

Chhattisgarh State Centre For Climate Change



Quarterly Newsletter

Volume 24 (October - December 2023)



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Message from Editor's Desk.....

Dear Readers,



I am happy to present 24th volume of quarterly newsletter. In this newsletter, we're excited to share some positive initiatives to fight against climate change. Innovative technologies and green initiatives are creating opportunities for a cleaner, greener world. As individuals, by making eco-conscious choices, we can collectively contribute to more sustainable tomorrow.

The Chhattisgarh State Centre for Climate Change is organizing various training programmes, workshops since its inception for capacity building and strengthening the knowledge base of all stakeholders. The Climate Change Lecture Series is one of the key initiatives taken by centre in this perspective. In continuation of lectures series, lecture on “Regional Impacts of Climate Change & Management Strategies and “Ecological Planning and Regeneration of Wild Fruit Species “ was organised on 14.12.2023. Dr. N.H.Ravindranath, Professor (Retd.), IISc, Bengaluru & Dr. Satish Sharma, Foundation for Ecological Security, Anand, Gujarat were invited to deliver their lectures among the Officers of Indian Forest Service, Representatives of sectoral departments, academic and research institutions, NGOs representatives etc .

We have also integrated the brief information about India's net zero emission target. At the 26th session of the United Nations Framework Convention on Climate Change (COP 26) in November, 2021, India announced its target to achieve net zero by 2070. In recognition of the Para 19 of Article 4 of the Paris Agreement, India's long-term low-carbon development strategy, has been submitted to the United Nations Framework Convention on Climate Change, and it reaffirms the goal of reaching net-zero by 2070.

We welcome your feedback and suggestions for upcoming issues of this newsletter.

(Arun Kumar Pandey)

APCCF and Nodal Officer^{I.F.S.}

**Chhattisgarh State Centre for Climate Change
Aranya Bhawan, Nava Raipur**

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Lecture on “Regional Impacts of Climate Change & Management Strategies and “Ecological Planning and Regeneration of Wild Fruit Species “ was held on 14.12.2023

The Chhattisgarh State Centre for Climate Change is organizing various training programmes, workshops since its inception for capacity building and strengthening the knowledge base of all stakeholders. The Climate Change Lecture Series is one of the key initiatives taken by centre in this perspective, in which eminent speakers having national and international experience and strong knowledge base in the field of Climate change are invited to provide their valuable insights through their lectures and knowledge. In continuation of lectures series Dr. N.H.Ravindranath, Professor (Retd.), IISc, Bengaluru & Dr. Satish Sharma, Foundation for Ecological Security, Anand, Gujarat were invited 14.12.2023 to deliver their lectures among the Officers of Indian Forest Service, Representatives of sectoral departments, academic and research institutions, NGOs representatives etc.

The inaugural session of the lecture series begun with the lighting of lamp by PCCF & HOFF Chhattisgarh Shri V. Sreenivasa Rao together with Shri Arun Kumar Pandey APCCF and Guest Speakers Dr. N.H.Ravindranath, Dr. Satish Sharma and Shri V. Shetteppanavar, APCCF. Shri Alok Tiwari, IFS welcomed all the dignified guests, IFS officers, Government officials from State agriculture, health, forest and water resource department, representatives from the civil society, NGO, students and University Scholars.



Shri Arun Kumar Pandey, APCCF and Nodal Officer, Chhattisgarh State Centre for Climate change delivered the opening remark and said that “Climate change is the field which can encompass every activity you can think of from forestry to day to day affairs” In the long run we all will get impacted by climate change in some or other way. While we can’t control some factors like Sea level rise, we can manage some other factors like better water, land use, agriculture and pest attack. Against this backdrop Chhattisgarh State Centre for Climate change is committed to organize lecture series to enrich knowledge of all stakeholders by inviting eminent personalities who can share their experience to address this global issue and to identify adaptation and mitigation strategies to cope up with

the challenges.

Shri V. Sreenivasa Rao, PCCF & HOFF, Chhattisgarh Forest Department has also addressed the gathering in this occasion and expressed that “Climate change is a pan global challenge but with regionally distinct and locally severe implication.” Considering these unexpected consequences, the State Centre for Climate Change has also been prepared a action plan on Climate Change for the period of 2021 to 2030. This plan will also help up to mitigate and adapt the foreseen climate crises.



First lecture of the session delivered by Prof. N. H. Ravindranath on “Regional Impacts of Climate Change & Management Strategies” with special reference to State of Chhattisgarh. His presentation covered, What is climate change and Causes of climate change, Projected climate change Globally, Nationally and in Chhattisgarh, Impact of climate change on Forests and Agriculture, Adaptation strategies for Climate Change, Role of Forests in Mitigating Climate Change, Global and National strategies to address climate change, Can we save the world from climate change.



Second Lecture session delivered by Dr. Satish Kumar Sharma on “Ecological Planting and Regeneration of Wild Fruit tree species.” His presentation covered Reasons for Plantations Failure, Lack of consideration of Limiting Factors, Dependency on the seedling stock availability in the nursery, Usual practice of Buying seeds from the market, Lack of rigour in the decision making related to Afforestation, Fear of plantation failure, Poor understanding of the local Ecology among the actors, Common errors by the ground level staff, Lack of proper training of people who are actually performing plantation activities, Ecology vs Survival.

The closing remarks of the day was given by Shri Arun Kumar Pandey. He said that senior forest officials having rich experience of field area operations should write books and other publications to enrich the knowledge base of new incumbent officers. In nursery at least 10-15% inferior species must be developed and raised in mixed plantations. Local forest fruiting species should be identified and raised along with plantations. Development of near natural forest by disseminating proper knowledge to grass root level i.e forest guards. We must learn from past mistakes and should not repeat same mistake.



The delegation from Chhattisgarh joined Climate Group Asia Action Summit 2023 in Singapore

Climate Group, London is an international organization working in the field of climate change. The organization's national office in India is located in Delhi. The organization has formed the Under2 Coalition at the international level to make efforts to prevent a potential 2-degree Celsius increase in global temperature by the year 2100. Chhattisgarh state is also a member of this coalition.

On June 8, 2023, the organization hosted the Climate Group Asia Action Summit 2023 in Singapore. In this event, Chhattisgarh was represented by a delegation of 3 members,

including Mr. Manoj Kumar Pingua, IAS, Principal Secretary, Government of Chhattisgarh, Forest and Climate Change Department; Mr. Arun Kumar Pandey, IFS, APCCF and Nodal Officer, Chhattisgarh State Centre for Climate Change; and Mr. Dhammashil Ganveer, IFS, Director, Kanger Valley National Park, Jagdalpur.

A bilateral meeting between Chhattisgarh delegation and South Korea delegation headed by Mr. Kim Key Young, Vice Governor of Chugnam Province, Republic of South Korea was held during the summit for the purpose of Knowledge exchange and Future Collaboration.

Mr. Manoj Kumar Pingua addressed the gathering on innovative practices being implemented in the state of Chhattisgarh. Mr. Arun Kumar Pandey shared noteworthy initiatives taken by the Chhattisgarh state in the areas of Climate Change, Biodiversity Conservation, and Wetland Protection.



Evaluating kharif Rice Acreage at the Block Level and its Relationship with Southwest

Prof. G.K. Das, Dean, College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya .

Mr. P. Kawishwar, Scientist E-1, Chhattisgarh Council of Science and Technology, Raipur

Abstract

This study utilized Synthetic Aperture Radar (SAR) data from Sentinel-1 to estimate Kharif paddy acreage in the Raipur district. The unique capability of microwaves to penetrate clouds enabled the mapping of paddy fields even during the monsoon season. Supervised classification based on training samples was employed to delineate paddy fields. The results demonstrated that the estimated paddy area closely matched the reported area, with error percentages of 5.3% and 8.6% in 2017 and 2019, respectively. The analysis of data from 2011 to 2019 revealed a consistent decline in both paddy acreage and rainfall during that period. Furthermore, the block-level analysis indicated significant spatial variations, with the Arang blocks having the largest paddy cover and the Raipur block the least. Moreover, a strong correlation was observed between southwest monsoon rainfall and Kharif rice cultivation, with paddy acreage decreasing during SW monsoon deficit years. These findings shed light on the impact of monsoons on rice cultivation and can guide agricultural planning and water resource management strategies in the region.

kharif rice area estimation

During the 2017 and 2019 kharif seasons, twenty ground truth observations of the rice cultivated area were gathered in the study region. These observations were subsequently utilized as inputs for estimating rice area using the Random Forest classifier. The agriculture shape file was utilized for delineating agricultural areas exclusively, ensuring that the classification focused solely on agricultural land. This approach prevented miscalculations caused by water stagnation in open forests or barren areas mimicking paddy fields.

The rice area map prepared for 2017 and 2019 is represented in Fig.1. The total geographic area (in hectares) for the Abhanpur, Arang, Dharsiwa, and Tilda blocks were 58,069, 87,053, 63,008, and 71,724, respectively. Table 2 presents the estimated kharif rice areas in each block and the corresponding percentages relative to the total geographic area. Among the four blocks, the highest rice area was observed in the Arang block, while the lowest was in the Dharsiwa block. In 2017 and 2019, the estimated kharif rice cultivation area was 1,48,885 hectares and 1,63,176 hectares, constituting 53.2% and 58.3% of Raipur's total geographic area, respectively. Based on data obtained from ICRISAT (<http://data.icrisat.org/dld/src/crops.html>), Raipur district featured 1,56,860 hectares and 1,72,810 hectares of kharif paddy in 2017 and 2019, respectively. These figures were utilized to compare with the estimated rice area and to compute the error in the area estimation, revealing district-level percentage errors of 8.3% and 5.6% for 2017 and 2019, respectively. The error percentage between 5 to 10 % is considered acceptable in remote sensing and agricultural research. Hence, the error percentage estimated in this study fell within the acceptable range, and the use of SAR data for kharif rice area estimation was determined to be effective acceptable range, and the use of SAR data for kharif rice area estimation was determined to be effective.



Block-wise kharif rice area details

Blocks	2017		2019	
	<i>kharif</i> Rice area (ha)	% of <i>kharif</i> rice area	<i>kharif</i> Rice area (ha)	% of <i>kharif</i> rice area
Abhanpur	33233.9	57.2	36600.4	63.0
Arang	53948.7	61.9	57232.7	65.7
Dharsiwa	23121.3	36.7	26180.1	41.5
Tilda	38580.7	53.8	43162.5	60.2

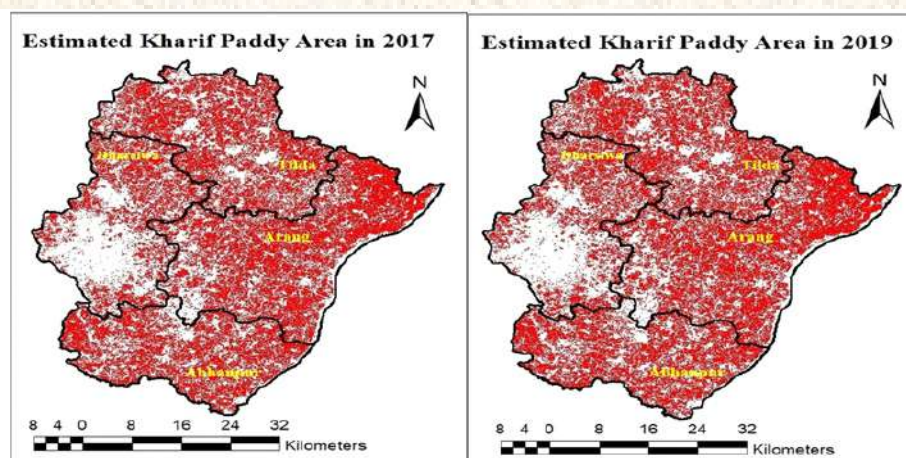


Fig 2. Estimated kharif Paddy Area in 2017 and 2019

Correlation of rice area with rainfall

The precipitation data for the southwest monsoon in the years 2017 and 2019 was obtained from the Indian Meteorological Department (IMD). Block-level rainfall figures were calculated using a weighted average approach, and these were subsequently correlated with the kharif rice cultivation acreage for the respective years. Pearson correlation analysis was conducted using excel to explore the connection between southwest monsoon rainfall and rice cultivation acreage at the block level. A significant positive correlation was noticed between southwest monsoon and rice acreage with a correlation coefficient of 0.7. This finding further underscores the influence of monsoon patterns on rice cultivation. The observed spatial variations in kharif paddy acreage and its correlation with southwest monsoon among different blocks provide valuable insights for targeted agricultural planning and water resource management strategies.

Conclusion

It is clearly evident that using satellite data rice acreage can be mapped and rice cultivation area is directly subjected to the kharif rainfall. With deficit rainfall area of rice cultivation will also reduce.



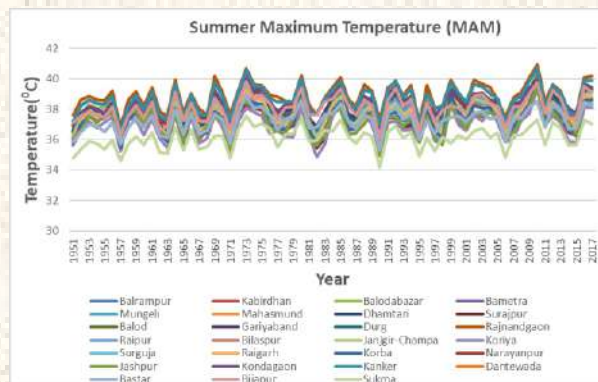
Analysis of historical temperature trend of Chhattisgarh

Dr. Anil Kumar Shrivastava, Project Scientist - III, Chhattisgarh State Centre for Climate Change .

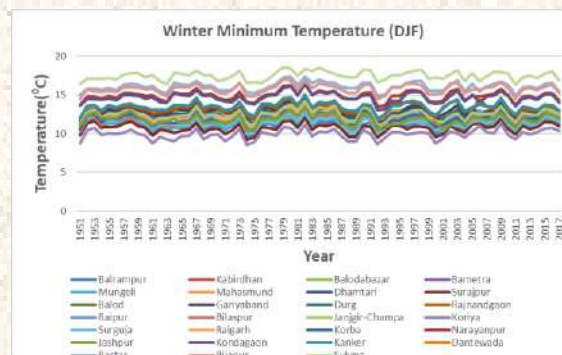
Mr. Abhinav Kumar Agrahari, Senior Project Associate, C.G. State Centre for Climate Change

The adverse effects of climate change are being felt significantly around the globe. These effects are also being observed clearly in the Chhattisgarh state. Rise in average temperature, decrease in rainfall, and increase in extreme events such as droughts and heatwaves are very common in Chhattisgarh. A temperature base analysis for a period of 1951-2017 has been carried out by Chhattisgarh State Centre for Climate Change with NIT Raipur. IMD (Indian Meteorological Division) gridded temperature data of resolution $1^{\circ} \times 1^{\circ}$ for a period of 1951-2017 are used to analyze trends and variability of Chhattisgarh. Mann-Kendall (Z) statistics, Sen's Slope and 67-year variation are used for historical temperature assessment.

Temperature time series during 1951-2017 depicts moderate increasing warming trend in Chhattisgarh for summer maximum, whereas moderate versatile trend for winter minimum. The average maximum temperature in the districts of Chhattisgarh during March-April-May (MAM) was clinched high and ranged from 36.11°C in Sukma to 38.88°C in Rajnandgaon district. The summer maximum temperature during the historical period (1951-2017) has increased in the range of 0.15°C in Balrampur to 1.10°C in Gariyaband.



The average minimum temperature in the districts of Chhattisgarh during December-January-February (DJF) was observed and ranged from 9.90°C in Koriya to 17.47°C in Sukma district. The winter minimum temperature during the historical period (1951-2017) has varied in the range of -0.28°C in Raigarh to 0.43°C in Koriya. It is also noticed that Koriya being the coldest district during winter is more influenced by temperature variability. In the past 67-year Koriya has increased by 0.43°C .



CREDA was awarded the Star Performance Award for the best performance at the national level

On September 21, 2023, Chhattisgarh State Renewable Energy Development Agency (CREDA) was awarded the Star Performance Award for the best performance at the national level in the field of energy conservation in a function organized in New Delhi. This honor was given by the Society of Energy Engineers and Managers (SEEM) at the 8th National Energy Management Awards ceremony.



It is noteworthy that for 3 consecutive years (2020, 2021 and 2022) CREDA has been awarded the National Award by SEEM like the best performing state nominated agency in the field of energy conservation. Chhattisgarh State Renewable Energy Development Agency (CREDA) has made important achievements in the field of energy conservation and energy efficiency in the state in the last 11 years.

(Source - CG Jansampark Dep.)

**DID YOU
KNOW?**

21st September
is Zero Emissions Day



(Source:- MoEF&CC, Govt of india)



NASA-ISRO Radar Mission to Provide Dynamic View of Forests, Wetlands

NISAR is a joint mission by NASA and ISRO (Indian Space Research Organisation), and when in orbit, its sophisticated radar systems will scan nearly all of Earth's land and ice surfaces twice every 12 days. The data it collects will help researchers understand two key functions of both ecosystem types: the capture and the release of carbon.

Forests hold carbon in the wood of their trees; wetlands store it in their layers of organic soil. Disruption of either system, whether gradual or sudden, can accelerate the release of carbon dioxide and methane into the atmosphere. Tracking these land-cover changes on a global scale will help researchers study the impacts on the carbon cycle – the processes by which carbon moves between the atmosphere, land, ocean, and living things.

Forestry and other land-use changes account for about 11% of net human-caused greenhouse gas emissions. NISAR's data will improve our understanding of how the loss of forests around the world influences the carbon cycle and contributes to global warming.

The signal from NISAR's L-band radar will penetrate the leaves and branches of forest canopies, bouncing off the tree trunks and the ground below. By analyzing the signal that reflects back, researchers will be able to estimate the density of forest cover in an area as small as a soccer field. With successive orbital passes, it will be able to track whether a section of forest has been thinned or cleared over time. The data – which will be collected in early morning and evening and in any weather – could also offer clues as to what caused the change, such as disease, human activity, or fire.

It's an important set of capabilities for studying vast, often cloud-covered rainforests such as those in the Congo and Amazon basins, which lose millions of wooded acres every year. Fire releases carbon into the air directly, while the deterioration of forests reduces the absorption of atmospheric carbon dioxide.

(Source - Official Website, NASA)



Technologies to address Air Pollution

A pilot study was awarded wherein 30 buses were fitted with Pariyayantra Filtration units on bus roof top for dust collection from the environment in Delhi-NCR. Several projects were undertaken to incorporate new technologies to address air pollution.

Details of studies undertaken for incorporation of new technologies to address air pollution.

- Under pilot study of WAYU, 54 Air Purification Units were installed at traffic intersection in Delhi.
- Pilot study on 'Control of Dust emissions using Dust Suppressant'
- Pilot study on 'Ionisation technology for reduction in ambient air pollution'
- 2 Smog towers as medium/large-scale air purifiers to reduce particulate air pollution were installed.
- Pilot project on 'Emission measurement for in-use diesel generator sets (DG sets) and evaluating the potential of retrofitting exhaust after treatment solutions for emissions reductions.
- Pilot Project on 'Retrofitting emission control devices in identified classes of in-use vehicles and recommendations for emission reduction from old/in-use vehicles (BS III)'
- R&D project of DST for development of indigenous photonic system for real time remote monitoring of air quality parameters.
- DST National Mission on Interdisciplinary Cyber Physical Systems (NM-ICPS), Technology Innovation Hub on Autonomous Navigation Foundation on 'development of Electric Vehicle (EV) based autonomous vehicles'. Autonomous technology of EVs has potential to reduce greenhouse gas emissions by optimizing driving patterns and reducing traffic congestion.

(Source - Press Information Bureau, Government of India)



Lok Sabha passes the Forest (Conservation) Amendment Bill 2023

Union Minister for Environment, Forest and Climate Change Shri Bhupender Yadav today moved the Forest (Conservation) Amendment Bill 2023 as reported by the Joint Committee of Parliament to be taken into consideration in Lok Sabha and subsequently requested the House to get the Bill passed. After deliberations and taking the views of Members of Parliaments, the Lok Sabha passed the Bill.

The Forest (Conservation) Act, 1980, is an important Central statute for the conservation of forests in the country. It provides that the de-reservation of reserved forests, use of forest land for non-forest purpose, assigning forest land by way of lease or otherwise to private entity and clearing of naturally grown trees for the purpose of reforestation requires prior permission of the Central Government.

During the intervening period, after the promulgation of the Act, new challenges relating to ecological, social and environmental developments have emerged at national as well as international levels. For example mitigating the impact of climate change, achieving the national targets of Net Zero Emission by 2070, maintaining or enhancing the forest carbon stock, etc. Therefore, to carry forward the country's rich tradition of preserving forests and their bio-diversity and to tackle the climate change challenges, it is necessary to encompass such issues in the ambit of the Act.

Therefore, to achieve the country's national as well as international commitments of NDCs, carbon neutrality, eliminate the ambiguities and bring clarity about the applicability of the Act in various lands, promoting the plantation in non-forest land, enhancing the productivity of the forests, amendment has been proposed in the Act and the Forest (Conservation) Amendment Bill, 2023 has been moved by the Central Government.

(Source - Press Information Bureau, Government of India)



FOREST (CONSERVATION) AMENDMENT BILL, 2023



India's initiatives to enhance green cover

Forest Survey of India (FSI), Dehradun, an organization under the Ministry carries out the assessment of forest cover biennially, since 1987 and the findings are published in India State of Forest Report (ISFR). As per latest ISFR 2021, the total forest cover of the country is 7,13,789 square kilometer which is 21.71% of the geographical area of the country. The forest cover has increased by 1,540 square kilometer between ISFR 2019 and ISFR 2021 assessment.

The Ministry provides technical and financial assistance to States/UTs under various Centrally Sponsored Schemes namely Green India Mission (GIM), Forest Fire Prevention and Management Scheme, CAMPA, Nagar Van Yojana and other schemes of line ministries to increase the forest and tree cover of the country as per the mandate of National Forest Policy.

Green India Mission (GIM) activities were started in the Financial Year 2015-16. During the last five years, the amount of Rs. 755.28 Crores has been released to seventeen States and one union territory for taking up the afforestation activities.

The Ministry has also implemented Centrally Sponsored Scheme, National Afforestation programme for regeneration of degraded forest and adjoining areas in the country. Under the scheme, an amount of Rs. 108.57 crore has been released during the years 2019-20 to 2021-22. National Afforestation Programme is now stands merged with Green India Mission.

The Ministry is implementing Nagar Van Yojana (NVY) since the year 2020 which envisages creation of 600 Nagar Vans and 400 Nagar Vatika in the country during the period 2020-21 to 2024-25 under the funds available under Compensatory Afforestation Fund (CAMPA). The Nagar Van Yojana aims to enhance the green cover in the urban and peri-urban areas including biological diversity, provide ecological benefits and improve the quality of life of city dwellers. So far, the Ministry has approved 270 projects under Nagar Van Yojana with the total cost of Rs.238.64 Crore.

The Compensatory Afforestation Fund (CAMPA fund) is being utilized by States/UTs for taking up compensatory afforestation as per approved Annual Plan of Operations for compensating the loss of forest & tree cover due to diversion of forest land for developmental projects as per provisions of Compensatory Afforestation Fund Act, 2016 (CAF Act) and CAF Rules, 2018. During the last five years, an amount of Rs. 55,394.16 Crore has been released to State/UT Forest Department under CAMPA funds.



(Source - Press Information Bureau, Government of India)



Generation of plastic waste in India

Unmanaged and littered plastic waste including plastic packaging waste has adverse impacts on terrestrial and aquatic ecosystems. The Plastic Waste Management Rules, 2016, provides the statutory framework for plastic waste management in an environmentally sound manner throughout the country. Considering the adverse effect of littered single use plastic items on terrestrial, aquatic and marine ecosystems, the Ministry notified the Plastic Waste Management Amendment Rules, 2021, on 12th August 2021, prohibiting identified single use plastic items, which have low utility and high littering potential, from 1st July 2022. The Ministry of Environment, Forest and Climate Change has also notified the Guidelines on the Extended Producer Responsibility for plastic packaging vide Plastic Waste Management Amendment Rules, 2022, on 16th February, 2022.

As per Annual report of Central Pollution Control Board (CPCB) on the implementation of Plastic Waste Management Rules, 2016, the plastic waste generated in the country during the last five years are given below:

(Source - Press Information Bureau, Government of India)

S.No.	Year	Plastic Waste Generated (Tonnes Per Annum - TPA)
1.	2016-17	1,568,714
2.	2017-18	660,787
3.	2018-19	3,360,043
4.	2019-20	3,469,780
5.	2020-21	4,126,997



Lectures on climate change at Aranya Bhawan

■ Staff Reporter

RAIPUR, Dec 14

TWO lectures were organised by the government under the Climate Change Lecture Series at Chhattisgarh State Climate Change Centre in Aranya Bhawan, Forest and Climate Change Department, Chhattisgarh on Thursday.

In event, Dr NH Ravindranath, Prof (Senior), Indian Institute of Science Bangalore on the topic Regional impacts of climate change and management strategies and Dr Satish Sharma, Expert, Foundation of Ecological Security.

Gujarat delivered a lecture on the topic Ecological planning and regeneration of wild fruit species.

In the programme, V Srinivas Rao, Principal Chief Conservator of Forests and



Lecture under way at Aranya Bhawan.

Chief of Forest Force, Chhattisgarh, Arun Kumar Pandey, Additional Principal Chief Conservator of Forests and Nodal Officer, Chhattisgarh State Climate Change Center and various officers/employees of Forest Department, including other departments like Water Resources Department, Agriculture Department, Revenue and Disaster Management Department, Industry, Urban Administration, Women and Child Development Department, representatives

of various government and non-government Professors and students of educational institutions were present.

More than 100 participants took part in the programme. Dr NH Rabindranath gave information about the remarkable work being done at the national and international level in the field of climate change and also stressed the need to implement agriculture and forestry on a large scale. He explained about the framework used in climate modeling and also about Chhattisgarh. Information about future pro-

jections related to temperature and rainfall was also given in the context of Chhattisgarh. In his lecture he mentioned about the possible adverse effects of climate change in various areas of the state and the proposed strategies to deal with them. Information about ecological management of wild fruit species of trees and their regeneration was given by Dr Satish Sharma, FES Gujarat. They mainly used 04 techniques for tree plantation like selection of right species.

Correct placement. The right time and correct method of planting and sowing was highlighted. Along with this, information was given by Dr Sharma about different types of forestry and silvicultural practices according to the environment. The programme was concluded by thanking all the participants.

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