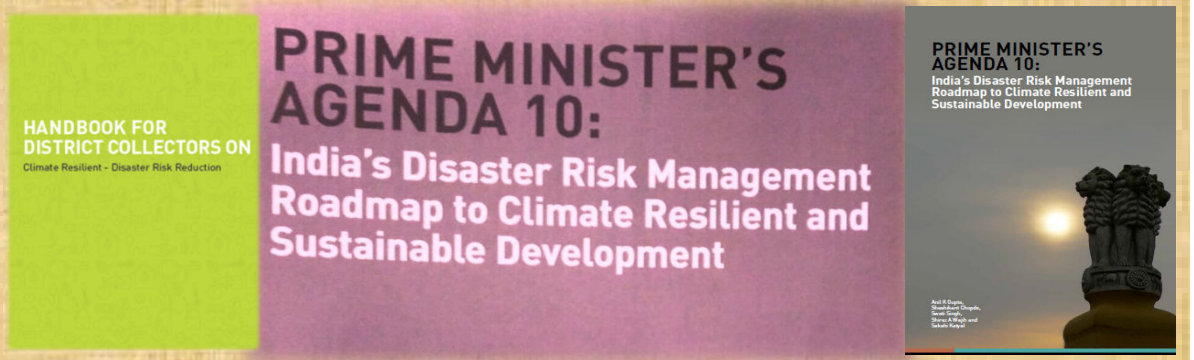
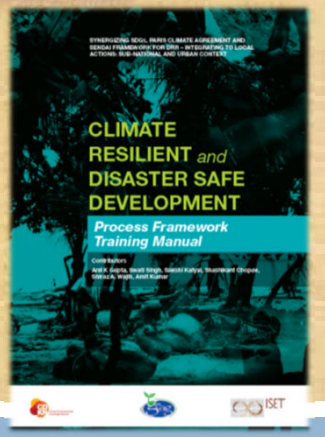
Mainstreaming Climate Resilience into Sub-national Planning for Drought Proofing South Asia





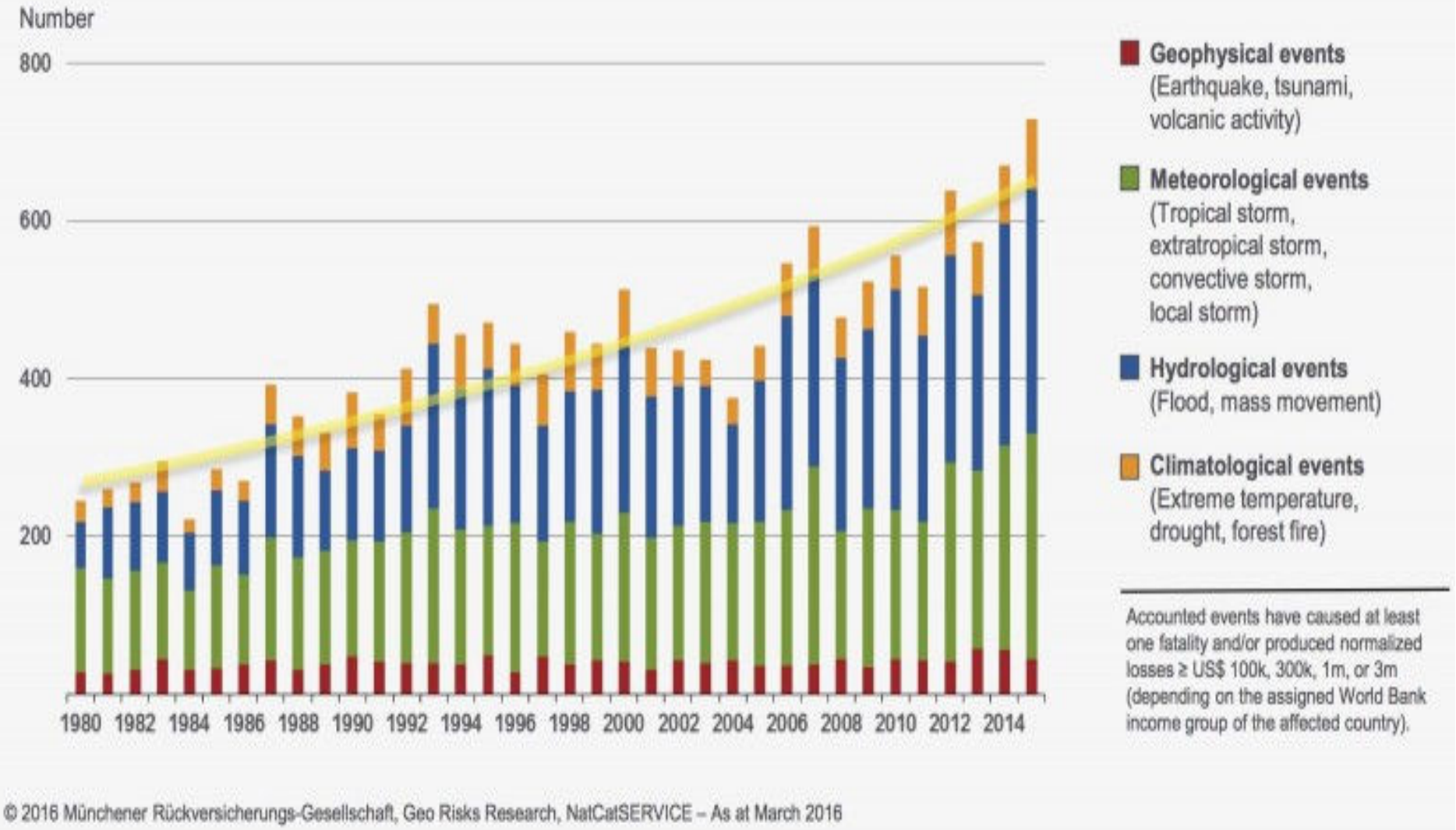
Dr. Anil K Gupta

Head, Division of Policy Planning, CEM-CG Member IUCN

National Institute of Disaster Management

(Govt. of India), New Delhi

DISASTERS: MORE PEOPLE AFFECTED AND INCREASING ECONOMIC DAMAGE



The Paradigm Shift

- Disaster Management (DM) was relief centric before 1991
- IDNDR 1991-99 (Focused on "Natural" Disasters… no attention on underlying causes)
- New Paradigm since HFA 2005-15 (Priority 4)
  - Approach of inter-linking CCA –DRR

    CCA becoming central to DRR
- Turning point ….Sendai Framework 2015-30

Paradigm Shift in Disaster Management

- Response Centric
- Relief Centric

- Mitigation centric
- Preparedness centric
- Disaster Centric

- Hazard Centric
- Vulnerability Centric
- Environment Centric

2nd Paradigm shift

- From Relief to Risk Reduction
- From Compartmental to Integration
- From Ad-hoc to Organized
- From Single hazard to multi-hazard

Climate Change Adaptation

INDIA DROUGHT 2015-16

- Unprecedented crisis of recent drought affected more than **330 million people in more than 2.5 lakh villages of 266 districts from 11 states.**
- Devastating impact on people's lives
  - water availability,
  - agriculture,
  - livelihoods,
  - food production and food security,
  - natural resources;
  - huge burden on exchequer.

A total of 13497 crore rupees has been approved for drought relief by the NDRF in 2015-16

Shift Warranted - Drought Monitoring to "Drought Risk Monitoring & Early Warming"

- Consistent rainfall deficit for two years resulting into failure of four agriculture seasons worsened the situation.
- In addition, there is a broad consensus that *more than rainfall deficit, the policies and practices in relation to surface/ground water use, cropping patterns, neglect of rain-fed areas and micro irrigation, investment priorities, dwindling efficiency of big dams, prioritizing externally based solutions than local peoples knowledge and experience, failure of timely relief and mitigation measures etc.*, led to the present crisis. (Action Aid Report)

El Niño Impact

•States– UP, Maharashtra, Bihar, Chhattisgarh, MP, Karnataka, Telangana, Odisha and WB declared drought prone in 2015

- **Maharashtra had a rainfall short by 40% in 2015, the third year of deficit (it was 30% short in 2014, 20% in 2012 and above average in 2013)**
- Erratic, unseasonal rainfall—unsettling India's agriculture, economy and politics
- Extreme rainfall events in central India, the core of the monsoon system, are increasing and moderate rainfall is decreasing
- Complex changes in local and world weather
- Successive years of low rainfall have resulted in falling groundwater levels and early drying of natural streams
- **A staggering 3,228 farmers committed suicide in Maharashtra in 2015 alone (almost nine farmers every day)**
- Uttar Pradesh - worst hit among all is the Bundelkhand region
- Andhra Pradesh - XX **heat-related deaths** have been reported from Andhra Pradesh till date
- Madhya Pradesh- decided to release 55 per cent of its annual MGNREGA budgetary allocation of Rs. 38,500 crore by June 2016
- States nearing drought include Gujarat, West Bengal, Haryana and Bihar.

IMD/WMO – El Nino forecasts 2015

Forewarning of drought and heatwave

EL NINO PREPAREDNESS PLANNING?

•As many as 302 of the country's 640 districts are living with drought-like conditions

• **IMD analysis – out of 18 El Nino years between 1880 and 2006, 12 coincided with deficient or below-normal rainfall in India**

- Led to *wrong forecasts* for the monsoon
- led to *heat waves* caused by delayed monsoon in India- 2500 death alone in 2015
- Rainfall in August 2015 was *22.54% below normal*, making it the driest month of the monsoon season
- Harvests affected - production of rice, wheat, coffee and other crops was hit by droughts and floods, leading to higher prices
- Delhi witnessed a warmer-than-usual December heading into cozy January days- *direct connection between a weak winter and El Nino has not been demonstrated*
- UN report: Southern India experienced higher than normal rainfall leading to more flooding
- Tamil Nadu battered by record-breaking showers *(Chennai city floods)*
- Monsoon rainfall was ***14% below average in 2015***, and ***12% in the year*** before
- **Forest Fire** in Uttarakhand: Poor rainfall, extreme dryness, Climate change, human-induced- **GLOF**

Response Actions to El Niño

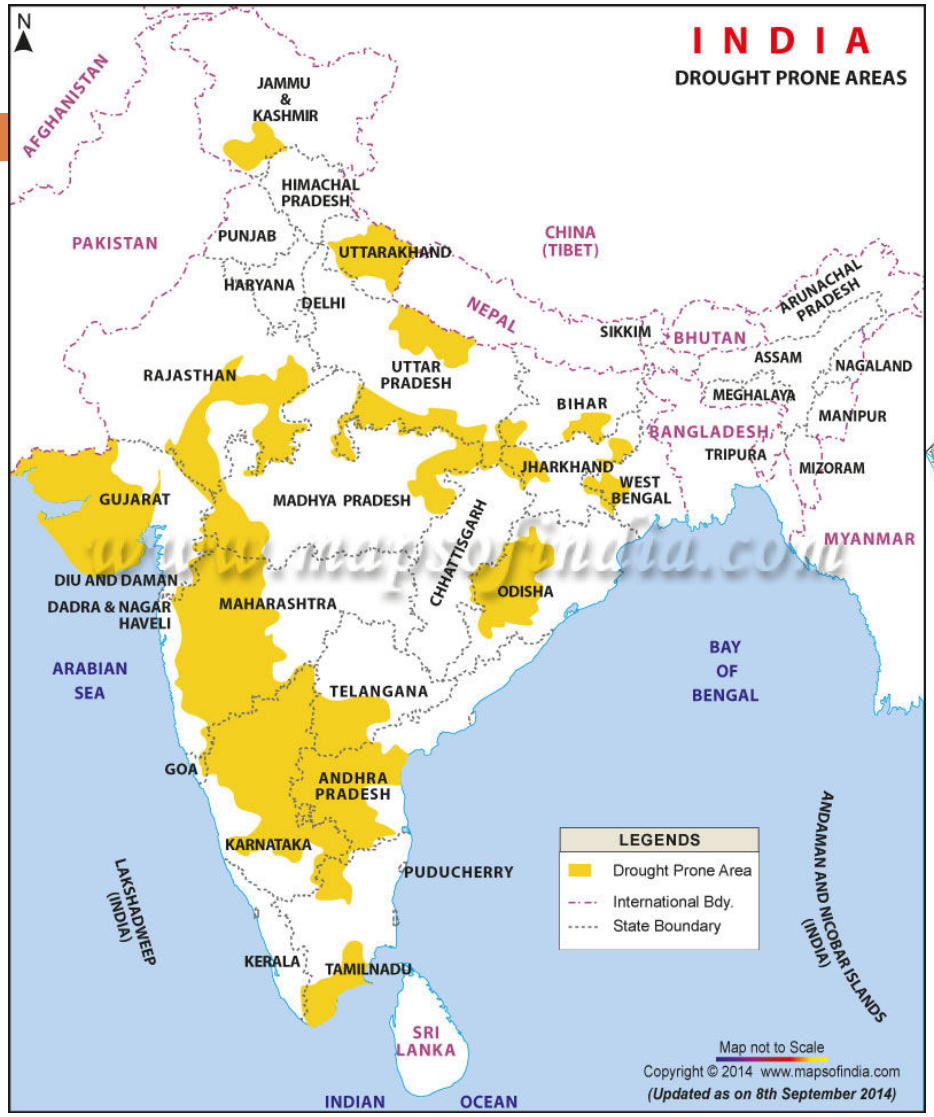
• India Meteorological Department, Earth System Science Organisation (ESSO-IMD) monitors rainfall situation throughout the year in different spatial scales.

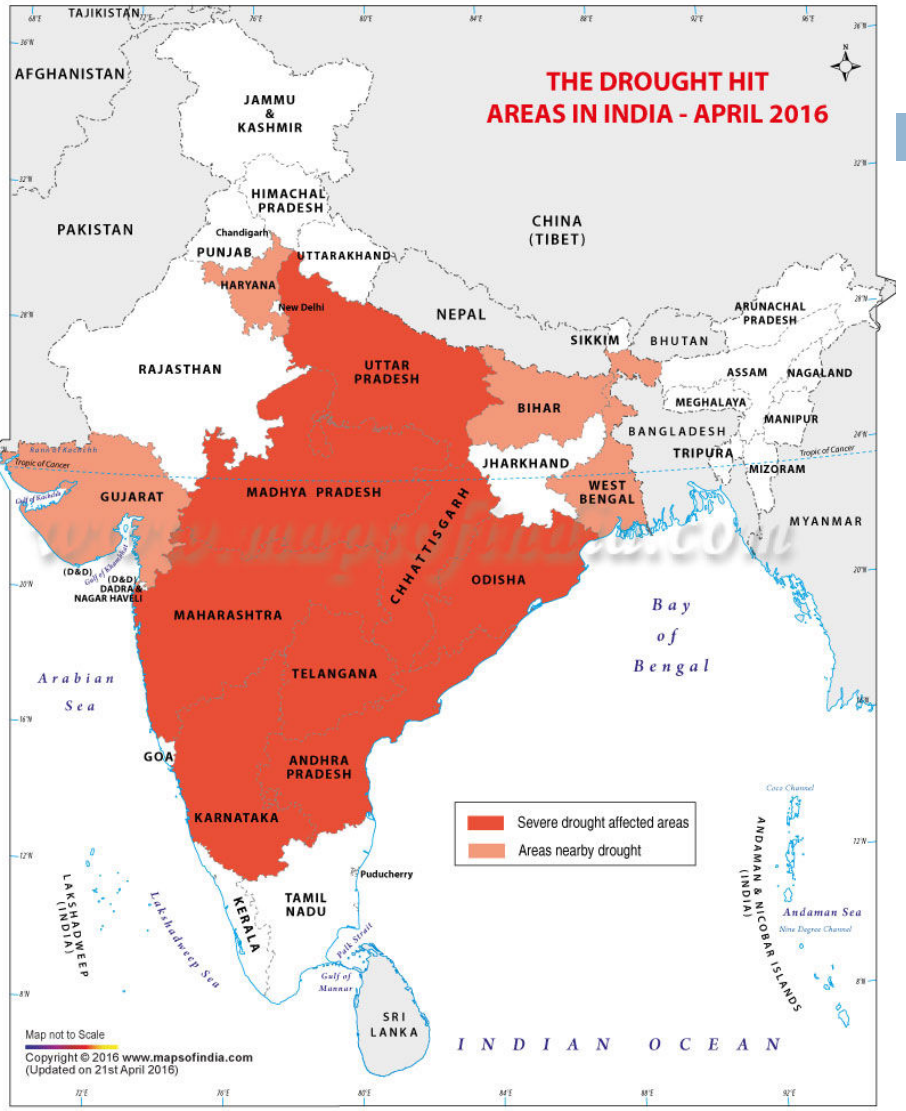
• Central Water Commission, National Centre for Medium Range Weather Forecasting, National Remote Sensing Centre and National Rainfed Area Authority are other key agencies that provide early warning

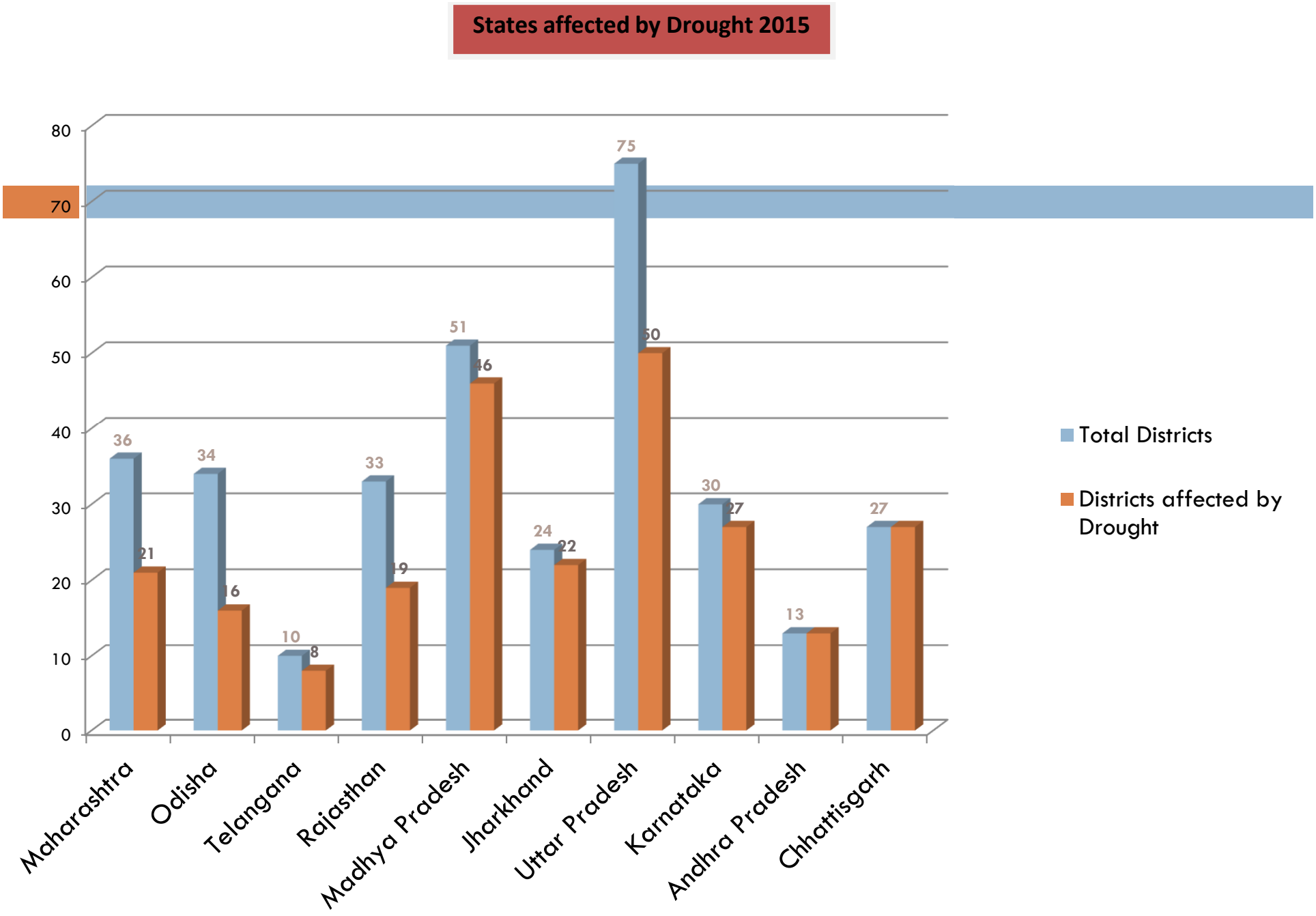
•Seeking as much as Rs 20,000 crore in Central aid (for States)

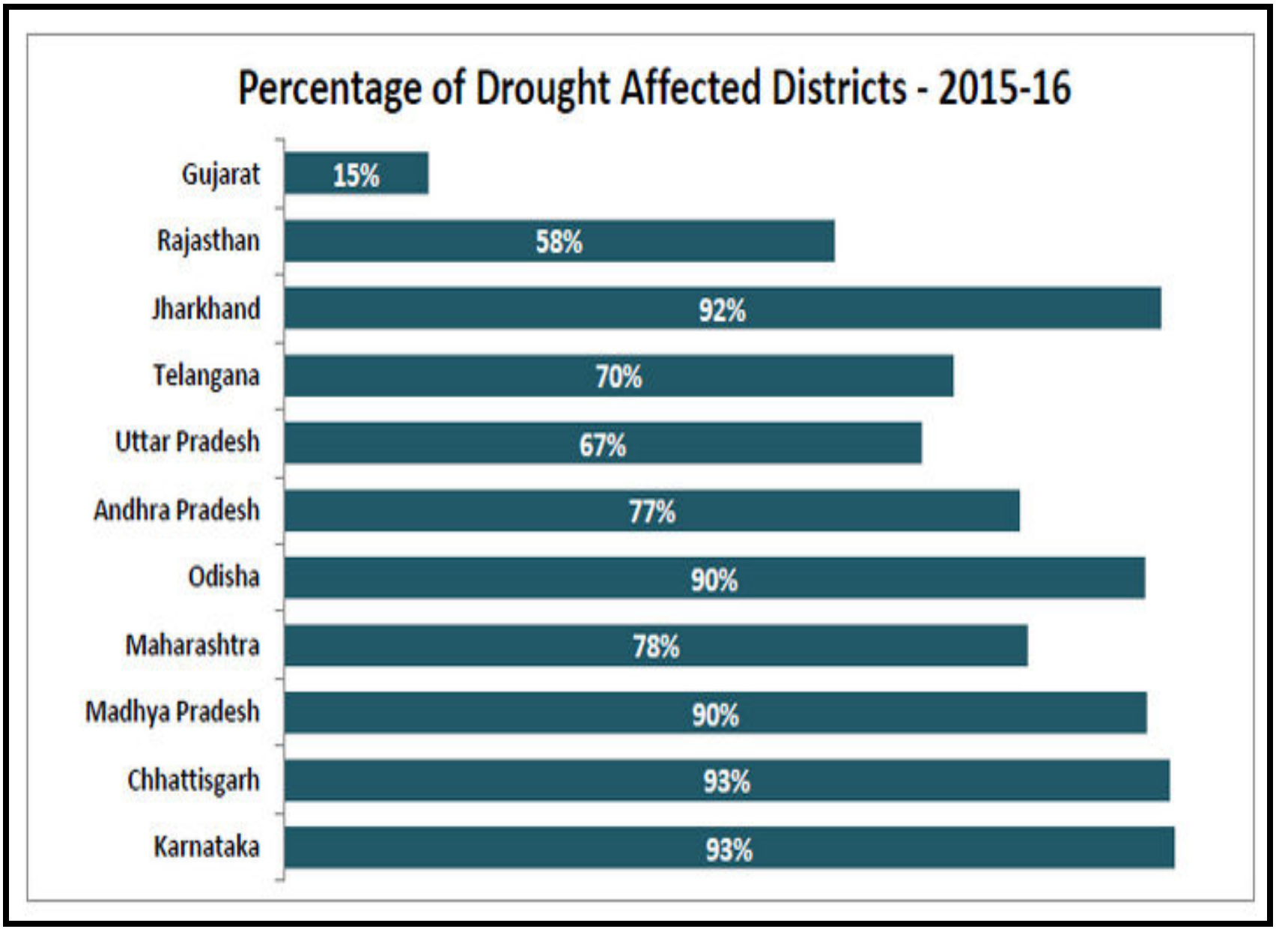
•Indigenous knowledge and traditional wisdom on protective methods against heat waves and strokes are tapped, documented, researched. Sensitization and awareness generation against the same initiated too.

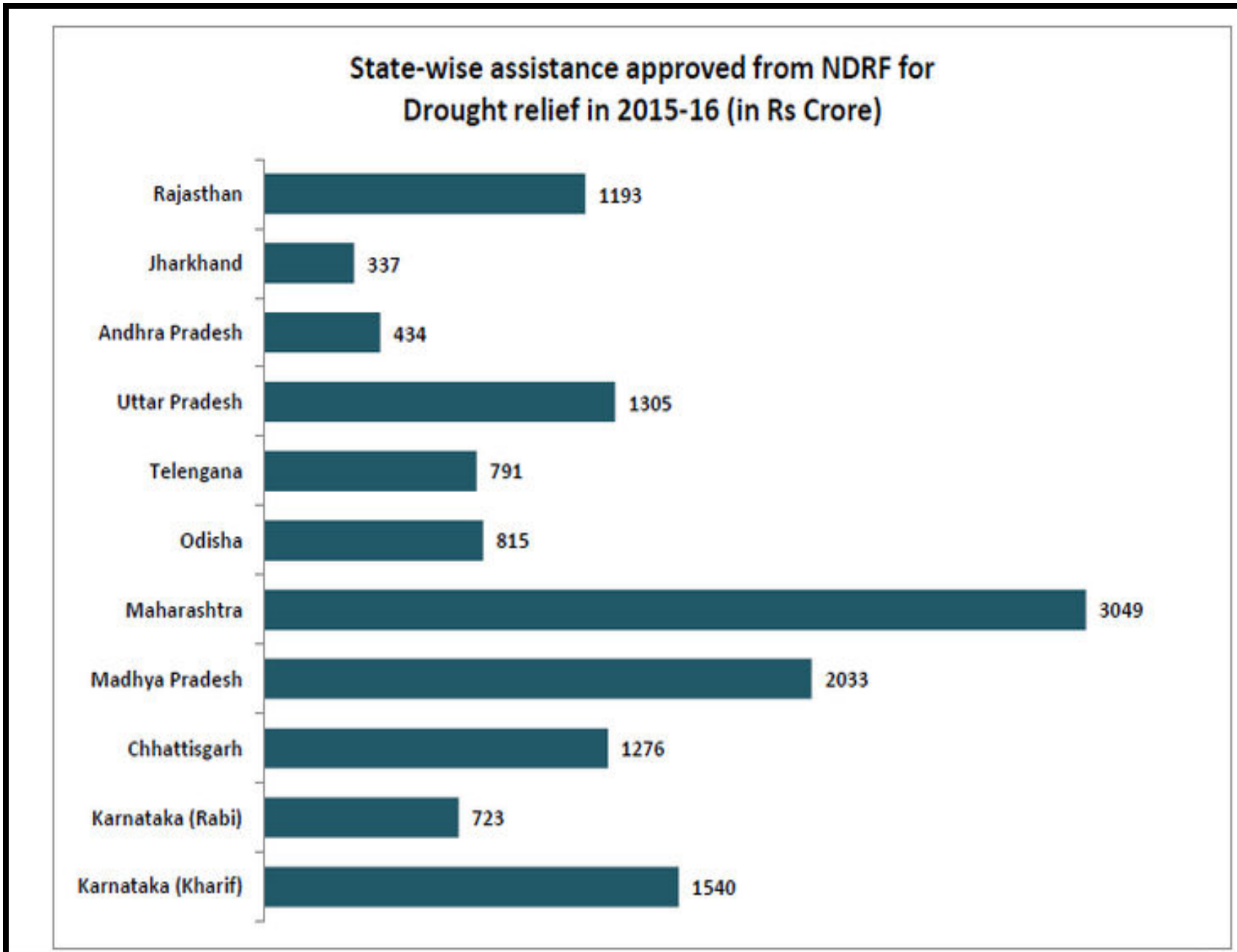
•National Disaster Management Plan (released by Prime Minister, June 2016) . **Drought Manual revised 2016 in the light of recent experiences.**


INDIA
DROUGHT PRONE AREAS
N
AFGHANISTAN
PAKISTAN
CHINA (TIBET)
NEPAL
BHUTAN
BANGLADESH
MYANMAR
JAMMU & KASHMIR
HIMACHAL PRADESH
PUNJAB
UTTARAKHAND
HARYANA
DELHI
RAJASTHAN
UTTAR PRADESH
BIHAR
SIKKIM
ARUNACHAL PRADESH
ASSAM
NAGALAND
MEGHALAYA
MANIPUR
TRIPURA
MIZORAM
JHARKHAND
WEST BENGAL
GUJARAT
MADHYA PRADESH
CHHATTISGARH
ODISHA
MAHARASHTRA
DIU AND DAMAN
DADRA & NAGAR HAVELI
TELANGANA
ANDHRA PRADESH
GOA
KARNATAKA
PUDUCHERRY
KERALA
TAMILNADU
LAKSHADWEEP (INDIA)
ANDAMAN AND NICOBAR ISLANDS (INDIA)
SRI LANKA
ARABIAN SEA
BAY OF BENGAL
INDIAN OCEAN
LEGENDS
Drought Prone Area
International Bdy.
State Boundary
Map not to Scale
Copyright © 2014 www.mapsofindia.com
(Updated as on 8th September 2014)


THE DROUGHT HIT AREAS IN INDIA - APRIL 2016
TAJIKISTAN
AFGHANISTAN
PAKISTAN
CHINA (TIBET)
NEPAL
BHUTAN
BANGLADESH
MYANMAR
JAMMU & KASHMIR
HIMACHAL PRADESH
Chandigarh
PUNJAB
UTTARAKHAND
HARYANA
New Delhi
RAJASTHAN
UTTAR PRADESH
BIHAR
SIKKIM
ARUNACHAL PRADESH
ASSAM
NAGALAND
MEGHALAYA
MANIPUR
TRIPURA
MIZORAM
JHARKHAND
WEST BENGAL
GUJARAT
MADHYA PRADESH
CHHATTISGARH
ODISHA
MAHARASHTRA
(D&D) DADRA & NAGAR HAVELI
TELANGANA
ANDHRA PRADESH
GOA
KARNATAKA
Puducherry
KERALA
TAMIL NADU
LAKSHADWEEP (INDIA)
ANDAMAN & NICOBAR ISLANDS (INDIA)
SRI LANKA
Arabian Sea
Bay of Bengal
Lakshadweep Sea
Andaman Sea
INDIAN OCEAN
Tropic of Cancer
Severe drought affected areas
Areas nearby drought
Map not to Scale
Copyright © 2016 www.mapsofindia.com
(Updated on 21st April 2016)

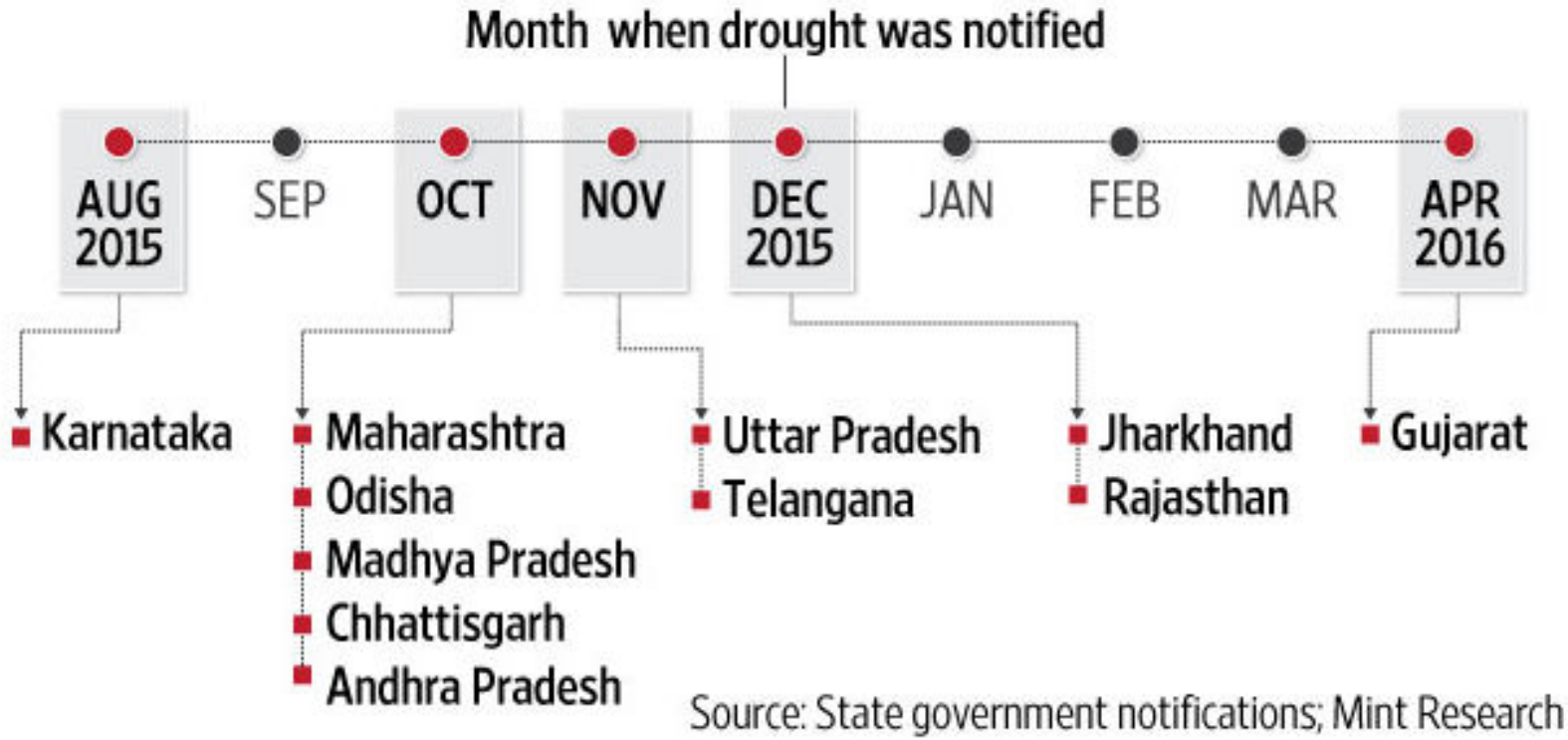

States affected by Drought 2015
80
70
60
50
40
30
20
10
0
36
21
34
16
10
8
33
19
51
46
24
22
75
50
30
27
13
27
Maharashtra
Odisha
Telangana
Rajasthan
Madhya Pradesh
Jharkhand
Uttar Pradesh
Karnataka
Andhra Pradesh
Chhattisgarh
Total Districts
Districts affected by Drought


Percentage of Drought Affected Districts - 2015-16
Gujarat
15%
Rajasthan
58%
Jharkhand
92%
Telangana
70%
Uttar Pradesh
67%
Andhra Pradesh
77%
Odisha
90%
Maharashtra
78%
Madhya Pradesh
90%
Chhattisgarh
93%
Karnataka
93%


State-wise assistance approved from NDRF for Drought relief in 2015-16 (in Rs Crore)
Rajasthan
1193
Jharkhand
337
Andhra Pradesh
434
Uttar Pradesh
1305
Telengana
791
Odisha
815
Maharashtra
3049
Madhya Pradesh
2033
Chhattisgarh
1276
Karnataka (Rabi)
723
Karnataka (Kharif)
1540

HOW LONG DID IT TAKE STATES TO DECLARE A DROUGHT?

Of the eleven states which declared a drought over the past year, Karnataka was the first to notify a drought status and Gujarat the last. Most states declared a drought between October and December, waiting for yield data from crop cutting experiments to take a decision, thus delaying relief operations.



Source: State government notifications; Mint Research

Graphic: Prajakta Patil/Mint

MARATHWADA, VIDARBHA WORST HIT

Total farmers in state

1.37 crore

Affected farmers

89.7 lakh | **65**%

Kharif crop area	Affected area
144.3 lakh hectares	**98.6** lakh hectares (68%)

Total villages
39,453

Declared drought-hit
23,811

➤ **60**% villages report half the standard crop yield

Crops affected include cotton, soyabean, paddy

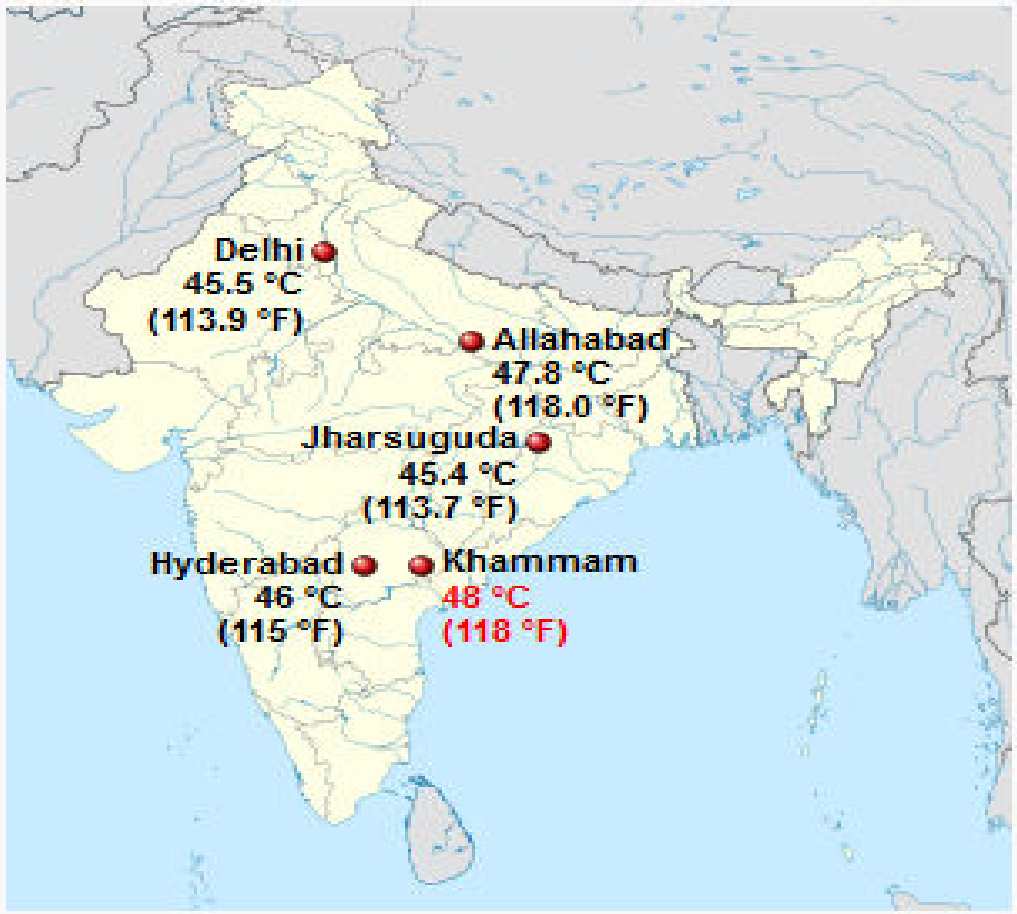
> It is a very difficult situation. Farmers in the state are facing severe agrarian distress
> **K H Govinda Raj** | STATE RELIEF AND REHABILITATION SECRETARY

➤ State has released relief worth ₹ 2,000 crore

➤ Aid worth ₹ 4,800 crore sought from Centre yet to come

Another water train carrying 2.5 million litres of water is scheduled to reach Latur in Maharashtra on Wednesday

2015 Indian heatwave



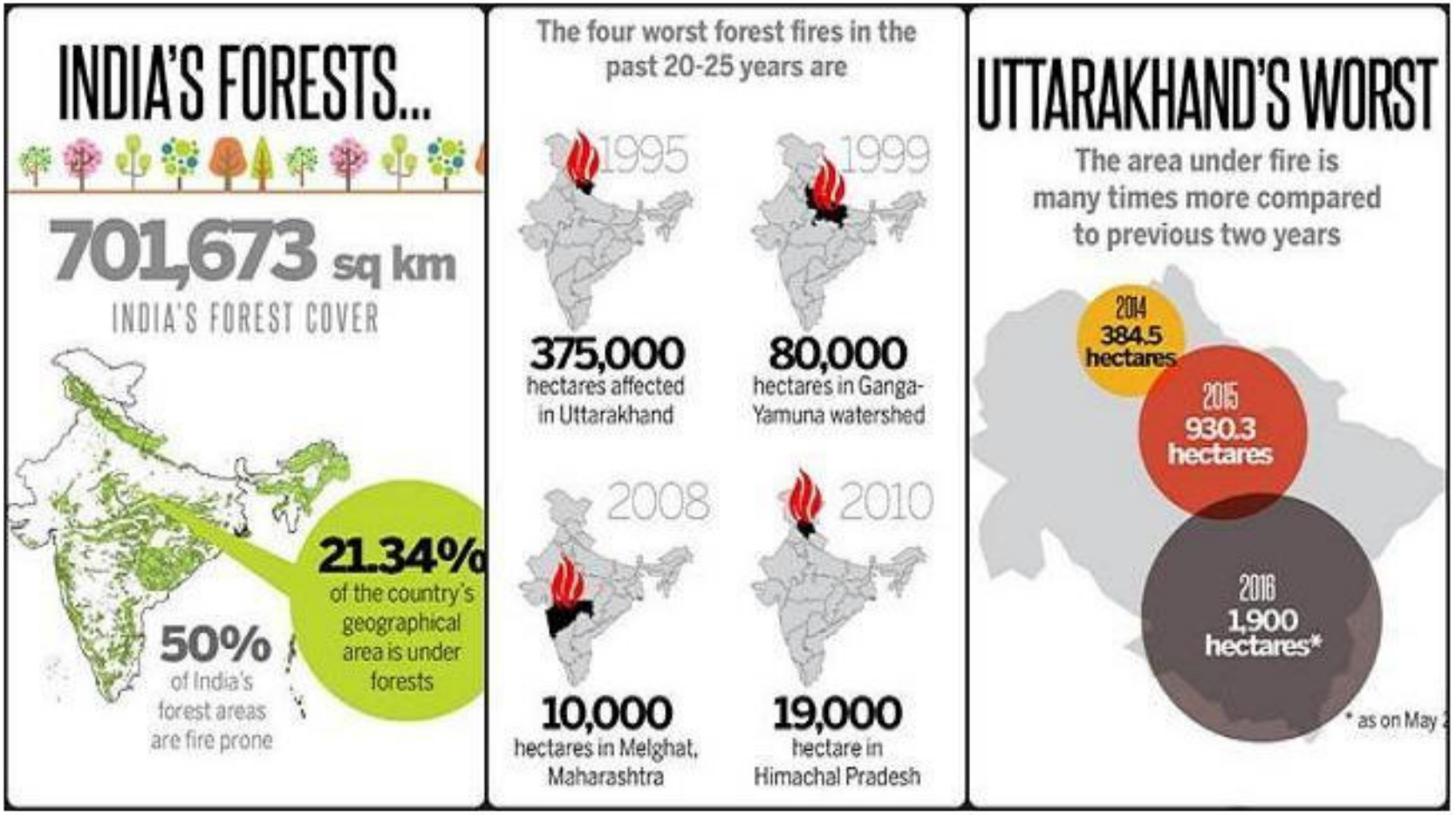
A map marking significantly affected cities

Date	Since May 2015
Location	India

Casualties

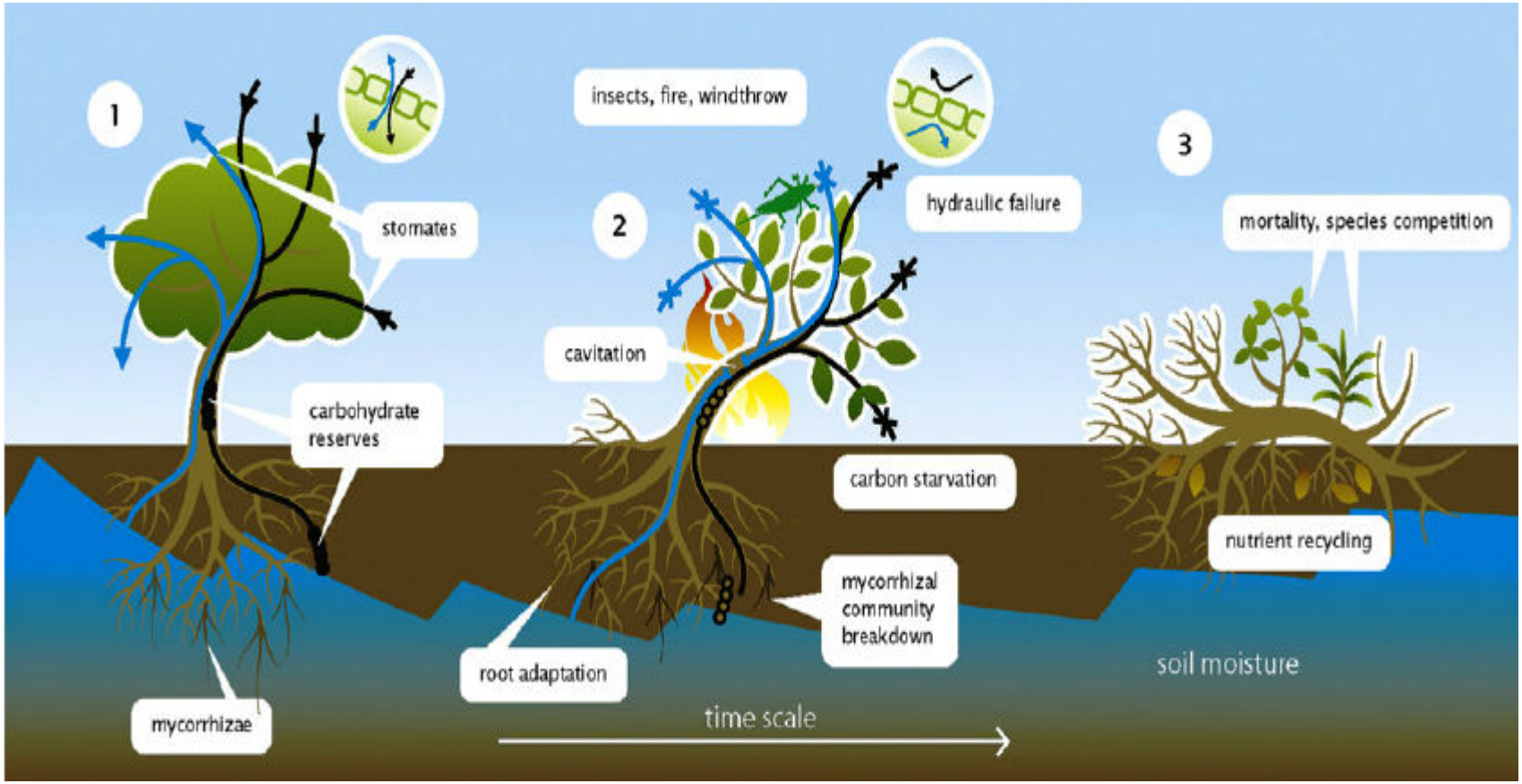
As of 3 June 2015, there were at least 2,500 deaths[1]

State	Number of deaths	As of
Andhra Pradesh	1,735	3 June 2015[20]
Telangana	585	3 June 2015[20]
Odisha	35[a]	5 June 2015[21]
Uttar Pradesh	22	30 May 2015[22]
West Bengal	13	27 May 2015[9]
Gujarat	10	28 May 2015[23]
Madhya Pradesh	10	29 May 2015[24]
Delhi	5	27 May 2015[4]
Maharashtra	2	27 May 2015[9]
Rajasthan	2	25 May 2015[25]
Chhattisgarh	1	25 May 2015[26]
Bihar	1	29 May 2015[27]
Karnataka	1	30 May 2015[28]
Total	2,500	3 June 2015[29]



Forest Drought?

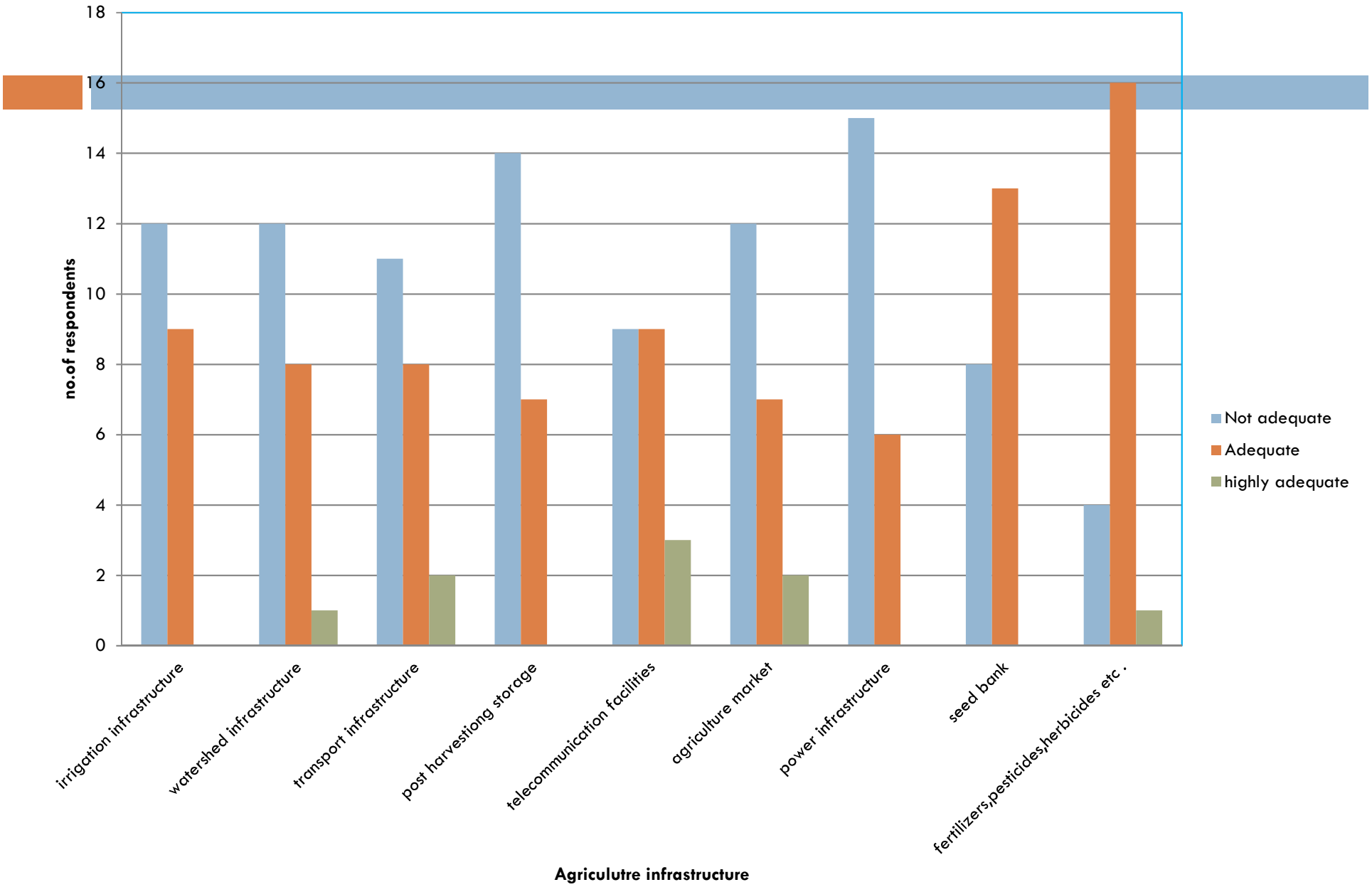
Ecological drought?



While South Asia supports more than 21 percent of the world's population, it has access to just over eight percent of global water resources, with per capita water availability decreasing by nearly 80 percent since the 1950s .

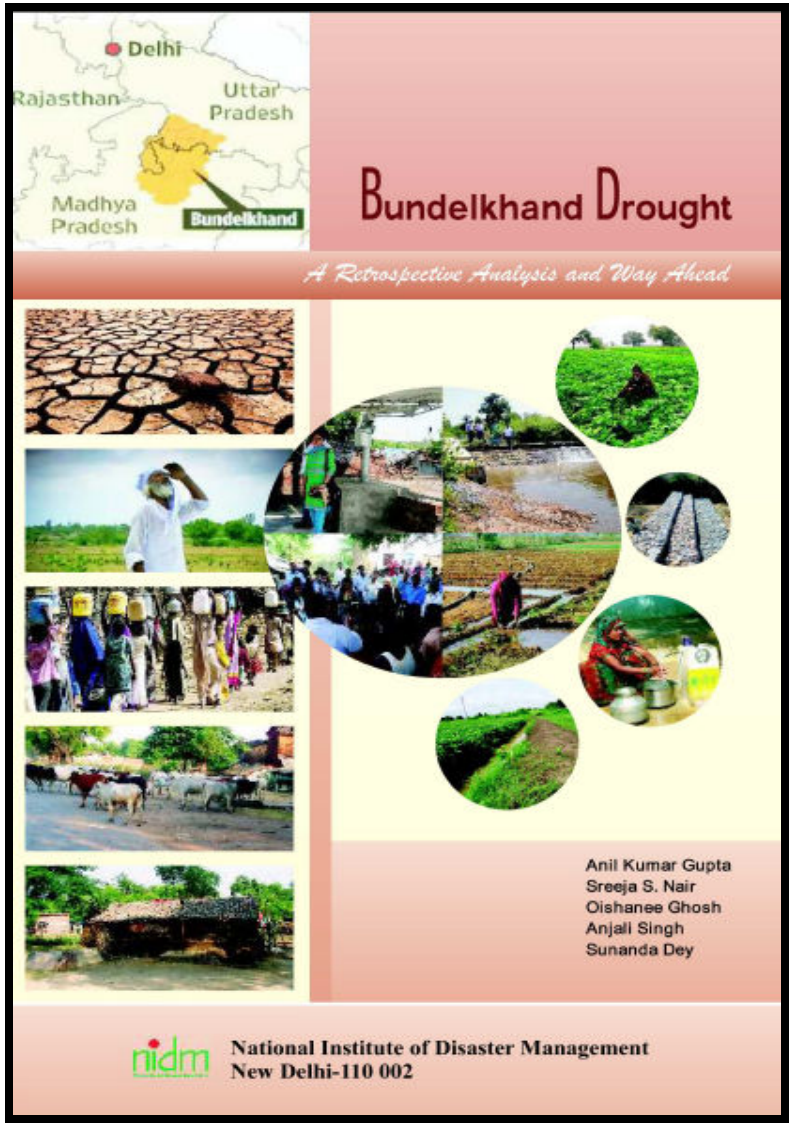
http://asiafoundation.org/

Agriculture Infrastructure Status in South Asia



Issues

- Urban agriculture /peri urban ecosystems
- Food consumption
- Waste management – reuse recycling
- Sustainable and resilient manufacturing, resilient agro and food industries
- Water pricing – water use auditing?
- Advance crop planning - micro level (village, sub-village)?
- Responsible agro-met-advisory? Research –extension feedback mechanism?
- Role of mobile technology and social media in drought risk /drought monitoring?



Bundelkhand Drought

A Retrospective Analysis and Way Ahead

Anil Kumar Gupta
Sreeja S. Nair
Oishanee Ghosh
Anjali Singh
Sunanda Dey

National Institute of Disaster Management
New Delhi-110 002

ekDRM 2010-2013

- Project “Environmental Knowledge for Disaster Risk Management” (GIZ Germany) under EPDRM.
- MoEF, GoI cooperation with Indo-German Environment Program (IGEP)
- Role of environmental information and tools in disaster related risk analysis, decision support system, mitigation and emergency response.

GIZ Project ekDRM (Environmental Knowledge for Disaster Risk Management)

Thematic Areas

Decision support system including environmental statistics for disaster risk management

- Environmental and natural resource legislation for disaster risk management
- Spatial planning for reducing risk of Industrial/chemical disasters
- Post-disaster environmental services and role of EIA in context of disaster management
- NRM - DRM Linkages (including climate-change adaptation for DRR)

Case Studies / Training Modules

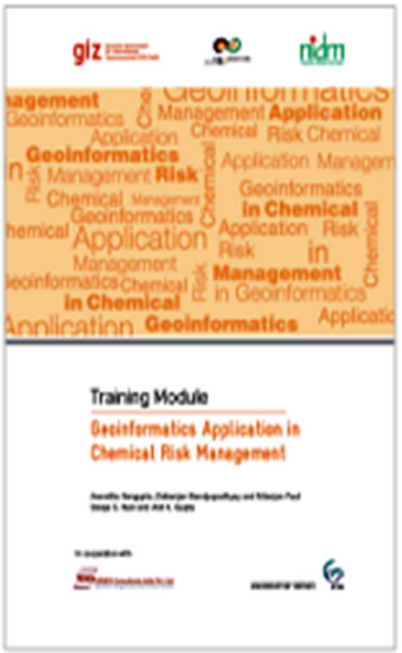
Environmental Legislation for Disaster Risk Management
ISBN: 978-3-944152-12-7
Anil K. Gupta,
Sreeja S. Nair and S. Singh

Flood Disaster Risk Management: Gorakhpur Case Study
ISBN: 978-3-944152-14-1
Anil K. Gupta,
Sreeja S. Nair,
Shiraz A. Wajih and
Sunanda Dey

Critical infrastructures and Disaster Risk Reduction in the Light of Natural Hazards

ISBN: 978-3-944152-13-4

Claudia Bach,
Anil K. Gupta,
Sreeja S. Nair and
Jörn Birkmann



Geoinformatics Application in Chemical Risk Management

ISBN: 978-3-944152-33-2

Anandita Sengupta,
Debanjan Bandyopadhyay,
Nilanjan Paul,
Sreeja S. Nair and
Anil K. Gupta

Databases and Statistics for Disaster Risk Management

(4 Modules)

ISBN: 978-3-944152-11-0

Sreeja S. Nair, Klaus Röder
& Anil K. Gupta

Disaster Management and Risk Reduction

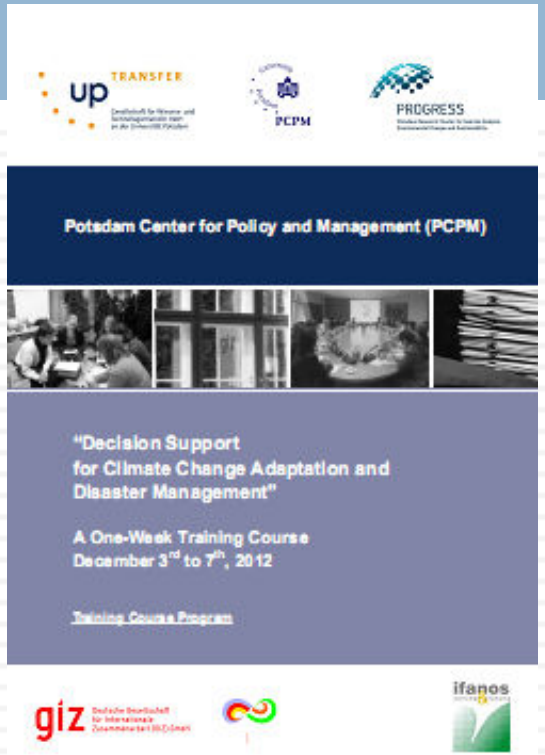
Role of Environmental Knowledge

Editors
Anil K. Gupta
Sreeja S. Nair
Florian Rammerlein-Lux
Sudipta Chatterji

Narosa

International Training Workshop on “Decision Support for Climate Change Adaptation and Disaster Management”, Postdam, Germany, 3-11 December 2012

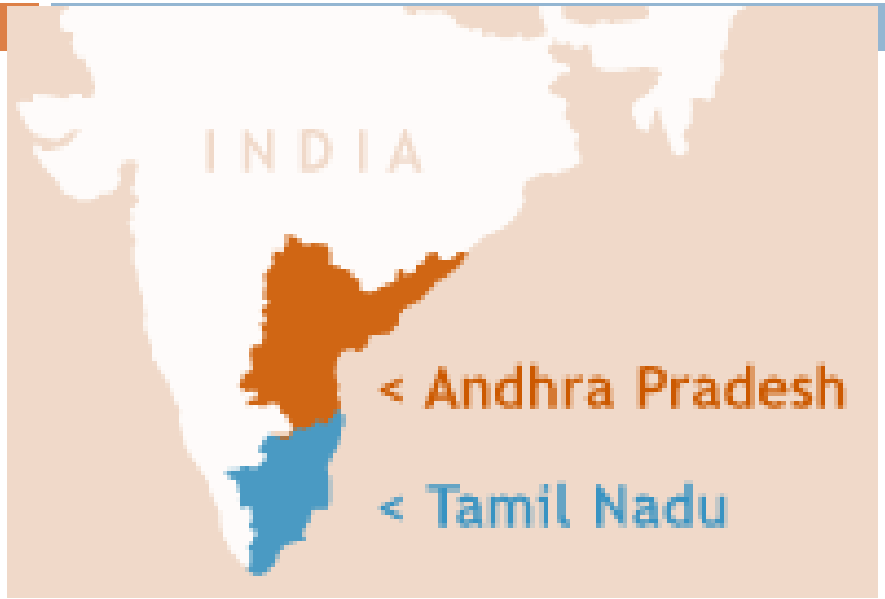
- Institution : Potsdam Centre for Policy and Management (PCPM). Interdisciplinary "Potsdam Research Cluster for Georisk Analysis, Environmental Change and Sustainability - PROGRESS“
- 12 Participants from NIDM, ATIs, SDMA attended the Programme.
- Change Management – DRR /CCA and Safety Context...



Climate Change Adaptation

- Climate Resilient Development and Adaptation (CRDA) with UNDP, MoEF, ISET (USA), TERI, Winrock
- Role of Policy and Institutions in Local Adaptation to Climate Change: Case Studies on Responses to Too Much and Too Little Water in the Hindu Kush Himalayas (ICIMOD Kathmandu)
- Training Need Analysis for CCA-DRR integration (UNDP, State of Tripura)

Coastal DRR



Integrating Climate Resilient Plan into Disaster Management in Coastal Areas of Tamil Nadu and Andhra Pradesh

Andhra Pradesh:
Vishakapatnam, Prakasham, Nellore

Tamil Nadu:
Cuddalore, Nagapatinam, Thiruvallur

6 cities and 18 villages forming 6 clusters

GIZ Germany - European Union - NIDM Under Indo-German Environment Programme

AdaptCAP-drr (EU, GIZ-IGEP)

- Urban Rural Linkages
- Infrastructure interventions and their up-scaling..to make development climate smart
- CCA integration in planning process..(Village to District Level)
- Disaster Management Plans at Village and District Levels
- State Action Plan on Climate Change and State DM Plan/Policy.

FLOOD DRR

- Case Study of Gorakhpur district—what are the **exposure** and **fragilities** of **Key Systems** (water supply, drainage etc.) fragility—current and projected **Climate Change contexts** by analyzing:

- ***Secondary data on flood impacts***
- ***Programmes of various depts***
- ***DRR responses of DDMA (Gorakhpur) during past flood events***
- ***Codes, legal and regulatory frameworks of various depts***

Project Objectives & Key outcomes

CDKN Supported Project

Objectives

- Systemic factors that contributes to resilience or vulnerability.
- Policy innovations for bridging vertical and horizontal gaps
- Capacity building
- Document and disseminate generated knowledge

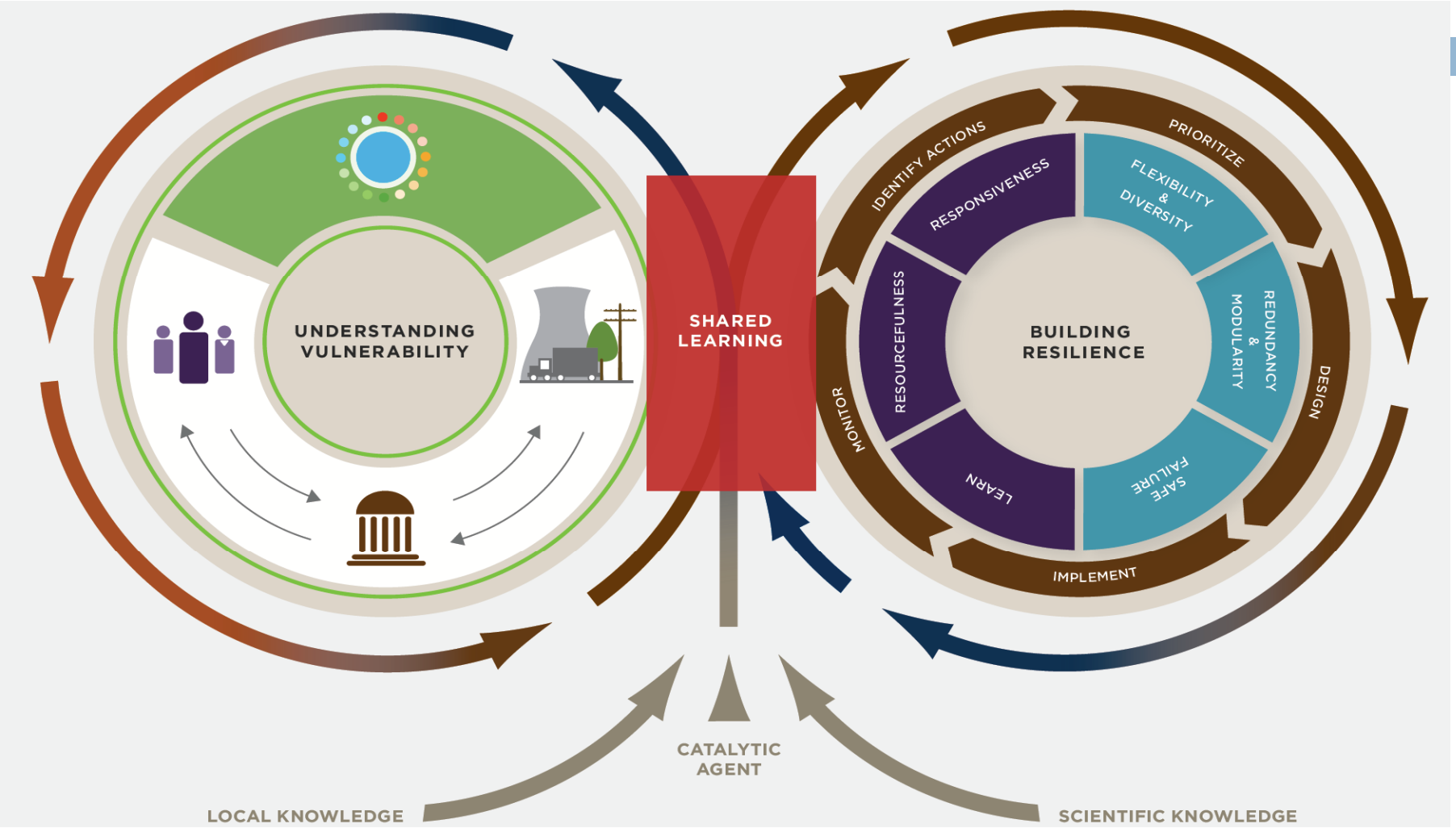
Implementation:

Gorakhpur Environmental Action Group (GEAG), Institute of Social & Environment Transition (ISET, USA), District Disaster Management Authority Gorakhpur (DDMA), National Institute of Disaster Management (NIDM)

Key Outcomes:

- Developing CCA integrated **DDMP,** operationalized
- **Participatory Planning** : Identifying gaps and solutions
- Departmental planning and linking with policy provisions (**inter-sectoral coordination**)
- **Capacity:** Researchers and Departments (DDMA)
- **Directives and Orders** for adopting the process
- **Sharing of learning** at State and national level
- **Training** Module
- **Delhi Declaration on Resilient Housing 2014**

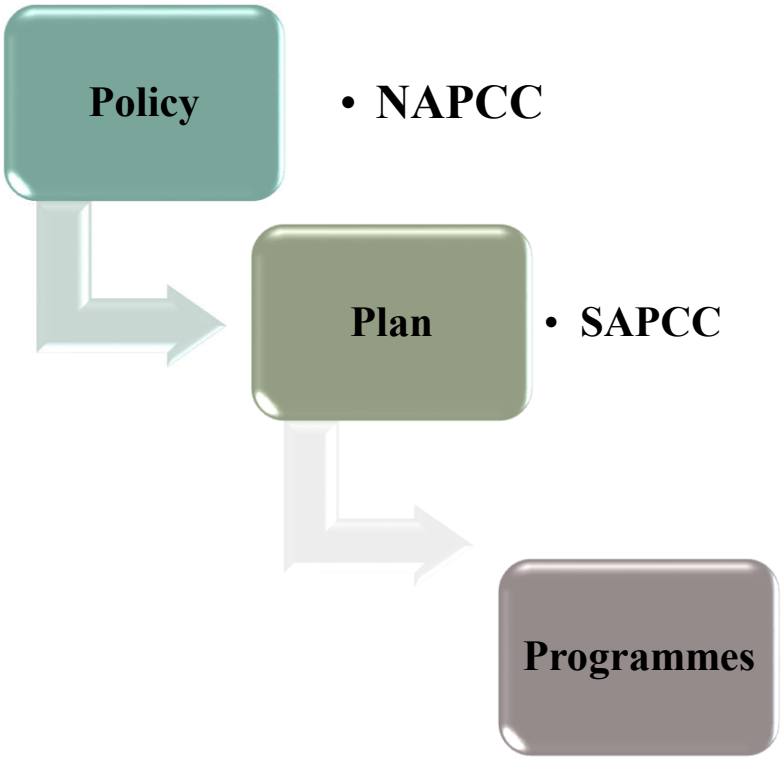
The Climate Resilience Framework (CRF)



ISET, USA

- CRS http://geagindia.org/PDF/Towards%20a%20Resilient%20(Englishl).pdf
- Policy Brief CDKN+ GEAG http://geagindia.org/PDF/EXTREME%20RAINFALL,%20CLIMATE%20CHANGE,%20AND%20FLOODING%20Policy%20Brief%20Gorakhpur%20India.pdf
- Teri Policy Breif http://www.teriin.org/policybrief/
- Process document http://www.start.org/download/2014/geag_mainstreaming-cca-drr_processdocument.pdf
- Training Module http://nidm.gov.in/PDF/modules/climate.pdf
- CRF-ISET http://i-s-e-t.org/projects/crf.html

Flow of Policy and Actions on Climate Change

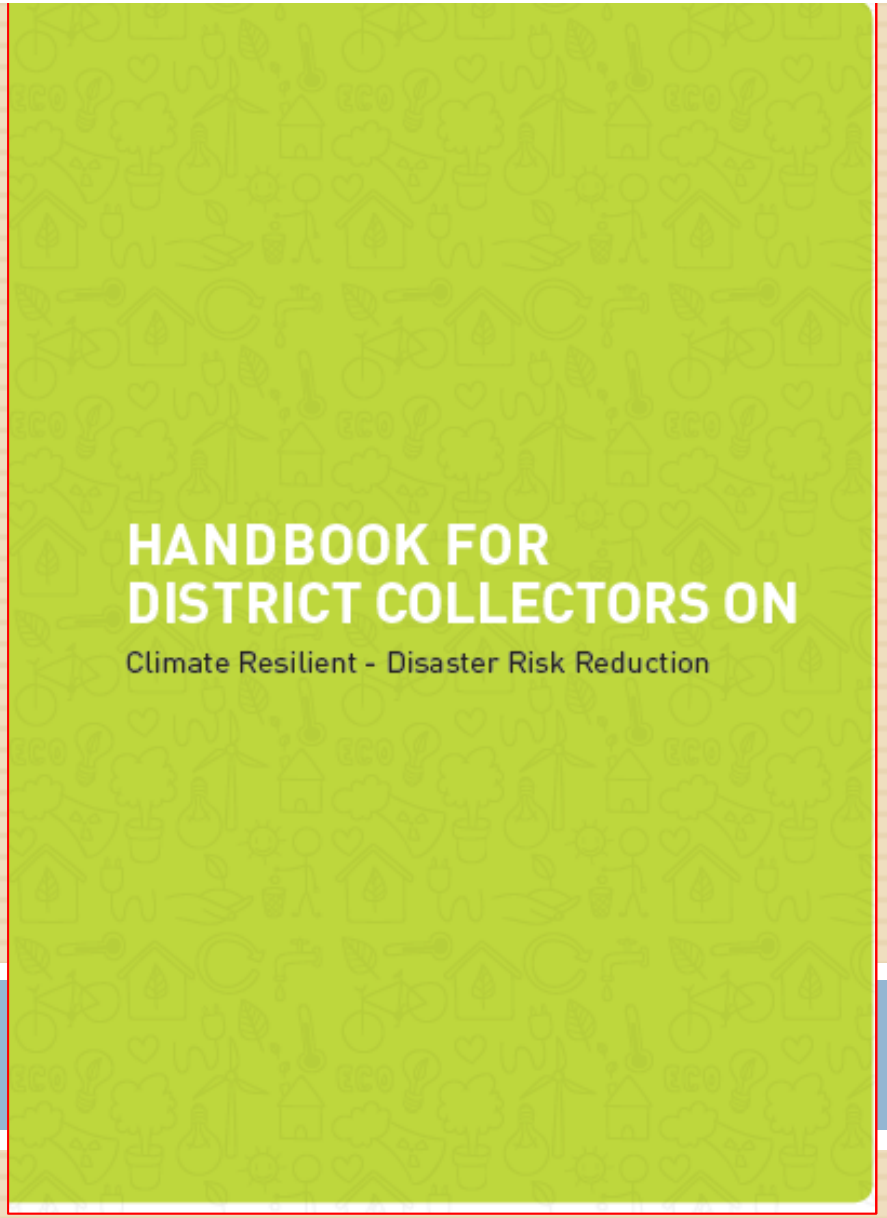


•The Central Government is the apex body to give policy directions; inventive plans and

• programmes are planned at sub-national level, while the actual actions take place at district / local level

• **DDMP- Projects, Programmes,** Actions, Resources, Community Participation, Training & Capacity Building

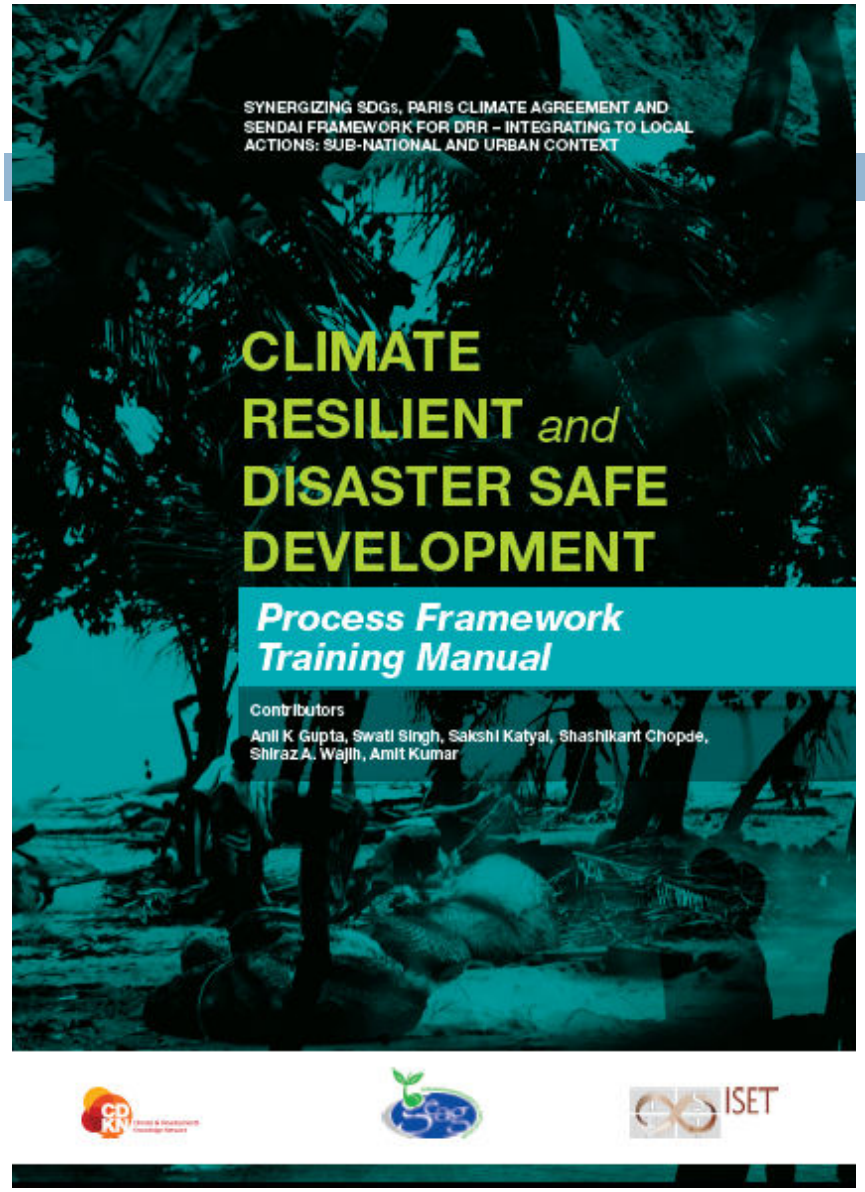
District Administration & Local Government



Schemes, Programmes, Departmental developmental plans, Flagship schemes/Mission

National / Sectors

- All development sectors must
- imbibe the principles of disaster risk
- management
- Work towards risk coverage for all
- Encourage greater participation and leadership of women in disaster risk management
- Invest in risk mapping globally
- Leverage technology to enhance the efficiency of disaster risk management efforts
- Develop a network of Universities to work on disaster issues
- Utilize the opportunities provided by social media and mobile technologies
- Built local capacities and initiatives
- Ensure the opportunity to learn from a disaster is not wasted
- Bring about greater cohesion in international disaster response



Harnessing Synergies

Integrated mainstreaming

ECO-DRR

- UN-PEDRR (Partnership for Environment and Disaster Risk Reduction) - collaborating (through UNEP Geneva): Conceptualized in 2010 Bonn.
- First pilot PEDRR Training Course in Sri Lanka in May 2011.
- Following, NIDM and PEDRR organized national / regional trainings (New Delhi Dec 2011)
- ecoDRR International Training Manual by UNEP.
- Indian Case Studies – 12, Published as Book on ecoDRR.
- Special Side Events – Policy Dialogue at 6th AMCDRR Bangkok, 7th AMCDRR Delhi, 3rd WCDRR Sendai, jointly with UNEP, Kyoto University, ICIMOD.


Ecosystem Based Disaster Risk Reduction

nidm

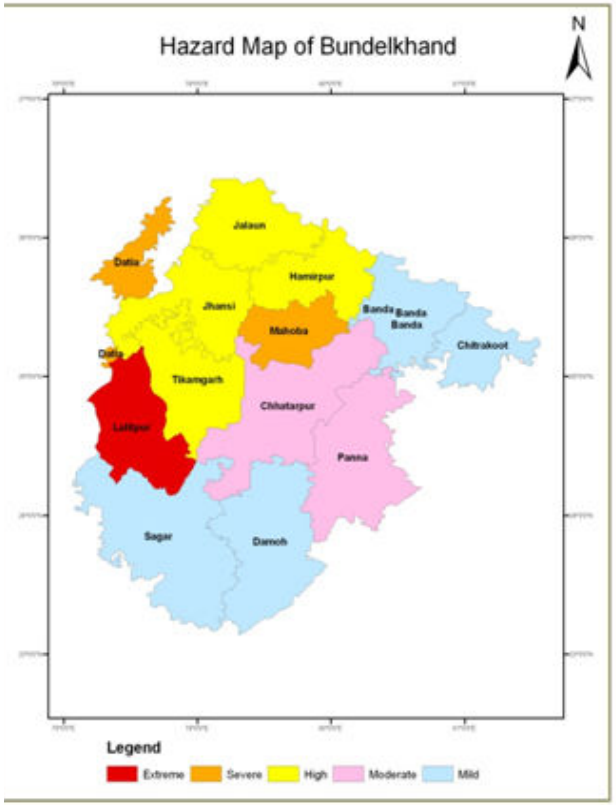
Towards a disaster free India

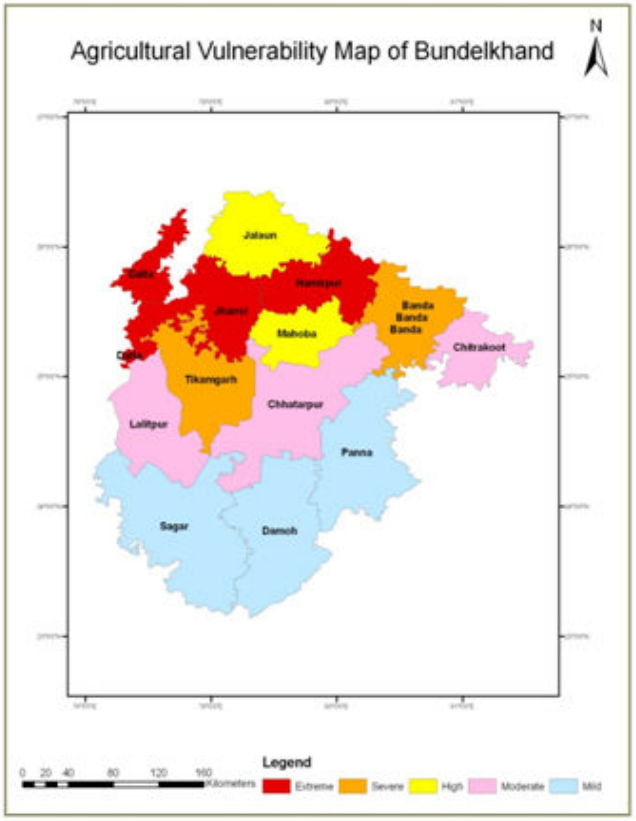
Ecosystem Approach to Disaster Risk Reduction

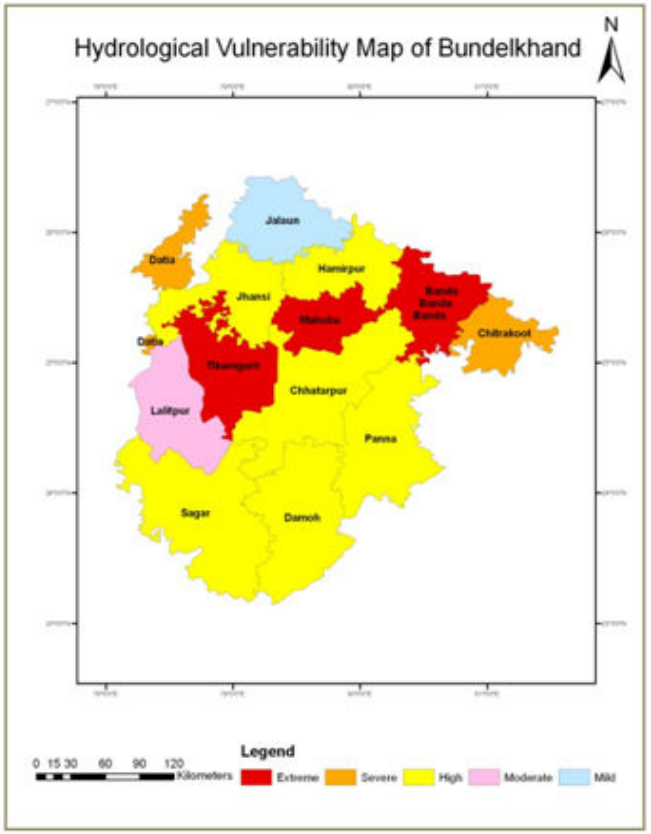
Bundelkhand Drought

(Indian Council of Social Science Research, Funded Project)

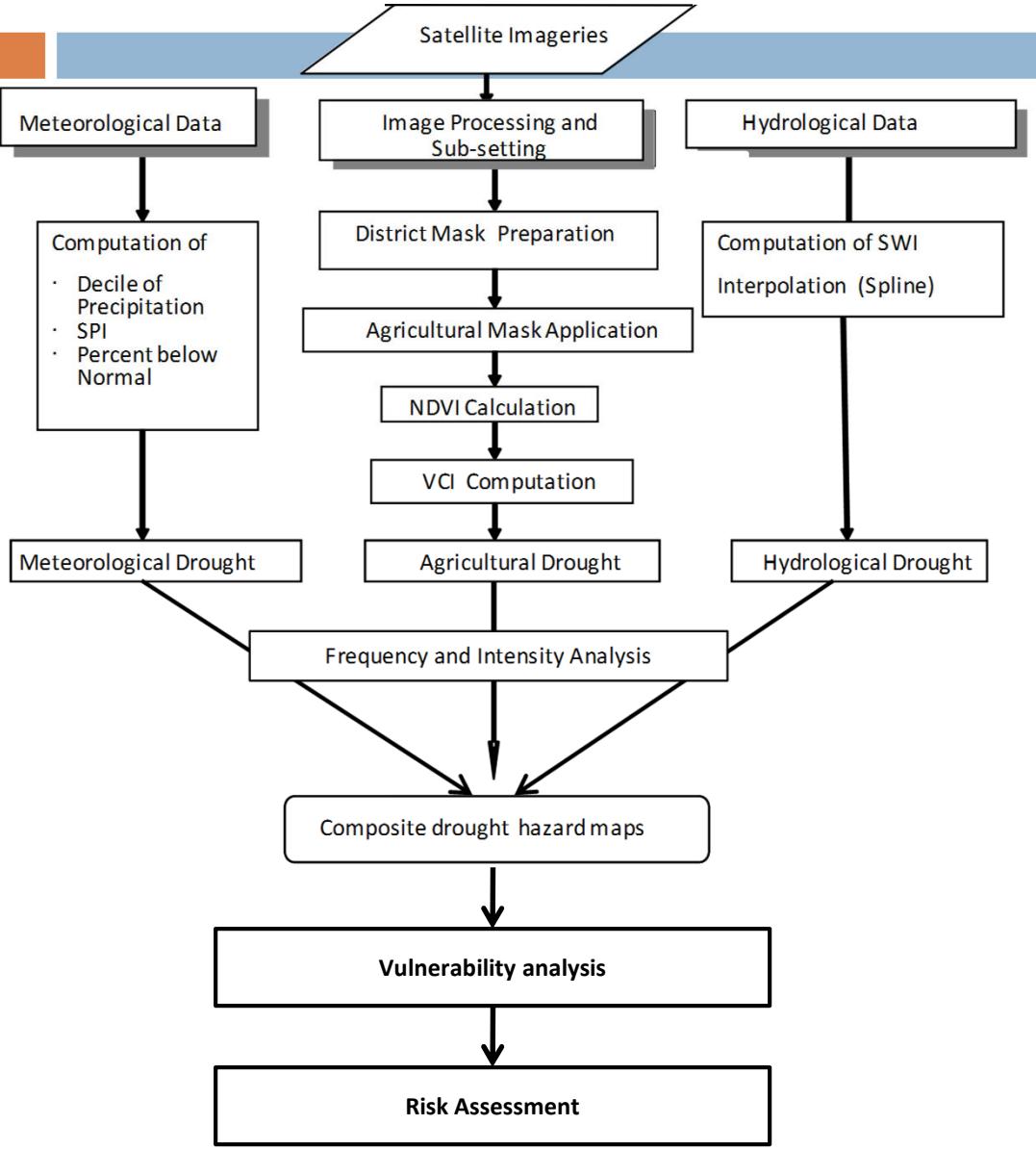
- Patterns of meteorological, hydrological and agricultural drought
- Spatial extent of environmental and socio-economic vulnerability
- Mitigation analysis (a new tool/approach) – spatial extent, effectiveness



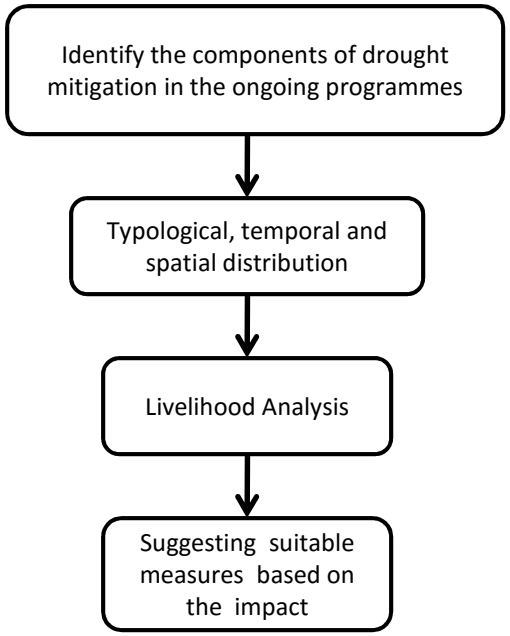




Risk Assessment



Mitigation Analysis



Vulnerable Bundelkhand

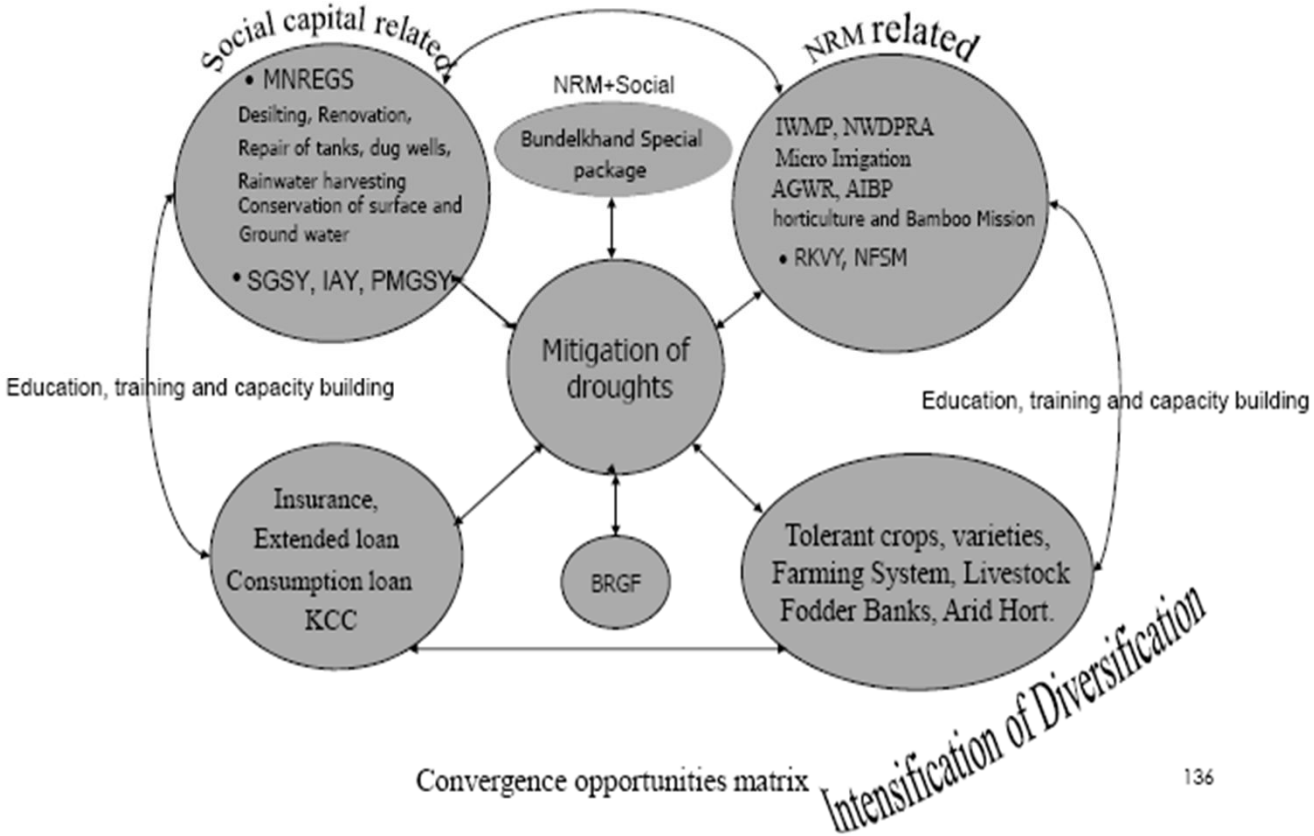





Table 25. Convergence Matrix of different programmes/schemes and projects in Bundelkhand region

S No	Name of the Scheme/ Project/ Programme	Activity	Drought Mitigation (NRM/ Social/ Both)
1.	Bundelkhand Package	• Watershed Management • Water Resource Management • Environment and Forests Including water shed management, soil and water conservation in forests • Agriculture including Warehousing and integrated marketing infrastructure …nent, contingency Cropping and …tiplication, micro irrigation, …tation, capacity building,	Both

Mainstreaming Drought Risk Reduction by Convergence



Convergence opportunities matrix

UNDP-DRR India and Environment

Guidelines and Tools for Mainstreaming Disaster Risk Management in

- Environment Sector
  - *Focus on NRM, ecosystem services, community based issues, sustainable development: Coastal, Mountains, Forestry Sector, Agro-ecosystems, etc.*
- Housing sector
- Health Sector
- Agriculture sector
- Urban Planning

Guidelines for Reconstruction & Recovery Framework

National Disaster Management Plan

- National DM Policy, DM Act
- Integrated, participatory, consultative process
- DM Plans of Ministries/Departments
  - *Mitigation Plan*
  - *Response Plan*
  - *Capacity Building Plan*
  - *Budgetary Provisions*
- Programmes and Schemes of the Ministries
- National Human Resource Development Plan
- State Plans for DM

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Ecosystem Services for Disaster Risk Reduction: A Case Study of Wetland in East Delhi Region, India

By Swati Singh, Sreeja S. Nair & Anil K. Gupta
National Institute of Disaster Management, India

Abstract - Ecosystem services are the benefits that societies receive from the nature. These may be in the form of regulating, provisioning, supporting or cultural services. Wetland being one of the most productive ecosystems provides these services at no cost. These ecosystems also contribute to reducing disaster risk by serving as natural protective barriers or buffers and, thus, mitigating hazard impacts. But many such wetland ecosystems are tremendous stressed due to anthropogenic pressure. Wetlands on the fringes of river channels in the city are looked upon as a resource for different land use planning. The capital Delhi manifests all the ills that a river

SFDRR highlights

- *Resilience*
- *Ecosystem Based Solutions*
- *Integrating CCA*
- *Health Systems*
- *Specific goals for DRR – Monitoring*

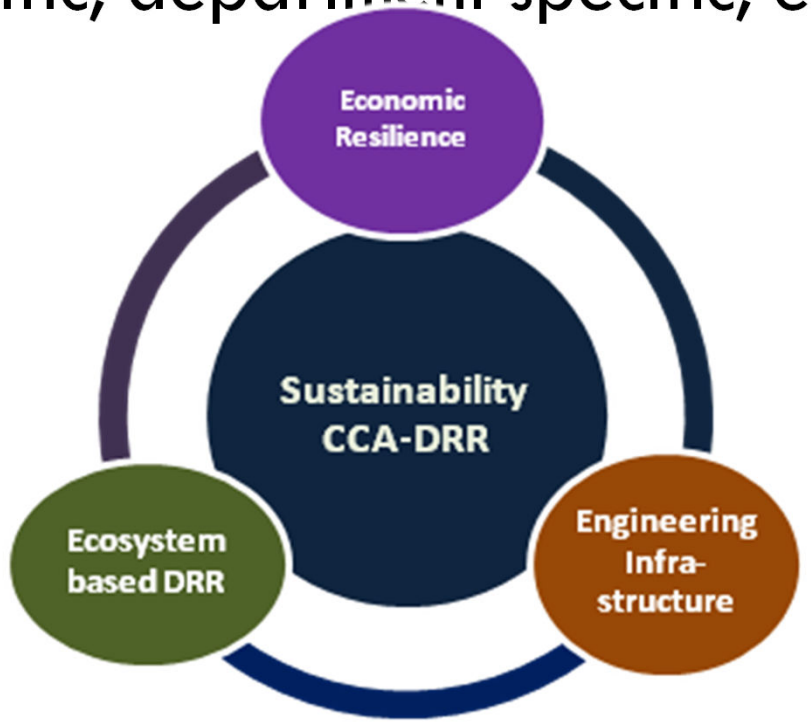
Four Priorities

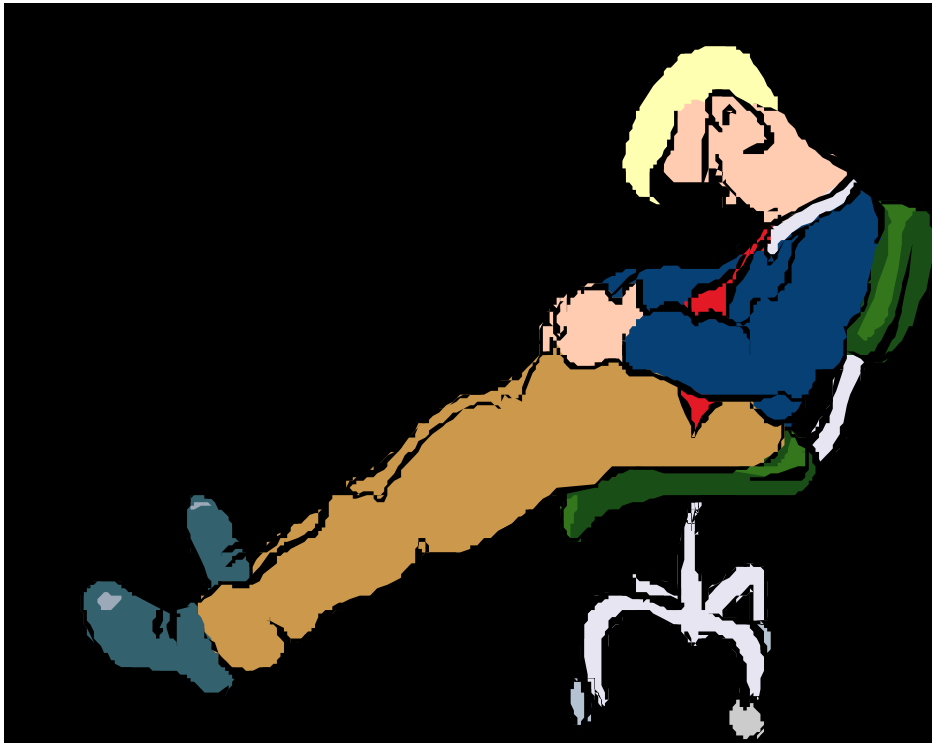
1. Understand disaster risk
2. Strengthen disaster risk governance
3. Invest in DRR
4. Enhance disaster preparedness

- Emphasis on Recovery

Operational Needs

- Translating Sendai Framework to National/sub-national and local DRR frameworks
- Disaster Management Plans – National/state, local, sector specific, department specific, etc.





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