



IASRI

NEWS



Volume 19

No. 2

July-September, 2014

- Research Achievements
- Human Resource Development
- Awards and Recognitions
- Panorama of Activities
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From Director's Desk . . .

This newsletter highlights some of the salient research and training achievements made and other significant activities performed during the period under report.

An approach based on RF methodology was proposed (combined Random Forest) for the prediction of disease risk from imbalance case-control data. The proposed approach was compared with the existing methods meant for imbalance data, namely, Balanced Random Forest (BRF) and Weighted Random Forest (WRF) based on performance metrics, viz., sensitivity, specificity, classification accuracy, and precision.

The proposed approach was illustrated using a case-control data set of *Rheumatoid arthritis* and found to perform better in terms of prediction accuracy over the existing BRF and WRF.

Some methods of constructing designs for breeding trials involving complete/ partial three-way crosses have been developed. Three-way crosses are intermediate between single and double cross hybrids with respect to uniformity, yield, stability and the relative simplicity of selecting and testing and hence are increasingly gaining popularity among breeders. Series of designs involving complete/ partial three-way crosses for test vs. control line comparisons have also been obtained. An empirical best predictor for small area means has been developed which addresses the problem of small sample sizes as well as dissimilarities between the small areas. An approximately unbiased estimator for mean squared error of the empirical best predictor of small area means is also proposed.

One training on Post ICAR-ERP implementation under NAIP and a refresher training programme on Statistical Techniques were organised. ICAR Foundation Day was also celebrated in the Institute on 16 July 2014.

Scientists of the institute have received various awards & recognitions. It is a matter of pride for the institute that Dr. Seema Jaggi has received ICAR's Dr. C. Subramaniam award for outstanding lecture and Dr. Hukum Chandra has been awarded ICAR National Fellow. Scientists have visited various countries on different assignments. During the period one new project was initiated. Scientists of the Institute have published 13 research papers, 07 popular articles and one book chapter. 4 macros and one data base were also developed which are available at Institute's web site. Besides this, 11 invited lectures were delivered and scientists have participated in different conferences/ symposia/ workshops, etc. It is hoped that the contents of this document would be informative and useful to scientists in NARS. Any suggestions for improving the contents of the newsletter further would be highly appreciated.


(UC Sud)

RESEARCH ACHIEVEMENTS

- **Whole Genome Association (WGA) analysis in common complex diseases.**

Rheumatoid Arthritis and Ulcerative Colitis are the two common complex diseases in humans. These diseases are largely governed by gene x environment interactions. While assessment of environmental determinants remains a difficult task, identification of genetic components like Single Nucleotide Polymorphisms / genes seems to be more realistic. Gaining insights into the said complex diseases by employing an inter-disciplinary approach was the main aim of the study. An approach based on RF methodology (combined Random Forest) was proposed for the prediction of disease risk from imbalanced case-control data. The proposed approach was compared with the existing methods meant for imbalance data, namely, Balanced Random Forest (BRF) and Weighted Random Forest (WRF) based on performance metrics, viz., sensitivity, specificity, classification accuracy and precision. The proposed approach was illustrated using a case-control data set of *Rheumatoid arthritis* and found to perform better in terms of prediction accuracy over the existing BRF and WRF. Besides, SNPs associated with ulcerative colitis and rheumatoid arthritis diseases were identified at whole genome level by employing Least Absolute Shrinkage and Selection Operator (LASSO), a penalized regression technique. In addition, the disease status of individuals was further predicted by applying machine learning approaches such as LASSO, support vector machine (SVM) and Random Forest (RF). A comparison among the performances of all the three methods showed that the sensitivity, specificity and overall accuracy of RF were highest with values 0.80, 0.59 and 0.70 respectively.

- **Statistical designs involving three-way crosst.**

The objective of a breeding programme is to create variability and to select genotypes for growing or for further breeding purpose. The breeding goals should meet the requirements of a grower, a processor and a consumer. A grower requires high yield, pest resistance and tolerance to environmental stresses and yield stability, a processor requires uniform maturity favourable to mechanization and a consumer requires acceptable taste, shape, size, colour and texture of the product. The most common designs used by a geneticist to study genetic parameters and their interpretations are diallel (single cross), triallel (three-way cross) and quadriallel (double cross). Three-way crosses are intermediate between single and double cross hybrids with respect to uniformity, yield, stability and the relative simplicity of selecting and testing and hence are increasingly gaining popularity among breeders. Considering a full model including general and specific combining ability effects and a reduced model ignoring specific combining ability effects, the information matrices for the estimation of combining ability effects have been derived for designs involving three-way crosses. Some methods of constructing designs for breeding trials involving complete/ partial three-way crosses have been developed. Among these, two methods are based on Mutually Orthogonal Latin Squares (MOLS), which yield three-way crosses arranged in blocks and are variance balanced. The other methods are derived from triangular association scheme and two-associate class Partially Balanced Incomplete Block (PBIB) designs, respectively. The variance of contrasts pertaining to estimated general combining ability effects of full parents as well as half parents are of two types, indicating that these designs are partially variance balanced. The efficiency factor in terms of information per cross pertaining to general combining ability effects of half parents as well as full parents in comparison to a complete triallel cross plan, assuming the error variance to be same for both the plans, has been computed. Parameters of the designs constructed have been listed along with the efficiency factors. Further, four series of designs for breeding trials involving complete/ partial three-way crosses for test vs. control line comparisons have been obtained using MOLS, PBIB designs and their association schemes. In all the designs obtained, three-way crosses are arranged in incomplete blocks and hence heterogeneity in the experimental field can be controlled

in blocks of smaller sizes. The estimated variance of contrasts pertaining to general combining ability effects of full parents as well as half parents are computed for test vs. test lines and test vs. control lines and it was found that test vs. control lines comparisons are made with more precision.

- **Small area estimation for skewed data.**

In many agricultural, environmental and business surveys, data are typically skewed and linear model assumptions are questionable. Consequently, small area estimation using linear mixed models can lead to inefficient estimates. Chandra and Chambers (2011) described two approaches for small area estimation of skewed variables that can be modelled linearly following a non-linear transformation (in particular, logarithmic transformation), the model-based direct estimation (MBDE) and the prediction approach based synthetic type estimation. For skewed data these two small area methods provide efficient estimates of small areas as compared to the linear mixed model based empirical best linear unbiased prediction. However, the MBDE is a direct estimator and unbiased in the presence of between area heterogeneity, but can yield unstable estimates if sample sizes are too small. On the other hand, the synthetic type of empirical predictor only accounts for between area variability through the covariates and therefore can lead to biased estimates when heterogeneity exists between the areas. An empirical best predictor for small area means has been developed which addresses both these issues simultaneously, that is, problem of small sample sizes as well as dissimilarities between the small areas. An approximately unbiased estimator for mean squared error of the empirical best predictor of small area means is also proposed. In addition, R codes have been developed for different small area estimators and their associated MSE estimation. Subsequently, simulation studies have been carried out to evaluate the empirical performance of different small area estimation methods. The empirical results indicated that the proposed small area estimation method for skewed data is efficient than the existing methods. The mean squared error estimator has shown satisfactory performance.

AWARDS AND RECOGNITIONS

- Dr. Seema Jaggi received the Bharat Ratna Dr. C. Subramaniam Award for Outstanding Teachers-2013 for excellent teaching in the field of Social Sciences during the 86th ICAR Foundation Day and Award Ceremony held at NASC Complex on July 29, 2014.
- Dr. MA Iqbal appointed as Member, Editorial Board, Greener Journal of Agricultural Sciences
- Dr. AR Rao is Member, Editorial Board for the Indian Journal of Genetics and Plant Breeding.
- Dr Hukum Chandra
 - Awarded ICAR-National Fellow.
 - Acted Member, Experts Meeting on Skills Framework and Training Needs Assessment Tools for Agricultural and Rural Statistics and Chairman Session on “Recommendations on guiding principles for developing Training Needs Assessment (TNA) tools” at Tsukuba, Ibaraki, Japan on 5 September 2014.



NEW PROJECT INITIATED

- Study to test the developed alternative methodology for estimation of area and production of horticultural crops funded by Department of Agriculture and Cooperation, Ministry of Agriculture, Govt. of India w.e.f. 16 September, 2014.

HUMAN RESOURCE DEVELOPMENT

Training Programmes/ Workshops Organised

S.No.	Title	Venue	Date	Sponsored by	No. of Participants
1.	Training program for Post ICAR-ERP implementation Co-ordinator: Dr. Alka Arora	IGFRI, Jhansi	21-22 July, 2014	NAIP	
2.	A refresher Training Programme on Statistical Techniques Co-ordinator: Dr. Hukum Chandra	IASRI, New Delhi	08-12 September, 2014	Livestock Department Govt. of Chhattisgarh	20

VISIT ABROAD

Dr. Hukum Chandra

- Visited Italy to attend the Collaborative Training Programme on Small Area Estimation under Generalised Linear Mixed Model from Resource Person Dr. Nicola Salvati, researcher of Statistical Methodology, Department of Economics and Management, University of Pisa, Italy during 09 June to 01 August 2014.
- Visited Tsukuba, Ibaraki, Japan to participate in Sixth Workshop on Forging Partnerships in Statistical Training in Asia and the Pacific: Networking for Agricultural and Rural Statistics, 02-04 September 2014 and attended Experts Meeting on Skills Framework and Training Needs Assessment Tools for Agricultural and Rural Statistics on 05 September 2014.

PANORAMA OF ACTIVITIES

- ICAR Foundation Day was celebrated on July 16, 2014 at IASRI, New Delhi. Scientists, technical, administrative, students and other staff attended the Function. Former Directors of the Institute and IASRI Alumni were invited to participate. All the distinguished invitees Dr. SK Raheja, Dr. SD Sharma, Dr. VK Bhatia, Dr. Alope Dey, Dr. AC Kulshreshtha, Dr. Randhir Singh, Dr. HVL Bathla shared their experiences in ICAR.
- Meeting of Institute Joint Staff Council was organised on 26 August 2014 under the Chairmanship of Dr. UC Sud, Director(A), IASRI.
- 81st meeting of the Institute Research Committee (IRC) was organized during September 25-26, 2014 under the chairmanship of Dr. UC Sud, Director (A), IASRI. Dr. Seema Jaggi, Incharge PME Cell and the Member Secretary made a presentation on different research, teaching and training related activities undertaken by the Institute during March to September 2014. 11 new research projects (06 Institute funded, 03 in collaboration with other institute and 02 outside funded) were approved and progress of 53 on-going research projects (22 Institute funded, 08 in collaboration with other Institute and 23 outside funded) were reviewed and 19 research projects were declared as complete during the meeting.

Seminars Delivered

Seminars on different areas of Agricultural Statistics, Computer Application and Bioinformatics were delivered. These seminars include presentation of salient findings of the completed research projects and proposal of the new projects by the scientists, Thesis/ORW/Course seminars of students of M.Sc. and Ph.D. (Agricultural Statistics), M.Sc. (Computer Application) and M.Sc. (Bioinformatics) and Guest seminars.

The Details of Seminars Delivered

Category	Type of seminar	Number
Scientist	Project Completion	01
	Project Proposal	02
Student	Course	14
	ORW	02
	Thesis	01
Total		20

PUBLICATIONS

Research Papers

- Alam, W, Chaturvedi, A and Kumar, A (2014). Estimation of survival function under type II censoring using a generalized family approach. *Int. J. Agril. Statist. Sci.*, **10(1)**, 17-19.
- Barat, A, Goel, C, Sahoo, PK and Rao, AR (2014). Development of expressed sequence tags (ESTs) from the brain tissue of snowtrout *Schizothorax richardsonii* (Gray, 1832) (Family Cyprinidae) and its preliminary annotation. *Ind. J. Fish.*, **61(2)**, 118-128.
- Basak, P, Chandra, H, Sud, UC and Lal, SB (2014). Prediction of population total for skewed variable under a log transform model. *Int. J. Agril. and Statist. Sci.*, **9(2)**, 143-154.
- Chilana Poonam, Bhati Jyotika, Sharma Anu, Mishra DC, Rai Anil (2014). Analysis of codon usage pattern and prediction of potentially highly expressed genes in drosophila. *European J. Molecular Bio. Biochem.*, **1(4)**, 144-150.
- Divya, B, Biswas, A, Robin, S, Rabindran, R and Joel, A, John (2014). Gene interactions and genetics of blast resistance and yield attributes in Rice (*Oryza sativa* L.). *J. Genet.*, **93(2)**, 415-424.
- Ghosh, Himadri, Sarkar, KA and Prajneshu (2014). Fourier-autoregressive (F-AR) coefficient non-linear time-series model for forecasting asymmetric cyclical data. *Ind. J. Anim. Sci.*, **84(7)**, 802-806.
- Gupta, AK, Chandra, Hukum, Sud, UC and Singh, Man (2014). Methodology for estimation of meat production in North-East hilly region. *Ind. J. Anim. Sci.*, **84(7)**, 783-788.
- Jyotika Bhati, Pavan Kumar Chaduvula, Ruchi Rani, Sanjeev Kumar and Anil Rai (2014). In-silico prediction and functional analysis of salt stress responsive genes in Maize (*Zea mays*). *European J. Molecular Bio. Biochem.*, **1(4)**, 151-157.
- Karak, T, Sonar, I, Paul, RK, Das, S, Boruah, RK, Dutta, AK and Das, DK (2014). Composting of cow dung and crop residues using termite mounds as bulking agent. *Bioresource Technology*, **169**, 731-741.
- Karak, Tanmoy, Sonar, Indira., Paul, RK, Frankowski, Marcin., Boruah, Romesh. K., Dutta, Amrit K. and Das, Dilip. K. (2014). Aluminium dynamics from soil to tea plant (*Camellia sinensis* L.): Is it enhanced by municipal solid waste compost application? *Chemosphere*, **119**, 917-926.
- Mahajan, GR, Pandey, RN, Kumar, Dinesh, Datta, SC, Sahoo, RN and Parsad, Rajender (2014). Development of critical values for the leaf color chart, SPAD and fieldscout CM 1000 for fixed time adjustable nitrogen management in aromatic hybrid rice (*Oryza sativa* L.). *Comm. Soil Sci. Plant Anals.*, **45(14)**, 1877-1893.

- Panwar, Sanjeev, Singh, KN, Kumar, Anil, Sarkar, Susheel Kumar, Paul, Ranjeet, Rathore, Abhishek, and Sivaramane, N (2014). Forecasting of growth rates of wheat yield of Uttar Pradesh through non-linear growth models. *Ind. J. Agric. Sci.*, **84** (7), 68–71.
- Paul, RK, Birthal, PS and Khokhar, A (2014). Structural breaks in mean temperature over agro-climatic zones in India. *The Scientific World J.* doi.org/10.1155/2014/434325.

Macros Developed

- Parsad, Rajender, Kumar, Pramod, Tomar, RS and Kumar, Sachin (2014). Analysis of data from Strip Split Plot designs. Available at www.iasri.res.in/sscnars/stripssplit.aspx.
- Parsad, Rajender and Kumar, Pramod (2014). Analysis of data from split factorial (main A×B, Sub C) designs. Available at www.iasri.res.in/sscnars/spltfctdsgnm2s1.aspx.
- Varghese, Cini, Jaggi, Seema and Varghese, Eldho (2014). Generating polycross designs. Available at <http://www.iasri.res.in/sscnars/polycrossdesign.aspx>.
- Bhowmik, Arpan, Varghese, Eldho, Jaggi, Seema and Varghese, Cini (2014). Generation of trend free neighbour balanced block designs. Available at <http://www.iasri.res.in/sscnars/TFNBCBdesigns.aspx>.

Book Chapters

- Jaggi, Seema, Varghese, Eldho and Bhowmik, Arpan (2014). Statistical techniques for studying effect of climate change on crop production. In a book entitled Climate Change Effect on Crop Productivity, CRC Press, Taylor and Francis Group, USA.

Database Developed

- Onion Genome Resource database using MYSQL and website using PHP and java. The website has been uploaded into cabgrid.res.in server.

INVITED LECTURES DELIVERED

- DBT funded training programme on “Molecular Tools and Bioinformatics Approaches for Livestock Genome Analysis” held during September 10-30, 2014 at Central Institute for Research on Cattle (ICAR-CIRC), Meerut.
 - Dr.Dinesh Kumar. i) Global Status of Domestic Animal Bioinformatics: Where do we stand?, ii) DNA signature based SNP and STR marker analysis, iii) Next generation sequencing data and Genome assembly, iv) RNA Seq/ Differential Gene expression/Transcriptome Analysis and v) IPR issues related to indigenous domestic animal germplasm.
 - Dr. MA Iquebal. i) DNA signature based SNP and STR marker analysis (P), ii) Genome annotation (P) and iii) Metagenomics of Rumen microbes (T+P).
 - Dr. Sarika. i) Genome annotation (T), ii) Genome assembly (P) and iii) RNA Seq/ Differential Gene expression/Transcriptome Analysis (P).

PAPERS PRESENTED

- International conference on Innovative Approach in Applied Physical, Mathematical / Statistical, Chemical Sciences and Emerging Energy Technology for Sustainable Development (APMSCSET-2014) held at Jawaharlal Nehru University, New Delhi, during September, 27–28, 2014.
 - Alam, Wasi (2014). Sequential testing procedures in a family of lifetime distributions with applications.

- Sixth Workshop on Forging Partnerships in Statistical Training in Asia and the Pacific: Networking for Agricultural and Rural Statistics, 02-04 September 2014, Tsukuba, Ibaraki, Japan.
 - Chandra, H. (2014). A curriculum for training on agricultural and rural statistics.
- National Workshop on Improvement of Agricultural Statistics organized by Directorate of Economics and Statistics, Ministry of Agriculture, Govt. of India at NASC Complex, New Delhi on 30 September and 01 October 2014.
 - Ahmad, T, Sud, UC, Rai, A, Sahoo, PM and Bhatia, VK (2014). Study to develop an alternative methodology for estimation of cotton production,

Participation

Conferences / Workshops / Trainings/ Seminars / Symposia etc.

- Refresher Course on Agricultural Research Management at NAARM, Hyderabad during July 14-26, 2014. (Dr. Monendra Grover)
- Workshop on Statistical Computing using R software jointly organized by NIRT (ICMR) and Presidency College, Chennai under the aegis of International Biometric Society (Indian Region) during July 17-19, 2014. (Sh. SD Wahi and Dr. AR Rao)
- 86th ICAR Foundation Day and Award Ceremony and Directors/Vice Chancellors Conference organised by ICAR at National Agricultural Science Centre (NASC) during July 29 -30, 2014. Sh. Narendra Modi, Hon'ble Prime Minister of India delivered the Foundation Day lecture and Honour the awardees. (Dr. UC Sud)
- One day workshop on Hindi organized by Krishi Parbandhan Nideshalya on 26 Sept, 2014 at NASC complex, New Delhi. (Dr. SP Bhardwaj, Dr. Cini Varghese, Dr. AK Gupta, Dr. Prawin Arya and Dr. Sanjeev Panwar)
- National Workshop for Launching of CHAMAN Project at National Agriculture Science Complex (NASC) Pusa, New Delhi on 16-09-2014. (Dr. UC Sud, Dr. AK Gupta, Dr. Tauqueer Ahmad and Dr. Prachi Misra Sahoo)
- 7th Agriculture Leadership Summit 2014 organised by Agriculture Today Group at hotel Taj Palace, New Delhi on 27 September, 2014. (Dr. KK Tyagi and Dr. Tauqueer Ahmad)
- National Workshop on Improvement on Agricultural Statistics organized by Directorate of Economics and Statistics, Ministry of Agriculture, Govt. of India at National Agriculture Science Complex (NASC), Pusa, New Delhi during 30 September-01 October, 2014. (Dr. UC Sud, Dr. KK Tyagi, Dr. AK Gupta, Dr. Tauqueer Ahmad, Dr. Hukum Chandra and Dr. Prachi Misra Sahoo)

Meetings

- Meeting on CHAMAN Project on July 14, 2014 at Krishi Bhawan, New Delhi. (Dr. UC Sud)
- Meeting for discussing Integrated Sample Survey Methodology Schedules organised by Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Govt of India at Krishi Bhawan, New Delhi under the Chairmanship of Sh. SK Das, Adviser, DADF on July 14, 2014. (Dr. KK Tyagi)
- Meeting of DBT Task force as Scientist from partnering institute IASRI for defending the Mega Project "De novo whole genome sequencing of Mithun (*Bos frontalis*) and bioinformatics analysis, NRC Mithun" at NERBPMC, DBT, New Delhi on July 15, 2014. Lead centre is NRC Mithun, Nagaland. (Dr. Dinesh Kumar)
- XII five year plan EFC meeting for consideration of Plan Scheme of DARE/ICAR under the Chairmanship of DDG (Education), ICAR and Secretary, DARE and DG, ICAR on July 16 and July 17, 2014 at Krishi Bhawan, New Delhi respectively. (Dr. UC Sud, Dr. Anil Rai and Dr. Seema Jaggi)

- Multi-institutional meeting under DBT funded project “Whole genome based SNP mining and development of breed signatures for dairy and dual-purpose indigenous cattle” with partnering PI and CoPIs of NBAGR and NDRI, Karnal and IASRI at IASRI, New Delhi on July 23, 2014. (Dr. Sarika)
- Meeting under the Chairmanship of DDG (NRM) to discuss the modalities and future course of action for implementation of ICAR Research Data Management Policy on July 23, 2014. (Dr. Mukesh Kumar)
- Meeting of Technical Committee of Direction (TCD) organised by Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Govt of India, at Yashwant Rao Academy of Development Administration (YASHADA), Pune (Maharashtra) during July 24-25, 2014. (Dr. KK Tyagi)
- Meeting of Committee of DWR, Karnal for web page construction and scientific content development as External Expert Member on July 26, 2014. (Dr. Dinesh Kumar)
- All scientists of the CABin attended a meeting with Dr. Nickolai Alexandrov, Senior Scientist, Bioinformatics, International Rice Research Institute (IRRI), Philippines on September 26, 2014.
- 2nd Meeting of Subcommittee for Sampling Methods, MSD-3:6 on September 12, 2014 at Bureau of Indian Standards, ManakBhawan, New Delhi. (Dr. UC Sud)
- First meeting of the Technical Committee of 20th Livestock Census held at Krishi Bhawan, New Delhi on September 18, 2014. (Dr. UC Sud)
- High Level Technical Coordination Committee (HLTCC) Meeting at Pant Krishi Bhawan, Jaipur on September 23, 2014. (Dr. KK Tyagi)
- 3rd Meeting of Subcommittee, MSD-3:4 for Basic Statistical Methods of Bureau of Indian Standards, in Manak Bhawan, New Delhi on September 03, 2014. (Dr. Rajender Parsad)

CONSULTANCY /ADVISORY SERVICES PROVIDED

- Dr. Rajender Parsad advised i) Dr. KH Singh, Principal Scientist, Directorate of rapeseed and Mustard Research, Bharatpur on analysis of data generated through an alpha design with $v=28$, $b=12$, $r=3$, $k=7$ at four locations, ii) Dr. NK Lenka, Principal Scientist, IISS Bhopal on the analysis of data generated from an experiment conducted to study the runoff values from 5 different crop cover treatments in two replications, iii) Dr. Vikender Kaur, Scientist, NBPGR, New Delhi on the procedure of analysis of factorial CRD using SAS and iv) Dr. Sujay Rakshit and Dr. Harvinder Talwar from Directorate of Sorghum Research, Hyderabad on the analysis of data pertaining to an experiment conducted using an alpha design in three replications in blocks of size 8 to study the performance of 48 genotypes in two artificially created environments (stress: rainfed and no stress) across two locations for two years (2010 and 2011). They were also advised on the SAS code to be used.
- Dr. Arpan Bhowmik advised Mr. Sandip Mandal, Scientist, Agricultural Engineering Division, ICAR Research Complex for NEH Region on the use of contrast analysis for studying the impact of 24 treatment combinations (12 doses of bio-char + 2 doses of fertilizer) along with two control on soil biomass, pH, CEC etc.
- Dr Tauqueer Ahmad provided guidance to Miss Fatima Siddiqui, a Ph.D. student of Department of Statistics and Operations Research, Aligarh Muslim University (AMU), Aligarh in the area of Remote Sensing and Statistics.
- Dr. Sukanta Dash advised Dr. Neeta Singh, NBPGR, IARI, New Delhi in asymmetrical factorial experiments of responses on germination percentage of various crops like till, mustard, wheat etc. in 14 period, 3 moisture level and 3 temperature condition.

PERSONNEL

Congratulations on your Promotion

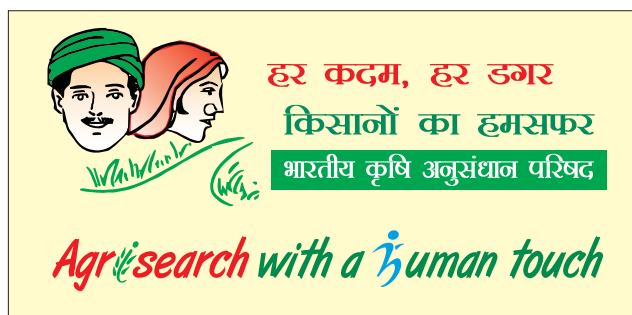
Name	Designation	Effective Date
Dr. Mir Asif Iqbal	Scientist (Research Gr.Pay 7000/-)	07.01.2012
Dr. (Smt.) Sarika	Scientist (Research Gr.Pay 7000/-)	07.01.2012
Sh. Susheel Kumar Sarkar	Scientist (Research Gr.Pay 7000/-)	26.06.2012
Dr. (Smt.) Prachi Misra Sahoo	Sr. Scientist (Research Gr.Pay 9000/-)	09.08.2012
Sh. Shashi Bhushan Lal	Scientist (Research Gr.Pay 9000/-)	28.01.2012
Smt. Shashi Dahiya	Scientist (Research Gr.Pay 9000/-)	25.08.2012
Md. Samir Farooqi	Scientist (Research Gr.Pay 9000/-)	28.09.2012

Transfer

Name	To	Effective Date
Sh. KPS Gautam, CAO	NDRI, Karnal	19.05.2014
Dr. Yogesh Gautam, Scientist	DMR, Solan	06.08.2014
Sh. SK Gajmoti, SAO	IASRI, New Delhi	11.09.2014

Wish you Happy Retired Life

Name	Designation	Effective Date
Sh. PK Saksena	Chief Technical Officer	31.07.2014
Sh. KK Kesari	Pump Operator	31.07.2014
Sh. Bhavnesh Kumar	Pump Operator	31.07.2014
Sh. Vinod Kumar	SSS	31.08.2014
Dr. PK Malhotra	Principal Scientist	30.09.2014
Dr. KK tyagi	Principal Scientist	30.09.2014
Sh. NK Sharma	Scientist	30.09.2014
Sh. Raj Kumar	Private Secretary	30.09.2014
Sh. Devender Pal Singh	Chief Technical Officer	30.06.2014



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