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**National Research Centre for Agroforestry, Jhansi-284 003**  
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October- December, 2013

**National Consultation Meet on Agroforestry**

Natural Resource Management Division, ICAR and National Research Centre for Agroforestry (NRCAF), Jhansi organized one day National Consultation Meet on Agroforestry Research and Development in India on 19<sup>th</sup> November, 2013 at NASC Complex, New Delhi.



Dr. S. Ayyappan, Secretary, DARE & DG, ICAR in his opening remarks emphasized upon the importance of agroforestry. He said that agroforestry is key path to prosperity for millions of farm families, leading to extra income, employment generation, greater food and nutritional security and meeting other basic human needs in a sustainable manner.

Dr. D.N. Tewari, Former Member, Planning Commission stressed that agroforestry will play an important role in eliminating poverty and contribute in meeting energy requirements of the country through cultivation of biofuels and simultaneously effective utilization of biomass based gassifiers besides ensuring healthy ecosystem services. He reiterated need to assign monetary value for intangible benefits accruing from agroforestry landuse for governing policy support. Dignitaries also released a publication on Profile of AICRP on Agroforestry on the occasion.



**Forthcoming Events**

- World Agroforestry Congress-2014 (10-14 Feb.2014)
- Celebration of ICAR-Industry Day & Agricultural Education Day
- Institute Joint Staff Council/Women Cell / PME/ RFD Cell meetings

**Issues Highlights**

- National Consultation Meet on Agroforestry
- ISO 9001: 2008 Certification
- Farm Innovator's Day -16<sup>th</sup> November, 2013
- **fgUnh dk;Z`kkyk- 30 fnlEcj] 2013**

Earlier, Dr. A.K. Sikka, DDG (NRM), ICAR briefed the delegates about the objectives of this meet. Dr. S.K. Dhyani, Director, NRCAF welcomed the delegates and also made a presentation on ‘Agroforestry Research in India: ICAR Perspective’.

The meeting was organized in two sessions. Session-I was chaired by Dr. D. N. Tewari and Dr. B. Mohan Kumar, ADG (Agronomy and Agroforestry) was the Co-Chairman, while Session-II was Chaired By Dr. Gurbachan Singh, Chairman, ASRB and Dr. K. B. Thampi, Technical Expert (F), NRAA was the Co-Chairman. During the session, Dr. Gurbachan Singh also highlighted the role of agroforestry in providing environmental services and urged researchers to make available technology packages for different situation to the stakeholders.

Senior officials from National Advisory Council (NAC), Planning Commission, National Rainfed Area Authority, Ministry of Agriculture, Ministry of Environment and Forests, Ministry of Rural Development (Land Use and Planning), World Agroforestry Centre, BAIF, ICFRE, ICAR Institutes, representatives from WIMCO, ITC, NABARD, Tree Grower’s Association and progressive farmers participated in the meet.

The Meet was organized as precursor for showcasing Indian perspective for Agroforestry R & D and development at Global level during forthcoming WCA2014. The outcome of the meeting was identification of critical gaps and constraints in implementing Agroforestry Development and viable alternatives to overcome them. This was a part of initiatives for evolving a framework for a National Agroforestry Policy.

### **Shade modifies root nodule formation depending on incident light intensity and biochemical status of leaves in pea (*Pisum sativum* L.)**

Land productivity per unit area is now a days one of the major prioritized issue for researchers and policy makers. In the context of climate change agroforestry is one of the major options for its recognized potential for enhancing land productivity. Trees being integral component of agroforestry systems, tree canopy imparts limitation for light interception to the understory crops. Due to low incident light under the canopy, the resultant shade poses a major constraint for optimal crop productivity in comparison to the sole crop being grown without trees. Intensity of shade varies from partial to deep through moderate intensity depending upon the tree canopy, its growing pattern and the microclimate. About 78% of the atmosphere is nitrogen gas (N<sub>2</sub>). Despite its abundance in atmosphere, it cannot be used directly by higher organisms including plants, animals and human in cellular metabolism. Low light or shade is a crucial factor to decide the intercellular mechanisms of plants including root nodules formation. Thus we have examined that how low light has affected the nodules formation which in turn affected the nitrogen metabolism in pea plants under varying regimes of shade in simulated shade net house conditions with three different categories of shade or without shade in open field.

The number of root nodules in open grown pea plants was much more than shade grown plants (Fig.1 and plate-1). It was observed that the activity of nitrate reductase enzyme in leaves was decreasing with the increase in the intensity of shade (Fig.2). This fact has been supported by the decreasing trend of nitrogen percentage in leaf with increase in shade

intensity (Fig.3). Results indicated that availability of light and intrinsic activity of nitrate reductase enzyme are some of the major regulatory factors controlling nitrogen fixing ability and root nodules formation in pea plants which holds much significance for controlling crop productivity under low light environment.

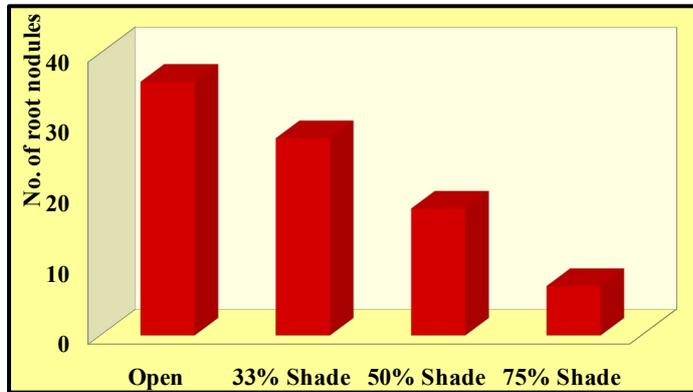
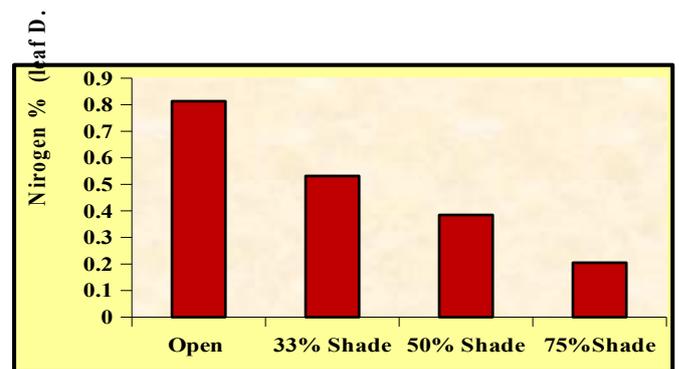
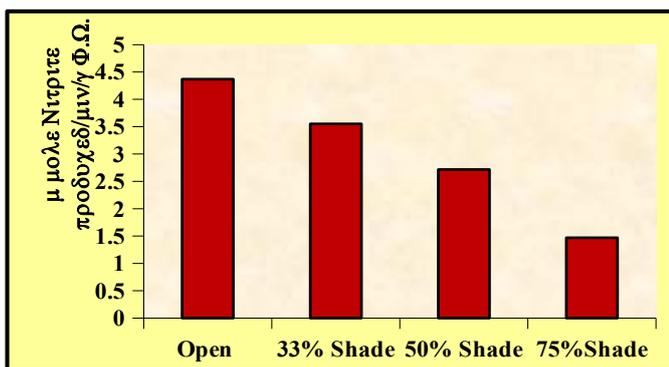


Fig.-1. Effects of varying shade on root nodules (per plant) in pea (*Pisum sativum*).



Effect of varying shade on leaf nitrate reductase enzyme activity (Fig. 2) and leaf nitrogen % (Fig. 3) in pea plants.

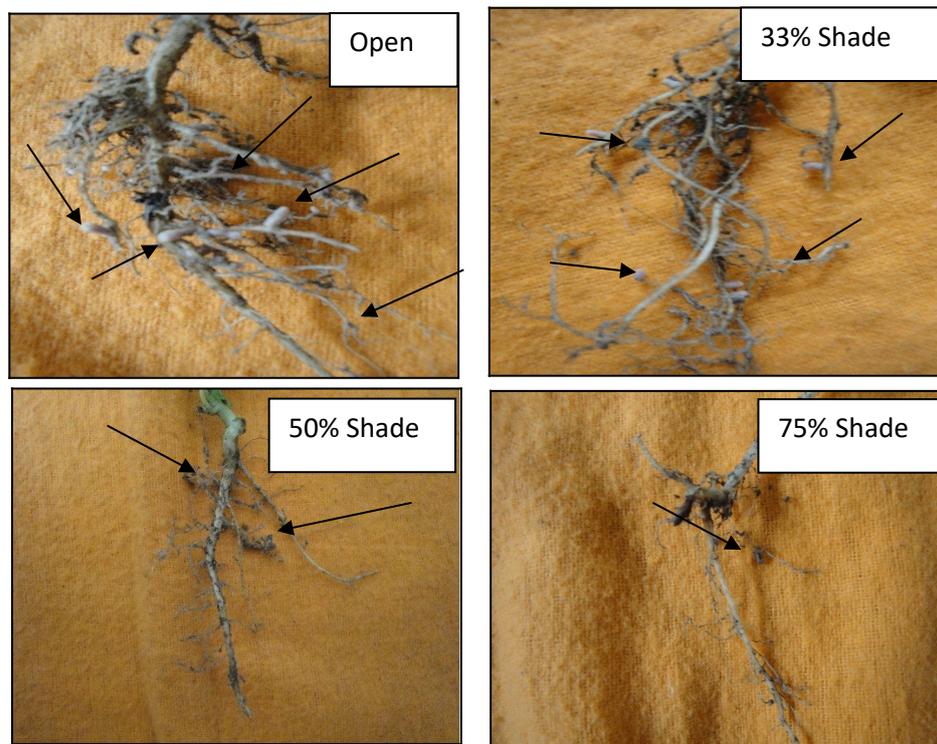


Plate-1 Effects of varying shade on root nodules in pea (*Pisum sativum*).

( —→ Indicating root nodules).

**Badre Alam, Mayank Chaturvedi, Anil Kumar Singh, Ram Newaj and S.K. Dhyani**  
**National Research Centre for Agroforestry, Jhansi (Uttar Pradesh)**

### ISO 9001:2008 Certification

NRCAF has been accredited ISO 9001:2008 certificate for its management standards on 18<sup>th</sup> December, 2013. The certificate was awarded in a simple function organized at the Centre. The function was attended by all the Head of Divisions of IGFRI, Jhansi, Head, CSWCR&TI Regional Centre, Datia, staff of NRCAF, Jhansi.



### Research Advisory Committee

16<sup>th</sup> RAC meeting of NRCAF was held on 18<sup>th</sup> & 19<sup>th</sup> October, 2013 under the chairmanship of Dr. V.P. Singh, Regional Representative for South Asia, WAC, New Delhi. Dr. S. D. Kashyap, Former Dean, Dr. Y.S. P. U. of Horti. & Forestry, Solan; Dr. D. K. Das, Former Head, IARI, PUSA, New Delhi; Dr. Brahma Singh, New Delhi and Dr. V. K. Gupta, Ex-Principal Scientist, NRCAF and Dr. S. K. Dhyani, Director, NRCAF, Jhansi including scientists and CTO participated in the meeting. The chairman and members of RAC committee also visited the Parasai- Sindh watershed and had discussions with farmers and watershed committee and watershed team.



### Impact of Rainwater Harvesting Structures on Groundwater Recharge in Parasai-Sindh watershed of Central India

Study was carried out at Parasai - Sindh watershed located in Babina block of Jhansi (Bundelkhand region) Uttar Pradesh. This watershed was selected in 2011 to enhance water availability, water use efficiency and agricultural productivity through agroforestry and improved management of land and water resources. The open shallow dug wells, situated in unconfined aquifer, are the major source of irrigation throughout Bundelkhand region of Central India. These wells due to dependence on perched water are characterized by very low specific yield do not support continuous operation of pumps to irrigate the agricultural fields in a single stretch. This warrants immediate need of water harvesting to ensure quick recharge in wells and thereby facilitate irrigation and in turn crop productivity.

Total area of the watershed is 1246 hectares comprising three villages namely Parasai, Chhatpur and Bachhauni. It is located between 25° 23' 47.6" - 25° 27' 05.1" latitude and 78° 20' 06.5" - 78° 22' 33.0" longitude. The watershed has a semi-arid sub-tropical climate and characterized by dry and hot summer, warm and moist rainy season and cool winter with occasional rain showers. Mean annual temperature ranges from 24 to 25 °C. The mean summer (April-May-June) temperature is 34 °C which may rise to a maximum of 46 to 49 °C during the month of May and June. Majority of the area is under agriculture (88.7%) followed scrub land (5.7%). However, about 200 ha of agricultural land are generally kept fallow during *rabi* due to lack of irrigation water. Majority of agricultural land in the watershed comprises shallow gravelly red soil (82%) with patches of light black soil. Red soil has very low water holding capacity (7 to 16%) and poor in organic carbon (0.2 to 0.4%). As such, they suffer badly on account of water scarcity, hence, low productive. To improve the water resources in the watershed about 1,00,000 cum. rainwater harvesting facility was created through 10 cost-effective structures during 2012 and 2013. The open wells were monitored for water level once in a month since May, 2011 to capture the trend of water level as influenced by rainwater harvesting structures. Depth of wells varies from 2.95 to 17.8 m with average of 9.7 m.

The Water table Fluctuation (WTF) method was applied in the Parasai-Sindh watershed during pre (2011, 1289.2 mm rainfall) and post (2013, 1396 mm rainfall) intervention phase to quantify groundwater recharge. Specific yield was estimated in the range between 0.5 and 1.5 % with average value of 1.0 % for Bundelkhand hard rock region. Underlying deep percolation is assumed negligible due to presence of impervious granite layers. Evaporation losses from the groundwater aquifer were calculated as 5-10 mm year<sup>-1</sup> for the study area using Coudrain-Ribstein's depth–evaporation relationship. The average difference in hydraulic head of 200 open wells for the months of May and October during pre and post interventions was 3.54 and 5.01 m, respectively (Fig. 1). Net groundwater recharge during monsoon season of pre and post interventions was estimated at 53.7 and 82.6 mm, respectively, which is 53.7 per cent higher than pre intervention phase. The significant increase in groundwater recharge is attributed to rainwater harvesting through cost-effective structures. Improved yield of open wells reduced *rabi* fallow by about 70 ha besides, ensuring irrigation water through dug wells to *rabi* crops predominantly wheat in entire treated area of the watershed. The study has proved beyond doubts the efficacy of rainwater harvesting for groundwater recharge in Bundelkhand region of Central India. The findings of Parasai- Sindh watershed are in conformity with that of Garh Kunder –Dabar watershed. This has established replicability of watershed management programmes in Bundelkhand region for resolving issue of ground water recharge and availability for irrigation and drinking as well.

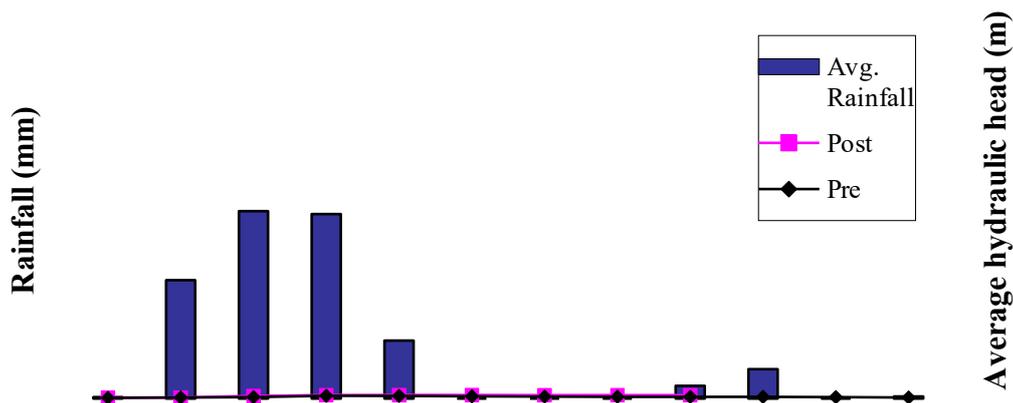


Fig. 1. Fluctuation of hydraulic head during pre and post watershed intervention

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### Farm Innovators Day

NRCAF organized Farm Innovators Day on 16<sup>th</sup> November, 2013 in Parasai- Sindh Watershed. Two farmers Shri Lakhnan Singh Yadav, vill. Kharak, Datia and Shri Bala Ram Yadav, vill. Chhatpur, Jhansi were felicitated on the occasion for adopting *Tectona grandis* based agroforestry system on large scale. On the eve health camp was also organized for watershed dwellers to provide overall integrated development in watershed development projects. A team of doctors from different disciplines viz. Paediatrician, surgeon, gynaecologist and pathologist from different reputed hospitals of the country examined 400 people from all three villages of watershed. Medicines worth ` Ten thousand were also distributed especially to the malnourished women and children. The people suffering from chronic diseases were advised to visit specialized government hospitals including Dr. Ram Manohar Lohiya Hospital New Delhi. It was observed by the doctors that most of the children were suffering from deficiency of different kinds of vitamins.



### Human Resource Development

- Dr. Rajendra Prasad, Pr. Scientist & PI, Sh. Rajendra Sngh, ACTO and Dr. V D Tripathi (R. A.) attended 5<sup>th</sup> Coordination Committee Meeting of the Network Project

on “Harvesting, Processing and Value Addition of Natural Resins and Gums” during 8<sup>th</sup> to 9<sup>th</sup> October, 2013 held at JNKVV, Jabalpur.

- Dr. K. B. Sridhar, Scientist participated in International Short Course on “Ecosystem Services and Integrated Watershed Management” during 6<sup>th</sup> to 15<sup>th</sup> November, 2013 held at ICRISAT, Hyderabad. He also participated in National Seminar on Recent Advances in Research on Beneficial Insects: Honey bee, Lac culture, Tussser and Sericulture held at IINRG, Ranchi during 27<sup>th</sup> to 30<sup>th</sup> November, 2013 and presented paper.
- Dr. R. K. Tewari, Pr. Scientist & Nodal Officer (RFD) and Dr. Rajeev Tiwari, Chief Tech. Officer participated in the RFD Meeting of NRM Division on 18<sup>th</sup> November, 2013 held at NASC, New Delhi.
- Dr. S.K. Dhyani, Director; Dr. R. K. Tewari, Dr. A. K. Handa, Dr. Inder Dev, Pr. Scientists and Dr. Rajeev Tiwari, Chief Tech. Officer participated in the “National Consultation Meet on Agroforestry” organized by NRM Division and NRCAF on 19<sup>th</sup> November, 2013 held at NASC, New Delhi.
- Dr. Mahendra Singh, Sr. Scientist participated in the MDP Workshop on PME on Agricultural Research during 19<sup>th</sup>- 23<sup>rd</sup> November, 2013 held at NAARM, Hyderabad.
- Dr. Ramesh Singh, Sr. Scientist (Soil & Water Conservation Engg.) delivered lecture on “Impact of Integrated Watershed Development Interventions on Hydrology and Eco-system services in drought prone Bundelkhand region of Central India” at Deptt. of Civil Engineering, Indian Institute of Technology, Banaras Hindu University, Varanasi on 30<sup>th</sup> December, 2013.
- Sh. Asha Ram, Scientist attended Winter School on “Quality seed production and seed standards in forage crops and range grasses: Challenges, advances and Innovation” during 11<sup>th</sup> September to 1<sup>st</sup> October, 2013 held at IGFRI Jhansi.
- Sh. Birendra Singh Tomar, Assistant attended Central Joint Staff Council Meeting during 15<sup>th</sup> & 16<sup>th</sup> December, 2013 held at NASC, Complex, New Delhi. The meeting was chaired by DG, ICAR & Secretary, DARE, New Delhi.

#### **CMMUNAL HARMONY CAMPAIGN**

Communal Harmony Campaign and Fund Raising Week from 19<sup>th</sup> to 25<sup>th</sup> November, 2013 was observed at the Centre, A sum of ` ` was collected by Sh. Veer Singh Pal, Sr. Clerk from the staff members during the week .

#### **Promotion**

Sh. R.K. Singh, Tech. Officer promoted to Sr. Tech. Officer w.e.f. 19<sup>th</sup> June, 2013.

#### **Exhibition Stall**

An exhibition stall was displayed on the occasion of *Kharif Kisan Mela* organized collaboratively by ATMA, Jhansi and U.P. State Agricultural Department, on 3<sup>rd</sup> October, 2013 at Company Bag, Baruasagar of Jhansi district. A number of visitors *i.e.* D.M., C.D.O.,

Joint Director (Agriculture), Dy. Director (Agriculture), Jhansi; Line department officials, Bankers, NGOs, VO, including farmers, nursery growers visited the exhibition stall of NRCAF, Jhansi.

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## Pre Congress Activities

### Report on Painting and Essay Competition for School Children

One of the key pre congress activity related to 3<sup>rd</sup> World Congress on Agroforestry to be held at New Delhi from 10<sup>th</sup> – 14<sup>th</sup> February, 2014 was the Painting and Essay writing competition for school children. The objective of the event was to imbibe responsibility in the young generation towards the Mother Nature and to help them to develop as citizen's conscious towards their duties to save the environment. The theme of this competition was "Trees for Life". The event helped in creating awareness amongst school children about present scenario of climate change and role of trees in mitigating its impact on our daily routine, biodiversity conservation and values of trees in human life.

The competition was organized in two groups painting for 6-12 year old and essay for 13-18 years old children and well publicized through announcements on official web pages of Indian Council of Agricultural Research (ICAR), New Delhi and National Research Centre for Agroforestry (NRCAF), Jhansi. In addition to this information was displayed on Facebook pages, through E. mail to Pan-India Data base of more than 264 schools all over country, to 25 State Agricultural Universities in different parts of the country through Officer in Charges of Coordinating centres of All India Coordinated Research Project on Agroforestry and publication in NRCAF, Newsletter.

The competition received overwhelming response from throughout the country with participation of children from 18 States of the country namely Assam, Andhra Pradesh, Andaman & Nicobar Island, Chhattisgarh, Gujarat, Haryana, Karnataka, Maharashtra, Manipur, Meghalaya, New Delhi, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, Utrkhand and West Bengal. It is heartening to note that about 56 per cent of the participants in the competition were girl children. It is very significant that girls were encouraged by



their parents and teachers and provided desired exposure for participating in competitive events. The entries were judged by independent Jury. The President of the Indian Society of Agroforestry, Dr Shiv Kumar Dhyani, while announcing the results of the competition on 15<sup>th</sup> January, 2014 congratulated the winners, their parents and teachers and also thanked all those children who participated in the competition.

#### **The winners of Essay competition are:**

1. Km. Nisitha Pattanaik D/O Shri Kshitish Chandra Pattanaik **-I Prize**  
Bhubaneswar, Odisha
2. Mr. V.S. Naveen Kumar S/O Shri R. Saravanan- **II Prize**  
Karamadai, Dist.- Coimbatore, Tamil Nadu
3. Mr. Prashant Kaushik S/O Shri J.L. Sharma **–III Prize**  
Mathura , Uttar Pradesh

Km. Nisitha Pattanaik from Bhubaneswar, winner of the first prize in essay competition elaborated in a very interesting and emphatic way about the role of trees in our lives and the need to conserve our environment and biodiversity by saving trees and forests for the future human and animal life on earth. Similarly, Km. V. Niharika, winner of First prize in painting competition belonging to Tamil Nadu depicted the role of trees in our lives in a very beautiful way as shown here.

The winners of the competition will receive their prizes including a certificate at Vigyan Bhawan, New Delhi from the Hon'ble President of India during the opening ceremony of the Congress on 10<sup>th</sup> February 2014. The organizers of the World Congress on



Agroforestry once again congratulate all the winners and looking forward to receive them at the New Delhi to be a part in their proudest moment.

**The winners of painting competition are:**

1. Km. V. Niharika D/O Shri S. Varada Rajan- **I Prize**  
K.K. Pudur, Coimbatore, Tamil Nadu
2. Km. Bidyasha Harichandan D/O Shri Benudhar Harichandan- **II Prize**  
IRC Village, Bhubaneswar, Odisha
3. Km. Vaishvi Shah D/O Dr. Sarvesh Kumar Shah- **III Prize**  
SDAU, Sardarkrushinagar, Gujarat

Dear Children, It is proud moment to all of you, your teachers, parents and to all of us as well. It is even more so as the President of India will give the award, said the president of the Indian Society of Agroforestry, Dr. Shiv Kumar Dhyani, when he announced the winners on 15<sup>th</sup> January, 2014.

**HAPPY NEW YEAR 2014**

From Director & Editorial Board

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