UNCCD COP-14 Special Event:
Reducing Drought Risk to improve Land-water Resilience, mainstreaming eco-DRR pathways and tools

Organized by

Centre for Excellence on Climate Resilience, National Institute of Disaster Management (Ministry of Home Affairs), New Delhi, jointly with IUCN- Commission of Ecosystem Management (IUCN-CEM, South Asia)



India Pavillion, UNCCD, Auto Expo Mart & Centre, Greater Noida, NCR

2nd September 2019

11:00-13:00 hrs

AGENDA
Welcome by Major General Manoj Kumar Bindal, ED, NIDM (11:00 – 11:05 hrs)
Context Setting by Dr. Anil Kumar Gupta, Head – ECDRM, NIDM (11:05 – 11:10 hrs)
TECHNICAL PRESENTATIONS (11:10 – 12:10 hrs) Chairs: Dr. Anil K. Singh, Secretary, NAAS and Dr. Vivek Saxena, Country Rep., IUCN India
• *Extending scenario of drought and its implication* - Dr. V. K. Sehgal, Professor, IARI • *Cropping systems and adaptation for agriculture resilience* - Dr. G. Ravindra Chary, Director, CRIDA • *Water Resilience for drought proofing* - Dr. Manoj Khanna, Principal Scientist, WTC, IARI • *Nature Based Solutions for land water resilience* - Dr. Shalini Dhyani, Scientist NEERI & IUCN-CEM South Asia Chair • *Role of forests & wildlife in integrated resilience* - Dr. Ramesh Krishnamurthy, Principal Scientist, WII • *Forest sector mitigation: Its synergy with adaptation & drought proofing* - Dr. Rajiv Chaturvedi, Faculty, BITS-Goa • *NADMP: Towards global drought initiative* - CECR-NIDM (National Agric. DM Planning Team)
KEY DISCUSSANTS (12:10 – 13:00 hrs) • Dr. Anand K. Sharma, DDG, IMD • Dr. J. K. Garg, Emeritus Prof., TERI Univ. (former Dean USEM, IPU) • Prof. J. P. Gupta, Former Director& VC, RGIEPT(Former Prof. IIT Kanpur) • Dr. M. S. Nathawat, Director, Institute of Science, IGNOU • Mr. Amitabh Gautam, Joint Secretary, DAC&FW, GOI • Dr. Shibendu S. Ray, Director, MNCFC • Mr. Unnikrishnan D. Nair, India Prog. Lead, GGGI • Mr. Kritiman Awasthi, Sr. Policy Advisor, GIZ • Dr. S. D. Attri, Dy. Director General, IMD • Mr. Anup Kumar Srivastava, Sr. Consultant, NDMA • Mr. Manjeet Saluja, SFP-CC&H, WHO India • Dr. S Bhanskar, Assistant Director General, NRM Division, ICAR, New Delhi • Dr. Gyan Sharma, Professor, Delhi University
Open Forum (Q&A) 13.00-13.15 hrs
Vote of thanks by Dr. Sushma Guleria, Asst. Prof. ECDRM Div. NIDM

Manoj Kumar Bindal
Executive Director
National Institute of Disaster Management,
New Delhi



FOREWORD

Drought is a complex disaster with a prolonged period of water scarcity for agricultural use, livestock, livelihood and human use which occurs mainly due to changes in precipitation pattern, degradation of water resources and diminishing ecosystem services. Unsustainable land-water management, desertification, salinity ingress, soil erosion, groundwater depletion, degradation of ecosystems including wetlands, forests and grasslands are the major causes of drought.

To reduce the consequences of such disasters, it is important to study the areas comprehensively and adopt area specific approach. This calls for an active immediate response mechanism to address the growing challenge of land degradation associated with drought risks in both developing and developed nations. Key steps to improve water resilience include precision land management, efficient land management, reducing groundwater dependence, promoting drip irrigation, reducing chemical fertilizer usage, adapting nature based sustainable solutions, etc.

The aim of the special event was to discuss about the increasing severity of drought across regions and key hotspots of drought-led land degradation, review the existing drought risk reduction strategies, and identify resilience tools for ecoDRR-based solution in developmental planning and to develop a roadmap for achieving the SDG targets. Drawing the highlights and key recommendations from the speakers and discussants, I am happy to present this report after conducting a successful event with valuable insights and recommendations from many eminent speakers and discussants. I am sure that the contents of this report will be useful in future.

Manoj Kumar Bindal

Background

Drought is a common and most widespread and complex disaster incidences in India that has significant impact on food-water-energy nexus. Nearly 50% of the country is currently facing drought with almost 16% falling in the "exceptional" or "extreme" category. Drought led vulnerability affects resilience and results in loss of ecosystem benefits and services. Continuing drought burden is already depleting ground water resources. Though, famine like condition is not expected, it has a massive impact on the economy. Land degradation especially the process of desertification, salinity ingress, soil erosion, ground water dependent ecosystems and deforestation in changing climate regimes are mega drivers of drought disaster. Efficient land management, reducing ground water dependence, avoiding flood irrigation and switching to drip irrigation, reduced chemicals and fertilizer usage along with other ecosystem based interventions are key to build resilience.

In this context NIDM in collaboration with IUCN-CEM, South Asia, hosted a side event on the theme of Reducing drought disaster (occurrence, extent and impacts) by promoting mainstreaming of land-water resilience interventions into developmental planning (and actions) at different levels with the aim of controlling or reversing land degradation. The session critically deliberated on the prevailing status of land degradation and drought spread in different parts of India and across South Asia. UNCCD's principal goal of reducing land degradation by developing and proposing efficient tools and promoting mainstreaming of land-water resilience interventions into developmental planning at different levels with the aim of controlling or reversing land degradation were discussed in the session. Different speakers and discussants shared various success stories of reducing drought incidences and their extents were discussed.

Agenda

The session primarily focused on:

- Increasing severity of drought and key hotspots of drought-led land degradation.
- Potential of existing drought risk reduction strategies.
- Develop better understanding of capacity needs.
- Sharing best practices and success stories of reducing drought incidences and its extent, along with up scaling and out-scaling challenges.
- Identifying and exploring resilience pathways and tools to be incorporated into the developmental planning.
- Development of a road-map for achieving SDGs, Paris Climate Agreement, SFDRR, enhancing climate resilience and enhancing farmers ease of living, with lessons towards enabling a "global drought mitigation initiative".

Participation

The session had participation of about 80 senior officials from government organizations including NIDM, CRIDA, IARI, IMD, NDMA, NIDM, CSIR-NEERI, DAC&FW, MNCFC; UN agencies including IUCN & IUCN-CEM; International organizations including GIZ, WHO-India, GGGI; NGOs/ iNGOs implementers, and from various research and academic institutions including Delhi University, WII, GB Pant University, BITS-Goa, TERI-SAS, IGNOU, RGIEPT, professional and business organizations, etc.







Inaugural Session

Context setting and Background

Dr. Anil K. Gupta, Head- Division of Environment, Climate and Disaster Risk Management, National Institute of Disaster Management



He welcomed all the dignitaries, speakers, discussants and participants. He spoke in brief about the background of the session and mentioned that drought is a complex disaster, which is a global, national, sub-national and regional problem that may result in industrial shutdown, food insecurity, employment loss, famine, migration, epidemics, etc. He discussed about the multi-dimensionality of drought that it can be an agricultural drought, physical drought causing drinking water scarcity and urban drought with emerging urban agriculture practices. He also briefed about the role of NIDM towards resilient agriculture and climate resilience. He mentioned about NADMP (National Agriculture Disaster Management Plan) to develop a roadmap towards resilient agriculture and Climate Adaptive planning for Sustainability and Resilience.

Welcome Remarks

Major General Manoj Kumar Bindal, Executive Director, National Institute of Disaster Management



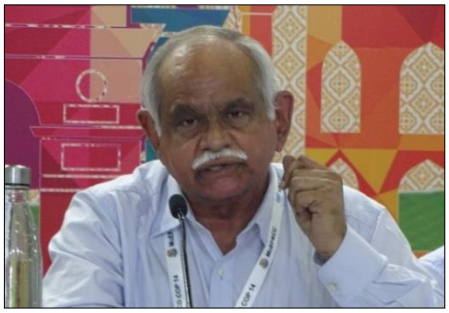
In his welcome address, he mentioned about the causes of aggravation of drought incidences. He stated that prolonged period of water scarcity, environmental changes, land degradation and depletion of natural resources have aggravated drought occurrence. He further mentioned that 13 states in India are considered as drought prone and desertification, salinity ingress, soil erosion, groundwater depletion, groundwater dependent ecosystem and deforestation are mega drivers of such disaster.

To combat such incidences he suggested some key steps to improve water resilience that included precision land management, efficient land management, reducing groundwater dependence, promoting drip irrigation, reduce chemical fertilizer usage.

Technical Session

Session Chairs:

Dr. Anil Kumar Singh, Secretary, NAAS



He chaired the technical session. He highlighted the issue of land degradation, drought and water scarcity in India. He stated that India has 96.5 million ha of degraded land and mentioned that India is aiming to reduce land degradation by 2030. He further mentioned that drought is a very complex disaster that can affect livelihood and may occur at any time of the year. He cited the case of Chennai drought.

Dr. Vivek Saxena, Country Representative, IUCN, India



He chaired the discussion session. He focused on the use of nature-based solutions to tackle the issue of land degradation, desertification, drought and climate change

Presentations

Dr. V. K. Sehgal, Professor, IARI in his presentation on *"Extending Scenario of Drought and its Implication"* stated that increasing in variability of climatic parameters causing abiotic stresses are leading to frequent drought both globally and nationally. The various precursors of drought that he highlighted were meteorological factors like unpredictability in precipitation pattern, uneven distribution of rain in the season and temperature increase. However, the major factor that determines certain meteorological condition to become a drought is the way of utilization and management of water resources. Apart from the meteorological factors other factors including socio-economic factors, water management factor, climate change, increase in temperature in tropics and sub-tropics and various other abiotic stresses on crops accentuates the causes of drought. Temperature increase is one of the important determinants of water demand.



He spoke about the prediction of change in global precipitation distribution that in part of central Asia and Africa. He stated that there is going to be a significant reduction in rainfall resulting in drought and there may be increase in

precipitation in Europe, North America, resulting into flood. He highlighted the increase in global drought trend beyond 1980s, based on drought Index that is calculated using soil moisture and precipitation data. He stated that the incidences of drought are more towards tropics and sub-tropics about 36% of world land area that is inhabited by 70% of world's population.

He spoke about the present drought scenario in India and showed the projection of future changes over the country. He mentioned that in India, the metreological drought in terms of Standard Precipitation Index shows that more amount of rainfall is occuring in the month of June and decrease in rainfall in July and August.

He stated that drought is not just an environmental issue but also a serious threat to economic development and poverty alleviation. All developing nations and underdeveloped nations are facing rainfall variability which in turn affecting the GDP.He concluded with a remark that it is in need to strengthen the science based national and sub-national drought management plans for adaptation and mitigation to meet economic and sustainable development goals.

Dr. G. Ravindra Chary, Director, CRIDA in his presentation on *"Cropping Systems and adaptation for agriculture resilience"* highlighted about the need of resilience in agriculture, how to manage risk (rainfall and agricultural droughts), how to alleviate overuse of groundwater and reduced groundwater recharge, etc. He stated that management of available resource is important in the present scenario of change in cropping pattern and shift in food demands from plant based to animal based. He asserted that system perspective, efficiency measures, governance issues and participatory management needs to be considered for Eco-DRR.

He suggested the alignment of crops on the basis of soil moisture availability and soil type, based on which suitable agro-ecology specific cropping system can be used. Apart from rainfall pattern of an area, run-off potential should also be considered for ex-situ rainwater management. He focused on assessment of rainwater harvesting and supplement irrigation as even during the drought period crop production can be enhanced by 12% i.e., 28 to 30 M tonnes from 20 to 25 M ha. He mentioned about the use of real time contingency plan, which is implemented based on real time weather pattern in any crop-growing season.



He focused on technologies like short duration/ drought escaping varieties, resilient intercropping systems, crop diversification, in-situ moisture conservation and creating water assets. He mentioned that agro-ecology specific crop zoning, responsive or anticipatory adaptation and resilience at micro level should be adopted.

Dr. Shalini Dhyani, Scientist NEERI & IUCN-CEM, South Asia Chair in her presentation on *"Nature based solution for climate resilience"* stated that land degradation is one of the major issue in South Asia affecting 83 million hectares, or 25% of all agricultural land in the region causing permanent loss of the land's productive capacity. Soil loss caused by wind, soil fertility decline due to lowering of soil organic matter and loss of nutrients, water logging caused by improper irrigation facilities, soil degradation caused by increase of salt in the soil, improper irrigation management or intrusion of sea water into coastal soils arising from over- extraction of groundwater are other causes of land degradation.



She emphasized on the need to update the classification of drought-affected areas in India that was done in 1973-74, as it is being used since then for undertaking any drought-proofing measures. She stated that the drought hit states in India are inhabited by almost 40% of the country's population.

She spoke about major challenges of drought in anthropocene that intensive agriculture is leading to loss of indigenous crop diversity and land degradation, rehabilitation, restoration and afforestation raising monocultures, insufficient knowledge about biodiversity, ecosystems, ecosystem services, flawed conservation efforts, lack of coordination between government bodies and lack of people centric approaches are other major challenges of drought.

She focused on nature-based solutions, which is an approach that puts people and their natural resource use practices at the center of decision-making. She highlighted about the targets of Eco-DRR i.e., disaster prevention and recovery, hazard mitigation and climate change adaptation using nature based solution. The co-benefits from ecoDRR are carbon sequestration, biodiversity conservation, stabilization of regional climate, water and soil protection, heritage and culture and sustainable livelihoods. She concluded her presentation with a way forward note that preference should be given to community needs/ requirements, community livelihood support should be given importance to alleviate poverty and to adopt traditional measures with effective innovative technological inputs.

Dr. Ramesh Krishnamurthy, Principal Scientist, WII, in his presentation on *"Role of forests & wildlife in integrated resilience"* mentioned that drought is a recurring phenomenon that is not only due to low rainfall but also due to overexploitation and poor management of freshwater ecosystems such as lakes, rivers, wetlands, streams and groundwater. He highlighted the missing link of terrestrial-aquatic Continuum. He further stated that there is a complex integrity within an ecosystem that the forest and wildlife absorbs the effects and offers resilience in the short and long-term but a disaster is caused when it is beyond its resilience capacity.



He emphasized on global forest watch and land surface temperature as a key indicator to view spatiotemporal problems and resilience capacity and in increasing land-water resilience. He stated that a surrogate model is required to map the biological integrity at large spatial scale. He presented maps of Himachal Pradesh and Arunachal Pradesh to show how surrogate model is applied and spatial prioritization is done. Robust surrogate methods are required for large scale spatial planning and management to enable resilience capacity. He mentioned that a landscape approach is needed to understand the socio ecological linkages and drivers towards integrated landscape management strategies.

He concluded by citing that land use policy and proper land management are key and it can be taken up from local to national and regional scale.

Dr. Rajiv Chaturvedi, Faculty, BITS-Goa in his presentation on *"Factor sector mitigation: Its synergy with adaptation & drought proofing"* Stressed on the global temperature rise and importance of positioning of forest sector in the Paris agreement. He mentioned country wise commitments on increasing forest cover and highlighted that India and China are planting more trees and carrying out intensive crop cultivation.



He spoke about how trees interface with water cycle and mentioned that increased soil infiltration is a particularly important outcome from forest cover restoration because it can lead to higher groundwater recharge however that the effect of terrestrial plant restoration on groundwater storage is complex and difficult to quantify.

He ended with a key suggestion that knowledge gaps needs to be addressed in order to improve the capacity to plan for any restoration projects.

Dr. Manoj Khanna, Principal Scientist. Water Technology Centre, ICAR- IARI, New Delhi though his presentation on the topic *"Water Management Strategies in Rain fed areas for Drought Mitigation and Adaptation"* highlighted the importance of water management systems for drought mitigation and adaptation using the case study of Dhar in Madhya Pradesh and Mewat in Haryana. He mentioned some adaptation strategies to minimize drought induced vulnerability and risks- enhancement of income, improvement in efficiency of resource use, enhancement of farmers and community adaptive capacity, etc.

He highlighted the issue of no or less water availability during non-monsoon period and declining water table. Such issues can be addressed by deepening of open wells, renovation of existing soil water conservation systems, improving of rainwater harvesting structures, laying underground pipelines, laser leveling and using modern innovation technologies like drip irrigation, sprinklers, rain gun irrigation systems, etc. He concluded stating the importance of knowledge-based extension through private-public partnership, which is a two-way communication service between farmers and the agricultural experts so that the issues are solved timely.



Dr. Sanayanbi Hodam, Research Associate, National Institute of Disaster Management in her presentation on *"NADMP: Towards global drought initiative- CECR-NIDM (National Agriculture Disaster Management Planning)"*spoke about global and Indian scenario of drought condition and stated that during the period 1871-2015, there were 26 major drought years in India. She mentioned that Indian agriculture is one of the most disaster-affected sectors and therefore, a comprehensive plan is needed for this sector. She focused on the need to incorporate hazard-risk considerations into sectoral plans to ensure sustainable development.

She briefed on the development of National Agriculture Disaster Management Plan, which will be a descriptive and prescriptive plan covering not only drought but all the disasters including pest attacks, post-harvest losses, cyclones, etc that are affecting Indian agriculture. She mentioned that the concept of NADMP came from Sendai Framework. She highlighted the four objectives of NADMP that includes: 1) To ensure the protection of infrastructure, assets, property and resources; 2) To ensure the activities (including physical development and systematic practices/operations) do not aggravate hazards risks and vulnerabilities for disasters; 3) To ensure that the activities and schemes under the Ministry increase resilience against risk of disasters and extreme events; 4) To ensure the Ministry and associated sector and constituents at all levels are prepared to deal with the situations arising out of any disaster or emergency situations.



She concluded by mentioning some broad componets of NADMP including mainstraming DRR, post-disaster impact assessment ans sustainable recovery framework, implementation Roles/Responsibilities, Organizational framework, review& updation of the DM Plan, etc.

Discussions

Dr. J. K Garg, Emeritus Prof. TERI-School of Advanced Studies urged to have a well-set approach for landscape restoration and landscape rehabilitation to combat land degradation and desertification.



Dr. M. S. Nathawat, Director, Institute of Science, IGNOU stated that drought is a slow onset disaster, which is why preparation should be done before it turns into a severe disaster. He emphasized on the need of land-water auditors at state level, regional level, district level and block level to have a site-specific data in order to disseminate innovative ideas to tackle land degradation, soil erosion and desertification.



Mr. Kritiman Awasthi, Sr. Policy Advisor, GIZ, focused on the importance of area specific ways and long-term solutions to tackle issues of land degradation, highlighting the issues faced in Lahaul Spiti, Tamil Nadu and Punjab. He mentioned that in Lahaul, farmers are facing the problem of land degradation due to the loss of soil moisture due to irregular snowfall, rainfall pattern and incidences of cloudburst are washing away the top fertile soil. He further mentioned that in Tamil Nadu increase in dry or no rainfall and increase in the intensity of rainfall is causing erosion of the topsoil. He also discussed about the increase in water intensive crop cultivation in Punjab that is causing loss of soil moisture and ultimately in the root zone due to reduced surface water and groundwater availability.



Dr. Indrani Charashekaran, Former Adviser, Niti Aayog, Founding Partner - ERCCON focused on the importance of having clarification in the definition of disaster for preparation of any disaster management plan which changes from state to state and district to district. She emphasized on importance to consider the financial aspects of compensation and the relief to design any National Disaster Management Plan. She mentioned that all the action plans and management plans should be linked with SDG targets.



Dr. S. D. Attri, Dy. Director General, IMD stated that due to more climate variability and unpredictability, livelihoods of farmers are severely affected. Therefore, he focused on the protection of soil from flood and drought by prior prediction of extreme weather events.



Dr. S Bhanskar, Assistant Director General, NRM Division, ICAR, New Delhi, spoke about Meteorological drought, Agricultural drought and hydrological drought, which are three major types of drought. He stated that meteorological drought varies from place to place depending on the area's average rainfall while an agriculture drought becomes a disaster when there is a shortage of fodder, food scarcity and drinking water scarcity.



He focused on the importance of increase in the green cover of India. He also pointed out that the rain gauges that is being used to measure the rainfall data is not sufficient, as it may not be accurate when rainfall is accompanied with strong wind.

Dr. Shibendu S. Ray, Director, MNCFC emphasized on the timely maintenance of groundwater data for any type of hydrological study.

He urged to promote vulnerability study, soil moisture study with the help of various tools like satellite study or the use of models like SLR and IDRE.



Dr. Gyan Sharma, Professor, Delhi University, mentioned about the need of hour to respect our nature and strive to protect our ecosystem. He highlighted that it is important for all organizations to converge and work in collaboration so that we can come up with a joint solution. He further mentioned that stakeholder involvement is essential to understand the socio-economic aspects and to conduct any vulnerability assessment. He focused on the empowerment of stakeholders for any disaster management.



Question & Answer session

In the question and answer session, the importance of having a clear-cut definition of disasters in context with different states was highlighted. It was stated that children and youth plays a major role in bringing any positive change.

Concluding Remarks

The session was summarized by **Dr. Anil Kumar Singh** by mentioning that disasters like drought, land degradation and desertification leads to loss of GDP. He stated that it is difficult to analyze the climate variability, uncertain rainfall, hailstorms and dry period since these are complicated issue. He encouraged utilization of latest technologies to predict the climate uncertainties. Integrated approach for land-water management will help in building land-water resilience. He concluded the session stating that small interventions like rainwater harvesting can make a huge impact in conserving and proper management of groundwater, surface water and rainwater.

Vote of Thanks

Dr. Sushma Guleria, Assistant Professor, NIDM



She extended valuable thanks and gratitude to the speakers, discussants, participants, NIDM and the session organizers.

Key Recommendations

- The importance of positioning forest and its allied sectors in Paris Agreement need to be recognized and policy research on this aspect should be promoted, for reaping greater benefits.
- Convergence of agriculture, forest, land and water policies to address resilience linking key SDG targets and Biodiversity Targets to address and realize Bonn Challenge and Paris COP, 2015 promises.
- Revision of the classification of drought affected areas in India that was done in 1973-74, as it is being used since then for undertaking any drought-proofing measures.
- New initiatives of water management system, rainwater harvesting and need of land-water auditors to have site-specific data that will help in implementing nature based solutions.
- Renovation of old water management systems, rainwater harvesting systems, laser leveling, underground laying of pipes, etc.
- Focus on exchange of case studies and best practices of nature based solutions.
- Development and area-specific implementation of policies and mapping of degraded land should be given importance.
- Importance of having a clear understanding of the definition of disasters for designing of any disaster management plan (with reference to land degradation and land-water resilience).
- Importance of national and local strategies for reducing the forestland for non-forestland uses.
- Strengthening of institutional mechanism for resilient agriculture and drought risk at national level, e.g. In India it can be a consortium of various organizations and research institutes including NIDM, IUCN, ICAR, ICFRC, IARI, WII, GIZ, etc.
- The significance of knowledge sharing and building the response capacity of local communities was given emphasize.
- Use of people centric approach to tackle land degradation and disasters like drought.

- The framework of global drought mitigation initiative should be built with a broad understanding of drought. It should comprise of agriculture droughts, water crisis, urban agriculture, peri-urban agriculture and allied services including tourism, food security, nutrition, livelihoods, gender justice, child welfare, marginalized and deprived – vulnerable sections of the societies with blended use of traditional, local knowledge and modern technologies, and participatory approaches.
- Capacity building including training, research, and education are core component of this initiative and specific modules need to be developed for varying sections of target groups – vertical and horizontal, in government and outside.
- Land degradation and drought mitigation issues need to also vouch linkages with health, safety, carbon neutrality and sequestration/adaptation issues as core components of region specific strategies that need to be in accord with global and national priorities set under various other protocols on environment, sustainability and disaster related issues.
- Integrated approach for land-water management must be encouraged which will help in building land-water resilience.

Organizing Committee
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• Dr Anil K Gupta, Project Director - CECR, Head ECDRM, NIDM
• Shweta Bhardwaj, JRF, CAP-RES, NIDM
• Thinles Chondol, Young Professional, CECR, NIDM
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Gallery







List of Participants
Name, Designation and address of Participants
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• Dr. V. K. Sehgal, Professor, Indian Agricultural Research Institute
• Dr. Shalini Dhyani, Scientist NEERI & IUCN-CEM, South Asia Chair
• Dr. Rajiv Chaturvedi, Assistant professor, Birla institute of technology and science, Pilani, Goa campus
• Dr. G. Ravindra Chary, Director, ICAR – Central Research Institute for Dryland Agriculture, Hyderabad
• Dr. Manoj Khanna, Principal Scientist, ICAR-Indian Agricultural Research Institute New Delhi
• Dr. J K Garg, Senior Fellow, TERI School of Advanced Studies (Former Dean, USEM GGSIPU)
• Prof. J P Gupta, Distinguished Professor, Shiv Nadar University (Former DG, DDU University of Petroleum and Energy, Professor IIT Kanpur)
• Prof. M. S. Nathawat, School of Science IGNOU, Delhi
• Dr. Shibendu S. Ray, Director, Mahalanobis National Crop Forecast Center
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