MAHALANOBIS NATIONAL CROP FORECAST CENTRE

DEPARTMENT OF AGRICULTURE & COOPERATION

NCFC Newsletter

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IN THIS ISSUE

Message

SIRAJ HUSSAIN,
SECRETARY (A&C)

सत्यमेव जयते

भारत सरकार
कृषि मंत्रालय
कृषि एवं सहकारिता विभाग
Government of India
Ministry of Agriculture
Department of Agriculture & Cooperation

I am extremely happy to know that MNCFC is bringing out an issue of its Newsletter on the occasion of completion of 3 years of operation. During these 3 years, MNCFC has made significant strides in operationalizing Crop Forecasting and Drought Assessment using satellite data. During the last one year, final forecasts of area and production were done at district level. Yield modelling of 3 crops has been started using satellite data. Site identification for crop cutting experiments for more than thousand locations was done using satellite data in combination with smartphones. MNCFC has also taken up new programmes for Horticulture Assessment (CHAMAN) and Crop Insurance.

Space and Geospatial Technologies may prove highly beneficial for better governance, especially for Soil Health Card and Pradhan Mantri Krishi Sinchai Yojana (PMKSY) and Crop Insurance Schemes of the Government of India. I am sure MNCFC will work in this direction.

I wish MNCFC all success.

(Siraj Hussain)
22/4/15

New Delhi
22 April, 2015

Office: Krishi Bhawan, New Delhi-110001, दूरभाष / Phone: 23382651, 23388444, फैक्स सं. / Fax No.: 23386004,
E-mail : secy-agri@nic.in

1. Crop Forecasting

FASAL (Forecasting Agricultural output using Space, Agro-meteorology and Land based observations)

Under the operational components of FASAL programme of Ministry of Agriculture, MNCFC regularly generates crop production forecasts at District/State/National level for 8 major crops of the country using Remote Sensing data, using the procedures developed by Space Applications Centre, ISRO, Ahmedabad. In the year 2014-15, all total 16 forecasts were generated for 8 crops such as Jute, Kharif Rice, Sugarcane,Cotton, Rapeseed & Mustard, Rabi Sorghum, Wheat and Rabi Rice.
The details of the crop forecasts are given in the Table.

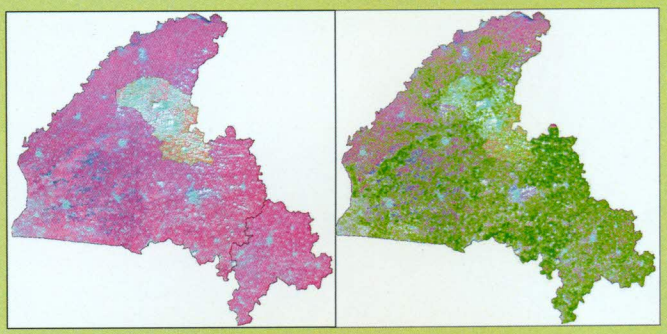
Some of the major initiatives under this project, during 2014-15, include:

- District level crop production forecasts were generated for all the crops using satellite based remote sensing data (optical and microwave), with the support of State Remote Sensing Centres.
- Updating of new district wise sampling plan in FASALSoft (an automated Software designed by Space Applications Centre (SAC, ISRO) for image analysis.
- Use of newly developed Resources at-2 AWiFS NDVI products for image classification and acreage estimation.
- More than 6600 Ground truth data collection by State Agriculture Department officials using Smart phones during Kharif and Rabi Season of 2014-15
- Generation of Remote Sensing based CCE (Crop Cutting Experiment) plan and conducting CCEs (4 per district) for Rice and Wheat crop.
- Estimation of Yield, using multiple approaches, i) semi- physical remote sensing based model (developed by SAC), ii) correlation weighted agro-met model of IMD and iii) crop simulation model (developed by IMD), and iv) data obtained from crop cutting experiments.
- Study of impact of Hailstorm and Heavy Rainfall on wheat crop and accordingly, production forecasting.

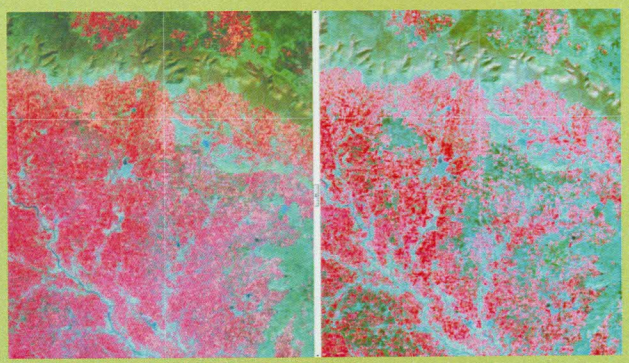
Ground truth collected using Smartphones

Crop	No. of States	Fore-casts	Dates of Forecasts	Satellite Data Used
Jute	3	F1	Jul. 18, 2014	RISAT-1 SAR
Kharif Rice	13	F1	Sep. 5, 2014	RISAT-1 SAR
	13	F2	Oct. 1, 2014	RISAT-1 SAR
	14	F3	Feb. 3, 2015	RISAT-1 SAR
Sugarcane	5	F1	Aug. 8, 2014	R-2 AWiFS
	5	F2	Dec. 17, 2014	R-2 LISS III/AWiFS
Cotton	8	F1	Nov. 7,2014	R-2 AWifS
	8	F2	Dec. 17, 2014	R-2 LISS III/AWiFS
Rapeseed & Mustard	5	F1	Dec. 31, 2014	R-2 AWiFS
	5	F2	Feb. 3, 2015	R-2 AWiFS
	6	F3	Mar.5, 2015	R-2 LISS III
Rabi Sorghum	2	F1	Feb. 3, 2015	R-2 LISS III
Wheat	6	F1	Feb. 9, 2015	R-2 AWiFS
	6	F2	Mar. 5, 2015	R-2 AWiFS
	7	F3	Apr. 10,2015	R-2 LISS III
Rabi Rice	4	F1	Apr. 1, 2015	RISAT-1 SAR

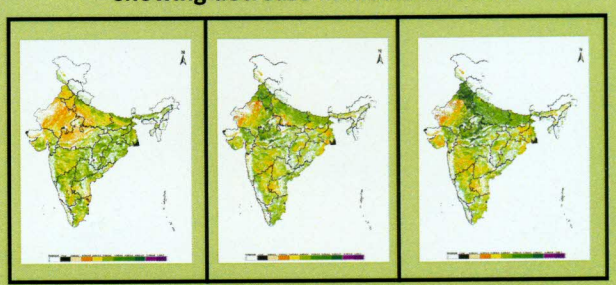
Summary of Crop Forecast



False color composite image with classifed image of Part of Punjab& Haryana for Cotton



Mandsaur District in MP (8 Jan 2014 and 11 Jan 2015) showing decrease in Mustard Area



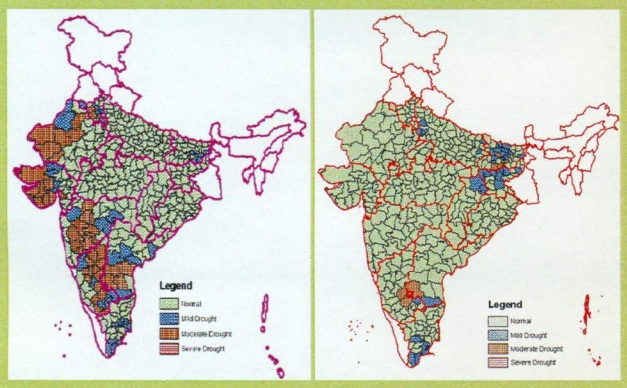
AWiFS NDVI Products i) Nov 01-15, ii) Jan 16-31 and iii) Feb 01-15

2. Drought Assessment

NADAMS (National Agricultural Drought Assessment and Monitoring System)

- National/State/District level drought assessment was carried out for 14 agriculturally important states of India, under the NADAMS project, using the procedures developed by National Remote Sensing Centre, ISRO, Hyderabad.
- The remote sensing data of NOAA AVHRR (for district level), MODIS and & Resourcesat-2 AWiFS (for sub-district level) along with IMD rainfall data was used for drought assessment.
- Various spectral indices, such as Normalized Difference Vegetation Index (NDVI), Normalized Difference Water Index (NDWI) & Shortwave Angle Slope Index (SASI) were computed and integrated with Soil Moisture Index and District Level Rainfall to assess the drought condition.
- Fortnightly and Monthly drought reports (June to October) were generated and sent to all the concerned state and national level government agencies.
- Use of newly developed Resourse sat-2 AWiFS NDVI products for Sub-district level drought assessment

2012 **2013**



2014

District-level drought assessment for 3 Different Years

Field Condition during July (22-26), 2014 caused by Delayed Monsoon Rainfall

Fallow Lands in Jalgaon District, Maharashtra

Poor Crop Condition in Bhavnagar District of Gujarat

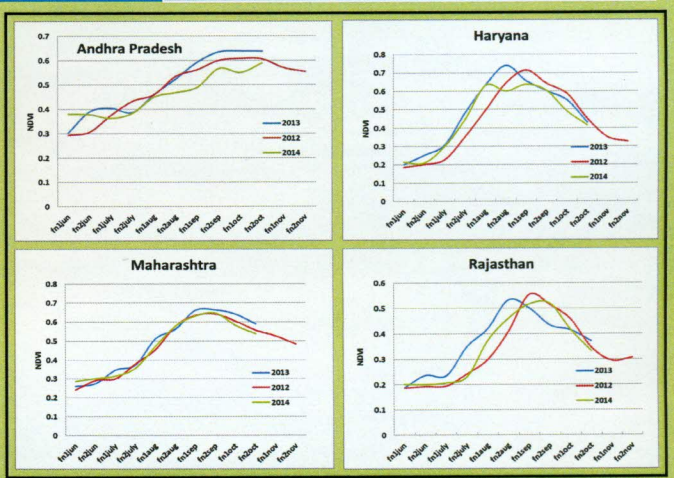
Field Condition during August, 2014 caused by Delayed Monsoon Rainfall

Fallow Lands in Jhajjar District, Haryana

Dry Rice Fields in Bhabua District of Bihar

District level Agricultural Drought Assessment during Kharif, 2014

State	Normal	Mild	Moderate
Andhra Pradesh	04	05	03
Bihar	36	02	00
Chattisgarh	18	00	00
Gujarat	17	07	02
Haryana	10	08	03
Jharkhand	23	01	00
Karnataka	25	04	01
Maharashtra	18	13	04
Madhya Pradesh	47	03	00
Orissa	30	00	00
Rajasthan	29	00	04
Tamil Nadu	25	07	00
Telangana	09	00	01
Uttar Pradesh	32	35	04
Total	323	85	22



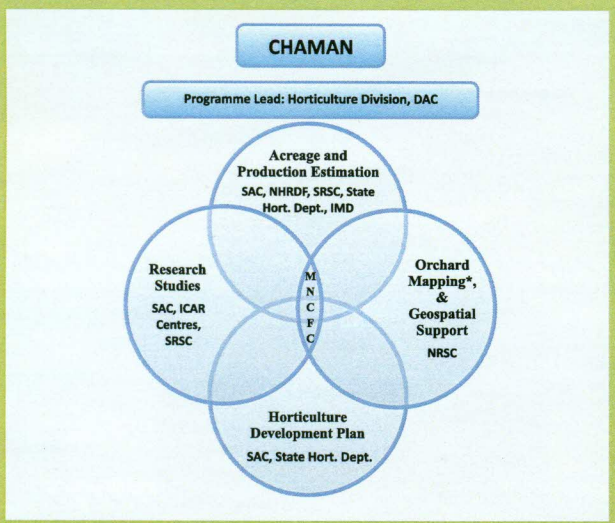
NDVI Pattern of 4 states during Kharif 2014, compared with 2012 and 2013

3.Horticulture Assessment

Considering the importance of Horticulture for the national economy and nutrient security, the Department of Agriculture & Cooperation, Ministry of Agriculture has launched a national level programme on horticulture assessment and development, called **CHAMAN *(Coordinated Horticulture Assessment and Management using geo-informatics)*.** CHAMAN was launched during September, 2014.

This programme envisages use of satellite remote sensing data for area and production estimation of 7 horticultural crops (Potato, Onion, Tomato, Chili, Mango, Banana and Citrus) in selected districts of major producing States. The programme also uses GIS (Geographical Information System) tools along with remote sensing data for generating action plans for horticultural development (site suitability, infrastructure development, crop intensification, orchard rejuvenation, aqua-horticulture, etc.). Another component of CHAMAN is to carry out research activities on horticultural crop condition studies, diseases assessment and precision farming.

Two National Level Agencies have been identified for implementing this programme i.e. Mahalanobis National Crop Forecast Centre (MNCFC) of Department of Agriculture & Cooperation for the remote sensing component and the Indian Agricultural Statistical Research Institute (IASRI) for the field survey component. The programme is jointly implemented through Space Applications Centre, Ahmedabad; National Remote Sensing Centre, Hyderabad; State Horticulture Departments; State Remote Sensing Centres, National Horticulture Research & Development Foundation, Nasik; India Meteorological Department and ICAR Centres. The project has a three year duration.



4.Crop Insurance

In order to explore the role of Remote Sensing technology to supplement the yield assessment through Crop Cutting Experiments (CCE), Department of Agriculture & Cooperation has funded a Pilot study. The Study is being carried in 2 districts each of 7 states (both in Kharif and Rabi season) for crops like Rice (K&R), Wheat, Cotton, Guar and Sorghum.

In each district 25-30 CCEs, selected based on remote sensing data, were supervised. The data received from these CCEs are being analysed along with various remote sensing based indices for developing better yield models and improved CCE plan.

The study is jointly implemented by MNCFC, Space Applications Centre, Ahmedabad; National Remote Sensing Centre, Hyderabad; State Agriculture Departments; State Remote Sensing Centres, India Meteorological Department and Agricultural Insurance Company

Crop Cutting Experiment in West Bengal

5.International Training

A Two week training programme on **"Basics of Remote Sensing & GIS and Applications in Agriculture"** is being organised by **Mahalanobis National Crop Forecast Centre, Department of Agriculture & Cooperation, New Delhi for 8 officials of the Republic of Fiji, during 16 - 27 June 2014.**

The Fiji participants were from Ministry of Rural & Maritime Development, Ministry of Agriculture and Ministry of Forestry & Fisheries, Fiji

The training was inaugurated on 16th June, 2014 by Sh. Sanjeev Gupta, Jt. Secy. (IT), DAC in the august presence of the First Secretary to Fiji High Commission, New Delhi Mr. SakeasiWaikere.

The training programme had two modules. The first module had lectures and hands-on. The faculties of the training programme were the experts from ISRO, IMD, IARI, IGNOU, State Govt., DAC and MNCFC. In the weekend there was field visit to Agra to show the participants field data collection.

In the second module the participants carried out short duration projects using remote sensing data. The Guests for the Valedictory session were Sh. Sanjeev Chopra, JS(IC),DAC and the First Secretary to Fiji High Commission, New Delhi Mr. Sakeasi Waikere.




6.Events @ MNCFC


2nd Foundation Day Celebration and NNRMS- Standing Committee on Agriculture Meeting, 23rd April, 2014

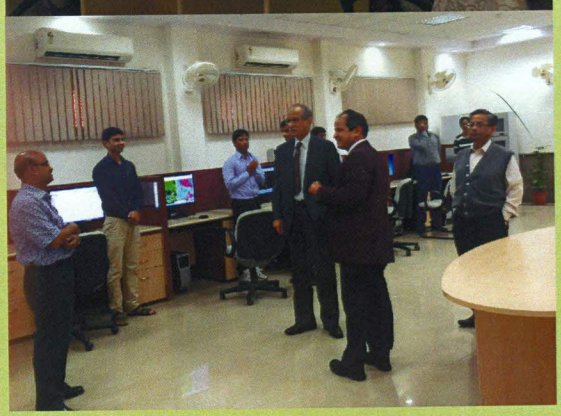

National Workshop on "Use of Remote Sensing Technology for Crop Insurance", 15th May, 2014

CHAMAN Launching Workshop on
16th September, 2014

Swachhata Divas on 2nd October, 2014

MNCFC Stall at India International Trade Fair,
14-27 November, 2014, Pragati Maidan, New Delhi

MNCFC Stall at ISPRS Conference,
9-12 December, 2014, Hyderabad



Visit of Secretary, DAC Sh Ashish Bahuguna to
MNCFC on 25th February, 2015

Meeting on "GIS for Governance in Agriculture", 3rd March, 2015

Visit of Additional Secretary Sh. D. K. Jain

7. Publications

- Sahoo, R. N., Ray, S. S. and Manjunath, K. R. (2015) Hyperspectral remote sensing of agriculture. Current Science. 108 (5).848-859.
- Das, B. S., Sarathjith, M. C., Santra, P., Sahoo, R. N., Srivastava, R., Routray, A. and Ray, S. S. (2015) Hyperspectral remote sensing: opportunities, status and challenges for rapid soil assessment in India. Current Science, 108 (5).860-868
- Ray, S. S., Sesha Sai, M. V. R. and Chattopadhyay N. (2014) Agricultural Drought Assessment: Operational Approaches in India with Special Emphasis on 2012. In: High-Impact Weather Events over the SAARC Region (Ed. K. Ray, M. Mohapatra, B.K. Bandyopadhyay, L.S. Rathore). Springer. pp. 349-364.
- Choudhary, K., Goel, Inka, Bisen, P. K., Mamatha, S., Ray, S. S., Chandrasekar, K., Murthy, C. S. and Sesha Sai, M. V. R. (2014) Use of Remote Sensing Data for Drought Assessment: A Case Study for Bihar State of India During Kharif, 2013 In: High-Impact Weather Events over the SAARC Region (Ed. K. Ray, M. Mohapatra, B.K. Bandyopadhyay, L.S. Rathore). Springer. pp. 399-407.
- Ray, S. S., Neetu, Mamatha, S. and Gupta, S. (2014) Use of Remote Sensing in Crop Forecasting and Assessment of Impact of Natural Disasters: Operational Approaches in India. FAO Expert Meeting on Crop Monitoring for Improved Food Security, Vientiane, Lao PDR; 02/2014.
- Neetu, Prashnani, Meghavi, Singh, D. K., Joshi, R.and Ray, S.S., (2014). Understanding Crop Growing Pattern in Bardhaman District of West Bengal Using Multi-Date RISAT 1 MRS Data. The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Volume XL-8, 2014. pp. 861-864.
- Ray, S. S. (2014) Drought Early Warning, Assessment and Remote Sensing. ISG Newsletter. Vol. 20 (2):45-51
- Gavli, A., Raman, S., Mamatha, S., Patel, N. and Ray, S. S. (2014). District wise Micro Irrigation Potential in India: A Crop Area based Assessment using Statistical Data. MNCFC/MI/01/2014. Mahalanobis National Crop Forecast Centre, New Delhi. 41p.
- Neetu, P.Kalyan C., Y.Pavan Kumar. and Ray,S.S., (2014) Analysis of RISAT-1 Quad Polarization Data for Various Crops. Presented at ISPRS Symposium, Hyderabad.
- Ray, S.S., Manjunath, K. R., Neetu, Gupta, S. and Prihar, J. S. (2014) An Analysis of FASAL: The Operational Crop Forecasting Programme of India.Presented at ISPRS Symposium, Hyderabad.

8.Symposium & Conference Participations

Scientists and Analysts from MNCFC participated in following International/National Conferences, Workshops and Meetings.

1. International Workshop on "Small Satellite and Sensor Technology for Disaster Management (SSTDM), Bangalore
2. Krishi Vasant Mela – 2014, Nagpur, Maharastra.
3. IMD Working Group Meeting, Pune
4. FASAL Review Workshop, Ranchi
5. NISAR Science Workshop, SAC, Ahmedabad
6. ISPRS Mid-Term Symposium, Hyderbad
7. NRSC User Meet, Hyderabad
8. IIRS User Meet Dehradun, Uttarakhand.
9. International Sympoisum, NASA-2014, Pantnagar
10. India International Trade Fair– 2014, New Delhi.
11. Regional Seminar on Geospatial Technology for Natural Resource Management, Ludhiana

9. Visitors

- Secretary (A&C) Sh. Ashish Bahuguna
- Aditional Secretary, DAC, Sh. D. K. Jain.
- Horticulture Division of DAC led by Addl. Secretray, Sh. D. K. Jain and Jt. Secretray Sh. Sanjeev Chopra
- Director, NRSC Dr. V. K. Dadhwal
- USDA Official Dr. Dath Mita and Dr. Santosh K. Singh
- Economic and Statistcis Adviser, DES Smt. Sangeeta Verma
- Joint Secretaries, DAC: Sh. Sanjeev Gupta, Sh. Narendra Bhoosan, Sh. Shakil P. Ahmed
- Japanese Embassy Official.

10. New Joinings

- Ms. Preeti Tahlani, System Manager
- Sh. A. K. Srivastava, Consultant.
- Sh. S. C. Chittral, Consultant (SO)
- Sh. Suresh K. Singh, Consultant
- Sh. Dhiraj K. Singh, Consultant
- Two Consultants (Dr. M. M. Kimothi & Dr. Seema Sehgal) and 3 Analysts (Ms. Aditi, Ms. Shreya and Mr. Pavan) deputed from Randstad India Ltd. For CHAMAN project

MNCFC Group Photo with Secretory, DAC Sh. Ashish Bahuguna

Director,
Mahalanobis National Crop Forecast Centre (MNCFC),
Department of Agriculture & Cooperation,
Nr. Krishi Vistar Sadan, Pusa Campus,
New Delhi – 110012, India
Ph. +91-11-25843224, Fax. +91-11-25843225
Email: ncfc@gov.in. Web: www.ncfc.gov.in