



IISS

Indian Institute of Soil Science

Bhopal

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
5. Advance Techniques for Soil C Pool Analysis and Carbon Sequestration under Diverse Land Use Management System

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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.

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

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 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

Course Contents

- 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

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

This 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 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

Course Contents

- 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

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 interdisciplinary 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 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

Course Contents

- 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

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 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.

Course Contents

- 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

5. Advance Techniques for Soil C Pools Analysis and Carbon Sequestration under Diverse Land Use Management Systems

Soils can be a source or sink for atmospheric carbon dioxide depending upon the land use and management. The majority of carbon is held in the form of soil organic carbon, having a major influence on soil structure, water holding capacity, cation exchange capacity, the soils ability to form complexes with metal ions and to store nutrients. This organic carbon is highly sensitive to changes in land use and management practices such as increased tillage and increased reliance on chemical fertilizers, leading to soil organic carbon decline. Conversely, land use change and the approximate management of soils also provide us with the potential to sequester carbon in soils. Soil degradation and desertification, exacerbated by land misuse and soil mismanagement deplete the SOC pools through direct and indirect effects on several ecosystem processes. Therefore, this training emphasis the management strategies for soil C sequestration include adoption of conservation tillage and mulch farming techniques, maintenance of soil fertility, soil and water conservation.

Training Programme

The course is designed to strengthen knowledge and skill of the participants involving impact of land use management on carbon sequestration for enhancing productivity and soil quality and minimizing global warming.

Faculty

Well qualified and trained 35 scientists of the institute and invited speakers from the ICAR and SAUs will constitute the faculty

Course Director	: Dr M C Manna
Duration	: 2 weeks (01/02/09 to 14/02/2009 and 01/10/2009 to 14/10/09)
Course fee	: US \$ 1000 per trainee (exclusive of boarding and lodging)
No. of trainees per course	: 15
Eligibility	: Masters degree in Soil Science, Agronomy, Microbiology and Biochemistry. Working experience in wastes recycling, composting and resource management

Course Contents

- The early history and importance of organic matter management in the country.
- Characterization of soil carbon pools under different land use management systems in India.
- Quantifying changes of carbon accreditation under different tillage and nutrient management systems.
- Quantitative estimation of SOC pools in soil under long-term application of different organic materials.
- Identifying cropping system for enhancing better C-sequestration and soil quality.
- Soil quality and resilience in relation to SOC pools.
- Quantitative estimation of C-sequestration under different land use management systems.
- Nutrient management options for better C-sequestration and crop production.
- Conservation agriculture in relation to C-sequestration.
- Scope of land use management on carbon trading.