

# ICAR-Indian Agricultural Statistics Research Institute (IASRI) Portal - Complete Documentation

**Portal:** <https://iasri.res.in>

**Institute:** ICAR-Indian Agricultural Statistics Research Institute (IASRI), New Delhi

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## Executive Summary

The ICAR-Indian Agricultural Statistics Research Institute (IASRI), located in New Delhi, is India's premier national institution dedicated to research, education, and training in agricultural statistics, computer applications, and bioinformatics[1][2]. Established with the vision of enriching the quality of agricultural research through advanced statistical methodologies and computational tools, IASRI serves as the statistical backbone of India's National Agricultural Research System (NARS).

IASRI's mandate encompasses developing innovative statistical techniques for experimental design and data analysis, creating sampling methodologies for agricultural surveys and crop estimation, building forecasting models for crop yields and agricultural economics, advancing statistical genetics and bioinformatics for crop and livestock improvement, and providing cutting-edge training to agricultural researchers across India[3].

The Institute operates through six specialized research divisions—Design of Experiments, Sample Surveys, Forecasting and Agricultural Systems Modelling, Statistical Genetics, Computer Applications, and

Centre for Agricultural Bioinformatics—supported by a robust Training and Administrative Cell. Through its research innovations, software development, and capacity building programs, IASRI has transformed agricultural research methodology in India, enabling evidence-based decision-making and enhancing research efficiency across the agricultural sector.

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# 1. Institute Overview and Mandate

## 1.1 Establishment and Vision

**Established:** 1959 (as Indian Agricultural Statistics Research Institute)

**Location:** Library Avenue, Pusa Campus, New Delhi - 110012

**Parent Organization:** Indian Council of Agricultural Research (ICAR), Ministry of Agriculture & Farmers Welfare

**Vision Statement:**

"Statistics and Informatics for enriching the quality of Agricultural Research"[4]

**Mission:**

- Undertake research, education, and training in Agricultural Statistics, Computer Application, and Bioinformatics for Agricultural Research
- Develop innovative statistical methodologies suited to the needs of agricultural research
- Build capacity of agricultural scientists in statistical thinking and computational tools
- Provide advisory services on experimental design, data analysis, and survey methodologies
- Create and disseminate statistical software for agricultural applications
- Establish IASRI as a center of excellence in agricultural statistics globally

## 1.2 Strategic Importance

### Role in National Agricultural Research System:

1. **Methodological Innovation:** Develops advanced statistical techniques addressing unique challenges of agricultural experimentation and surveys
2. **Capacity Building:** Trains thousands of agricultural scientists annually in statistical methods and software usage
3. **Advisory Services:** Provides consultation on experimental design, sampling plans, and data analysis to ICAR institutes and state agricultural universities
4. **Software Development:** Creates user-friendly statistical software packages widely used across NARS
5. **Data Management:** Establishes standards and platforms for agricultural research data management
6. **Policy Support:** Provides statistical inputs for national agricultural policies and planning

### Impact Areas:

- Crop yield estimation and forecasting
- Varietal trials and breeding programs
- Agricultural economics and marketing studies
- Natural resource surveys (soil, water, biodiversity)
- Impact assessment of agricultural technologies
- Food security monitoring
- Climate change adaptation research

## 1.3 Organizational Structure

### Leadership:

- **Director:** Dr. Kairam Narsaiah (ADG Process Engineering, Additional Charge)[5]
- **Chief Administrative Officer:** Manages administrative functions
- **Comptroller:** Handles finance and accounts
- **Heads of Divisions (6):** Lead specialized research divisions

### Governance Bodies:

1. **Institute Research Committee:** Reviews research progress biannually
2. **Research Advisory Committee:** Refines and recommends research activities
3. **Institute Management Committee:** Oversees institutional management
4. **Institute Joint Staff Council:** Addresses staff welfare issues

**Administrative Sections:**

- Administration I and II
  - Cash and Bill Section
  - Stores and Maintenance
  - Works Section
  - Central Purchase Section
  - Equipment and Maintenance
  - Hindi Section
  - Research and Development Section
  - Audit and Accounts Section
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## **2. Research Divisions and Areas of Expertise**

### **2.1 Division of Design of Experiments**

**Head:** Designated Senior Scientist[6]

**Primary Objectives:**

- Develop innovative experimental designs for agricultural research
- Create designs for complex experimental situations (multi-factor, multi-location, multi-year trials)
- Provide advisory services on experimental planning to NARS researchers
- Develop software for design generation and data analysis
- Train agricultural scientists in principles and applications of experimental designs

**Major Research Achievements:**

1. **Structurally Complete and Incomplete Designs (2023):** Developed two-part designs for Integrated Farming System experiments allowing simultaneous evaluation of multiple enterprises[7]
2. **Mixed Level Response Surface Designs (2023):** Created designs addressing overlap effects from neighbouring experimental units in precision agriculture trials[8]
3. **Augmented Block Designs:** Designs for testing large number of treatments (varieties) with limited replication, widely used in plant breeding programs
4. **Repeated Measurement Designs:** Designs for experiments where observations are taken repeatedly over time on same experimental units
5. **Multi-Stage Designs:** Designs for experiments involving multiple stages (e.g., nursery to main field trials)
6. **Designs for Agroforestry Systems:** Specialized designs accounting for spatial heterogeneity and tree-crop interactions
7. **Split-Plot and Strip-Plot Designs:** Refinements for experiments with factors requiring different precision levels

### **Experimental Design Catalogue:**

Comprehensive catalogues of standard and non-standard designs available for:

- Block designs (RBD, Latin Square, Incomplete Blocks, Lattice)
- Factorial experiments (confounding, fractional factorials)
- Response surface methodology
- Designs for multiple treatments and locations

### **Software Contributions:**

- Statistical Package for Block Designs (SPBD) 1.0
- Statistical Package for Factorial Experiments (SPFE) 1.0
- Web-based design generation tools
- Augmented design software

### **Advisory Services:**

Scientists across NARS consult division for:

- Selection of appropriate experimental design
- Randomization and layout generation
- Sample size determination
- Analysis of experimental data

## 2.2 Division of Sample Surveys

**Head:** Designated Senior Scientist[9]

### **Primary Objectives:**

- Develop efficient sampling methodologies for agricultural surveys
- Create crop area and production estimation techniques
- Design surveys for impact assessment and technology evaluation
- Provide consultancy on survey design and data analysis
- Train field staff and researchers in survey methodologies

### **Major Methodological Contributions:**

#### **1. Cotton Production Estimation Methodology:**

- Developed double sampling approach under stratified two-stage sampling framework
- 19% more efficient and highly cost-effective than existing methodology
- Reduces Crop Cutting Experiments (CCEs) significantly
- Validated in Maharashtra and Andhra Pradesh
- **National Implementation:** Adopted by Directorate of Economics and Statistics (DES) for all cotton-growing states from 2015-16[10]

#### **2. Horticultural Crops Area and Production Estimation:**

- Developed simplified methodology reducing survey workload
- Significant sample size reduction while maintaining precision
- Efficient, simple, less time-consuming, and cost-effective
- Pilot tested in 11 states till 2013-14[11]

#### **3. Mixed and Continuous Cropping Estimation (FAO Project):**

- Stratified two-stage sampling with two phases at each stage

- Combination of subjective (farmer inquiry) and objective (crop cutting) methods
- Domain estimation approach for multiple crops from single sample
- Addresses North-Eastern States' unique cropping patterns[12]

#### **4. Small Area Estimation for Crop Insurance:**

- Methodology for Rashtriya Krishi Bima Yojana (RKBY)
- Block/village-level yield estimation with limited samples
- Pilot tested across insurance implementing states

#### **5. Specialized Survey Methodologies:**

- Imported fertilizer quality assessment surveys
- Marine and inland fish catch estimation
- Flower production surveys
- Post-harvest loss assessment (AICRP on Post Harvest Technology)
- Private food grain stock estimation at farmers' level
- Seed, feed, and wastage ratios estimation

### **Adoption by Government Agencies:**

Methodologies developed by IASRI are officially adopted for:

- Crop area and yield estimation by State Agriculture Departments
- General Crop Estimation Surveys (GCES) by DES, Ministry of Agriculture
- Agricultural Census planning
- NSS (National Sample Survey) agricultural rounds

### **Survey Design Services:**

- Baseline and impact assessment surveys for agricultural schemes
- Technology adoption studies
- Farmers' constraints and needs assessment
- Socio-economic surveys
- Market surveys

## 2.3 Division of Forecasting and Agricultural Systems Modelling

**Head:** Designated Senior Scientist[13]

### **Primary Objectives:**

- Develop pre-harvest crop yield forecasting models
- Create price forecasting models for agricultural commodities
- Build pest and disease forewarning systems
- Model agricultural systems for policy analysis
- Provide training in forecasting techniques and time series analysis

### **Forecasting Methodologies Developed:**

#### **1. Crop Yield Forecasting:**

- Weather-based regression models
- Within-year growth models using plant biometric characters
- Farmers' appraisal-based models
- Discriminant function approach for categorical forecasting
- Structural time series models
- Non-parametric regression techniques
- Fuzzy regression models
- Neural network and machine learning approaches
- Bayesian forecasting methods

#### **2. Pre-Harvest Forecasting Data Integration:**

- Weather parameters (rainfall, temperature, humidity, sunshine hours)
- Agricultural inputs (fertilizers, irrigation, seeds)
- Plant biometric characters (plant height, leaf area, tillers)
- Farmers' subjective assessment near maturity
- Historical yield trends

#### **3. Price Forecasting Models:**

- Linear and non-linear time series models (ARIMA, GARCH)
- Markov chain approach for price regime switching
- Machine learning techniques for volatile commodity prices
- Price volatility measurement and risk assessment
- Market integration analysis across spatial markets



#### **4. Pest and Disease Forewarning:**

- Weather-based pest outbreak prediction models
- Disease incidence forecasting using climatic variables
- Early warning systems for major pests (locusts, stem borers, aphids)
- Integration with pest surveillance data

#### **Agricultural Systems Modelling:**

- Production function estimation and resource optimization
- Crop simulation models for scenario analysis
- Farm household decision-making models
- Technology adoption and diffusion models
- Return to investment in agricultural research
- Technical efficiency and productivity analysis
- Supply chain and value chain modelling

#### **Economic Analysis Contributions:**

- Measurement of indemnity and premium rates for crop revenue insurance
- Production efficiency and resource use in farming
- Impact assessment of micro-irrigation technologies
- Technological dualism and technological change analysis
- Price spread and market integration studies
- Dietary pattern analysis of rural households
- Impact of technological interventions on farm income

#### **Software and Tools:**

- Time series analysis macros in SAS and R packages
- Forecasting model validation tools
- Econometric modeling software modules
- Web-based forecasting platforms

## **2.4 Division of Statistical Genetics**

**Head:** Designated Senior Scientist[14]

#### **Primary Objectives:**

- Conduct theoretical and applied research in Statistical Genetics and Biometrics
- Develop computational tools for plant and animal breeding programs
- Provide advisory services on genetic parameter estimation
- Train breeders and geneticists in statistical methods
- Build platforms for Genome-Wide Association Studies (GWAS) and genomic selection

## **Major Research Thrust Areas:**

### **1. Genome-Wide Association Studies (GWAS):**

- Statistical approaches for identifying genetic markers associated with traits
- Handling population structure and relatedness in GWAS
- Multiple testing correction methods
- Platforms for understanding complex traits and diseases in crops and livestock

### **2. Genomic Selection and Prediction:**

- Statistical models for predicting breeding values using marker data
- Machine learning techniques for genomic prediction
- Software for genomic best linear unbiased prediction (GBLUP)
- Cross-validation strategies for prediction accuracy

### **3. QTL Mapping and Gene Expression Analysis:**

- Expressed QTL (eQTL) modelling
- Statistical methods for gene expression data analysis
- Innovative methods for biologically relevant gene selection
- Hybrid methods for informative gene selection from crop gene expression data

### **4. Genetic Parameter Estimation:**

- Heritability estimation (narrow-sense and broad-sense)
- Bootstrap-based robust estimates of heritability
- Confidence interval estimation for genetic parameters
- Repeatability and breeding value estimation
- Genetic correlations and genetic gain prediction
- Estimation for unbalanced and incomplete data

### **5. Selection Indices:**

- Multi-trait selection indices for simultaneous improvement
- Selection indices for yield and stability
- Economic selection indices
- Restricted selection indices

#### **6. Animal Breeding Applications:**

- Progeny testing methodologies
- Sire and dam evaluation in dairy cattle
- Survival analysis in livestock
- Analysis of animal epidemiology data
- Estimation of breeding values for auxiliary traits

#### **7. Population Genetics and Computational Biology:**

- Population structure analysis
- Genetic diversity and conservation genetics
- Phylogenetic analysis
- Evolutionary genetics modelling

#### **8. Advanced Statistical Techniques:**

- Computer simulation studies for genetic scenarios
- Resampling techniques (Bootstrap, Jackknife, Balanced Repeated Replications)
- Non-linear statistical modeling of biological phenomena
- Nonparametric modelling of time-series genetic data
- Stochastic differential equation models in genetics

#### **Software for Breeding Programs:**

- Statistical Package for Animal Breeding (SPAB)
- Software for marker-assisted selection
- Breeding value prediction tools
- Genetic diversity analysis software

#### **Advisory Services:**

Plant and animal breeders across ICAR institutes and SAUs receive consultation on:

- Design of breeding experiments
- Analysis of multi-location varietal trials
- Heritability and genetic parameter estimation
- Selection strategies
- Genomic data analysis

## 2.5 Division of Computer Applications

**Head:** Designated Senior Scientist (Acting)[15]

### Primary Objectives:

- Develop statistical software packages for agricultural research
- Provide high-end computing infrastructure to NARS
- Create web-based analysis platforms and tools
- Manage ICAR Data Centre and disaster recovery systems
- Implement enterprise resource planning (ERP) systems for ICAR
- Train researchers in statistical computing and software usage

### Major Software Packages Developed:

Software Package	Purpose
SPAR (Statistical Package for Agricultural Research) 2.0/3.0	Analysis of experimental data, ANOVA, regression, multivariate
SPBD (Statistical Package for Block Designs) 1.0	Generation and analysis of block designs
SPFE (Statistical Package for Factorial Experiments) 1.0	Analysis of factorial experiments, confounding, interactions
SPAB (Statistical Package for Animal Breeding)	Analysis of animal breeding data, heritability, breeding values
SSDA (Software for Survey Data Analysis)	Analysis of survey data, domain estimation, complex sampling
SPAD (Statistical Package for Augmented Designs)	Augmented design generation and analysis

Table 1: IASRI Statistical Software Packages

### Web-Based Tools and Platforms:

#### 1. Indian NARS Statistical Computing Portal (

<http://stat.iasri.res.in/sscnarsportal>)

- Service-oriented computing for NARS users via IP authentication
- Analysis of experimental data online
- Access to high-performance computing resources

- Over 1,623 installations across NARS (653 in a single year) [16]

## **2. GRAPES (General R-shiny based Analysis Platform Empowered by Statistics):**

- User-friendly web interface for statistical analysis
- No programming knowledge required
- Developed in collaboration with Kerala Agricultural University

## **3. Online Analysis Tools:**

- Compound growth rate estimation
- Fuzzy C-means clustering
- Experimental design generators
- Survey sample size calculators

## **4. SAS Macros and R Packages:**

- Custom macros for agricultural data analysis
- R packages for experimental design and analysis
- Time series analysis tools
- Multivariate analysis routines

## **ICAR Enterprise Systems:**

- **ICAR-ERP (Enterprise Resource Planning):** Implemented with modules for:
  - Financial Management System (FMS)
  - Project Management System
  - Material Management
  - Human Resource Management
  - Payroll System
  - Management Information System (MIS)
- **e-Office:** Digital file management system for ICAR
- **SPARROW:** ICAR research publication repository
- **ICAR Data Centre (DC):** Centralized data hosting and management
- **Disaster Recovery Centre:** Backup and business continuity for critical systems
- **ASHOKA:** ICAR human resource management portal

## **Mobile Applications Developed:**

IASRI has contributed to development of ICAR mobile apps:

- IVRI Biosafety App
- IVRI Technologies and Services App
- IVRI Antimicrobial Resistance App
- Research Methods Tutorial Apps
- Quiz apps for extension education

### **Capacity Building in Computing:**

- Annual training of 776+ researchers from NARS in statistical computing[17]
- Workshops on statistical software usage
- Webinars on data analysis techniques
- Online tutorials and documentation

## **2.6 Centre for Agricultural Bioinformatics**

**Head:** Designated Senior Scientist[18]

**Establishment:** Established to integrate bioinformatics with agricultural research

### **Primary Objectives:**

- Develop bioinformatics tools and databases for agriculture
- Provide computational biology services to crop and animal scientists
- Conduct research in agricultural genomics and systems biology
- Train researchers in bioinformatics techniques
- Establish national bioinformatics infrastructure for agriculture

### **Major Research Achievements (2023):**

1. **RBPLight:** Machine learning tool for identifying RNA-binding proteins in plants, crucial for understanding post-transcriptional gene regulation[19]
2. **ASLncR:** Computational platform for predicting abiotic stress-responsive long non-coding RNAs (lncRNAs) in crops, aiding development of stress-tolerant varieties[20]
3. **ASmiR:** Tool for predicting abiotic stress-responsive microRNAs (miRNAs), contributing to breeding for drought, salinity, and temperature tolerance[21]

4. **Root-Associated Protein Prediction Tools:** Web-enabled platforms for predicting proteins involved in root development and nutrient uptake
5. **Compound Bioactivity Prediction:** Tools predicting bioactivity of chemical compounds against plant pathogens and pests, supporting biopesticide development

### **Research Thrust Areas:**

- **Sequence Data Analytics:**
  - Splice-site prediction methods (parametric, non-parametric, machine learning)
  - Deep learning techniques for biological sequence analysis
  - Gene finding and annotation algorithms
  - Promoter and regulatory element prediction
- **Gene Expression Data Analysis:**
  - Statistical methods for differential gene expression
  - Machine learning for informative gene selection
  - Hybrid methods for analyzing crop transcriptome data
  - Network analysis of gene expression
- **Genome Assembly and Annotation:**
  - De novo genome assembly pipelines
  - Structural and functional genome annotation
  - Comparative genomics
  - Pan-genome analysis
- **Protein Structure and Function:**
  - Protein structure prediction and modeling
  - Protein-protein interaction prediction
  - Functional annotation of proteins
  - Enzyme classification and pathway analysis
- **Agricultural Databases:**
  - Crop genome databases
  - Transcriptome repositories
  - Proteome databases
  - Marker databases for molecular breeding

### **National Bio-Computing Portal:**

- High-performance computing facility for genome analysis
- Automated bioinformatics pipelines

- Genome submission portal for ICAR researchers
- Access to international biological databases (NCBI, EBI, DDBJ)
- Training in computational biology tools

#### **Collaborative Research:**

- Partnership with ICAR crop and animal science institutes
- Collaboration with agricultural universities for genomics projects
- Integration with ICAR-NBPGR for germplasm characterization
- Linkage with biotechnology institutes

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## **3. Training and Capacity Building Programs**

### **3.1 Training Philosophy**

IASRI's training programs aim to:

- Build statistical thinking among agricultural researchers
- Enable effective use of statistical software
- Promote experimental rigor and data quality
- Enhance research publication quality
- Foster evidence-based agricultural research

### **3.2 Major Training Programs**

#### **Centre for Advanced Faculty Training (CAFT):**

Long-duration intensive training programs for faculty of agricultural universities:

##### **1. Post-Graduate Programme in Computer Application in Agricultural Research (PCCARP)**

- Duration: 24 weeks
- Eligibility: Graduate with statistics knowledge
- Topics: Statistical software, forecasting, regression, modeling, GIS, remote sensing
- Participants: 10 per course
- Outcome: Comprehensive training in statistical computing for agriculture[22]



**2. Recent CAFT Program (2026):** "Development of Artificial Intelligence and Deep Learning Frameworks for Advanced Agricultural Systems" (February 20 - March 12, 2026)[23]

**Short-Duration Training Programs:**

- 3-week programs on specific statistical techniques
- 1-week workshops on software packages (SPAR, SPBD, SPFE, R, SAS)
- Hands-on training in experimental design and data analysis
- Survey methodology and sampling techniques
- Forecasting and time series analysis
- Statistical genetics and genomic data analysis
- GIS and remote sensing for agriculture

**International Training Programs:**

IASRI conducts training for international participants (especially from developing countries) on:

- Agricultural statistics methodologies
- Experimental designs
- Survey sampling
- Statistical software
- Crop yield estimation techniques

**Customized Training:**

- Training for specific ICAR projects
- Capacity building for state agriculture departments
- Training for PhD scholars across NARS
- Workshops for field staff of crop estimation surveys

### **3.3 Training Impact**

**Annual Reach:**

- 776+ researchers trained annually in statistical computing (reported in one year)[24]
- Hundreds of participants in short-duration courses
- Thousands reached through online webinars

**Long-Term Impact:**

- Improved research methodology across NARS
  - Higher quality research publications
  - Efficient use of resources through optimal experimental designs
  - Better data management and analysis practices
  - Enhanced capacity for evidence-based policy formulation
- 

## 4. Publications and Knowledge Dissemination

### 4.1 Research Publications

**Annual Report:**

Comprehensive annual report documenting:

- Research achievements across all divisions
- Training programs conducted
- Consultancy services provided
- Software and tools developed
- Publications and presentations
- Collaborative research initiatives

**Research Journals:**

IASRI scientists publish in:

- High-impact international journals
- Indian statistical and agricultural journals
- Conference proceedings

**Technical Bulletins and Manuals:**

- Methodology manuals for crop estimation surveys
- Software user guides
- Experimental design catalogues
- Training materials

## 4.2 IASRI Vision 2050

Strategic document outlining:

- Future research priorities in agricultural statistics
- Emerging areas: biotechnology, bioinformatics, biodiversity, genomics, nanotechnology
- Infrastructure and capacity building plans
- National and international collaborations
- Integration with digital agriculture initiatives[25]

## 4.3 Data and Statistical Services

### **Agricultural Statistics at a Glance:**

IASRI contributes to compilation of comprehensive agricultural statistics:

- Crop area, production, yield
- Input use statistics
- Economic indicators
- State-wise agricultural profiles

### **Open Data Initiatives:**

- [Data.gov.in](https://data.gov.in) agriculture datasets
- Institutional data repository
- Research data sharing with proper citations

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# 5. Infrastructure and Facilities

## 5.1 Research Infrastructure

### **Computing Facilities:**

- High-performance computing (HPC) cluster for genomic analysis
- Dedicated servers for statistical computing portal
- ICAR Data Centre with disaster recovery
- Software development and testing labs
- Bioinformatics workstations

**Library and Information Centre:**

- Extensive collection of statistical and agricultural books
- Subscription to national and international journals
- Digital library with e-resources
- Access to statistical databases

**Conference and Training Halls:**

- Multiple conference rooms with audio-visual facilities
- Computer labs for training programs
- Seminar halls for workshops and symposia

## 5.2 Guest House and Accommodation

IASRI provides accommodation for trainees and visitors at reasonable cost in institute guest house, facilitating extended training programs.

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# 6. Collaborative Research and Partnerships

## 6.1 ICAR Institute Network

IASRI collaborates with:

- All 113 ICAR research institutes
- 71 Agricultural universities
- 731 Krishi Vigyan Kendras
- ICAR project directorates and national bureaux

**Nature of Collaboration:**

- Joint research projects
- Consultancy on experimental design and data analysis
- Training of institute scientists
- Software customization for specific needs
- Data management support

## 6.2 Government Agencies

### **Partnerships with:**

- Directorate of Economics and Statistics (DES), Ministry of Agriculture
- National Sample Survey Office (NSSO)
- Department of Animal Husbandry and Dairying
- Ministry of Statistics and Programme Implementation (MOSPI)
- State Agriculture Departments

### **Collaborative Projects:**

- National crop estimation surveys
- Agricultural census planning
- Sampling methodology development for government schemes
- Impact assessment studies

## 6.3 International Collaborations

- FAO (Food and Agriculture Organization) projects on crop estimation
  - CGIAR centers for statistical methodologies
  - Training programs for developing countries
  - Academic exchanges with international universities
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# 7. Major Contributions to Indian Agriculture

## 7.1 Crop Estimation and Food Security

### **Impact on National Crop Forecasting:**

IASRI methodologies adopted for:

- General Crop Estimation Surveys (GCES) for major crops
- Cotton production estimation (implemented nationally)
- Horticultural crops estimation
- Advance estimates for crop production

### **Contribution to Food Security Planning:**

- Accurate crop production estimates enable government planning
- Price forecasting supports market interventions
- Food grain stock estimation for buffer management
- Early warning for food deficit scenarios

## 7.2 Enhancing Research Efficiency

### **Through Experimental Designs:**

- Optimal use of land, inputs, and manpower in experiments
- Increased precision in treatment comparisons
- Faster varietal release through efficient multi-location trials
- Resource savings (estimated in crores of rupees annually)

### **Through Statistical Software:**

- Simplified data analysis process
- Standardization of analysis procedures
- Time saving for researchers
- Improved quality of research conclusions

## 7.3 Supporting Breeding Programs

### **Genetic Improvement Acceleration:**

- Efficient selection strategies increase genetic gain
- Genomic selection reduces breeding cycle time
- GWAS identifies markers for marker-assisted selection
- Heritability estimation guides breeding decisions

### **Quantified Impact:**

Methodologies contribute to faster development of improved crop varieties and livestock breeds, indirectly supporting India's food security and agricultural growth.

## 7.4 Policy Support

### Evidence for Agricultural Policies:

- Data-driven insights on technology adoption
- Impact assessment of agricultural schemes
- Economic analysis of farm profitability
- Regional disparity analysis
- Climate change adaptation strategies

### Commission for Agricultural Costs and Prices (CACP) Support:

Statistical inputs for MSP determination and agricultural price policy.

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## 8. Portal Features and Online Services

### 8.1 IASRI Website (<https://iasri.res.in>)

#### Key Sections:

1. **About IASRI:** Institute profile, history, mandate, organizational structure
2. **Divisions:** Detailed information on six research divisions
3. **Research:** Ongoing projects, achievements, publications
4. **Training:** Training calendar, course details, registration
5. **Software:** Download links for statistical packages
6. **Services:** Consultancy, advisory, data analysis services
7. **Publications:** Annual reports, technical bulletins, research papers
8. **Contact:** Scientist directory, division contacts

### 8.2 Statistical Computing Portal

URL: <http://stat.iasri.res.in/sscnarsportal>

#### Features:

- Online access to statistical analysis tools
- IP-authenticated access for NARS users
- High-performance computing resources
- Software repositories

- Training materials and tutorials
- Data analysis request submission

## 8.3 Bioinformatics Resources

### **Agri-Genomic Repository:**

- Crop genome sequences
- Transcriptome databases
- Proteome information
- Marker databases

### **Analytical Tools:**

- BLAST searches
  - Sequence alignment tools
  - Gene prediction software
  - Phylogenetic analysis tools
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## 9. Future Directions and Emerging Areas

### 9.1 Artificial Intelligence and Machine Learning

#### **Planned Research:**

- Deep learning frameworks for agricultural predictions
- AI-powered crop yield forecasting
- Machine learning for disease and pest identification
- Computer vision for crop monitoring
- Natural language processing for agricultural text mining

### 9.2 Big Data Analytics

#### **Integration with:**

- AgriStack for farmer-level data analytics
- Satellite imagery for large-scale crop monitoring
- IoT sensor data from precision agriculture
- Social media data for market intelligence
- Blockchain for agricultural supply chain analytics



### 9.3 Climate-Smart Agriculture Analytics

- Climate change impact modeling
- Statistical downscaling of climate projections
- Crop-climate relationship modeling
- Adaptation strategy evaluation
- Greenhouse gas emission estimation from agriculture

### 9.4 Precision Agriculture Statistics

- Spatial statistics for variable rate application
- Geostatistical modeling of soil properties
- Within-field variability analysis
- Prescription mapping algorithms
- Profitability analysis of precision technologies

### 9.5 Open Science and Data Sharing

#### **FAIR Principles Implementation:**

- Findable: Metadata standards and data catalogs
- Accessible: Open access repositories
- Interoperable: Standard data formats and APIs
- Reusable: Proper documentation and licensing

#### **Research Data Management:**

- Data Management Plans (DMPs) for projects
- Institutional data repository
- Data curation and quality assurance
- Long-term data preservation

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## 10. Contact Information and Access

### 10.1 Institute Address

**ICAR-Indian Agricultural Statistics Research Institute (IASRI)**

Library Avenue, Pusa Campus

New Delhi - 110012, India

**Phone:** +91-11-25841479, 25842495, 25846595

**Fax:** +91-11-25841564

**Email:** [director.iasri@icar.gov.in](mailto:director.iasri@icar.gov.in)

**Website:** <https://iasri.res.in>

## 10.2 Division Contacts

### **For Research Collaboration and Advisory Services:**

Contact respective division heads through:

- Phone: Institute main numbers
- Email: Division-specific emails on website
- Online inquiry forms on portal

## 10.3 Training Inquiries

### **Training and Administrative Cell:**

Phone: Institute main numbers

Email: [training.iasri@icar.gov.in](mailto:training.iasri@icar.gov.in) (representative)

### **Training Registration:**

Through IASRI website training section with online application forms.

## 10.4 Software Download and Support

### **Statistical Software:**

Download from IASRI website software section

### **Technical Support:**

Email: [support.iasri@icar.gov.in](mailto:support.iasri@icar.gov.in) (representative)

### **Statistical Computing Portal:**

Access through: <http://stat.iasri.res.in/sscnarsportal>

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# 11. Conclusion

The ICAR-Indian Agricultural Statistics Research Institute (IASRI) stands as India's premier institution for agricultural statistics, computer applications, and bioinformatics, playing a transformative role in enhancing the quality, efficiency, and impact of agricultural research across the nation[26].

## Key Contributions:

1. **Methodological Innovation:** Pioneering statistical techniques tailored to agricultural research challenges, from experimental designs for complex farming systems to sampling methodologies for accurate crop estimation
2. **National Adoption:** IASRI methodologies officially adopted for national crop estimation surveys, directly supporting India's food security planning and agricultural statistics
3. **Capacity Building:** Training thousands of agricultural scientists annually, building statistical thinking and computational skills across NARS
4. **Software Development:** Creating user-friendly statistical packages (SPAR, SPBD, SPFE, SPAB, SSDA) widely used across Indian agricultural research
5. **Computational Infrastructure:** Establishing high-performance computing facilities and ICAR Data Centre, enabling advanced analytics and genomic research
6. **Bioinformatics Leadership:** Developing cutting-edge tools for genomic analysis, supporting development of stress-tolerant and high-yielding crop varieties
7. **Research Efficiency:** Enhancing resource optimization in agricultural experiments, accelerating technology development and varietal release
8. **Policy Support:** Providing statistical evidence for agricultural policies, scheme evaluations, and planning decisions

## Vision Forward:

IASRI is poised to lead India's agricultural research into the era of:

- **Artificial Intelligence:** Deep learning frameworks for prediction, classification, and decision support in agriculture
- **Big Data Analytics:** Harnessing massive datasets from satellites, sensors, and digital platforms for actionable insights
- **Precision Agriculture:** Spatial statistics and geostatistics for site-specific crop management
- **Open Science:** FAIR data principles, open-access publications, and collaborative research platforms
- **Climate Intelligence:** Advanced modeling for climate-smart agriculture and adaptation strategies

## Call to Action:

- **Researchers:** Leverage IASRI expertise for experimental design, data analysis, and software support
- **Breeders:** Utilize statistical genetics and bioinformatics services for accelerated genetic improvement
- **Policy Makers:** Engage IASRI for evidence-based agricultural policy formulation
- **Students:** Participate in training programs to build expertise in agricultural statistics
- **Institutions:** Collaborate with IASRI for capacity building and methodological innovations

IASRI's journey from its establishment in 1959 to becoming a center of excellence reflects India's commitment to scientific rigor, data-driven decision-making, and continuous innovation in agricultural research. As Indian agriculture navigates challenges of climate change, resource constraints, and growing food demands, IASRI's contributions to statistical science and computational tools will remain indispensable for achieving sustainable agricultural development and national prosperity.

## Statistics and Informatics Enriching Agricultural Research

### Empowering Agricultural Science Through Data-Driven Excellence

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**Disclaimer:** This document is compiled based on publicly available information from official IASRI sources and publications. For the most current research programs, training schedules, software versions, and service details, please visit <https://iasri.res.in>. Institute activities and offerings are subject to updates by ICAR-IASRI.

**Usage:** This comprehensive guide is prepared for educational and informational purposes to assist agricultural researchers, scientists, students, breeders, and stakeholders in understanding and utilizing IASRI's research contributions, training programs, and statistical services for advancing agricultural science in India.

**Acknowledgment:** This document recognizes the pioneering contributions of ICAR-IASRI scientists, technical staff, and trainers who have continuously enriched agricultural research through statistical innovation, computational tools, and capacity building since 1959, supporting India's journey toward food security and agricultural prosperity.

**Enriching Agricultural Research Through Statistical Excellence and Computational Innovation**