seed set in other countries
- Varietal identification and botanical description
- Breeding for high sucrose
- Biometrical genetics as applied to sugarcane
- Breeding varieties for cogeneration and ethanol production
- Development and use of inbreds for sugarcane improvement
- Tissue culture for sugarcane improvement
- Molecular markers and genomics for sugarcane varietal improvement
- Genetic transformation in sugarcane
- Present status of genebank at Kannur
- Evaluation and cataloguing of genetic resources
- Cytogenetics of *Saccharum* and related genera
- Flowering control and regulation for hybridization
- Sugarcane seed technology
- Molecular approaches in identifying disease resistance, pathogen variability, identifying anti-fungal genes, diagnosis and disease management in sugarcane
- Diversification in the sugar industry
- Bagasse fibre: A sustainable raw material for paper making-problems and solutions
- Experimental techniques for clonal evaluation

2. Abiotic Stresses and their Management including Cultivar Screening

Course Director : Director
Duration : 15 days (21 August–4 September 2008)
Course fee : US $ 1,250 per trainee
No. of trainees per course : 15
Accommodation : Trainees will be accommodated in Scientists' home
Eligibility : Graduate or higher level degree in Agriculture (Plant Breeding/Agronomy/Plant Physiology/ Agricultural Chemistry/Soil Science) or
Research personnel working in sugarcane research institutes/sugar industries

Sugarcane is cultivated predo-minantly as an annual irrigated crop in both tropics and sub-tropics of India. The crop is favourably adaptable to a wide range of agricultural situations, but the productivity is generally limited by abiotic stresses such as drought, salinity and alkalinity, water logging, cold and high temperature stress. Although improved cultural practices and use of high yielding varieties substantially contributed for growth of sugar industry, the per hectare yields and general productivity remained relatively low, primarily due to the expansion of cane cultivation in to relatively less fertile marginal soils which are characterized by various abiotic stresses. Drought in combination with high temperature stress during summer months is deterring the cane yields in both tropical and sub-tropical climates. Salinity and alkalinity problem is mounting because of saline water irrigation. Water logging is a constant threat in coastal zones. Accordingly, evolution of sugarcane varieties tolerant to these different abiotic stresses and search for genotypes which possess inherent capabilities of stress tolerance has been an important area for immediate attention.

Training Programme

The participants would be trained on all aspects of abiotic stresses such as drought, salinity and alkalinity, water logging, high and low temperature stress, radiation and pollution stress and management including recent biotechnological advances in sugarcane.

Faculty

Sugarcane Breeding Institute is well equipped to conduct the course in terms of infrastructure facilities with full fledged laboratories and field facilities. There are seven pathologists and many of them are trained in modern biotechnology techniques. There are other Scientists in the discipline of Entomology, Nematology, Breeding, Cytogenetics, Agricultural Chemistry, Soil Science, Agronomy, Physiology, Statistics and Extension.

Course Content

- Sugar and sugarcane—International and national scenario and the role of Sugarcane Breeding Institute in varietal improvement
- Sugarcane genetic resources—collection, conservation and utilization
- Origin and evolution of cultivated sugarcane varieties
- Hybridization and selection of location specific sugarcane varieties
- Molecular characterization and genomics for sugarcane varietal improvement
- Screening of genotypes for abiotic stress tolerance
- Germplasm and breeding methodology
- Adaptability of sugarcane varieties to different agro-climatic zones and stresses
- Drought management
- Salinity and alkalinity tolerance
- Waterlogging resistance
- High and low temperature stress
- Heat avoidance and tolerance mechanism
- Management of sugarcane for different abiotic stresses
- Molecular approaches towards stress tolerance

3. Advances in Sugarcane Disease Management

Course Director	:	Dr P Padmanaban
Duration	:	15 days (11–27 October 2008)
Course fee	:	US $ 2,000
No. of trainees per course	:	15
Accommodation	:	Trainees will be accommodated in Scientists' home
Eligibility	:	Post graduate degree in Agriculture (Plant Pathology/Plant Breeding/Agronomy/ or Microbiology) and Research personnel working in sugarcane research institutes/sugar industries

The crop is favourably adaptable to a wide range of agricultural situations, but the productivity is generally affected by diseases such as red rot, smut, wilt, ratoon stunting, grassy shoot disease, leaf scald, mosaic, yellow leaf, etc. Although disease resistant varieties are released to tackle the diseases in the field, the breakdown of resistance to newly emerging pathogen races or varietal degeneration due to systemic accumulation of pathogens is widespread. This results is low cane productivity in different regions. Hence identification of resistant sources for different pathogens is being taken up continuously. Besides that characterization of new pathotypes/races, quarantining the cane materials for the systemic infection of viral, phytoplasmal and bacterial pathogens, etc. are the other core activities of the group.

The biotechnology and molecular biology tools are being applied recently in sugarcane pathology for precisely detecting pathogens, identifying pathogen variability, molecular markers for disease resistance, identifying and cloning of novel antifungal genes, developing transgenic sugarcane for resistance to diseases, induced resistance, etc. Molecular Plant Pathology is one of the emerging key areas of Sugarcane Breeding Institute contributing much to applied and basic research.

Training Programme

It is planned to cover key areas of sugarcane Pathology, viz. Disease diagnosis and early detection, Biochemical indices for resistance and molecular mechanism of disease resistance, Pathogen variability, Host-pathogen interaction. Quarantine for disease, Evaluation for disease resistance and Disease management.

Faculty

Sugarcane Breeding Institute is well equipped to conduct the course in terms of infrastructure facilities with full fledged laboratories and field facilities. There are seven pathologists and many of them are trained hands in modern biotechnology techniques. There are other Scientists in the discipline of Entomology, Nematology, Breeding, Cytogenetics, Agricultural Chemistry, Soil Science, Agronomy, Physiology, Statistics and Extension.

Course Content

- Disease screening techniques
  - Field screening techniques
  - Controlled condition testing
  - Disease resistant indices
- Diagnostic techniques
  - Conventional
  - Serological
  - Molecular
- Host-pathogen interaction
  - Disease resistant mechanism
  - Recognition and signal transduction
  - Induced resistance
- Pathogen variability
  - Cultural
  - Morphological
  - Pathogenic
  - Molecular
- Management strategies
  - Biological
  - Chemical
  - Physical
  - Host resistance
- Quarantine and exchange of germplasm
- Genetic transformation in sugarcane for disease resistance
- Identification of antifungal genes
- Markers for disease resistance
- Bioinformatics

IIPR

Indian Institute of Pulses Research
Kanpur

The Indian Institute of Pulses Research (IIPR) came into existence in the year 1993 at Kanpur, U.P. after elevation from erstwhile Directorate of Pulses Research. The institute undertakes basic, strategic and applied research on major pulse crops viz., chickpea, pigeonpea, urdbean, mungbean, lentil, fieldpea, lathyrus and rajmash, and is playing the key role in strengthening the nutritional security and sustenance of soil health.

Contact Person

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Courses

1. Molecular and conventional breeding approaches for genetic improvement of pulses
2. Improving sustainability through grain legumes in cropping systems

The IIPR streamlined the research and extension activities through a set of mandates such as to act as national centre for basic and applied research on pulse crops, to monitor, guide and coordinate research on pulses in the country, to impart training to scientists and extension workers engaged in pulses research and development, to foster national and international collaborations for exchange of views and material, to disseminate information on latest pulses production technology, to serve as an information bank on different aspects of pulses for strategic planning and to extend consultancy services and expertise.

The IIPR has been providing training at various levels of officials/scientists, extension workers from all over the country as well as abroad on all aspects of pulses research and development in addition to hosting regular training programmes for the farmers.

The Institute has adequate scientific strength to impart trainings, modern facilities, well-equipped laboratories, adequate infrastructure, experimental farms, weather controlled green house, computer and library facilities, conference room, seminar Hall and guest house accommodation for the International participants.

During 2008, two international training programmes are planned.

1. Molecular and Conventional Breeding Approaches for Genetic Improvement of Pulses

Course Directors: Dr Shiv Kumar

Duration : 15 days (16-30 September 2008)

Course fee : US $ 1,500

No. of trainees per course : 10-15

Eligibility : Scientists engaged in research/teaching having M.Sc/PhD degree in Plant Breeding/Genetics & Biotechnology

The Institute maintains sizable amount of pulse germplasm and currently has more than 6000 accessions which includes exotic and wild species apart from the regular ones. The Crop Improvement division is in the process of developing short duration, high yielding, location and climate specific pulses which are compatible with different cropping systems through identification of new plant types, which would help to break the yield plateau not only under rainfed but also expand pulse varieties in nonconventional areas.

The Institute has been putting rigorous efforts to develop *Bt* transgenics against the pod borer pest for Chickpea and pigeonpea.

Putative transformants have already been developed against pod borers. DNA fingerprinting of released varieties of major pulse crops and molecular characterization of different races of wilt pathogen are being carried out to develop viable diagnostic tool for identification of varieties and management of different *fusarium* races.

The QTL analyses are being done for complex traits like drought and diseases for developing Marker-assisted selection under breeding programme.

Training objective

To train scientists from developing countries in the latest technologies of molecular breeding and conventional approaches

Faculty & facilities

The Institute has well qualified internationally established scientists to impart the training and having wellequipped laboratories of biotechnology and plant breeding

Course Content

- Recent advances in pulses improvement
- Genetic resource management
- Analysis of complex traits using classical and molecular approaches
- Identification and characterization of genes
- Isolation of plant genome DNA and electrophoresis
- Molecular marker technologies & marker assisted selection.
- New approaches in genomics enabled pulses breeding
- PCR amplification and cloning of single copy genes.
- PCR Primer design and bioinformatics tools
- QTL of complex traits
- Tissue culture technique
- Genetic transformation of chickpea & pigeonpea
- Data management & statistical analysis.

2. Improving Sustainability through Grain Legumes in Cropping Systems

Course Directors: Head, Crop Production

Duration : 2 weeks
(16-31 December, 2008)

Course fee : US $ 1,500

No. of trainees per course : 10-15

Eligibility : Scientists engaged in research/teaching having M.Sc/PhD degree in Agronomy/ Soil Science/Physiology/Microbiology

Sustainability of agricultural production system refers to maintaining their ability to continue to meet the demands of the growing population without degrading the natural resources base. Green revolution has made a phenomenal increase in food grain production, hitherto the environmental costs of agricultural production has been neglected ever since green revolution.

Horizontal and vertical intensification of cropping pattern coupled with excessive dependence on chemical fertilizers and pesticides have not only polluted the environment, but also exhausted the basic natural resources (soil and water) threatening the sustainability of agricultural production system. Grain legumes are the unique crops among the human selections which act as biological factory for nitrogen fertilizer for self nutrition as well as bringing life to the soil system. As these groups of crops thrives well and produce better under low input and management conditions, they contribute positively towards sustainability of agricultural production system.

Training objective

(i) To familiarize participants about the latest advances in Pulse production technologies (ii) To strengthen the knowledge of the participants about the selection of grain legumes in the cropping systems and their management aspects. (iii) To learn the Indian experience of low cost yet sustainable method of agricultural production through legumes in cropping system.

Faculty & facilities

The Institute has well qualified internationally established scientists to impart the training and having well-equipped laboratories of Crop Production and plant Physiology.

Course Content

- Agricultural sustainability & Role of grain legumes
- Grain legumes & cropping systems in India.
- Biodiversity in Grain legumes and its utilization.
- Development of biotic and abiotic stress tolerant high yielding varieties (HYV's).
- Development of HYV suitable under various cropping systems.
- Variety development in grain legumes for different agro-eco niches
- Soil fertility management through grain legumes
- Resource conservation technologies for grain legumes production
- Suitable crops and varieties under different cropping systems
- Agroecological management of grain legumes under different cropping systems
- Physiology of grain legumes, plant types and soil microbiology

CRIJAF

Central Research Institute for Jute and Allied Fibres
Kolkata

The Central Research Institute for Jute and Allied Fibres, earlier known as Jute Agricultural Research Institute, is one of the premier institutes to deal with a family of bast fibre crops of commercial importance. The institute was founded in 1953 at its present site at Barrackpore, Nilgunj (West Bengal) under Indian Central Jute Committee and later brought under the aegis of ICAR in 1966. In keeping with the changing social needs, government policies vis-à-vis domestic and international market scenario research thrust areas are identified employing cutting edge technologies depending on its relevance with focus on commercial application.

Contact Person

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Courses

1. Improved Crop Production and Breeding Technology of Jute and Allied Fibre Crops
2. Molecular Techniques for Characterization and Diagnosis of Geminivirus

The institute deals with a family of crops like, jute (*Corchorus olitorius & Corchorus capsularis*), kenaf or roselle (*Hibiscus cannabinus* and *Hibiscus sabdariffa*), sunnhemp (*Crotalaria juncea*), ramie (*Boehmeria nivea*), siaal (*Agave sisalana*) and flax (*Linum usitatissimum*) with the objectives to improve for yield and quality in each. It has a moderately good collection of germplasm for each crop, which are regularly maintained. The institute is the nodal agency for maintenance of breeder seed/planting material stock of the crops in the country. It has advanced research laboratories and about 66 hectare area as experimental farm.

1. Improved Crop Production and Breeding Technology of Jute and Allied Fibre Crops

Course Director : Dr H S Sen

Duration : 14 days (1–14 July 2008)

Course fee : US $ 1,000 per trainee

No. of trainees per course : 10

Eligibility : M. Sc. in Agriculture/relevant field

Course Content

- Jute and allied fibre crops research—problems and prospects; Present scenario
- National and International; Jute and Allied Fibre Crops germplasm
- Current status; Variability and utilization potential; Varietal development for higher yield and quality improvement; Breeding strategy; Crop production module; Fertilizer recommendations and organic farming in jute based cropping system; Weed management; Drought management; Integrated pest and disease management; Antagonistic microbes for disease control; Improved post-harvest technology including retting; Genetic diversity analysis and DNA fingerprinting; DUS and IPR issues in jute and allied fibre crops; Diversified uses of jute and allied fibres.

2. Molecular Techniques for Characterization and Diagnosis of Geminivirus

Course Director : Dr H S Sen

Duration : 14 days (15–28 October 2008)

Course fee : US $ 1,000 per trainee

No. of trainees per course : 10

Eligibility : MSc in Agriculture/relevant field

Course Content

- Theory
  - Importance of geminivirus diseases in tropical and sub-tropical countries
  - General properties of geminivirus: morphology, transmission, symptoms caused by geminivirus, genome organization, diagnosis methods and management
- Practical
  - Isolation of viral nucleic acid through PCR
  - Cloning, restriction analysis
  - Detection of geminivirus by PCR, Southern blotting
  - Sequence analysis and relationship study

VPKAS

Vivekananda Parvatiya Krishi Anusandhan Sansthan
(Vivekananda Institute of Hill Agriculture)
Almora

The Vivekananda Parvatiya Krishi Anusandhan Sansthan is a multi crop, multi-disciplinary Research Institute for north-western hill region. Established as one man laboratory known as Vivekananda laboratory by Late Dr Boshi Sen in July 1974 at Calcutta. It was permanently shifted in 1936 to Almora. In October 1974, the Indian Council of Agricultural Research took it over to make it a 'Centre for Excellence in Hill Agriculture' and named as Vivekananda Parvatiya Krishi Anusandhan Sansthan, (Vivekananda Institute of Hill Agriculture) Almora.

Contact Person

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Courses

1. Seed Production of Major Hill Crops
2. Wasteland Management in Hills

The Institute regularly organizes short training courses for officials of the State Departments of Agriculture. During the year 2008, two international training courses, one on Seed Production of Major Hill Crops and the other on Wasteland Management in Hills, will be organized. These training programmes are open to both national and international scientists/ persons. Those interested should send their applications to the Indian Council of Agricultural Research in proforma attached with this brochure.

1. Seed Production of Major Hill Crops

Course Director : Dr Vinay Mahajan

Duration : 3 weeks (March 8-28, 2008)

Course fee : US $ 1,250
(exclusive of boarding & lodging)

No. of trainees per course : 10

Accommodation : Will be provided at Institute's guest house at reasonable cost

Eligibility : Scientific/technical persons with minimum BSc (Ag)/BSc

The course aims to cover know how to various aspects on seed production technology related to wheat, maize, rice, vegetables, pulses and small millets, the major crops grown in hills. The training imparted will be helpful to individual trainee to handle seed production programme of these crops in an efficient manner.

Training Programme

Training programme consists of

- In-house lectures on various aspects of seed production
- Practical training in field and exposure to the seed testing.
- Processing, post-harvest handling, storage and marketing of the seed.

Faculty

Highly qualified scientific staff with specialization in various aspects of seed production technology are available at the Institute.

Course Content

- Importance of quality seed, varietal development and release procedures
- Seed production procedures in general and crop-wise. Maintenance breeding, Varietal characteristics, Seed certification and harvesting
- Agronomic management. Management of disease and insect pests, post-harvest handling of seeds, molecular characterization of released cultivars and seed village concept.

2. Wasteland Management in Hills

Course Director	:	Dr A K Srivastava
Duration	:	3 weeks (8–28 September 2008)
Course fee	:	US $ 1,250 (exclusive of boarding & lodging)
No. of trainees per course	:	10
Accommodation	:	Will be provided at Institute's guest house at reasonable cost
Eligibility	:	Graduate in agriculture or Botany with experience in crop production or agro-forestry or wasteland management

Widespread land degradation that we see today in hills is a bi-product of excessive exploitation of its natural resources beyond a threshold limits resulting into ever declining production of fuel, fodder etc. There is an acute scarcity of forages in hills round the year. The crucial question at this juncture is from where and how to bridge this gap between availability and requirement, obviously we have to take account of existing land resources, their quality and production potential. For this there is a need to develop a system which can maintain the soil fertility, checks the soil erosion and supply the fodder for animal from different type of wastelands. Thus, there is an utmost need to have proper wasteland land management which will produce from marginal land and will also be capable of maintaining and improving the quality of producing environment. A specific management of land and water resources in hilly areas through appropriate vegetation measure will attain long term conservation and production need. This course will helpful in overall development of wasteland in hills.

Training Programme

The course consists of lectures on specific topics as well as brief field trips and laboratory work.

Faculty

A group of highly qualified scientific specialization in various disciplines in agriculture, are available in the Institute.

Course Content

- Land-use concept and utilization. Principles of crop production, cropping system in hills.
- Natural resource management. Sustainable land-use pattern.
- Water management, water harvesting and its utilization.
- Soil conservation techniques, soil management and tillage.
- Protected cultivation, intensive and extensive grazing, integrated catch management.
- Grassland management, strategies for fodder production, quality aspect of forage resources, conflict resolution on common property resources, extension.

NBPGR

National Bureau of Plant Genetic Resources
New Delhi

The NBPGR is nodal agency in the National Agricultural Research System that caters to the needs of germplasm augmentation, exchange, quarantine and conservation including various PGR services and back up research. It also has a significant role in the subject matter input in PGR policy and IPR related issues.

Contact Person

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Courses

1. Management of Plant Genetic Resources
2. *In vitro* Conservation and Cryo-preservation of Plant Genetic Resources

National Bureau of Plant Genetic Resources (NBPGR) was established in 1976 as the nodal agency at national level for management of plant genetic resources (PGR) for food and agriculture, and to carry out related research and human resource development. The NBPGR, with the network of its 10 regional stations located in diverse agro-climatic zones of the country, the 57 national active germplasm sites (NAGS) situated at different crop based ICAR institutions and state agricultural universities and other locations has been spearheading various activities on PGR management. The national PGR programme essentially includes- germplasm exploration and collection; germplasm exchange and plant quarantine; germplasm characterisation; PGR conservation- *ex situ* base collection, including seed bank (-20°C), cryo-bank (-156°C/-196°C) and *in vitro* bank; field genebanks for clonally propagated crops; medium-term conservation of active/working collections; on-farm conservation studies; back-up research on conservation regimes and protocols; registration of plant germplasm; PGR policy issues; DNA fingerprinting of crop cultivars; new areas related to PGR - regulation of exchange of transgenics and GMOs. Human resources development, training and postgraduate teaching in PGR has also been the major thrust.

1. Management of Plant Genetic Resources

Course Director : Dr S K Sharma

Duration : 2 weeks

Course fee : US $ 1,250

No. of trainees per course : 20

Accommodation : International Guest Houses at IARI or NASC Complex at Pusa Campus, New Delhi

Eligibility : Masters degree in botany/any branch of agricultural science preferably with experience in PGR

Objectives

To expose the participants to the whole range of basic science, policy and other related PGR management issues.

Faculty

The resource persons will be mainly from NBPGR. Experts from the national system will be invited as guest faculty In specific areas.

Course Content

- Biodiversity: an overview
- Harmonizing bioaiversity conservation and agricultural development
- The central role of agricultural biodiversity: trends and challenges
- Agro-biodiversity and plant genetic resources
- Origin and history of agriculture, centers of crop plant origin and diversity
- Importance of lndian gene centre
- Managing plant genetic resources: basic science issues
- Managing plant genetic resources: policy issues

2. *In vitro* Conservation and Cryo-preservation of Plant Genetic Resources

Course Director : Dr S K Sharma

Duration : 2 weeks

Course fee : US $ 1,250

No. of trainees per course : 20

Accommodation : International Guest Houses at IARI or NASC Complex at Pusa Campus, New Delhi

Eligibility : Masters degree in botany/any branch of agricultural science preferably with experience in PGR

Objectives

- To improve skills of participants in using tissue culture techniques for conservation and management of PGR
- To equip participants with essential knowledge necessary for developing and using cryopreservation techniques
- To enhance the use of *in vitro* conservation and cryopreservation protocols for germplasm of crops relevant in their countries

Faculty

The resource persons will be from NBPGR and Bioversity International and in specific cases international experts will be invited to give lectures.

Course Content

- Importance of *in vitro* conservation and cryopreservation techniques
- *In vitro* techniques in conservation and use cycle
- Methods of *in vitro* clonal propagation
- Methods of *in vitro* conservation
- Cryopreservation: principles and requirements
- Techniques of cryopreservation
- Cryopreservation of *in vitro* cultures
- Cryopreservation of non-orthodox seeds

DRR

Directorate of Rice Research
Hyderabad

The Directorate of Rice Research was established as All-India Co-ordinated Rice Improvement Project in 1965 to provide leadership by bringing together the scattered efforts of rice researchers in the country under a single umbrella at the national level. The project was elevated to the level of Directorate during 1975 by the addition of lead research functions to its mandate.

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Courses

1. Rice-based Cropping Systems
2. Integrated Pest Management in rice
3. Hybrid Rice Seed Production Technology

DRR has developed many location-specific and cost-effective technologies with its unique advantage of over 120 testing centers located in almost all major ecosystems in the country. The DRR conducts short-term refresher courses for the subject matter specialists and senior level extension functionaries of various state agricultural departments and state agricultural universities. It established the communication and Training Centre (CTC) in the year 1978, which is actively engaged in rice production technology. Directorate of Extension (DoE), ministry of Agriculture, Government of India strengthened the training facilities by sanctioning the Advanced Training Centre (ATC) on rice, latter on it has been chaged as centre of excellence for training in rice.

1. Rice-based Cropping Systems

Course Director : Dr Surender Pal Singh

Duration : 3 weeks
(1–20 September 2008)

Course fee : US $ 1,250 per trainee

No. of trainees per course : 15–20

Accommodation : Will be provided at very reasonable cost in institute hostel

Eligibility : Subject mater specialist/Scientist/Extn. Functionaries having B.Sc. (Ag.), M.Sc, or Ph. D. degree

The objectives of the course are:

- To identify the major constraints limiting cropping intensification under different rice ecosystems.
- To impart the latest know how technologies for rice based cropping systems under different rice growing ecologies.
- To develop location-specific action plan by the participants in order to implement the new innovations in next cropping seasons in their respective working areas.

Faculty

Experienced scientists of DRR and guest speakers from other ICAR Institutes and Acharya N.G. Ranga Agricultural University (ANGRAU), Rajendranagar, Hyderabad will constitute the faculty.

Course Content

- The art and science of multiple cropping-historical background and current developments constraints limiting the increase in cropping intensity Problems and prospects of increasing the cropping intensity in rice-based cropping systems
- Current status of varietals improvement for adjusting different crops in different crop sequences
- Stubble management, conservation tillage and selective mechanization need for land preparation, seeding and stand establishment of different crops in the rice fallows
- Rains water management and moisture conservation for intercropping and moisture conservation for intercropping and / or sequence cropping
- National needs of an explosive agriculture involving high intensity cropping and nutrient disorder
- Regenerative agriculture involving need-based and integrated nutrient management practices for selected cropping systems
- Change in pests, disease and weed associations with the changing systems and integrated pest management
- Harvesting, threshing and processing of component crops and by-product utilization
- Effective communication use of audio-visual aids/training materials and planning and extension programmes for transfer of technology
- Socio-economic consideration governing the acceptability of cropping systems

2. Integrated Pest Management in Rice

Course Director : Dr Mangal Sain

Duration : 3 weeks (10-30 October 2008)

Course fee : US $ 1,250

No. of trainees per course : 15-20

Accommodation : To be provided in institute hostel

Eligibility : Scientists, Subject Matter Specialists, extension and technical personnel engaged in plant protection activities and having BSc (Ag) or MSc or PhD degree

The objective

- to impart knowledge to identify the rice pest problems and acquaint with the available pest management options and skill;
- to acquaint the participants in analyzing agro ecosystem for taking pest management decisions and
- to appraise them the methods of educating the farmers and of communication methods for effective transfer of Integrated pest management technology

Faculty

Experienced scientists of DRR and guest speakers from other ICAR Institutes and Acharya N G Ranga Agriculture University (ANGRAU), Rajendranagar, Hyderabad will constitute the faculty.

Course Content

- Analysis of rice pest (insects, diseases, weeds, rodents, nematodes) problems-seasonal and historical profiles
- Diagnosis of insect pest, disease, weed, rodent, nematode problems and nutrient deficiencies
- Bio-ecology and management of key pests of rice
- Utility of sex pheromones in Integrated Pest Management
- Host plant resistance for insect pests of rice
- Present and future pest management options with emphasis on biological, cultural, behavioral and other non-chemical methods
- Pesticide management methods for effective and safe use
- Economic thresholds - calculation and use along with pest surveillance for decision making in pest management
- Agro-ecosystem analysis
- Educating the farmers on IPM – Practical experiences
- Communication media for different ecological and crop management regimes

3. Hybrid Rice Seed Production Technology

Course Director : Dr B C Viraktamath

Duration : 3 weeks
(1-20 October 2008)

Course fee : US $ 1,250 per trainee

No. of trainees per course : 15-20

Accommodation : To be provided in institute hostel

Eligibility : Subject mater specialist/ Scientist/ Extn. Functionaries havingB.Sc. (Ag.), M.Sc, or Ph. D. degree

The course has been developed:

- To impart knowledge an skills regarding hybrid rice seed production methods for obtaining higher seed yield
- To develop the skills of participants to perform various operations in parental line purification, CMS multiplication and hybrid rice seed production
- To acquaint the trainees with various innovative approaches in the exploitation of hybrid vigorous

Faculty

Experienced scientist of the DRR and guest speakers form other ICAR institute an Acharya N.G. Ranga Agricultural University (ANGRAU) Hyderabad will constitute the faculty.

Course Content

- Global and national status of hybrid rice
- Floral biology of rice, outlines of hybrid rice breeding and seed production
- Synchronization, prediction and adjustment of flowering
- Desirable traits of parental lines, purification and maintenance of parental lines
- Techniques of super high yielding seed production, cultural practices and input management
- Disease and insect pest management
- Harvesting and threshing, seed processing, seed testing and seed certification, economics of hybrid rice seed production, 'Gender sensitization', etc
- Effective communication, planning and implementation of the extension and the training programmes for transfer of improved hybrid seed production technologies

DOR

Directorate of Oilseeds Research
Hyderabad

Directorate of Oilseeds Research is the only organization exclusively committed to promote greater productivity and profitability of oilseed crops, viz sunflower, safflower and castor with the simultaneous concern for public health, protection of environment and sustenance of their production. DOR had its beginning as the All India Coordinated Research Project on Oilseeds in April 1967 and subsequently elevated to the status of Directorate on 1 August 1977.

Contact Person

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Project Director
Directorate of Oilseeds Research
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E-mail : director@dor-icar.org
Website : http://www.dor-icar.org

Courses

1. Hybrid Seed Production Technology in Sunflower, Castor and Safflower
2. Hybrid Purity Assessment using Molecular Markers in Sunflower, Safflower and Castor
3. Production Technology of Sunflower, Castor and Safflower-based Cropping Systems
4. Integrated Pest Management in Sunflower, Safflower and Castor
5. Microbial Control of Insect Pests and Plant Diseases

1. Hybrid Seed Production Technology in Sunflower, Castor and Safflower

Sunflower, castor and safflower are the important oilseed crops in India cultivated both under irrigated and rainfed conditions. One of the major factors for the poor spread of hybrids for yield enhancement is non-availability of quality seed. Hybrid seed production is highly skilled and location specific and the DOR has developed low input cost hybrid seed production technology for sunflower, castor and safflower. The course aims to acquaint the scientists, subject matter specialists and technical personnel of public and private sector, seed producing agencies about the latest technology on hybrid seed production of sunflower, castor and safflower.

Faculty

Senior scientists of the institute will constitute the faculty.

Course Director : Dr A R G Ranganatha

Duration : 3 weeks (2-22 January 2008)

Course fee : US $ 1,500 per trainee

No. of trainees per course : 15-20

Accommodation : It will be arranged in hostel

Eligibility : Scientists, subject matter specialists and technical personnel engaged in seed production and research

Course Content

- Theoretical and practical training on maintenance of the parental lines and certified hybrid seed production of sunflower, castor and safflower
- Production and protection technology of parental lines and certified hybrid seed production, seed certification standards
- Lectures on breeding, seed technology, agronomy, pathology and entomology in the respective crops and field visits, group discussions and practicals

2. Hybrid Purity Assessment using Molecular Markers in Sunflower, Safflower and Castor

It is well known that the success of improved variety/hybrid in the farmers' fields depend upon the availability of seeds with high genetic purity and a seeds of provenance is the most critical input which decides the effect of all other inputs in increasing the productivity. Therefore, assessing the genetic purity is of utmost importance before the seed reaches the farmers field. Also, in the context of IPR, identification of the cultivar has assumed increased significance. Conventionally, the purity of seeds is assessed using morphological markers in the field based 'Grow-Out-Test'. However, this method has several disadvantages including the environmental influence, limited variability observed for the characters, subjectivity, etc. DNA-based markers hold greater promise with several advantages, viz. high polymorphism, insensitivity to environment, stability, developmental stage independence etc. Several molecular markers have been developed and used successfully for varietal discrimination. Once the specific molecular markers are identified for each variety or hybrid, they could be used successfully to assess the genetic purity and thus could avoid the laborious GOT.

At this Directorate, molecular markers have been developed for assessing the genetic purity of hybrids in sunflower and castor.

Faculty

Senior scientists of the Directorate having expertise in different disciplines will constitute the faculty.

Course Director : Dr V Dinesh Kumar

Duration : 2 weeks (1-15 July 2008)

Course fee : US $ 1,500 per trainee

No. of trainees per course : 8-10

Accommodation : To be provided in institute hostel

Eligibility : Scientists, subject matter specialists and technical personnel engaged in seed certification and purity assessment

Course Content

- Isolation of genomic DNA
- Quantification of genomic DNA
- Gel electrophoresis
- Screening of RAPD primers to identify the markers giving robust PCR profiles
- Identification of male specific RAPD marker
- Validation of identified RAPD markers at individual plant level
- Screening of SSR primers to identify male specific markers
- Validation of the identified SSR marker at individual plant

3. Production Technology of Sunflower, Castor and Safflower-based Cropping Systems

Horizontal expansion of area under oilseeds is limited due to the declining per capita arable land and competing crops. Many efficient cropping systems involving oilseeds have been identified for different agro-ecological regions of the country. Many newer and non-traditional areas, such as paddy fallows offer great potential for extending profitable cultivation of oilseeds. The requirement of production factors for cropping systems differs from that of managing the sole crops. Concerted research efforts in working with many aspects of oilseeds including cropping systems have resulted in identifi-cation of location-specific techno-logies. Adopting recommended oilseeds production technologies in cropping system would result in efficient resource utilization and crop production with economic gain and sustainability.

Course Director : Dr B N Reddy

Duration : 3 weeks (September 2008)

Course fee : US $ 1,500 per trainee

No. of trainees per course : 15–20

Accommodation : To be provided in institute hostel

Eligibility : Agronomists involved in oilseed-based cultural management programmes

Faculty

Senior scientists of the institute will constitute the faculty.

Course Content

- Lectures on concepts of cropping systems
- Choice of varieties/hybrids, fertilizer management, weed, pest and disease management including economics of oilseeds raised under monocrop, intercrop and sequential systems in diversified agro-ecological situations

4. Integrated Pest Management in Sunflower, Safflower and Castor

Spodoptera, *Heliothis*, jassids, *Alternaria* and downy mildew are the major insect pests and diseases of sunflower. Red hairy caterpillar and semilooper are the major insect pests and wilt and *Macrophomina* root rot are the major diseases of castor. Wilt, *Alternaria* and aphids are the major biotic stresses of safflower. These pests pose a serious threat to the production of these oilseed crops. In the recent past, the over reliance and indiscriminate use of pesticides has led to acquired pesticide resistance in pests, pest resurgence and development of secondary pests besides environmental pollution and various health hazards. The plausible approach is therefore, the Integrated Pest Management to minimise the problem of various pests.

Course Director : Dr Harvir Singh

Duration : 3 weeks (October 2008)

Course fee : US $ 1,500 per trainee

No. of trainees per course : 15–20

Accommodation : To be provided in institute hostel

Eligibility : Research workers, extension personnel involved in crop protection measures in oilseeds

Course Content

- Theoretical lectures on concept of IPM; IPM approaches in Sunflower, Castor and Safflower etc.; use of bio-control and microbial agents, botanical pesticides; management of weeds etc.
- Interactions, group discussions, field visits and practicals

5. Microbial Control of Insect Pests and Plant Diseases

Course Director : Dr P S Vimala Devi and Dr D R D Prasad

Duration : 3 weeks (2-22 November 2008)

Course fee : US $ 1,500 per trainee

No. of trainees per course : 15-20

Accommodation : To be provided in institute hostel

Eligibility : Scientists, subject matter specialists and technical personnel involved in microbial control of crop pests and diseases

The approach to insect pest and disease management has seen a significant change over the years from chemical control to integrated pest management (IPM) with emphasis currently on Bio-intensive integrated management (BIPM). The shift in this paradigm is an outcome of the continuing search for eco-friendly pest management strategies driven by the impact of the ill-effects of injudicious use of chemical pesticides on human health and environment. The immediate need for sustainable, eco-friendly pest management has been felt very strongly providing an impetus to research and development of microbial pesticides. Majority of the microbial pesticides can be easily multiplied on artificial media with an immense scope for ensuring their timely availability – a pre-requisite for their effective integration into the BIPM modules. It is in this context that expertise development for effective handling and exploitation of the potential microbial agents gains utmost importance.

Faculty

Senior scientists of the institute form the faculty.

Course Content

- Lectures on the potential microbial agents
- Hands on training on various microbial techniques— Isolation, identification, maintenance and storage
- Mass multiplication of *Bacillus thuringiensis,* entomopathogenic fungi (*Nomuraea rileyi, Beauveria bassiana, Metarhizium anisopliae* etc.), fungal and bacterial anatagonists for plant disease management (*Trichoderma* spp and *Pseudomonas* spp)
- Fermentation and downstream processing
- Formulation and quality testing
- Characterization through morphological and molecular techniques
- Interactions, group discussions and visits to microbial agents production units

NRCRM

National Research Centre on Rapeseed-Mustard
Bharatpur

National Research Centre on Rapeseed-Mustard (NRCRM) was established to provide a strong leadership to the rapeseed-mustard research activities in the country and for promoting mission oriented basic, strategic and applied research during 8th plan at Bharatpur. NRCRM also has under its umbrella, All India Coordinated Research Project on Rapeseed-Mustard with 22 research and 11 verification centres across the country. It is mandated to act as National repository for rapeseed-mustard genetic resources, conduct basic, strategic and applied research to improve the productivity, quality of oil and seed meal, develop ecologically sound and economically viable agro-production and protection technologies for different situations, generate location specific, interdisciplinary information based on multilocation testing and coordiation, establish linkages and promotion of cooperation with national and international agencies and extend technical expertise and consultancies.

Contact Person

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National Research Centre on Rapeseed-Mustard
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Course

1. Improved Rapeseed-Mustard Production Technology

1. Improved Rapeseed-Mustard Production Technology

Course Director : Dr Arvind Kumar

Duration : 2 weeks
(6–18 February and 15–29 December 2008)

Course fee/ trainee : US $ 1,000 per trainee

No. of trainees per course : 10

Accommodation : To be arranged at Centre's guest house and hotels in the city (on twin sharing basis) free transport will be provided from hotel to the Centre and back.

Eligibility : Master's degree in Agronomy/Plant Breeding and working experience in oilseeds or officials nominated by Government on deputation

Training Programme

The course is designed to strengthen knowledge and skill of the participants involving in crop improvement and crop production from developing countries.

Faculty

Well-qualified and trained 21 scientists of the centre and invited speakers from the ICAR and SAUs will constitute the faculty.

Course Content

- International Rapeseed-Mustard scenario: Past, present and future
- History, origin, genetics and cytogenetics of rapeseed-mustard
- Breeding methods and varietal improvement in rapeseed-mustard
- Hybrid development in rapeseed-mustard
- Principles of seed production and distinctness, uniformity and stability testing
- Integrated nutrient management in rapeseed-mustard
- Weed management in rapeseed-mustard based cropping system
- Management of brackish water and problem soil in rapeseed-mustard
- Geographical distribution and identification of major diseases and insect-pests of rapeseed-mustard
- Integrated management of major diseases and insect-pests of Rapeseed-Mustard including bio-pesticides
- Adoption and dissemination of rapeseed-mustard production technology
- Enhancing nutrient use efficiency in rapeseed-mustard
- Computer programming and application in rapeseed-mustard production

NRCG

National Research Centre for Groundnut
Junagadh

The National Research Centre for Groundnut (NRCG) was established in the year 1979. It is mandated to conduct basic and strategic research to enhance production, productivity and quality of groundnut; act as the national repository of working collection of groundnut germplasm and information on groundnut research; establish relevant institutional linkages, offer consultancy and training, and to provide logistic support and coordination mechanism for generation of location specific technology through the All India Coordinated Research Project on Groundnut.

Contact Person

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Courses

1. Management of Aflatoxin contamination in Groundnut
2. Enhancement of Drought Tolerance in Groundnut
3. Integrated Pest Management in Groundnut

1. Management of Aflatoxin contamination in Groundnut

Course Director : Dr M S Basu

Duration : 7 days (23–29 August 2008)

Course fee : US $ 750 per trainee

No. of trainees per course : 5

Accommodation : Will be provided at guest house or hotels at reasonable cost

Eligibility : Scientist/Technical/Extension personnel with post-graduation in Agriculture/Allied subject

Faculty

Experienced and qualified scientists of the centre constitute the faculty.

Course Content

- Toxic effect of aflatoxin in man and animals
- Aflatoxin contamination and world groundnut trade
- Sampling and analytical procedures for aflatoxin determination
- Strategies for minimizing aflatoxin contamination in groundnut

2. Enhancement of Drought Tolerance in Groundnut

Course Director : Head, Crop Improvement Unit

Duration : 5 days (5–9 August 2008)

Course fee : US $ 750 per trainee

No. of trainees per course : 5

Accommodation : Will be provided at guest house or Hotels at reasonable cost

Eligibility : Research workers with post-graduation in branch of Agriculture/Allied subjects

Faculty

Experienced and trained scientists of the centre constitute the faculty.

Course Content

- Characterization of drought and its patterns
- Morpho-physiological traits associated with drought tolerance
- Genotype—environment interaction
- Measurement of water use efficiency

3. Integrated Pest Management in Groundnut

Course Director : Head, Crop Protection Unit

Duration : 5 days (5–9 September 2008)

Course fee : US $ 750 per trainee

No. of trainees per course : 5

Accommodation : Will be provided at guest house or Hotel

Eligibility : Post-graduation on relevant fields

Faculty

Experienced and trained scientists of the centre constitute the faculty

Course Content

- Components of IPM in groundnut
- Principles of development of IPM components
- Methods of testing and evaluating the components and their integration

NRCS

National Research Centre for Soybean
Indore

National Research Centre for Soybean was established in 1987 to provide centralized support to the production systems research with basic technologies and breeding material of soybean (*Glycine max* L. Merrill). The NRCS functions to empower and enable the organisations involved in soybean R&D to tackle location-specific problems. The Centre is mandated to conduct basic and strategic research in soybean and soybean-based cropping systems.

Contact Person

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Fax : +91-731-2470520
E-mail : director@nrcsoya.com
Web-site : www.nrcsoya.com

Course

1. Improved Production Technology of Soybean

1. Improved Production Technology of Soybean

Faculty

Well qualified faculty are available at the centre

Course Director : Dr G S Chauhan

Duration : 3 weeks (1–21 September 2008)

Course fee : US $ 1,250 per trainee

No. of trainees per course : 5–10

Eligibility : BSc (Ag.)/MSc (Ag)

Course Content

- Breeding technology, seed production, related IPR issues
- Mineral nutrition, cultural practices and cropping systems
- Pest (including weeds) and disease management
- Crop physiology, microbiological and biochemical aspects, post-harvest technology, farm implements and transfer of technology

NCIPM

National Centre for Integrated Pest Management
New Delhi

National Centre for Integrated Pest Management (NCIPM) was established in February 1988 to cater to the emerging plant protection needs of agriculture in the country. The activities of NCIPM extend across and beyond different disciplines and agencies to establish partnerships with ICAR institutes, SAU's, Government agencies, industries, NGOs and farmers.

Contact Person

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Director
National Centre for Integrated Pest Management
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Courses

1. Integrated Pest Management in Selected Field Crops
2. Bt Cotton : A Change in Pest Scenario and Reorientation of IPM

The Centre has successfully demonstrated IPM technology for rice, cotton, oilseeds and pulses in farmers participatory mode. The centre has developed softwares on Pest Management Information System (PMIS) and databases on plant protection recommendations for important field crops. More than ten national training programmes comprising of IPM in rice, cotton, vegetables and oilseeds and mass production of biocontrol agents have already been conducted.

1. Integrated Pest Management in Selected Field Crops

Course Director	: Dr O M Bambawale
Duration	: 3 weeks (October-November 2008)
Course fee	: US $ 1,500
No. of Trainees	: 15-20 per course
Accommodation	: To be arranged in International Guest House
Eligibility	: Scientists, Extension and technical personnel engaged in IPM/plant protection research/ teaching/or extension activities with B.Sc. (Ag.) or M. Sc. degree in the relevant field.

Training programme

The training programme covers lectures and hands on practicals, visit to adopted IPM villages and other laboratories, scientific discussion and interaction with researchers and with farmers adopting IPM.

Faculty

Experienced Scientists of NCIPM, and guest speakers from IARI and other ICAR institutes will constitute the faculty.

Course Content

- Sustainable crop protection through IPM strategies: Global scenario
- Role of taxonomy in IPM
- Mass production, storage and field release of natural enemies
- Role of ITK in IPM
- Use of Information technology in IPM
- Management of non insect pests like rodents
- Advance techniques in management of storage pests
- Management of nematode pests
- Role of IPR in IPM
- Monitoring and forecasting in IPM
- Role of transgenics in IPM
- Neem and other botanicals in IPM
- Molecular detection techniques for virus diagnosis and management
- On farm validation of IPM in rice and cotton
- Development and validation of IPM in oilseeds and vegetables
- IPM in corn and other coarse grains
- Integrated weed management
- Adoption and socio-economic aspects of IPM technology

2. Bt Cotton : A Change in Pest Scenario and Reorientation of IPM

Course Director	: Dr O M Bambawale
Course Coordinator	: Dr P Jeyakumar
Duration	: 3 weeks (August-September 2008)
Course fee	: US $ 1,500
No. of Trainees	: 15-20
Accommodation	: To be arranged in ICAR Guest House
Eligibility	: Scientists, Extension and Technical personnel involved in Cotton IPM research / demonstration / dissemination / teaching with a basic degree in agriculture B.Sc. (Ag.) or M.Sc. degree in the relevant field.

Introduction

India is an unique country with multi varied agro ecosystems growing all the four species of cultivated cotton. It is the only country where, Bt cotton in the form of hybrids is being cultivated, which occupied more than one third of cotton area in 2006, and is expected to cross 60 % in 2007. This led to a change in pest scenario, in cotton in India. The thrips incidence is on the increase, which appears to be attributable to the seeds treated with imidacloprid. The severe incidence of mealy bugs was observed in many areas, especially in Gujarat. Incidence of *Spodoptera* in Bt cotton (Cry 1 Ac) as a foliage feeder during the later parts of plant growth throughout the coutry. Incidence of

Course Content

- Introduction to *Bacillus thuringiensis* and mode of action of Cry proteins
- Concept of development of Bt transgenics with special reference to cotton
- Bt cotton cultivation – The International and Indian scenario
- Bio safety aspects related to release and commercial cultivation of Bt cotton
- Impact of abiotic factors on Bt cotton cultivation
- Why and How of emerging insect pest problems in Bt cotton
- Why and How of emerging diseases including parawilt of Bt cotton
- Integrated Nutrient Management of Bt cotton under different soil and agronomic conditions
- Performance of Bt cotton under different agro eco system in different cotton zones – Case Study
- Role of pest forewarning models in Bt cotton and interaction of pest and weather
- Agronomic manipulations for the management of insect pests in Bt cotton
- Field Visit to different agro eco-system to gain on-farm experience on performance of Bt cotton
- To assess the damage due to emerging pest problems on Bt cotton
- To interact with Bt cotton growing farmers
- Sharing field experience and exchange of views among participants
- Botanical insecticides and their role in management of emerging sucking pest problems in Bt cotton
- Impact of Bt cotton on natural enemies in cotton eco system
- Bio control agents (Parasitoids and Predators) and their production for the management of emerging insect pests in Bt cotton
- Integrated disease management for Bt cotton
- Resistance against Bt cotton and its management
- Organic farming practices in Bt cotton
- Role of microbial agents in the management of emerging insect pests in Bt cotton and their production with special reference to Sl NPV
- Integrated management of emerging pests in Bt cotton
- Role of Private Industries in improving the performance of Bt cotton – An interaction with Industry Representative

Mirid Bug

Grey Mildew

mirid bug, *Creontiodes biseratense* (Distant) has become more serious causing the drop of immature fruiting parts. The incidence of shoot weevil in central zone as well as stem weevil in Tamil Nadu on Bt cotton is increasing. More attack of biotic stresses such as grey mildew, leaf spots, rusts, etc. in extended Bt cotton hybrids were also noted. Now it is a high time for reorienting IPM approach in cotton. Development and implementation of suitable protection and related production packages is the need of the day for improving the performance of Bt cotton.

NCIPM : Centre of Excellence in Bt Cotton IPM

National Centre for Integrated Pest Management (NCIPM) established in February, 1988, has demonstrated IPM technologies in various crops with special emphasis on cotton, which is evident from the successful IPM model in Astha village of Maharashtra State. The recently concluded Integrated Pest Management project of Technology Mission on Cotton, also demonstrated utility of IPM in Bt cotton in around 60 villages spread throughout the country. Besides, this centre also regularly imparts training to the personnel from State Agricultural Universities (SAU's), State Agriculture Department (SAD's), Krishi Vigyan Kendras (KVK's), Non Governmental Organizations (NGO's), farmers, etc. in IPM in different crops.

Faculty

NCIPM has experienced scientists in the different disciplines such as Entomology, Plant Pathology, Nematology, Agricultural Chemicals, etc. besides, the guest faculty from IARI, NRCPB and other institutes also will share their experiences with participants.

Mealy Bugs ⟶

IIHR

Indian Institute of Horticultural Research
Bangalore

The Indian Institute of Horticultural Research was established on 5th September 1967 at the headquarters of Indian Council of Agricultural Research, New Delhi and later shifted to Bangalore on 1st February 1968. The Institute has experimental lands with excellent state of art infrastructure facilities for conducting basic as ell as applied research on horticultural crops.

Contact Person

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Courses

1. Post-Harvest Management in Tropical and Sub-tropical Horticultural Crops
2. Integrated Pest Management in Tropical and Sub-tropical Horticultural Crops
3. Protected Cultivation in Vegetable and Ornamental Plants
4. Integrated Nutrient and Water Management Techniques in Horticultural Crops
5. Tropical Viticulture

These facilities coupled with a pool of talented, experienced scientific and technical human resources (154 scientists, 22 technicians, 93 administrative and accounts, and 165 supporting staff) makes the Institute a premier

organisation for research, teaching and extension in all branches of horticultural science. While serving as repository of genetic material and scientific information related to horticulture, the institute is also engaged in dissemination of these information through various human resource developmental programmes such as training programmes, seminars, symposiums, brain storming sessions, technical consultancy services, field based extension programmes etc. The institute also organizes international training programmes on many aspects of tropical horticulture. Some of these programmes are being planed for the year 2008-09.

1. Post-Harvest Management in Tropical and Sub-tropical Horticultural Crops

Course Director : Dr S D Sikhamany

Duration : 11 days (15–25 October 2008)

Course fee per trainee : US $ 2,400

No. of trainees per course : 10

Accommodation : Participants will be accommodated in the hotels at Bangalore City. Transport will be provided to the trainees to commute between the institute and the city.

Eligibility : Bachelor's degree or equivalent in Agriculture, Horticulture, Biology with basic knowledge of horticultural crops productivity and technology

Training programme

The present course is designed to strengthen the knowledge and skill of the participants on the techniques to minimize the pre and post-harvest losses of horticultural crops and also to provide value addition. This course also will provide information on post harvest management of pest and diseases, pesticide residual in fruit and vegetables, mechanization and economic feasibility of establishing small-scale co-operative processing units.

Faculty

The institute has highly trained devoted and motivated scientists, who are working in frontier areas of horticultural science.

Course Content

- Recent Developments in Post harvest management of horticultural crops
- Handling, Packing and storage of fresh fruits, vegetables
- Preservation of fruits and vegetables by fermentation
- Processing of fresh fruits and vegetables
- Harvesting and posts harvest handling of cut flowers
- Post harvest management of pests in fruits and vegetables and their management
- Post harvest diseases of fruits and vegetables and their management
- Pesticide residues in fruits and vegetables
- Economic feasibility of establishing a small scale cooperative processing unit in rural areas
- Development of packages for export of horticultural produce
- Scope for mechanization of pickle manufacturing in the new millennium
- Visit to commercial horticultural crop processing industries and firms in and around Bangalore and CFTRI, DFRL in Mysore

2. Integrated Pest Management in Tropical and Sub-tropical Horticultural Crops

Course Director : Dr S D Sikhamany

Duration : 11 days (13-23 November 2008)

Course fee : US $ 2,300 per trainee

No. of trainees per course : 10

Accommodation : Participants will be accommodated in the hotels at Bangalore City. Transport will be provided to the trainees to commute between the institute and the city

Eligibility : Bachelors degree of equivalent in Agriculture/ Horticulture, Biology with at least 3 years of experience in the diseases and insect pest management of horticultural crops.

Training programme

Despite the widespread use of insecticides and fungicides, the pest damage course heavy yield losses (30-32%) in horticultural crops, Indiscriminate use of hazardous pesticide to control pests in horticultural crops disturbs the biodiversity of natural enemies, encourages the outbreak of secondary pests and disease, promotes resistance to pesticides and pollutes the food and ecosystem, and therefore, there is a need of integrated insect-pest and disease management. Hence, this training will provide is designed to strengthen the knowledge and skill of the participants from developing countries on the integrated approach using resistance breeding, botanicals and bio-pesticides, cultural and Bio-control methods in management of pests and diseases in horticultural crops.

Faculty

The institute has highly trained, experienced and motivated scientists, who are working in frontier areas of horticultural sciences.

Course Content

- Integrated Pest Management in Fruit crops
- Integrated Pest Management in Vegetable crops
- Pest Management in Ornamental, Medicinal and Aromatic crops
- Microbial control of Horticultural crop pests
- Biological control of Horticultural crop pests
- Integrated Nematode Management in Horticultural Crops
- Breeding for Pest and Disease Resistant varieties of Horticultural Crops
- Management of Pesticide residues in Fruits, Vegetables and Ornamental Crops
- Integrated Weed Management Practices in Horticultural crops
- Application of Biotechnology in development of Insect pest resistant varieties in Horticultural crops
- Application of Bio-pesticides in IPM of Horticultural crops
- Study Tour to IPM farmers fields and Bio-control research laboratories

3. Protected Cultivation in Vegetable and Ornamental Plants

Course Director : Dr S D Sikhamany

Duration : 11 days, (10–20 December 2008)

Course fee : US $ 2,400 per trainee

No. of trainees per course : 10

Accommodation : Participants will be accommodated in the hotels at Bangalore City. Transport will be provided to the trainees to commute between the institute and the city.

Eligibility : Bachelor's degree or equivalent in Agriculture, Horticulture, Biology with basic knowledge of horticultural crops productivity and technology.

Training programme

Protected cultivation provides much needed protection against both biotic and abiotic stresses. Vegetable yield increases by 2-3 times and superior quality vegetables and flowers are produced when grown under protected structures. Year round cultivation of superior quality vegetables in a green house is the need of the day to regulate continuous supply to the quality conscious consumers in near and far markets. The major hurdle in spread of this proven technology is the initial cost of the structure, which can be reduced considerably by using locally available material for construction of the green house. The present course is designed to strengthen the knowledge and skill of the participants on the techniques on protected cultivation. The course will empower the trainees on various aspects of cultivation, fertigation, Designing and fabrication of various structures for protected cultivation, plant protection techniques under protected environment.

Faculty

The institute has highly trained devoted and motivated scientists, who are working in frontier areas of horticultural sciences.

Course Content

- Advanced production technology for quality production of selected fruits, vegetables, ornamental crops and mushrooms
- Protected cultivation of high-value vegetables and ornamental crops
- Designing and fabrication of structures for protected cultivation of vegetables and ornamental crops
- Advances in production and management of dryland horticultural crops
- Integrated nutrient management techniques in horticultural crops
- Advances in integrated pest management in horticultural crops
- Advances in integrated disease management in horticultural crops
- Tissue culture and micro-propagationof horticultural crops
- Advances in post-harvest technology of horticultural crops
- Economics of production and marketing of commercial horticultural crops
- Visit to commercial and exort oriented production, marketing and processing units of horticultural crops

4. Integrated Nutrient and Water Management Techniques in Horticultural Crops

Training programme

Nutrient and water management plays a vital role in realizing targeted production in Horticultural crops. Providing water based on the need and stage of the crops is important in utilizing water judiciously and to realize higher yield per unit water. Horticultural crops being long duration ones, needs continuous supply of nutrient for better growth and productivity. In recent times there is increased demand for micronutrient in most of the horticultural crops. The interaction of water and nutrient is also very much important in achieving better growth, yield and productivity. Due to the limited availability of water and increased cost of fertilizers it is essential to give attention for judicious management of both these critical inputs. There is increase awareness on use of drip irrigation and also fertigation. The Institute has standardised irrigation and fertilizer management schedule for most of the horticultural crops. This training programs aims at providing complete knowledge and skill on efficient and integrated use of both water and nutrients in realizing higher yields of horticultural crops.

Faculty

The institute has highly trained devoted and motivated scientists, who are working in frontier areas of horticultural sciences.

Course Director : Dr S D Sikhamany

Duration : 11 days (15-25 January 2008)

Course fee : US $ 2,400 per trainee

No. of trainees per course : 10

Accommodation : Participants will be accommodated in the hotels at Bangalore City. Transport will be provided to the trainees to commute between the institute and the city.

Eligibility : Bachelor's degree or equivalent in Agriculture, Horticulture, Biology with basic knowledge of horticultural crops productivity and technology.

Course Content

- Importance of integrated nutrient and water management in horticultural crops
- Integrated Water management techniques in fruit, vegetable, ornamental, medicinal and Aromatic crops
- Integrated Nutrient management techniques in fruit, vegetable, ornamental, medicinal and Aromatic crops
- Principles and interpretation of leaf, soil and water analysis for nutrient management in horticultural crops
- Fertilizer management in horticultural crops based on isotopes studies
- Growing horticultural crops under saline and sodic soils
- Micro irrigation and fertigation methods in horticultural crops
- Micro irrigation and fertigation practices in fruit, vegetable, ornamental, medicinal and Aromatic crops
- Diagnosis and management of Micro-nutrients in horticultural crops
- Role of Biofertilizers in horticultural crops
- Visit to farmers fields and commercial organisations

5. Tropical Viticulture

Course Director : Dr S D Sikhamany

Duration : 11 days (16-26 August 2008)

Course fee : US $ 2,400 per trainee

No. of trainees per course : 10

Accommodation : To be arranged in hotels of Bangalore City. Transport will be provided to the trainees to commute between the institute and the city

Eligibility : Bachelor's degree or equivalent in Agriculture/ Horticulture/Biology with basic knowledge of fruit production and at least three years' experience in fruit production and closely related subjects

Training programme

Grapes are one of the important fruit crops having multiple uses. Grape has got demand as fresh fruit, resins, wine and ready-to-serve juice. The course is designed to strengthen the knowledge and skill of the participants on the techniques in tropical viticulture. The course will cover all aspects of grape production including planting, training, location-based agro techniques, plant protection, post-harvest value-addition and economics of production.

Faculty

The institute has highly trained devoted and motivated scientists, who are working in frontier areas of horticultural sciences.

Course Content

- Crop improvement and improved varieties of grapes
- Agro-techniques of grapes including pruning and training techniques
- Integrated nutrient and water (including drip irrigation, fertigation) management techniques for grapes
- Integrated insect pest management (including biocontrol and nematode management) in grapes
- Pesticide residues analysis and their management in grapes
- Post-harvest management (handling, storage, preservation and processing) in grapes
- Economics and production and marketing of grapes
- Field visits and study tours to various relevant organizations and grape farmers field

A view of the interaction of Trainees and resource persons

CPCRI

Central Plantation Crops Research Institute
Kasaragod

Central Plantation Crops Research Institute (CPCRI) was established in 1970 as one of the agricultural research Institutes in the National Agricultural Research System under the Indian Council of Agricultural Research (ICAR). The primary mandate of the Institute is to develop appropriate production, protection and processing technologies for coconut, arecanut and cocoa and to transfer the same to farmers through the co-operation of developmental departments and other agencies.

Contact Person

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Courses

1. Organic Farming Technologies for Palm-based Cropping Systems
2. Biological Supression of Coconut Pests

The Institute will be organizing two International training programmes during the year 2008 as per the following details.

1. Organic Farming Technologies for Palm-based cropping Systems

Course Director : Dr George V Thomas

Duration : 7 days (12-18 November 2008)

Course fee : US $ 1,000 per trainee

No. of trainees per course : 10

Accommodation : To be provided in the Institute's guest house/ hotel

Eligibility : Scientist/Technical/Extension personnel in Agriculture/Allied subjects

Worldwide, there is an ever increasing demand for organically grown agricultural produce and products. This trend is likely to continue in future and farmers who produce crops through organic farming methods may get a premium price for their produce. Palms like coconut and arecanut are vital to the agricultural economy of large number of small farmers in many countries. The growth habit and planting methods of coconut and arecanut make them highly suitable for managing through organic farming. The planting methods of these palms also make possible to accommodate a number of intercrops capable of adding lots of organic wastes to the system and recycling of these wastes within the system make it productive even in the absence of external inputs.

The proposed international training programme aims to impart knowledge and skills to the participants about various aspects of organic farming technologies for palm based cropping systems. The key contents of the course include concept of organic farming in plantation crops, biomass availability for recycling in coconut based farming systems, vermicomposting techniques, microbial inoculants for composting, nutrient and microbial analysis of composts, field experiments on chemical fertilizer substitution with organic manures, soil fertility and plant analysis, green manure legumes and nitrogen fixation, and production and use of biofertilizers.

Faculty

Eminent research scientists with vast experience in plantation crops are available in the Institute.

Course Content

- Concept of organic farming in plantation crops
- Biomass availability for recycling in coconut-based farming systems
- Vermicomposting techniques
- Microbial inoculants for composting
- Nutrient and microbial analysis of composts
- Soil fertility and plant analysis
- Green manure legumes and nitrogen fixation
- Production and use of biofertilizers

Photo 2, 3: Vermicomposting of coconut leaves

2. Biological Suppression of Coconut Pests

Coconut palm grown widely in the South East Asian Countries, Pacifics and also in many parts of Africa and Latin America provides livelihood to millions of small and marginal farmers. The crop is subjected to infestation by a large number of insect and non-insect pests. There has been considerable efforts to develop IPM strategies to combat the pest problems in various countries. The natural enemies of pests play a pivotal role in suppression of various pests on coconut. In India much attention has been given to develop biocontrol methods of managing major pests and against two major pests viz; rhinoceros beetle (*Oryctes rhinoceros* L.) and leaf eating caterpillar (*Opisina arenocella* Wlk.) effective biocontrol strategies cold be developed and implemented.

The key contents of the proposed international training programme include bio-ecology of major pests of coconut in India, major pests of international status, biocontrol agents of major pests of coconut, laboratory mass multiplication and maintenance of biocontrol agents and norms for their field release and role of biocontrol programme as an integral part of Integrated Pest Management System in coconut.

Faculty

Experienced scientists of the Institute will constitute the faculty.

Course Director : Dr C P R Nair

Duration : 7 days (10-16 December 2008)

Course fee : US $ 1,000 per trainee

No. of trainees per course : 15

Accommodation : To be provided in guest house/hotels

Eligibility : Scientists, extension and technical personnel Agriculture/allied subjects

Course Content

- Seasonal occurrence, life history and control of major pests of coconut
- Pest population, assessment and sampling technique
- Natural enemies and biological suppression of major pests of coconut, parasites, predators, pathogens and entomophilic nematodes
- Laboratory mass multiplication, norms for field release
- Setting up of biological control laboratory

Oryctes rhinoceros *grubs infected with* Metarhizium anisopliae

Goniozus nephantidis, *a promising larval parasitoid of* Opisina arenosella

CTCRI

Central Tuber Crops Research Institute
Thiruvananthapuram

The Central Tuber Crops Research Institute (CTCRI) established in 1963 at erstwhile Trivandrum, now Thiruva-nanthapuram, has the pride of being one of the world's leading research institutes devoted to the improvement of tropical tuber crops.

Contact Person

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Website : http://www.ctcri.org

Course

1. Tuber Crops Production and Processing Technology

1. Tuber Crops Production and Processing Technology

Course Director : Dr S Edison

Duration : 2 weeks (9-22 October 2008)

Course fee : US $ 1,200 per trainee

No. of trainees per course : 20

Accommodation : To be provided in the Institute's guest house

Eligibility : Graduate in Agriculture/Biology

The training programme covers lectures and practicals, visit to outreach field programmes etc.

Faculty

Eminent research scientists with vast experience in tuber crops are available in the Institute.

Course Content

- Importance of tuber crop varieties
- *In vitro* conservation and rapid multiplication of planting material
- Nutrient management, nursery techniques, soil and climatic requirement, growth physiology, drought tolerance
- Tuber crops cropping system, agro-techniques, bio-fertilizer, water, pest and diseases management
- Value added products and processing technologies, recipes from tuber crops, post-harvest tools and implements, etc.
- Technology transfer and field testing, economics and resource utilization in tuber crops

CISH

Central Institute for Sub-tropical Horticulture
Lucknow

Central Institute for Subtropical Horticulture, Lucknow was established on 1st June 1984 to undertake basic and applied research, to enhance productivity and develop value chain of major and minor fruit crops, viz., mango, guava, papaya, aonla, bael and underutilized fruits (Jamun, phalsa, tamarind, mahua, chironji, khirnee, etc.); to act as national repository of above fruit crops; to act as a centre for human resource development and provide consultancy to stakeholders; to develop linkages with National and International agencies.

Contact Person

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Courses

1. Advances in Improvement of Subtropical Fruit Crops
2. Production Technology for Subtropical Fruit Crops
3. Integrated Pest Management in Mango
4. Integrated Management of Guava Diseases and Pests
5. Post Harvest Management of Mango
6. Value Addition in Subtropical Fruits

CISH, Lucknow has been providing training on improvement, production, protection and post harvest management of subtropical fruit crops. Many farmers, officials from Government, NGOs, students, researchers and entrepreneurs have been trained on various aspects of fruit production. The Institute has good facilities for training such as air-conditioned lecture hall and auditorium, audio-visual aids, well equipped laboratories and hostel facilities.

1. Improvement of Subtropical Fruits

Course Director : Dr Ramesh Chandra

Duration : 2 weeks

Course fee : US $ 1,250 per trainee

No. of trainees per course : 25

Accommodation : Will be provided by the Institute

Eligibility : Scientists/Extension functionaries/ University teachers

The Institute has been a pioneer in research on improvement of subtropical fruit crops such as mango, guava, bael and aonla. The Institute has the largest world germplasm collection of mango with nearly 708 accessions collected from different indigenous and exotic sources. A mango hybrid variety 'Ambika' has been released for commercial cultivation by the Institute. In guava, Lalit and Shweta have been released. In bael, two promising selections have been released as CISH B-1 and CISH B-2. Institute has developed production technology of mandate crops. The training module has been designed to cover the improvement of sub-tropical fruit crops.

Training Programme

Objectives

- To expose trainees on recent advances in improvement of Sub-tropical fruit crops.
- To give hands on experience/practical training on improvement of subtropical fruit crops.

Faculty

CISH has experienced scientists and trainers in all the disciplines of sub-tropical fruit crops

Course Content

- Present Status and future needs for improvement of sub-tropical fruits.
  - Global and national scenario
  - Researchable issues
- Advances in germplasm management of subtropical fruit crops.
- Improvement of subtropical fruits through selection.
- Breeding strategies for improvement of subtropical fruits.
- Exploitation and utilization of genetic resource of minor and underutilized fruit crops for improvement of jamun, khirni, karonda, woodapple, mahua etc.
- Role of molecular markers in germplasm management and improvement of fruit crops.
- Transgenic fruit crops: An emerging tool for improving fruit crops.
- *In vitro* conservation of fruit germpiasm: A new paradigm.
- Advanced tools for improvement of fruit crops.
  - In vitro cellular selection
  - Embryo rescue technique
  - Anther culture
- IPR issues concerning fruit varieties.
  - Geographical Indications
  - Protection of varieties

2. Production Technology of Subtropical Fruits

Course Director : Dr S R Bhriguvanshi

Duration : 2 weeks

Course fee : US $ 1,250 per trainee

No. of trainees per course : 25

Accommodation : Will be provided by the Institute

Eligibility : Scientists/Extension functionaries/ University teachers

Objectives

- To expose trainees on recent advances in production of Sub-tropical fruit crops.
- To give hands on experience/practical training on production of subtropical fruit crops.

Faculty

CISH has experienced scientists and trainers in all the disciplines of sub-tropical fruit crops

Course Content

- Overall view on subtropical fruits, development and scope
  - Global and national perspectives
  - Researchable issues
- Nursery production
  - Hi-Tech fruit nursery management for mass production of plants.
  - Micro propagation techniques
  - Optimal or multifunctional use of green houses and polyhouses
- Soil and nutrient management
  - Land suitability for various subtropical fruits
  - Fruit production in problem soils
  - Nutrient requirement of various subtropical fruits
  - Nutrient disorders and their management for increasing productivity
  - Organic fruit production
  - Integrated nutrient management
- Water Management
  - Present status of water resources and their management
  - Quality of irrigation water
  - Basic principles in irrigation
  - Systems and methods of irrigation
  - Micro irrigation and fertigation
- Canopy Management
  - Pruning and training of fruit trees
  - High density orchard ing-advances and future perspectives
  - Meadow orcharding
  - Rejuvenation of unproductive and senile orchards
- Nature and control of irregular bearing in mango
- Physiological disorders in fruit crops
- Mechanization in fruit production-technologies and future perspectives
- Use of information technology in orchard management Economic evaluation of subtropical fruits

3. Integrated Pest Management in Mango

Course Director : Dr S R Bhriguvanshi

Duration : 2 weeks

Course fee : US $ 1,250 per trainee

No. of trainees per course : 25

Accommodation : Will be provided by the Institute

Eligibility : Scientists/Extension functionaries/ University teachers

Indiscriminate use of pesticides lead to problems like insect pest and disease resistance to pesticides, resurgence of insect pests and diseases, risk to human and animal health and environmental pollution. During the last three decades or so, pesticide use in mango production had been dominating our efforts for insect pest and disease management. However, in recent years the use of pesticides in mango production is being discouraged largely due to the emergence of many problems and use of eco-friendly IPM technologies are being encouraged for protecting environment and sustainable mango production. One of the main constraints for low productivity in mango is infestation/ infection of insect pests and diseases. Insect pest and disease management is very important for the profitable cultivation of mango. Some of the pests and diseases are so important that, if, proper control measures are not undertaken in time, there is total loss of the crop. For example mango hopper and powdery mildew affect the blossom of mango almost every year and, if, timely and proper control measures are not adopted there may be total loss of crop. Similarly other insect pests and diseases also cause severe loss. IPM programme will minimize use of pesticides, save environment and boost mango production. Institute has done pioneering work in the management of these diseases and insect pests. Various methods for the management of mango diseases and pests viz. chemical, biological and cultural were worked out at this Institute with identification of most favourable period of their occurrence, pathogens and insects involved, factors responsible for their occurrence etc. It is required to educate guava/ mango workers for the concept of IPM for the efficient management of these problems to increase the mango production.

Training Programme

Objectives

- To expose the participants about Integrated Pest and Disease Management in mango.
- To educate participants about the current national and international scenario of pests and diseases of mango.
- To educate trainees about the bioecology/epidemiology of insect pests and diseases.
- To apprise participants about latest techniques of IPM.

Course Content

- Concept of IPM in fruit crops.
- National and international scenario of insect pests and diseases of mango.
- Identification of insect pests and diseases of mango.
- Bio-ecology, population dynamics and forecasting of major insect pests.
- Etiology, epidemiology and forecasting of major diseases.
- Loss assessment in pre and post harvest insect pests and diseases.
- Management of stone weevil and fruit flies by vapour heat treatment and irradiation for export.
- Post harvest disease management through hot water treatment.
- Management of insect pest and diseases through cultural, mechanical, biological and chemical means.

Faculty

CISH has experienced scientists in the field of IPM of mango. Besides, faculty will also be drawn from internationally reputed organizations as well as experienced retired scientists in the field.

4. Integrated Management of Guava Diseases and Pests

Guava suffers badly due to several important diseases and insect pests, hence management of diseases and pests are important for increasing the production of guava. Wilt, anthracnose, several post harvest diseases, stem borer, bark eating caterpillar, fruit borer, fruit flies etc. are some of the important problems of guava, which directly affect the guava production. Institute has done pioneering work in the management of these diseases and insect pests. Various methods for the management of guava diseases and pests viz., chemical, biological and cultural were worked out at this Institute with identification of most favourable period of their occurrence, pathogens and insects involved, factors responsible for their occurrence etc. Guava is a perishable fruit and consumed raw. Hence, management of guava diseases and pests requires special care. Considering the toxicity of chemicals, IPM and eco-friendly management is the need of hour. The concept of IPM has undergone radical change in recent years. It is to educate guava workers for the concept of IPM for the efficient management of these problems to increase the guava production.

Course Director : Dr A K Misra

Duration : 2 weeks

Course fee : US $ 1,250 per trainee

No. of trainees per course : 20

Accommodation : Will be provided by the Institute

Eligibility : Scientists/Extension functionaries/ University teachers

Training Programme

Objectives

- To expose the participants to the range and themes of Integrated Disease and Pest Management.
- To educate participants about the current national and international scenario of diseases and pests of guava.
- To educate trainees about the bioecology/epidemiology of pests and diseases.
- To apprise participants about latest techniques of IPM.

Faculty

CISH has experienced scientists in the field of IPM of guava. Besides, faculty will also be invited from internationally reputed organizations and well experienced retired scientists in the field.

Course Content

- Concept of IPM in fruit crops.
- National and international scenario of diseases and insect pests of guava.
- Identification of diseases and pests of guava.
- Bio-ecology and population dynamics of major pests.
- Etiology and epidemiology of major diseases.
- Cultural and molecular variability in pathogens of guava.
- Loss assessment in pre and post harvest diseases and pests.
- Management of pest and diseases through cultural, biological and chemical means.

5. Post Harvest Management of Mango

Course Director : Dr M D Singh

Duration : 2 weeks

Course fee : US $ 1,250 per trainee

No. of trainees per course : 25

Accommodation : Will be provided by the Institute

Eligibility : Scientists/Extension functionaries/ University teachers

India is the largest producer of mango in the world. Fresh fruits account for a lion's share in the marketing of mango followed by processed products. But due to improper post harvest practices and lack of processing facilities, the loss in quality and quantity is very high after harvest. In order to reduce this loss, efficient post harvest management practices should be adopted right from harvesting to marketing. Mango, being a subtropical fruit, is much more perishable than temperate fruits and causes specific problems in conservation and transportation. The quantitative and qualitative losses in fruits after harvest occur mainly due to some biochemical, physiological and mechanical changes or damages. The rate at which changes occur in harvested fruit may be influenced by some environmental factors viz., temperature, humidity and atmospheric composition. All these factors can be manipulated by careful management of post harvest handling and storage operations for obtaining better quality and longer shelf life. All fruits (even different cultivars of the same fruit) have highly specific requirements and tolerances to storage environments.

The Institute has developed a protocol for export of mango cv. Dashehari. The Institute has very good experience in research and training in the area of post harvest management of mango. This programme provides an excellent opportunity for the participants to acquire knowledge towards minimizing the post harvest losses through information on maturity indices, physiological changes in fruit after harvest, handling and storage requirements.

Objectives

- To familiarise and update the knowledge of participants about post harvest technologies of fresh mangoes.
- To affect improvement in existing protocols for export of mango through brain-storming interactions.

Faculty

The Division of Post Harvest Management has a multidisciplinary team of scientists from different branches of agriculture like farm machinery and power, biochemistry, microbiology, agricultural chemistry, horticulture etc. who constitute the core faculty for training programme.

Course Content

- Need of post harvest management
  - Importance of post harvest management.
  - Pre harvest factors in post harvest losses.
  - Environmental factors in post harvest losses.
  - Losses due to improper handling, storage and transport.
- Maturity indices and harvesting parameters
  - Determination of maturity
  - Maturity indices
  - Pre harvest treatments
  - Harvesting and handling
- Pack house operations and its management
  - Lay out of pack house
  - Selection of machines
  - Selection of packages and packaging materials
  - Pack house operations
- Storage and transportation
  - Control of ripening
  - Factors affecting storage life
  - Importance and methods of pre-cooling
  - Storage at low temperature
  - Modified and controlled atmosphere storage
  - Estimation of cooling load and design of cold storages
  - Mode of transportation
- Quality assurance and marketing
  - Hazards due to pesticide residues and their management
  - Codex standards
  - System operations in marketing
  - Importance and need of marketing operation systems

6. Value Addition in Subtropical Fruits

Course Director : Dr D K Tandon

Duration : 2 weeks

Course fee : US $ 1,250 per trainee

No. of trainees per course : 25

Accommodation : Will be provided by the Institute

Eligibility : Scientists/Extension functionaries/ University teachers

Subtropical fruits like mango, guava, aonla etc. are mostly perishable in nature and post harvest losses, both quantitative and qualitative, are high in this sector. This colossal loss can be minimized considerably by adopting appropriate agricultural practices and valueaddition technologies as soon as fruits are ready for consumption. Value addition in post harvest processing is taken as the net positive difference between the gross value of the processed product(s) and the cost of raw materials, other material inputs and depreciation. The issues of generation, employment nutrition, quality of raw produce and processed products, byproducts, utilization and environmental pollution can be addressed to a large extent if post harvest processing and value addition activities are promoted in the production catchments. Farming families, landless and seasonal labourers can find non-farm jobs to supplement their income through value addition, thus reducing post harvest losses and simultaneously conversing agricultural residues into value-added products.

The Institute has been a pioneer in research, development and training in the area of value addition in subtropical fruits. A number of value added products, like raw mango squash, aonla segments in syrup etc. developed at the Institute, are commercially exploited by processing industries. The course is designed in such a way that the participants will be exposed to the whole spectrum of value addition technologies in subtropical fruits to obviate the quantitative and qualitative losses and provide skills and knowledge for ensuring quality of produce through enterpreneurship development.

Objectives

- To expose the participants to value addition technologies for utilization of sub-tropical fruits (mango, guava and aonla).
- To ensue adequate training to participants on fruit processing for efficient operation and product quality and developing entrepreneurship ensuring among the participants.

Faculty

Processing and value addition is an unit working under Division of Post Harvest Mangement of CISH, which has a multidisciplinary team of scientists from biochemistry, farm machinery and power microbiology, agricultural chemistry and horticulture, who constitute the core faculty for training programme.

Course Content

- Introduction
  - Need for value addition
  - Techniques for value addition
  - Recent trends in value addition
  - Process machinery
- Preservation techniques
  - Preservation by heat application
  - Preservation through water removal
  - Preservation through temperature reduction
  - Preservation through fermentation
- Product utilization
  - Types of by products
  - Chemical extraction of byproducts from fruit processing wastes
  - Fermentative utilization of fruit processing wastes
  - Food fortification
- Quality assurance and safety management
  - Quality assurance
  - Quality standardization
  - Quality testing equipments
  - Hazard analysis and critical control points (HACCP)
  - Sanitary and Phyto-sanitary (SPS) measures
- Processing plant lay-out and entrepreneurship development
  - Site selection and plant lay-out
  - Selection of equipments and machineries
  - Sanitation and effluent treatment
  - Enterpreneurship and marketing
- Practical classes : Product preparation
  - Preparation of beverages
  - Preparation of dehydrated products
  - Preparation of powder by spray drying
  - Preparation of powder through freeze drying
  - Preparation of cider/ wine

NRCB

National Research Centre For Banana
Tiruchirapalli

The National Research Centre for Banana (NRCB) was established at Tiruchirapalli, Tamil Nadu in 1994. The Centre is carrying out mission oriented research programme on banana and plantains for resolving the production constraints and to increase the productivity. The Centre has developed post-harvest technologies including value-added products. The Centre has the expertise in modern production technologies for small and marginal banana farmers. Besides it coordinates banana and plantain research with International agencies like INIBAP, France and BAPNET, Philippines.

Contact Person

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Courses

1. Improved Production Technologies for Banana and Plantain
2. Molecular Diagnostic Techniques for Detection of Major Viruses in Banana
3. Value-added Products Technology in Banana and Plantain

1. Improved Production Technologies for Banana and Plantain

Course Director : Dr M M Mustaffa

Duration : 15 days (2nd and 3rd week of December 2008)

Course fee : US $ 1,000 per trainee

No. of trainees per course : 10

Eligibility : Bachelor's degree or equivalent in Agriculture/Horticulture

Faculty

Experienced and qualified scientists of the Centre constitute the faculty.

Course Content

- Varieties and hybrids of bananas and plantains
- Tissue culture banana production and cultivation
- Sucker selection and management
- Agro-techniques and canopy management
- Integrated nutrient management and micronutrients
- Irrigation management and fertigation
- Integrated pest and diseases management
- Post-harvest technologies including processing and value-addition

2. Molecular Diagnostic Techniques for Detection of Major Viruses in Banana

Course Director : Dr R Selvarajan

Duration : 15 days

Course fee : US $ 1,250 per trainee

No. of trainees per course : 15

Eligibility : Graduate or Post graduate in Agricultural or Horticultural sciences

Banana production is severely hampered by the incidence of four major virus diseases. The spread of the diseases is mainly through planting of infected suckers. Identification and planting of disease-free suckers is the only solution to control the disease. For identification of virus diseases, molecular diagnostic techniques are reliable and fast. Hence this course will be useful to the banana workers.

Faculty

Senior scientists of the Institute will constitute the faculty.

Course Content

- Importance of banana viral diseases
- Sero-diagnostic techniques for detection of plant viruses
- Molecular tools for detection of plant viruses
- Somaclonal variations in micro propagation of banana
- Elimination of viruses through meristem tip culture technique
- Biotechnological approaches for virus disease management in banana
- Management of plant viruses infecting vegetatively propagated plants
- Quarantine in management of banana viruses

3. Value-added Products technology in banana and plantain

In international market, there are not many banana products available but there is lot of scope of producing and marketing several value-added products of banana like figs, ready-to-drink beverages, snack foods, pickles, etc. By value-addition, the profitability increases more than 100% as compared to fresh fruits. There is a huge potential for value-added products of banana in domestic markets in several banana growing countries as well as in international market. NRC Banana has developed several processes and products for value-addition in banana and plantain has successfully commercialized many.

Faculty

The centre has well trained faculty.

Course Director : Dr C K Narayana

Duration : 14 days

Course fee : US $ 1,250 per trainee

No. of trainees per course : 10

Eligibility : Graduation in Science or Agriculture or Food Science or Home Science

Course Content

- Importance of processing and value-addition
- Status of banana processing in the world
- Processing techniques for value-addition
- Hands on training on 10-value-added products of banana and plantain

NRCC

National Research Centre For Citrus
Nagpur

National Research Centre for Citrus Nagpur was established in 1985 to undertake basic & applied research to develop technologies for improvement and increased productivity in citrus, to act as repository for genetic resources and scientific information related to citrus, to undertake research to develop technologies for better shelf life and utilization of citrus fruits considering domestic and export needs, to act as a Centre of training in advanced research methodologies and technology up-gradation in citrus, to collaborate with relevant national and international organizations/Govt. agencies for citrus research and technology dissemination, to provide consultancy services and undertake contract research to solve the problems of Citrus Industry. NRCC has made tremendous progress in term of developing the research site, creating requisite infrastructure and making research facilities available in laboratories and field. All the laboratories are functional with sophisticated equipments to meet the requirements of research in the respective fields.

Contact Person

Dr Shyam Singh
Director
National Research Centre for Citrus
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Maharashtra (India)

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Courses

1. Production Technology of Citrus
2. Production of Disease-Free Planting Material of Citrus

Training has been one of the most important activities of this Centre. The Centre conducted one-week National training programme on 'Citrus Fruit Production Technology' sponsored by Directorate of Extension, Ministry of Agriculture, Govt. of India, wherein officers across the country participated. The Centre also conducted regional as well as national one-day transfer of technology programme to acquaint the personnel working in the State Deptt. of Agriculture with various aspects of Citriculture. Besides improving upon their knowledge and skills, it was aimed at obtaining the feedback regarding the field problems to serve the citrus industry in an effective manner.

ffhe Centre also conductecT various training courses from time to time ranging from fruit production and export quality production of Nagpur mandarin for the citrus growers. The Centre has a well-equipped air-conditioned auditorium. and a recently constructed 10-room capacity guesthouse attached to the existing ICAR guesthouse in the heart of city. The Centre has a sprawling 250 acres campus covering plantation of Nagpur mandarin, Sweet orange, acid lime and other indigenous as well as exotic germplasm on 100 acres with various well laid out experiments.

1. Production Technology of Citrus

Course Director : Dr Shyam Singh

Duration : 6 days

Course fee : US $ 600 per trainee

No. of trainees per course : 20

Accommodation : Will be provided at a very reasonable cost in the Centre's guest house

Eligibility : Subject matter specialists/Extension functionaries/University teachers/scientists working in citrus

Citrus is cultivated as a commercial venture since 17th century in different parts of the world. Citrus industry in India registered nearly 7 per cent annual growth during last four decades. Yet, on the larger scale, the technology dissemination and the pace of its adoption by the growers are very slow. In view of this, the technologies developed by the Centre in respect of control of fruit drop, drainage, irrigation, insect pest and disease management are very significant for solving the variety of problems confronting citrus industry. The Centre is first of its kind in India conducting research on various aspects of citrus industry in holistic manner. The broad research areas comprises nursery management, nutrition management through leaf & Soil analysis, insect pest and disease management as well as post harvest handling, packing, processing and value addition of citrus.

Training Programme

The objectives are

- to familiarize participants with the overall scenario of citrus *vis- a-vis* other citrus growing countries.
- to provide a platform to discuss issues and currents problem related to citrus in India.
- to enable participants gain sufficient knowledge & skills for tackling the problems of citrus.

Faculty

NRCC has experienced scientists and trainers in all the disciplines of Citriculture viz., Citrus Improvement, Tissue Culture, Soil Science, Water Management, Entomology and Bio-control, Nematology, Plant Pathology, Virology, Post-harvest and Extension. Besides, faculty is also drawn up from other National and International organizations to share their experiences with the participants. The course will offer a combination & training methods and techniques like Formal presentations, practical & field visits

Course Content

- Citrus: Global & National scenario
- Soil and nutrition
- Production of disease free planting material
- Micro-propagation: shoot tip grafting
- Orchard establishment
- Water management
- Intercropping
- Flowering & fruit drop
- Weed control
- Chemical and biological control of insect pests
- Fungal, bacterial & viral diseases and their management
- Post harvest technology

2. Production of disease free planting material of citrus

Course Director : Dr Shyam Singh

Duration : 6 days

Course fee : US $ 600 per trainee

No. of trainees per course : 20

Accommodation : Will be provided at a very reasonable cost in the Centre's guest house

Eligibility : Subject matter specialists/Extension functionaries/University teachers/scientists working in citrus

Citrus trees are propagated by seed and vegetative means. Vegetative propagation is preferred because it ensures true to type plants, uniform quality, regular and early bearing etc. In most areas, a citrus tree is produced by budding the desired scion variety Onto the rootstocks seedling. In the process of bud selection, ensuring clonal purity, good physiological vigour, yield potential and bud material free from transmissible diseases becomes prerequisite. However it is not given due attention. In the NEH region of India, for raising mandarin orchards are raised through seedlings the seeds are normally collected randomly from the trees of non-descript performance. In Vidarbha region of Maharashtra, Nagpur mandarin and Mosambi are propagated through budding where nurserymen collect scion from the tree without due care of diseases, yield and fruit quality of mother plants resulting in poor planting material for citrus industry.

Citrus is highly susceptible to both biotic as well as abiotic stresses. Virus and virus - like pathogens besides some fungal diseases like gummosis, turig blight etc are responsible for poor tree health and reduced yield. For growing healthy citrus trees, it is essential to have mandatory bud-wood certification programme. Unless the orchards are planted with disease-free nursery stock, the potential of the improved practices can be fully realised. Therefore production of disease-free planting material in a need of hour for bright and healthy future of the citrus industry. For the first time in the country India, the Centre standardized the technique of raising the disease free planting material of citrus. It has produced and distributed lacs of citrus saplings to the growers and nurserymen.

Training Programme

The objectives are

- to acquaint the participants with the status of citrus industry & familiarize them with the problems faced by citrus growers due to the non- availability of disease free planting material
- to know the methods and techniques of production of disease-free planting material of citrus and acquaint them with proper identification/ diagnosis of diseases and their treatment

Faculty

NRCC has experienced team of scientists involved in the project of Production of disease free planting material of citrus. They would be acting as the resource persons to impart training on all the aspects of Citriculture viz., nursery management, nutrition management, Soil-water conservation, bio-control and integrated pest as well as disease management. Besides, the faculty is also drawn from other organisations like Regional Remote Sensing Organisation, Marketing Deptt. Govt. of India and Nagpur University to share their experiences with the participants.

Course Content

- Importance of disease- free saplings (global and national scenario)
- Present status of nursery management and the future of citrus industry
- Rootstock and disease resistance
- Site selection for nursery
- Preparation of potting media, solarization
- Seed extraction and Seed sowing
- Preparation of primary, secondary nursery
- Bud-wood selection and budding techniques
- Management of insect pest diseases
- Nutritional disorder and its management
- Identification & diagnosis of maladies due to insect pest attacks &various diseases (bacterial, viral, fungal)
- Bridge grafting for rejuvenation
- Bordeaux paste/ mixture preparation

NRCM

National Research Centre for Mushroom
Solan

The National Research Centre for Mushroom was established under the aegis of Indian Council of Agricultural Research in the year 1983. It has grown up as a Centre of excellence for mushroom research and training in the country. Besides developing and improving the cultivation technology of mushrooms, including some new species, the Centre has played a key role in creating awareness and popularization of mushroom cultivation throughout the country.

Contact Person

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Course

1. Mushroom Production Technology

During 2008, an international training on mushroom production technology is planned.

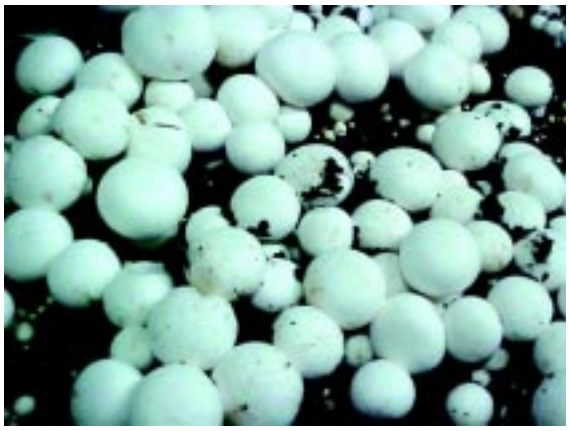
1. Mushroom Production Technology

The centre has well-equipped laboratories, National Gene Bank, modern spawn unit, mechanized composting and environmentally controlled cultivation facilities, central library facilities including acess to digital literature database. Besides this, on-campus furnished guest-house facilities are also available for trainees.

Faculty

Qualified faculty including Director, Five Principal Scientists, six Sr. Scientists, and three Scientists (Senior Scale) will act as resource persons for both theory and practical.

Course Director	: Dr R P Tewari
Course Coordinator	: Dr S K Singh
Duration	: 2 weeks (06-20 October, 2008)
Course fee	: US $ 1,000 per trainee
No. of trainees per course	: 20 (Approx.)
Accommodation	: Will be provided at centres guest house
Eligibility	: Foreign nationals/NRIs' with Bachelor's degree/Diploma in Science/Agriculture or related fields



Course Content

- Introduction, Scope and importance of mushroom cultivation.
- Taxonomy, molecular characterization and conservation of mushroom germplasm.
- Cultivation of white button mushroom (*Agaricus bisporus*), oyster mushroom (*Pleurotus* spp.), specialty mushroom (Shiitake, Black ear, Milky mushroom), paddy straw mushroom and *Ganoderma lucidum*.
- Breeding strategies for crop improvement in edible mushrooms.
- Infrastructure development for mushroom cultivation on commercial scale.
- Economics of cultivated mushrooms.
- Post-harvest technology of mushrooms.
- Transfer of mushroom cultivation technology.

NRCOP

National Research Centre for Oil Palm
Pedavegi

The National Research Centre for Oil Palm under the aegis of Indian Council of Agriculture research (ICAR) was established at Pedavegi, West Godavari District, Andhra Pradesh on 19th February 1995. This centre is 13 km away from Eluru, which is the head quarter of West Godavari district. It has a Regional Station at Palode, Trivandrum, in Kerala. The centre serves as a Centre of Excellence for conducting and coordination of research on all aspects of oil palm conservation, improvement, production, protection, post-harvest technology and transfer of technology. It has coordination and linkages with international organizations like PORIM, Malaysia; FELDA, Malaysia; IDEFOR, Ivory coast, ASD Costa Rica; UNDP and national organizations like TMOP&M, State Departments of Agriculture/Horticulture and Entrepreneurs etc.

Contact Person

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Andhra Pradesh (India)

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E-mail: nrcop@rediffmail.com
kochubabum@rediffmail.com
Website: http://nrcop.ap.nic.in

Course

1. Oil Palm Production Technology

1. Oil Palm Production Technology

Course Director : Dr M Kochu Babu

Duration : 3 weeks

Course fee : US $ 1,250 per trainee

No. of trainees per course : 10

Accommodation : To be provided in hostels

Eligibility : Scientists, extension and technical persons involved in oil palm research and development having graduation in agriculture and experience in oil palm

Faculty

Scientists of the centre will constitute the faculty.

Course Content

- Oil Palm scenario in the world and India, botany, nursery management, planting, management of plantations, breeding, seed production, irrigation management, fertilizer management, leaf nutrient analysis, cropping systems, role of pollinators, pest & disease management in plantations, quarantine requirements, management of nutrient deficiency, maturity standards & harvesting of oil palm fresh fruit bunches, product & by product utilization, transfer of appropriate technology for sustainable production, visits to experimental blocks, oil palm plantations, seed gardens and processing units etc.

CAZRI

Central Arid Zone Research Institute
Jodhpur

The Institute was established on 1 October 1959 with its headquarters at Jodhpur. The Institute is unique of its kind at both National and International levels.

Contact Person

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Courses

1. Desertification Assessment, Monitoring and Principles of Control Measures
2. Alternate Land-use Systems for Degraded Lands in Arid Ecosystem

The Institute has five laboratories. The institute has eight divisions that are involved in interdisciplinary research programmes. It has four regional research stations at Bikaner, Jaisalmer, Pali and Bhuj to undertake researches on location-specific problems.

1. Desertification Assessment, Monitoring and Principles of Control Measures

The training programme covers lectures and practicals, visits to other laboratories, scientific discussion, seminars and interaction.

Faculty

The Institute has about 140 scientists and depending on their specialization faculty will be formed from amongst these scientists.

Course Director : Director CAZRI

Duration : 3 weeks (1-21 December 2008)

Course fee : US $ 1,250 per trainee (exclusive of travel, boarding and lodging)

No. of trainees per course : 5

Accommodation : This will be provided at a very reasonable cost at the Institute's guest house

Eligibility : Master's degree in the relevant subject(s)

Course Content

- Environmental conditions of drylands
- Causes of degradation: climate change, population pressures, shifts in land-use; wind erosion, water erosion, water logging, salinization, vegetation degradation and other processes
- Drought analysis; indicator of desertification
- Field and remote sensing methods for assessment, mapping and monitoring
- Methods of wind erosion control, sand dune stabilization, water erosion control and soil conservation
- Management of croplands and rangeland, plant improvements, rehabilitation of derelict lands, livestock and wildlife
- Combating droughts, community perception and learning from traditional knowledge
- Technology transfer. Planning of arid watershed through RS-GIS etc

2. Alternate Land-use Systems for Degraded Lands in Arid Ecosystem

The training programme covers lectures and practicals, visits to other laboratories, scientific discussion, seminars and interaction.

Faculty

The Institute has about 140 Scientists and depending on their specialization faculty will be formed from amongst these scientists.

Course Director : Director CAZRI

Duration : 3 weeks (1-21 December 2008)

Course fee : US $ 1,250 per trainee (exclusive of travel, boarding and lodging)

No. of trainees per course : 5

Accommodation : This will be provided at a very resonable cost at the institutes guest house

Eligibility : Master's degree in the relevant subject(s)

Course Content

- Alternate land-use system, definition, principles and concepts, land degradation, erosional losses, role of resource conservation, establishment techniques, package of practices
- Integrated nutrient and pest management, canopy management, water balance, nutrient cycling, tree-crop interaction, water and nutrient-use efficiency, micro-climatic modifications, forage production/utilization, grazing management
- Value-additions, product processing and economic evaluation
- Integrated watershed management

CRIDA

Central Research Institute for Dryland Agriculture
Hyderabad

The Central Research Institute for Dryland Agriculture was established in 1985 to undertake basic and applied research, to act as repository of information, provide leadership and coordinate network research, to act as a centre for training, to collaborate with relevant National and International organizations and to provide consultancy for the development of drylands. The All India Co-ordinated Research Project for Dryland Agriculture with 22 Cooperating Research Centres and the All India Co-ordinated Research Project on Agro-meteorology with 25 centres across the country are part of the Institute.

Contact Person

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Andhra Pradesh (India)

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Courses

1. Integrated Watershed Management
2. Mechanization of Rainfed Agriculture

Training has been one of the major activities of the Institute. CRIDA has been providing training at various levels to top level officials from all over India and abroad on all aspects of dryland agricultural research and development. The Institute is also providing the technological backstop for developmental projects, like watershed programmes, livelihood programmes to the government agencies. The institute has state-of-art facilities for training such as air-conditioned conference room-cum-training halls, audio-visual aids, well equipped laboratories and hostel facilities of international standard besides two research farms and a number of field demonstration projects.

1. Integrated Watershed Management

Course Director : Dr P K Mishra

Duration : Two weeks

Course fee : US $ 1,250

No. of trainees per course : 20

Accommodation : Will be provided at a very reasonable cost in the Institute's International guest house

Eligibility : Subject matter specialists/Scientists/ Extension functionaries/University teachers from GOs and NGOs.

The Institute has been a pioneer in research, development and training in the area of watershed management and 'water-shed plus' concept consisting of judicious use of natural resources in conjunction with employment generation, poverty alleviation and evironmental upgradation. The concept of watershed management has undergone radical changes in the past from a mere resource conservation activity, it has enjoined with it enhanced crop productivity, alternate land use systems, farming systems development, people's participatory develop-ment, integration of livestock, etc. over time.

Now, it is also linked with employment generation, social equity, poverty alleviation and environmental quality. Thus it encompasses the entire gamut of rural development. Synchroni-zation of various interests and conflict resolution are important in watershed management. The course is designed in such a way that the participants will be exposed to the whole spectrum of watershed management activities so as to be in a position to discharge the responsibilities more efficiently by them.

Training Programme

The objectives are

- to expose the participants to the range and themes of Integrated watershed development
- to give an overview of the possible technological options for better resource conservation, productivity improvement, environmental upgradation and socio economic benefits
- to brainstorm and arrive at suitable watershed development models for the back home situations of participants.

Faculty

CRIDA has experienced scientists and trainers in all the disciplines of dryland agriculture, viz. soil and water conservation engineering, farm machinery and power, soil science, livestock production and management and social sciences. Besides, faculty are also drawn up from other National and International organizations and also NGOs to share their experiences with the participants.

Course Content

- Brief history of dryland agriculture development initiatives (global and national level), watershed concept and components
- Weather variability and its impact on agriculture
- Drought mitigation strategies in watershed development
- Water resources conservation
- Soil management
- Environment friendly and low-cost technologies for the watershed
- Intergrated nutrient management
- Integrated pest management
- Risk management through suitable crops and cropping systems
- Alternate land use systems for high income generation— Agroforestry, silvipasture, bio-diesel, medicinal, dye-yielding and aromatic plants
- Integration of livestock in watershed development programmes
- Mechanization in watersheds
- Community mobilization and capacity building of stakeholders in watershed development
- Use of Information technology in watershed development
- Use of remote sensing in watershed planning
- Economic evaluation of watersheds

2. Mechanization of Rainfed Agriculture

Course Director : Dr V M Mayande

Duration : Two weeks (1-15 September 2008)

Course fee : US $ 1,250 per trainee

No. of trainees per course : 20

Accommodation : Will be provided at a very reasonable cost in the Institute's International guest house

Eligibility : Middle and senior level researchers and managers who are responsible for planning and executing mechanization

Rainfed agriculture is the major sector in most developing countries and its importance is growing. Shift to rainfed agriculture is eminent due to depleting water resources. Increasing food productivity from this sector has become necessity to meet food demand of growing population in developing world. Inadequate farm power and use of imprecision tools has been one of the impediments in improving rainfed productivity. Mechani-zation of rainfed agriculture enhances resource utilization efficiency, improves precision and increases productivity and profitability. Technological advances in rainfed agriculture also could not be adopted due to inadequate mechanization research input. Changing global scenario in agricultural trade, competitiveness and emergence of WTO raised a demand for farm mechanization input especially in rainfed agriculture.

In light of these changes, Institutional infrastructure for mechanization research needs to be remodelled. Issues related with farm power, better input use efficiency, reduced cost, industry linkages, automation and social and economic changes needs to be understood by researchers. This programme provides excellent opportunity for participants to acquire new knowledge, sharpen their skills in planning and implementation of rainfed mechanization research.

Training Programmes

The objectives are

- to familiarize participants with tools and techniques in planning and implementa-tion of rainfed mechanization research and
- to analyse Indian experience on rainfed mechanization and evolve strategy for application in participants home country.

Faculty

Mechanization of rainfed agriculture is a unit funcitioning under Division of Resource Management, which has a multidisciplinary team of scientists who constitute the core faculty for training programme. Most faculty members of the Institute are agricultural scientists. Farm mechanization in rainfed agriculture is one of the major achievements of the Institute with experienced faculty members contributing number of designs and successful commercialization in India. Farm mechanization and other related faculty members of the Institute alongwith experts from Industry and management institutes support the various programmes offered by the Institute.

Course Content

Rainfed mechanization
- Global and national perspective
- Rainfed agriculture in India
- Farm power and energy scenario
- Timeliness and precision factors
- Researchable issues

Mechanization package for rainfed crops
- Cotton, Soybean, Groundnut, Castor, Sorghum, Maize, Millet and Rainfed rice

Mechanization of resource management
- Improving fertilizer use efficiency
- Micro-site improvement for tree crops
- Understanding operational precision
- Soil-water management
- Conservation tillage
- Biomass incorporation
- Mechanization for agro-forestry
- Weed control

Information technology and automation
- Emerging trends in information technology
- Scope of electronics in agricultural automation
- Computer model for selection of farm machinery

Intellectual property and commercialisation
- IPR in farm machinery designs- global and national scenario
- Commercialisation of farm machinery
- Farm machinery custom hiring centres
- Industry-Institute linkages

Socio-economic, gender and policy issues
- Small farm mechanization for drudgery reduction of women
- Indigenous technical knowledge in rainfed farm mechanization
- Transfer of technology in farm mechanization
- Socio-economic factors
- Initiatives for community mobilization
- Gender issues in rainfed mechanization

CSWCRTI

Central Soil and Water Conservation Research and Training Institute
Dehradun

The Central Soil and Water Conservation Research and Training Institute was established during 1954-55 with centres at Kota, Vasad, Agra, Udhagamandalam, Chandigarh, Datia, Koraput, Bellary and Headquarters at Dehradun.

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Courses

1. Design and Planning of Drainage Line Treatment in a Watershed
2. Participatory Watershed Management for Livelihood and Environmental Security

The Central Soil and Water Conservation Research and Training Institute (CSWCRTI) organizes two regular courses of five-and-a-half months each every year starting from 16 April and 8 October. In addition to regular courses, the Institute also organizes National and International short-courses varying in duration from one to four weeks on specific themes related to resource conservation and watershed management.

1. Design and Planning of Drainage Line Treatment in a Watershed

Course Director : Dr V N Sharda

Duration : 2 weeks (5-18 November 2008)

Course fee : US $ 1,250 per trainee

No. of trainees per course : 20

Accommodation : The accommodation will be made available at a reasonable cost in the Institute's guest house

Eligibility : Bachelor degree in Agriculture, Engineering, Forestry, Horticulture, Environmental Sciences and allied subjects

The training programme covers lectures and practicals, visit to successful projects, scientific discussions, seminars, interaction with teachers, farmers and researchers.

Faculty

The Institute is having experts in all the disciplines of soil and water conservation and watershed management techniques covering the theme area of drainage line treatment. The resource persons from other Government and non-Government organizations are also invited to deliver special lectures on specific themes and share their experiences with the participants of regular and short courses from India and abroad.

Course Content

- Survey techniques for assessment of drainage line problems
- Development of drainage line treatment management plan
- Planning and designing techniques of spurs for torrent control in hill and mountain regions
- Bio-engineering measures for torrent control
- Retaining walls: design, planning and construction
- Repair, maintenance and evaluation of structures
- Bio-engineering measures for rehabilitation of mass erosion problems (minespoil, landslides etc.)
- Water harvesting techniques and their design principles
- Rooftop water harvesting-scope, design and use of stored water
- Use of remote sensing and GIS in drainage line treatment
- Participatory approaches for drainage line treatment
- Use of harvested water for enhancing crop productivity
- Vegetative conservation measures for drainage line treatment
- Utilization of degraded lands for fruit, fuel & fodder production
- Economic evaluation and environmental impact assessment of conservation measures in drainage line treatment
- Field visits to the projects of the institute and other organizations

2. Participatory Watershed Management for Livelihood and Environmental Security

The training programme covers lectures and practicals, visits to other laboratories, scientific discussion, seminars, interaction with teachers and researchers.

Faculty

The Institute is having experts in all the disciplines of soil and water conservation and watershed management. The resource persons from other Government and non-Government organizations are also invited to deliver special lectures on different themes and share their experiences with the participants of regular and short courses.

Course Director : Dr V N Sharda

Duration : 3 weeks (8-28 October 2008)

Course fee : US $ 1,250 per trainee

No. of trainees per course : 20

Accommodation : The accommodation will be made available at a reasonable cost in the Institute's guest house

Eligibility : Bachelor degree in Agriculture, Engineering, Forestry, Horticulture, Environmental Sciences and allied subjects

Course Content

- An overview of watershed management in India
- Participatory watershed management for natural resource management
- PRA exercises for sustainable watershed management planning and evaluation
- Role of NGOs, gender issues and conflict management in the watershed programme
- Role, importance and formation of PIA, watershed development team, watershed association, users association, self help groups etc. in watershed management programme
- Land-capability classification and soil parameters in relation to watershed management
- Map reading, area measurement and surveying techniques
- Rainfall and run-off analysis for crop planning and design of conservation structures
- Bio-engineering measures for drainage line treatment in a watershed
- Conservation agronomic measures for sustained production
- Alternative land use systems – agroforestry, silvi-pastoral, horticulture and agri-silvi-pastoral measures in the watershed
- Risk management through crop diversification and cropping systems
- Design and planning of mechanical measures on arable and no-arable lands
- Water harvesting and recycling, ground water recharge and in-situ soil moisture conservation practices
- Livelihood security, income and employment generation activities etc
- Preparation of watershed management plan with costing and phasing
- On site and offsite impact assessment and economic evaluation of watershed programmes
- Field visits to the projects of the institute and other organizations

ICAR RC-ER

ICAR Research Complex for Eastern Region
Patna

Contact Person

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Course

1. Advance Course on Harnessing Prosperity through Water Wealth

1. Advance Course on Harnessing Prosperity through Water Wealth

Course Content

- Potentials of integrated aquaculture—agriculture in SAARC countries
- Aquaculture—agriculture including horticulture resource and management
- Multiple use of water through integrated farming system
- Development of livelihoods of stake holders in water stagnated, flooded and flood prone ecosystems
- Inland fish production through advance technology
- Environment and fish health
- Production of aquatic crops including *Euryale ferox* and *Trapa* sp.
- Value-adding, processing and marketing of aquaculture products
- Scope of networking of R&D organization of South-East Asian countries
- Social, economic, institutional and policy issues of integrated aquaculture-agriculture
- Farm visit and farmers interface

Course Director : Director

Duration : 7 days (9-15 October 2008)

Course fee : US $ 1,200 per trainee

No. of trainees per course : 10

Eligibility : Graduate in agriculture and engaged in research, education, extension and Government Officials

IISS

Indian Institute of Soil Science
Bhopal

The Indian Institute of Soil Science (IISS) established in 1988 with the sole objective to provide a scientific basis for enhancing and sustaining productivity of soil resources with minimal environmental degradation. The All India Co-ordinated Research Project (AICRP) on Long-Term Fertilizer Experiments with 17 research centres, AICRP on Soil Test Crop Response Studies with 17 centres, AICRP on Micronutrients with 11 centres and All India Network Project on Biofertilizers with 11 centres across the country are part of the institute.

Contact Person

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Courses

1. Farmers' Resource Based Site Specific Nutrient Management in Different Production Systems
2. Advanced Methods of Soil and Plant Analysis
3. Recent Advances in Soil Physical Analysis and Management
4. Biological Methods of Sustaining Soil Fertility and Crop Production

Training has been one of the major activities of the institute. IISS has been providing training at various levels to participants from India and abroad on aspects such as Soil testing, Techniques for improving nutrient and water efficiency, Carbon sequestration, Soil quality assessment, GIS and GPS tools for online fertilization recommendations etc. The institute has state-of-art facilities for training such as air conditioned conference hall, committee room, lecture theatres, audio-visual aids, laboratory facilities, library and guest house of international standard besides a well maintained 50 ha research farm and many field trials in different villages.

1. Farmers' Resource Based Site Specific Nutrient Management in Different Production Systems

Course Director : Dr. K. Sammi Reddy
Duration : 2-3 weeks
Course fee : US $1,250 (exclusive of boarding & lodging)
No. of trainees per course : 15
Eligibility : Subject matter specialist/Scientists/Extension functionaries/Teachers etc from GOs and NGOs

Nutrient management technologies generated by scientists and fertilizer and manure recommendations prescribed by extension personnel are adopted to a very limited extent by the farmers. The main reasons for such low adoption are the constraints of various resources including organic manures, water availability etc with the farmers. Hence attempts at IISS, Bhopal have been made to develop farmers' resource based site specific nutrient management (SSNM) for different production systems. This system not only takes the resources available with the farmers and native soil conditions into account but also considers augmenting of nutrients from different sources, notably organic materials, nutrients carried over from previous cropping seasons, the dynamics, transformations and interaction of nutrients in soils, their availability in the rooting zone and during growing season, in relation to the nutrient demand by the crop. In addition, it integrates the objectives of production, ecology and environment and is an important part of any sustainable agricultural system. The basic goal of this system is the maintenance or adjustment of soil fertility and of plant nutrient supply to an optimum level for sustaining the desired crop productivity by optimization of the benefits from all possible sources of plant nutrients available with the farmers in an integrated manner.

Training Programme

This training programme aims at practical application of farmers' resource based site-specific nutrient management concepts for optimization of nutrients to crop or sequence of crops in different production systems to enhance resource use efficiency and sustain soil quality.

Faculty

IISS scientists have developed efficient nutrient management techniques through farmers' participation for major production systems of the country. Farmers' resource based integrated nutrient management has been the thrust area of the institute. Scientists of AICRP on STCR had unique experience of developing Soil Test Crop Response models for site specific nutrient management involving organic manures, biofertilizers etc. Most of the institute scientists are working closely with the farmers in projects funded by FAO, Rome, ACIAR, Australia and ICRISAT, Hyderabad. Besides, faculty is invited from other national and International organizations to share their experiences on farmers' resource based site-specific nutrient management.

Course Content

- Concepts of farmers' resource based site-specific nutrient management (SSNM)
- Different approaches of farmers' participatory SSNM technology development
- Modern tools for inventorization of resources available with the farmers
- Role of organic manures, biofertilizers, crop residues etc in precise nutrient management
- Soil test crop response (STCR) based precision nutrient management
- Nutrient prescription models for different cropping systems
- On-line site specific fertilizer recommendations using GIS and GPS tools
- Sensor based techniques for the right time application of nutrients for higher efficiency
- Customized and fortified fertilizers for balanced fertilization
- Farmers' resource based site specific nutrient management *vis-a-vis* soil, food and environment quality
- Social responsibility of farming community in implementing the site specific nutrient management
- Incorporation of farmers' experience towards precise nutrient management
- Demonstrations/ site visits.

2. Advanced Methods of Soil and Plant Analysis

Course Director : Dr Muneshwar Singh

Duration : 3 weeks

Course fee : US $ 1,250 per trainee (exclusive of boarding & lodging)

No. of trainees per course : 15

Eligibility : Post-Graduate level qualification in soil science and experience in the field of soil chemistry, soil fertility and fertilizers

Soil testing is the only tool to control the soil fertility which is carried out with an objective of recommending fertilizer and manure application and assessing the requirement of soil ameliorants for problem soils. The gap between the nutrient additions and removals is widening in agricultural production systems and soil fertility status of soils in developing countries particularly in India is fast declining. The agriculture extension agencies need to be alarmed at the declining soil fertility for sustaining the agricultural production growth rate in order to feed the teeming millions. The extension agencies have got a wide network of soil testing laboratories to monitor soil fertility parameters but the laboratories are reported to be not well equipped with efficient equipments, trained manpower and modern techniques to predict timely any adverse impact undergoing in any particular agro-system.

Training Programme

0This training programme is aimed to equip the students, researchers or extensionists working in soil or plant analysis laboratories in any developing countries of Asia or African continent with the advance methods of soil and plant analysis.

Faculty

IISS has experienced scientists engaged in developing new analytical methods. The faculty has huge experience in working with the most advanced instruments such as ICP, AAS, CHNS Analyzer, HPLC, GLC, Flow injection analyzer, Ion chromatograph, Water analyzer, NIR spectrophotometer etc. Besides, faculty is also drawn up from other national and International institutes to share their experiences.

Course Content

- Techniques in sampling, processing and storing of soil and plant samples for chemical analysis
- Laboratory requirement for standard soil and plant analysis
- Principles of analytical methods involved in analysis of major, secondary and micronutrients in soil and plants
- Working principles of advanced instruments used in soil and plant analysis
- Practical consideration in procurement, operation and maintenance of modern instruments used in soil testing
- Demonstrations/site visits

3. Recent Advances in Soil Physical Analysis and Management

Course Director : Dr A K Misra

Duration : 3 weeks

Course fee : US$ 1,250 (exclusive of boarding and lodging)

No. of trainees per course : 5-15

Eligibility : Graduate level qualification in soil science and experience in the field of soil conservation, soil fertility and fertilizers

Understanding of soil physical properties has gained importance in modern agriculture because these properties have strong linkages with sustainable agriculture production and issues related to ground water and atmospheric pollution. There is ample indication for need to enhance/maintain the soil physical attributes for improving soil quality/health. The properly managed soil physical properties bear potential to conserve soil resources, reduce soil and groundwater pollutions, and help in mitigating climate change. The present course is designed to provide theoretical and technical knowledge in the topics of the course. The course will be inter-disciplinary covering different aspects of developments in agriculture with special emphasis on understanding and management of soil physical properties.

Training Programme

The training programme offers the theoretical and practical knowledge in the course content through lectures, practicals, scientific discussions and seminars.

Faculty

Experienced scientists of the Institute will constitute faculty.

Course Content

- Units and measurements
- Principles and techniques for crop growth and root measurements
- Overview on climatological parameters in relation to crop growth
- Assessment of soil quality, concept of minimum data set and frameworks for integrating soil physical, chemical and biological attributes
- Modern principles and practices of water and tillage management
- Concept and application of systems approach in agriculture
- Soil organic carbon conservation and sequestration in agriculture and climate change

4. Biological Methods of Sustaining Soil Fertility and Crop Production

Course Director : Dr D L N Rao

Duration : 3 weeks

Course fee : US $ 1,500 per trainee (exclusive of boarding and lodging)

No. of trainees per course : 15

Eligibility : Graduate level qualification in Soil Science/ Microbiology/Agronomy with experience in the field of soil biology and fertility.

With increasing trends of stagnation in productivity in major production systems and agro-climatic zones, decreasing factor productivity, decreasing levels of soil organic matter and impaired soil health, the attention has now firmly turned towards wider application of ecologically acceptable methods of food production based on renewable and sustainable use of the planet's resources. These methods emphasize reduced usage of fertilizers and pesticides, increased use of biomass, crop residues, composts and biofertilizers to augment the nutrient supply and maintain soil biodiversity while aiming to reduce pollution and emission of green house gases.

Training Programme

The training programme aims at an exposure to the theoretical concepts underlying the biological methods as well as hands-on-training on various aspects of biomass generation, compost preparation, production and use of biofertilizers, organic farming etc. along with relevant analytical methods.

Faculty

Experienced scientists of the institute and invited faculty from other ICAR institutes/ agricultural universities/ industry will form the faculty.

Course Content

- Chemical and microbiological aspects of various nutrient cycles
- Biological methods of improving nutrient use efficiency
- Biological Nitrogen Fixation in legumes, cereals and its optimization in cropping systems in tropical agriculture
- Biological phosphorus mobilization/ solubilization
- Microbial diversity, microbial inoculants to improve nitrogen fixation, P mobilization, for plant growth promotion (Diazotrophic Bacteria, Blue green algae, PGPR, VAM)
- Biofertilizer technology – strain selection, mass production, usage
- Production of green biomass for green manure, green leaf manure by annual and perennial legumes
- Composting, vermicomposting, nutrient-enriched manures, quality standards for organic manures, large scale compost production
- Organic farming – Theory and Practice
- Integrated soil health management and soil quality improvement

NBSS & LUP

National Bureau of Soil Survey and Land Use Planning
Nagpur

The National Bureau of Soil Survey and Land Use Planning (NBSS & LUP) is a premier Institute with the research mandate/or soil resource inventories, agro-ecological zoning, soil degradation assessment, pedology, remote sensing applications, and land use planning.

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Course

1. Geo-informatics for Land Use Planning

1. Geo-informatics for Land Use Planning

Course Director : Dr Arun Chaturvedi

Duration : 2 weeks
(10–22 December 2008)

Course fee : US $ 1,000 per trainee

No. of trainees per course : 20

Eligibility : Degree in Agriculture; work experience in natural resource management

Training Programme

The training programme covers lectures and practicals, visits to other laboratories, scientific discussion, seminars, interaction with teachers and researchers.

Faculty

The Institute has about 70 scientists and depending on their specialization faculty will be formed from amongst these scientists.

Course Content

- Geology and geomorphology aspects
- Elements of pedology
- Aerial photo and image interpretation
- Types of soil surveys
- Classification and correlation of soils
- Laboratory analysis
- Land evaluation
- Use of GIS for resource management

CIAE

Central Institute of Agricultural Engineering
Bhopal

The Central Institute of Agricultural Engineering, established in 1976, is a premier institute in the country to conduct basic, applied and adaptive research leading to development of improved agricultural equipment, recipes and technologies.

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Courses

1. Design, Testing and Production Technology of Agricultural Implements and Machinery
2. Machinery for Mechanization of Rice Cultivation
3. Testing of Field Plot Machinery for Mechanization of Field Research
4. Equipment and Technology for Processing and Value-addition to Agricultural Produces at Small Scale/Rural Level
5. Soybean Processing and Utilization
6. Feed Processing Technology and Equipment

All the developments are meant for crop production, processing, use of energy in agriculture and for entrepreneurship development. The institute also acts as a nodal agency in the country for information/technology dissemination through display/demonstration of innovative products/technologies in fair, exhibition, in laboratory and field. Human resource development by organizing specialized training courses is also a major commitment of the institute in order to upgrade skills of artisans and update knowledge of engineers, subject matter specialists, manufacturers and policy planners engaged in promotion of farm mechanization in the country.

1. Design, Testing and Production Technology of Agricultural Implements and Machinery

Faculty

Highly experienced scientists are available at the Institute.

Course Director : Dr H S Biswas / K C Bhardwaj

Duration : 2 weeks (February 2008)

Course fee : US $ 1,000 per trainee

No. of trainees per course : 10

Accommodation : Will be provided by the CIAB, but all expenditure will be borne by the trainees

Eligibility : Graduate in Agricultural/Mechanical Engineering or Diploma with five year relevant experience

Course Content

- Computer-aided designing
- Use of standard testing
- Procedures and production techniques for manufacturing

2. Machinery for Mechanization of Rice Cultivation

Faculty

Highly experienced scientists are available at the Institute.

Course Director : Dr V V Singh / S K Rautaraj

Duration : 2 weeks (July 2008)

Course fee : US $ 1,000 per trainee

No. of trainees per course : 10

Eligibility : Graduate in Agricultural/Mechanical Engineering or Diploma with five year relevant experience

Course Content

- Introduction of rice machinery, field testing and use of standard testing procedures

3. Testing of Field Plot Machinery for Mechanization of Field Research

Faculty

Highly experienced scientists are available at the Institute.

Course Director : Dr V V Singh

Duration : 2 weeks (October 2008)

Course fee : US $ 1,000 per trainee

No. of trainees per course : 15

Eligibility : Graduate in Agricultural/Mechanical Engineering or Diploma with five year relevant experience

Course Content

- Introduction of field plot machinery and use of standard testing procedures

4. Equipment and Technology for Processing and Value-addition to Agricultural Produces at Small Scale/ Rural Level

Faculty

Highly experienced scientists are available at the Institute.

Course Director : Dr H S Biswas / S D Deshpande

Duration : 3 weeks (September 2008)

Course fee : US $ 1,250 per trainee

No. of trainees per course : 10

Eligibility : Graduate in Agricultural/Mechanical Engineering or Diploma with five year relevant experience

Course Content

- Agro processing equipments and techniques for cereals pulses and oilseeds
- Use of standard testing procedures and computer-aided designing

5. Soybean Processing and Utilization

Faculty

Highly experienced scientists are available at the Institute.

Course Director : Dr S D Kulkarni / A P Gandhi / L K Sinha

Duration : 2 weeks (November 2008)

Course fee : US $ 1,000 per trainee

No. of trainees per course : 10

Eligibility : Graduate in Agricultural/Mechanical Engineering or Diploma with five year relevant experience

Course Content

- Soybean processing equipments and techniques
- Use of standard testing procedures and computer-aided designing

6. Feed Processing Technology and Equipment

Faculty

Highly experienced scientists are available at the Institute.

Course Director : Dr H S Biswas / D M Bhandarkar

Duration : 2 weeks (December 2008)

Course fee : US $ 1,000 per trainee

No. of trainees per course : 10

Eligibility : Graduate in Agricultural/Mechanical Engineering or Diploma with five year relevant experience

Course Content

- Feed requirements of fish, poultry and cattle, their nutritional requirement, equipment and production techniques and cost economics

CIRCOT

Central Institute for Research on Cotton Technology
Mumbai

CIRCOT established in 1924, is a research institute under the Indian Council of Agricultural Research (ICAR), of the Department of Agricultural Research and Education (DARE), Government of India. The main objective of the Institute is to support cotton improvement research by evaluating the quality of new strains evolved at agricultural research stations in India and to provide necessary technological inputs that will promote cottons meeting the quality requirements of the textile industry. In addition, the Institute also functions as a National Centre for education and training in cotton technology and related areas.

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Courses

1. Cotton Quality Evaluation
2. Use of HVI and AFIS
3. Ginning

1. Cotton Quality Evaluation

Course Director : Director

Duration : 1 week (23-27 July 2008, 22-26 October 2008, 26-30 November 2008 and 10-14 December 2008)

Course fee : US $ 1,850 per trainee

No. of trainees per course : 10

Accommodation : To be provided in hotels

Eligibility : Cotton traders, graders and merchants etc.

Course Content

- Introduction
  The importance of cotton fibre consumption trends. A brief outline of the main stages in cotton growing, marketing and processing. Need for objectivity in the testing of cotton for fibre properties.
- Cotton Production
  Fibre growth, development of different varieties, fibre structure, cotton contaminants, cotton ginning and visual grading of cotton.
- Fibre quality evaluation
  Theoretical background sampling for testing logic and methods, measurement of length, fineness, maturity, strength, trash content, fibre quality index. Briefing about HVI evaluation for fibre quality. A visit to East India Cotton Association to know as to how cotton is commercially being graded.

2. Use of HIV and AFIS

At a time of globalization and liberalization of world economy it is important to ensure that cotton and cotton textiles manufactured in any country and are able to withstand the challenge posed man-made fibre textiles in no way inferior to those available in the international market. Exercise of quality control at every stage of textile processing right from raw material selection is the best way to achieve this object.

The High Volume Instrument (HVI) system has established itself as the most effective tool in material selection and bale management. Similarly, the Advanced Fibre Information System (AFIS) holds immense potential not only in the evaluation of certain special quality parameters of raw cotton but also in process control in textile mills through proper scheduling of machinery maintenance. Maintenance of fibre quality as measured by AFIS would ensure fewer quality related problems in the finished product.

The Round Test organized by CIRCOT for HVI users in the country in 1997 had clearly brought out the need for training programme for the users to ensure effective utilization of the instrument both in quality evaluation and quality control.

Faculty

Experienced scientists of CIRCOT and Guest speakers from ZUI Organizations.

Course Director : Director

Duration : 1 week (15-19 October, 19-23 November 2008)

Course fee : US $ 2,350 per trainee

No. of trainees per course : 6

Accommodation : To be provided in hotels will boarding

Eligibility : Personnel from quality control department of textile mills having HVI and AFIS or intending to purchase these instruments/fibre testing personnel from trade and textile association

Course Content

- Introduction
  An outline of the main stages in cotton growing, harvesting, ginning, marketing and processing; need for objectivity in testing
- HVI System Introduction
  Theoretical background; calibration cotton and calibration of instrument; procedure for testing; repeatability and reproducibility of test results; importance of humidity during storage and testing of cotton; interpretation of HVI test data; bale management
- Advanced Fibre Information System (AFIS)
  Introduction; theoretical background; calibration of instrument; procedure for testing; interpretation and use of test results in quality control

3. Ginning

Under the Integrated Cotton Development Project (ICDP) with World Bank assistance, CIRCOT has set up a Ginning Training Centre (GTC) at Nagpur in 1985. This centre equipped with ginning machines and allied infrastructural facilities conducts regular training programmes for the benefit of technicians and supervisory staff employed in ginning units in the country. Under the Mini Mission II programme of the Technology Mission on Cotton, utilizing the funds made available by the ministry of Agriculture, Government of India, CIRCOT has created most modern facilities for ginning at this Ginning Training Centre (GTC) at Nagpur. Also facilities for scientific processing of cotton seeds in terms of machines for delinting, dehulling, oil crushing and refining have also been created at this centre.

Faculty

Experienced Scientists of CIRCOT and Guest speakers from other R&D Organizations.

Course Director : Director

Duration : 1 week (6-10 August, 3-6 September 8-12 October 2008)

Course fee : US $ 1,750 per trainee

No. of trainees per course : 10

Accommodation : Including Boarding and Lodging

Eligibility : Research workers/Managers/Extension Personnel involved in Cotton Industry

Course Content

- Introduction
  Ginning scenario in India and World: A brief outline of the main stages in cotton processing. The need for improvements in ginning technology
- Cotton Production and Marketing
  Fibre growth-Development of different varieties-Visual Grading Marketing of kapas
- Materials Handling Equipment and Structures
  Storage of kapas-Handling of kapas—Design, construction, working of belt conveyors, screw conveyors, chain conveyors and bucket elevators, pneumatic suction system, handling of lint and seed
- Pre-cleaning
  Importance of pre-cleaning and trash percentage, seed coat fragments, types of pre-cleaners, working and maintenance of cylinder type cleaners and kapas extractors
- Ginning
  Ginning percentage—Types of gin machines, comparison of SH, DR and Saw gins
- Maintenance
  Schedule of Gin' machines, setting and adjustments of gins for different cottons, effect of faulty settings on the quality of lint, safe work practices
- Bale packaging machinery
  Operation of unit condenser, bale press classification, working of press machine, packaging material, bale marking bale standardization
- Fibre quality evaluation
  Sampling for testing, measurement of length, fineness, maturity and strength, fibre quality index assessment of fibre quality by using HVI

IVRI

Indian Veterinary Research Institute
Izatnagar

The Indian Veterinary Research Institute established in 1889, as Imperial Bacteriological Laboratory at Pune, was later transferred to Mukteshwar, UP and named as the Imperial Veterinary Research Institute. It was shifted to the present campus in 1913 and was renamed as the Indian Veterinary Research Institute in 1947. It is the flagship of veterinary research, education and extension in India.

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Courses

1. Molecular Biology and Biotechnology Techniques in Animal Research
2. Processing of Livestock Products
3. Recent Advances in Nutritional Microbiology
4. Anaesthesia and Pain Management in Animal
5. Poultry Disease Diagnosis and Control

Post-graduate Education

The Indian Veterinary Research Institute (IVRI) is a deemed-to-be University since 1983. It awards MSc degree and PhD degree in various disciplines of animal health, production and technology. The Institute is having National Library of Veterinary Sciences.

1. Molecular Biology and Biotechnology Techniques in Animal Research

Biotechnology and molecular biology techniques are emerging techniques that form the backbone of animal research. The frontier areas of molecular diagnosis of specific bacterial, viral and para-sitic diseases and identification of reproductive dysfunctions in animals require sound working knowledge of these techniques. The present course is designed to provide first hand technical knowledge of techniques used for molecular biology and biotech-nological research. It is a multi-disciplinary course emphasizing modern techniques of molecular biology used for veterinary research.

Training Programme

The training programme will offer both theory and practical working knowledge in various techniques listed under course content of this programme.

Faculty

Well qualified scientists/staff are available for conducting the programme.

Course Director : Dr A K Srivastava

Duration : 4 weeks (1-3 October 2008)

Course fee : US $ 1,500 per trainee

No. of trainees per course : 8-10

Eligibility : Scientists/Technicians/students having Master's or PhD degree in veterinary sciences/life science/allied sciences

Course Content

- Techniques of nucleic acid isolation, isolation of bacterial, viral and eukaryotic DNA. Isolation of plasmid DNA
- Isolation of total cellular RNA and fractionation of eukaryotic mRNA
- Nucleic acid hybridization techniques
- Northern blot analysis
- Southern blot analysis
- Protein analysis
- SDS-Polyacrylamide gel electro-phoresis of proteins.
- PCR analysis
- Peptide fractionation and synthesis techniques
- Nucleic acid sequencing techniques
- Preparation of Monoclonal antibodies and hybridoma technology
- Enzyme-linked immunoassay for important animal diseases

2. Processing of Livestock Products

The major emphasis would be on the processing of meat and meat products, milk products and quality control.

Training Programme

This training programme covers all the topics mentioned in course contents.

Faculty

A number of well experienced faculty members are available on the subject.

Course Director : Dr A S R Anjaneyulu/Dr S K Mendiratta

Duration : 6 weeks (1 November to 15 December 2008)

Course fee : US $ 2,000 per trainee

No. of trainees per course : 8-10

Accommodation : To be provided at a very reasonable cost in the Institute's guest house

Eligibility : Bachelor's degree in Veterinary Science and adequate knowledge in meat or milk products processing techniques

Course Content

- Processing of meat products including comminuted products, cured and smoked products, restructured products, indigenous meat products, poultry meat products; by-products utilization, packaging and quality control
- Processing of milk products covering dairy products like *paneer*, *ghee* etc
- Major emphasis of the course would be on practical training with a few lectures to explain the application of the processing techniques

3. Recent Advances in Nutritional Microbiology

Course Director	:	Dr. D N Kamra
Duration	:	Four weeks (4–31 October 2008)
Course fee	:	US $ 1,500 per trainee
No. of trainees per course	:	10
Eligibility	:	Master's degree in Animal Nutrition, Animal Physiology, Biochemistry and Microbiology

In ruminants and non-ruminant herbivorous animals, the digestion of lignocellulosis feeds is accomplished in the gastro-intestinal tract with the help of micro-organizms. In addition to feed digestion, the microbes are also important for feed processing, control of gastric disorders and animal organic waste management. Keeping in view the vital role played by the micro-organisms in animal nutrition. This course has been proposed for the students, technicians, researchers and teachers of animal nutrition, animal physiology, biochemistry and microbiology.

Training Programme

The training programme covers lectures and practicals, visits to other laboratories, scientific discussion, seminars, interaction with teachers and researchers.

Faculty

Well qualified staff are available for conducting the programme.

Course Content

Lectures

- Introduction to microbes important in animal nutrition research
- Rumen microbes
- Microbial status of gastro-intestinal tract of herbivorous animals
- Microbial status of GIT of wild ruminants
- Enzymology of rumen microbes
- Manipulation of rumen metabolism
- Rumen disorders
- Effect of toxins on rumen microbes and their detoxification
- *In vitro* methods of feed evaluation
- Bioconversion of lignocellulosis feeds
- Microbial processing of forages and animal wastes for recycling of nutrients
- Statistical designs for rumen microbiological studies

Practicals

- Microscopic examination of rumen bacteria, protozoa and fungi
- Cultivation and enumeration of rumen bacteria and fungi under anaerobic conditions in Anaerobic work station
- Microscopic counting and identification of ciliate protozoa
- Processing of rumen liquor and preparation of enzymes from the rumen microbes
- Estimation of various enzymes of carbohydrate and protein degradation
- Silage microbiology
- Quantification and preparation of probiotics for animal feeding

4. Anaesthesia and Pain Management in Animals

Course Director : Dr A K Sharma
Duration : 6 weeks (3 April–30 May 2008)
Course fee : US $ 2,000 per trainee
No. of trainees per course : 10
Accommodation : Will be provided a very reasonable cost in the Institute's guest house
Eligibility : Bachelor's degree in veterinary science or equivalent qualification with at least two years experience in veterinary surgery/ veterinary anaesthesia

Pain during and after surgery may lead to prolongation of disability and morbidity and sometimes even death. It is also a major factor responsible for stress, which may depress the immune system, increase the chances of infection and prolong the healing time. Therefore, the knowledge in the area of pain perception and its management using different drugs, physiotherapy and acupuncture etc. is essential not only to achieve desired results in clinical practice but also to satisfy the humanitarian values. The course is aimed at imparting training on latest techniques in the area of anaesthesia and pain management in animals.

Faculty

Most experienced faculty are available in the subject.

Course Content

- Introduction of terminology and theories of pain perception in animals
- Role of peripheral and central sensitization in establishment of post-operative pain
- Concept of pre-emptive analgesia, indicators of pain and stress in animals
- Critical evaluation of common anaesthetic techniques and drugs with regards to their ability to alleviate pain and surgical stress in animals
- Local infiltration and regional anaesthetic techniques for treatment of post-operative pain
- Use of options, alpha-2 agonists, NSAIDs and their combinations in the management of pain
- Use of spinal drugs for pain management
- Use of NMDA receptor antagonists for treatment of pain
- Application of acupuncture and physiotherapeutic techniques in the treatment of pain
- Comparison of pre-emptive and post-operative treatments of pain using drugs of different groups

5. Poultry Disease Diagnosis and Control

Course Director : Director
Duration : 4 weeks (3–31 October 2008)
Course fee : US $ 1,500
No. of trainees per course : 8–10
Accommodation : To be provided at a very reasonable cost in the Institute's guest house
Eligibility : Bachelor's degree in Veterinary Science. Experience in poultry diseases will be preferred

Training Programme

The training programme covers lectures and practicals, visits to other laboratories, scientific discussion, seminars, interaction with teachers and researchers.

Faculty

Experienced faculty is available on the subject.

Course Content

- An overview of important poultry diseases
- Handling an outbreak of disease, necropsy technique of birds, methods of collection, preservation and despatch of morbid materials for laboratory examinations
- Isolation of the etiological agents (viral/bacterial mycoplasma chlamydial/fungal agents) from ailing birds
- Processing of morbid materials for histopathological examination and interpretation of slides
- Various diagnostic tests used in poultry disease, diagnosis, e.g. HI, gel diffusion, serum neutralization, PA, ELISA and PCR
- Principles of poultry disease prevention, different type of vaccines, vaccination schedule

NDRI

National Dairy Research Institute
Karnal

The National Dairy Research Institute metamorphosed from erstwhile Imperial Institute for Animal Husbandry and Dairying which was established in 1923 at Bangalore. In 1955, it was shifted to Karnal at the location formerly called Central Cattle Breeding Farm. The Institute is the premier organization providing R&D support for dairy development programmes of the nation.

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Courses

1. Dairy Production in Tropics
2. Frozen Semen Technology and Artificial Insemination
3. Breeding Strategies for Genetic Improvement of Farm Animals
4. Animal Tissue Culture Technology
5. Application of Genetic Techniques for Improvement of Farm Animals
6. Endocrine Techniques for Improvement of Reproduction in Buffaloes
7. Technology of Milk and Milk Products
8. Technology of Cheese & Fermented Milk Products
9. Technology of Traditional Indian Dairy Products
10. Technology of Dairy By-Products including Membrane Technology
11. Technology of Value added and Functional Dairy Foods Course
12. Sensory Evaluation of Milk and Milk Products
13. Whey Utilization
14. Manufacture of Ice cream & Frozen Desserts

Post-graduate Education

National Dairy Research Institute (NDRI) is a deemed-to-be University since 1989. It awards MSc and PhD degrees in different disciplines of dairy science.

Training Programmes

The Institute organizes refresher and short-term training courses in various areas of dairy science for the benefit of teachers, research and extension scientists working in public and private sector organizations. During the last two decades several training courses have been organized by the Institute in which the scientists received training in advanced areas of dairy technology. The Institute also organizes international training programmes in various subjects.

1. Dairy Production in Tropics

The production faculty consists of three divisions, i.e. Dairy Cattle Breeding, Dairy Cattle Physiology and Dairy Cattle Nutrition. A well established animal farm has 1,500 diary animals with modern management facilities. In addition, Institute has also a forage farm and animal breeding complex which houses the bull calves and bulls required for reproduction management.

Training Programme

This course is designed to impart training to dairy farmers and entrepreneurs in scientific dairy production methods and exchange ideas for improvement of animals in tropics.

Faculty

The faculty consists of 25 scientists who have obtained advanced training in different areas of animal production.

Course Director	: Dr P K Nagpaul
Duration	: 3 months (1 November 2008 to 30 January 2009)
Course fee per trainee	: US $ 2,500 per trainee (exclusive of boarding and lodging)
No. of trainees per course	: 20
Eligibility	: Diploma/Graduates in Animal Sciences/ Veterinary Sciences/Agriculture Science with knowledge of written and spoken english

Course Content

- Dairy herd management practices at NDRI herd Karnal (practicals)
- Breeds of indigenous dairy animals and their production performance
- Management of neonates and young calves up to six months of age
- Management practices for heifers, pregnant animals, down calves and dry animals, scientific management inputs for new born calves and pregnant animals
- Housing and shelter management for all categories of dairy animals in tropics
- Ecological sustainability of milk production system in tropics, factors affecting the profitability of dairy entreprise
- Advances in tissue culture techniques
- Epizootic bacterial and viral diseases and their control
- Calendar for herd health programmes, environmental stress and its effect on milk production, environmental pollution control and waste management
- Farm machinery and power, animal behaviours and welfare studies, farming system and IVLP projects study in villages
- Feed and fodder distribution and computation of ration
- Handling and treatment of sick animals, clean milk production, process of hand and machine milking, optimum schemes for progeny testing programme
- Use of computers in managing farm and field data
- Maintenance of livestock records, physical variation to increase milk production in dairy animals
- Draft animal power and its measurement and utilization
- Farming practices at NDRI forage farm
- Handling of bulls for artificial insemination, semen collection and evaluation
- Freeing techniques in semen preservation
- Recent advances in embryo biotechnology techniques, breeding strategies for increasing milk production in the tropics
- Genetic markers and their importance

2. Frozen Semen Technology and Artificial Insemination

Training Programme

The course is for imparting training to the scientists, officers working with frozen semen stations, artificial insemination, reproduction management and allied technologies.

Faculty

The facility comprises of of 20 scientists who have obtained advanced training in different areas of the concerned subject. The Artificial Breeding Complex has all basic and state of the art facilities in the area of research in semen biotechnology.

There is livestock farm having 1,200 dairy animals and 120 young and adult bulls managed separately for quality semen production and progeny testing programme.

Course Director	: Dr V S Raina
Duration	: 4 weeks (1–30 December 2008)
Course fee	: US $ 1,500 per trainee (exclusive of boarding and lodging charges)
No. of trainees per course	: 20
Eligibility	: Diploma/Graduate in Animal Sciences/ Veterinary Science/Animal Husbandry with knowledge of written and spoken english

Course Content

- Frozen semen bank activities
  - Management of bull
  - Semen collection
  - Standard semen evaluation
  - Preparation of different buffer
  - Processing for cryo-preservation
  - Computer controlled freezing
  - Quality assessment of frozen semen
  - Utilization of frozen semen
- Artificial insemination
  - Heat detection in cattle and buffaloes
  - A.I in cattle and buffaloes
  - Pregnancy diagnosis
  - Reproductive management
  - Reproductive record management
  - Management of breeding efficiency
- Special test for semen evaluation
  - Sperm concentration and motility
  - Non-eosinophillic count
  - Hypo-osmotic swelling test (HOST)
  - Acrosome integrity
  - Cervical mucus penetration test
  - *In-vitro* fertility test
  - Bacteriological evaluation of semen
  - Quality assessment of frozen semen
- Management of frozen semen bank
  - Maintenance of record in frozen
  - Planning of semen bank
  - Care and handling of semen and liquid nitrogen
  - Care and maintenance of equipment

3. Breeding Strategies for Genetic Improvement of Farm Animals

Training Programme

This course provides the latest methods of genetic evaluation and formulation of optimum breeding plans for genetic improvement of dairy animals under organized farms and farmer herds conditions.

Faculty

The Dairy Cattle Breeding Division has been recognized as a Centre for Advance Studies (CAS) by the Indian Council of Agricultural Research (ICAR). It undertakes research on various aspects and coordinates the breeding and management activities of the institute herd (having more than 1,500 heads) maintaining two indigenous cattle breeds, viz Sahiwal and Tharparkar, two synthetic crossbred strains of cattle, viz Karan Swiss and Karan Fries, Murrah buffaloes and a flock of crossbred goats. The division also has an artificial breeding complex involved in production, processing, preservation and distribution of quality semen. The faculty consists of 20 scientists who have obtained advanced training in different areas of animal breeding, genetics and livestock production and management.

Course Director	: Dr B K Joshi
Duration	: 6 weeks (1 October 1 to 15 November 2008)
Course fee	: US $ 2,000 per trainee (exclusive of boarding and lodging)
No. of trainees per course	: 10
Eligibility	: Officials actively engaged in research, teaching and training activities for development and improvement of farm animals

Course Content

- Current status of farm animal genetic resources, genetic and non-genetic factors affecting growth, production and reproduction characteristics
- Evaluation of genetic parameters
- Selection of young bulls for progeny testing
- Estimation of breeding value of bulls and cows using different statistical models, i.e. BLUP, Animal model etc., for selection of elite animals and their faster use for multiplication of germplasm
- Semen production, processing and cryo-preservation
- Evaluation of seminal characteristics of bulls
- Selection of breeding bulls using fertility index
- Improvement of reproductive efficiency of farm animals
- Nucleus breeding schemes (with or without MOET) vis-a-vis conventional breeding schemes
- Multivariate animals models for estimation of genetic parameters
- Conservation and utilization of farm animal genetic resources
- Performance recording systems of farm animals under field conditions
- Application of computers for animal data management and analysis
- Various mating systems and their implications in improvement of dairy animals
- Development of optimum breeding plans for genetic improvement of farm animals

4. Animal Tissue Culture Technology

Training Programme

The course will provide on-bench practical training to teachers/technical workers/students in various aspects of culture of cells, tissue and organs and its applications in animal improvement programme.

Course Director : Dr Archana Verma

Duration : 6 weeks (1 September to 15 October 2008)

Course fee : US $ 2,000 per trainee (exclusive of boarding and lodging)

No. of trainees per course : 20

Eligibility : Graduate in Life Science with knowledge of written and spoken english

Faculty

Well qualified, experienced, motivated scientist of the Institute constitute the faculty.

Course Content

- Design and layout of tissue culture laboratory, basic equipment and reagents required, general laboratory rules and procedure
- Analytical techniques in tissue culture, advances in microscopy and photography, aseptic techniques and culture environment
- Isolation and characterization of cell, manipulation and microsurgery at cellular level, somatic cell genetics and gene mapping, safety and biohazards
- *In-vitro* cell/tissue culture system, preparation of sterilized tissue culture media
- Lymphocyte and bone marrow cell culture, culture of mammalian gametes and embryos
- Production of hybridomas, fibroblast culture
- Cloning of mammalian cell lines, separation and characterization of cell lines, culture of mammary gland tissue, recording and documentation of observation

5. Application of Genetic Techniques for Improvement of Farm Animals

Training Programme

The course will provide hands-on training for various genetic techniques and its applications in livestock improvement programme to teachers/technical workers/students.

Course Director : Dr I D Gupta

Duration : 8 weeks (1 October to 30 November 2008)

Course fee : US $ 2,500 per trainee (exclusive of boarding and lodging)

No. of trainees per course : 20

Eligibility : Graduate in Life Science with knowledge of written and spoken english

Faculty

Well qualified, experienced, motivated scientist of the Institute constitute the faculty.

Course Content

- The genome organization
- Cytogenetics of farm animals
- C, G, NOR, SCE and RE banding of chromosomes, karyotypic analysis, gene expression and regulation
- DNA polymorphism in farm animals
- Isolation of genomic DNA, restriction fragment length polymorphism
- *In-vitro* amplification of DNA (PCR), gene cloning and gene mapping
- Genetics of fertility, molecular markers, marker assisted selection, transgenic animal production

6. Endocrine Techniques for Improvement of Reproduction in Buffaloes

There are about 158 million buffaloes in the world and roughly 153 million (97%) of these are water buffaloes essentially found in the Asian Region. The overall buffalo numbers are increasing by about 1.3% annually. Apart from being the mainstay of the milk production system in many south & south-east Asian countries, buffalo also contribute to the rural economy in terms of meat production and draught. The riverine buffalo is better adapted than cattle to tropical climates especially with respect to utilization of poor quality roughages and resistance to some of the tropical diseases. This makes buffaloes easy to maintain using the locally available roughage and crop residue. In recent years the buffalo has gained more attention around the world compared to the cow, not just due to its reasonable growth rate on roughage feeding, but also due to its high milk yield with high fat percentage, tolerance to hot and humid climate, lean meat and draught ability.

The buffalo, however, is a sluggish breeder and is beset with various constraints which adversely influence its fertility; such as, problems of silent heat coupled with late maturity, poor expression of estrus, irregular estrous cycles, seasonality in breeding, anestrus, low conception rates, long postpartum calving intervals and repeat breeding. Considerable attention has been focused on the reproductive endocrinology of the buffalo as a means to identify specific problems and devise means to augment reproductive performance. An understanding of hormonal interplay is required for alleviating reproductive problems of an endocrine origin. This knowledge is paramount for biotechnological applications for enhancing the reproductive efficiency in this animal.

Course Director	: Dr B S Prakash
Duration	: 4 weeks
Course fee	: US $ 1,500 per trainee
No. of trainees per course	: 10
Accommodation	: Will be provided on cost at the International Hostle of the Institute
Eligibility	: Graduate in Animal Science/Veterinary Science with basic knowledge of Reproductive Physiology

Training Programmes

The training program is designed to provides "hands on" training to participants on hormone analysis using radioimmunoassay and enzymeimmunoassay procedures.

In addition, lectures will also be given on practical aspects for enhancing fertility in buffaloes.

Faculty

The facilities for the estimation of protein & steroid hormones by RIA & EIA procedures are available in the Division of Dairy Cattle Physiology. Highly qualified and trained scientists & technicians are available for imparting training in specialized areas. The Division has been extending facilities for hormone assays to scientists belonging to other organizations & universities within the country. Training in these areas have also been imparted to Indian & Foreign students.

Course Content

Practicals

- Training on steroid and protein hormone estimation by RIA and EIA
- Titer determination
- Standard curve plot and tracer preparation.

Lectures

Endocrine biotechniques for fertility improvement

- Pregnancy/non-pregnancy diagnosis by Progesterone determination
- Pregnancy confirmation by oestrone sulphate determination in milk
- Progesterone determination in body fluids for estrus confirmation
- Cyclicity monitoring, identify animals with cystic ovarian disorders
- Embryo transfer monitoring
- Parturition induction
- Oestrus synchronization
- Interferon alpha and recognition of pregnancy
- Antisera production and purification.

7. Technology of Milk and Milk Products

Infrastructure / Faculty Strength

The Dairy Technology Division has been engaged in research and teaching activities in the area of milk processing. Various cells, viz. Traditional Dairy Products, Cheese and Fermented Milk Products, Concentrated, Dried and Frozen Dairy Products, Dairy Analogues and Rheology Infant Food Cells and Food Technology Laboratory exist in the division for carrying out area specific research. A 10,000 lpd dairy is attached to the Division. This Experimental Dairy serves as a central facility for the research and teaching activities of the Institute. A 60,000 lpd state-of-the-art computer controlled dairy plant has been established at NDRI for giving hands on training to B.Tech. (DT) students. The plant has equipment to process milk and convert it into various products such as butter, ghee, cheese, paneer ice-cream, powder and traditional sweets. The faculty of the division consists of 12 scientists.

Brief Outline of the course

The course on "Technology of milk and milk products" has been designed to familiarise the candidates with the basic aspects of milk processing and the technology of various dairy products being manufactured in India and abroad.

Market milk industry; clean milk production; collection and transportation of milk; physico-chemical properties of milk, Processing of milk - Reception, Chilling, Clarification, Bactofugarion, Separation and Homogenisation; Thermal processing Pasteurization & UHT processing; Processing of cream; Technology of butter, cheese, fermented milk products, ice-cream and frozen dessserts, condensed milk and dried milks; Technology of Indian dairy products, viz. ghee, khoa, chhana, paneer, chakka, srikhand and milk sweets / confections; Formulated dried products - Infant foods, and malted milk foods. Technology of by-products - casein, caseinates. Whey processing and its utilization; Sensory evaluation of dairy products; Packaging of dairy products, Cleaning and sanitization of dairy equipment.

Course Coordinator	: Dr R R B Singh Senior Scientist, Associate Professor
Duration	: 2 weeks (June/December)
Course fee	: US $ 2,500 per trainee
No. of trainees per course	: 10
Accommodation	: Will be provided at reasonable cost in the Hostle of the Institute
Eligibility	: Dairy / Food Technology graduates, R & D personnel & Dairy / Food entrepreneurs with knowledge of written and spoken English.

8. Technology of Cheese & Fermented Milk Products

The course on "Technology of Cheese Making" has been designed to familiarize the participants with the basic aspects of cheese making and the technology of common varieties of cheese various fermented milks being manufactured in India and abroad.

Brief Outline of the Course

Principles and basic requirements of cheese making; raw materials for cheese; starter cultures; rennet; pre-treatments of milk, methods of manufacture of different varieties of cheese; ripening changes; accelerated ripening, defects and remedies; recent advances, Fresh varieties of cheese including paneer.

Processed cheese and cheese spread

Processed-cheese products; standards; selection of raw materials; role of different ingredients; methods of manufacture; packaging defects and shelf life.

Fermented milk products

Principles and basic requirements of manufacturing fermented milk products, pretreatments of milk, starter cultures, method of manufacture of different fermented milk products such as dahi, fruit dahi, Misti dahi, Lassi, etc. Analysis and sensory evaluation of cheese and fermented milks.

Course Coordinator	: Dr S K Kanawjia Principal Scientist/Professor
Duration	: 1 week (July/January)
Course fee	: US $ 1,500 per trainee
No. of trainees per course	: 10
Accommodation	: Will be provided at reasonable cost in the Hostle of the Institute
Eligibility	: Dairy / Food Technology graduates, R & D personnel & Dairy / Food entrepreneurs with knowledge of written and spoken English.

9. Technology of Traditional Indian Dairy Products

The objective of this course is to familiarize participants with the different types of Indian dairy products and principles of their manufacture.

Brief Outline of the Course

Status and classification of traditional dairy products, significance of these products and principles involved in their manufacture. Methods of manufacture, compositions, uses and shelf life of ghee, khoa, chhana, paneer, shrikhand, rabri, kulfi and milk sweets such as burfi, peda, rasogolla, milk cake etc. Mechanized / large scale / commercial methods of manufacturing and packaging traditional dairy products and packaging.

Course Coordinator : Dr Dharam Pal
Principal Scientist/Professor

Duration : 1 week (July/January)

Course fee : US $ 1,500 per trainee

No. of trainees per course : 10

Accommodation : Will be provided at reasonable cost in the Hostle of the Institute

Eligibility : Dairy / Food Technology graduates, R & D personnel & Dairy / Food entrepreneurs with knowledge of written and spoken English.

10. Technology of Dairy By-Products including Membrane Technology

The course is designed to impart training in dairy by-products covering latest methodologies and status and uses of dairy by-products etc. Basic principles of membrane processing and the uses of various membrane processes in the manufacture of dairy and food products.

Brief Outline of the Course

Manufacturing processes, physico-chemical and functional properties and uses of casein, caseinates, whey concentrate and dried whey, whey protein concentrates, lactose and buttermilk. Principles of membrane processing, hardware of membrane units, processing of whey and milk using microfiltration, ultrafiltration, nanofiltration, reverse osmosis, cleaning of membranes, manufacture of cheese, paneer, chakka, milk protein concentrate using membrane technology.

Course Coordinator : Dr Vijay Kumar Gupta
Principal Scientist/Professor

Duration : 1 week (July/January)

Course fee : US $ 1,500 per trainee

No. of trainees per course : 10

Accommodation : Will be provided at reasonable cost in the Hostle of the Institute

Eligibility : Dairy / Food Technology graduates, R & D personnel & Dairy / Food entrepreneurs with knowledge of written and spoken English.

11. Technology of Value added and Functional Dairy Foods Course

This course has been designed to introduce the student to add value to milk and milk products in order to harness the market potential, to cater to health and nutritional demands and to provide variety and choice in food.

Brief Outline of the Course

Role of food in nutrition and health - an introduction; technology of low lactose products; low fat dairy products; probiotic dairy foods, sports beverages, infant foods, ice cream, high fibre foods, high energy foods, foods for the elderly, low sugar and sugar based dairy foods.

Course Coordinator : Dr (Ms) Latha Sabikhi
Sr. Scientist / Associate Professor

Duration : 1 week (July/December)

Course fee : US $ 1,500 per trainee

No. of trainees per course : 10

Accommodation : Will be provided at reasonable cost in the Hostle of the Institute

Eligibility : Dairy / Food Technology graduates, R & D personnel & Dairy / Food entrepreneurs with knowledge of written and spoken English.

12. Sensory Evaluation of Milk and Milk Products

The Course on "Sensory Evaluation of Milk and Milk Products" has been designed to acquaint and train the participants in sensory evaluation techniques of raw materials and final processed foods.

Brief Outline of the Course

Applications of sensory evaluation, brief physiology of sensory receptors, selection and training of test panel, various sensory tests, setting up of sensory laboratory, statistical analysis of sensory data, sensory evaluation of milk and milk products, instrumental analysis of texture.

Course Coordinator : Dr Dharam Pal
Principal Scientist/Professor

Duration : 1 week (June/July/December)

Course fee : US $ 1,500 per trainee

No. of trainees per course : 10

Accommodation : Will be provided at reasonable cost in the Hostle of the Institute

Eligibility : Dairy / Food Technology graduates, R & D personnel & Dairy / Food entrepreneurs with knowledge of written and spoken English.

13. Whey Utilization

The course on "Whey Utilization" has been designed to familiarise the students with the whey processing operations involved in the manufacture of various products from whey.

Brief Outline of the Course

Sources, type and composition of whey, Basic unit operations in processing of whey, technology of whey powder, lactose and whey protein concentrates (WPC) including membrane processing, whey constituents and their application in processed foods, technology of whey cheeses and beverages including fruit based, fermented beverages, sports beverages.

Course Coordinator : Dr A K Singh
Sr Scientist/Associate Professor

Duration : 1 week (July/December/January)

Course fee : US $ 1,500 per trainee

No. of trainees per course : 10

Accommodation : Will be provided at reasonable cost in the Hostle of the Institute

Eligibility : Dairy / Food Technology graduates, R & D personnel & Dairy / Food entrepreneurs with knowledge of written and spoken English.

14. Manufacture of Ice cream & Frozen Desserts

The course on Ice cream and frozen desserts has been designed to familiarize the participants with the principles and methods of manufacture of various frozen dairy products.

Brief Outline of the Course

Status of ice cream industry in India & abroad, classification of frozen desserts, selection of different ingredients used for the manufacture of ice cream; calculating the proportion of each ingredient to meet the compositional requirements in the final product, manufacture of ice cream mix and its processing. Ice cream making equipment, preparation of fruit / chocolate / plain / soft serve ice cream; manufacture of kulfi etc.

Course Coordinator : Dr F C Garg
Sr Scientist/Associate Professor

Duration : 1 week (July/December/January)

Course fee : US $ 1,500 per trainee

No. of trainees per course : 10

Accommodation : Will be provided at reasonable cost in the Hostle of the Institute

Eligibility : Dairy / Food Technology graduates, R & D personnel & Dairy / Food entrepreneurs with knowledge of written and spoken English.

NIANP

National Institute of Animal Nutrition and Physiology
Bangalore

The National Institute of Animal Nutrition and Physiology was established on 24th November 1995 by Indian Council of Agricultural Research (ICAR) to sort out some of the major impediments pertinent for the usage of feed resources and the physiological constraints limiting the production potential of farm animals. The institute is located in Bangalore which is nerve centre of scientific activities of the country and also populalry known as garden city and silicon valley of India.

Contact Person

Dr K T Sampath
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Courses

1. Assisted Reproductive Techniques to Augment Productive Functions
2. Recent Techniques for Feed Analysis and Evaluation

The Institute has three research divisions namely, Animal Nutrition, Animal Physiology and Bioenergetics & Environmental Sciences and sections/units like the Economics, Statistics and Extension section, experimental livestock unit and fodder production unit with strong support of central facilities and computerized administrative set up. The institute has also very strong base of Agricultural Research Information System (ARIS) equipped with modern hardware and software. The laboratories in the institute have been conceptualized as central facilities for all divisions and sections. The main laboratories are Macronutrient laboratory, Micronutrient laboratory, Feed analysis laboratory, Rumen Microbiology laboratory, Animal Biotechnology laboratory, Radioisotope & Endocrinology laboratory, Reproductive physiology laboratory, Molecular Biology laboratory, Toxicology laboratory, Bioenergetics laboratory and Fermentation Technology laboratory.

1. Assisted Reproductive Techniques to Augment Productive Functions

Course Director : Dr K T Sampath

Duration : 5 weeks (1 November to 4 December 2008)

Course fee : US $ 3,000 per trainee (exclusive of boarding & lodging)

No. of trainees per course : 10

Eligibility : Post graduate in Animal Physiology, Animal Reproduction and Animal Biotechnology/Degree in Veterinary and Animal Sciences with 2 years of experience in Reproduction Physiology or Animal Biotechnology

Embryo Resource Generation by in vitro technique

The productive capability of animals in many developing countries is low because of poor genetic make up. The improvement of the genetic quality of the milch breeds of cattle and buffalo has traditionally been met by the pedigree breeder in the post 40-50 years by Artificial insemination (Al), using progeny tested and performance tested bulls. The important emerging biotechnology in improvement of genetic make up of cattle and buffalo breeds is Embryo Transfer Technology (ETT) coupled with *in vitro* Fertilization (IVF) technology. IVF technology consists of harvesting of ooctytes, *in vitro* maturation (IVM), *in vitro* fertilization (IVF) and *in vitro* culture (IVC). During the reproductive life time of the animals less than 1% of the follicular population will be utilized for offspring production. The objectives of IVF Technology are to mass produce embryos for genetic manipulation and / or embryo transfer, for basic research in gamete biology and developmental physiology and commercial utilization of emerging biotechnologies including transgenic livestock production and cloning, transfer of in vitro produced embryos. Exploitation of female gametes which are otherwise lost can be utilized for production of a number of embryos. The immature oocytes derived from ovaries after maturing and fertilizing in vitro can be utilized for generation of embryo pool. The training will provide in depth knowledge and hands on experience to the persons to take up techniques for assisted animal reproduction.

Semen Evaluation

Artificial insemination has remained one of the improtant assisted reproductive techniques for the rapid dispersal of valuable genes and it has been the method of choice for dairy farmers around the world to improve the genetic quality of their stock. Reliable laboratory assays/ techniques to accurately predict the fertility potential of a bull is essential for obtaining consistently high conception rate for the semen used. The training porgram will provide exposure to various tests, evalultions and interpretations for predicting fertility status of bull semen.

Hormone Profile Monitoring

Any Aberrations/ deficiencies in hormonal make up of the animal affects reproduction. It is essential to map hormonal profiles of animals for a clear understanding of the involvement of hormones in productive and reproductive functions. Also, assisted reproductive techniques/reproductive interventions require hormonal investigations and monitoring. This programme imparts training in estimating various metabolic and reproductive hormones associated with productive and reproductive functions of the animals.

Training programme

Training programme will consist of in- house lecture on various aspects and practical demonstrations.

Faculty

Scientists of the institute will constitute the faculty.

Course Content

Embryo resource generation by in vitro techniques

- Isolation of immature oocytes ovaries by various methods
- Ultrasound guided oocyte pickup by ovarian follicular fluid aspiration from live animals.
- Grading of oocytes
- In vitro maturation of oocytes
- *In vitro* capacitation of sperm
- *In vitro* fertilization of matured oocytes
- Grading of fertilized oocytes
- *In vitro* culture of embryos
- Grading of embryos to evaluate developmental stages
- Embryo freezing by different methods.
- Micro manipulation of embryos
- Isolation and *in vitro* culture of preantral follicles, harvesting and IVF of oocytes from *in vitro* cultured preantral follicles.

Semen Evaluation Methods:

- Routine semen evalution techniques
- Functional based assay : Induction of capacitation and / or acrosome reaction, homologous oocyte penetration assay, plasmalemma functional integrity.
- Molecular/biophysical assessment of fertility: Seminal plasma & sperm membrane proteins, sperm nuclear morphology DNA integrity and mitochondrial membrane potential

Hormone Estimation

- Principles & procedures of RIA technique for estimation of steroid & peptide hormones
- Protocols for estimation of peptide hormones like TSH, insulin, Prolactin, LH, FSH, growth hormone etc., including iodination of the hormones.
- Protocols for estimation of steroid hormones like estradiol, progesterone, cortisol, testosterone etc.
- Estimation of melatonin
- Estimation of T_3, T_4
- General principles of hormone isolation and purification and production of hormone antibodies.

2. Recent Techniques for Feed Analysis and Evaluation

The feed Analysis and evaluation is a major tool for Animal Nutrition Research. It includes analytical techniques, which are more accurate, less time consuming and enables handling of large sample size.

Course Director : Dr K T Sampath

Duration : 5 weeks (10 May to 30 June 2008)

Course fee : US $ 3,500 (exclusive of boarding and lodging)

No. of trainees per course : 10

Eligibility : Post-graduation in Veterinary and Animal Sciences or Degree in Veterinary and Animal Sciences with 2 years of field or research experience.

Feed Analysis

Moisture estimation by hot air oven drying method is time consuming. Moisture analysis based on infrared drying is rapid and more accurate.

- Estimation of nitrogen/protein by Kjeldahl method is more complex and involves both digestion and distillation processes.
- Estimation using nitrogen analyzer based on combustion method does not involve the process of digestion and distillation and is faster and brief.

Course Content

a. *Proximate analysis*
- Estimation of moisture content of feeds of fodders
  - Principles and methods
  - Estimation of moisture content based on infrared heating
- Estimation of nitrogen/protein using combustion method
  - Principles and methods of nitrogen estimation
  - Protein/nitrogen estimation bycombustion method
- Estimation of fibre fractions
  - Weendy method of crude fibre estimation and their limitation
  - Estimation of ADF, NDF, lignin by Vansoest method.
- Estimation of ether extract
  - Principles of method
  - Estimation of fat by rapid ether extract analyzer
- Estimation of ash and insoluable ash

b. *Micronutrient analysis*
- Estimation of minerals
  - Classification of minerals
  - Principles and methods of estimation
  - Principles of Atomic Absorption Spectrophotometry
  - Sample preparation
  - Estimation of minerals (macro & micro) by AAS method
- Estimation of amino acids
  - Principles of HPLC and its uses
  - Role of Amino acids in ruminants and non ruminants
  - Limiting amino acid
  - Estimation of amino acids by HPLC method

a. *In vitro* techniques
- Principles of feed evaluation
- Different methods, their advantages and disadvantages
- Determination of digestibility by chemical composition
- Estimation of digestibility of feeds by Vansoest method
- Principles of Gas production techniques.
- Determination of digestibility of feeds by Menke's method
- Digestibility estimation by using Gas Pressure transducer

b. *In situ* techniques
- Principles of *In situ* technique
- Rumen canulation, Care and management of fistulated animals.
- Determination of protein degradability using nylon bags
- Estimation of RDP and UDP by Enzyme method.

- Estimation of crude fibre by Weendy method does not give the true fibre content of the feed. Determination of fibre fractions (NDF, ADF and lignin) by Vansoest method is more accurate.
- Estimation of fat in feeds and fodders by conventional ether extraction method is time consuming. The use of rapid ether extract analyzer is a faster method for fat estimation.
- Estimation of macro and micro minerals by colorimetric/ Titrimetric method is time consuming and laborious. Use of atomic absorption spectro photometry provides accurate and rapid estimation of the entire range of minerals.
- Estimation of amino acid content of feeds by high pressure liquid chromatography is an accurate method in deciding the protein source which can provide limiting amino acids.
- *In-vitro* evaluation of feedstuffs by VanSoest method is a faster method of determining the digestibility of organic matter as compared of 2 stage technique of Tilley and Terry and it represents the true digestibility.
- Determination of digestibility of feeds by gas production procedures (Menke and pressure transducer) provide information on the kinetics of digestion and enables evaluation of large number of feeds samples in a shorter period of time.
- Evaluation of digestibility of organic matter of feedstuffs by nylon bag technique will provide information on the degradability values and helps in identifying protein sources rich in bypass protein (UDP).
- Feed evaluation using enzymatic method is more convenient as they do not require fistulated animals as inoculums donors.

Faculty

Scientists of the institute will constitute the faculty.

CARI

Central Avian Research Institute
Izatnagar

The Central Avian Research Institute (CARI), the premier Institute of poultry research in the country, was established on 2nd November, 1979 as a commodity Institute of the Indian Council of Agricultural Research (ICAR). It has a Main Campus at Izatnagar, Bareilly (Uttar Pradesh) and a Regional Centre at Bhubaneswar (Orissa). Its mandate speaks as to undertake basic, applied and adoptive research in all disciplines relating to production of diversified poultry; to develop post harvest technologies; to impart specialized training/post graduate education in Poultry Science (PSC) leading to Diploma (National Diploma in Poultry Husbandry-NDPH), Master's (MVSc) and Doctoral (PhD) degrees in PSC in collaboration with the Indian Veterinary Research Institute Deemed University (IVRIDU) Izatnagar; to transfer the proven technologies to the end users and to provide referral/consultancy services.

Contact Person

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Courses

1. Advances in Poultry Nutrition and Feed Technology
2. Advances in Poultry Processing and Products Technology
3. Artificial Insemination Technology for Poultry
4. Biotechnological Tools for Poultry Production
5. Breeding Strategies for Egg and Meat
6. Quail Production for Commercial Exploitation

Climate

In summer (March-June) the ambient temperature varies between 30-45^{0}C, whereas the rainy season (July-October) observes the temperature range from 25-35^{0}C and the winter (November-February) registers the temperature from 4-15^{0}C. The average rain fall is around 70cm

How to Reach

The CARI, Izatnagar is situated at a longitude of 79^0 27' and latitude of 28^0 22' and about 250 kms from New Delhi, the capital of India or Lucknow, the capital of Uttar Pradesh state. One can reach by air upto New Delhi or Lucknow and then to the Institute by rail or road.

1. Advances in Poultry Nutrition and Feed Technology

Course Director : Dr A K Shrivastava, PS & Head, PGE&T

Course Coordinator : Dr H P Shrivastava, PS & Head, PGE&T

Duration : 3 weeks (1-22 February 2008)

Course fee : US $ 1500

No. of trainees per course : 10 (maximum)

Accommodation : At a very reasonable cost in the Institute's Trainees' Hostel cum Guest House

Eligibility : Graduate in Agriculture/Animal/Biology/ Veterinary Science with practical experience in poultry production. Proficiency in English language

Concept

Feed being the largest input in poultry production system, the nutritionists have been striving hard to develop nutritional regimen for different types and classes of birds in an attempt to ensure sustainability and profitability of the enterprise. The primary approach had been to meet the quantitative as well as qualitative feed requirements of birds. Both the nutrient contents and their bioavailability are highly variable depending upon type of the material, cultivars and processing technique. Under these circumstances gathering knowledge through the present training on advances in poultry nutrition and feed technology through theoretical and practical approach would be immensely imperative to those interested personnel of developing region of the world.

Objectives

- To expose the participants to the fundamentals of poultry nutrition and feed technology
- To give an overview of the recent advances linked with feed evaluation and nutrient utilization giving higher productivity and profit.
- To brainstorm and arrive at appropriate technology leading to poultry feeds and feeding.
- To generate human resource for furthering poultry production

Faculty

Highly educated and well experienced Scientists in Poultry Science and other allied subject will constitute the faculty. Besides, the faculty is also drawn up from other neighboring Institute viz., Indian Veterinary Research Institute, Izatnagar to share their experiences with the participants.

Course Content

- Nutrient needs for growth and production
- Possible interactions among nutrients
- Biotechnology leading to better digestibility
- Antinutrients/Toxicants and amelioration
- Feeding value/quality testing
- Feed additives and nutraceuticals
- Gut health and immunomodulation
- *in ovo* feeding and juvenile nutrition
- Cost effective formulation
- Feed compounding
- Feed processing technology

2. Advances in Poultry Processing and Products Technology

Concept

Processing has become a vital link between poultry production and marketing. Great strides have taken place in both egg and meat processing sectors in developing countries including India over the last two decades to create efficient poultry production cum processing interface to meet the growing domestic and oversea demand of quality poultry products. In this direction several value added egg and poultry meat products have been formulated, developed, evaluated and patented at the Institute. In view of this, a practical oriented training course encompassing all the possible aspects of poultry processing and products technology has been formulated for the benefit of all those interested on the subject in developing region of the world.

Objectives

- To expose the participants to the fundamentals of poultry processing and products technology.
- To give an overview of the possible technological options for better utilization of egg and poultry products.
- To brainstorm and arrive at suitable poultry processing and products technology.
- To generate human resource for furthering poultry production.

Course Director	: Dr R P Singh, PS & Head, PHTz
Course Coordinator	: Dr H P Shrivastava, PS & Head, PGE&T
Duration	: 3 weeks (1–22 April 2008)
Course fee	: US $ 1500
No. of trainees per course	: 10 (maximum)
Accommodation	: At a very reasonable cost in the Institute's Trainees' Hostel cum Guest House
Eligibility	: Graduate in Agriculture/Animal/Biology/ Veterinary Science with practical experience in poultry production. Proficiency in English language

Faculty

Highly educated and well experienced Scientists in Poultry Science and other allied subject will constitute the faculty. Besides, the faculty is also drawn up from other neighboring Institute viz., Indian Veterinary Research Institute, Izatnagar to share their experiences with the participants.

Course Content

- National and global scenario in egg and poultry processing
- Egg processing technology
- Primary and further- processing of poultry
- Egg and poultry meat quality evaluation
- Value- added poultry products
- Packaging of poultry products
- Microbiology of fresh and processed poultry products
- Residues of heavy metals/pesticides in egg and meat
- Byproduct utilization
- Concept and application of hazard analysis and critical control points (HACCP) in egg and poultry processing.

3. Artificial Insemination Technology for Poultry

Course Director : Dr R P Moudgal, PS & Head, AP&R

Course Coordinator : Dr H P Shrivastava, PS & Head, PGE&T

Duration : 3 weeks (3–24 June 2008)

Course fee : US $ 1500

No. of trainees per course : 10 (maximum)

Accommodation : At a very reasonable cost in the Institute's Trainees' Hostel cum Guest House

Eligibility : Graduate in Agriculture/Animal/Biology/ Veterinary Science with practical experience in poultry production. Proficiency in English language

Concept

The success of poultry farming is primarily rated with the yield of more number of eggs and higher quantity of poultry meat. Besides many essential facts, the measurement of reproductive physiological efficiency of male and female breeders should not be under estimated. Artificial insemination (AI) technology opens the means to control rapid genetic gain; to facilitate mating among incompatible individual/breed/species; better option to improve non-descript village poultry population; economized use of semen; handy to international transport of male gamete etc. This technology is considered as an economical viable tool particularly for under developing and developing countries, and likely to provide an update comprehensive opportunity to augment the reproductive efficiency of different poultry species.

Objectives

- To expose the participants to the fundamentals of poultry processing and products technology.
- To give an overview of the possible technological options for better utilization of egg and poultry products.
- To brainstorm and arrive at suitable poultry processing and products technology.
- To generate human resource for furthering poultry production.

Faculty

Highly educated and well experienced Scientists in Poultry Science and other allied subject will constitute the faculty. Besides, the faculty is also drawn up from other neighboring Institute viz., Indian Veterinary Research Institute, Izatnagar to share their experiences with the participants.

Course Content

- Comparative avian reproductive systems
- Spermatogenesis and sperm maturation
- Structure/function of avian spermatozoa
- Biochemical composition of semen
- Follicular growth and atresia
- Ovulation and oviposition
- Optimization of variables influencing male/female reproductive functioning
- Direct *in situ* exposures of different parts of male/female reproductive systems
- Methodology of avian semen collection
- Semen evaluation/dilution/preservation
- Artificial insemination protocol and testing of its success.

4. Biotechnological Tools for Poultry Production

Course Director : Dr B P Singh, Director, CARI

Course Coordinator : Dr H P Shrivastava, PS & Head, PGE&T

Duration : 4 weeks (1-29 August 2008)

Course fee : US $ 2000

No. of trainees per course : 10 (maximum)

Accommodation : At a very reasonable cost in the Institute's Trainees' Hostel cum Guest House

Eligibility : Graduate in Agriculture/Animal/Biology/ Veterinary Science with practical experience in poultry production. Proficiency in English language

Concept

The poultry breeding programmes for high growth rate in broilers and egg production in layers of the last three decades have now been largely achieved and genetic requirements are shifting towards new goals. As the poultry breeding stands on the brink of new challenges, the recent advances in avian biotechnology will greatly wider the options for genetic change. The biotechnological tools may be of wide applications in augmenting poultry production and protection. Keeping several merits of biotechnological techniques into account, the present training programme has been developed to educate those personnel interested in poultry production in developing regions of the world.

Objectives

- To expose the participants to the fundamentals of poultry processing and products technology.
- To give an overview of the possible technological options for better utilization of egg and poultry products.
- To brainstorm and arrive at suitable poultry processing and products technology.
- To generate human resource for furthering poultry production.

Faculty

Highly educated and well experienced Scientists in Poultry Science and other allied subject will constitute the faculty. Besides, the faculty is also drawn up from other neighboring Institute viz., Indian Veterinary Research Institute, Izatnagar to share their experiences with the participants.

Course Content

- Merits of biotechnological tools
- Functional genomics
- Molecular techniques
- Marker assisted selection
- Production of recombinant cytokines
- Genetic characterization of poultry
- Breeding for increased disease resistance
- Gene silencing
- Development of immuno-competent stocks
- Proteomics
- Embryo culture and transgenesis

5. Breeding Strategies for Egg and Meat

Course Director : Dr M C Kataria, PS & Head, AG&B

Course Coordinator : Dr H P Shrivastava, PS & Head, PGE&T

Duration : 4 weeks (1–29 August 2008)

Course fee : US $ 2000

No. of trainees per course : 10 (maximum)

Accommodation : At a very reasonable cost in the Institute's Trainees' Hostel cum Guest House

Eligibility : Graduate in Agriculture/Animal/Biology/ Veterinary Science with practical experience in poultry production. Proficiency in English language

Concept

By realizing an annual growth rate of 5-7% for egg production and15-20% in broiler and having an annual production of about 44 bn eggs and 1.7 bn of broilers, India ranks 4th and 5th position in egg production and poultry meat, respectively in the global scenario. Besides chicken, other poultry species such as ducks, guineafowls, quails, turkeys etc. have also made a significant place in poultry production sector. In order to develop the viable and user-friendly poultry germplasm for better productivity and profitability, the present training program on breeding strategies has therefore been casted.

Objectives

- To expose the participants to the fundamentals of poultry processing and products technology.
- To give an overview of the possible technological options for better utilization of egg and poultry products.
- To brainstorm and arrive at suitable poultry processing and products technology.
- To generate human resource for furthering poultry production.

Faculty

Highly educated and well experienced Scientists in Poultry Science and other allied subject will constitute the faculty. Besides, the faculty is also drawn up from other neighboring Institute viz., Indian Veterinary Research Institute, Izatnagar to share their experiences with the participants.

Course Content

- Relevance of poultry breeding research
- Important economic traits
- Selection methods and breeding programme
- Male and female breeder stock
- Artificial insemination techniques
- Incubation and hatchery operation
- Feeding and rearing systems
- Genotype-environment interactions
- Developed avian germplasm
- Record keeping
- Poultry health and biosecurity
- Cost return analysis

6. Quail Production for Commercial Exploitation

Course Director : Dr Raj Narayan, SS & Incharge, Quail Unit

Course Coordinator : Dr H P Shrivastava, PS & Head, PGE&T

Duration : 3 weeks (2–23 December 2008)

Course fee : US $ 1500

No. of trainees per course : 10 (maximum)

Accommodation : At a very reasonable cost in the Institute's Trainees' Hostel cum Guest House

Eligibility : Graduate in Agriculture/Animal/Biology/ Veterinary Science with practical experience in poultry production. Proficiency in English language

Concept

The Japanese quails alternate to chickens have been domesticated in India basically for meat production and have also attracted attention of many countries for its commercial exploitation over the past three decades. The concerted research and development (R&D) programme in quail production technology has improved the species and developed several high yielding varieties of broiler and layer quails. The quail production has generated enormous interest among the farmers, especially more suited to rural poultry production. The present training program has been designed covering all aspects of quail farming for the benefit of all persons intending to work in quail production in the developing region of the world.

Objectives

- To expose the participants to the fundamentals of poultry processing and products technology.
- To give an overview of the possible technological options for better utilization of egg and poultry products.
- To brainstorm and arrive at suitable poultry processing and products technology.
- To generate human resource for furthering poultry production.

Faculty

Highly educated and well experienced Scientists in Poultry Science and other allied subject will constitute the faculty. Besides, the faculty is also drawn up from other neighboring Institute viz., Indian Veterinary Research Institute, Izatnagar to share their experiences with the participants.

Course Content

- Scenario of quail farming
- Breeding programme
- Developed germplasm
- Artificial insemination technique
- Selection and care of hatching eggs
- Incubation and hatching
- Housing and management
- Nutrient needs and feeding
- Nutritive value of quail eggs and meat
- Value added egg and meat products
- Health and control measures
- Economics of quail farming

CIRG

Central Institute for Research on Goats
Makhdoom

The Central Institute for Research on Goats was established on 12 July 1979 and is located at a distance of about 2.5 Kms from Farah town between Agra and Mathura cities on National Highway No. 2.

Contact Person

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Courses

1. Application of Reproductive Techniques for improvement of goat production.
2. Use of Molecular Techniques in rumen microbiology.
3. Molecular Diagnosis of goat diseases.

The Institute has four Research Divisions namely, Genetics and Breeding, Physiology, Reproduction & Shelter Management, Nutrition, Feed Resource and Products Technology & Animal Health and two Sections namely, Extension Education & Socio-Economics and Education & Research Coordination. Institute has also well developed Agricultural Research Information System (ARIS) equipped with modern hardware and Software. The Institute has developed elite flocks of Jamunapari and Barbari goats and Muzaffarnagri Sheep and is continuing to conduct

need based research and development programmes, demonstrations, technology transfer on goat production. Trainings for commercial goat farming and specialized training programmes in goat production on various aspects are undertaken in routine as per schedule.

1. Application of Reproductive Techniques for Improvement of Goat Production

Course Director : Dr S D Kharche

Duration : 30 days (1-30 November 2008)

Course fee : US $ 2,000 per trainee (excluding boarding and lodging)

No. of trainees per course : 10

Eligibility : Graduate in veterinary science/ Biotechnology/Life Science with knowledge of written and spoken English

Training Programme

The course will provide lectures and on-bench practical training to teachers/ technical workers/students in various aspects of reproductive technologies and their application in goat improvement programme.

Course Content

- Design and layout of artificial insemination, embryo transfer and tissue/embryo culture laboratory, basic equipments and reagents required, general laboratory rules and procedures.
- Sterilization and preparation of glass wares, plastic wares, rubber wares and media required for various procedures.
- Reproductive behaviour and physiology of Buck and Doe.
- Synchronization, superovulation, embryo collection and embryo transfer.
- In-vitro maturation, fertilization and embryo culture.
- Lymphocyte culture, granulosa cell monolayer culture, oviductal epithelial cell culture and culture of gametes and embryos.
- Micromanipulation of gametes and embryos for various biotechnological experiments.
- Semen collection, evaluation, dilution and freezing of semen and embryo.
- Laparoscopic artificial insemination and embryo transfer.
- Ultrasonography.

2. Use of Molecular Techniques in Rumen Microbiology

Course will include the demonstrative training programmes to research staff including teachers, technical, persons and students in different aspects of culture of anaerobic rumen bacteria and fungi and their identification using different molecular tools.

Course Director : Dr U B Chaudhary

Duration : 6 weeks (1st February to 15th March, 2008)

Course fee : US $ 2,200 per trainee (excluding boarding & lodging)

No. of trainees per course : 10

Eligibility : PG in animal nutrition / Biotechnology With knowledge of English.

Course Content

- Use of different equipments for culture of anaerobic bacteria and fungi.
- Different methods for preparation of anaerobic media and application of different cultural techniques for rumen microbes.
- Use of anaerobic chamber for culture of strict anaerobes.
- Morphological and biochemical techniques for identification of rumen bacteria and fungi.
- Extraction of DNA from rumen bacteria and fungi using different protocols.
- Use of primer for PCR and sequencing of PCR products for identification of anaerobic bacteria and fungi.
- RFLP for identification of rumen bacteria and fungi.

3. Molecular Diagnosis of Goat Diseases

Training Programme

The course will provide hand-on training for various molecular techniques and their application for the diagnosis of goat disease which ultimately help for the control of infectious diseases of goats.

Course Director : Dr V S Vihan

Duration : 6 weeks (18 March to 30 April 2008)

Course fee : US $ 2,000 per trainee (excluding of boarding & lodging)

No. of trainees per course : 20

Eligibility : Graduate in Veterinary Science with knowledge of written and spoken English

Course Content

- Nucleic acid based approaches for identifying pathogens and diagnosing infectious disease.
- Probing molecular structure in diseased tissues and biological fluids.
- Detection of specific genes of microbial DNA/RNA from clinical specimen by PCR.
- PCR based amplification and detection of organisms.
- DNA sequencing.
- Techniques of collection of different types of specimens for molecular diagnosis.

NRCC

National Research Centre on Camel
Bikaner

The National Research Centre on Camel is located at Jorbeer at a distance of about 10 km from Bikaner city.

Contact Person

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Courses

1. Artificial Insemination, Embryo Transfer Technology and Sonography to Enhance Reproductive Efficiency in Camel
2. Camel Bioenergy and Products Evaluation and Utilization in Arid Ecosystem
3. Molecular Genetic Techniques for Conservation and Production Enhancement in Camel and their Livestock Species
4. Advances in Camel Milk and Milk Products and Analytical Techniques in Dairy Products

The Centre has developed an elite camel herd consisting of *Bikaneri*, *Jaisalmeri* and *Kachchhi* breeds. Genetic parameters have been estimated for several traits of economic importance. Reduction in early calf mortality from 20-30% in field condition to around 5% under farm through improved management practices has been made. Breeding efficiency of camel herd has been improved significantly in terms of age at first calving and calving interval. Random amplification of polymorphic DNA technique showed genetic variability in Indian dromedary camel.

1. Artificial Insemination, Embryo Transfer Technology and Sonography to Enhance Reproductive Efficiency in Camel

Course Director : Dr Aminu Deen

Duration : 3 weeks (January/February 2008)

Course fee : US $ 1,250 per trainee

No. of trainees per course : 5-10

Eligibility : Scientists and Technical Officers in the relevant field

Faculty

Scientists of the institute and guest lecturers from outside will constitute the faculty.

Course Content

- Clinical and sonographic examination of female genital tract of camel for ovarian follicular dynamics and pregnancy status
- Collection of semen by artificial vagina method, evaluation of semen, cryo-preservation of semen and AI with while and frozen semen
- Super-ovulation and embryo harvesting from female camels
- Enzyme immuno assay (EIA) for determination of male and female steroid hormones

2. Camel Bioenergy and its Utilization in Arid Ecosystem

Course Director : Dr Aminu Deen

Duration : 3 weeks (April 2008)

Course fee : US $ 1,250 per trainee

No. of trainees per course : 5–10

Eligibility : Scientists and Technical Officers in the relevant field

Camel bioenergy and products evaluation and utilization will be useful to understand (i) physical, physiological and biochemical markers/tools to evaluate work potential as draught, riding and race (ii) optimum utilization of camel work potential under normal and stress conditions, (iii) camel bioenergy in augmentation of reproductive efficiency, (iv) health and management practices in better utilization of camel bioenergy.

Faculty

Scientists of the Institute and guest lecturers from outside will constitute the faculty.

Course Content

- Characteristics of breed identification for different production trait
- Work biochemistry and physiology
- Evaluation techniques for camel bioenergy for different works
- Utilization of camel bioenergy
- Camel bioenergy for reproductive efficiency
- Advances in disease diagnosis techniques for improvement of working efficiency
- Dietary model and camel bioenergy utilization. Improved management practices for camel bioenergy evaluation and product utilization

3. Molecular Genetic Techniques for Conservation and Production Enhancement in Camel and their Livestock Species

Course Director : Dr S C Mehta

Duration : 3 weeks (February/March 2008)

Course fee : US $ 1,500 per trainee

No. of trainees per course : 5-10

Eligibility : Scientists, Research Scholars and Technical Officers working on relevant field

This programme is specially designed to disseminate knowledge and skill on various aspects of wool and specialty hair fibres. The relevant areas covered are quality evaluation in respect of physical, chemical and mechanical properties; grading and marketing of animal fibres; mechanical and chemical processing and blending, dyeing and finishing new product development. Also environment-friendly processing and waste minimization will be covered.

Faculty

Scientists of the institute and guest lecturer from outside will constitute the faculty.

Course Content

- Characteristics of Indian camel breeds and their status in the breeding tract
- Breeding strategies for *in situ* conservation of camel breeds
- Satellite DNA analysis
- PCR-RAPD technique for species and breed indentification
- Microsatellite analysis in camel breeds
- PCR-RFLP in livestock species for production traits

4. Advances in Camel Milk and Milk Products and Analytical Techniques in Dairy Products

Course Director : Dr Raghvendar Singh

Duration : 3 weeks (March/April 2008)

Course fee : US $ 1,250 per trainee

No. of trainees per course : 5-10

Eligibility : Scientists and Technical Officers working on relevant field

Camels' milk is considered as one of the most valuable food in arid and semi-arid areas as it contains all essential nutrients similar to that of cows' milk . Further, it is cost effective in comparison of cow and goat due to its longer lactation length and better adoptive mechanism to retain and dissipate heat without affecting the milk production. However, good genetic potential to produce milk exists in indigenous breeds of camels. The composition of camel milk, its products therapeutic role clearly reflects that camel milk is advantageous not only in term of faster recovery in some of chronic diseases but as health promoter for malnourished and drought affected areas. It can be an additional source of income for camel keepers there by provide future sustainability of camels in India.

Faculty

Scientists of the Institute and guest lectures from out side will constitute the faculty

Course Content

- Physical, physico-chemical, biochemical and microbiological properties of camel milk
- Therapeutic/ medicinal application of camel milk and milk products
- Camel milk products preparation, evaluation, utilization and their future prospects
- Camel milk fat and protein-based formulations of commercial applications
- Camel milk shelf-life, evaluation and its extension
- Overview on chemical analysis of milk including GLC, AAS and HPLC
- Advances in biochemical techniques in milk proteins assays including immuno assays

CIFE

Central Institute of Fisheries Education
Mumbai

Central Institute of Fisheries Education, Mumbai started as an in-service training center for the officers serving Department of Fisheries in different States and Union Territories of the country. Over the years it has excelled in fisheries education , the institute has been providing post graduate education in the frontier and emerging areas of fisheries and has contributed immensely for capacity building of various state fisheries departments and personnel and society *per se* .

Contact Person

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Courses

1. Fisheries Co-management for Sustainable Livelihood Development
2. Trickle Down System (TDS) of Aquaculture Extension

CIFE endeavours in becoming a global leader in fisheries education and in advancement of knowledge. Since inception, the institute has been imparting different kinds of demand driven training programmes for different clientele. Fishers, farmers, entrepreneurs, development personnel, and university teachers had been benefited by such courses.

Consistent with its missions in teaching, research, and extension CIFE aims to be actively involved in the international dimensions of higher education, as

international education is becoming an integral and vital component of university life. With this background CIFE, proposes to organize an international training programme on 'Fisheries Co-management for Sustainable Livelihood Development' and 'Trickle Down System for Aquaculture Extension.'

Target training beneficiaries

- Primary resource users : fishers/ fish farmers
- Resource managers
- Non government organisations
- Representatives of government agencies
- Department of fisheries personnel
- Community-based groups and local traditional authorities
- Fishers co-ops, fishers / farmers federations
- Elected government officials
- Academicians and scientists
- Policy planners

Training Methodology

Different training methods and techniques like lectures, group work discussions, field level demonstrations, case studies to mention only a few will be employed. There will be immense opportunities for participants to play an active role in the learning process. The thrust of the training programme will emphasize on experiential sharing and individual reflection across-disciplines. The training programme will be focused with due weightage on practical and hands on training .In addition to post training evaluation in form of concept and measurement; online pre-training session will be held to have a competent participatory curriculum content as per the needs, knowledge and skill sets of learners.

Faculty

CIFE has experienced faculty of global competence and international exposure to conduct such training programmes. In addition to that the institute also has faculty having on this subject. The institute also has multidisciplinary faculty to enrich the participants on the concerned sub-topics.

Duration: 14 days

1. Fisheries Co-management for Sustainable Livelihood Development

Preamble

In many developing countries, population pressure and limited alternative employment opportunities, coupled with the inability and reluctance of governmental inactions to take necessary conservation and management decisions, have resulted in severely overfished coastal and inland resources and increased threats to the livelihoods of fishers. This has generated calls for improved management strategies and sustainable use of aquatic resource systems.

Thus challenge of the day is how to conserve and ensure sustainability of fishery resources and protect the livelihoods of fishing communities. For this, policy planners and resource managers are searching for better ways of managing fisheries. As

Course Content

- Co management – Origin, Concept, Process
- Transition from Traditional to Contemporary Fisheries Management
- Need of the of co-management
- Classification of fisheries co-management
- Co-management - A Process
- Contributing Factors for Successful Co-management
- Benefits of co management-equity and social justice, organization:
- Property rights in fisheries co-management
- Perspectives of the biologist, the economist and the social scientist on co management
- Fisheries co-management case studies from different regions and from different types of fisheries
- Gender analysis of Comanagement

Course Director	: Dr Dilip Kumar
Duration	: 2 weeks
Course fee	: US $ 3,000 per trainee
No. of trainees per course	: 10
Accommodation	: Will be provided in the Institute's guest house
Eligibility	: Subject Matter Specialists/ Scientist/ Extension functionaries/ University Faculties from GOs and NGOs

the current top down and bureaucratic fisheries management approaches based on centralized government interventions are unable to address most of the confronting issues; the participatory approaches are gaining grounds.

The concept of co management is gaining acceptance as an alternative fisheries management strategy in contrast to the top down, centralized government managed approach. Here the fishers participation., local stewardship; greater responsibility, authority and participation of those involved in fishing sector in decision-making; and recognition of not just fish, but the ecosystems in which they live is emphasized. Such "co-management" recognizes the need for management decisions to be made in collaboration with fishers who use and depend upon the resource. However, the actual process of co management needs to be understood for its effective implementation.

What is co management?

Co-management is the management of a resource with a view to protecting it and ensuring its sustainability. This implies the participation of the population and all other stakeholders. The key concept behind co-management is power sharing between the owners or agents managing the resource and users of the resource. It gives resource users a meaningful role in the management of their resources. In co-management regimes, users share with government both the power to make decisions and accountability for those decisions.

Co-management can be defined as a partnership arrangement in which the community of local resource users (fishers/fish farmers), government, other stakeholders (boat owners, fish traders, boat builders, businesspeople, etc.) and external agents (non-governmental organizations (NGOs), academic and research institutions) share the responsibility and authority for the management of the fishery/aquaculture. Through consultations and negotiations, the partners develop a formal agreement on their respective roles, responsibilities and rights in management, referred to as 'negotiated power'. Co-management is also called participatory, joint, stakeholder, multi-party or collaborative management.

Why Co management?

Co-management can enhance the scientific understanding of fisheries resources, the effectiveness of management initiatives, and the compliance with those initiatives. It also deals with issues of social justice and equity.

Objectives of the training programme

- To enable the participants in conducting need assessment of the stake holders and their fulfillment through community participation
- To facilitate mobilization of the facilitating institutions to promote the welfare measures of the stake holders
- To educate networking with the participating communities for taking common decision required to manage the resources
- To facilitate empowering the local resource users to share the power and responsibility for resource management with the government.

Expected outcome

Participants will gain a new body of knowledge and skills and the training programme will bring together participants from different countries to discuss, review and draw common and not so common themes emerging from specific countries This will also result in development of inventory of partners and shared experiences.

Application

At the conclusion of the trainings, participants will have both a new body of knowledge as well as the skills to convey this new knowledge to other professionals in their community. The learning process and the knowledge imparted will provide for appreciating the varied interest and concerns of the different stakeholders .This will eventually lead to the judicious utilization of the different resources in an environmentally sustainable,. ecologically sound, technically feasible, socially acceptable and culturally compatible manner which will lead to a better standard of living.

2. Trickle Down System (TDS) of Aquaculture Extension

Course Director : Dr Dilip Kumar

Duration : 2 weeks

Course fee : US $ 2,000 per trainee

No. of trainees per course : 10

Accommodation : Will be provided in the Institute's guest house

Eligibility : Subject Matter Specialists/ Scientist/ Extension functionaries/ University Faculties from GOs and NGOs

Preamble

Aquaculture in Asia is primarily practiced by the resource poor. Aquaculture is the fastest growing food sector in the world. Aquaculture is a viable and alternative option to the depleting trend in the capture fisheries sector. Aquaculture assures substantial cash income from the sale of domestic surplus and has great potential for its expansion in areas like saline soils, swamps, flood plains etc., which are not suitable for agriculture.

The existing aquaculture services are not available to the poor farmers. The prime objective of aquaculture/fisheries extension is to persuade and help aquafarmers and fishing communities to improve their socioeconomic condition and quality of life by

Course Content

- Relevant aquaculture practices for the poor
- Aquaculture extension
- Genesis and Concept of TDS
- Planning, Design and Operation of TDS
- Results and Lessons Learnt in implementing TDS
- Designing Future Strategy.

making improvement in their farming practices resulting in increased fish production and income.

Each an every country in the region has developed its own aquaculture extension services delivery system with its own methods and approaches. The major hurdles faced in the aquaculture extension service delivery syetem have been the dearth of extension officers. It becomes imperative to address these issues. With this background there is a need to introduce an Aquaculture Extension System which would deliver adequate extension services without time over run to huge masses. The system has been experimented and found successful is the Trickle Down System (TDS) of Aquaculture Extension by FAO.

What is Trickle Down System?

The TDS approach of aquaculture extension is a participatory farmer to farmers extension approach which involves an initial bottom-up participatory planning of extension programme and thereafter a lateral spread of knowledge and skills of improved culture technology. TDS ensures an active flow of information from the Result Demonstration Farmers (RDFs) to the Fellow Fish Farmers (FFs) by involving both categories of participating farmers in the extension programme.

Objectives of the training programme

- To provide an overview of Aquaculture Extension
- To make aware about the Trickle Down System (TDS) of Aquaculture Extension, Lessons Learnt and Future Plans
- To encourage the participants to prepare their action plan that can be implemented in their area of operations.
- To train and develop change agents who could effectively facilitate the transfer of technology
- Further strengthening the TDS by incorporating recommendations

Application

In the context of paucity of funds and dearth of extension personnels the expected benefits of the effective technology transfer and service delivery system are to suffer a time over run. It is this hurdle that the trickle down system of extension approach tackles in an effective manner. The participatory approach involving the primary resource users with the application of *seeing is believing* and *learning is doing* will lead to a higher pace of technology transfer and service delivery system. The training programme will help to create *Change agents* or progressive farmers who will become potential innovators who are not averse to risk in the decision making process.

CIFT

Central Institute of Fisheries Technology
Cochin

The Central Institute of Fisheries Technology established on 29 April 1957 is the only multi-disciplinary Institute in South East Asia with capability of dealing with the entire range of harvest and post-harvest technology of fish.

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Courses

1. Design and Operation of Responsible Fishing Gear
2. Seafood Quality Assurance
3. HACCP for Seafood Industry
4. Laboratory Techniques for Microbiological Examination of Seafoods
5. Biochemical Evaluation of Fish and Fishery Products
6. Extension Methodologies for Coastal Fisheries
7. Fishery Byproducts—Prawn-shell Powder—Chitin and Chitosan, Glucosamine Hydrochloride and High Density Chitosan
8. Development of Fish and Shrimp-based Value-added Products
9. Design and Operation of Fishing Vessels
10. Energy Efficient and Eco-friendly Fish Drying Systems

The Institute has its headquarters of Cochin, Kerala, and Research Centres at Veraval (Gujarat), Visakhapatnam (Andhra Pradesh), Burla (Orissa), Mumbai (Maharashtra) and Calicut (Kerala). Research work is carried out by the research division, viz Fishing Technology, Fish Processing, Quality Assurance and Management, Microbiology, Fermentation and Biotechnology, Engineering and Extension, Information and Statistics and Biochemistry and Nutrition.

The Institute is well equipped with laboratories and allied facilities in all major subject areas of fishery technology.

1. Design and Operation of Responsible Fishing Gear

The training programme is meant for the fishing technologists to acquaint themselves with the recent developments in harvest technology of fish and to give exposure to the concepts delineated in the Code of Conduct for Responsible Fisheries with special reference to fishing operations. Conservation of fishery resources through responsible fishing techniques like bycatch reduction devices and optimization of mesh size in shrimp and fish trawls and square meshes in cod end for facilitating escapement of juveniles are dealt within the course. Eco-friendly fishing gears and methods which can ensure minimum damage to the ecosystem is also dealt with. The course includes both theoretical and practical training classes.

Faculty

The Institute has well experienced and highly qualified team of scientists and technical officers in the field of design and construction of fishing vessels; operation and maintenance of marine engines; design and fabrication of onboard facilities and deck equipments; design and fabrication of electronic aids for fishing; design and fabrication of fishing gear etc. The Institute offers services in the testing and certification of marine engines and fishing vessels, design and construction supervision of fishing vessels and small craft; design and fabrication fishing gear; design and development of fuel efficient propeller systems; development of onboard systems and equipments.

Course Content

- Basic design, fabrication and rigging of responsible fishing gears
- Testing of different materials used for fishing
- By catch reduction devices
- Design and operation of ecofriendly trawls
- Design and fabrication of improved lobster traps
- Design and fabrication of turtle excluder devices
- Field trials on board departmental fishing vessels/ commercial fishing vessels

Course Director : Dr B Meenakumari

Duration : 10 weeks (4 September–9 November 2008)

Course fee : US $ 2,500 per trainee (exclusive of boarding and lodging)

No. of trainees per course : 4

Accommodation : To be arranged in the Institute's guest house at reasonable rate

Eligibility : Graduate in Fisheries/Science or equivalent

2. Seafood Quality Assurance

This training programme is meant for the technologists and managers of seafood processing industry. The course includes basic principles of seafood quality assurance through organoleptic, microbial and chemical evaluation as well as basic plant design and process control, evaluation of food safety hazards etc. Besides, the course also covers basic systems of inspection in seafood processing plants, National and International standards (EU & USFDA) and principles of HACCP. The course includes both theoretical and practical classes of techniques and methodology of seafood quality assurance.

Course Director : Dr M K Mukundan

Duration : 12 days (10-22 September 2008)

Course fee : US $ 1,500 per trainee

No. of trainees per course : 10-15

Accommodation : To be arranged in the Institute's guest house at reasonable rate

Eligibility : Graduate in Fisheries/Science or equivalent

Faculty

Experienced scientists of the institute will form the faculty of the courses.

Course Content

- Organoleptic evaluation of fish/shell fish
- Fundamentals of bacteriology
- Methods of identification and isolation of pathogens and indicator organisms
- Quality problems
- Quality management
- Requirements of importing countries
- Methods of evaluating fish freshness and quality
- Legislation on export inspection in India
- Systems of inspection

3. IS/ISO 22000-HACCP for Seafood Industry

Hazard Analysis and Critical Control Point (HACCP) and Pre-requisite Programmes (PRPs) have become very much relevant to the food processing industry in general and seafood industry in particular after the implementation of European Union and FDA Regulations. The training programme on HACCP for seafood industry systematically introduces basic principles of ISO 22000 namely HACCP principles, preparation of HACCP manual, conducting hazard analysis, formation of HACCP plan form, development of prerequisites for safe food preparation etc. so as to enable the trainees to prepare manual, establish plant HACCP and conduct verification / audit on their own. The trainees will be familiarized with all types of hazards, viz biological, chemical and physical, commonly encountered in the seafood industry. Case studies of different marine products will be taken up to get a practical experience in hazard analysis and HACCP implementation. The course also describes different types of records to be maintained.

Course Content

- Hazard analysis
- Preparation of flow charts
- Identification of hazards
- Identification of CCP's
- Corrective actions, verification, auditing, record keeping and preparation of HACCP manual

Course Director : Dr M K Mukundan

Duration : 6 days (15–20 October 2008)

Course fee : US $ 750 per trainee (exclusive of boarding and lodging)

No. of trainees per course : 10–15

Accommodation : To be arranged in the Institute's guest house at reasonable rate

Eligibility : Graduate in Fisheries/Life Science or equivalent

4. Laboratory Techniques for the Microbiological Examination of Seafoods

Course Director : Dr N Thampuran

Duration : 4 weeks (13 August–7 September 2008)

Course fee : US $ 1,500 per trainee (exclusive of boarding and lodging)

No. of trainees per course : 6

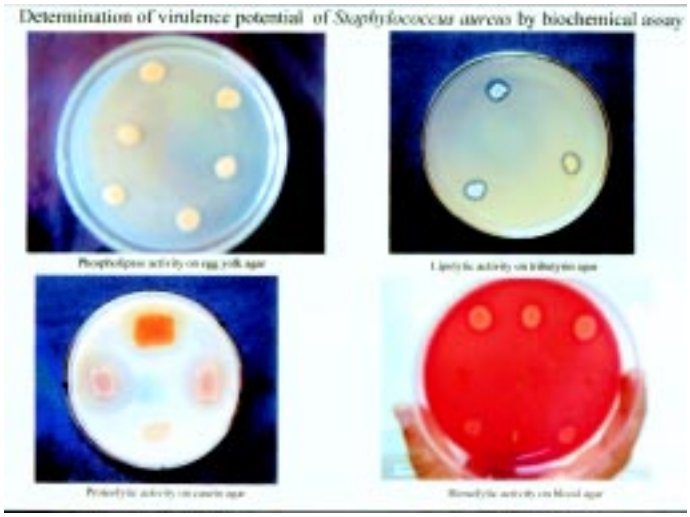
Accommodation : To be arranged in the Institute's guest house at reasonable rate

Eligibility : Bachelor's degree in Chemistry/Biochemistry/ Fishery Science/Biotechnology/Microbiology/ Food Science/Veterinary Science/Life Science of any recognized university or a 2 year diploma in Food Science after 10+2 schooling

The fish processing industry has emerged as a well organized food processing industry in most of the nations of the world. Fish being a protein rich virgin product from the sea and other aquatic systems, is in great demand as a commodity for export. From the environments and during handling, fish/shellfish can harbour some pathogens as well as some toxigens. The FAO, USFDA and the EC are insisting that the processed fishery products should meet strict sanitary and phytosanitary regulations laid down by the importing countries/WTO. This needs modern microbiological testing laboratories and well trained technicians. The proposed training course is meant for training science graduates as excellent laboratory technicians in microbiology for testing fish and fishery products for pathogens and related parameters.

Faculty

Fully qualified and experienced scientists of the microbiology, fermentation and biotechnology (MFB) division constitute the faculty.



Course Content

- Fundamentals in fishery microbiology; Basic techniques in bacteriology, microscopy, media preparation; bacteriological analysis for total bacteria, Coliforms, *E. coli*, Streptococci, Staphylococci, *Salmonella*, Pathogenic Vibrios *(V. cholerae, V. parahaemolyticus, V. vulnificus)*, *Listeria* spp., *Bacillus cereus*, *Clostridium botulinum* and *C. perfringens;* Isolation of yeast and molds; MPN techniques, Toxin assay of Staphylococcus, *Bacillus cereus* and *Clostridium botulinnun;* PCR techniques; Assay for antibiotics in tissues (Microbiological methods and ELISA)

5. Biochemical Evaluation of Fish and Fishery Products

Reliable data on biochemical composition is very important for several purposes. Chemical parameters are basic requirements for assessing the nutritional value and the overall quality of fish and fishery products. Equally important is monitoring the levels of toxicants and pollutants, viz heavy metals, hydrocarbons, pesticide residues, antibiotic residues etc. in these products and the ecosystem. The advanced analysis requires well-equipped laboratories and well-trained personnel. The Biochemistry and Nutrition Division has the advantage of having both equipment and manpower to impart necessary training in these areas.

Faculty

Experienced scientists of the institute will constitute the faculty.

Course Director : Dr T V Sankar

Duration : 6 weeks (from 3rd October 2008)

Course fee : US $ 2,500 per trainee (exclusive of boarding and lodging)

No. of trainees per course : 4

Accommodation : To be arranged in the Institute's guest house at reasonable rate

Eligibility : Bachelor's degree in Biochemistry/Fishery Science/Food Science/Biotechnology of any recognized university

Course Content

- Proximate composition analysis
- Protein
  - fractionation
  - quantification
  - amino acid analysis (HPLC)
  - electrophortetic separation
- Lipids

  Chemical analysis
  * iodine value
  * saponification value
  * peroxide value

  Fractionation
  * phospholipids
  * neutral lipids
  * non-saponifiable matter
  * cholesterol
- Fatty acid analysis (GC)
- Heavy metal (AAS)
- Organochlorine pesticides (GC)
- Polyaromatic hydrocarbons (HPLC)
- Antibiotic residues (HPLC) – MS MS
- Aflatoxin (HPLC)

6. Extension Methodologies for Coastal Fisheries

The course is organized for the extension/development / research officials and it aims to highlight the various extension methodologies which could be used in development organizations. Needs assessment is to be done and need-based programmes and schemes have to be developed for technology transfer. By identifying the critical factors in the adoption of innovations, the rate of adoption of innovations could be increased. The course also deals with the human resource development aspects in fisheries. Different evaluation techniques and impact analysis methods will be discussed. The course will also focus on the innovative approaches in coastal zone management and appropriate technologies in fishing, fish processing and seafood quality assurance.

Course Director : Dr S Balasubramaniam

Duration : 3 weeks (12-30 November 2008)

Course fee : US $ 2000 per trainee (exclusive of boarding and lodging)

No. of trainees per course : 5-10

Accommodation : To be arranged in the Institute's guest house at reasonable rate

Eligibility : Graduate in fisheries/science or equivalent

Course Content

- Extension methodologies
- Programme building in fisheries
- Technology transfer system and strategies
- Adoption and diffusion of innovations
- Communication for fisheries development
- Human resource development in fisheries
- Evaluation techniques and impact analysis
- Innovative approaches in coastal zone management
- Appropriate technology in fishing, fish processing and seafood quality assurance

7. Fishery Byproducts—Prawn Shell Powder-Chitin and Chitosan, Glucosamine Hydro-chloride and High Density Chitosan

The shellfish processing plants through out the world face a problem of disposal of the wastes which amounts to 50% of the raw material. This can be solved by converting this waste into useful products, shell powder, chitin and chitosan, glucosamine and high density chitosan. These are having application in feed formulations, dietary supplements and pharmaceuticals. In addition to solving pollution problems, it will generate income and employment opprotunities.

Course Director : Dr P T Mathew

Duration : 4 weeks (1-30 November 2008)

Course fee : US $ 2,550 per trainee (exclusive of boarding and lodging)

No. of trainees per course : 10

Accommodation : This will be provided at a very reasonable cost at the Institute's guest house

Eligibility : Bachelor's degree in Science or equivalent from any university or institution with experienced in the relevant field

Faculty

The Institute has well experienced scientists in this faculty.

Course Content

- Handling of shellfish wastes
- Dehydration and pulversing
- Production of chitin and chitosan

8. Development of Fish and Shrimp-based Value-added Products

The present market trends reflect a rapidly growing demand for ready-to-cook/ready-to-serve convenience and value-added fish and fishery products. Value-added products fetch more unit price compared to conventional products. Due to these reasons, the fish processing industries all over the world are trying to change their production strategy from conventional products to value-added products. However, the product should satisfy the quality criteria and the product specifications of the buyer.

Faculty

The Institute has well experienced and specially trained faculty to handle various aspects of the training course.

Course Content

- Handling and processing
- Prepraration of raw materials
- Development of products such as fish finger, fish steaks, fish cutlets, fish balls, breaded shrimp, *nobashi*, *sushi*, skewered shrimp, *barbacu* etc.

Course Director : Dr T K Srinivasa Gopal

Duration : 2 weeks (17-29 September 2008)

Course fee : US $ 1,000 per trainee (exclusive of boarding and lodging)

No. of trainees per course : 10

Accommodation : This will be provided at very reasonable cost at the Institute's guest house

Eligibility : Bachelor's degree Science or equivalent with experience in fish processing

9. Design and Operation of Fishing Vessels

Faculty

The Institute has well experienced and highly qualified team of scientists and technical officers in the fields of design and construction of fishing vessels, operation and maintenance of marine engines, design and fabrication of onboard facilities and deck equipments, design and fabrication of electronic aids for fishing, design and fabrication of fishing gear etc. The Institute offers services in the testing and certification of marine engines and fishing vessels, design and construction supervision of fishing vessels and small craft, design and fabrication of fishing gear, design and development of fuel efficient propeller systems, development of onboard systems and equipments, evaluation and certification of electronic equipments for fishing, etc. in addition to training for university students in the design of fishing vessels.

Course Director : Mr M Nasser

Duration : 5 months (1 January-30 May 2008)

Course fee : US $ 5,000 per trainee (exclusive of boarding and lodging)

No. of trainees per course : 10

Accommodation : This will be provided at a very reasonable cost at the Institute's guest house

Eligibility : Bachelor's degree in Science or equivalent with experience in the relevant field

Course Content

- Basic design of fishing vessels
- Onboard facilities and equipments
- Fitting out of fishing vessels
- Navigational aids
- Electronic aids for fishing
- Selection of fishing vessels and their equipments
- Constructional aspects of fishing vessels
- Setting up of boat yard
- Inspection of fishing vessels
- Computer aided applications in design and construction of fishing vessels
- Maintenance of fishing vessels
- Fleet management
- Project evaluation

10. Energy Efficient and Eco-friendly Fish Drying Systems

Course Director : Dr P N Joshi

Duration : 1 week (23–28 April 2008)

Course fee : US $ 500 per trainee
(exclusive of boarding and lodging)

No. of trainees per course : 5

Accommodation : This will be provided at a very reasonable cost at the Institute's guest house

Eligibility : B.Sc. in Chemistry/zoology/biology/fisheries/ aquaculture or equivalent

Faculty

Highly qualified scientists of this institute will constitute the faculty.

Course Content

- Objectives of fish drying
- Solar drying systems
- Design of fish dryers
- Forced and natural convection systems
- Effect of temperature, relative humidity, and air-velocity on drying
- Integrated collector systems and air heating systems
- Stand alone PV systems
- Materials selection and dryer fabrication methods
- Evaluation of drying systems; cost and capacity analysis
- Instrumentation—measurement of drying parameters; temperature monitoring
- PV operation; Battery buffer
- Back up systems using eco-friendly gaseous fuels, PV cells and electricity
- Small, medium and large scale fish dryers
- Operation and maintenance of fish dryers

CMFRI

Central Marine Fisheries Research Institute
Cochin

Central Marine Fisheries Research Institute established in 1947 is the nodal agency in India, responsible for research support in marine fisheries development. Over the period of 60 years since its inception, the Institute has built up excellent infrastructure, research facilities and qualified R & D staff, comparable to any well-established marine fisheries laboratory in the world. The major mandates of the CMFRI are to monitor the exploited marine fisheries resources of our coasts and develop appropriate management and governance interventions for ensuring sustainability as well as to develop and field test commercially viable technologies for Mariculture of economically important fish and shell fishes. The Institute undertakes research in environmental characteristics of inshore sea and on sensitive marine ecosystems for their conservation and restoration and act as a repository of information on marine fishery resources. The Institute also conducts Post-graduate education programmes leading to M. F.Sc. and Ph.D. degrees.

Contact Person

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Courses

1. Diseases in Mariculture - Diagnosis and Management
2. Fish and Crustacean Nutrition
3. Molecular Genetic Characterization of Fish and Shellfish
4. Marine Pearl Production
5. Multivariate Statistical Methods for Fisheries Research
6. Trophic Modeling of Marine Ecosystems

The Institute has established three Regional Centres, eight Research Centres and 15 Field Centres all along the coast with its Headquarters at Cochin. The multidisciplinary researches in capture and culture fisheries are conducted under ten Divisions. Besides, the Institute also takes up short-term research projects on important and priority areas through *ad hoc* research projects funded by outside agencies in the country and abroad and offers consultancy services to the clients from Government organizations as well as private industry.

Training has been one of the major activities of the Institute and has responded to the needs of the different clientele groups by organizing short-term skill oriented training programmes. The Institute proposes to offer the following training programmes during 2008-2009

1. Diseases in Mariculture - Diagnosis and Management

Diseases are among the greatest deterrents to the sustained production in aquaculture. Prevention and management of diseases in cultured organism become a vital requirement for a sustained industry. To this end, several national and international organizations have recognized the need for trained aquatic animal health specialists. It is in this context that the training programme on "Diseases in Mariculture - Diagnosis and Management" is proposed with a view to provide in depth knowledge to the participants.

The Central Marine Fisheries Research Institute (CMFRI) has immensely contributed to the growth of coastal aquaculture by developing technologies in the frontier areas. The institute also recognized the importance of developing disease monitoring and management regimes in mariculture systems. The division of Physiology, Nutrition and Pathology (PNPD) of CMFRI has been undertaking research projects on diagnosis and management of diseases in coastal aquaculture for the past two decades. The recent developments in microbiology, immunology, molecular biology and biotechnology made it possible to device highly specific and rapid tools for the diagnosis of major diseases in mariculture.

This is an intensive three-week programme designed to provide training in the methodology of diagnosis and management of bacterial, viral, mycotic, parasitic, nutritional, and environmental diseases of marine food fish and aquarium species. The training programme provides an opportunity to learn with experts in academic and applied aspects of health management in mariculture.

Training programme

The objective of the training programme is to familiarize the participants in the wide range of disciplines and skills necessary for the investigation, prevention and control of diseases in mariculture.

Course Director	: Dr. K.K. Vijayan
Duration	: Three weeks
Course Fee	: US$ 3000 per trainee (Exclusive of food and accommodation)
No. of trainees Per course	: 10
Accommodation	: Will be arranged on advance payment by the trainee
Eligibility	: Masters Degree in Aquaculture & allied fields

Faculty and Facilities

The division has a multidisciplinary team of scientists specialized in the areas of Fish and shellfish pathology, microbiology, parasitology, immunology, toxicology, histopathology, electron microscopy, molecular biology, immunodiagnosis and cell cuture who constitute the core faculty of the programme. The division has facilities for microbiological, histopathological, ultrastructural, antibody based as well as molecular techniques in fish and shellfish disease investigations.

Course Content

- Overview of diseases and disease development in mariculture systems
- Systematic pathology and histopathology of fish and shellfish
- Bacterial diseases of fish and shellfish
- Viral diseases of fish and shellfish
- Fungal diseases of fish and shellfish
- Fish and shellfish Immunology
- Parasitic diseases of fish and shellfish
- Environmental ant other noninfectious diseases
- Nutritional diseases
- Epidemiology and disease control in mariculture systems
- Ecotoxicology
- Physical, environmental and chemical methods of disease prevention
- Immunological and biological methods of disease prevention and control
- Principles and methods of disease diagnosis
- Antibody based and molecular techniques in disease diagnosis
- Importance of aquatic animal health certification and quarantine programmes
- Field/laboratory case studies

2. Fish and Crustacean Nutrition

Aquaculture in the new millennium has to meet the challenges in intensification of culture practices, expansion of area under culture, species diversification, ecosystem sustainability, long term productivity, declining fish meal production, increased feed demand. In order to sustain this promising sector it is imperative to produce and supply nutritionally adequate, cost-effective and environment friendly feeds for the commercially important fish and crustaceans of nutritional, ornamental and recreational importance. The proposed short- term training programme would focus on nutritional requirements, formulation and production of sinking and floating feeds required by a number of marine species.

The Central Marine Fisheries Research Institute (CMFRI) is a pioneer institute which has contributed much to the development of aquaculture nutrition research in India.

Training programme

The objective of the training programme is to familiarize the participants in developing skill for fish and crustacean nutrition research for application in research and development and industry.

Faculty and Facilities

Experienced scientists of the nutrition team will conduct the training. The team has been regularly organizing short-term training programmes as well as summer/winter schools, and workshops over the past 20 years, which has benefited several academicians, entrepreneurs and researchers in India and abroad.

Course Director	: Dr R Paul Raj
Duration	: Three weeks
Course Fee	: US$ 3000 per trainee (Exclusive of food and accommodation)
No. of trainees Per course	: 10
Accommodation	: Will be arranged on advance payment by the trainee
Eligibility	: Masters Degree in Aquaculture & allied fields

The training center has well equipped laboratories for nutrition and feed research. The exclusive facilities include HPLC (Waters), GC (Perkin Elmer), Atomic Absorption Spectrophotometer, Spectrophotometer, Kjeltec, Soxtec, Fibertec (FOSS Tecator, Sweden), Semi-micro bomb calorimeter, fluorimeter (Varion), Twin-screw extruder (Lab model) *etc*. along with other routine analyzers. The trainees can also get excellent hands-on experience in small-scale aquafeed production.

Course Content

The training programme involves theory, practicals and on-farm/field studies and observations.

- Nutritional requirements of cultivable fish and shellfish.
- Raw materials for cost-effective feed production.
- Anti-nutritional factors
- Feed additives
- Processing equipments
- Feed formulation techniques and strategies
- Proximate composition
- Amino acid profile of raw materials and feeds
- Fatty acid profile of raw materials and feeds
- Production of floating and sinking pellets
- Storage and shelf-life
- Quality assessment and standards
- Feed management

3. Molecular Genetic Characterization of Fish and Shellfish

In recent years several advance techniques have been developed in the area of genetics and biotechnology which can have application in fisheries and aquaculture. The Central Marine Fisheries Research Institute (CMFRI), Kochi is organizing a training programme on "Molecular genetic characterization of fish and shellfish" to bring about qualitative improvement in the knowledge and skills of the participants in some of the important platform technologies in molecular genetic and biotechnology.

Training programme

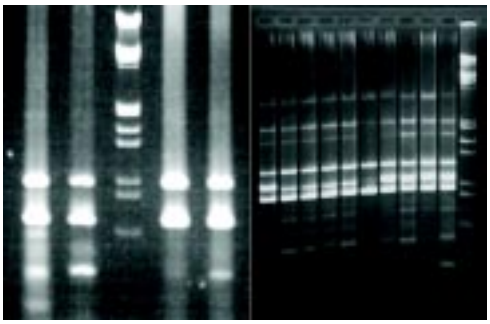
The objective of the training programme is to impart theoretical and practical knowledge on various techniques used for molecular genetic characterization of fish and shellfish.

Faculty and Facilities

The training will be conducted by experienced scientists of the institute.

The CMFRI training center has well equipped laboratories for Genetics and Biotechnology research. Some of the important equipments in possession of the Division include PCR thermocyclers, gel documentation unit, densitometer scanner, electroporation unit, refrigerated centrifuge, deep freezer, ice flaker, gel drier, vertical & submarine electrophoresis units with power packs, etc.

Course Director	: Dr P Jayasankar
Duration	: Three weeks
Course Fee	: US$ 3000 per trainee (Exclusive of food and accommodation)
No. of trainees Per course	: 10
Accommodation	: Will be arranged on advance payment by the trainee
Eligibility	: Masters Degree in Aquaculture & allied fields

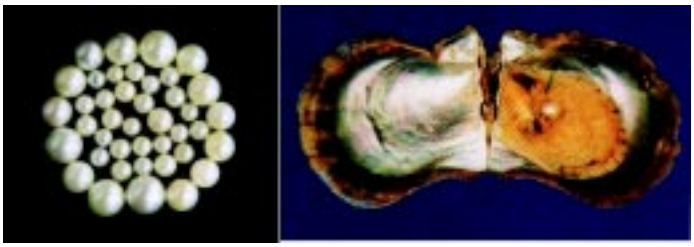


Course Content

The training programme involves theory, practicals and on-farm/field studies and observations.

- Sample/tissue collection and storage
- Genomic DNA extraction
- Protein (general) gel electrophoresis
- Principals and application of Polymerase Chain Reaction (PCR)
- Random Amplified Polymorphic DNA (RAPD)
- Amplified Fragment Length Polymorphisms (AFLP)
- Microsatellites
- PCR/RFLP of mitochondrial DNA
- Agarose gel electrophoresis
- Documentation of gel
- Software/statistical analysis of electrophoretic patterns for various molecular markers
- Species relationship analysis

4. Marine Pearl Production



The Central Marine Fisheries Research Institute is one of the premier institutes in marine pearl research. The technology for marine pearl production was developed in 1973 and by the end of the decade the hatchery technology for pearl oyster seed production was also developed. In 1992 India organized an International training with participation from eleven countries under the NACA program. Since then, several short and long term training programs have been conducted for national as well as international candidates. Recently a breakthrough which won international recognition is the development of a technique for pearl production through tissue culture. India is the first country to make commendable progress in this biotechnological venture. Further, CMFRI has succeeded in development of techniques for colour manipulations in cultured pearl and in mabe pearl and akoya pearl production.

Objective

The main objective of the training is to 1) provide hands on training in marine pearl production through pearl surgery to 2) familiarize on the pearl seed production and farming technologies

Pearl Research Facility

The CMFRI has a fully equipped research and training center in pearl production complete with surgery equipments, implantation theaters, high power microscopes and and tissue culture laboratory. The Institute has also several open sea pearl farms with rafts and cages (grow-out containers) and a lab for grading and sorting quality pearls. A well equipped pearl oyster seed production unit complete with water intake system, live feed production unit, spawning and larval rearing sections is an added advantage of the Institute where the candidates can get hands on training in pearl spat production.

Faculty

The pearl culture research programs are conducted by a team of researchers capable of operating modern equipments and open sea mariculture activities. The candidates will be given individual attention by the experienced faculty

Course Director : Dr V Kripa
Duration : Twenty One days
Course Fee : US$ 3000 per trainee (Exclusive of food and accommodation)
No. of trainees Per course : 10
Accommodation : Will be arranged on advance payment by the trainee
Eligibility : Masters Degree in Aquaculture & allied field

Course Content

Pearl culture

- Pearl Culture Technology: Natural pearl – pearl sac theory
- Pearl surgery single and multiple implantation
- Convalescence – flow through system
- Harvest-post harvest grading
- Grow out systems, Farm management
- Different types of pearls- koya- keisi- biwa pearls - black pearl- golden pearls
- Recent developments in pearl culture – on shore pearl culture
- Mabe pearls – images- materials- location of insertion make up pearls

Pearl Oyster Hatchery

- Hatchery requirements Seawater supply system
- Microalgal culture system – infra structure facilities.
- Induced breeding of oysters
- larval rearing techniques (upwelling and downwelling systems)
- Remote setting and nursery cultures
- Larval feed High Density Micro algae Production, continuous harvesting
- Preserved and dried algae – replacement diets-artificial diets
- Probiotics in larviculture

5. Multivariate Statistical Methods for Fisheries Research

Fishery Research, be it macro level in-vivo study or micro level laboratory study, depends a lot on the quantitative information and their ramifications. Hence a scientific analysis of the information can never be over emphasized. So far as stock assessment studies are concerned giant strides have been made on modeling and forecasting fronts, but mostly with focus on one facet at a time. But being a complex multi factor environment the real nature of the information generated from any system will be multivariate in nature with the interdependence of the variables revealing more together than in solitude. The synergism and antagonism is an inseparable part of their existence and hence have to be taken care of while studying their structure.

With these basic compulsions, it is high time that an objective look is cast with a pure Analytical perspective which will be of immense help to researchers and data analysts in the field of Fisheries. CMFRI with a trail blazing history of analytic research in various fields of capture fisheries and laboratory research, has been possessing a multi-purpose data aggregation system in place since late 1970's.

Faculty and Facilities

With a band of highly qualified professional personnel from various fields like statistics, biostatistics, econometrics and informatics, CMFRI, especially the Fishery Resources Assessment Division has been striving for excellence in the field of multivariate data analysis. It is with the backing of such a wealth of information and experience, CMFRI proposes a specific training programme of three weeks duration on the multivariate applications in Fisheries Research.

Course Director : Dr M Srinath
Duration : 21 days
Course Fee : US$ 1500 per trainee (Exclusive of food and accommodation)
No. of trainees Per course : 10
Accommodation : Will be arranged on advance payment by the trainee
Eligibility : Masters Degree in Aquaculture & allied field

Course Content

Pearl culture

- Introduction to Matrix algebra – Definition, types of matrices, matrix addition, multiplication
- Determinants & Inverse
- Eigen structure of a matrix
- Statistical; Methods – Introduction, central tendencies, dispersion and co-variation
- Correlation, regression and multiple regression
- Distributions (Binomial, Poisson, Normal, Multinomial, Multivariate Normal)
- Statistical Tests of significance (t, Chi-square, F and T^2)
- An overview of Multivariate Techniques – Introduction, types of analysis required – ordination, classification and test of hypothesis
- Statistical Software for Multivariate Analysis – Introduction to tools in excel, SPSS and Systat
- Multivariate Analysis of Variance (MANOVA)
- Principal Component Analysis (PCA)
- Linear Discriminant Analysis (LDA)
- Cluster Analysis (CLA)
- Factor Analysis (FA)
- Canonical Correlation Analysis (CCA)
- Path Coefficient Analysis (PATH)
- Principal Component Regression (PCR)
- Principal Co-ordinate Analysis (PCoA/PCO)
- Multi-Dimensional Scaling (MDA)
- Canonical Analysis of Principal Components (CAPC)
- Sheared Principal Component Analysis (SPCA)
- Empirical Orthogonal Function Analysis (EOFA)
- Generalized Discriminant Analysis
- Artificial Neural Networks (ANN)

6. Trophic Modelling of Marine Ecosystems

Fishing has one of the most widespread anthropogenic impacts on marine ecosystems. In recent times, the dev-elopment of measurable metrics of the resultant ecosystem effects has become an important aspect of fisheries management. In the policy domain, the call for ecosystem consid-erations to be integrated into fisheries management has become commonplace in international and national policy statements regarding fisheries through the last decade, largely inspired by the natural science debate on the ecosystem effects of fisheries.

The Reykjavik declaration (Declaration of the Rey-kjavik conference on Responsible Fisheries, FAO 2001) undertakes to 'identify and describe the structure, components and functioning of relevant marine ecosystems, diet composition and food webs, species interactions and predator-prey relationships, the role of habitat and the biological, physical and oceanographic factors affecting ecosystem stability and resilience'.

Ecosystem models are often advocated as tools for the evaluation of system effects. Demand for accurate predictions encourages biologists to quantify and compact the complex inter-actions of organisms in an ecosystem into predictive computer models to guide ecological management and analysis of choices and tradeoffs. One of the software widely used for this application is ECOPATH with ECOSIM (EwE).

Faculty

The course will be conducted by the Central Marine Fisheries Research Institute (CMFRI) at its headquarters in Cochin. Marine ecosystem mod-elling is a multi-disciplinary science and the course director and faculty have experience in constructing the trophic models of the Arabian Sea ecosystem off Karnataka and the Arabian Gulf ecosystem of Saudi Arabia. The faculty which includes biologists and oceanographers are also experts in tropical marine fisheries management techniques.

Course Director : Dr K S Mohamed
Duration : 2 Weeks (2008/2009)
Course Fee : US$ 1500 per trainee (Exclusive of food and accommodation)
No. of trainees Per course : 20
Accommodation : Will be arranged on advance payment by the trainee
Eligibility : Masters Degree in Fisheries, Middle and senior level fisheries researchers and managers

Course Content

- Classical stock assessment methods
- Ecosystem concepts
- Basic fisheries ecology
- Mass balance ecosystem models
- Principles of Ecopath software
- Basic parametrization : Production; Consumption; Mortality rates; Other mortality; Biomass estimates; Ecotrophic efficiency; Diet composition and diet matrix; Detritus fate; Migration; Fishery information; Data pedigree
- Mass balance procedures
  - Manual mass balancing
  - Auto mass balance
- Parameter evaluation
  - Flows to detritus
  - Net efficiency
  - Omnivory index
  - Respiration
  - Assimilation
  - Predation mortality
- Summary statistics
  - Total system throughput
  - Efficiency of the fishery
  - Connectance index
  - Niche overlap
  - Network analysis
  - Ascendancy measure
  - Mixed trophic impact
  - Cycles and pathways
  - Preparation of flow diagrams
- Time-dynamic simulations – ECOSIM
  - Flow control: top down/ bottom up
  - Ecosim forcing functions
- Capabilities and limitations of Ecopath and Ecosim

CIFRI

Central Inland Fisheries Research Institute
Barrackpore

The CIFRI established in 1947 is a premier facility in Asia in the field of Inland Fisheries Research, Extension and Training.

Contact Person

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Courses

1. Environment and Fish Health Management
2. Management of Small Reservoirs
3. Inland Fisheries Management through GIS tools

The Institute is devoted to the cause of research back up for fisheries development of the country and is conducting investigations for proper appraisal of open water inland fisheries resources of the country with an objective to evolve suitable methodologies for their sustainable utilization and conservation. The Institute has successfully conducted numerous environmental impact assessment studies prior to commissioning of various import industrial projects as a nodal consulting agency.

1. Environment and Fish Health Management

The participants would be apprised of latest techniques available for studying the EIA and for formulation of action plan for their mitigation under different situations. Methods of analyses of water quality, sediments, heavy metals, and pesticides will be taught to participants to assess the status of water pollution. Similarly, assessment of pollution based on biological methods would also be discussed. Practical classes and field visits will be an essential components of the course.

Course Director : Dr K K Vass

Duration : 30 days (20 November to 19 December 2008)

Course fee : US $ 1,500 per trainee (exclusive of boarding and loadging)

No. of trainees per course : 10

Accommodation : Will be provided at Institute guest house

Eligibility : Bachelor/Master degree in fisheries or life Science

Training Programme

Institute regularly conducts several training programmes for scientists, university lecturers, managers and research scholars round the year.

Faculty

Director and scientists of the institute working in respective fields.

Course Content

- Water and soil quality attributes—methods of assessment
- Aquatic pollutants, their monitoring and assessment methods
- Eutrophication and its impact on fish
- Anatomy and physiology of fish
- Biological monitoring tools for aquatic ecosystem and fish health assessment
- Bioassay and toxicity test methods
- Bio-indicator methods for assessment of fish and ecosystem health
- Statistical methods application for assessing fish and its environment status
- Methods for assessment and economic impact of fish and its environment degradation

2. Management of Small Reservoirs

Management techniques for reservoirs based on ecological parameters developed by the Institute over a period of 30 years research for enhancement of fish production would be discussed in this course. The course will include theoretical and practical classes besides field visits.

Course Director : Dr K K Vass

Duration : 30 days (2-31 January 2008)

Course fee : US $ 1,500 per trainee (exclusive boarding & lodging)

No. of trainees per course : 10

Accommodation : Will be provided at Institute guest house

Eligibility : Bachelor/Master degree in fisheries or Life Science

Training Programme

Institute regularly conducts several training programmes for scientists, university lecturers, managers and research scholars round the ysear.

Faculty

Director and scientists of the institute working in respective fields.

Course Content

- Classification of reservoirs
- Morphology and hydrodynamics
- Biotic and abiotic factors
- Production potentiality
- Stocking assessment
- Craft and gear
- Rational exploitation
- Conservation
- Socio-economics

3. Inland Fisheries Management through GIS Tools

Participants will be appraised of Geographic Information System (GIS) as a resource management tool. Applications of GIS in fisheries and aquatic science research and management will include : mapping, modeling of fish stock, resources and habitat; identification, mapping of fishery conservation sites, sighting aquaculture zones, generating trends in global warming, and assessing watershed & land use activities, GIS facilities the evaluation of spatially oriented fisheries problems through spatial modeling and visualization.

Course Director	: Dr K K Vass
Duration	: 30 days (01-30 March 2008)
Course fee	: US $ 1,500 per trainee (exclusive of boarding and loadging)
No. of trainees per course	: 10
Accommodation	: Will be provided at Institute guest house
Eligibility	: Bachelor/Master degree in fisheries or life Science

Training Programme

Institute regularly conducts several training programmes for scientists, university lecturers, managers and research scholars round the year.

Faculty

Scientists of the institute working in respective fields constitute the faculty.

Course Content

- Database
- RDBMS and GIS Concept
- Image processing and GIS software tools
- TNT mips
- Arc View
- ERDS and related software
- Role of biotic parameters in fish production
- Concept of GIS based decision support system for inland fisheries management

NAARM

National Academy of Agricultural Research Management
Hyderabad

The National Academy of Agricultural Research Management was established in 1976 at Hyderabad to impart training, conduct research and to provide consultancy service in the area of agricultural research and education management.

Contact Person

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Courses

1. Agricultural Research Management
2. Human Resource Management
3. Computer Based Multimedia Development
4. Web-based Education
5. Open Source Based E Learning Development

Training Programmes

Since, its inception, the academy has trained nearly 19,500 scientists at different levels through a variety of programmes which include induction course for the newly recruited scientists, refresher courses for the senior level functionaries, workshops and seminars, and international programmes. All its training programmes are backed-up by appropriate research studies. Through these

programmes, the academy has established its credibility as a premier management training institute in the national and international arena. The academy has been collaborating with several international agencies, viz. ADB, CASAS, FAO/UNDP, the Ford Foundation, ICRISAT, IDRC, ISNAR, SAARC, SEARCA, USAID, and World Bank. Participants from Bangladesh, Bhutan, Brunei, China, Malaysia, Myanmar, Nepal, Nigeria, Pakistan, Philippines, Singapore, Somalia, and Sri Lanka have participated in several programmes organized by it. The academy has had the distinction of training the senior level functionaries from Nigeria in Agricultural Research Management through three special tailor-made programmes.

The Academy has excellent residential facilities for participants to its various programmes.

During 2008, following international training programmes are planned. These programmes are open to both national and international scientists. Interested scientists should send their applications to the Indian Council of Agricultural Research on proforma attached on the last page.

1. Agricultural Research Management

Agricultural research organizations in the developing countries have grown up in the size and scope of research activities, in the recent years, to meet the every growing needs to goods, fibre and fuel. At the same time, they are faced with the problems of inadequate resources to address the complex and more demanding research problems as a result of rapidly changing national and global agricultural scenario and the emergence of WTO. In light of the increased institutional activities coupled with scarce research resources, the researches in these countries are looking for appropriate management tools and techniques to enhance the efficiency and effectiveness of their research. The programme provides excellent opportunities for the participants to acquire new knowledge and develop appropriate skills towards improved management of research. The major objectives of the programmes are:

- to familiarize the participants with appropriate tools and techniques for efficient and effective management of research.
- to analyze and synthesize the Indian experience in agricultural research management and evolve strategies for application in their back home situation.

Faculty

The Academy is organized into three functional Divisions, viz. Agricultural Research Systems Management and Policies, Human Resource Development, and Information and Communication Management. A multi-disciplinary team of scientists, who constitute the core faculty, work in different Divisions. Each faculty member is basically an agricultural scientist with specialization in one of the agricultural disciplines, who has also received specialized management training in India and abroad. On the strength of the expertise available with the faculty members and the experience gained by them over a long period, the credibility of the various programmes offered by the Academy has been quite high. The Academy borrows the services of external specialists faculty for its multifarious training programmes.

Course Director	: Dr T Balaguru / Dr N Hanumantha Rao
Duration	: 3 weeks (3-22 July 2008)
Course fee	: US $ 2,000 per trainee
No. of trainees per course	: 20
Accommodation	: Will be provided at a very reasonable cost in the Institute's guest house
Eligibility	: Participants in the programme will be middle and senior level research managers who are responsible for planning and managing agricultural research

Course Content

Research management
- Global agricultural scenario
- Indian agricultural scenario
- WTA and IPR regime in agricultural research
- Privatization of agricultural research
- Technological forecasting
- Macro level research planning-policy issues
- Project management
- PRA techniques for problem diagnosis
- Priority setting
- Project planning and formulation
- Project budgeting system
- Project management techniques

Human resource development
- HRD strategies for improved performance
- Manpower planning and recruitment
- Individual and organization
- Interpersonal relationships and organizational effectiveness
- Multidisciplinary team building
- Motivation of scientists
- Organizational climate
- Performance assessment of scientists
- Scientist-Administrator interface

Information technology and management
- Trends in information technology
- Information retrieval through Internet
- Importance of information and its management
- Management Information System (MIS)
- Geographic Information System (GIS) for natural resource management
- Statistical software for data analysis
- Management of information centres

Transfer of technology (TOT)
- TOT System—organization and system
- Communication skills
- Use of modern tools in scientific communication
  - computer
  - video
  - posters
- Research-extension linkage

2. Human Resource Management

People are the most important and precious resource of any organization. Any shortfall in material, infrastructure, and financial resources can be compensated by highly efficient, devoted, and committed people in the organization. The success of any organization, thus, primarily depends on the enthusiasm and motivation of the people working in it and the leadership that guides them.

With globalization and economic liberalization, the agricultural research organizations have started facing tall challenges to cope up with the increased competition, demands, and expectations. These increasing demands placed on the organizations and the consequent streamlining of organizations have created both challenges and paradoxes. There is, therefore, a greater need these days for devising more effective ways of delivering value to the organization by way of developing and managing people.

The development and management of the human resources of an organization is not a matter of chance but it requires a planned and concerted effort to impart the knowledge and skills for the management of the self, and also other human beings working in groups and in organization. This programme provides an excellent opportunity for the participants to develop conceptual understanding and practical skills in various aspects related to organizational behaviour and human resource management that would facilitate them to improve their efficiency and effectiveness.

Training Programme

The programme will consist of a blend of theoretical sessions, interactive discussion, structured instruments for self-exploration, experiential exercises, and case analysis. The programme will provide an excellent forum for the participants to have exchange of information and experience sharing. The programme is aimed

- to sensitize agricultural professionals to the issues of human resource management in the organization
- to provide knowledge and skills to the participants for management of individual group and organizational behaviour
- to develop an action plan for self and organizational development

Course Director	: Dr P Manikandan / Dr M M Anwer
Duration	: 3 weeks (8-27 September 2008)
Course fee	: US $ 2,000 per trainee
No. of trainees per course	: 20
Accommodation	: Will be provided at a very reasonable cost in the Institute's guest house
Eligibility	: Scientists of any discipline with a minimum of three years experience

Faculty

The Academy is organized into three functional Divisions, viz. Agricultural Research Systems Management and Policies, Human Resource Development, and Information and Communication Management. A multidisciplinary team of scientists, who constitute the core faculty, work in different Divisions. Each faculty member is basically an agricultural scientist, with specialization in one of the agricultural disciplines, who have also received specialized management training in India and abroad. On the strength of the expertise available with the faculty members and the experience gained by them over a long period, the credibility of the various programmes offered by the Academy has been quite high. The Academy also utilizes the services of external resource persons for its multifarious training programes, whenever necessary.

Course Content

Human resource development

- overview of HRD
- training management
- self-learning
- performance appraisal
- HRD strategy

Human resource facilitation

- personality exploration
- personality development
- motivation
- perception
- values and attitudes
- interpersonal relationships
- communication
- group dynamics
- leadership
- power and politics
- conflict management
- team building
- organizational culture and climate
- organizational change and development
- stress management
- structured experiences

3. Computer-based Multimedia Development

During the last decade, there have been dramatic developments in information technology especially in communications. We witnessed the advent of worldwide packet networks, mass storage devices, interactive video, graphics technologies and a wide variety of multimedia production tools. The tools include those used for animation like flash, image processing and photography like Photoshop, authoring softwares like director, sound and video editing tools, computer aided instructions, planning, production and editing tools, all of which fall under one umbrella of multimedia.

R&D institutions can employ multimedia for developing effective presentations in teaching, research, technology transfer and in posting information on web.

Course Director : Dr K M Reddy
Dr V K J Rao

Duration : 3 weeks (7-26 August 2008)

Course fee : US $ 2,000 per trainee

No. of trainees per course : 20

Accommodation : Will be provided at a very reasonable cost in the Institute's guest house

Eligibility : Scientists and faculty members from National Agricultural Research and Education Systems and other related organizations

Training Programme

This programmeis aimed at

- to develop among participants an under-standing and appreciation of use of Multimedia in technology development and transfer
- to expose participants to digitizing, synthesizing, animating and packing images, and use of sound, graphics and text in high speed global network environments
- to familiarise participants with Multimedia production tools in various categories and enable them to develop their own exercises

Faculty

The Academy is organized into three functional Divisions, viz. Agricultural Research Systems and policies Management, Human Resource Development, and Information & Communication Management. A multi-disciplinary team of scientists, who constitute the core faculty.

Course Content

- Effective presentation techniques, role of audio-visuals in effective presentation, role of computers and multimedia in presentation
- Basics of multimedia, story boarding, media selection, resource material building for multimedia presentation
- Introduction, demo and hands-on with different multimedia authoring, animation and sound and video editing softwares
- Project work to integrate audio and visual resources into an effective computer based multimedia presentation using an authoring tool; multimedia case studies on efficiency of computer based multimedia

4. Web-based Education and Training

World Wide Web (WWW) has emerged as the unique application of Internet with all kinds of data and information providing interactivity and control to the user. Web is bringing rapid and radical change in education, and Web-based education (WBE) has become a very important branch of educational technology. The field of instructional media has undergone tremendous change with the advent of Distance education and Web-based technology in addition to the traditional settings. Web is the largest and richest "agricultural information system" in the world covering all aspects of agriculture. Developments in Information and Communication Technology (ICT) have tremendous impact in spreading the benefits of agricultural education and research to all its stake holders. Web-based training eliminates the cost and inconvenience of attending a course away from the Office. Besides, they have many benefits such as flexibility, just-in-time delivery and interactivity. NAARM is having excellent facilities for developing web-based education and training. Currently, NAARM is actively involved in developing virtual learning center for web-based education and training and also build the capacity of NARS scientists and faculty in these areas.

Course Director : Dr M Narayana Reddy / Dr N Sandhya Shenoy
Duration : 2 weeks (10-20 December 2008)
Course fee : US $ 1,200 per trainee
No. of trainees per course : 20
Accommodation : Will be provided at a very reasonable cost in the Institute's guest house
Eligibility : Scientists and officers of any discipline

Andragogy

The course will consists of theoretical lectures and discussion on individual topics, followed by intensive hands-on use of computers to develop modules on web-based education. It will provide excellent opportunity for the participants to have experience in using state-of-art technology in developing web-based education modules.

Objectives

- To familiarize participants with instructional technology for web-based learning
- To develop web-based education and training modules

Faculty

The Academy is organized into three functional Divisions, viz., Agricultural Research Systems and Policies Management, Human Resource Development and Information and Communication Management. A multi-disciplinary team of faculty members have long experience in organizing training in IT area. Academy also borrows the services of expert specialist faculty from industry for its multifarious training programmes.

Course Content

Internet-based information systems

- Basic concepts of internet, emerging trends in internet-based information systems, web design for dissemination of academic and research content, database and information systems

Web-based instruction

- Technology in web-based education, online lessons and electronic publishing

Project

- Developing web-based lesson or research information using commonly available module.

5. Open source based E-Learning Development

The process of E-Learning provides the ease of learning like A3 (Anyone, Anytime and Anywhere) mode of learning to a learner and provides a scope for the content developer (who may be a teacher or a researcher who wants to share his knowledge with the farmer) to update his/her content. Encapsulating the learning process through E-Learning methodology which may be lessons for the students or research results for the benefit of farmers can increase the scope, quality and user base to access knowledge/ information. Open source software have got wider acceptance because of its affordability and scope to mould the software to suit one's requirements. This program envisages to bring awareness in E-Learning and build the capacity in content creation and management using open source software, among participants who are involved in teaching, research, extension and technology transfer activities.

Course Director : Dr G R Murthy / Dr D Rama Rao

Duration : 3 weeks (10–30 September 2008)

Course fee : US $ 2,000 per trainee

No. of trainees per course : 20

Accommodation : Will be provided at a very reasonable cost in the Institute's guest house

Eligibility : Scientists and Faculty members from Research, Education and Extension Systems and other related organizations.

Training Programme

The Objectives are

- To familiarize with open source software for content development, capture and editing
- To familiarize with open source content management software in the web environment
- To develop case studies on content development project mode

Faculty

The Academy is endowed with a multi-disciplinary team of scientists. Having rich experience in imparting training on various aspects of Information Technology and well supported IT infrastructure to support Academy's training initiates.

Course Content

- Basics of open source software in content management- software installation, course creation and administration, assignments, evaluation, grading, web hosting
- Introduction to Open office suite- open source documentation, spreadsheet, presentation and web design software
- open source E-Learning tools- audio, video tools, content capturing techniques
- E-learning standards
- Modern E-Learning methodologies- Mobile learning, pod-casting, internet radio, video conferencing
- Software on online learning evaluation and monitoring

IASRI

Indian Agricultural Statistics Research Institute
New Delhi

Indian Agricultural Statistics Research Institute at New Delhi, India is a premier central institute under the Indian Council of Agricultural Research for research, teaching and training in statistical methodology and computer application in agriculture. It also provides statistical methodology for national agricultural statistics system of the country for generating crop statistics and livestock statistics. Several statistical packages and information systems for agricultural research have been developed by the institute. The institute has achieved international recognition for its high quality research and teaching work in the field of agricultural statistics and computer application.

Contact Person

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Courses

1. Early Warning System for Food Security
2. Senior Certificate Course in Agricultural Statistics and Computing
3. Forecasting Techniques in Agriculture
4. Experimental Designs for Agricultural Research
5. Application of Remote Sensing and GIS in Agricultural Surveys
6. Statistical Software Packages in Agriculture
7. Statistical Techniques for Agricultural Research

Post-graduate Education

Besides MSc (Agricultural Statistics), MSc (Computer Application) and PhD (Agricultural Statistics) programme, the Institute is also recognized as a Centre for Advanced Studies in Agricultural Statistics and Computer Applications under the aegis of the United Nations Development Programme (UNDP) during October 1983–March 1992. The Institute continued to be a Centre of Advanced Studies (CAS) in these subject under the aegis of Education Division of ICAR since 1995.

The Institute has grown up as a centre of excellence with adequate infrastructure and facilities to undertake advanced training programmes and to carry out research on various aspects of agricultural statistics and computer application.

1. Early Warning System for Food Security

The course aims at educating the participants about techniques for estimation of agricultural production and issues involved in food security. The imbalance between demand and supply of food will also be dealt with.

Faculty

A team of scientists working in related areas will comprise the faculty for this course

Course Director : Dr V K Gupta

Duration : 3 weeks (5-24 June 2008)

Course fee : US $ 1,250 per trainee

No. of trainees per course : 10

Accommodation : Will be provided at a very reasonable cost in the Institute's guest house

Eligibility : Graduate with adequate knowledge of computers

Course Content

- ***Module 1:*** Statistical methods
  Graphical presentation of data; measures of central tendency and dispersion: probability theory; probability distributions; correlation and regression. Concept of testing of hypotheses
- ***Module 2:*** Sampling techniques
  Concepts of survey sampling: simple random sampling; systematic sampling; varying probability sampling; stratified sampling ratio and regression estimators; cluster sampling; multi-stage sampling
- ***Module 3:*** Techniques used in studying food security, elementary econometric methods, regression analysis, time series analysis, ARIMA models
- ***Module 4:*** Forecasting techniques:
  Introduction to early warning system for food security; forecasting models; techniques of crop forecasting based on agro-meteorological parameters; crop monitoring/ forecasting using remote sensing data; assessment of demand and supply; monitoring factors affecting the food security-weather, prices, inputs, infrastructure, storage, transportation, public distribution system, stocks, diseases, pests, drought, etc.
- ***Module 5:*** Data Processing:
  Fundamental of computers introduction to MS Windows and MS Office; exposure to statistical packages like SPSS, PCCARP

2. Senior Certificate Course in Agricultural Statistics and Computing

The course aims at familiarizing the participants with current statistical techniques as well as use of computers and software packages.

Faculty

A team of scientists working in related areas will comprise the faculty for this course.

Course Director : Dr V K Sharma

Duration : 24 weeks (3 July–30 December 2008)
(Module 1: 3 July–30 September 2008)
(Module II: 9 October–30 December 2008)

Course fee : US $ 2,000 per trainee from SAARC countries
US $ 5,000 per trainee from other countries

No. of trainees per course : 10

Accommodation : Will be provided at a very reasonable cost in the Institute's guest house

Eligibility : Graduate with adequate knowledge of computers

Course content

Statistical methods and official agricultural statistics; use of computers in agricultural research; design of experiments; statistical genetics; sampling techniques; econometrics and forecasting techniques.

3. Forecasting Techniques in Agriculture

The course has been developed with short objectives of

- educating the participants on the state of art in forecasting techniques,
- acquainting the participants on latest developments in related fields,
- to identify gaps and needs in the field of forecasting research.

Faculty

A team of scientists working in related areas will comprise the faculty

Course Director : Dr R Agarwal

Duration : 3 weeks
(10 September to 7 October 2008)

Course fee : US $ 1,250 per trainee

No. of trainees per course : 10

Accommodation : Will be provided at a very reasonable cost in the Institute's guest house

Eligibility : Graduate with adequate knowledge of statistics

Course Content

- Software packages useful in forecasting techniques; regression analysis, modelling and diagnostics; ridge regression; principal component of regression and discriminant function; planning of surveys/experiments for forecast studies
- Different approaches of forecasting crop yields based on weather, plant characters and remotely sensed data—between/within year models, GMDH procedure, Markov chain, Bayesian and simulation models, Agrometeorological models; Forewarning systems for pests and diseases—models for qualitative and quantitative response variables; Forecasting yield loss due to various factors; Use of non-linear ANN, linear and non-linear time-series models in forecasting agricultural phenomena; forecast models in fisheries; drought monitoring; composite forecasts

4. Experimental Designs for Agricultural Research

The course aims at exposing the participants to the concepts and usage of designed experiments and use of statistical software packages in research.

Faculty

A team of scientists working in related areas will comprise the faculty

Course Director : Dr V K Sharma

Duration : 3 weeks (3-23 October 2008)

Course fee : US $ 1,250 per trainee

No. of trainees per course : 10

Accommodation : Will be provided at a very reasonable cost in the Institute's guest house

Eligibility : Graduate with adequate knowledge of computers

Course Content

- Planning of experiments; principles of design of experiments; Basic experimental designs; missing plot technique, balanced incomplete block designs, partially balanced incomplete block designs, lattice designs, augmented designs, row-column designs, nested designs; Designs for multi-factor experiments including balanced confounded designs, fractional replication, split-plot, strip-plot designs, designs for cropping systems research, inter-cropping experiments, agro-forestry experiments, long-term fertilizer experiments, change-over designs; Contrast analysis; Multiple comparison procedures; Competition effects; Analysis of covariance, etc.; Exposure to software packages like SAS, SPSS and SPBD release 1.0; Statistical Package for factorial experiments (SPFE) 1.0, etc.

5. Application of Remote Sensing and GIS in Agricultural Surveys

The course aims at

- familiarizing the participants with the basic concepts of remote sensing and GIS and
- acquainting the participants with Use of GIS and Remote Sensing Software Packages
- exposure to application of remote sensing and GIS in agricultural surveys.

Faculty

A team of scientists working in related areas will comprise the faculty for this course.

Course Director : Dr Anil Rai

Duration : 3 weeks (6-25 November 2008)

Course fee : US $ 1,250 per trainee

No. of trainees per course : 10

Accommodation : Will be provided at a very reasonable cost in the Institute's guest house

Eligibility : Graduate with adequate knowledge of computers

Course Content

- ***Module 1:*** Indian agricultural statistics system; sampling methods; use of computers in agricultural surveys; statistical techniques for spatial data analysis; crop forecasting techniques; spatial statistics in GIS
- ***Module 2:*** Introduction to remote sensing and Indian space program; principles of remote sensing; satellite data reception and image interpretation; remote sensing platforms and sensors; map projection and coordinate system; digital image processing; accuracy assessment in remote sensing; use of spectral indices in agriculture; introduction to ERDAS IMAGINE; data loading and image interpretation and geo-registration; classification and accuracy assessment
- ***Module 3:*** Introduction to geographic information system; data models in GIS spatial analysis of vector and raster data; spatial interpolation techniques using GIS; data quality and errors in GIS; introduction to ARCVIEW; creating, editing and manipulating spatial and non-spatial data; querying from spatial and non spatial databases; creating a map layout; introduction to global positioning system and its applications
- ***Module 4:*** Use of remote sensing for crop yield estimation and crop yield forecasting; crop yield simulation; effect of misclassification on post-stratified estimators of crop yield; application of GIS in agro-forestry; application of GIS in spatial sampling for agricultural surveys; application of GIS and remote sensing in land use statistics

6. Statistical Software Packages in Agriculture

The course has been developed with short objectives to train the research workers in computer literacy and research data analysis.

Faculty

A team of scientists working in related areas will comprise the faculty

Course Director : Dr P K Malhotra

Duration : 3 weeks (4–23 December 2008)

Course fee : US $ 1,250 per trainee

No. of trainees per course : 10

Accommodation : Will be provided at a very reasonable cost in the Institute's guest house

Eligibility : Graduate with adequate knowledge of computers

Course Content

- *Module 1:* Computer fundamentals; Introduction to computers; Windows operating system
- *Module 2:* MS Office: Introduction to MS Office; microsoft word for text processing; microsoft excel for spreadsheet applications; microsoft access for database management; microsoft power point for presentation
- *Module 3:* Statistical packages: Use of statistical packages like SAS; STATISTICA, MINITAB, SPSS, SPAR 2 etc, practicals covering application of these packages for solving real life problems in agricultural research such as analysis of variance, regression analysis and multivariate techniques

7. Statistical Techniques for Agricultural Research

The course aims at exposing the participants to the concepts and usage of designed experiments and use of statistical software packages in agricultural research.

Faculty

A team of scientists working in related areas will comprise the faculty for this course.

Course Director : Dr V K Sharma

Duration : 3 weeks (4–23 September 2008)

Course fee : US $ 1,250 per trainee

No. of trainees per course : 10

Accommodation : Accomodation will be provided in the Institute's guest house at a moderate charge

Eligibility : Graduate with adequate knowledge of statistics and computers

Course Content

- *Module 1:* Desription statistics, probability, random variables, probability distributions, normal distribution, sampling distributions, tests of significance (large sample, X^2, t and F tests), estimation of parameters, regression and correlation, general linear model and analysis of variance, non-parametric tests, diagnostic measures in linear models
- *Module 2:* Sampling techniques: Sample surveys vs complete enumeration; planning and execution of sample surveys, questionnaire designing for socio-economic studies, simple random sampling and sample size dtermination, stratified sampling, systematic sampling, ratio and regression methods of estimation, successive sampling on two occasions, varying probability sampling, cluster sampling and multiple stage sampling, non-sampling errors.
- *Module 3:* Design of Experiments: Planning and designing of experiments, size and shape of plots of blocks, basic experimental designs, missing plot techniques, balanced incomplete block designs, partially balanced incomplete block designs, lattice designs, augmented designs, factorial experiments, concepts of confounding and fractional factorials, split plot designs, Strip plot design, S.P.B.D. Release 1.0, SPFE 1.0, analysis of covariance, designs for multistage experiments, repeated measurement designs, groups of experiments, design of experiments for agro-forestry system

NRCWA

National Research Centre for Women in Agriculture
Bhubaneswar

National Research Centre for Women in Agriculture (NRCWA) is a unique centre of Indian Council of Agricultural Research established in 1996 at Bhubaneshwar (Orissa). The mandate of the centre is to identify gender issues and test appropriateness of available farm-technologies/programmes/policies with women perspective for promoting gender mainstreaming in research and extension for empowerment of farmwomen and capacity building of scientists, planners and policy makers to respond to the needs of the farm women. The centre has a team of multidisciplinary farm scientists and infrastructural facilities to conduct research and training in gender perspective. Participatory research trials conducted in the developing rural scenario has given the centre a big advantage to identify programme content for gender mainstreaming.

Contact Person

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Course

1. Gender Analysis and its Application in Agricultural Research and Extension

1. Gender Analysis and its Application in Agricultural Research and Extension

Training

The training is aimed at

- to enable the participants acquire the skills for undertaking gender analysis and gender sensitization.
- to help the participant undertake field work using the gender analysis tools and use gender disaggregated data
- to facilitate discussion among the participants for drawing implications of the field study and developing action plan for gender sensitive research and extension projects for third world countries in agriculture.

Course Director	: Dr B N Sadangi
Duration	: 15 days (15-29 November 2008)
Course fee	: US $ 1,000 per trainee
No. of trainees per course	: 10
Accommodation	: Accomodation will be provided in the Institute's guest house at a moderate charge
Eligibility	: Policy makers, scientists and project managers associated with the development of agriculture and allied subjects

Faculty

Internationally trained scientists with experience of conducting training on gender mainstreaming constitute the faculty. Renowned gender experts at national level will give special talks.

Course Content

- Gender concerns in agricultural development, why?
- Gender roles in agriculture and allied sectors
- Importance of gender disaggregated data and scope of developing database
- Gender analysis approaches
- Gender analysis tools and their practice in the fields
- Gender issues
- Gender mainstreaming in farming systems research
- Approaches to strengthen gender equity in agriculture development
- International status on gender mainstreaming

PDBC

Project Directorate of Biological Control
Bangalore

Project Directorate of Biological Control was established in 1993 to undertake basic and applied research on biological control of crop pests and weeds. The All India Co-ordinated research Project for Biological Control of Crop Pests and Weeds with 10 State Agricultural University (SAU's) based and 6 Indian Council of Agricultural Research (ICAR) based research centers across the country is part of the Institute research activity.

Contact Person

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Course

1. Biological control of crop pests and weeds

Training has been one of the major activities of the Directorate. PDBC has been providing trainig at various levels to top level officials from all over India and abroad on all aspects of biological control of agricultural, horticultural and plantation crop pests and weeds. The Directorate is also providing the technological backstop for establishment of biological control agents production centers to government and private entrepreneurs. The Directorate has state-of-art facilities for training such as air-conditioned conference hall, audio-visual aids, well equipped laboratories and hostel facilities of international standard besides one research farm and a number of field demonstration projects.

1. Biological Control of Crop Pests and Weeds

The Directorate has been a pioneer in research, development and training in the area of biological control of crop pests and weeds. Biological control of crop pests gains prime importance on the back drop of poisoning of crop produce, the water bodies and the village surroundings due to excessive abuse of pesticides for the control of crop pests.

Now, it is also linked with employment generation, social equality, poverty alleviation and environmental quality. Thus it encompasses the entire gamut of rural development. Synchronization of various interests and conflict resolution are important in biological control programme. The course is designed in such a way that the participants will be exposed to the whole spectrum of biological control activities so as to be in a position to discharge the responsibilities more efficiently by them.

Training Programme

The objectives are

- To expose the participants to the range and themes of biological control of crop pests
- To give an overview of the possible technological options for better resource conservation, productivity improvement, environmental up gradation and socio economic benefits.
- To brainstorm and arrive at suitable biological control programme models for the back home situations of participants.

Course Director : Dr B S Bhumannavar
Duration : 2 weeks

Course fee : US $ 1,250 per trainee

No. of trainees per course : 20

Accommodation : Will be provided at a very reasonable cost in the Institute's guest house

Eligibility : Subject matter specialists / scientists/Extension functionaries/University teachers from Gos and NGOs

Faculty

PDBC has experienced scientists and trainers in all the disciplines of biological control programmes viz. biological control of crop pests and diseases, mass production of biocontrol agents such as egg parasitoids, larval parasitoids, predators, antagonistic fungal pathogens, entomopathogenic nematodes, control of plant parasitic nematodes, entomopathogenic bacteria and insect viruses. Besides, faculty are also drawn up from other National and International organizations and also NGOs to share their experiences with the participants.

Course Content

- Status of biological control of crop pests and weeds
- Orientation programme on information technology using library facility
- Biochemical techniques and their application in biological control
- Artificial diets and insect nutrition
- Use of computer in biological control
- Conservation of natural enemies and tritrophic interactions and host habitat manipulations
- Biological control of insect pests in potato, fruit crops, vegetables, coconut, rice, sugarcane, pulses, cotton, oilseeds.
- Biological control of insect pests using fungal pathogens
- Biological control of crop diseases using fungal and bacterial antagonists
- Biological control of mites using fungal pathogens
- Mass multiplication of *Corcyra*, trichogrammatids and chrysopids
- Mass multiplication of host insects such as Chilo spp. *Opisina* sp., *Plutella* sp., PTM, Mealy bugs, scale insects and aphids
- Mass multiplication of bethylids, chalcidids, elasmids, eulophids and encyrtids
- Mass mulplitication of *Helicoverpa* sp., *Spodoptera* sp. and their promising parasitoids and predators
- Mass mulplitication of coccinellids and syrphids
- Mass production of fungal and bacterial antagonists
- Mass production of entomofungal pathogens and mite pathogens
- Biological control of insect pests using entomopathogenic nematodes and mass production of EPN
- Biological suppression of plant parasitic nematodes
- Biological control of crop insect pests using insect viruses
- Biological control of weeds
- Visits to biocontrol production units

PDFMD

Project Directorate on Foot and Mouth Disease
Mukteswar

Project Directorate on Foot and Mouth Disease is established in 2001 under Indian Council of Agricultural Research to conduct basic and applied research in the areas of Foot and Mouth Disease Epidemiology and Diagnosis. The directorate previously housed the All India Coordinated Research Project on FMD, which was established in 1968 and functioned in Indian Veterinary Research Institute, Mukteswar campus. The AICRP project has been upgraded to Project Directorate (PD) and the Central Laboratory of the PD is functioning in Mukteswar campus of IVRI and there are 8 regional centers and 15 network units distributed throughout the country functioning under the Project Directorate.

Contact Person

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Project Directorate on Foot and Mouth Disease
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Courses

1. FMD Diagnosis and serotyping employing serological and molecular techniques
2. Strain differentiation of EMD virus using serological and molecular techniques

Apart from coordinated network research through leadership, the directorate produces and supplies reagents for serotyping and LPB - ELISA kits throughout the country, acts as an information repository for FMD epidemiology in India, providing consultancy to public and private sector involved in FMD research and nodal agency in monitoring the FMD-control programme initiated by government of India.

Training has been one of the major activities of the Institute. The Institute is providing training in Serotyping of FMD suspected clinical material and LPB-ELISA for monitoring the vaccine efficiency to researchers in Regional Center and Network Units and other personnel involved in FMD control in Public and Private Domains. With the experience available, expert scientists involved in cutting edge areas of FMD epidemiology, directorate is initiating training programmes to SAARC nation citizens and domestic personnel involved in FMD research with the sole objective to develop FMD work force across the Indian subcontinent and other SAARC countries.

1. FMD Diagnosis and Serotyping using Serological and Molecular Techniques

Aim

To create FMD work force in though human resoiurce development

Training Objectives

- To introduce participants about the importance of laboratory diagnosis of Food and Mouth Disease
- To impart hands-on training on serological and molecular methods of Foot and Mouth Disease diagnosis

Course Director	: Dr Jajati Kesari Mohapatra
Duration	: 2 weeks (1-15 April 2008)
Course fee	: US $ 1,000 per trainee
No. of trainees per course	: 20
Accommodation	: Will be provided at a very reasonable cost in the Delegates guest house
Eligibility	: Any personnel in government and private sectors involved in FMD research in SAARC countries

Course Content

An overview of Foot and Mouth Disease

- Introduction
- Impact of FMD in National Economy
- Current status of FMD in world
- Current status of FMD in India and SAARC countries

Foot and Mouth Disease and Foot and Mouth Disease Virus

- Mode of Transmission and Clinical signs
- Diagnostic Methodology and Differential Diagnosis
- Importance of Laboratory diagnosis
- Collection, preservation, dispatch of Suspected materials to Laboratory for FMD diagnosis
- Serological Diagnosis
- Molecular Diagnosis

Serological Diagnosis of FMDV

- Sandwich ELISA for serotyping
- Liquid Phase Blocking - ELISA
- Virus Neutralization Assay

Molecular Diagnosis of FMDV

- Polymerase chain reaction (PCR)
- Multiplex PCR
- PCR-ELISA
- Dot-hybridization

2. Strain Differentiation of FMD Virus Using Serological and Molecular Techniques

Aim

To deveop scientific expertise in SAARC countries in FMD epidemiology through use of conventional and modern technqiues for Foot and Mouth Disease virus strain differentiation

Training Objectives

- To provide hands-on training to scientific community in serological and molecular methods of FMD virus strain differentiation

Course Director	: Dr Aniket Sanyal
Duration	: 2 weeks (1–15 May 2008)
Course fee	: US $ 1,000 per trainee
No. of trainees per course	: 20
Accommodation	: Will be provided at a very reasonable cost in the Delegates guest house
Eligibility	: Any personnel in government and private sectors involved in FMD research in SAARC countries

Course Content

An overview of Foot and Mouth Disease

- Introduction
- Impact of FMD in National Economy
- Current status of FMD in world
- Current status of FMD in India and SAARC countries

Foot and Mouth Disease and Foot and Mouth Disease Virus

- Mode of Transmission and Clinical signs
- Diagnostic Methodology and Differential Diagnosis
- Importance of laboratory diagnosis
- Immunity to FMD

Strain differentiation of FMDV

- Differences between the FMDV strains
- Importance of differentiating the FMDV strains

Methods for differentiating the FMDV strains

- Serological Techniques for strain differentiation
- Molecular methods for strain differentiation

Serological Techniques for strain differentiation

- Two dimensional micro neutralization test
- Monoclonal profiling

Molecular techniques for FMDV strain differentiation

- Introduction to DNA sequencing
- Genes vs. Genome in strain differentiation
- Methodology of DNA sequencing
- Phylogenetic analysis and strain differentiation
- Software's/programmes/algorithms for gene sequence analysis

AAI

Allahabad Agricultural Institute-Deemed University
Allahabad

The Allahabad Agricultural Institute-Deemed University, established in 1910 has been a leading institution in the field of Agricultural Engineering, Agricultural Sciences & Technology, Food Technology, Water Resource Engineering, Dairy Technology, Forestry, Veterinary Science, Biotechnology, Home Science, Health Science, Management and Theology etc.

Contact Person

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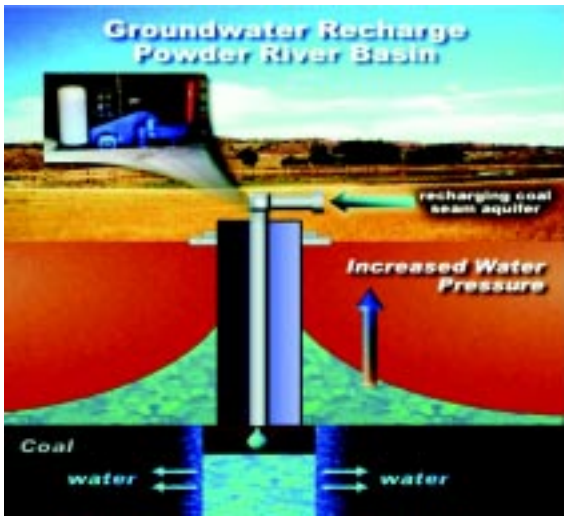
Courses

1. Rain Water Harvesting and Ground Water Recharge - A solution to scarce water resources in global context
2. Landscape/turf Irrigation Design and Management
3. Micro Irrigation System - Need of today's agriculture to enhance productivity and economic return under scarce water conditions
4. Fruits and Vegetables Processing
5. Meat Processing
6. Operation, Repair and Maintenance of Farm Machinery
7. Animal energy utilization with enhanced system efficiency
8. Process Standardization of Indigenous Dairy Products
9. Remote Sensing & Geographical Information System

In the recent years, Allahabad Agricultural Institute Deemed University has achieved the distinction to be amongst the top universities in India and South East Asia. The university is moving towards greater heights and looking forward to collaborate with several universities in the developed countries such as USA, Canada, European Union, Japan and Australia. The alumni's of our university have acquired high positions in India, USA, Canada, Europe, Australia, Middle East, Srilanka, Mauritias, New Zealand, the African Nations, etc. The university has a special distinction in the field of Agricultural Engineering and is solely responsible for establishing Agricultural Engineering education, research and extension in almost all the south Asian countries. Since its establishment in 1910, Allahabad Agricultural Institute, has played a major role in the International scenario.

1. Rain Water Harvesting and Ground Water Recharge - A solution to scarce water resources in global context



As we stand on the threshold of a new century, which mean further growth and urbanization on one hand and environmental crises on the other, it is required to rejuvenate our 'dying wisdom' and adapt the water harvesting and ground water recharge systems to meet present day urban and agricultural needs. Every year a great amount of rain water is wasted that falls on our land. On one side, there is flooding during rains and on the other, depleting ground water. It is time to learn that how to make wise use of the rains. This problem of water shortage and depleting ground water can be solved by rain water harvesting and artificial ground water recharge.

Faculty

Highly qualified interdisciplinary faculty members are available in the Department of Soil Water Land Engineering and Management, College of Agricultural Engineering and Technology, Allahabad Agricultural Institute-Deemed University.

Course Co-ordinator	: Er. Arpan Sherring
Duration	: 4 weeks
Course fee	: US $ 3,000 per trainee
No. of trainees per course	: 20
Accommodation	: Graduate in Agriculture / Agricultural Engineering
Eligibility	: will be provided at University guest house at reasonable cost

Course Content

Theory

- Area Identification and Methods of artificial ground water recharge in rural and urban areas i.e. Water spreading, Recharge through pits, trenches, wells, shafts, small check dams and other structures; roof water harvesting, recharge from surface water bodies
- Basic design of water harvesting and recharge structures, operation and maintenance

Practical

- Data analysis, design and constructional details of rain water harvesting and recharge structures, field visit.

2. Landscape/ Turf Irrigation Design and Management

Landscape / turf development provides improved human use of land, aesthetic enjoyment and a positive influence on the environment of the community living plants are essential to nature's cycle of oxygen replenishment for our atmosphere. In addition, scientific studies have shown turf grass and landscaping to be excellent sound insulators, effectively reducing noise levels. Irrigation is an necessary part of landscape maintenance in most region of the world. Automatic irrigation systems are very useful in providing and controlling the efficient application of moisture for all types of developed properties. The knowledge and techniques provided at the training incorporates the most recent change in technology, methods and the application of landscape / turf irrigation.

Faculty

Highly qualified interdisciplinary faculty members are available in the Department of Soil Water Land Engineering and Management, College of Agricultural Engineering and Technology, Allahabad Agricultural Institute-Deemed University

Course Co-ordinator	: Dr. D M Denis
Duration	: 4 weeks
Course fee	: US $ 3,000 per trainee
No. of trainees per course	: 20
Accommodation	: Graduate in Agriculture / Agricultural Engineering
Eligibility	: Will be provided at University guest house at reasonable cost

Course Content

Theory

- Introduction to Irrigation systems equipment & materials, survey, design of landscape irrigation system, selection of hydraulics and design of piping network, selection operation and maintenance of pumping unit, water quality and filtration, installation, operation and maintenance, control valve and controller wiring, grounding controller system, pump circuit.

Practical

- Survey, site selection, selection of landscape irrigation system, design operation, maintenance and economic analysis of landscape irrigation system. A case study.

3. Microirrigation System - Need of today's agriculture to enhance productivity and economic return under scarce water conditions

Due to urbanization and increasing population, the competition of limited water resources for irrigation, domestic and industrial needs is increasing considerably. Water for irrigation is becoming both scarce and expensive due to significant depletion of surface and sub-surface water resources caused by erratic rainfall and over exploitation. It is, therefore essential to formulate an efficient, reliable and economically viable water and other input management strategies in order to irrigate more land area with existing water resources and to enhance crop productivity and quality of high value crops. Improper water and other input management practices are not only waste expensive and scarce water resources but also decrease crop yield quality, water use efficiency and economic return and leads to water logging and salinity.

Optimal water and nutrient management through microirrigation methods is essential for higher crop production, quality, water use efficiency and economic return. Nutrients and pesticides are applied by microirrigation methods at frequent intervals throughout the crop growing season.

Faculty

Highly qualified interdisciplinary faculty members are available in the Department

Course Co-ordinator	: Er. Arpan Sherring
Duration	: 4 weeks
Course fee	: US $ 3,000 per trainee
No. of trainees per course	: 20
Accommodation	: Graduate in Agriculture / Agricultural Engineering
Eligibility	: Will be provided at University guest house at reasonable cost

Course Content

Theory

- Introduction to Fruits and Vegetables Processing, Unit Operations in Fruits and Vegetables Processing, Development of new products like beverages, preserved, sauces, pickles, soup etc., Fruits and Vegetables Processing plant layout and hygiene, Quality control in Fruits and Vegetables Processing and International marketing rules and regulations.

Practical

- Technologies used in Fruits and Vegetables processing, preparation of jam, jellies, candy, preserved, pickles and visit to Fruit and Vegetable processing industry.

4. Fruits and Vegetables Processing

The Department of Agricultural Process & Food Engineering, Allahabad Agricultural Institute Deemed University welcomes organization and individuals interested in and connected with field of fruits and vegetable processing. The aim is to provide an international forum to exchange novel ideas and disseminate practical knowledge in fruits and vegetable processing. Fruits and vegetable processing has grown in importance and is regarded a vital marketing tool. Better processing result in protection and safe transportation of products and reduces loss, damage and wastage of products. It enhances product value and helps expand international market.

Faculty

The Department of Agricultural Process & Food Engineering has highly qualified faculty. Specialized faculty in food and process engineering, processing of fruits, vegetable and meat, storage and structure engineering, quality control and food analysis, Total quality management, food process modeling and process equipment design, food plant production management and optimization techniques in food processing.

Course Co-ordinator	: Dr Tufail Ahmed
Duration	: 4 weeks
Course fee	: US $ 3,000 per trainee
No. of trainees per course	: 15
Accommodation	: Graduate in Agriculture or allied field
Eligibility	: Will be provided at University guest house at reasonable cost

Course Content

Theory

- Introduction to Fruits and Vegetables Processing, Unit Operations in Fruits and Vegetables Processing, Development of new products like beverages, preserved, sauces, pickles, soup etc., Fruits and Vegetables Processing plant layout and hygiene, Quality control in Fruits and Vegetables Processing and International marketing rules and regulations.

Practical

- Technologies used in Fruits and Vegetables processing, preparation of jam, jellies, candy, preserved, pickles and visit to Fruit and Vegetable processing industry.

5. Meat Processing

Allahabad Agricultural Institute Deemed University welcomes organization and individuals interested in and connected with field of meat processing. Foods from animal products represent concentrated sources of many of the nutrients required by humans with respect to meeting the requirement for essential amino acids, vitamins and minerals. Meat and meat products generally includes the skeletal muscles of animals. It also includes many by-products from animal slaughters, hormones used for the foods, pharmaceuticals and other industries. The processing of meat has become one of the most developed branches of food processing sciences. It enhances product value and helps expand international market.

Faculty

The Department of Agricultural Process & Food Engineering has highly qualified faculty. Specialized faculty in food and process engineering, processing of meat, storage and structure engineering, quality control and food analysis, Total quality management, food process modeling and process equipment design.

Course Co-ordinator	: Dr Tufail Ahmed
Duration	: 4 weeks
Course fee	: US $ 2,000 per trainee
No. of trainees per course	: 15
Accommodation	: Graduate in Agriculture or allied field
Eligibility	: Will be provided at University guest house at reasonable cost

Course Content

Theory

- Scope and status of meat processing, pre and post slaughter techniques, meat products, recent development in meat processing, Hygiene and sanitation in meat processing industry, plant layout, quality control and safety in meat processing and Export regulation of meat products.

Practical

- Meat preservation, canning, sausages making, meat products preparation, chicken pickle, meat patty, and visit to meat processing industry.

6. Operation, Repair and Maintenance of Farm Machinery

Use of farm machinery in agricultural production system is an important factor in increasing crop production. Knowledge of different farm machines, their operation, repair and maintenance is necessary for its efficient and trouble free use and higher production

Faculty

The Department of Farm Machinery and Power Engineering has highly qualified faculty involved in teaching and research. In addition, the faculty is involved in extension activities which includes short term training and transfer of technology from laboratory to farmers' field.

Course Co-ordinator	: Dr Tufail Ahmed
Duration	: 4 weeks
Course fee	: US $ 2,000 per trainee
No. of trainees per course	: 15
Accommodation	: Graduate in Agriculture or allied field
Eligibility	: Will be provided at University guest house at reasonable cost

Course Content

Theory

- Basic principles of operation of primary and secondary tillage implements. Study of sowing, interculture, harvesting and threshing machinery. Study of improved implements and machinery for various farm operations. Introduction to practices involved in the repair and maintenance of various agricultural machineries. Study of tools and equipments involved in the repair and maintenance process.

Practical

- Dismantling and assembling of various animal drawn tillage implements. Operation of tractor drawn tillage implements; sowing harvesting and threshing machinery. Calibration of seed drill. Operation and adjustments of precision planting machinery. Operation of various types of sprayers. Study of various tools and equipments used in repair and maintenance of machinery.

7. Animal Energy Utilization with Enhanced System Efficiency

In the developing countries animal power is the most important source of farm power. In this scenario the efficient use of this readily and cheaply available power source is the call of the hour. Thus, development of animal drawn Implements and their use in farming is a necessary step for increased crop production at lower input costs

Faculty

The Department of Farm Machinery and Power Engineering has a highly qualified faculty, involved in teaching and research. In addition, the faculty is also involved in development of animal drawn implements and machinery with enhanced system efficiency. The extension activities include short term training and transfer of technology from the laboratory to the farmers' field.

Course Co-ordinator	: Dr A K A Lawrence
Duration	: 4 weeks
Course fee	: US $ 3,000 per trainee
No. of trainees per course	: 15
Accommodation	: Diploma in Engineering or allied field
Eligibility	: Will be provided at University guest house at reasonable cost

Course Content

Theory

- The basic principles of operation of animal drawn primary and secondary tillage implements and seeding machinery. Study of the principles of animal drawn rotary mode energy conversion unit into a prime mover for different processing operations like threshing, winnowing, chaff cutting etc. Study of electric generation unit. Study of the Allahabad yoke. Introduction to the practices involved in the repair and maintenance of animal drawn machinery.

Practical

- Dismantling and assembling of various animal drawn tillage implements. Testing and ORP trials for various load and work rest cycle conditions on Allahabad yoke. Performance evaluation of rotary mode for various uses like chaff cutting, threshing etc. Performance evaluation and calibration of animal drawn seed drill. Testing of multipurpose tool frame with different attachments.

8. Process Standardization of Indigenous Dairy Products

In order to modernize the Indian milk sweet sector, it is necessary to understand the basic characteristics of these products . The knowledge of these characteristics would contribute a great deal in design of equipments and standardizing scaled up methods for manufacture of these products . The department of dairy technology is committed to conduct research in order to make proposals to modify standards of food products as well as improving the quality of these products . There is also need to evolve the quality assurance system to meet the international standards of food hygiene and food safety. The department is organizing training programs through the directorate of extension for efficient use of energy, good hygiene and sanitation to produce uniform quality products.

Faculty

The department of dairy technology has well qualified and multi-disciplinary faculty.

Course Co-ordinator	: Dr Ramesh Chandra
Duration	: 4 weeks
Course fee	: US $ 3,000 per trainee
No. of trainees per course	: 15
Accommodation	: Graduate in Dairy/Food
Eligibility	: Will be provided at University guest house at reasonable cost

Course Content

Theory

- Understanding basic characteristics of Indigenous Dairy Products. Classification of Indian Dairy Products. Conventional Methods of manufacturing indigenous Dairy Products. Innovation in Value added Indigenous Dairy products. Mechanization of manufacture of Indigenous Dairy Products. Current views on the Healthful Attributes of Indigenous Dairy Products. Strategies to Improve Shelf-life of Indigenous Dairy Products

Practical

- Preparation of Indigenous Dairy Products. Chemical and Microbial analysis of Indigenous Dairy Products. Comparative studies on quality parameters of the indigenous dairy products made from cow & buffalo milk. Comparative study on energy efficiency based on the data collected between traditional and mechanized/ standardized method of production. Methods of estimation of health and nutritional benefits.

9. Remote Sensing and Geographical Information System

Techniques in Water Resource Management

Among the various application of space science and technology, remote sensing of the earth and its environment is one of the major application which has provided a very powerful tool for assessment and monitoring of resources for better management. As it is necessary to update information regarding dynamic themes of land resources such as vegetation, Landuse and general environmental data. Remote Sensing proves to be the most economical source of information for updating and augmenting data bases. Thus a combination of Remote Sensing image data with Geographical Information System makes on effective tool in the hand of resource managers and planners. Globally detoreating natural resources requires constant monitoring and assessment so as to retard the degradation and develop new techniques towards sustaining the resources of a watershed.

Course Co-ordinator	: Dr D M Denis
Duration	: 4 weeks
Course fee	: US $ 3,000 per trainee
No. of trainees per course	: 15
Accommodation	: Graduate in Agriculture/Agricultural Engg. or allied field
Eligibility	: Will be provided at University guest house at reasonable cost

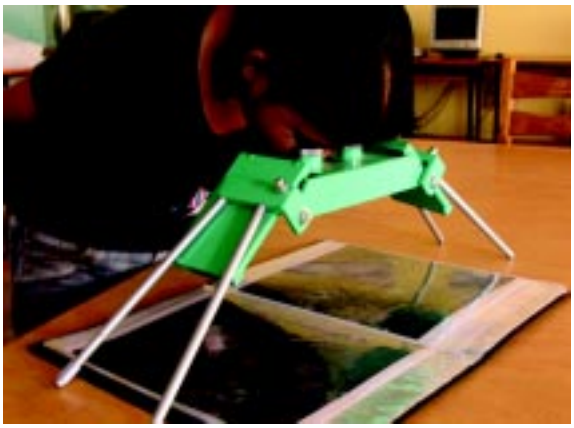
Course Content

Theory

- Introduction of Geographical Information System and Remote Sensing, Steps in watershed management. Use of remote sensing and geographical information system: Runoff harvesting, storage and recycling, soil survey, land use, soil and land capability, rainfall, runoff modeling, flood hazards and soil erosion modeling.

Practical

- Introduction of GIS softwares, Registration of Images, Classification Practices, Application in Runoff harvesting, storage and recycling, soil survey, land use, soil and land capability, rainfall, runoff modeling, flood hazards and soil erosion modeling.



10. Biointensive integrated pest/disease management for sustainable Agriculture with special reference to biopesticides and bioagents

The continuous usage of chemicals for the management of insects, pests and diseases with agro system, caused, problem like pesticide residues on the agricultural commodities, insects and diseases resistance and environmental pollution. Moreover the sole dependence of chemicals also caused great concern as it reduces the natural enemies population and their activities. As many of the pesticides are not compatible with the natural enemies complex in agro ecosystem. Therefore, there is an urgent need for biointensive integrated pest management comprising inputs like entomopathogenic fungi, bacteria, nematodes etc. This short term course for 21 days may through more light on the nature's gift for the management of insects and disease.

Faculty

The Department of Plant Protection has highly qualified faculty working on Integrated pest & disease management especially on bio-pesticide and bio-agents.

Course Co-ordinator	: Prof Dr (Mrs) Sobita Simon
Duration	: 4 weeks
Course fee	: US $ 3,000 per trainee
No. of trainees per course	: 20
Accommodation	: Graduate in Agriculture/Horticulture/ Biological Sciences
Eligibility	: Will be provided at University guest house at reasonable cost

Course Content

Theory

- Concept of integrated pest/disease Management. Understanding the functional characters and mechanism of biocontrol and biopesticides. Efficacy of biopesticides & biocontrol against pest & disease. Constraints and future thrusts of IPM / IDM. Quality control formulation and application.

Practical

- Identification, isolation and characterization of entomopathogenic fungi, bacteria and nematodes. Identification of various bioagents (predator & parasites). Mass multiplication of biopesticides and bioagents. Rearing of host insects. Standardization/quality control of biopesticides & bioagents. Field application.

11. Integrated Nutrient Management for Sustainable Fruit & Vegetable Production

In India, about 28 million tonnes of plant nutrients (NPK) are removed by field crops per year. No estimate are available in case of nutrient, removed by horticulture crops per *year*. If these too are included, the quantum of nutrient removal would be much higher. The fertilizer consumption however around 17 mt /year. No single source of plant nutrients including fertilizers, organic manures, compost, FYM, biofertilizers and green manure in capable to satisfy the crop need. Moreover, it has been well established that when nutrients are supplied through inorganic as well organic forms, the crop yield & quality get improved significantly. Similarly, physical- chemical properties of soil also get improved, thereby sustaining higher yield. Therefore, integrated supply of all sources of plant nutrients need to be encouraged. This also includes locally available organic sources at farmer disposal. Integrated nutrient management is normally practiced in almost all the horticulture crops in all region of the country.

Faculty

The Department of Horticulture has highly qualified faculty working on integrated nutrient management on different horticulture crops.

Course Co-ordinator	: Prof Dr D B Singh
Duration	: 4 weeks
Course fee	: US $ 3,000 per trainee
No. of trainees per course	: 20
Accommodation	: Graduate in Agriculture/Horticulture
Eligibility	: Will be provided at University guest house at reasonable cost

Course Content

Theory

- Concept and principles of INM Integrated nutrient management in fruits and vegetables, Different modules of INM in various fruits and vegetable crops. Success story of INM modules in fruits and vegetable crops Constraints and future strategies.

Practical

- Leaf analysis of fruits and vegetable crops, Identification of plants deficient in nutrients, Soil analysis for pH, EC, ESP NPK, SAR, micro-nutrients. Application of macro and micro nutrients by different methods. Practice of green manuring, vermicomposting and preparation of vermiwash.

12. Organic Farming of Fruits and Vegetables in Global Context

To prepare organic manure the importance of Agriculture wastes in General and Agro industrial products in particular has been recognized during in recent years. There has been renewed emphasis on use of organic manures in fruit and vegetable to sustain high yields, maintained the physical, chemical and micro-biological productivity of soil and to compensate for suboptimal physical condition and efficient utilization of all available sources of nutrients

Faculty

Highly qualified interdisciplinary faculty members are available in the Department of Horticulture.

Course Co-ordinator	: Dr V M Prasad
Duration	: 4 weeks
Course fee	: US $ 3,000 per trainee
No. of trainees per course	: 20
Accommodation	: Graduate in Agriculture/Horticulture
Eligibility	: Will be provided at University guest house at reasonable cost

Course Content

Theory

- Importance and scope of organic farming.
- Concept and principle of organic farming.
- Various component of organic farming.
- Application of organic manure for various fruit and vegetable.
- Uses and method of Application of bio-fertilizer in fruit and vegetable.
- Application of bio pesticide
- Analysis of soils, leaf and edible part of fruit & vegetable and HACCP
- Method of preparation and various compost green manuring practices in vegetable crops.

Practical

- Methods of application of manures, bio-fertilizer and bio pesticides. Preparation of vermicompost, vermiwash and nadep compost. Methods of analysis of soil, leaves and edible part of fruit and vegetable. Use of bio-agent for various fruit and vegetable.

SKUAST-K

Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir
Srinagar

The University has been established with the prime objective of promoting agricultural development in the temperate region of Jammu and Kashmir State of India. Rice, being the staple food of Kashmir, is grown over an area of 0.15 million hectares in the valley which is exposed to cold damage right from germination to the ripening stage. The damage is more severe in higher altitudes where, besides low soil and atmospheric temperature, cold water from melting snow is used directly for irrigation purposes. Therefore, evolving high yielding rice cultivars with characteristics conferring tolerance to cold is an important breeding endeavor. Department of Plant Breeding & Genetics has organized several training programmes at the National Level on enhancing agricultural productivities in the Hill zone of North India. The International Training Programme is envisaged to share the experiences concerning the breeding researches in rice with international research community particularly working on the development of cold tolerant rice varieties.

Contact Person

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Courses

1. Development of High yielding Cold Tolerant Rice
2. Advances in Animal Reproduction Technology

1. Development of High Yielding Cold Tolerant Rice

Preamble

Rice is grown over a wide range of agro-climatic conditions where its growth is affected by a multitude of biotic and abiotic factors. Among these factors low temperatures is one of the main constraints in regions where the temperature during the growing season is less than 18°C.

More than 15 million hectares of rice, throughout the world, suffers from cold damage at one or the other stage of the crop growth resulting in reduced yields. Seven million hectares of rice are estimated to suffer from cold injury in South and South East Asia alone. In the hill zone of North India, 1.8 million hectares of rice are exposed to low temperature stress at different growth stages. Development of varieties showing resilience to cold stress would be a pragmatic option to ameliorate the problem to a significant extent.

Course Director : Dr Shafiq A Wani

Duration : 3 weeks (September 2008)

Course fee : i) Foreign nationals, US $ 1,000 per trainee
ii) Indian Nationals, Rs. 10,000 per trainee

No. of trainees per course : 15

Accommodation : Will be provided at a very reasonable cost in the Institute's guest house

Eligibility : Post graduates in Plant Breeding & Genetics/ Biotechnology

Faculty

Highly qualified multi- disciplinary faculty is working in the Department of Plant Breeding & Genetics

Course Content

The International Training Programme is broadly expected to address the following objectives :

- Rice production in low temperature conditions: constraints and future prospects.
- Screening for cold tolerance in rice under natural and artificial epiphytotic conditions
- Classification of rice sub-species using morphological, biochemical and molecular techniques.
- Genetic, Physiological and molecular aspects of cold tolerance in rice.
- Breeding cold tolerant high yielding rice varieties through conventional methods and adoption of biotechnological approaches.
- Heterosis breeding for low-temperature affected situations.
- Improving grain quality characteristics of cold tolerant rice.

2. Advances in Animal Reproduction Technology

Course Director : Dr G M Wani

Duration : 4 weeks (August-September 2008)

Course fee : US $ 2,000 per trainee

No. of trainees per course : 15

Accommodation : Will be provided at a very reasonable cost in the Institute's guest house

Eligibility : Graduate in Veterinary or Animal Science or Students with B. Sc./ BS or M. Sc./ MS degrees in Biosciences /Biology.

This training programme shall focus on: Diseases and their reproductive management under tropical and temperate conditions.

Course Content

Courses

- Early pregnancy, placental formation, foetal differentiation etc.
- Reproductive physiology, growth factor and reproductive hormones.
- Cashmere goats their productivity, reproductive ability and sustainability
- Rota virus investigation with special reference to neonatal mortality in small ruminants
- Reproductive diseases diagnostics using modern microbiological, pathological & parasitological analysis tools.
- Field visits to organized and farmers farms in Kashmir, Jammu & Ladakh regions of the State.

Practical

- A small one week survey cum operative training project to be undertaken by the trainees.

AAU

Assam Agricultural University
Jorhat

Assam Agricultural University was established in 1969 with the mandate for development of Agriculture in the region in particular and the nation in general through various basic and applied researches, human resource development as well as for extension programme carried out in the institute for the socio-economic transformation of the region.

Contact Person

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Director
Department of Soil Science
Assam Agricultural University
Jorhat 785 013, India

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Fax : +91376-2340101

Courses

1. Production Potential of Biofertilizer Enriched Organics for Sustainable Agriculture
2. Recent Trends in Tea Production and Processing Technology

The excellence of the Department of Soil Science, Assam Agricultural University was recognized by Indian Council of Agricultural Research (ICAR), New Delhi with a mega project on "Production Potential of Biofertilizer Enriched Organics for Sustainable Agriculture" identifying it as a Niche Area of Excellence for strengthening the academic and research activities on biofertilizer - a component of organic farming. The Department of Soil Science has organized several advanced training including summer school, short courses on various aspects to the Scientists of various State Agricultural Universities / institutes under the ICAR in the country. The department has great potential for organizing such trainings at National as well as at International level.

1. Production Potential of Biofertilizer Enriched Organics for Sustainable Agriculture

Organic farming is becoming popular world wide and the global demand for organic products is growing rapidly. Organic farming is not only expected to increase the income and livelihood of the farmers but also help in moving towards sustainable agriculture, clean environment and healthy food. The Department of Soil Science has successfully designed and developed compost enriching techniques through use of bio-fertilizer and mineral ores. This is showing great potentiality in enhancing nutrient content in compost besides protecting soil health.

Andragogy

The course will consists of theoretical lectures and discussion on individual topics, followed by intensive hands-on use of computers to develop modules on web-based education. It will provide excellent opportunity for the participants to have experience in using state-of-art technology in developing web-based education modules.

Course Director : Dr M Narayana Reddy / Dr N Sandhya Shenoy

Duration : 2 weeks (10-20 December 2008)

Course fee : US $ 1,200 per trainee

No. of trainees per course : 20

Accommodation : Will be provided at a very reasonable cost in the Institute's guest house

Eligibility : Scientists and officers of any discipline

Objectives

- To provide training in identifying soil microbial community for production of bio-fertilizers
- To impart practical training in production, storage and application of biofertilizers in field.

Faculty

The department has highly qualified faculty members working on various aspects of bio-fertilizer production and research. The Scientists are also actively involved in imparting trainings to farmers, Non Government Organizations and Agricultural Officers of different categories.

Course Content

Theory

- Concept of rhizosphere and mechanisms of growth enhancement by biological agents., Biological agents as candidates for bio-fertilizers: Bacteria, Actinomycetes, Fungi. Blue green algae : Isolation and screening of biological agents; Enriched compost – methods of enrichment of organics with Biofertilizer and mineral ores; Storage of culture; Production of inocula for field application; Methods of field application of biofertilizers; Storage of biofertilizers; Trend of biofertilizer use; Procedure involved in making a patent and related legal issues. Evaluation and quality control of biofertilizers: Persistence of biofertilizers in soil.

Practical

- Isolation, characterization and mass culture production of Azotobacter, Rhizobium, free living blue green algae, phosphate solubulizing bacteria and fungi from soil. Determination of microbial cell number in biofertilizer. Testing of different filler materials for production of biofertilizers. Methods of preparation of enriched compost. Growth response of Rice and legumes to different biofertilizers. Determination of indigenous population of the microbial agent in a field soils to which biofertilizers may be applied.

2. Recent Trends in Tea Production and Processing Technology

Tea is one of the most important plantation crops, which is grown in more than 55 countries and consumed in 66 countries worldwide where people drink 4 billion cups daily. Being a non-alcoholic beverage, tea has been proved to be a health drink by virtue of its many medicinal properties. Scientific cultivation and processing of the crop have received attention worldwide in view of changing scenario in the world market and demand from the consumers. The course will impart an insight of the recent advances in production and processing technology of different types of tea, organic tea production, quality improvement and value addition.

The Assam Agricultural University is the only institute which offers formal education in tea science leading to both graduate and post graduate degrees in this discipline. Established in 1969, the Department of Tea Husbandry & Technology has been rendering yeoman services in the field of education, training, research and extension activities by way of producing scientific manpower not only for India but also for other tea producing countries and developing and transferring technology to the tea industry.

Faculty & Infrastructure

Highly qualified and experienced faculty is available. The department is located amidst the finest tea producing belt of the world and has its own tea garden and tea processing unit besides other infra-structural facilities.

Course Director : Dr A Deka

Duration : 4 weeks (August 2008)

Course fee : US $ 2,000 per trainee

No. of trainees per course : 10

Accommodation : University Guest House/Training Hostel

Eligibility : Graduate in Science/Agriculture/Horticulture

Course Content

Theory

- Production technology, Processing technology of different types of tea, Quality control, Organic tea production, Value addition, Recent trends in agro-techniques in tea production, tea processing and factory management.

Practical

- Techniques of planting, young tea management and other agro-techniques. Harvesting technology, processing of black and green tea, Visits to commercial tea estates, tea factories, organic tea garden, research Institutes.

AMU

Aligarh Muslim University
Aligarh

The Aligarh Muslim University was established in 1920 as Central University and soon it got recognition as an University of International Fame which occupies a place of Pride among Universities of the country. Department of Post Harvest Engineering and Technology was established in 1994 but it has achieved good reputation in country by virtue of the high academic standards, incredible research achievements and very effective transfer of technology programmes. The apex Indian Council of Agricultural Research (ICAR) has funded 5 adhoc Research Projects including two on Processing and Preservation of Buffalo Meat which have been completed. Since X"' Plan, the department has been strengthened as a full fledged centre of "All India Coordinated Research Project" on 'Post Harvest Technology' funded by ICAR.

Contact Person

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Director
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Course

1. Processing and Preservation of Buffalo meat

The research centre has undertaken following Research Projects on processing and preservation of buffalo meat including one each on -

- Studies on effects of incorporation of edible offals and fat mimicking substances on quality and shelf life of selected ready to eat/serve buffalo meat products under refrigerated storage
- Development and quality evaluation of meat offal and vegetable wastes incorporated pet foods
- Development of buffalo meat based functional food

Indian Society of Agricultural Engineers has conferred Team Award to scientists of the department for research work done related to meat processing. At present 6 passed out students of this department are placed in various meat processing industries in India.

The department is now capable of organizing trainings on Processing and Preservation of Buffalo Meat for both National and International scientists/entrepreneurs

1. Processing and Preservation of Buffalo Meat

India has a large population of buffalo (94 million) which accounts for 56.5% of world buffalo population (166.42 million). The country produces 1.4 million tones of buffalo meat which gained importance in recent years because of increasing domestic needs and its export potential. It contributes about 85% of total meat export from India. However, in India, it is mainly produced form old and unproductive animals so it is coarse and tough which can be profitably utilized for production of a variety of convenience, value added and ready to eat/serve products. The approach for processing and preservation of tough meat is quite different than the same in case of tender meats obtained from animals specifically reared for meat and slaughtered at specific age/ weight. Value addition through processing of meat into meat products increases the returns from animal agriculture to a great extent. Processed meat products provided tasty, convince and designer foods to the meat consumers with exceptional level of satiety. Research on Meat Products development is carried out in India by NRI, CFTRI, DFRL and Food Technology Departments of several Universities including Department of Post Harvest Engineering and Technology of AMU, Aligarh.

Course Director	: Dr P K Srivastava
Duration	: 3 weeks (June 2008)
Course fee	: US $ 2,000 per trainee
No. of trainees per course	: 10
Accommodation	: Will be provided at a very reasonable cost in the Institute's guest house
Eligibility	: Graduate in Food Science and Tech./Food Engg./ Food Processing

Faculty

Highly qualified multi-disciplinary faculty is working in the departments of Post Harvest Engineering and Technology and Agricultural Microbiology and in All India Coordinated Research Project on Post Harvest Technology. The expertise of some renounced experts in industry and other institutions will also be utilized as guest faculty.

Field Visits

To modem animal slaughtering and meat processing plants in U.P.

Course Content

Theory

- Meat Composition, characteristics and nutritional advantages of buffalo meat and its product/by-products.
- Microbiology, Processing and Preservation (smoking, curing, antioxidant treatment, chilling, freezing, cooking, smoking etc.) Comminuted meat products (process for traditional and continental products viz. meat balls, patties, nuggets, kebabs, sausages, burger, spreadable meat products etc.)
- Utilization of offals for edible and non edible applications.
- Quality characteristics of different buffalo meat products and safety aspects.
- Designer meat products.
- Packaging, Transportation and Distribution of meat, its products and by-products.
- Export of buffalo meat and its products.

Practical:

- Elementary meat microbiology, Estimation of physico-chemical and textural characteristics, Preparation of different types of buffalo meat products viz shami/ seekh/ boty/pasanda kababs, meat balls (kofta), patties, nuggets, fresh/cooked/smoked and fermented sausage, meat blocks, meat pickles etc.)
- Preservation of raw buffalo meat and its products.
- Utilization of edible offal's in meat products.
- Utilization of non-edible offals in animal feed

CCSHAU

Chaudhary Charan Singh Haryana Agricultural University
Hisar

The CCSHAU a leading agricultural university in the country has made significant contributions in the development of the state which witnessed remarkable agricultural growth during the last three decades. The university has established an Academy of agricultural research and education management, under the aegis of Directorate of Human Resource Management, which is responsible for institutionalized training of scientists, teachers and senior officers working in the field of agriculture.

Contact Person

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Courses

1. Human Resource Development and Management in Agriculture
2. Forage Development and Seed Production
3. Application of Biotechnological Techniques in Agriculture
4. Intellectual Property Rights and its Management in Agriculture

The academy regularly organizes national and international training programmes including induction training course, faculty development programmes on educational technology, research and extension management and personality development. It also conducts training courses on communication and reporting skills and human resource management. During the year 2006-07, three international training courses are planned.

1. Human Resource Development and Management

Human Resource Management through information technology has become an essential tool for improving the efficiency and efficacy of administrative set up. This course includes training on development of competence in financial and administrative management. The course also aims at training the teaching faculty through computer application. This course is useful for the senior academicians, policy makers, and executives engaged in teaching, research and extension development in their organizations.

Course Director : Dr R S Dalal

Duration : 2 weeks

Course fee : US $ 1,250 per trainee

No. of trainees per course : 25

Accommodation : Will be arranged at reasonable charges in the university guesthouse

Eligibility : Bachelor degree/diploma in agriculture or allied field

Faculty

The faculty consists of the Director, HRM assisted by one Joint Director, Five Associate Directors, two Deputy Directors and one Assistant Director in the areas of education technology, human resource management, extension management, monitoring and evaluation, manpower assessment and planning. The faculty is drawn from senior professors in the university and other institutions near Hisar.

Course Content

- Human resource development in agriculture, management perspective of developmental agriculture, instructional aids, communication fidelity, effective lecture delivery, importance of listening skills in HRM, reading skills and readability, administrative leadership.
- Inter-personal communication; concept of rural development; state agricultural universities in India, personality development for HRM, computer aided office management; computer graphics, internet and electronic mail.
- Variety of teaching methods including lecture, practicals, group discussions and exercises will be employed.

2. Forage Development and Seed Production

To balance the human diet and nutrition the grain intake should be supplemented with dairy products, meat and poultry. To increase the dairy productivity, it is essential that our cattle should be healthy, for this development of quality forage is important. It follows that to grow the best quality forage, we need the best quality of seed.

Course Director : Head, Forage Section

Duration : 2-3 weeks

Course fee : US $ 1,500 per trainee

No. of trainees per course : 15

Accommodation : Will be provided at a very reasonable cost in the Institute's guest house

Eligibility : Bachelor degree/diploma in agriculture or allied field

Faculty

The faculty consists of the Director, HRM assisted by one Joint Director, Five Associate Directors, two Deputy Directors and one Assistant Director in the areas of education technology, human resource management, extension management, monitoring and evaluation, manpower assessment and planning. The faculty is drawn from senior professors in the university and other institutions near Hisar.

Course Content

- Classification and characteristics of forage plants (grasses and legumes)
- Role of forage species in farming systems
- Basic seed production principles/technologies: agronomic practices, genetic/breeding strategies, species and varieties selection for different climatic zone/sites, soils and farming system and seed harvesting, threshing, cleaning, storage and conditioning
- Forage seed physiology (hardseedness, dormancy, viability and components of seed quality factors (genetic and physical, termination, health, moisture) for different forage seeds (grasses and legumes)
- Fodder production, feeding/feeding values of forage
- Non conventional resources of forages and their utilization
- IPR issues in forages

3. Application of Biotechnological Techniques in Agriculture

Traditionally, agriculture was targeted to improve the production of plant-derived foods, in terms of both quality and quantity. Developments in the area of biotechnology have provided new novel tools for the genetic improvement of various fields of agriculture including sequencing of genome of two model plant species, rice and Arobidopsis, transfer of ognonomically important genes/metabolic pathways in plants and molecular mapping of genes/QTLs for disease resistance and complex traits like drought and salinity tolerance etc.

Training programme

This course is specially designed to apprise the participants of latest developments in the field of agricultural biotechnology and hands-on practical training on genetic transformation, DNA fingerprinting, linkage mapping and certain aspects of microbial technology.

Course Director	: Dr V K Chowdhury
Duration	: 3-4 weeks
Course fee	: US $ 1,500 per trainee
No. of trainees per course	: 25
Accommodation	: Will be arranged at reasonable charges in the university guesthouse
Eligibility	: Bachelor degree/diploma in agriculture or allied field

Faculty

Department of Biotechnology and Molecular Biotechnology has experienced trained faculty.

Course Content

- Applications of biotechnology in agriculture—present status
- Plant genetic transformation
- Education policies for biotechnology and molecular biology in India
- Molecular markers, DNA fingerprinting and diversity analysis
- Genetic engineering for improving resistance against biotic and abiotic stresses and for improving photosynthetic efficiency and nutritional and crop quality
- Linkage mapping for disease resistance and salinity/drought tolerance
- Constraints in plant breeding to be tackled by biotechnology
- Applications of biotechnology in vaccine development & pharmaceutical drugs, value-addition in microbes important in agriculture
- Bioinformatics
- Genomics and proteomics
- IPR & Biosafety Issues, breeder's rights and patenting in WTO regimes

Academy Building

Foreign Participants at CCS HAU HISAR

4. Intellectual Property Rights and its Management Techniques in Agriculture

Introduction

Intellectual Property (IP) is an invaluable commercial asset. In this era of competition, IPRs are being used as tools for establishing strategic research collaboration and technology transfer. The role of Intellectual Property Rights in strengthening knowledge-based global economy is a major driving force for both public and private institutions to effectively incorporate IP to boost performance levels and maintain a distinct competitive edge.

Globally the agricultural occupation is slowly but definitely emerging as knowledge based industry. Therefore, the Agricultural Research Institutions (SAUs & ICAR Institutes) need to build and enhance competencies in core areas that would provide them the distinct advantage in global market. For technology and scientific knowledge to flow, and for the commercialization of technologies to take shape, it is essential to understand the basics of IP, its protection & commercialization, Institutional IP policy development and related issues.

Course Director : Associate Director, IPR

Duration : 2-3 weeks

Course fee : US $ 1,500 per trainee

No. of trainees per course : 15

Accommodation : Will be arranged at reasonable charges in the university guesthouse

Eligibility : Bachelor degree/diploma in agriculture or allied field.

Objectives

The very purpose of this School is to make aware the participants about IP linked issues so as to enhance their skills to recognize the various facets of Intellectual Property Rights and commercialization in agriculture. There will be blend of lectures by well experienced resource persons, interactive discussions, laboratory visits etc. to achieve the objectives. The participants will be evaluated on last day of the course duration.

Faculty

The faculty consists of the Director, HRM assisted by one Joint Director, Five Associate Directors, two Deputy Directors and one Assistant Director in the areas of education technology, human resource management, extension management, monitoring and evaluation, manpower assessment and planning. The faculty is drawn from senior professors in the university and other institutions near Hisar.

Course Content

- Applications of biotechnology in agriculture—present status
- Plant genetic transformation
- Education policies for biotechnology and molecular biology in India
- Molecular markers, DNA fingerprinting and diversity analysis
- Genetic engineering for improving resistance against biotic and abiotic stresses and for improving photosynthetic efficiency and nutritional and crop quality
- Linkage mapping for disease resistance and salinity/drought tolerance
- Constraints in plant breeding to be tackled by biotechnology
- Applications of biotechnology in vaccine development & pharmaceutical drugs, value-addition in microbes important in agriculture
- Bioinformatics
- Genomics and proteomics
- IPR & Biosafety Issues, breeder's rights and patenting in WTO regimes

CSKHPKV

CSK Himachal Pradesh Krishi Vishvavidyalaya
Palampur

The hill state Himachal Pradesh is endowed with rich diversity of water resources such as snow fed perennial river (3300 km.), seasonal streams (775 km), reservoirs (60000 hac.), ponds, natural lakes and irrigational channel (2000 hac.) but the fish production potential is not up to the mark. Though the biological productivity in the high altitude is constrained by some factors however, in foothills it is quite high which can be converted into fish biomass. So in order to uplift the economic status of farmer community of hills through aquaculture, it is of utmost important that the farmers should have the knowledge of area specific fish culture technology. The Department of Fisheries have evolved a area specific technology for fish farming in mid hill region and under different projects sponsored by DBT, New Delhi the same has been disseminated at gross route level among the women farmers of the district Kangra, Shimla and Solan. But still the farmers of the state need proper training to integrate this technology along with other agricultural and animal husbandry practices to uplift their economic and social status. The Department has following training materials in the field of fish farming:

Contact Person

Director Extension Education
CSK HP Krishi Vishvavidyalaya
Palampur 176 062

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Fax : +91-1894-283221

Courses

1. Polyculture Fish Model Technology
2. Water Harvesting Technology in Hills for Aquaculture

1. Polyculture fish model technology

1. Key characteristics of the technology: In this technology three major carps i.e. Common carp, Grass carp and Silver carp are the best amenable species for culture in the hills above 500m msl where other species of the major carp do not thrive well due to harsh climate in the mountain region. The production efficiency of this model has been worked out to be as high as 5 t/ ha / year at the stocking density of 15000 fingerlings/ha and the stocking ratio of 3:2:1 or 2:2:1, Common carp: Grass carp: Silver carp respectively.
2. Potential transferable areas: Upland waters in the hills and mountains above 500 to 1500 msl., sub temperate and temperate regions of the country.
3. Production guidelines/Users guidelines including input requirement: The minimum requirement for implementing this technology is 300m^2 and 1.5 to 2m deep pond with a water level between 1.2 to 1.5m., besides a perennial source of water. The users guide lines are detailed in the annual calendar as below:
4. Benefit cost involvement and expected outcome:

Area of the pond	0.1 Hectare
Recurring Expenditure:	
Cost of 1500 fingerlings @ Rs. 100/100 fingerlings	Rs. 1500
Cost of preparation of pond	Rs. 675
Wages of labour engaged	Rs. 1825
Cost of feed (400 Kg)	Rs. 4000
Miscellaneous Expenditure	Rs. 1000
Total Expenditure	Rs. 9000
Total Production	500 Kg.
Income	
Total Income(@ Rs. 50 per Kg.	Rs. 25,000
Net Profit	Rs. 25000 – Rs. 9000 = Rs. 16000

5. Advantage over similar technology: This technology is advantageous over conventional agricultural practices in terms of net profit which is as high as ten times as compared to any other technology in vogue in the area. The fish can be sold as per the market demand by partial harvesting or total harvesting, whereas the agriculture crops once ripe has to be marketed immediately. Use of marshy, unproductive and low lying land, which is not suitable for agriculture can be reclaimed in the form of fish farm. Adoption of this technology would solve the problem of malnutrition particularly in hills.
6. Risk involvement including Bio-safety: This model is eco friendly and do not involve any sort of risk, which may be disadvantageous to the entrepreneurs.
7. Impact on the environment: Since this technology is eco friendly there is no adverse impact on the environment.
8. Potential Users: Marginal farmers in the hills, those who do not have any other source of income ca be benefited by integrating this technology with other conventional agricultural practices.
9. Recommendation: The technology has very high potential for poverty alleviation in the rural area of hills and mountains as such it is recommended to disseminate this technology so as to improve the socioeconomic status of poor people by integrating the technology along with other agricultural practices.

Calendar for fish farming

Months	Activity
January	I. Construction of ponds OR II. Repairing and de-silting/renovation of old ponds
February	Preparation of ponds: i. Application of lime- Liming of pond @250 to 300 kg/h on a sunny day. ii. Application of Manure – After one or two days of liming, manure the pond @ 20t cow dung/ha/year in different installment. After the application of first installment @ 10t/ha divide the rest in different equal installments either weekly or fortnightly after two months of the first application. After initial manuring fill the ponds with water and leave it for to 14 to 15 days to stabilize the natural food production. iii. Remove unwanted fish, aquatic weeds, insects and other aquatic animals from old ponds.
March	Stocking of fish fingerlings: stock the fish fingerlings in the morning or evening after 15 days of manuring. Avoid stocking on cloudy days. Stock fingerlings @ 750 common carp, 500 Grass carp and 250 Silver carps or 600 Common carp: 600 Grass carp: 300 Silver carp in 1hectare water area.

April to November	Management: i. Maintain water column, avoid excess feed and manuring. ii. Monitor from time to time the growth of the fish and its health. iii. During rainy season when water colour appears red as a supplementary feed provide only wheat bran 1/4th amount of total calculated feed till it disappear. iv. Maintain proper hygiene and preventive measure, besides curative measures after due diagnose from the nearest clinical lab in case of some disease out break. **Supplementary feeding:** It is necessary to provide calculated feed depending upon water temperature. Generally supplementary feeding has to be done twice a day @ 2-3% of total body weight of fish in the pond with the following feeding ingredients. *Feed formulation*: Wheat/rice bran (50%) + Oil cakes (50%) + Vitamins (1%) or bran (50%) + oil cake (35%) + Fish meal/Soya meal (15%) + Vitamins (0.5%) + DCP (1%). Supply terrestrial chopped grass at the @50% of the grass carp's body weight daily.
December	Harvesting of fish: Partial or complete harvesting depending upon market demands

2. Water harvesting technology in Hills for aquaculture

The annual rainfall especially in western Himalayas ranges between 1126 mm to 2163 mm based on the last ten years data. Further there is no need to supplement the nutrient, as the runoff water would bring sufficient amount of nutrients as it flows through organic enriched forest and agricultural field of hill slopes. The thick canopy of primary forest and undergrowth acts as cushion to prevent the instant runoff and direct the rainwater to percolate deep into the soil, which acts as perennial resource. The thick vegetations check the excessive evaporation and melting of ice glacier. But barren hills allow the rainwater to run with in an hour at the bottom, which create flood in the plain and scarcity of water during lean period in the hills. Thus a suitable technology for harnessing the water would ensure the sustainable aquaculture in hills and also help to improve the health as well as economic status of the people.

1. Design a location specific and eco friendly fish farm for the hilly terrains without disturbing the natural contour of the watershed.
2. The fishponds are to be constructed in a ladder system and channelizing the runoff water in such a way so as to harvest and utilize the maximum runoff water for aquaculture in the hills.
3. A series of different size of ponds for harnessing the runoff water are to be constructed in relation to the gradation of hill slopes without disturbing the natural contour that is small, medium and big with the decreasing slopes.
4. This type of fish farm in the hill slopes also helps in conservation of ground water by acting as recharging water bodies. The smaller ponds at the top of slope act as a recharging pond besides nursery ponds that are seasonal. The medium size ponds at the lower elevation of a particular hill slope may act as harnessing of seepage water and rearing ponds for fish fingerlings. The biggest pond at the lowest elevation of slop is the total harvesting of seepage water as well as production pond, which are generally perennial in nature.
5. The production pond constructed in the gullies of watershed may simply be constructed by erecting earthen dike/bund, which is to be reinforced by planting Willow trees at the base of dry side of the bund. The Kikuyu grass has to be planted all around the bund and dikes of all types of ponds as biological bunds and soil binding material. This grass has very compact root system, which holds the soil particle firmly so as to prevent the soil erosion as such there is a least damage to the fish farm during heavy monsoon.
6. The excessive runoff water has to be channelized through vegetative channels around the fish farm in such a way that their should not be any excessive erosion of the soil.

With the adoption of runoff water harnessing technology, there is tremendous scope for development of location specific aquaculture in the hills for income generation.

PAU

Punjab Agricultural University
Ludhiana

The Punjab Agricultural University was established in 1962 and occupies a place of pride among agricultural universities/institutes of the country by virtue of its high academic standards in credible research achievements and very effective transfer of technology programmes.

Contact Person

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Courses

1. Integrated Pest Management in Global Context
2. The Art of Mass of Queen Bee Rearing and Production of Bee Products

PAU is the pioneer institute in introducing and establishing the high yielding exotic honey bee, *Apis mellifera* in India. The Department of Entomology was awarded the Centre of Excellence in Apiculture during 1999-2003, by Indian Council of Agriculture Research (ICAR), New Delhi under the World Bank sponsored 'National Agricultural Technology Project'. The Department of Entomology has organized several advance trainings in apiculture to scientists of various SAUs/ICAR institutes in the country and is now capable of organizing such trainings for both national and international scientists too.

1. Integrated Pest Management in Global Context

Integrated pest management is important component of crop protection system to achieve sustainable productivity with safety to the eco-system. The department of entomology has divised IPM strategies for management of insect pests in agric.—horticulture system to reduce the pest damage. The departkment is organizing training programmes on IPM for State Department of Agriculture, pesticide industry personnel's and private sector organization associated with agricultural.

Course Director : Dr N S Butter
Professor and Head

Duration : 4 weeks (August–September 2008)

Course fee : US $ 2,000 per trainee

No. of trainees per course : 15

Accommodation : Will be provided at the university guest house at reasonable cost

Eligibility : Graduate in Agriculture/Horticulture

Faculty

The department of entomology has highly qualified faculty working on integrated pest management in different crops. In addition the specialized faculty in toxicology, ecology, insect molecular biology and biocontrol help in devising farmer friendly IPM strategy.

Course Content

Theory

- Concept of integrated pest management, economic thresholds, components of IPM and application biotechnology. Besides, it includes development of IPM modules for different crops, along with success stories, Constraints and future trends in IPM

Practical

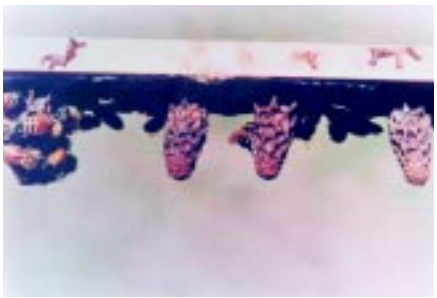
- Estimation of economic thresholds, development and evaluation of IPM strategies in different crops. Field visit to different areas for impact analysis of on going IPM programmes. Procedure for evaluation and documentation of IPM strategies in key crops

2. The Art of Mass Queen Bee Rearing and Production of Bee Products

The course will impart an insight into caste determination in the honey bees, selection of the better stocks, multiple queen rearing and their selective mating in isolated mating yards or through instrumental insemination and multiple queen bee banking.

Faculty

Highly qualified multi-disciplinary faculty is working in the Department of Entomology of the university.



Course Director : Dr G S Gatoria
Department of Entomology

Duration : 4 weeks (August 2008)

Course fee : US $ 2,500 per trainee

No. of trainees per course : 8–10

Accommodation : Will be provided at the university guest house at reasonable cost

Eligibility : Graduate in Agriculture/Horticulture/Biological Sciences

Course Content

Theory

- Caste determination and division of labour in a honey bee colony, selection of better stocks and methods of mass rearing of queen bees. Selective bee breeding through isolated queen bee mating yards/through instrumental insemination. Maintaining Queen bee reservoirs/banks. Honey bee wax, royal jelly, been venom, pollen, propolis, their composition, collection technology, processing utility and export potential. Bee brood as food for the human beings, ariptherapy

Practical

- Morphological and anatomical studies of different castes of honeybee. Selection of best performing stocks of honeybees. Mass queen bee rearing with conventional and latest methods, collection of drone semen and instrumental insemination of queen bee. Establishing queen bee bank. Collection and processing of honey, bees wax and their value-addition. Pollen, prop-olis, royal jelly and bee venom collection, their processing and storage. Preparing package bees, their transportation and rehiving. Obtaining bee brood.

TANUVAS

Tamil Nadu Veterinary and Animal Sciences University
Chennai

Contact Person

Dr N Balaraman
Vice Chancellor
Tamil Nadu Veterinary and Animal Sciences University
Madhavaram Milk Colony
Chennai - 600 051

Courses

1. Diagnostic and Therapeutic procedures in Veterinary Medicine
2. Current Practices in Veterinary Emergency Medicine
3. Wildlife Health and Disease Diagnosis
4. Sea Food Quality Assurance
5. Fish Stock Assessment in Tropical Seas

1. Diagnostic and Therapeutic procedures in Veterinary medicine

Course Director : Dr. S R Srinivasan
Duration : 13 days (06.08.2008 to 18.08.2008)
Course fee : US $ 2,500/- per candidate
No. of trainees per course : 20
Eligibility : Veterinarians and Veterinary Scientists

Course Content

Clinical procedures in Farm & Pet animals, Advanced Diagnostic Techniques, Emergency Clinical Procedures, Advanced practices in management of systemic disorders, Current concepts in internal medicine, cardiology, dermatology & production medicine, Clinical case studies

2. Current practices in Veterinary Emergency Medicine

Course Director : Dr. S R Srinivasan

Duration : 13 days (05.11.2008 to 17.11.2008)

Course fee : US $ 2,500/- per candidate

No. of trainees per course : 20

Eligibility : Veterinarians and Veterinary Scientists

Course Content

Basics of Veterinary Critical Care & Emergency medicine, Organization of Veterinary Critical Care, Triage - First Aid, Emergency Clinical Procedures, Emergency Therapeutic Procedures, Fluid therapy & Resuscitation, Oxygen therapy & Life support, Blood and Blood product transfusion, Management of systemic emergencies, Clinical case studies

3. Wildlife Health and Disease Diagnosis

Course Director : Dr M G Jayathangaraj

Duration : 14 days (12.02.2008 to 25.02.2008)

Course fee : Rs. 50,000/- per participant

No. of trainees per course : 20

Eligibility : International students from the Veterinary / Animal Sciences, Schools / colleges

Course Content

Introduction-Wildlife Conservation, Taxonomy, Wildlife Diseases in India, Overall health and disease management in elephants, Infectious diseases and application of microbiological techniques for diagnosis of diseases in wild fauna, Wildlife pathology, Zoonotic diseases in wild animals, Parasitological techniques in the diagnosis of parasitic diseases of wildlife, Blood borne parasitic diseases in captive wild animals, Digestive disorders with emphasis on colic and enteritis in elephants, Radiographic Techniques in Wild animals, Health assessment and diseases in peacocks, Restraint of Wild animals with emphasis on elephants, Surgical management of tooth problem in hippopotamus, Anatomical aspects of elephants, Zoo Management, Anatomical features in felids, Principles of feeding and related features in wild animals, Sexing of Avifauna by laparoscopy, Radiographical management and techniques used in wild animals, Sanitation and housing arrangements in Wild animals, Molecular Diagnostic Techniques in wild animal diseases with emphasis on tuberculosis, Transport of wild animals, Reptile Medicine and Aviary Medicine.

4. Sea food Quality Assurance

Course Director : Dr G Jeyasekaran

Duration : 30 days (01.11.2008 to 30.11.2008)

Course fee : US $ 1,500/- per candidate

No. of trainees per course : 20

Eligibility : Fish quality researchers, Fish quality technicians, Fish microbiologists, Scientists

Course Content

Microbial and chemical hazards, microbial and biochemical quality indices, marino toxins, Isolation and identification of microbial pathogens by conventional and modern methods including PCR, determination of chemical residues, TQM, HACCP, SSOP, SCP, ISO 9000 standards, USFDA standards, EU hygienic regulations

5. Fish Stock Assessement in Tropical Seas

Course Director : Dr V K Venkataramani

Duration : 20 days (24.11.2008 to 15.12.2008)

Course fee : US $ 1,400/- per candidate

No. of trainees per course : 20

Eligibility : Bachelor degree in Biological Sciences

Course Content

Need for fish stock assessments, Techniques used in fish sampling, Method for assessing maturation and spawning in fishes, Estimation of Length - Weight relationship & age and growth of fishes, Estimation of mortality parameters in fishes, Gill net selectivity, Trawl net selectivity, Swept area method, Estimation of MSY using surplus production model, Estimation of yield/recruit using analytical model, Micro computer programmes used for fish stock assessment, By-catch analysis, Fishing regulations, Stock enhancement methods, Overfishing, Exploitation of under utilized fisheries resources and Conservation of endangered marine resources

MPUAT

Maharana Pratap University of Agriculture & Technology
Udaipur

Contact Person

Director
MPUAT Extension
Udaipur

Courses

1. Integrated Renewable Energy Planning For Sustainable Development
2. Present State of Art of Technology for Value Addition in Milk
3. Protected Cultivation Techniques for Vegetable and Flower Crops
4. Entrepreneurship Development for Sustainable Livelihood of Underprivileged Farmers of SARRC Countries
5. Indian Ethnic Design for Apparels and Textile Made Ups in Global Perspectives
6. Water Harvesting Technological Options in Negotiating Drought

1. Integrated Renewable Energy Planning for Suatainable Development

Integrated Renewable Energy Planning acquired a significant role in achieving sustainable productivity with environmental protection. The Department of Renewable Energy Sources , College of Technology & Engineering, Maharana Pratap University of Agriculture & Technology, Udaipur has developed a strategy for management of Renewable Energy Sources and its integration in achieving optimum energy supply in different sectors such as domestic, agriculture, industrial and transportation. Integration of renewable energy sources for different unit operation in value addition such as solar energy for drying & process heat, biomass for power generation and bio-diesel for transportation etc. are getting importance globally. This training will be useful to personal working with Renewable energy, Environmental Protection, Food Technology, Value addition and Rural Development activities.

Course Director	: N.S. Rathore Professor & Dean
Duration	: 4 weeks (August – September 2008)
Course fee	: US $ 2,500 per trainee
No. of trainees per course	: 10-15
Accommodation	: Suitable accommodation in University guest house at reasonable cost will be provided to all participants.
Eligibility	: Graduate in Engineering and Agriculture Sciences.

Faculty

The Department of Renewable Energy sources has highly qualified faculty working on integration of renewable energy sources with various specialization such as solar energy, solar photovoltaic, bio energy, wind energy, biogas and energy conservation. In addition the specialized faculty in appropriate technology, rural development, ecology, environmental protection and sustainable development are also available.

Course Content

Theory:

- Fundamentals and basics of integrated renewable energy planning, techno economic feasibility of different renewable energy sources for sustainable development such as solar thermal, solar photovoltaic, bio energy, biogas energy, bio fuel, producer gas, wind energy, improved cookstoves, furnaces and energy conservation devices etc. Besides it includes various integration technologies for meeting essential energy requirement at domestic, agriculture, transportation and industrial level along with success stories. Present state of art of technology of different renewable energy sources and its devices. Constraint & future perspective of integrated renewable energy planning in global context.

Practical:

- Practical use of different renewable energy sources such as community solar cooker, solar water heater, industrial solar dryer, solar desalination unit, solar power generator, biogas for thermal application, producer gas for motive power generation, wind energy for power generation. Thermal conversion routes of biomass for solid, liquid and gaseous fuel generation, improved cook stoves and furnaces. Landfill technology and municipal solid waste management, Field visit to different areas for impact analysis of renewable energy sources for energy conservation and environment protection.

2. Present State of Art of Technology for Value Addition in Milk

Course Director : Dr. G.K. Mathur, Head, Department of Dairy & Food Technology, College of Dairy & Food Science Technology, Udaipur.

Duration : 8 weeks (October – November 2008)

Course fee : US $ 4,000 per trainee

No. of trainees per course : 10

Accommodation : Suitable accommodation in University guest house at reasonable cost will be provided to all participants.

Eligibility : Graduate in Dairy Technology, Agriculture & Biological Science.

The value addition in milk and its products requires immediate attention across the globe not only for effective use of milk for nutrition supply but also development of strategies for entrepreneurship in this emerging field. This course will import an insight of milk production and possible value addition in milk and its products and recent advances in this field globally. The College of Dairy & Food Science Technology of Maharana Pratap University of Agriculture & technology, Udaipur, Rajasthan is a pioneer institute imparting education in the field of value addition in milk and processing in food products.

Faculty

Highly qualified multi disciplinary faculty is working in the College of Dairy & Food Science Technology related to the field of Dairy Technology, Dairy Engineering, Dairy Chemistry, Dairy Microbiology, Dairy Economic & Management, Food Technology, Post Harvest Technology, Agro processing, Electrical Engineering, Mechanical Engineering and Energy Conservation etc.

Course Content

Market Milk

- Market milk industry in India and abroad. Distinctive features of tropical dairying as compared to those of the tropical climate of developed countries. Recent advances in collection and transportation of milk, reception and treatment of milk, thermal processing of milk, good manufacturing practices (GMP) in dairy processing, UHT processing of milk and in maintaining plant hygiene & HACCP.

Traditional Dairy Products

- Status and significance of traditional milk products in India. Product identification, process description, factors affecting yield , physico-chemical changes during manufacture of Khoa, Channa, Paneer, Srikhand , Sandesh, Misti dahi , Kheer and Payasam and its associated aspects. Fat-Rich Dairy Products : Status of fat-rich dairy products in India and abroad. Recent advances in manufacturing Cream, Butter, Special butters, Ghee and related products. Cheese Technology: Origin and history of development of cheese manufacture, status and scope in India and abroad. Manufacture of different varieties of cheese: Cheddar, Gouda, Swiss, Mozzarella, Cottage. Ice-Cream and Frozen Desserts: Advances in ice cream and other frozen desserts, Stabilizers and emulsifiers-their classification, properties and role in quality of ice-cream, Technological development aspects of ice cream manufacture, Recent advances in ice-cream industry and plant management, Technology for preparation of dried ice-cream milk mix. Condensed and Dried Milk : Status and scope in India and abroad, Definition and legal standards: Condensed milk, sweetened condensed milk and evaporated milk, Heat stability of milk and condensed milk, Microbiological qualities of condensed milks, Recent advances with reference to freeze concentration and membrane concentration and Dried Milks.

Practical

- Present state of art of equipment for Pretreatments (chilling, clarification, filtration), Cream separator, LTLT, HTST pasteurizer, Laboratory steriliser. Sampling and chemical examination of pasteurized, sterilized and UHT processed milk. Preparation of special milks; toned, double toned, standardised, flavoured, sterilised. Preparation of khoa, chhana and paneer from cow and buffalo milk and mixed milk. Preparation of misti dahi, chhaka and srikhand. Preparation of khoa and chhana based sweets. Microbiological examinations of traditional dairy products: Khoa, paneer, spore counts, coliform counts yeast, molds counts etc. Microbiological examination of cream, Preparation of sterilized cream. Study of construction and cooperation of the new generation power operated butter churn and butter packaging machine.
- Manufacture of Cheddar cheese, Gouda cheese, Mozzarella cheese, Swiss cheese, Cottage cheese, Processed cheese. Processed cheese spread and processed cheese food. Manufacture of chololcate, fruit and nut ice cream. Preparation of sherbets/ices. Preparation of soft served and filled ice-cream. Manufacture of kulfi. Manufacture of plain skim concentrated milk. Practical use of modern equipments of milk collection, transportation, reception, treatment and thermal processing of milk.

3. Protected Cultivation Techniques for Vegetable and Flower Crops

The horticultural crops particularly fruits and vegetables are becoming increasingly important globally. A number of these crops contribute significantly towards food and nutritional security, income & employment generation and environmental protection, while a few others are good foreign exchange earners and are important aesthetically and culturally. In a paradoxical situation of fast depletion of natural resources including shrinking of arable land and growing human needs, it has become extremely important to resort to Hi – tech agriculture, which are modern, less environment dependent, capital intensive and have the capacity to improve the productivity and quality. In order to develop entrepreneurship in the area of protected cultivation of vegetable and flowers, a model of Hi-tech horticulture unit has been established at Rajasthan College of Agriculture, Udaipur, Rajasthan. The college is having complete infrastructure facilities for demonstrate use of hi-tech cultivation including forced ventilated green house with cooling system, naturally ventilated green houses and poly houses for nursery to produce disease free good quality vegetable seedlings of improved varieties. Rose, gerbera, capsicum and cucumber are being produced and marketed. All the green/poly houses are equipped with fully controlled computerized fertigation unit and drip irrigation systems.

Course Director	: Dr. L K Dashora
Duration	: 4 weeks (November- December 2008)
Course fee	: US $ 2,500 per trainee
No. of trainees per course	: 10-15
Accommodation	: Suitable accommodation in University guest house at reasonable cost will be provided to all participants.
Eligibility	: Bachelors and Master Degree in Horticulture, Agronomy, Plant Protection and Agriculture engineering etc.

Faculty

The Department of Horticulture, Rajasthan College of Agriculture, Udaipur has highly qualified faculty working on various horticultural crops such as fruits, vegetable, flowers, spices, medicinal and aromatic plants. In addition the specialized faculty in appropriate technology i.e. protected cultivation of flowers and vegetable are also available.

Course Content

Theory and Practical

- Importance [illegible]
- Hi-Tech nursery raising and management : types of multi cell plastic plug tray, pro trays, ingredient used as root medium for seedling raising, sowing of seeds, temperature requirement for germination, height control in transplants, watering of transplants, transplant fertigation and hardening of seedling. Production of greenhouse vegetable - tomato, sweet peppers, cucumber, muskmelon and flower crops – rose, gerbera, car nation, gladiolus and chrysanthemum with special reference to climate, selection of varieties, preparation of soil, nursery raising, planting, training and pruning, pollination, fertigation, cooling, heating and ventilation, harvesting, post harvest handling and plant protection. Off season cultivation of cucurbits under plastic low tunnels: nursery raising, preparation of beds, fixing of hoops, transplanting and covering of plastic, fertigation and plant protection. Role of mulching in protected vegetable cultivation, Vegetable seed production under protected conditions, emasculation and pollination, harvesting of seed crops, seed extraction and yield. Drip irrigation and fertigation in protected vegetable cultivation. Integrated pest and disease management in green house. Entrepreneurship development through hi-tech cultivation. Economic analysis of protected cultivation techniques.

4. Entrepreneurship Development for Sustainable Livelihood of Underprivileged Farmers of SARRC Countries

Sustainable livelihood for agricultural practitioners is the basic and foremost need of SARRC countries. Increasing population and its pressure on land holding per unit farmer has considerably reduced per capita income of farmers. Globalization and liberalization of economy has also opened new vistas for farmers of SARRC countries. In order to sustain livelihood of these underprivileged farmers, it is necessary that they should establish their own ventures in addition to farming which will in turn provide them sustained income. Agriculture scientists working in these countries can play a preponderant role in helping these agricultural practitioners in establishing viable enterprises through counseling and motivation.

The Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan has taken up a new motto of reaching the unreached through its extension programme. The extension programmes are aimed at knowledge, technological and economic empowerment of the farming community. Towards this objective all KVKs of the university have been restructured. A number of demonstration units have been established in every KVK. Each KVK has organized large number (6400) of frontline demonstrations of important crops covering 2750 ha in the region in this year, which have had tremendous impact in adoption of new technologies for entrepreneurship development. Looking to these facts a training on Entrepreneurship Development for Sustainable Livelihood of Underprivileged Farmers of SARRC countries has been planned to develop conceptual perspectives of entrepreneurial development typology and entrepreneurial dynamics, resource analysis and preparation of viable business plan and Counseling, motivation and inculcation of skills.

Course Director	: Dr. V.N.Joshi
Duration	: 8 weeks (March-April 2008)
Course fee	: US $ 5,000 per trainee
No. of trainees per course	: 10-15
Accommodation	: Suitable accommodation in University guest house at reasonable cost will be provided to all participants.
Eligibility	: Bachelors and Master Degree in Horticulture, Agronomy, Plant Protection and Agriculture engineering etc.

Faculty

The Directorate of Extension Education, Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan is fully equipped with highly qualified faculty working on various aspects of entrepreneurship and rural development. In addition the specialized faculty in agriculture sciences and technology including agronomy, extension, economics and horticulture are also available in the directorate.

Course Content

Theory and Practical

- Entrepreneurship development (values, motivation and personality development), Fundamentals of entrepreneurship management (managerial skills, financial and risk analysis, farm management& decision making), Enterprise planning and resource management, Market survey, resource analysis and identification of opportunity, Techniques of resource analysis & preparation of viable business plan and Counseling, motivation and inculcation of skills. Techno- economics feasibility of various agriculture based entrepreneurs.
- Hands on experience and exposure visit and Preparation of business plan based on agriculture inputs.

5. Indian Ethnic Design for Apparels and Textile Made Ups in Global Perspectives

The Indian ethnic designs and fashion industry has grown consistently into big business and India has emerged as one of the leading players. Indian culture, traditions, clothing, style techniques and uniqueness have influenced the world and now are influencing world fashion. Apparel and interior enrichment especially with traditional designs are one of the fastest emerging and most exciting sectors with present boom envisaged in the field of textiles and apparel. The learners have ample scope for developing entrepreneur skills that help them establish domestic and global business. Two most important disciplines i.e. Textiles and Apparel Designing and Family Resource Management of College of Home Science, Maharana Pratap University of Agriculture and Technology, Udaipur has designed and developed Apparel production management programme and interior & exterior space designing through Indian soft furnishings with the focus to provide interactive learning experiences in Apparel production and textile made-ups and generation of human resource to promote employment opportunities and entrepreneurial abilities. The college is fully equipped with state of art machinery, equipments, design studios, pattern making, draping, cutting and sewing labs, weaving, knitting, printing labs – all add to a holistic learning experience. The CAD labs have the latest software such as TUkatech – Pattern making, grading and marker making and Tukastudio – complete package of seven modules – design and repeat, colour ways, colour reduction and cleaning, knits, weave, jacquard storyboards, Auto Cad and 3D Max etc.

Course Director : Dr.Meenu Srivastava Dr.Ritu Singhvi, HOD College of Home Science, Udaipur, Rajasthan

Duration : 6 weeks (May – June, 2008)

Course fee : US $ 4,000 per trainee

No. of trainees per course : 10-15

Accommodation : Suitable accommodation in University guest house at reasonable cost will be provided to all participants.

Eligibility :

Faculties

The College has highly qualified faculty, well groomed with latest technology & techniques having adequate industry exposure to teach various apparel, textile & interior designing soft-wares, grading for pattern making designing, construction techniques, marker making , production limitation of design, market trends etc. In addition, the specialized faculty in enterprise development & Management, merchandising & marketing, cost effectiveness in apparel production & textile made-ups & project planning are also available for this purpose.

Course Content

Theory

- Indian ethnic design- concepts, its growth &trends. Elements of Arts & principles of design. Fabric- its construction, selection & silhouette. Fashion illustrations. Computer aided Apparel, textile & furnishing designing, pattern making, grading & marker making. Apparel manufacturing technology, textile design & colour-ways, fabric embellishment, draping & sewing techniques fashion accessories, current trends issues in apparel & textiles made-ups, design studio projects. Architectural features of a building –walls, floors, door & windows. Soft furnishing – concept, types, fabric selection, designing & decoration.

Practical

- Computer application in designing through various textile soft-wares, AUTOCAD & 3 D Max, pattern making, grading & Marker making. Software to create patterns for selected Apparel & Textile Made-ups. Use of design & repeat colour separation, colour ways, knits, weaves & Jacquard module of textile designing, software to design & develop theme- based project on textile made-up with 3-4 coordinates & rendering efforts on crocque and architectural features. Pattern making, getting full scale pattern using Plotter. Draping on dress for custom made clothing, construction of developed design. Working on industrial sewing machine to develop skill on commercial production of Apparel and Textile made-ups for enterprise establishment with key focus on resource utilization. Field visits to museums, historical places, related industries, boutiques, export houses, design centers, trade fairs, exhibitions etc.

6. Water Harvesting Technological Options in Negotiating Drought

Drought relief works, emergency water supply through tankers, digging deeper bore-wells are no long term solutions for negotiating drought. The long-term technological options, therefore, are the only remedies to negotiate the drought and completely vanish it in the years to come. Scientific rain water harvesting, watershed management, water storage and conservation practices with an active participation and empowerment of users and their association shall be a befitting answer to meet water demands on sustainable basis. College of Technology and Engineering, Udaipur, Rajasthan since its inception has been catering the needs of this aspect by way of organizing trainings, workshops, conferences and several interactive sessions with various government and non-government agencies, particularly in the field of natural resource management and related disciplines.

Course Director	: Dr. Virendra Kumar, Professor & Dean
Duration	: 4 weeks (January - February 2008)
Course fee	: US $ 2,500 per trainee
No. of trainees per course	: 10-15
Accommodation	: Suitable accommodation at University guest house at reasonable cost will be provided to all participants. One scientist hostel of the college can also be utilized to accommodate them.
Eligibility	: Graduate in Engineering and Agriculture (Mainly working in the area of natural resources management).

Faculty

The Department of Soil and Water Engineering, CTAE, Udaipur has highly qualified human resources in the field of Watershed Hydrology, Watershed Management, Irrigation & Water Resource Systems Management. The additional faculty involved in number of government/ICAR sponsored and non-government funded research and consultancy projects is also available for this work.

Course Content

- Water harvesting and its basic criteria viz. source of water available, required storage duration and intended use of harvested water. Different water harvesting techniques; surface runoff harvesting, underground or sub-surface harvesting. Suitability and design of different long term runoff harvesting structures such as farm pond, percolation ponds, sunkenponds, Johads, Nadis, Khadins & Anicuts. Indigenous and low-cost water harvesting structure, their design aspects and cost analysis. Sub surface barriers used to retain seasonal sub surface flows.
- Land and water resources management in integrated manner, ground water recharge technologies and other water storage conservation practices.

Field Exposure Visits

- Exposure visits will be arranged to Soil and Water Conservation Demonstration Centre, developed at CTAE and other watersheds planned and developed under supervision of our faculty, farm pond (lined and unlined), low cost water harvesting structures designed & executed by college at different sites in the vicinity of Udaipur region.

GBPUA&T

Govind Ballabh Pant University of Agriculture & Technology
Pantnagar

On 17 November 1960 a dream came true when the first and the foremost State Agricultural University of India was dedicated to nation by the first Prime Minister Pt. Jawahar Lal Nehru. The idea of establishing this University came from Dr Sarvapally Radhakrishnan Report on Higher Education in 1952. Pt. Govind Ballabh Pant, the then Home Minister, Government of India and Major H S Sandhu, the then General Manager, the easrwhile Tarai State Farm, Haldi, played an instrumental role in its foundation. Established as Uttar Pradesh Agricultural University on Land Grand Pattern on 16,000 acre land of Tarai State Farm in the foothills of Himalaya was renamed as G B Pant University of Agriculture and Technology, Pantnagar in 1972. The University is committed to all round agricultural development in the country through its concerted efforts and innovative education, research and extension programmes. During last 46 years of its legendary journey, the University has grown up as a premier institute of higher education in agriculture, technology and allied streams and an in ternationally renowned model for research and extension in front line areas. The University is considered as Harbinger of Green Revolution. This is the only Agricultural University in the country which has been awarded with Sardar Patel Outstanding ICAR Institution Award twice by Indian Council of Agricultural Research, *i.e.* for 1997 and 2005.

Contact Person

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Courses

1. Vegetable Seed Production, Processing and Marketing
2. Cultivation and Utilization of Medicinal and Aromatic Plants
3. Bio-fertilizer—Production and Utilization
4. Modern Anesthetic and Surgical Techniques for Management of Diseases in Livestock and Pets
5. Modern Diagnostic Techniques in Animal Diseases

1. Vegetable Seed Production, Processing and Marketing

Course Director : Dr K P Singh

Duration : 1 week (18-23 June 2008)

Course fee : US $ 1,250 per trainee (exclusive of travel cost, boarding & lodging)

No. of trainees per course : 20

Accommodation : To be arranged in the International guest house at reasonable rate

Eligibility : Assistant/Associate Professor/Research Scientists engaged in Research/Teaching/ Extension Activity

The University has well equipped separate Vegetable Research Centre with an area of about 70 acres. The research centre so far has released 31 vegetable varieties including few hybrid varieties of brinjal and cucurbits. All India Coordinated Research Project on Potato Improvement alongwith other externally funded research projects are in operation, which provide immense scope for the organisation of vegetable seed production training course. The vegetable research centre also producs breeder seeds of tomato, brinjal, ladyfinger, cauliflower (E), pea, frenchbean, potato, cucurbits and spices particularly coriander, methi, chilli, sauf, ajavine etc.

Training Programme

The above course content will be covered through judicious mix of different instructional techniques related to vegetable seed production. Class room lectures alongwith field practices including use of different media will be used during the training period. About 60 percent time will be devoted to field practical, group discussion and visit to private growers.

Faculty

Experienced scientists of department of vegetaqble sciences will constitute the faculty

Course Content

- Importance and scope of vegetable seed production, processing and marketing
- Seed Production techniques of important vegetable crops
- Identification of cultivars & isolation distance under seed production
- Seed certification and maintenance of records
- Important agronomical practices in sustainable seed production
- Pest and disease management in important vegetable crops
- Seed processing techniques, drying, cleaning and packaging
- Storage techniques of important vegetable seeds
- Marketing as a constraint in vegetable seed trade

2. Cultivation and Utilization of Medicinal and Aromatic Plants

Uttaranchal being a herbal state has given top priority on the research and development of medicinal and aromatic plants. Keeping in view the priority of the state, the University has recently established a 100 acres research and development farm on Medicinal and Aromatic plants. The important medicinal and aromatic plants have been collected as per the suitability of climatic conditions. The hill and mountainous areas of Uttaranchal has wide bio-diversity of herbal plants. Theresourcesw of other research stations will also be pooled upto date information. Some species like bael, Brahmi, Chandan, Chitate, Giloe, Guggal, Isabgol, Jatmasi, Kunth, Kuthi, Mulethi, Safed Musali, Pashan Bheda, Pippal, Sarpgandha, Shatvari & Tulsi etc. are in high demand in national and international market. The cultivation & utilization of these herbal plants will be discussed in detail during the training programme.

Training Programme

The above course content will be imparted to the participants through judicious mix of different instructional strategies such as lectures, reinforced by visuals, group and panel discussion and brain storming session to obtain the set objectives. Practical knowledge will be imparted through experimental and field plots visits. Field laboratory as experiments will be utilized to impart cultivation techniques.

The pre and post evaluation will also to taken to access the knowledge acquired by the participants.

Faculty

Experienced scientists of the college and centre will constitute the faculty.

Course Director : Dr K P Singh

Duration : 1 week (18-23 June 2008)

Course fee : US $ 1,250 per trainee (exclusive of travel cost, boarding & lodging)

No. of trainees per course : 20

Accommodation : To be arranged in the International guest house at reasonable rate

Eligibility : Assistant/Associate Professor/Research Scientists engaged in Research/Teaching/ Extension Activity

Course Content

- Importance and scope of medicinal & aromatic plants
- Cultivation and utilization of important medicinal & aromatic plants like Aonla, Ashok, Ashwagandha, Bael, Brahmi, Chiraita, Giloe, Guggal, Isabgol, Jatamansi, Kalmagh, Kuth, Kutki, Mulethi, Musali, Pippal, Sarapgandha etc.
- Methods of mass propagation techniques of suitable species
- Preparation of different formulation of medicinal & aromatic plants
- Oil extraction and properties of important medicinal & aromatic plants
- Economics of different medicinal & aromatic plants
- Pest and disease management of important medicinal & aromatic plants

3. Bio-fertilizer—Production and Utilization

Uttaranchal state is pre-dominantly organic state, where consumption of chemical fertilizers are very less. Most of the crops are grown under organic mode. For sustainable crop production efforts are being made to use various formulations of organic manures, vermi-compost, green manuring, Rhizobium and Azotobactors etc. At University level various research projects are in progress to assess the importance of different organic manures and bio-fertilizers in crops alongwith fruits & vegetables.

A large number of NGOs are also working on various formulations of organic manures and E.M. Technology under area jurisdiction of this University.

Training Programme

The above course content will be covered through judicious mix of different instructional strategies such as field practical, farmers fields visits & exposure visits to demonstration sites. The participants will be benefited with the group and panel discussions including the use of different media in organic farming. The methods of preparation of different organic manures will be shown to participants alongwith application of Rhiizobia and Azotobactors.

The pre and post evaluation will be conducted to assess the knowledge acquired by the participants.

Course Director	:	Dr K P Singh
Duration	:	1 week (23–28 July 2008)
Course fee	:	US $ 1,250 per trainee (exclusive of travel cost, boarding & lodging)
No. of trainees per course	:	20
Accommodation	:	To be arranged in the International guest house at reasonable rate
Eligibility	:	Assistant/Associate Professor/Research Scientists engaged in Research/Teaching/Extension Activity

Faculty

Experienced scientists of Collegeof Agriculture will constitute the faculty

Course Content

- Concept of organic farming its need, scope and components
- Use of different sources of nitrogen like-rhyzobium culture azotobacter, azospirillum, blue green algae, azolla etc.
- Role of phosphat solubilizing bacteria
- Influence of micro-organism for the availability of Potash
- Method of preparation of compost, vermin-compost, NADAP compost & CPC and their role in crop production
- Effect of green manuring, blue green algae and azola on soil health and crop production
- Utilization of crop residues, farm waste and recycling of organic waste for sustainable crop production
- Use of bio-gas salary for increased crop production
- Improvement in soil health and grain quality through organic amendments
- Ecological consideration in organic farming

4. Modern Anesthetic and Surgical Techniques for Management of Diseases in Livestock and Pets

The latest anesthetic techniques developed by the institute have made the animal surgery easier and painless. These techniques have put confidence in field level veterinarians as well as in the researchers and thus have improved the health care and managemental conditions of animals and finally the productivity and production. The goal to impart trainings on these aspects it to transfer knowledge and make users trained to perform the action.

Training Programme

This programme emphasizes the practical application of basic and new concepts in surgery for quick healing and recovery of animals for better production performance.

Faculty

Well trained and experienced scientists of the College of Veterinary and Animal Sciences constitute the faculty.

Course Director	: Dr K P Singh
Duration	: 1 week (20-25 August 2008)
Course fee	: US $ 1,250 per trainee (exclusive of travel cost, boarding & lodging)
No. of trainees per course	: 20
Accommodation	: To be arranged in the International guest house at reasonable rate
Eligibility	: Assistant/Associate Professor/Research Scientists engaged in Research/Teaching/ Extension Activity

Course Content

- Modern regional anesthetic techniques: Sympathetic blockades: epipleural; cervical ganglionic; paravertebral, presacral; paranephric etc. for management of gastroinetestinal; musculo-skeletal, urogenital diseases and diseases of respiratory system
- Aacupuncture analgesia for surgery of thorax, abdomen, limbs; management of paresis/paralysis etc.
- Physiopathology and management of different types of shock (haemorrhagic; traumatic; toxic etc.) fluid and electrolyte management of diseases
- Modern trends in chemotherapy and antimicrobial therapy in small and large animal's surgery
- Recent concepts in the management of dystocia, prolapse of vagina/uterus
- Radiographic diagnostic/surgical techniques for the management of musculoskeletal disorders in animals.

5. Modern Diagnostic Techniques in Animal Diseases

The quick diagnostic techniques play a pivotal role in enhancing the production, minimizing the production cost and thus increasing the socioo-economic status of animal producers. The training will help in updating the knowledge of practitioners as well as researchers and getting two way interactions with the trainees, which will also provide new dimensions to the research and development. The extension agencies have a wide network of animal scientists but laboratories are reported to be poorly equipped with latest and efficient equipments and accordingly trained technicians. This training will help to bridge the gap and setting new laboratories in trainees department and to work in congenial environment.

Course Director	: Dr K P Singh
Duration	: 1 week (17-22 September 2008)
Course fee	: US $ 1,250 per trainee (exclusive of travel cost, boarding & lodging)
No. of trainees per course	: 20
Accommodation	: To be arranged in the International guest house at reasonable rate
Eligibility	: Assistant/Associate Professor/Research Scientists engaged in Research/Teaching/ Extension Activity

Training Programme

Training Programme is aimed to equip the trainees, students, researchers and others in practical application of advanced methods.

Faculty

The trained and experienced scientists for the College of Veterinary and Animal Sciences constitute the faculty.

Course Content

- Collection and preservation techniques and dispatch of material for laboratory diagnosis and biopsy techniques and exfoliative cytology in disease diagnosis
- Surveillance and monitoring of animal diseases
- Haematological and biochemical analysis for bacterial, viral and metabolic diseases
- Detection of aflatoxins in feed and tissues
- Counter Immuno electrophoresis (CIEP) and Agar Gel Immuno Diffusion (AGID), Fluorescent Antibody Technique (FAT), Radiodisotopes and Autoradiography, Enzyme linked immunosorbent assay (ELISA) and Dot immuno binding assay (DIA) techniques for diagnosis of viral disease
- Computer and bioinformatics in disease diagnosis
- Demonstration of techniques practically

MAU

Marathwada Agricultural University
Parbhani

Established in 1972 on land grant pattern, Marathwada Agricultural University (MAU), Parbhani, is one of the four Agricultural universities in Maharashtra. Except some industrialization around Aurangabad and Nanded, the entire region has rural setting. The objectives of the university are education in agriculture and allied sciences, undertake research-based on regional needs and facilitate technology transfer etc.

Contact Person

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Course

1. Development of Agro-based Nutraceutical Foods for Health Security

MAU is entrusted with the responsibilities to provide education in agriculture and allied fields, undertake research and facilitate technology transfer in Marathwada region of Maharashtra. The first college of Agriculture was established in this region at Parbhani in 1956 by Hyderabad State Government just before State reorganization. During Nizam's rule, however, agricultural education was available only at Hyderabad but crop research centres, viz sorghum, cotton, fruits existed in the region. The foundation of research was laid by the erstwhile Nizam State with commencement of the Main experimental farm at Parbhani in 1918. The famous 'Gaorani' *desi* cotton is the result of the research on cotton and local sorghum cultivars were improved by selection by the then Economic Botanist. Since then Parbhani remain the hub of educational, research and extension activities in Marathwada.

1. Development of Agro-based Nutraceutical Foods for Health Security

Nutraceuticals are food materials containing significant levels of biologically active components, imparting health benefits. Nutraceuticals include a wide range of agricultural food ingredients or phytochemicals extracted from edible plants or animal products commonly found in diet.

Training Programme

The training programme is organized

- to generate awareness about importance of nutraceuticals in the maintenance and development of human health
- to develop the desired skill in the isolation and characterization of nutraceuticals from agricultural commodities
- to scale up isolated nutraceuticals for ensuring techno-economical feas-ibility
- to disseminate the innov-ative technologies for popularizing health benefits of nutraceuticals.

Faculty

Highly educated trained faculty in the field are available.

Course Director	: Dr D N Kulkarni Associate Dean
Duration	: 10 days (August-September 2008)
Course fee	: US $ 1,250 per trainee
No. of trainees per course	: 15
Accommodation	: Will be provided at reasonable cost at the university guest house
Eligibility	: Assistant/Associate Professors of the University/ subject matter specialists

SDAU

Sardarkrushinagar Dantiwada Agricultural University
Sardarkrushinagar

Sardarkrushinagar Dantiwada Agricultural University came into existence on 1 May 2004 with its headquarter at Sardarkrushinagar, District Banaskantha with the jurisdiction spread over the districts of Banaskantha, Sabarkantha, Patan, Mehsana, Gandhinagar and Kachchh. The motto of the university 'Be Devoted to Agriculture and Agriculture Alone' speaks of the vision and idealism to which the university constituents are committed.

Contact Person

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e-mail : vc@sdau.edu.in

Courses

1. Pulses as a System Rejuvenating Component of Agriculture
2. Castor: An Industrial Dollar Earning Crop

The university offers a comprehensive educational package for nurturing excellence in professional education to train human resource in agriculture and allied fields for Nation building through agriculture and rural development

1. Pulses as a System Rejuvenating Component of Agriculture

Intensive agriculture has triggered cyclic problems that have raised doubts about the very sustainability of agriculture. Pulses provide requisite resilience to agriculture, capricious weather and ever looming global warming. They can be grown over wide oddities of soil, agricultural system and psycho-socio-economic backgrounds. They rejuvenate dissipating soil health through *Rhizobium* activity besides adding all-important dry matter in the soil. Consequent up on one-fourth of the pulses' constitution as protein, they may be regarded as Live Protein Tablets without any diverse efect on human health. Any enhancement in the production of pulses would reflect "mal-nutrition alleviation". SDAU is committed to excellence in research and development of pulses. The university has given many farmers' friendly packages inclusive versatile varieties of pulses that have proven their mettle over area and space. The recent released varieties are conspicuous of high yield with concomitant value-addition. The university has the distinction of developing the first ever cytoplasmic sterility-based hybrid GTH-1 in pigeonpea.

Faculty

Qualified professors and other scientists from R&D institute constitute faculty.

Course Director : Dr S B S Tikka

Duration : 1 week

Course fee : US $ 500 per trainee

No. of trainees per course : 10

Accommodation : Will be provided at a very reasonable cost in the university guest house

Eligibility : BSc (Agri)/MSc (Agri)

Course Content

- Enhancement of pulses utility through need-based augmentation in productivity and quality compatible as per international standards
- *Rhizo* engineering of pulses for sustaining eco-balance and promoting organic farming
- Hybrid pigeonpea in enhancing and sustaining productivity of pulses
- Pulses as bio-augmenting and bio-restricting components in sustainable agriculture
- Utilization of wild pigeonpea germplasm for genetic augmentation and sustainability of genetic bio-diversity
- IPR issues and DUS test for pigeonpea and arid legumes

2. Castor: An Industrial Dollar Earning Crop

Castor (*Ricinus communis* L) is an important non-edible oilseed crop having immense industrial use and export potential of over Rs 1,100 crores per annum. The volume of utilities and consequent export has further scope of expansion with requisite value-addition. India is conspicuous global leader in castor production, acreage, productivity, utility and export. In India SDAU has distinct contribution in research and development of castor activities. As a result Gujarat has been ensconcing at first position in productivity at global level (20 quintal/ha). These quantitative and qualitative achievements have been possible due to development of hybrid technology and associated improved package of practices. The hybrids developed by the SDAU are distinct in having enhanced productivity with requisite tolerance to biotic and abiotic stresses. The impact of the research can be gauged from the fact that the yield of castor has been increased from 3 quintal/ha in late 60s to present level of 20 quintal/ha.

Faculty

Qualified professors and other scientists from R&D institute constitute faculty

Course Director : Dr S B S Tikka

Duration : 1 week

Course fee : US $ 500 per trainee

No. of trainees per course : 10

Accommodation : Will be provided at a very reasonable cost in the university guest house

Eligibility : BSc (Agri)/MSc (Agri)

Course Content

- Hybrid technology in castor and its impact on enhancing productivity and quality
- Improved crop production technology for enhancing profitability
- Crop protection for reining on-field and off-field quantitative and qualitative diminution
- IPR and DUS test in reference to seed production
- Post-harvest technology for sustaining and enhancing quality of castor and castor products
- Marketing intervention and management in castor value chain

UAS

University of Agricultural Sciences
Bangalore

The mission of the University of Agricultural Sciences, Bangalore is to strive ahead and provide leadership in teaching, research and extension education services related to agriculture and allied sciences. The University endeavours to keep pace with new frontiers of science and contem-porary developments to be socially and technically relevant. In this context, the University is strongly committed in absorbing newer paradigms and using them to develop excellent human resources, innovative technologies and their dissemination so as to serve the farming community of the state and country.

Contact Person

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University of Agricultural Sciences
Bangalore 560 065
Karnataka (India)

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Fax: +91-80-23330277

Course

1. Post-harvest Technology and Rural Agro-processing

1. Post-harvest Technology and Rural Agro-processing

This course will provide first hand information on post-harvest technology with the developing country perspective. The course will provide advanced techniques on post-harvest technology of agricultural and horticultural crops for promotion among farming community. It will provide practical exposures to the unit operations in primary and secondary processing and also value addition. It is aimed at training on advances in storage and packaging of cereals, fruits and vegetables, and their processed products. It also aims to provide a comprehensive technical package on establishing agro-processing centres in rural areas and discussion on the economics and marketing strategies for processed products.

Training Programmes

The University has been organizing training programmes in the proposed area every year, for the staff of Development Department in Karnataka, besides organizing advanced course for faculty from University and R&D Institutions in India.

Faculty

A well qualified professional team of experts is available in the University.

Course Director : Dr B Ranganna

Duration : 3 weeks (10–30 December 2008)

Course fee : US $ 1,500 per trainee

No. of trainees per course : 15

Eligibility : Diploma or degree in agriculture/horticulture

Course Content

Primary processing
- threshing equipments for cereals, pulses and oilseeds
- cleaning and grading equipments for cereals, pulses, oilseeds, and fruits and vegetables
- drying of grains and seeds
- harvesting and pre-cooling of fruits/vegetables
- advances in transportation and handling of fruits/ vegetables

Storage and preservation
- storage structures for cereals
- storage of pulses and oilseeds
- CA/modified atmosphere storage of fruits/vegetables
- food packaging
- enhancing shelf-life using indigenous technical knowledge (ITK)
- importance of refrigeration and cold storage

Secondary processing
- processing equipments for cereals and oilseeds
- pulse milling technology and equipments
- processing of tamarind fruit, arecanut etc.
- processing of potato and spices
- extrusion technology in food
- preparation of different value added products

Packaging technology
- vacuum packaging technology for fruits
- modified atmosphere packaging of fresh produce
- aseptic food packaging
- packaging technology for export

Establishment of agro-processing centres
- role and importance of agro-processing centres in rural areas for income employment generation
- processing inventory, layout planning, installation and operating an agro-processing centre
- location-specific processing models
- packaging and marketing of processed products; maintenance of accounts and economics
- extension strategies for marketable surplus

Other related technologies/issues
- food quality and safety
- International food law and quarantine for marketing and export
- post-harvest technology of spices and plantation crops
- waste management from food industries
- biodegradable films in food
- high-tech applications in post-harvest processing
- advances in quality evaluation of cereal products
- freeze drying of high value products
- integrated approach for post-harvest management and marketing of horticultural produce

EDUCATION DIVISION
INDIAN COUNCIL OF AGRICULTURAL RESEARCH
Krishi Anusandhan Bhavan-II, Pusa Campus, New Delhi 110 012, India

APPLICATION FORM

Affix Applicant's Photograph

Course Name .....

Institute .....

1. Name in full (in Block letters) .....
2. Present Post held .....
3. Address for correspondence .....

   Telephone No. .....

   Fax No. .....
4. Address for contact .....

   In case of emergency .....

   Telephone No. .....

   Fax No. .....
5. Date of birth .....

   Nationality .....

   Gender .....

   Martial status .....
6. Educational qualifications (Bachelors degree onwards)
7. Work experience (in reverse order-starting with the present employment)
8. Proficiency in English (*Please evaluate yourself by writing 'excellent', 'good' or 'fair'*)

   Reading .....

   Writing .....

   Speaking .....
9. Name of the sponsoring agency .....
10. Whether sponsored for any other training programme in India in the past .....

    Yes/No .....

    If yes, full details thereof: .....
11. Utility of the training in your work .....

12. Financial arrangements .....

I will pay all expenses myself .....

13. Details of course registration fee remitance .....

14. Insurance .....

I understand that the organizers do not accept any responsibility for risks such as loss of life, accidents, illness, loss of property, theft, etc.

Signature of the candidate

Date .....

Statement by the Employer

(a) I the undersigned, being authorized to supply the following particulars, herewith certify that Mr./Miss/Mrs..... is employed by my organization and has been nominated to attend the course.

(b) I consider the training to be important for the applicant's work and our organization because of the following reasons:

Signature and official stamp

Date .....

Name of person signing .....

Position .....

Name of Organization .....

Medical Record

Name .....

Age.....Sex.....Height.....Weight .....

(i) In case having history of illness or other disorders during the last five years, please describe treatment given and present condition of health

(ii) List any abnormalities indicated in the chest x-ray .....

(iii) What is the fellow's normal blood pressure .....

(iv) Is the fellow free from infectious disease (AIDS, tuberculosis, trachoma, skin disease, etc.)

(v) Is the fellow physically and mentally able to carry on intensive training away from his/her home (Yes/No)

(vi) Describe the fellow's overall health condition (including remarks of the examining physician)

Name and address of clinic .....

Name of Physician .....

Date .....

Note: This certificate may be provided by any registered medical practioner.