



विज्ञान एवं  
प्रौद्योगिकी मंत्रालय  
MINISTRY OF  
SCIENCE AND  
TECHNOLOGY



अनुकूलन आपदा जोखिम-तन्त्र्यता व वहनीयता हेतु समेकित केन्द्र  
**Integrated Centre for Adaptation, Disaster Risk-  
Resilience and Sustainability (ICARS)**

जीएनईसी, भारतीय प्रौद्योगिकी संस्थान, रुड़की  
GNEC, Indian Institute of Technology, Roorkee

# AI in DRR, Safety and Crisis Response Policy-Planning & Capacities



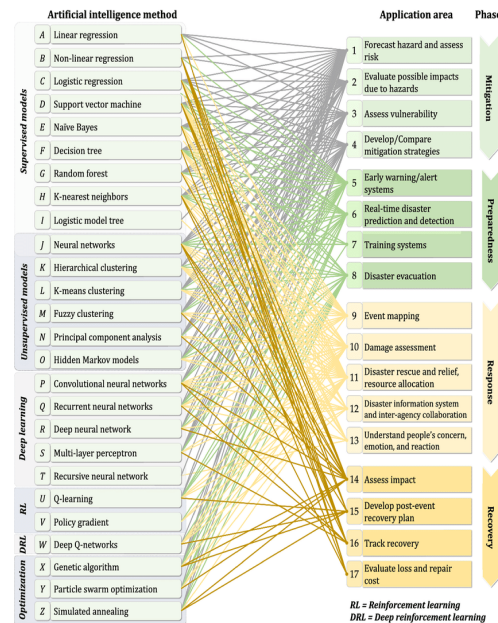
**Prof. Anil Kumar Gupta**  
Professor & Chief Executive  
ICARS\* (GOI-DST Centre of Excellence)  
IIT Roorkee Gr. Noida Campus (NCR)

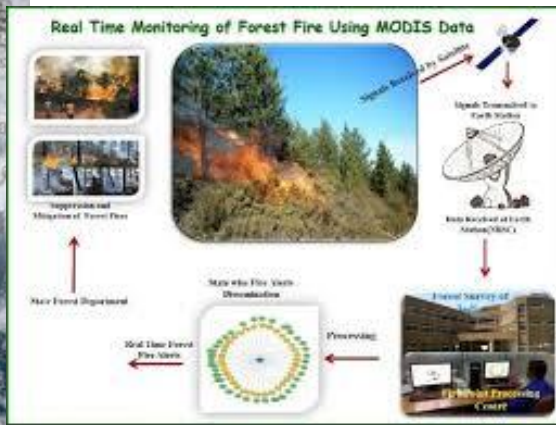
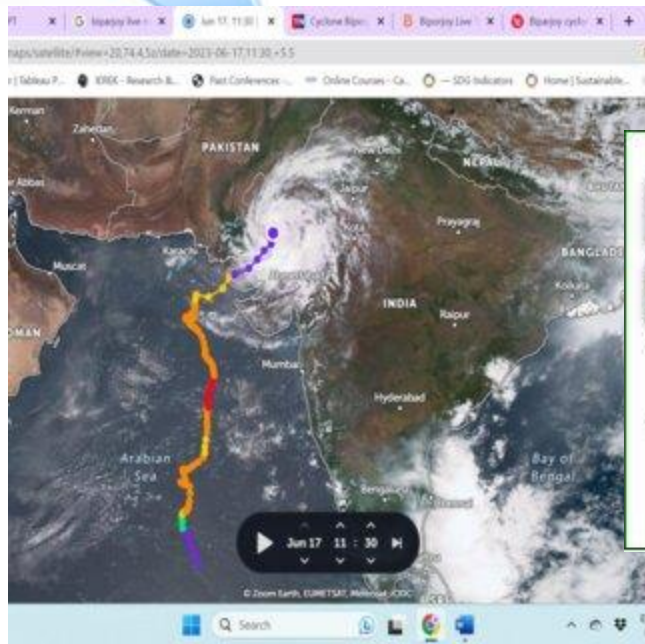
\*ICARS: Integrated Centre for Adaptation, Disaster-Risk Resilience and Sustainability



# DRR & Crisis Response: Critical Challenges

- Multi-component / Parameters
- Huge data
- Time effectiveness
- Geospatial precision / Processes
- Earth Observations: Space, Ground
- DSS and Access
- Communications
- Coordination/ Multi-agencies

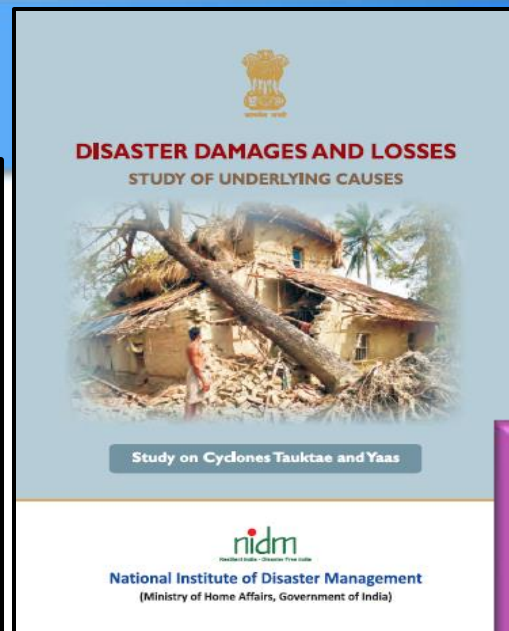
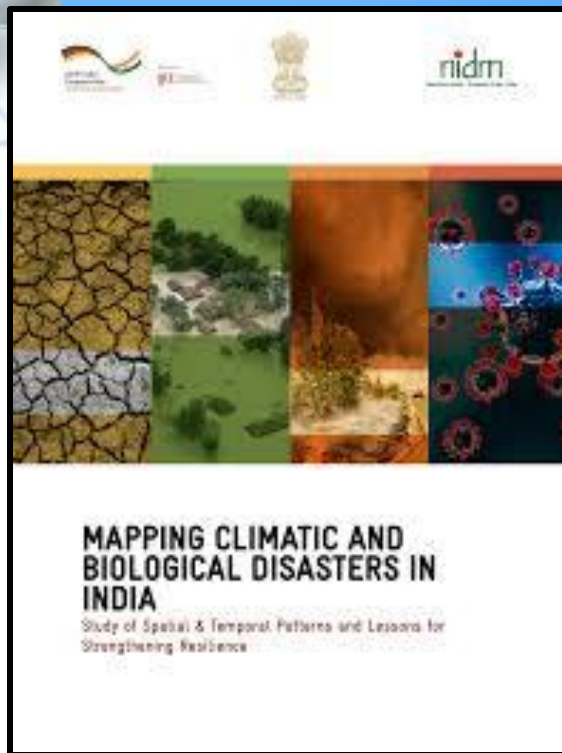




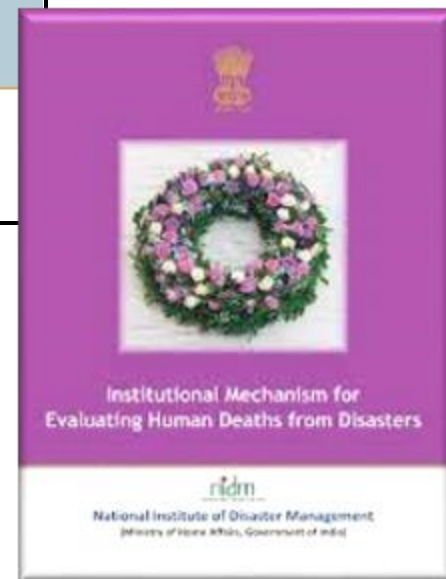




- 25 years / 3 periods
- 4 climatic, 3 biological disasters
- All states / UTs
- Frequency, Mortality



## Recent Studies



## Chapter 22

# Multi-Hazard Risk Management During Pandemic



Thinles Chondol, Shweta Bhardwaj, Ashish Kumar Panda, and  
Anil Kumar Gupta

**Abstract** Disasters not necessarily occur one at a time rather multiple disasters may occur amid another, in a form of secondary or cascading disaster or a new disaster may occur from a new origin due to the aggravated vulnerability factors. In past

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M. K. Goyal, A. K. Gupta (eds.), *Integrated Risk of Pandemic: Covid-19 Impacts, Resilience and Recommendations*, Disaster Resilience and Green Growth,  
[https://doi.org/10.1007/978-981-15-7679-9\\_22](https://doi.org/10.1007/978-981-15-7679-9_22)



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## Applying environmental impact assessments and strategic environmental assessments in disaster management

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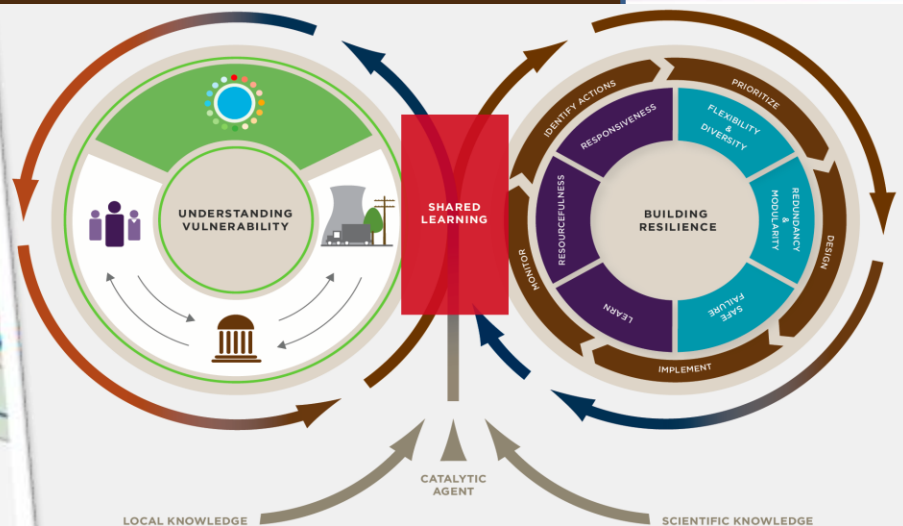
*Anil Kumar Gupta and Sreeja S. Nair*

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DIA, REIA

**Rationale:** Paradigm shift to ecosystem-based disaster risk reduction

The first paradigm shift in disaster management that took place over the past two decades moved “response- and relief-centric approaches” towards “mitigation and preparedness-centric approaches”, but this re-



- CRS [http://geagindia.org/PDF/Towards%20a%20Resilient%20\(English\).pdf](http://geagindia.org/PDF/Towards%20a%20Resilient%20(English).pdf)
- Policy Brief CDKN+ GEAG <http://geagindia.org/PDF/EXTREME%20RAINFALL.%20CLIMATE%20CHANGE.%20AND%20FLOODING%20Policy%20Brief%20Gorakhpur%20India.pdf>
- Teri Policy Brief <http://www.teriin.org/policybrief/>
- Process document [http://www.start.org/download/2014/geag\\_mainstreaming-cca-drr\\_processdocument.pdf](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>





## Transitions

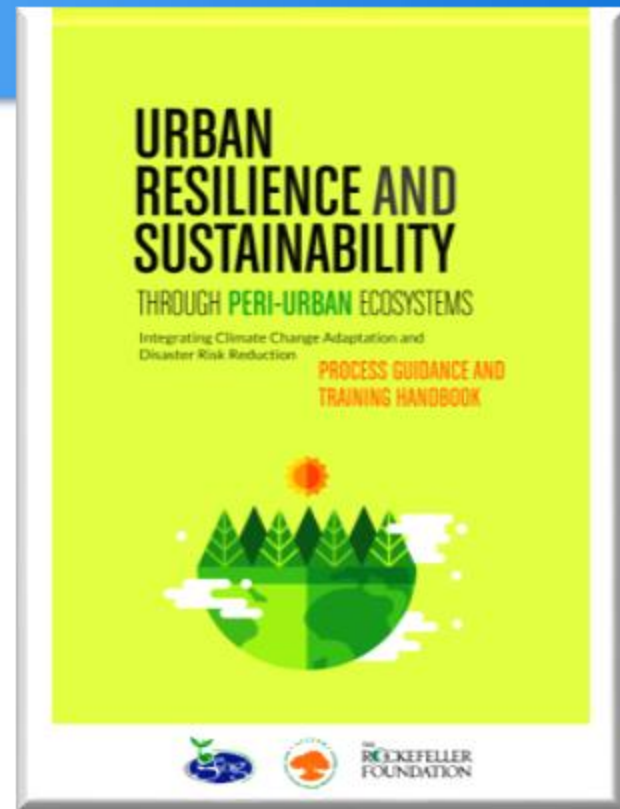
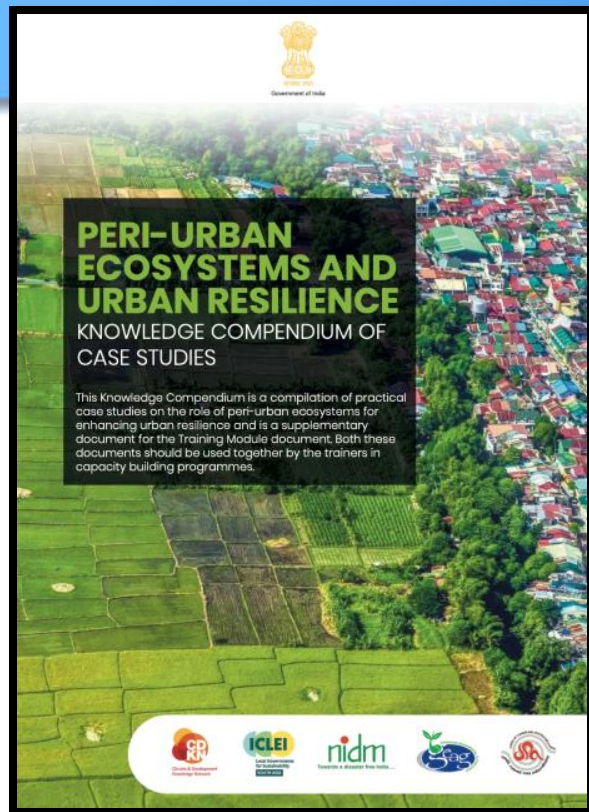
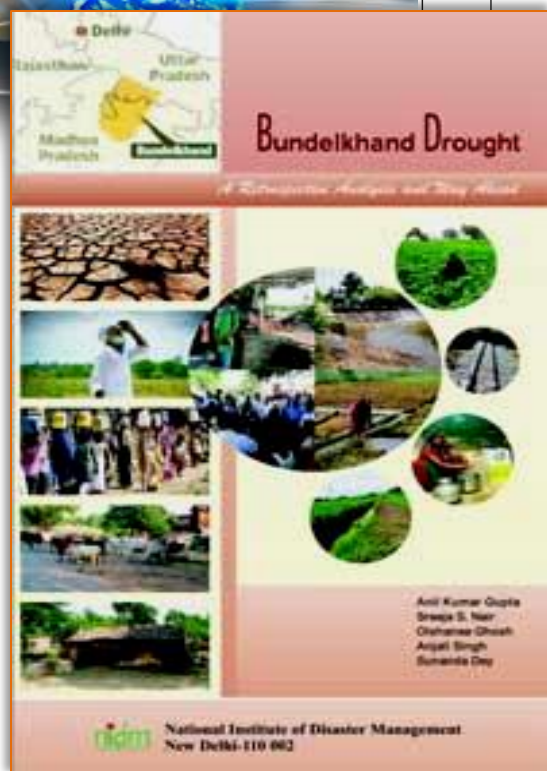


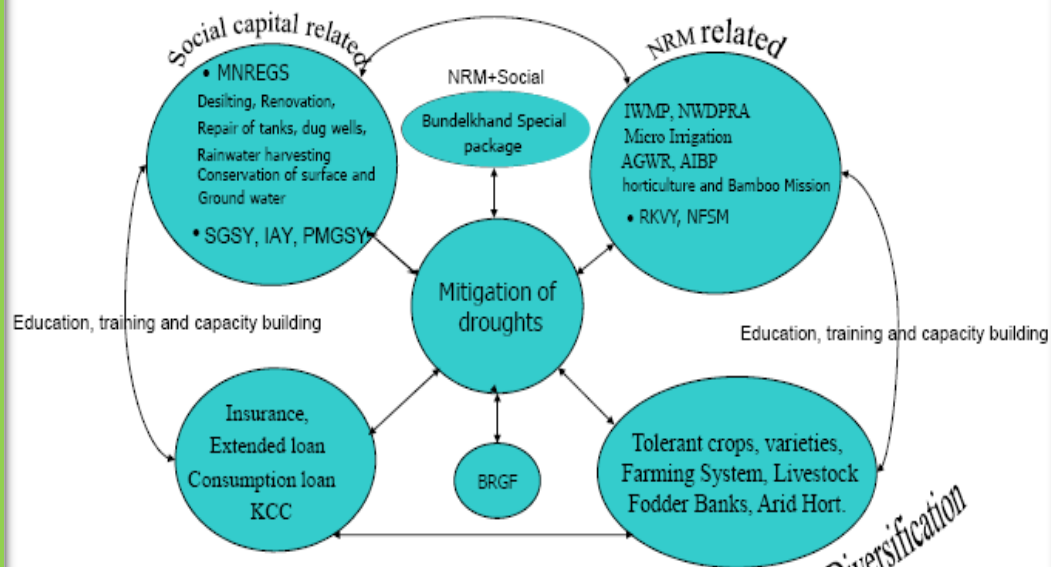


Table 25. Convergence Matrix of different programmes/schemes and projects in Bundelkhand region

S No	Name of the Scheme/ Project/ Programme	Activity	Drought Mitigation (NRM/ Social/ Both)
1.	Bundelkhand P		

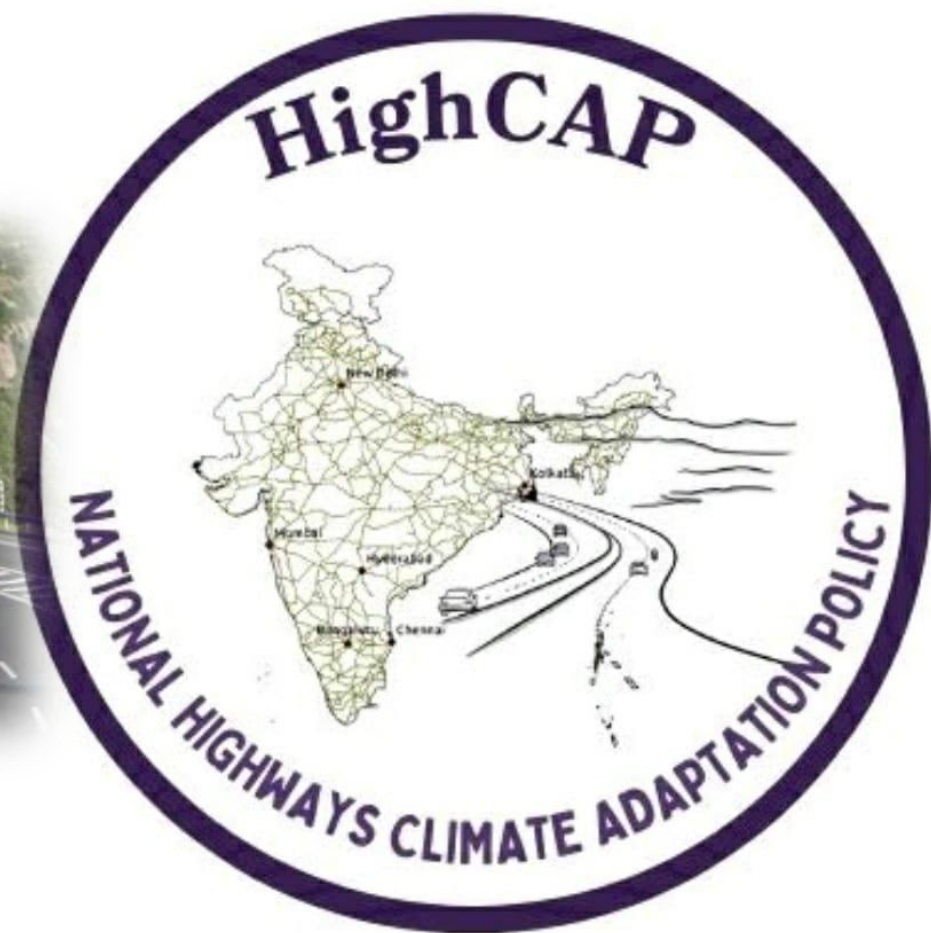


### Mainstreaming Drought Risk Reduction by Convergence



Convergence opportunities matrix

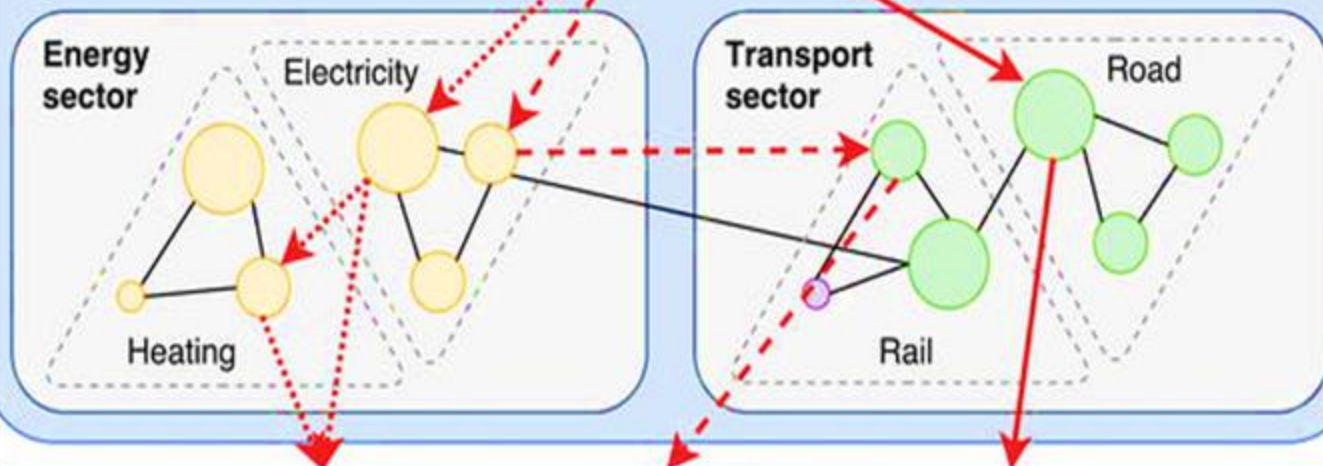
Intensification of Diversification



## Security threats

Intentional anthropogenic threats, Unintentional anthropogenic threats, Natural threats

## Critical Infrastructure System



## Society

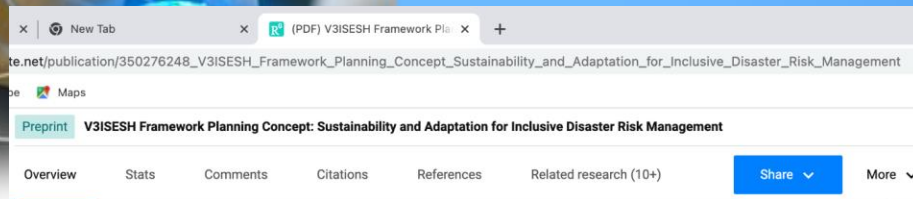
State security, Economy, Basic Human Needs

### Legend:

- Regional elements
- National elements
- Multinational elements
- Linkages
- Direct effect
- Cascading effect
- Synergistic effect



# V3ISHES FPC – The Integration Model



## Point of view

## V3ISHES Framework Planning Concept: Sustainability and Adaptation for Inclusive Disaster Risk Management

Prof (Dr) Anil K. Gupta is a Professor and Head of Division at the National Institute of Disaster Management, Ministry of Home Affairs, Govt. of India.

The V3ISHES - Vital, Viable and Vibrant Inclusive Safety-Environment-Sustainability-Health (V3ISHES) Framework is a wisdom-driven, innovative and effective tool to address the prevailing and future complexity of risks faced by people, governments and businesses. The PDM (Preventive Disaster Management) Framework by Gupta & Yunus (2004, Current Science) which preceded the 2005's Disaster Management Act of India argued for a holistic, proactive and risk-mitigation-centric approach. However, despite the best understanding,

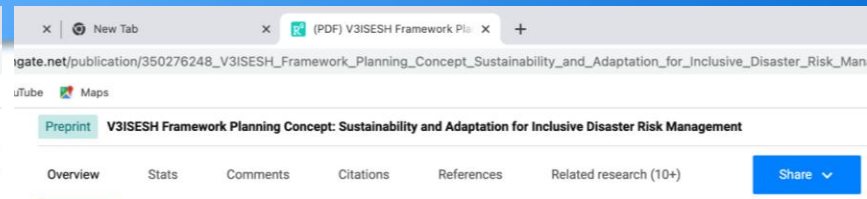
Climate Agreement and SDGs gives a set of parameters for monitoring and evaluation, but the question remains: how they can be defined under an integrated framework protocol. The Indian Prime Minister gave a 10 Point Agenda on Disaster Risk Management when he inaugurated the 7th AMCDRR (the first after SFDRR) at New Delhi in 2016 as an easy set of roadmap. However, an operational framework for these agenda items has never been devised in a form that can be monitored.

Given the above dichotomy of a pessimistic scenario, a light of optimism and promise with the proposed V3ISHES Framework Planning Concept that has been



Prof (Dr) Anil K. Gupta

adaptive risk management, and (ii) Governance and coordination effectiveness including financial strategies, tools, institutions and administrative mechanisms. These recommendations seem to have been built on the findings of recent



resilient infrastructure. An illustrative model exercise to enumerate the V3ISHES Framework concept and process, the pilot study involves the following key dimensions into the key planning sectors:

1. District-level Planning
2. Local Planning (Urban Local Bodies, Village Panchayat/Rural Cluster Units)
3. Corporate/Businesses
4. Industry, Establishment, Organization, Institution
5. Sub-national Level
6. Institutions and Systemic Framework

As the national level systemic framework suffers a lot due to duplicity, overlap, ambiguousness of roles at certain points and domains, and given the need of integration and options of reaping co-benefits, there is need to revamp these institutions, including disaster management organizations like the National Disaster Management Authority (NDMA) and related institutions. Climate change has become central (besides environmental emergencies including health, air, water, waste and chemical emergencies) due to the growing occurrence with new kinds of disaster typhoons. Therefore, public



in isolation from environment, health and sustainability disciplines. The integration under V3ISHES, which embraces vital significant, vibrant, viable options and flexible alternatives as an umbrella institutional authority in place of NDMA, can also be thought of.

India is seen globally, and especially in the global south (and in the regime of South-South cooperation), a leader with true ground examples in natural disaster management. The time has come that it comes up with a prudent model, i.e. V3ISHES Framework Planning Concept, with an equally equipped organizational and operational system covering

sustainability to foster a true sense of public safety as part of the development and socio-economic culture.

In Corporate planning and business management, the resilient inclusive BIA (Business Impact Analysis), DIA (Disaster Impact Analysis, as part of EIA – for a holistic and inclusive approach to project clearance and decision making), LCA (Life Cycle Analysis – to ensure risk is assessed and addressed at all stages) and auditing (safety, health, environment, etc.) are not recognized attributes to strengthen the business continuity and sustainability in the backdrop



# ADRES: The Network

- **Science, Technology & Innovation**
- City resilience, Chemical-industrial risks, Health-emergencies, Adaptation to Climate, Disruptive technologies, NBS, Socio-ecological resilience
- Industry, and Private Sector: including business continuity, sustainability, CSR, start-ups, etc.
- Adaptation Tools and Strategies: Public policy & planning, governance, finance, localization, Climate institutions (COEs), etc.





# Policy-Planning & Capacities



- S&T and Innovation Policy for DRR: Research-Policy-Practice Interface
- NAP for DRR & RI
- CAN-TNA : Sectoral, Regional/Geographical
- Localization Prototypes: District, City, Village, Industrial / Economic zones
- Research Integration and Synthesis to Policy & Practice
- Training innovations with Simulations AR-VR

# THANK YOU !!



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