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Resilient India - Disaster free India

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भारतीय बीमा संस्थान
INSURANCE INSTITUTE OF INDIA

Working Group Report

DISASTER RISK FINANCING, INSURANCE AND RISK TRANSFER

National Institute of Disaster Management
(Ministry of Home Affairs, Government of India)

and

Insurance Institute of India
Mumbai

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ISBN No.: 978-93-82571-49-0

Edition: 2021

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Citation:

Bindal, M.K., Kumar, S., Thomas, G., and Gupta A., (2021). Working Group Report: Disaster Risk Financing, Insurance and Risk Transfer. National Institute of Disaster Management, New Delhi 110001

Published by:

National Institute of Disaster Management,
New Delhi

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We welcome receiving information and suggestions on its adaptation or use in actual training situations. The content of this document are solely those of the author(s).

Acknowledgement

NIDM along with the Insurance Institute of India, Mumbai organized a national workshop in February 2020. Subsequently, a working group was constituted to deliberate further on the subject. The working group, despite of a very difficult time of COVID-19, did a splendid work in deliberating on the subject and meeting virtually in web-based discussion portal. Finally, the report is ready and being submitted for its submission.

During the web-based discussion, National Disaster Management Authority contributed in guiding the working groups. Govt of Assam, Orissa, Nagaland, Bihar, Uttarakhand, Andhra Pradesh and Maharashtra participated in state consultation of the working group. Insurance Regulation Development Authority has been constantly engaged in all the discussion and contributed in shaping its recommendations. NIDM extends its gratitude and heartfelt thanks to Dr P.K.Mishra, for his encouragement and kind message for taking the subject of Risk Financing, Risk Transfer and Insurance forward as one of the solutions for building financial resilience. We are grateful to Shri Kamal Kishore, & Dr. Krishna Vatsa, Member NDMA and Shri GVV Sarma, Member Secretary, NDMA for guiding the deliberation and acquainting with pragmatic challenges of implementation of catastrophe insurance.

NIDM extends its thanks to Mr. Pradeep Jena, IAS, CEO, OSDMA; Mr. Kamal Lochan Mishra, ED, OSDMA; Mr. Shekhar, Member Secretary, Kerala SDMA; Ms Mridusmita, Project Officer DRR, ASDMA; Mr. Mukta Ram Deka, Project Manager, ASDMA; Mr Murgesan, Sect, Uttarakhand SDMA; Dr. Anand Srivastava, USDMA; Mr. Rahul Jugran, USDMA and principal secretary of Andhra Pradesh.

NIDM extend its gratitude and thanks to Mr Joseph Augustine CEO,AXA XL India; Mr Shankar Garigiparthy, CEO, Country Manager, Llyords; Mr Devesh Shrivastava, Chairperson, GIC Re; Mr Hitesh Kotak, CEO, Munich Re; Shri Yegna Priya Bharath, CGM, IRDAI, Shri S. N. Rajeswari, GM & CFO, The Oriental Co. Ltd; Mr Ravinesh Kumar, Financial Advisor, NDMA; Mr Sanjay Datta, Chief- Underwriting & Claims, ICICILOMBARD; Mr Ankur Gupta, Head of Business, Munich Re, Mr Amitabha Ray, Head CM P & C India, Swiss Re; Mr Prashant Desai, Head of property underwriting; Mr T A Ramalingam, Chief Technical Officer, Bajaj Allainz; Mr Vijayasekar Kalavakonda, Financial Specialist, World Bank; Mr Ajay Kumar Singh, Tata AIG General Insurance Co.Ltd; Mr Balkrishna Varrier, GIC of India.

NIDM sincerely extends our thanks to the team of Insurance Institute of India, Mr Deepak Godbole, Secretary General, Insurance Institute of India, Mumbai, Mr Muktesh Chandra Chaturvedi, Director, III, Prof George and Dr Archana Vaze for working together jointly with the team of NIDM.

Background

Disaster Risk Financing and Insurance is one of the key financial tools for funding disasters. Across the globe, it is being worked out to make a viable instrument. Many countries have already adopted insurance as a key tool and many are in the process. In India, the government has been trying to apply this in majorly two sectors - agriculture and health. Keeping this in mind, National Institute of Disaster Management (NIDM) in collaboration with the Insurance Institute of India (I.I.I), had organized a ***National Workshop on "Disaster Risk Financing, Insurance and Risk Transfer" on 13th February 2020***.

Picture: Group Photo of all the delegates at the workshop.

The NIDM-I.I.I Workshop was represented by State Disaster Management Authorities, State Disaster Management Departments, National Disaster Management Authority, Insurance Regulatory and Development Authority of India (IRDAI), Reinsurance companies like GIC Re, Swiss Re, Munich Re, and Private and Public Sector Insurance companies. The Workshop also had a message from ***Dr P.K Mishra, Principal Secretary to the Hon'ble Prime Minister of India*** (who was not able participate due to certain unavoidable circumstances) congratulated NIDM and the Insurance Institute to India (III) for their collaborative effort in conducting this workshop. He opined that *"Insurance is important not only for financial resilience but also as one of the tools for mitigating the impact of disaster, particularly for the poor and vulnerable."* Dr Mishra pointed out that the Hon'ble Prime the Minister had also highlighted the importance and relevance of insurance in disaster risk reduction in his 10-point agenda for Disaster Risk Reduction. He observed that the 15th Financial Commission had recently "allocated funds for disaster risk mitigation, capacity building and long-term recovery." This he considered a "landmark in the history of disaster risk financing." Dr Mishra stated that he would be looking forward to the workshop's recommendations in order to "further refine the government's policies and practices."

The Member Secretary, NDMA Shri. G.V.V. Sarma in his inaugural address for the session: **"Designing Action Plan for the future"** had proposed constitution of a working group which would draft an implementable 'road ahead' document on Disaster Insurance implementation to be submitted to the National Disaster Management Authority and Ministry of Home Affairs, the nodal ministry for disaster management and subsequently to the Prime Minister Office.

The working group consisting of 19 members was formed from diverse background and organizations such as GIC Re; NDMA; Insurance Institute of India; Swiss Re; Munich Re; World Bank; Lloyds; AXA XL India; Oriental Insurance Co. Ltd; General Insurance Council; Bajaj Allianz; ICICI; and IRDAI. As part of the action plan, it was decided to conduct pilot projects on the natural hazards which affect the country at the catastrophic magnitude. It was decided to select six states for the pilot scheme on all perils relevant to those states as follows (a) Bihar and Uttaranchal (b) Orissa and Gujarat (c) Kerala and Maharashtra.

After the conclusion of the NIDM-I.I.I Workshop of 13 February 2020 at I.I.I, Mumbai, the first NIDM-I.I.I Working Group meeting on **'Disaster Risk Financing, Insurance, and Risk Transfer' was conducted online on 9th July 2020** (this could not be done earlier due to the Covid-19 situation). Accordingly, the meeting of the NIDM-I.I.I Working Group discussed various issues. During the deliberations, pragmatic products and processes were discussed. After discussing several ways ahead, the working group realized that for giving a concrete proposal to the government for implementation, there is a need to divide the group into three sub-groups which would deliberate upon sovereign, corporate and social sector issues. Various options were discussed and it was decided that after the inputs received from the slated meeting of the Ministry of Home Affairs, Govt. of India on 13th July, 2020, the NIDM-I.I.I Working Group would have its second sitting and finalize its report, which would be submitted to the government for their discussion and consideration.

The Meeting on Risk Transfer and Insurance by the Ministry of Home Affairs on 13th July 2020: A meeting took place in the Ministry of Home Affairs on the 13th July 2020, chaired by Mr Govind Mohan, Additional Secretary (UT/DM) in which JS DM, CGM, IRDA, FA, NDMA and Prof Santosh Kumar, NIDM were present. A proposal on Housing Insurance, submitted by IRDAI was discussed. The Ministry suggested to hold this proposal in abeyance till the recommendations of the Working Group were submitted to MHA. The Ministry acknowledged the constitution of the NIDM-I.I.I Working Group and suggested to submit the report by 31st August 2020. The IRDAI representative indicated that Chairman, IRDAI had been briefed of the NIDM-I.I.I Workshop of 13th February 2020, the constitution of the NIDM-I.I.I Working Group and had been supportive of the developments in this direction and looked forward to its recommendations.

The Ministry of Home Affairs suggested that the NIDM-I.I.I Working Group may like to discuss IRDAI's proposal on Housing Insurance and suggest a sustainable product which the Govt could adopt and support implementation. Till such time the IRDAI proposal would be kept in abeyance. The MHA also suggested that the NIDM-I.I.I Working Group members may also give examples of some international experiences where Insurance has been implemented as an ex-ante mechanism for disaster management.

The Second Working group Meeting was held on 7th October 2020. The main objective of the meeting was to have a presentations from the sub-groups of the possible solutions and future action plan; to design a roadmap for the implementation of the recommended insurance solutions and to development a timeframe for the implementation of disaster risk financing, insurance, and risk transfer. The outcome of the meeting was that the working group focused on six states and has decided upon common perils with a specific focus on 'Parametric Insurance' while considering Karnataka State to begin with which has good weather data. Various other suggestions were proposed which were incorporated in the report and a final workshop was suggested to be conducted on 29th December 2020.

The final workshop of the working group was held on 29th December 2020 where the final report was presented. It was attended by 19 working group members; special guests from NDMA, and various representatives of states. The executive summary of the final report talks about the brief outline followed with a detailed thereafter.

Bio of Working Group Members

MAJOR GENERAL MANOJ KUMAR BINDAL

VSM, Executive Director NIDM

Major General M. K. Bindal is presently the Executive Director, National Institute of Disaster Management. He was commissioned into the Corps of Army Air Defence in December 1985. An alumnus of the National Defence Academy, Major General M. K. Bindal is a graduate of the Defence Services Staff College and has attended the prestigious Higher Command Course at the Army War College besides excelling in all other career courses in the army. He holds a masters degree in Defence and Strategic Studies as well as Masters of Philosophy in Defence and Management Studies. During his more than three decades of service, he has held important command and staff assignments. Having held all echelons of command within an Air Defence Regiment in diverse theatres, he commanded an Air Defence Regiment and an Air Defence Brigade in the Kashmir region against the backdrop of counter insurgency operations. He was General Officer Commanding of a sensitive Sub Area in the North East. He has been on the staff of a Mountain Brigade deployed in counter insurgency ops and in High Altitude area, an Armoured Division deployed in the plains, a Desert Corps and in a Corps HQ in High Altitude Areas. He has also been posted as Deputy Director General in the Directorate of Army Air Defence where he was dealing with operations, Training, Air Defence Control & Reporting and Air Intelligence issues. Major General M. K. Bindal served as the Provost Marshall in the United Nations Mission in Mozambique where he was deeply involved in the liquidation of the mission. He has been the Director, Centre for United Nations Peacekeeping (CUNPK) New Delhi. For three years he was also the Secretary of the International Association of Peacekeeping Training Centres.

MR DEEPAK GODBOLE

Secretary General,
Insurance Institute of India

A post graduate in Commerce, and also in Management Studies from Mumbai University, with specialization in Finance, Mr Deepak Godbole joined General Insurance Corporation of India in the year 1988 as a direct recruit officer. Mr Godbole Having worked in different departments of GIC Re in various capacities, he now looks after Credit Rating; Business Expansion, JV, M&A ; Legal and Corporate Communications. He keeps close association with academics through visiting faculty assignments with National Insurance Academy, Pune, Insurance Institute of India, Mumbai and Universities & Business Schools of repute in the country as also with the Institute of Chartered Accountants of India (ICAI). His contributions on finance, risk management and insurance have been published in research Journals, newspapers and magazines. He has been a speaker on "All India Radio", "DD National", "Zee Business" on consumer awareness programmes. Mr Godbole has also been a speaker at Risk and Insurance conferences in India & abroad.

PROF SANTOSH KUMAR
Head, GiDRR division
National Institute of Disaster Management

More than 25 years' experience with the 15 years in providing leadership in institutions building, public policy, capacity development and strategic operations at regional, national local levels. Engaged in dialogue with Asian, ASEAN, EAS, BIMSTIC, SAARC, multi-lateral, UN organization and private sector for disaster risk reduction, climate change leading to sustainable development. Contributed extensively in the international negotiations while drafting Hyogo Framework of Action 2005-2015 and Sendai Framework of Disaster Risk Reduction 2015-2030 as part of the Govt of India delegation team. Also, contributed in establishing new discourse in disaster and development. Core areas of research, capacity building and policy advocacy are disaster loss assessment, disaster recovery, disaster risk financing, risk transfer & risk insurance. Studied economies (Masters & Ph.D), Gender and development and disaster risk management.

MR MUKTESH CHANDRA CHATURVEDI
Director College of Insurance,
Insurance Institute of India, Mumbai.

Mr. Muktesh Chandra Chaturvedi is working with LIC of India Since 1988. He is currently on deputation to Insurance Institute of India as Director, College of Insurance, Mumbai. He has about 32 years of experience in Life Insurance Industry in the areas of marketing of individual and Group Products and HR. He has a rich experience in Marketing in Metros, Urban and Rural Markets which includes being Senior Divisional Manager In charge in LIC's Mumbai Division III and IV and leading the Pension and Group Schemes vertical of LIC in its East Central Zone Patna comprising the states of Bihar, Jharkhand and Odisha. His academic qualification is, M.Sc, M.Phil a M.Sc. M. Phil (Chemistry) from HP University Shimla. He can be contacted on Director@iii.org.in.

DR GEORGE E. THOMAS
Professor (Research and Non- Life)
College of Insurance,
Insurance Institute of India (III)

Dr. George E. Thomas is a Ph.D. in Management from University. of Pune. His qualifications include MBA, MA(English), MA(Sociology), FIII, BGL, Diploma in Insurance Law and Diploma in PR & Advertising. He is Fellow Life Member of Indian Council of Arbitration and Life Member of Indian Institute of Public Administration. He is Guest faculty at National Insurance Academy, Pune and Directorate of Commercial Audit (RTC), Mumbai. He joined the General Insurance Industry in 1985 as

direct recruit Officer in Tariff Advisory Committee (TAC). He has exposure to different areas of non-life insurance, particularly insurance regulation, product design and approval (at TAC & IRDA), tariff administration and health insurance. He has worked on different committees on technical aspects of non-life insurance. He is the International Insurance Society's Ambassador for India, Member of the 'Insurance Regulation and Resilience Policies Working Group' of the Insurance Development Forum (IDF), Member of the 'Academic Steering Committee on Financial Inclusion' of the International Cooperative and Mutual Insurance Federation (ICMIF) and Member of the Advisory Board for the 'ICMIF - Cambridge Institute for Sustainable Leadership (CISL) Study' on 'mutual micro-insurance and sustainable development.' He was a Member of the 'Advisory Group (Non-Life Insurance) formed by the Finance Ministry, Govt. of India and an Invitee of the 15th Finance Commission's expert group on Disaster Risk Financing.

DR ARCHANA VAZE

Assistant Professor, College of Insurance,
Insurance Institute of India(III)

Dr. Archana Vaze is Assistant Professor in III's College of Insurance. She has done her Engineering in Computer Technology from Nagpur University, post-graduation from IIT Madras and her LLB from the University of Mumbai. Dr. Vaze is a Fellow Member (FIII) of the Insurance Institute of India. Dr. Vaze's exposure to the insurance industry spans multiple areas including underwriting, business strategy and process management. Prior to joining III, she headed the Maharashtra and Goa Region of SBI General Insurance Co. Ltd., as 'Manager Underwriting-Corporate and SME Lines'. Dr. Vaze has also worked as 'Senior Manager – Commercial Underwriting' for the Mumbai Zonal Office of Cholamandalam MS General Insurance Co.Ltd. and also at their Head Office in Chennai. Dr. Vaze's corporate exposure includes a stint with TCS as a Systems Analyst and domain expert in their Insurance vertical. Her research experience and interests include the Insurance needs of the Housing Industry, analyzing the efficacy of the Industrial All Risks Policy and other Property Insurances, the Insurance needs of the Logistics industry, Mutuals, Co-operatives and Community-based Insurance (MCCOs), Equity Research on Indian Life Insurance industry and Analyzing the (MCCOs), Equity Research on Indian Life Insurance industry and Analyzing the legal interpretations of policy wordings and their impact on the market. She can be contacted at <vaze@iii.org.in>.

MR JOSEPH AUGUSTINE, CEO

XL Insurance Company SE, India Reinsurance Branch.

Mr. Joseph Augustine is AXA XL's Chief Executive Officer for India – Reinsurance. Having set up the Reinsurance branch in Mumbai, he is responsible for developing AXA XL reinsurance presence in India and neighbouring countries. Joseph joined AXA XL in 2009 as Chief Representative of India. He has over 40 years' experience in the (re) insurance industry. Prior to joining AXA XL he held Senior position at General Insurance Corporation of India (GIC Re) including a posted

at Moscow Russia for over four years to established GIC Re office and service the Clients of East European territories. At National Insurance Company Ltd he was General Manager before moving on in 2009. He is a fellow of the Insurance Institute of India and holds a post graduate degree in Commerce. He served as a member of the Insurance Advisory Committee of IRDAI and sits on the Executive Committee of the General Insurance Council of India. Joseph is also a regular speaker at leading industry events and conferences.

MR SHANKAR GARIGIPARTHY
CEO & Country Manager, Lloyds India

Mr. Shankar is the CEO & Country Manager for Lloyd's in India, and has successfully established Lloyd's operations in India. Shankar brings a wealth of Regulatory and Compliance expertise and experience, having worked as Regional Compliance Manager for Lloyd's Asia (2011 - 2016) and as Director of Insurance Supervision at the Qatar Financial Centre Regulatory Authority (2005 to 2010), where he set up the regulatory framework for insurance companies in the QFC. Shankar holds an MBA from the University of Hull (UK) and a Bachelor of Science degree in Physics from Madras Christian College (India). He is also a Professional Member of the International Compliance Association, having completed the International Diploma in Anti Money Laundering and a Member of the Institute of Risk Management, having completed his Certificate in Risk Management.

MR. DEVESH SRIVASTAVA
Chairman & Managing Director
GIC Re

Mr. Devesh Srivastava has been involved in the insurance sector since 1987 following his joining the industry as a direct recruit. He has experience in both direct insurance and reinsurance. He has gained international exposure through postings to the Company's London branch where he was overseeing operations in the UK, Europe, Caribbean and the Latin American countries of Brazil, Argentina and Mexico.

Mr. Devesh Srivastava was a key player in the setting up of GIC Re 's Lloyds Syndicate in London. He is presently employed on a full-time basis in the capacity of Chairman and Managing Director. He holds a B. Sc (Hons) and a Master of Science degree from St Stephen's College, Delhi. He also holds a post-graduate degree in Management, majoring in Marketing with a Gold Medal from the Management Development Institute (MDI) Gurgaon. Mr. Srivastava is presently on Boards of Life Insurance Corporation of India, Export & Credit Guarantee Corporation, Indian Register of Shipping, Kenindia Assurance Co. Ltd., Nairobi, Asian Re, Agriculture Insurance Corporation of India, Health TPA Ltd., GIC Housing Finance Ltd and GIC South Africa Re, Johannesburg. He is also an elected member of the FAIR (Federation of the Afro-Asian Insurers & Reinsurers) Steering Committee, where GIC Re is a member.

MR HITESH KOTAK
CEO, Munich Re, India

Mr. Hitesh started his career with Munich Re in 2014. He is the CEO of India Branch since February 2017 and is responsible for the business from India & the Indian sub-continent. He joined Munich Re after spending thirteen years with a primary insurer with experience in Product Management, Bancassurance, International Business and Reinsurance and another two years in the Indian Automobile industry. He is a Mechanical Engineer with Post-graduation in Business Management and is a Fellow of Insurance Institute of India.

SMT. S N RAJESHWARI
Chairman & Managing Director
The Oriental Insurance Company Limited.

Mrs. S.N. Rajeswari has assumed charge as Chairman-cum-Managing Director of The Oriental Insurance Company Limited. She is a qualified Chartered Accountant. She did her MBA from Bharathiar University and is a Fellow Member of the Insurance Institute of India. Her career spans over a period of more than 37 years in General Insurance Industry starting in 1984 as a Direct Recruit Officer in United India Insurance Company Limited where she had good experience in various fields like marketing, technical, accounts and finance. She moved to New India Assurance Company Limited, Mumbai, on her promotion as Deputy General Manager & CFO in 2012. She was promoted to the cadre of General Manager in 2015 and has worked in capacities of Financial Advisor & Chief Financial Officer and has immense experience in Technical, reinsurance, marketing and other related areas.

MR RAVINESH KUMAR
Finance Adviser
National Disaster Management Authority

He is a civil servant belonging to the 1994 batch of Indian Defence Accounts Service. His work experience includes dealing with financial appraisal of defence projects, preparation of Budget Estimates, Budget Monitoring, making Government payments, maintenance of Government Accounts, Audit of sanctions & expenditures, financial advice to the spending Authorities of the governments. At present, he is posted as financial advisor with National Disaster Management Authority and discharging the above functionalities. As for his educational qualifications, he done BA (Economics Honors), and hold post graduation degree in Economics.

SMT. YEGNA PRIYA BHARATH
Chief General Manager,
Nonlife Dept-Chairman,
IRDAI

Ms. Yegnapriya Bharath is working as Chief General Manager IRDAI and is heading the Non-Life Department. She has more than 34 years of experience in the insurance sector with 18 of them in The New India Assurance Co. Ltd in various capacities. She has served/is serving in various committees relating to insurance. She has given lectures in India and abroad. She's a post graduate in Sociology and is a fellow of the Insurance Institute of India (III).

MR SANJAY DATTA
Chief – Underwriting, Reinsurance & Claims
Icici Lombard General Insurance Co. Ltd.

Mr. Sanjay Datta is Chief – Underwriting, Reinsurance and Claims, ICICI Lombard General Insurance Company Limited, one of the largest private sector general insurance company in India.

Mr. Datta was a part of the start up team at ICICI Lombard in 2001 and has since then contributed to growing the business into a market leadership position.

At ICICI Lombard, Mr. Datta is responsible for underwriting, reinsurance and claims function across the organisation. He heads customer service for all product lines of the business and spearheads risk management, underwriting discipline, operational excellence, product development and pricing across Wholesale and Retail products. Mr. Datta drives company's foray for quality service delivery across all products.

MR TA RAMALINGAM
Chief Technical Officer
Bajaj Allianz General Insurance Co. Ltd

Mr. TA Ramalingam is the Chief Technical Officer for Bajaj Allianz General Insurance Co. Ltd. He is currently handling underwriting, claims (Motor OD and Non Motor) , Re-Insurance and also responsible for formulating the underwriting policies and guidelines for accepting various risks for motor, health and all non-motor lines of business. He is also actively involved in the Long Range planning as well as the Annual Budget exercise of the Company.

Prior to this, he was the Senior President – Institutional Sales for Bajaj Allianz General Insurance. He was handling all Institutional Sales – Corporate, Banca, Agri and Govt. Business In addition to this, the training and renewals team was also reporting to him.

Rama started his career in the banking industry and has a total work experience of nearly three decade in the insurance industry. He started his career with a prominent national insurer and during his career he was exposed to handling various operational areas including Branch operations, finance and compensation.

MR VIJAYASEKAR KALAVAKONDA, Senior Operations Officer, South Asia Region, International Finance Corporation, The World Bank Group

Mr. Vijay Kalavakonda has 20+ years' experience working on agriculture insurance, and disaster risk finance and insurance. At the World Bank Group, Vijay worked on a range of access to finance and insurance related activities including agriculture, finance, microinsurance, parametric insurance, and Co-Contributory Pension targeting the poor and low-income households. Vijay Kalavakonda has worked on agriculture and disaster risk insurance across several countries incldıng Tunisia and Morocco, Nicaragua, Mexico, Turkey, Indonesia, the Philippines, Bangladesh, India, Nepal, Pakistan, and Sri Lanka, and Small Islands including both the Caribbean's and the Pacific. Over the last 3+ years Vijay's primary focus area has been insupporting agriculture finance, and financial risk resilience against climate change risks in South Asia.

MR ANKUR GUPTA
Head of Client Management
Munich Re

Mr. Ankur started his career with Munich Re in 2017. He is the Head of Client Management of India Branch and is responsible for the business development from India & the Indian sub-continent. He joined Munich Re after spending fourteen years with a primary insurer with experience in Product management, Rural & Agriculture Business and International Business and another three years in the organised retail industry developing Shop assurance model. He is a Post-graduate in Rural Management from IRMA, Anand (Gujarat) and is a Fellow of Insurance Institute of India.

MR PRASHANT DESAI
Head of Property Underwriting
Munich Re

Mr Prashant is currently the Head of Property Underwriting at Munich Re. He has about 20 years of experience in project management. A strategist cum implementer with recognized proficiency in spear heading operations/ business with an aim to accomplish corporate plans and goals successfully. Extensive experience in business research and consulting engagements across industry verticals for business development and corporate planning Managed dynamic and diversified work portfolio like business development, strategic planning, and risk management.

His expertise is in strategy, Insurance and reinsurance. Prior to joining Munich Re, he was the head of property (Treaty and Fak 2018), TATA AIG General Insurance (2009-2015), Head of Corporate UW, Reliance Industries - EA to Group President (2005-2009) and Project and Operation Management (RIL 2000-2005). In terms of education, he is a Chemical Engineer, MBA, FIII.

MR AJAY K SINGH
Lead-Govt. & Rural Business and Parametric Insurance

He is an expert in the field of Crop Insurance, Mass Health Insurance, Parametric weather Index Insurance, Project implementation of risk management and financial inclusion for Govt. Programs, Micro and Rural Insurance Product design, development and distribution, risk evaluation and underwriting, working with Govt. & non-Govt. organizations for providing micro, rural and other risk financing insurance solutions. Presently Working with Tata AIG General Insurance Company Limited based in Corporate Office, Mumbai, Maharashtra. Having more than 14 years of experience in non-life Insurance Industry,financial inclusion and Micro-Rural insurance distribution. Fellow of Insurance Institute of India and MBA with specialization in Marketing and Finance.

MR BALAKRISHNA VARRIER
Chief Manager,
GIC of India

A cost and management accountant, with a Certificate of Merit, from the Institute of Cost Accountants of India and qualifications of FIII and ACII, London, he presently handles property reinsurance in General Insurance Corporation of India. During the course of his 32 years with the Corporation he has worked in several sections of reinsurance and finance.

Special Invited Guests

National Disaster Management Authority

SHRI KAMAL KISHORE
Member,
National Disaster Management Authority

Kamal Kishore has worked on disaster risk reduction and recovery issues for over 22 years at the local, national, regional and global levels. Prior to joining the National Disaster Management Authority, he worked with the United Nations Development Programme (UNDP) for nearly 13 years in New Delhi, Geneva and New York. At UNDP headquarters he led global advocacy campaigns to address disaster risk reduction concerns in the UN's Sustainable Development Goals and the post-2015 development agenda. As programme advisor, he also led the development of disaster and climate risk management related elements of the UNDP Strategic Plan (2014-17).

Kamal Kishore has a Bachelor's degree in Architecture from the Indian Institute of Technology, Roorkee, and a Master's degree in Urban Planning, Land and Housing Development from the Asian Institute of Technology, Bangkok.

DR KRISHNA VATSA
Member,
National Disaster Management Authority

Krishna S. Vatsa has worked in the area of disaster risk reduction and recovery for the last 25 years.Prior to joining as Member, NDMA, Krishna S. Vatsa worked as Policy Advisor, Disaster Recovery, Bureau for Policy and Programme Support (BPPS), UNDP in New York and Nairobi during 2015-20. He served as the Regional Disaster Reduction Advisor, South & South- West Asia in New Delhi from 2008 to 2014. He joined UNDP in 2007 as Early Recovery Coordinator in the Philippines.

As a career civil servant, Krishna S. Vatsa joined the Maharashtra Emergency Earthquake Rehabilitation Programme in the state of Maharashtra in 1995, and implemented a large-scale earthquake recovery programme during the next four years. He has also served as Secretary to the Government of Maharashtra, Relief and Rehabilitation from 2003 to 2006, and then as Secretary, Rural Development & Panchayati Raj from 2006 to 2007. In course of his career, he extensively consulted for several national and international organizations in the area of disaster risk reduction and recovery. Krishna S. Vatsa has a Doctor of Science in Disaster Risk Management from the George Washington University, Washington, DC and published extensively on the subject.

Executive Summary

The Government of India strives to promote a national resolve to mitigate the damage and destruction caused by natural and man-made disasters, through sustained and collective efforts of all government agencies, non-governmental organizations and people's participation by adopting a technology-driven, pro-active, multi-hazard and multi-sectoral strategy for building a safer, disaster resilient and dynamic India.

There is a paradigm shift from the erstwhile relief-centric response to a proactive prevention, mitigation and preparedness-driven approach for conserving developmental gains and to minimize loss of life, livelihood and property.

The spirit of the National Disaster Management Act 2005 for the creation of mitigation fund for ex-ante risk reduction is honored by the finance commission which further got accepted by the government. Hon'ble Prime Minister's 10-point agenda for disaster risk reduction has also outlined about building financial resilience risk coverage to all. Agenda 2 states "work towards risk coverage for all – starting from poor households to small and medium enterprises to multi-national corporations to nation states".

One of the main objectives of the National Policy on Disaster Management 2009 is ensuring efficient response and relief with a caring approach towards the needs of the vulnerable sections of the society. Considering that the assistance provided by the Government for rescue, relief, rehabilitation and reconstruction needs may not be sufficient to mitigate *(refer Annexure 1)* massive losses on account of disasters and there is an urgent need to bring risk financing, insurance, re-insurance and risk transfer mechanism for building resilience.

Bridging the Protection Gap

The Government has been working and supporting the rescue and rehabilitation program for the vulnerable segment, however it is a big drain on the state exchequer. The large events like Kerala Flood, Chennai Flood or Cyclone Fani clearly show that one cannot depend on raising funds ex-post; and that ex-ante solutions that allow the government to access funds and act swiftly in the region impacted are need, to save precious lives and livelihoods.

Insurance Driven Social Protection Program

The Government of India has launched quite a few social protection schemes leveraging on insurance solutions like Ayushman Bharat Pradhan Mantri Jan Arogya Yojana, Pradhan Mantri Jeevan Jyoti Bima Yojna, Pradhan Mantri Suraksha Bima Yojna, Pradhan Mantri Fasal Bima Yojna and Atal Pension Yojna. A similar model can be used to offer the protection for the low income group in case of natural disaster for loss of livelihood and loss of assets. For such a scheme, it is important that the claims payment to the insured happens swiftly enough to help the beneficiary in real time of need. The traditional

model of survey and assessment of losses to make claims payment may not be best suited for such vast geographies and populations. The country needs quick and transparent mechanisms that address the key requirements of the impacted people efficiently and expeditiously.

Parametric Solution for Livelihood protection

To address these requirements the Group propose a parametric trigger based solution that can pay in the event of earthquake, cyclone or extreme precipitation. The product can be designed to suit the specific needs. The key is to have the right kind of historical data and consistent availability of such data in future to build an effective product model.

Next Steps: Proposal for Pilot Scheme in few states /region

- Run pilot schemes in the identified States/ Regions
- Working group of key stakeholders **for implementing the scheme**
  - **Government agency/ body:** Policy and regulatory challenges to be addressed; as also budgetary allocation for premium financing
  - **Insurance Regulator:** Facilitation from the point of view of filing of the Scheme under the Product Filing Guidelines.
  - **Insurers and Reinsurers:** Risk modelling involving internal as well as external agencies, develop products and present the solutions to Government for implementation
- Product Design : 60- 90 days post collection of data
- Government approval : 30-60 days
- Roll out and Monitoring : 12 months
- Assessment : Assess the performance periodically and refine the solutions

thereby reducing the human and economic losses and subsequently lowering the burden on the state exchequer. A sovereign risk management framework can be used to decide on the priority and target segment to be covered under the program.

Sovereign Risk Management Framework

Figure 7: Sovereign Risk Management Framework, Source: Munich Re Public Sector Business

When a new insurance solution has to be put in place one needs to assess the availability, breadth, and depth of market risk transfer solutions for disasters. In particular, regarding disaster insurance, the following main elements could be considered:

1. The segment of the population and the economy for which coverage is to be offered (e.g. low income group, small business enterprises, large commercial and industrial corporations, local governments)
2. The hazards covered (natural and/or man-made, depending on the disaster risk profile of the economy)
3. The scope of losses covered (e.g. property damage, business interruption, livelihood costs, life, accident, liability) by insurance
4. The contractual mechanism by which disaster coverage is made available on the market (e.g. Government Supported scheme for)
5. The pricing mechanism of insurance coverage

The pay-outs of risk transfer instruments may be quantified on the basis of actual losses sustained by the protection buyer (indemnity based), or the amount of such payment may be agreed upon by the parties irrespective of actual losses, and triggered by a physical parameter measuring the intensity of the hazard at given locations (parametric) or by an index comprising multiple measurements of such parameters for each event (parametric index).

Each of the mechanisms have their pros and cons. It is important to zero down on the key goal of the scheme and then decide on the model to be adopted. A simple matrix to put the strengths or weaknesses of each model basis the claims payment trigger can be used for supporting this decision.

NatCat Insurance driven Risk Transfer Mechanism

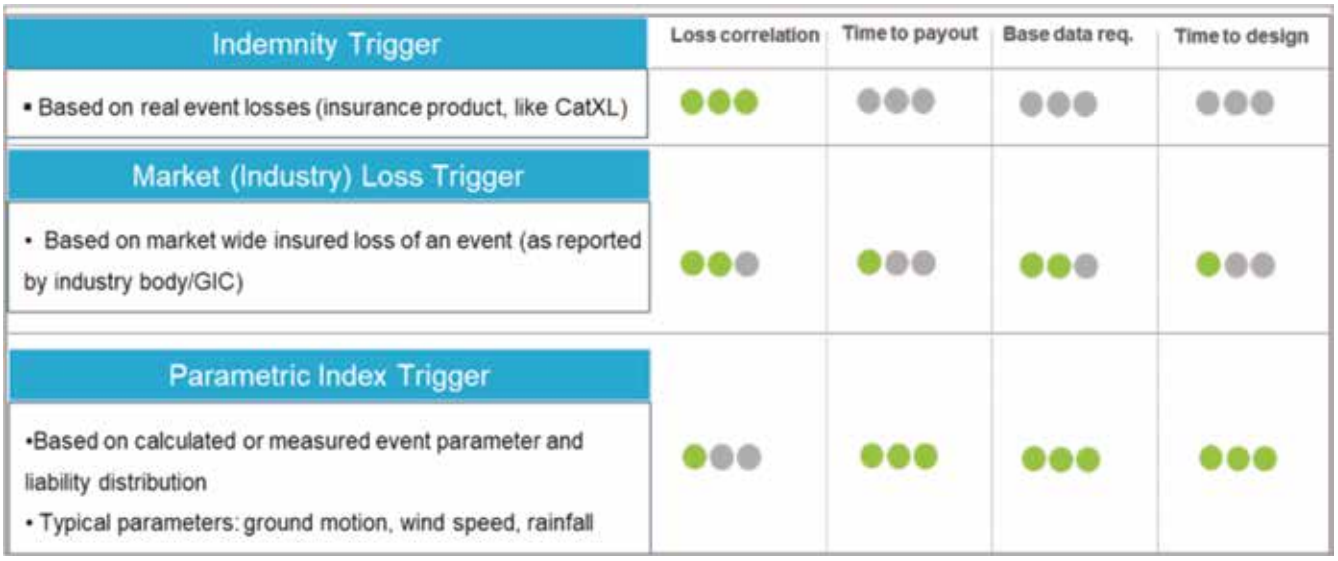

Figure 8: Risk Transfer Mechanism, Source: Munich Re Public Sector Business

Identifying the target segment

The Government has been consistently making efforts to safeguard the interests of the vulnerable segment. The schemes like **Pradhan Mantri Jeevan Jyoti Beema Yojna** (Life Insurance), **Pradhan Mantri Suraksha Beema Yojna** (Accidental Death and Disability), **Ayushman Bharat Pradhan Mantri Jan Arogya Yojana** (Health Insurance), **Atal Pension Yojna** (Pension for Unorganized and under privileged) creating a social safety net for the poor and underprivileged segment of population. There is still a gap in these schemes as these do not address the loss of assets and loss of livelihood due to natural catastrophe. The impact of Natcat events is disproportionately harder on the underprivileged. The quality of their housing, the nature of their livelihood (daily wages) and access to financial risk mitigation tools is significantly inferior as compared to the middle and higher income groups. The middle and higher income group of the society has access to privately purchased insurance covers, better savings and a consistent income source that enables them to withstand the natural disasters and reorganize their life post such events.

The vulnerable section not only has limited access to such risk mitigants, but they are also not able to afford these risk transfer mechanisms. The biggest impact is on their livelihood which is still not addressed through traditional insurance and risk transfer solutions. These segments need support of the government and other agencies to get access to such risk management mechanisms and with a phase-wise capacity building, the government can reduce the underprivileged segment's dependence on it and build a stronger and sustainable solution.

The Group proposes that as a first target, government can continue with its focused area of supporting the underprivileged and low income group.

Proposed Solution for the Low Income Group (Identified Target segment)

The Low income group is heavily impacted by the natural catastrophe events. They have a small asset base, but the disruption in the livelihood multiplies the threat to these households. Their dependence on the government support for both protection and rehabilitation is very high. There is a need for developing a strong protection net for this segment, helping to mitigate their economic challenges. The Government is already working on various schemes like **Ayushman Bharat Pradhan Mantri Jan Arogya Yojana**, addressing the need for access to good healthcare, **Prime Minister Fasal Bima Yojna** addressing the needs of the farming sector and many such welfare program supported through partnership with the insurance and reinsurance providers. A similar partnership structure between Government and the insurance & reinsurance providers can be used to provide used to protect the low income group for the low income group.

In case of a natural catastrophe, the low income group needs immediate support to tide over the loss of livelihood. For victims of natural disasters, the speed at which payment is made can have a significant impact. Designing schemes to support both protection and rehabilitation that need minimal on-ground presence; and can work in an expeditious and efficient manner, are needed for the purpose. The most comprehensive analysis on this benefit can be found in a study commissioned by the United Kingdom's Department for International Development (DFID) and completed by the risk modeling firm Risk Management Solutions (RMS). It concluded that faster availability of funds can accelerate disaster response and de-escalate losses. Payments from a parametric insurance policy can be 3.5 times as effective as delayed payments from aid. Thus, a **Parametric Index Based** solution to deliver a transparent and efficient insurance backed solution to cover the risks of low income household is proposed.

A parametric insurance product can be defined as an insurance contract where the ultimate payment or contract settlement is determined by a weather or geological observation or index, such as average temperature or rainfall over a given period or the intensity of an earthquake or wind storm. Parametric insurance pay-outs are not based on individual loss adjustments but are determined according to the measurement of event intensities highly correlated to the 'to be expected loss'. Therefore, there is a possibility of a potential mismatch between parametric insurance claims settlement and the actual losses of the insured, which is generally referred to as basis risk in case of a loss without triggering an insurance pay-out or as basis chance in case of an insurance pay-out without having a loss.

Here, it is important to highlight the possibility of basis risk, where the amount of the pay-out triggered by the defined parameter or index varies from the actual amount of damages, potentially leaving the insured with uncovered exposures or the insurer with payments exceeding the level of damage. This can be mitigated to an extent by way of granular data, however it cannot be fully removed. Moreover, by concentrating on stepped pay-out functions and on more extreme events, loss of assets or detrimental impact on the livelihood will be widespread, helps to manage the above mentioned mismatch. Parametric insurance has the advantage of a swift pay-out in comparison to traditional indemnity based insurance. It is also able to cover both the damages to assets owned by the low income households, as well as the losses stemming from a loss of income for the low income household, in the wake of a natural disaster affecting the local economy adversely.

Overview of parametric trigger based insurance solution

Application of parametric insurance requires the development of a trigger structure to determine when pay outs will be made. This structure is based on the physical hazard parameters of an event and the development of a trigger structure typically addresses common key elements of a parametric insurance coverage.

Covered Perils

The range of possible event types (perils), and the associated hazards need to be clearly identified. The types of perils covered would typically include:

- Earthquake
- Tropical Cyclone
- Extreme Precipitation
- River Flood (subject to sufficient and consistent data availability)

It is important to underline the importance of the availability of granular data (refer Annexure 2) for developing a robust parametric solution; historic time series of data and accurate measurement of actual data. Access to consistent and reliable data source is critical for parametric products. These data sources are to be pre-agreed and robust as they are used to design the product and also to settle claims.

Physical parameters of an event are used to determine pay-outs

To determine pay-outs from earthquakes, the proposed trigger can use spectral acceleration (a measurement of ground motion); extreme precipitation, in terms of rainfall exceeding an agreed threshold over a continuous period of defined number of days; while a 3-minute peak gust (a measurement of wind speed) can be used to determine pay-outs from cyclones. These hazard parameters have a strong correlation with the physical damage caused by the respective events. For instance, a higher level of spectral acceleration by earthquakes, a higher amount of rainfall in extreme precipitation events, or a stronger wind speed of 3-minute peak gusts stemming from cyclone events, all can cause a higher level of physical damage.

Following an event, reliable data on the selected event characteristics - spectral acceleration for earthquakes, rainfall measurement at weather stations and 3-minute peak gusts for cyclones - would be collected from appropriate data sources. These data sources have to be independent, reputable data providers, which provide historical time series of data and report actual events. The required data needs to be from across the entire country, collected in a consistent manner and supplied in time. These criteria would be help in reviewing the suitability of event parameter data published by various agencies for India to support parametric triggers. The Indian Meteorological Department (IMD) can be selected as a reporting agency.

There are many precedents for the use of both United States Geological Survey (USGS) and United States Joint Typhoon Warning Centre (JTWC) data products within the international reinsurance markets and they can be explored as well to help ensure efficient and cost-effective endorsement of the earthquake, precipitation and cyclone triggers by these markets.

Conversion of physical parameters to financial pay-outs

When an earthquake, precipitation or cyclone impacts India, the applicable physical event parameters (such as spectral acceleration for earthquakes or 3-minute peak gusts for cyclones) will be obtained from IMD. These parameters will be used to calculate an average ground shaking or wind speed index. This average is typically referred to as the "index value" and it is calculated by the NatCAT experts.

The level of pay-out will be determined by comparing the index value for an event to 2 pre-defined index thresholds which are specified in the insurance policy for each state and natural hazard – a lower bound (the so-called attachment point) and an upper bound (the so-called exhaustion point).

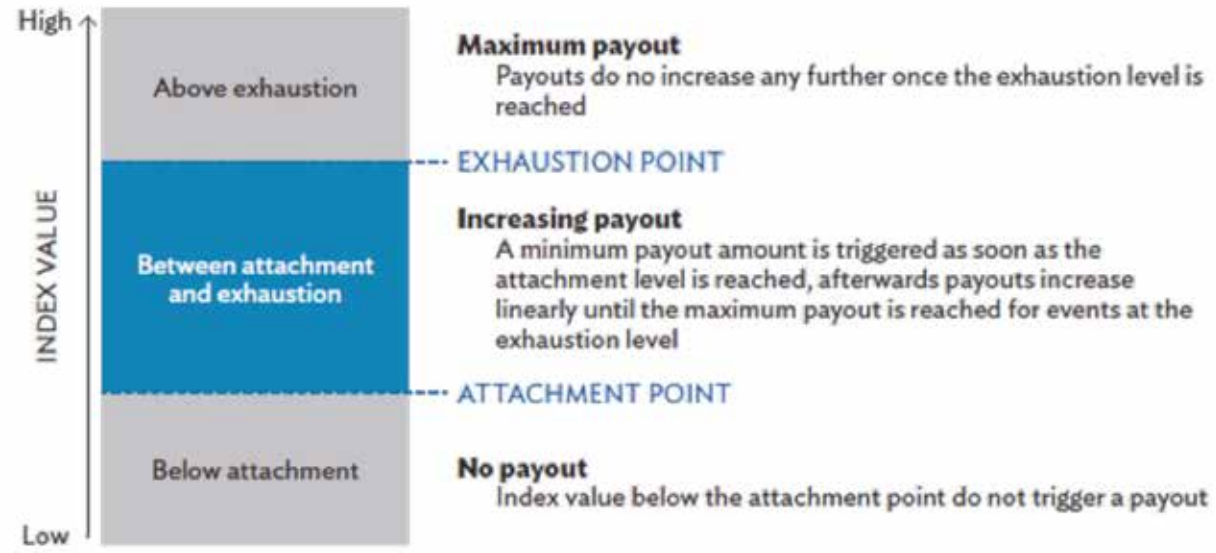

Figure 9: Parametric Index based Solution

- If the index value for an event is above the attachment point specified for the defined geographical area (event foot print) and relevant natural hazard, the insured (living in the affected geographical area) will receive a minimum pay-out.
- If the index value for an event reaches the applicable exhaustion point, the insured will receive the maximum pay-out.
- For an index value between the applicable attachment and exhaustion point, the pay-out will either increase linearly / or in stepped way between minimum and maximum pay-out: the higher the index value, the higher the pay-out the insured receives.

Proposed parametric index

The parametric insurance trigger structure described above enables insured to receive pay-outs within a few weeks of a disaster occurring, as no explicit loss adjustment process is required. This time frame incorporates appropriate time to allow for data gathered from the data provider, to settle upon a stable view of the level of ground shaking or wind speed, respectively, generated by the event, and for the completion of data processing and risk modelling (Annexure 3) required to calculate the "index values" of ground shaking or wind speed for each geographical unit.

- Once the key criteria described above are defined, the resulting trigger structure has to be extensively tested to ensure that it is likely to result in pay-outs when they are needed. By assessing the intensities of historic events and the damage and loss data from these historic events (previous disasters striking in the 'to be insured' area) the parametric index and trigger structure can be calibrated. As a parametric insurance policy does not rely on an explicit loss adjustment process to determine the actual amount of damage caused by an event, there is a chance that the insurance pays out even though no severe loss is suffered, or, conversely, that no pay-out is received despite suffering large losses. These instances of "basis risk" have to be minimized in order to make the insurance coverage an effective disaster risk financing instrument, providing funding as intended when required.
- The proposed parametric index structures for earthquake, precipitation and cyclone have been designed to ensure that levels of basis risk are acceptable. A close correlation between parametric index and actual damage and loss would suggest that the index is a good proxy for gauging physical damage, and therefore early recovery costs after an event. Pay-outs from an insurance policy based on this parametric index are therefore expected to correlate well with the early recovery costs faced by states, indicating acceptable basis risk for the proposed structure.

How to reach the Target Population Segment

Phase 1: The Government to buy the policy, claims to be paid to the government

Phase 2: The Government to partially subsidize the scheme and the balance premium to be collected by Insurers from the beneficiary household on enrollment basis. Claims to be settled directly to beneficiary account.

Case Study India: Parametric solution for extreme precipitation for Government of Nagaland

Nagaland, a state in India located to the east of Assam and west of Myanmar, features largely mountainous terrain where agriculture constitutes about 70% of its economy. Nagaland has high levels of humidity and heavy rains in the monsoon months of May to September. As a result, the state is susceptible to damage from heavy rainfall, windstorm/hailstorm, flood and landslides, particularly during the monsoon season.

The Nagaland State Disaster Management Authority (NSDMA) Home Department, Govt. of Nagaland proactively engaged with an Insurance company and a Reinsurance company to design parametric coverage for excess rainfall events that can lead to severe flooding. It is based on a geospatially gridded dataset whose precipitation levels are derived from satellite observations. The parametric structure is designed to cover the entire state of Nagaland through six distinct zones, with a stepped pay-out feature to ensure funds are allocated where losses occur and in proportion to the amount of recorded rainfall, to mirror its impact. NSDMA's vision was based on the realization that the developmental building blocks and investments of the government/ community for many years can be shattered in less than 15 seconds by a natural catastrophe as also that disaster was no longer 'IF' but 'WHEN'. The government hence regarded investment in risk transfer as a prudent investment, cardinal to sustainable development and decided that the severity of catastrophic losses being very

high, insurance was far more superior and effective option for risk transfer than any other option available for the purpose. In the context of the tropical cyclones Amphan and Nisarga hitting the Eastern and Western coasts of India in early 2020 and cyclone Nivar affecting Southern India in Nov 2020, the Nagaland Government model serves as an effective model for states looking forward to innovative re/insurance solutions to help protect their significant natural catastrophe exposures.

Product design for the Pilot Scheme in selected states

Risk evaluation and Parametric solutions for Maharashtra, Kerala, Orissa and Gujarat

Scope: Developing Disaster finance/ Insurance solutions targeting the Low Income Group to support the government's efforts for rescue and rehabilitation covering a combination of perils.

Historical NatCat Events since 2000

Figure 10 : Key Nat Cat Events in India, Source: Munich Re NATCAT Services

The select states have witnessed major natural disasters ranging from earthquake. Flood (extreme precipitation) and cyclone. A review of the key exposures of these states showcases following

State	Earthquake	Cyclone	River Flooding*	Extreme Precipitation
Maharashtra	Moderate	Moderate	Low	High
Kerala	Low	Low	High	High
Gujarat	High	Low	Low	Moderate
Orissa	Low	High	High	High

***River Flooding data sources to be determined**

Sample Product Coverage and Triggers

Peril	Trigger	Source of Data	Pay-out (Illustration only)
Earthquake	Intensity basis MMI* Scale	USGS and USGC Shake Map	MMI VI - VII : 30% MMI VIII - IX: 60% MMI X and Above: 100%
Cyclone	3 min peak gust	IMD, JWTC	100 - 120 km/h : 30% 121 -150 km/h : 60% 151 km/h and above: 100%
Extreme Precipitation	Rainfall over continuous period of 3/5/7 days	IMD, CHIRPS	100mm-200m over 3 days: 30% 201-300mm over 3 days: 60% 301mm and above over 3 days: 100%
River Flood	River Water level above average level	Source to be Identified	1 - 3M above average : 50% 3M and above average: 100%

Example:

1. Gujarat Earthquake Cover

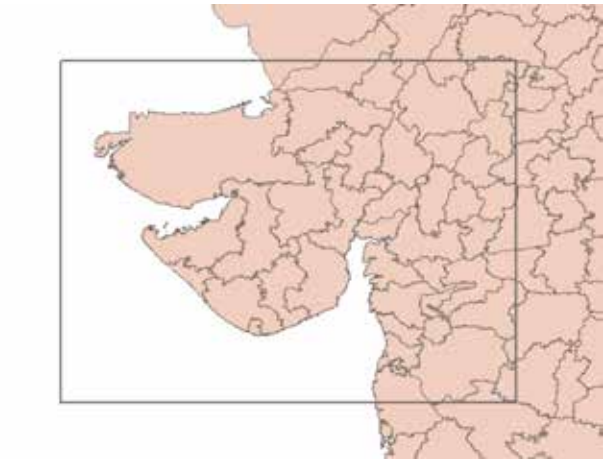

Figure 11 CAT in Box: Gujarat

A rectangle is assumed surrounding earthquake prone areas within the administrative boundaries of the State of Gujarat (rectangle in Figure 9). In the event of an earthquake, the location of the earthquake will be mapped based on the data source agreed. Another important step would be to check the moment magnitude of the earthquake, generally measured on Modified Mercalli Intensity (MMI) scale. This represents the level of intensity of the earthquake felt at each defined distance unit. Pay-out is triggered if the earthquake location is in the predefined box and intensity of the earthquake is more than the pre-defined threshold. The pay-out would be made in proportion to the insured population in the affected districts to overall insured population in the Pay-out Table below.

Illustration: Pay-out Table

EQ Magnitude (MMI)	PAY-OUT (INR Cr)
≥5.5 to <6	5
≥6 to <6.5	10
≥6.5 to< 7	15
≥7 to <7.5	20
≥7.5 to <8	50
≥ 8	100

2. Odisha Cyclone

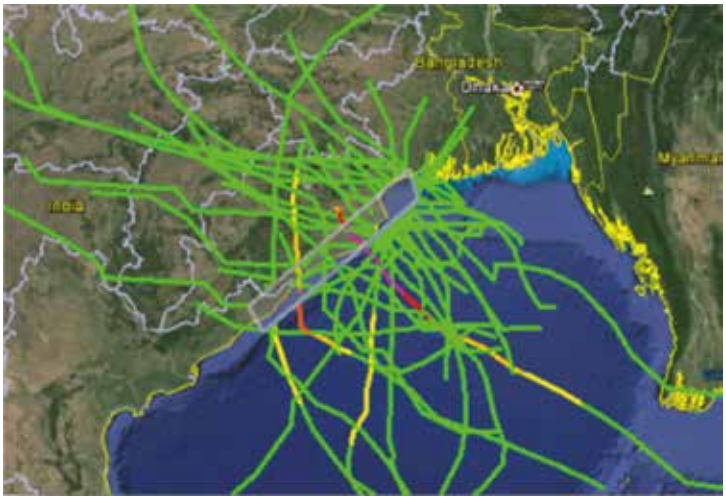

Figure 12 CAT in BOX- Odisha

A rectangle is assumed along the coast of Odisha. It takes care of any tropical cyclones which make landfall in Odisha or near the border and affect the state. The tropical cyclone must pass through the box to produce a pay-out. The solution is based on the observed category of the storm within the box (in this illustration, the Saffir Simpson scale based on wind speed is used). If the Cyclone makes a land fall inside the Box area, at a wind speed greater than or equal to a pre-agreed level, the pay-out will be triggered. It is important to note that the claim payment will be linked to the insured population in the area/district impacted by the cyclone. An indicative Pay-out Table is given below.

Illustration: Pay-out Table

Storm Category	Pay-out (INR Cr)
1	0
2	0
3 (major)	50
4 (major)	75
5 (major)	100

NEXT STEPS:

PROPOSAL FOR PILOT INSURANCE PROGRAM IN SELECT STATE / REGION

The report outlines the need for exploring parametric insurance based options for disaster risk financing to support Governmental endeavor for rehabilitation and reconstruction through quick inflow of funds from Insurance. Based on the findings of the report a summary proposal is being suggested for further action and implementation.

a. At least 4 states need to be selected to run the pilot program.

State	Earthquake	Cyclone	Precipitation
Maharashtra	Moderate	Moderate	High
Kerala	Low	Low	High
Gujarat	High	Low	Moderate
Orissa	Low	High	High
Assam	High	Low	High
Uttarakhand	High	Low	High
Bihar	Moderate	Low	High
Andhra Pradesh	Moderate	High	High
Tamil Nadu	Moderate	High	High

b. Chose a mix of districts – at least 4 districts in each state to allow for a balanced mix of exposure and a reasonable size of the household from the vulnerable section of the population.

State	BPL Population (in Lakh)	Households (@4 members per Household) (in Lakh)
Maharashtra	229.6	57.4
Kerala	77.0	19.2
Gujarat	116.3	29.1
Orissa	99.4	24.9
Assam	64.3	16.1
Uttarakhand	19.7	4.9
Bihar	200.7	50.2
Andhra Pradesh	122.7	30.6
Tamil Nadu	175.2	43.8

*** Source: https://pmmodiyojana.in/new-bpl-list/**

Note: The final beneficiaries can be a subset of the BPL population of the state or any other vulnerable segment as decided by the Government.

c. Identify and agree on the perils to be covered from earthquake, cyclone and extreme precipitation. The Government would need to advise on and decide the exposure to be covered. The Group recommends to cover the livelihoods of BPL households for a predetermined period of time depending on the intensity of the insured event.

d. The compensation would hence correspond to the livelihood costs per BPL household and the period of time the livelihood is expected to be affected by the insured event. The Group proposes to keep the per household cover at INR 10,000 per month with a maximum of 3 months livelihood costs covered under the scheme – corresponding to a maximum amount of INR 30,000 per household.

- List/ count of the households to be covered and arrive at the total Sum insured
- Determine average livelihood costs per household and determine attachment point/ exhaustion point per household for an insurance pay-out (e.g. minimum pay-out INR 10,000 corresponding to 1 month's livelihood affected to a maximum amount of 3 months livelihood affected and a pay-out of INR 30,000)
- Location of these households within the districts to be provided (Pin code level)

e. Design and roll out Insurance program in 90-150 days

- Agree on source of Data to be used
- Address the parametric trigger per peril per district or geographical unit at which the data is available (determine process for the calculation of the event foot-print)
- Use historical data, at least 40 years, of rainfall / wind speed / earth-shakes
- Use historic events having caused significant loss as basis to calibrate the solution

f. Design and agree on an adequate trigger in collaboration with the SDMA

- Determine minimum loss to trigger pay-out (loss = number of households affected (within the foot print of the event) x number of month of affected livelihood (depending on the intensity of the event).
- Determine Post Event Loss Calculation Process

g. Premium for the insurance program for the select segment to be paid by the Government

- Generic approach towards calculating the necessary premium budget:

Example

Incidence intensity	Low	Medium	High
# of households within event foot print	50,000	500,000	1,000,000
# of months of adverse livelihood impact per household in event foot print	1 months	2 months	3 months
Amount per household per month (INR)	10,000	10,000	10,000
Total: (INR)	500 million (50 crore)	10,000 million (1,000 crore)	30,000 million (3,000 crore)
Probability	1 in 10 years	1 in 30 years	1 in 50 years
Technical price	10%	3.33%	2%
Multiple on Technical price to meet operational and management expenses	1.3	1.5	2.0

- Agree to extend the insurance program for other sections of the society basis self- funding of premium by these households

h. Implement the cover and design of pilot for 2 years per state to understand the results of this proposal

i. Review the performance of the Insurance program and fine tune the same

j. Success criteria to be agreed, some of the points are suggested as under

- Ease of implementation
- Ease of understanding of the product for the final insured (determine the process of the flow of funds from the insurance via the insured government to the end-beneficiaries)
- In the event of claim

i. Claims settlement process, including turnaround time

ii. Reliability of the data source

iii. Payment processing

k. Roll out the scheme on a pan India basis in all the states in next 5 years with an overall coverage of INR 20,000 cr to INR 50,000 cr depending on the requirement of Government of India and availability of necessary insurance and reinsurance capacity

Premium Funding

The scheme would require support from the Government initially both from policy formulation perspective as well as funding the premium. There can be a phase-wise approach to manage the cost for the Government, where in Phase I, the Government will be required to pay full premium and the claims will also get paid to the Government entity/ body to utilise it as per defined usage guidelines.

In Phase II, Government can slowly start to reduce the subsidy and insurers can enrol the beneficiaries and collect part of the premium from beneficiaries. This will also allow for a direct transfer of claims to the beneficiaries account from Insurers or from state bodies.

Model for Scheme to function

Figure 14: Representation of Govt Supported Scheme

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11. Case Study - Parametric solution for extreme precipitation for Government of Nagaland, TATA AIG General Insurance Company and Swiss Re India Branch

Annexure 1

India NATCAT Analysis: SDRF Funds inadequate to cover the economic losses suffered

in USD million		2011	2012	2013	2014	2015	2016	2017	2018	2019
Andhra Pradesh/ Telangana	Economic losses	0	0	262	7000	1155	922	0	0	0
	SDRF	114	105	101	101	111	112	121	121	123
	Eco losses as % of SDRF	0.0%	0.0%	260.4%	6907.6%	1037.6%	826.4%	0.0%	0.0%	0.0%
	SGDP	158,297	152,147	156,453	168,896	184,289	199,806	237,479	252,050	275,834
	Eco losses as % of SGDP	0.0%	0.0%	0.2%	4.1%	0.6%	0.5%	0.0%	0.0%	0.0%
Arunachal Pradesh	Economic losses	0	0	0	0	0	0	90	0	0
	SDRF	8	8	7	7	8	8	9	9	9
	Eco losses as % of SDRF	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1029.0%	0.0%	0.0%
	SGDP	2,370	2,348	2,491	2,943	2,885	2,953	3,445	3,597	3,756
	Eco losses as % of SGDP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%	0.0%	0.0%
Assam	Economic losses	0	98	0	79	50	150	90	0	750
	SDRF	59	54	52	53	72	72	78	78	79
	Eco losses as % of SDRF	0.0%	180.1%	0.0%	150.5%	69.7%	208.7%	115.7%	0.0%	944.8%
	SGDP	30,675	29,356	30,364	32,068	35,538	37,853	43,488	46,182	49,044
	Eco losses as % of SGDP	0.0%	0.3%	0.0%	0.2%	0.1%	0.4%	0.2%	0.0%	1.5%
Bihar	Economic losses	176	0	200	0	232	0	1567	0	750
	SDRF	75	69	66	67	73	73	79	79	81
	Eco losses as % of SDRF	233.6%	0.0%	302.4%	0.0%	317.8%	0.0%	1973.0%	0.0%	926.6%
	SGDP	52,951	52,843	54,170	56,191	57,931	62,654	71,989	77,540	86,881
	Eco losses as % of SGDP	0.3%	0.0%	0.4%	0.0%	0.4%	0.0%	2.2%	0.0%	0.9%
Chhattisgarh	Economic losses	0	0	0	0	0	333	0	0	0
	SDRF	34	31	30	30	38	38	41	41	41
	Eco losses as % of SDRF	0.0%	0.0%	0.0%	0.0%	0.0%	885.4%	0.0%	0.0%	0.0%
	SGDP	33,868	33,220	35,333	36,229	35,102	37,332	42,087	44,455	46,746
	Eco losses as % of SGDP	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	0.0%	0.0%	0.0%
Delhi	Economic losses	0	0	0	0	0	0	0	7	0
	SDRF	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	Eco losses as % of SDRF	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
	SGDP	73,659	73,246	75,841	81,071	85,868	91,676	105,481	113,287	121,575
	Eco losses as % of SGDP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Gujarat	Economic losses	0	0	200	0	686	0	313	0	0
	SDRF	113	104	99	100	110	110	119	119	122
	Eco losses as % of SDRF	0.0%	0.0%	201.4%	0.0%	624.5%	0.0%	262.6%	0.0%	0.0%
	SGDP	131,895	135,585	137,964	151,029	160,418	173,678	204,119	219,727	236,527
	Eco losses as % of SGDP	0.0%	0.0%	0.1%	0.0%	0.4%	0.0%	0.2%	0.0%	0.0%
Haryana	Economic losses	0	0	0	0	187	0	0	0	0
	SDRF	43	40	38	38	48	48	52	52	53
	Eco losses as % of SDRF	0.0%	0.0%	0.0%	0.0%	389.2%	0.0%	0.0%	0.0%	0.0%
	SGDP	63,748	64,945	68,206	71,624	77,247	83,570	99,763	107,336	118,095
	Eco losses as % of SGDP	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%
Himachal Pradesh	Economic losses	0	0	200	0	82	0	0	0	0
	SDRF	29	27	26	26	37	37	40	40	41
	Eco losses as % of SDRF	0.0%	0.0%	773.4%	0.0%	223.9%	0.0%	0.0%	0.0%	0.0%
	SGDP	15,580	15,499	16,188	17,003	17,809	18,695	21,248	22,492	23,498
	Eco losses as % of SGDP	0.0%	0.0%	1.2%	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%
J&K	Economic losses	0	0	0	5974	158	0	0	0	0
	SDRF	39	36	34	34	40	40	43	43	44
	Eco losses as % of SDRF	0.0%	0.0%	0.0%	17392.7%	397.1%	0.0%	0.0%	0.0%	0.0%
	SGDP	16,766	16,307	16,334	16,117	18,266	18,578	21,384	22,801	24,312
	Eco losses as % of SGDP	0.0%	0.0%	0.0%	37.1%	0.9%	0.0%	0.0%	0.0%	0.0%
Jharkhand	Economic losses	0	0	0	0	0	333	61	0	0
	SDRF	58	54	51	52	57	57	62	62	63
	Eco losses as % of SDRF	0.0%	0.0%	0.0%	0.0%	0.0%	586.4%	99.2%	0.0%	0.0%
	SGDP	32,334	32,698	32,212	35,804	32,210	35,155	41,438	43,452	46,663
	Eco losses as % of SGDP	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	0.1%	0.0%	0.0%
Karnataka	Economic losses	0	0	200	0	0	333	0	0	5617
	SDRF	36	33	32	32	43	43	47	47	48
	Eco losses as % of SDRF	0.0%	0.0%	628.3%	0.0%	0.0%	772.4%	0.0%	0.0%	11773.0%
	SGDP	129,839	130,142	139,509	149,742	162,937	179,925	208,494	225,794	241,288
	Eco losses as % of SGDP	0.0%	0.0%	0.1%	0.0%	0.0%	0.2%	0.0%	0.0%	2.3%

Kerala	Economic losses	0	0	200	0	0	0	0	3836	0
	SDRF	29	27	26	26	29	29	31	31	32
	Eco losses as % of SDRF	0.0%	0.0%	771.6%	0.0%	0.0%	0.0%	0.0%	12260.8%	0.0%
	SGDP	77,998	77,162	79,442	83,981	87,612	94,474	107,747	114,279	121,208
	Eco losses as % of SGDP	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	3.4%	0.0%
Madhya Pradesh	Economic losses	0	0	0	0	82	483	0	0	0
	SDRF	88	81	78	78	137	137	149	149	151
	Eco losses as % of SDRF	0.0%	0.0%	0.0%	0.0%	60.2%	352.7%	0.0%	0.0%	0.0%
	SGDP	67,610	71,288	75,076	78,636	84,350	96,697	111,302	118,364	128,755
	Eco losses as % of SGDP	0.0%	0.0%	0.0%	0.0%	0.1%	0.5%	0.0%	0.0%	0.0%
Maharashtra	Economic losses	0	0	0	0	82	483	300	0	0
	SDRF	100	91	88	88	231	232	251	251	256
	Eco losses as % of SDRF	0.0%	0.0%	0.0%	0.0%	35.6%	208.6%	119.5%	0.0%	0.0%
	SGDP	274,322	273,160	281,805	291,504	306,526	327,120	365,909	384,919	404,916
	Eco losses as % of SGDP	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%
Manipur	Economic losses	0	0	0	0	0	60	90	0	0
	SDRF	2	1	1	1	3	3	3	3	3
	Eco losses as % of SDRF	0.0%	0.0%	0.0%	0.0%	0.0%	2016.1%	2792.9%	0.0%	0.0%
	SGDP	2,767	2,572	2,764	2,970	3,045	3,169	3,961	4,074	4,192
	Eco losses as % of SGDP	0.0%	0.0%	0.0%	0.0%	0.0%	1.9%	2.3%	0.0%	0.0%
Meghalaya	Economic losses	0	0	0	79	0	0	0	0	0
	SDRF	3	3	3	3	4	4	4	4	4
	Eco losses as % of SDRF	0.0%	0.0%	0.0%	2709.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	SGDP	4,267	4,093	3,918	3,807	3,916	4,083	4,532	4,895	5,193
	Eco losses as % of SGDP	0.0%	0.0%	0.0%	2.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Nagaland	Economic losses	0	0	0	0	0	0	90	0	0
	SDRF	1	1	1	1	2	1	2	2	2
	Eco losses as % of SDRF	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5331.9%	0.0%	0.0%
	SGDP	2,609	2,643	2,838	3,015	3,044	3,232	3,761	3,989	4,230
	Eco losses as % of SGDP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.4%	0.0%	0.0%

Orissa	Economic losses	606	0	1438	100	1500	333	0	316	2403
	SDRF	88	81	77	78	116	117	127	126	129
	Eco losses as % of SDRF	687.6%	0.0%	1857.6%	128.2%	1288.1%	285.4%	0.0%	249.7%	1861.6%
	SGDP	49,489	48,975	50,646	51,489	51,219	58,437	67,654	71,965	75,459
	Eco losses as % of SGDP	1.2%	0.0%	2.8%	0.2%	2.9%	0.6%	0.0%	0.4%	3.2%
Punjab	Economic losses	0	0	0	0	82	0	0	0	0
	SDRF	50	46	44	44	61	61	66	66	67
	Eco losses as % of SDRF	0.0%	0.0%	0.0%	0.0%	135.5%	0.0%	0.0%	0.0%	0.0%
	SGDP	57,126	55,719	56,740	58,182	60,813	63,538	72,309	76,957	81,620
	Eco losses as % of SGDP	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
Rajasthan	Economic losses	0	0	0	0	82	333	0	32	0
	SDRF	135	124	119	120	172	172	187	187	190
	Eco losses as % of SDRF	0.0%	0.0%	0.0%	0.0%	47.9%	193.4%	0.0%	17.0%	0.0%
	SGDP	93,165	92,365	94,131	100,870	106,240	113,203	128,263	137,808	144,988
	Eco losses as % of SGDP	0.0%	0.0%	0.0%	0.0%	0.1%	0.3%	0.0%	0.0%	0.0%
Sikkim	Economic losses	20	0	0	0	0	0	0	0	0
	SDRF	5	5	4	5	5	5	5	5	5
	Eco losses as % of SDRF	390.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	SGDP	2,392	2,309	2,368	2,524	2,811	3,078	3,989	4,199	4,615
	Eco losses as % of SGDP	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Tamil Nadu	Economic losses	375	0	0	0	1170	1000	0	1016	0
	SDRF	66	61	58	58	106	106	115	115	117
	Eco losses as % of SDRF	567.9%	0.0%	0.0%	0.0%	1105.4%	942.5%	0.0%	884.2%	0.0%
	SGDP	161,007	159,975	165,452	175,754	183,411	193,838	224,999	238,339	262,126
	Eco losses as % of SGDP	0.2%	0.0%	0.0%	0.0%	0.6%	0.5%	0.0%	0.4%	0.0%
Uttar Pradesh	Economic losses	186	0	0	0	203	333	0	132	751
	SDRF	87	80	76	77	105	106	114	114	116
	Eco losses as % of SDRF	214.3%	0.0%	0.0%	0.0%	193.1%	315.9%	0.0%	115.3%	644.9%
	SGDP	155,129	153,906	160,639	165,777	177,379	192,001	224,291	243,898	254,834
	Eco losses as % of SGDP	0.1%	0.0%	0.0%	0.0%	0.1%	0.2%	0.0%	0.1%	0.3%

Uttarakhand	Economic losses	10	20	200	0	0	0	0	0	0
	SDRF	26	24	23	23	33	33	35	36	36
	Eco losses as % of SDRF	37.8%	81.1%	859.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	SGDP	24,709	24,631	25,466	26,451	27,619	29,035	34,223	35,950	37,765
	Eco losses as % of SGDP	0.0%	0.1%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
West Bengal	Economic losses	239	0	200	0	82	0	61	100	1600
	SDRF	69	63	60	61	80	81	87	87	89
	Eco losses as % of SDRF	348.7%	0.0%	331.8%	0.0%	102.4%	0.0%	69.9%	114.4%	1794.1%
	SGDP	111,515	110,689	115,624	117,655	124,296	129,836	149,692	159,345	178,054
	Eco losses as % of SGDP	0.2%	0.0%	0.2%	0.0%	0.1%	0.0%	0.0%	0.1%	0.9%

Source: Disaster Management Division, Ministry of Home Affairs, Government of India; Ministry of Statistics and Programme Implementation; Swiss Re Institute.

Annexure 2

Data Requirement Template for Parametric Products

Data Requirement Template for Parametric Products		
Weather Data		
Extreme Precipitation	**Preferable**	**Workable**
1 Historical daily (mm / 24 hours) rainfall Data at Weather Station level	50 years	25 years
2 Location of each Weather Station	Lat Long	PINCODE
3 Future availability of the Daily Rainfall Data from same weather stations for Claims assessment	Must have	Must have
If Weather Station Level data is not available - can lead to higher Basis Risk		
1 Grid Data (grided satellite data or grided / interpolated weather station data?)	50 years	25 years
2 Grid Size	10*10	25*25
3 Sample Weather Station data to Map with the Grid data to support and validate modelling (not necessarily leading to a better result as both have their failure sources. Calibration by using historical events necessary for both)	25 weather stations	10-15 weather stations
Cyclone **(Challenge: Objective external data source for wind field necessary....)**	**Preferable**	**Workable**
1 Historical Data and data source and/or stochastic data / track information (sustained wind speed, central low pressure, measured wind speed from AW	50 years	25 years
2 Future availability of data from Same Source (Consistency between pricing and reporting is very important) Issue: Cyclone loss often driven by storm surge and extreme precipitation but not by wind speed.		
3 ERA 5 data (remote sensing based) provides track record from 1961 onwards for modelled windspeed per pixel (resolution: 30 km * 30 km, 3 hourly)		
4 Alternative: Modelled loss with JBA (Has a Cost implication)		
5 (H.-Wind (RMS offspring) is producing wind fields on a global level on fee basis. Comparatively expensive)		
Earthquake **(Challenge: Objective external data source for shake map is necessary)**	**Preferable**	**Workable**
USGS		
1 Historical EQ Data available, and Same source can be used for claims Management Earth Shake Map also produced by USGS can be used for mapping the EQ intensity and area or impact from epicentre		
2 Issue for pricing / reduces basis riks for client: Generation of the shake map is not 100% standardized but subject to adjustment for most events to achieve a better fit.		
3 **If USGS is not acceptable** Data Source that is mutually agreeable- say any Indian Government Data Source Does the Agency generates Earth Shake map? *Access to some of the historical / artificial events and Shake Map for the same*		
Riverine Flooc Challenge: How to create a foot print for the event?	**Preferable**	**Workable**
1 Historical flood event data (historical flood maps)	50 years	25 years
2 River gauge data (to correlate with historic events)	critical gauge stations necessary plus back-up)	
3 Modelled loss by involving a vendor such as JBA (remote sensing, weather station data and gauge data used as input variable for dynmaic run-off models)		
4 Possibly: Assessing remote sensing data for submerged areas....		
Beneficiary Data	**Preferable**	**Workable**
1 Beneficiary Household details (number of households per geographical unit, number of members per household)	Count of Household by Pincode	Count by Village
2 Growth in Beneficiary count expected	%	
3 How many Beneficiaries expected to be covered	%	
Historical Claims Data	**Preferable**	**Workable**
1 Damage and loss information from historic events, like Amphan, Gujarat EQ	Pincode level	Village level
2 Number of households affected, impacted		
Sum Insured	**Preferable**	**Workable**
1 Flat Sum Insured per beneficiary (informed by livlihood costs and by the duration of the impact of the event)		
2 Consolidated Sum insured at the Government agency level		
Enrollment Process	**Preferable**	**Workable**
1 Government / Bank / Other Agency covering all beneficiaries	Agency paying for all insured	
2 Enrollment based Model	Expected participation levels	
Claims Process	**Preferable**	**Workable**
1 Retrieve information from applicable reporting agent / reporting source		
2 Calculate the number of affected households and determine the insurance payout		
3 Payment to Government entity / Bank		
4 Payment to Individual beneficiary		

Annexure 3

Risk Modeling

Purpose of risk modeling

Risk modeling is central to the development of any disaster risk financing instrument, including insurance products. It plays a key role at several stages in the development of a parametric disaster insurance mechanism:

- Risk modeling is required to understand the correlation of the intensity of an event and the expected damage and loss on state level and the underlying probability of this event / damage and loss to occur
- This understanding helps the responsible disaster management authorities to proper plan its risk financing strategy for future disasters and to determine the probable events for which an insurance pay-out is regarded as the most efficient risk financing instrument. The latter informs the selection of the most suitable trigger mechanism.
- Finally, the probability of triggering events and the corresponding risk financing need on state level, determine the technical price of this risk financing instrument. The technical price is required to calculate fair premium prices.

Most frequent causes of damage and loss, such as the risk from car accidents or thefts, can generally be reliably estimated based on historical data. For more severe—and typically less frequent—events like cyclones, precipitation, or earthquakes, however, their historical record is typically too short to adequately capture the full range of risks from these events. Just because an earthquake has not happened in a certain location or with a certain magnitude within the available historical record, does not guarantee that such earthquake will not happen in the future.

In the case of such severe, infrequent events, an assessment based on a robust risk model is required to capture the full range of potential impacts. Risk models combine latest scientific knowledge on natural hazards, such as cyclones and earthquakes, with their historical record to achieve a more complete view of the risk these hazards present.

A disaster is caused by 3 factors in combination: the occurrence of a natural hazard event, the presence of asset exposure (such as buildings and other infrastructure) in the affected region, and vulnerability of that exposure to damage from that event. As such, risk modeling requires a series of steps to determine (i) the types of natural hazard that could occur in a particular location (in this case, defined geographical

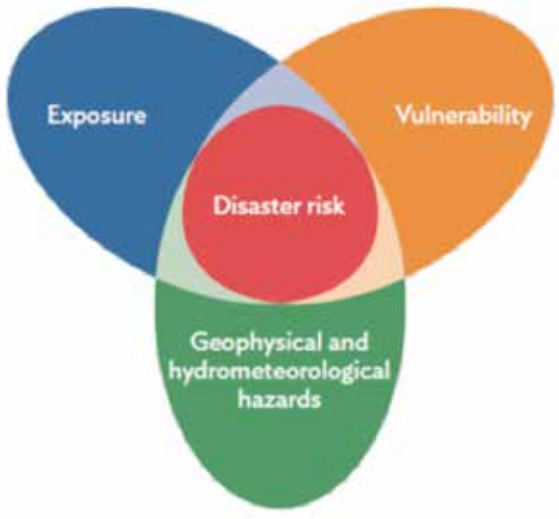

Figure 12 Disaster Risk Modelling

area) and levels of frequency at different levels of intensity; (ii) the physical characteristics of those hazard events (e.g., wind speed, storm surge, and ground shaking); (iii) the physical assets exposed to those hazards; and (iv) the degree of vulnerability of those physical assets to hazard events of varying levels of intensity and physical characteristics. These factors come together in a final, fifth stage to determine the scale of physical losses, expressed in monetary terms, that can be expected to occur at different levels of frequency.

The risk modeling to assess disaster risk for the states can be based on the India earthquake and flood models which are available in the market. Both models are based on the modeling steps outlined above and described in further detail below. These modeling steps are widely used by modern catastrophe models to quantify risk from severe events. Recognizing the broad range of flood and earthquake risk across India, the models enable the assessment of individual geographical area risk profiles and comparison of risk between districts and types of natural hazard.

Modeling Physical Asset Damage

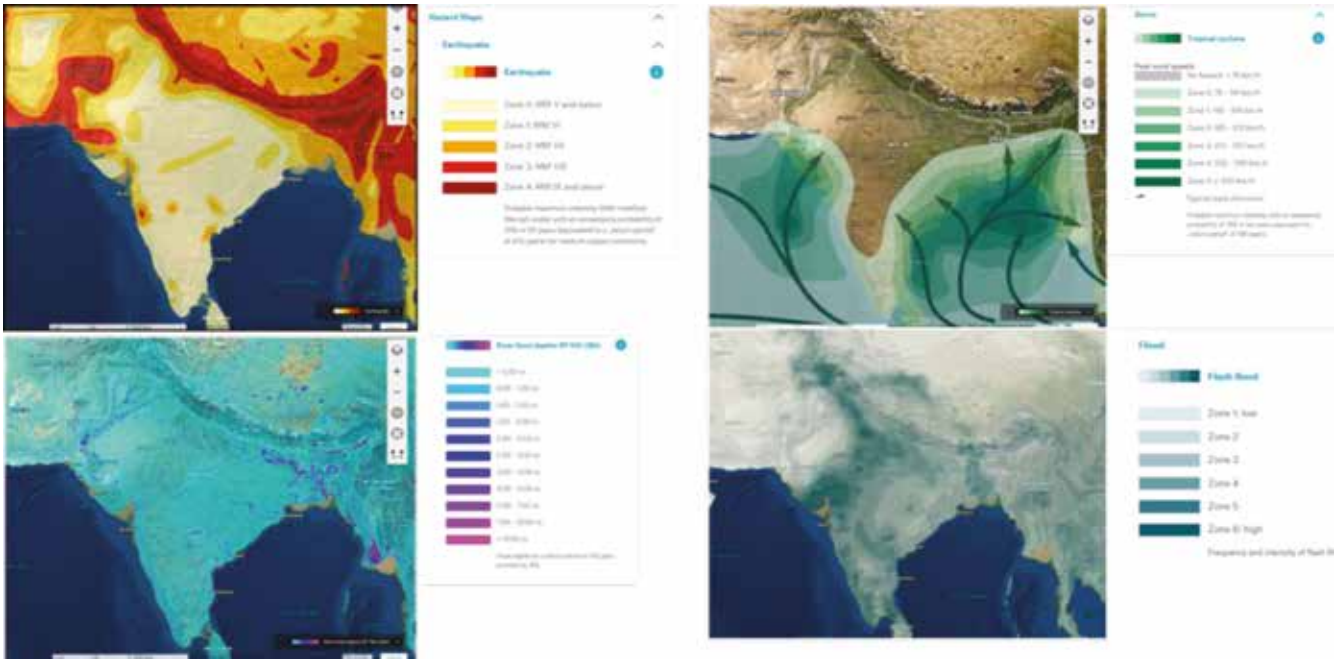

Figure 15 India Physical Risk Map, Source: Munich Re Nat Cat Services

To assess the risk from flood and earthquake events to the participating states in the design of the scheme, a bespoke exposure database is to be developed for each geographical area.

1. **Defining possible types and frequencies of hazard**. Thousands of hypothetical events for a given natural hazard, such as earthquakes or precipitation, are simulated based on the latest scientific understanding of these hazards. For example, the Model may contain thousands of simulated flood events. Unlike historical precipitation, these simulated events are not intended to reflect specific events that have occurred in the past. Instead, they have been created to represent the range of possible severities of flood events which could potentially impact India in the future.

2. **Determining physical (hazard) characteristics**. Each simulated event will impact a certain geographical area with different physical characteristics. These characteristics are expressed in terms of event-specific hazard measurements. For example, the impact of a flood event is measured in terms of its flood depth hazard; and the hazard used to measure the impact of an earthquake event is its ground motion. The model generates the hazard characteristics of each simulated events across all locations impacted by that event.
3. **Identifying impacted assets**. A risk model requires information about the assets that would be impacted by potential hazard events. This information is typically captured in an exposure database which contains information on the type, location, reconstruction cost, and building characteristics of each asset. During the modeling process, the locations of the assets included in the exposure database is overlaid with the stored hazard information on each simulated event. Through this process, the level of hazard (for example, flood depth or ground motion) experienced by each asset in the exposure database can be determined for every simulated event.
4. **Assessing asset vulnerability to experienced hazard levels**. Vulnerability is the relationship between hazard (e.g. ground shaking) and damage (e.g. 30% damage to a building structure). The vulnerability of an asset is dependent on its physical characteristics, such as building material and height, and can vary by natural hazard: for example, a building could be more vulnerable to cyclones than to earthquakes. The models store vulnerability information for thousands of asset types. During the modeling process, the models select the vulnerability information appropriate for each of the assets contained in the exposure database used for the modeling and use this information to calculate the level of damage caused by each simulated event for all assets impacted by the event.
5. **Calculating financial loss**. In the final step, the level of damage that a simulated event of a particular intensity causes to an asset is converted into a financial loss, based on the total value of the asset. For example, if a 30% damage level is calculated for an asset with a value of ¤1,000, the resulting financial loss is 300. For each simulated event, losses are then aggregated across all assets included in the analysis. Finally, different levels of losses are assigned different likelihoods or probabilities. For a given level of loss, its likelihood (often expressed as a return period) depends on how many simulated events reach this level of loss. Typically, larger, more severe events have a lower likelihood than smaller, less severe events.

   The likelihood with which different level of loss can be expected to occur is frequently measured using the concept of return periods. A loss with a return period of 100 years, for example, can be expected to be exceeded once every 100 years, on average. Conversely, the likelihood of exceeding this loss level within any given year is 1-in-100 or 1%. This 1% probability is commonly called occurrence exceedance probability (OEP) and describes the probability with which an event with a loss above a pre-defined threshold can be expected to occur in any given year, on average.

   This concept of a loss amount at a given return period (or OEP) is sometimes also referred to as “probable maximum loss” (PML), with a subscript denoting the return period for that loss (for example, the expected loss at 1-in-100-year return period would be denoted PML100).

Annexure 4

Report of the 15th Finance Commission for FY 2020-21

Report Summary

- The Finance Commission is a constitutional body formed by the President of India to give suggestions on centre-state financial relations. The 15th Finance Commission (Chair: Mr N. K. Singh) was required to submit two reports. The first report, consisting of recommendations for the financial year 2020-21, was tabled in Parliament on February 1, 2020. The final report with recommendations for the 2021-26 period will be submitted by October 30, 2020.

Key recommendations in the first report (2020-21 period) include:

- Devolution of taxes to states: The share of states in the centre's taxes is recommended to be decreased from 42% during the 2015-20 period to 41% for 2020-21. The 1% decrease is to provide for the newly formed union territories of Jammu and Kashmir, and Ladakh from the resources of the central government. The individual shares of states from the divisible pool of central taxes is provided in Table 3 in the annexure.

Criteria for devolution

Table 1 below shows the criteria used by the Commission to determine each state's share in central taxes, and the weight assigned to each criterion. We explain some of the indicators below.

Table 1: Criteria for devolution (2020-21)

Criteria	14th FC 2015-20	15th FC 2020-21
Income Distance	50.0	45.0
Population (1971)	17.5	-
Population (2011)	10.0	15.0
Area	15.0	15.0
Forest Cover	7.5	-
Forest and Ecology	-	10.0
Demographic Performance	-	12.5
Tax Effort	-	2.5
Total	100	100

Sources: Report for the year 2020-21, 15th Finance Commission; PRS.

- Income distance: Income distance is the distance of the state's income from the state with the highest income. The income of a state has been computed as average per capita GSDP during the three-year period between 2015-16 and 2017-18. States with lower per capita income would be given a higher share to maintain equity among states.
- Demographic performance: The Terms of Reference (ToR) of the Commission required it to use the population data of 2011 while making recommendations. Accordingly, the Commission used only 2011 population data for its recommendations.
- The Demographic Performance criterion has been introduced to reward efforts made by states in controlling their population. It will be computed by using the reciprocal of the total fertility ratio of each state, scaled by 1971 population data. States with a lower fertility ratio will be scored higher on this criterion. The total fertility ratio in a specific year is defined as the total number of children that would be born to each woman if she were to live to the end of her child-bearing years and give birth to children in alignment with the prevailing age-specific fertility rates.
- Forest and ecology: This criterion has been arrived at by calculating the share of dense forest of each state in the aggregate dense forest of all the states.
- Tax effort: This criterion has been used to reward states with higher tax collection efficiency. It has been computed as the ratio of the average per capita own tax revenue and the average per capita state GDP during the three-year period between 2014-15 and 2016-17.

Grants-in-aid

In 2020-21, the following grants will be provided to states: (i) revenue deficit grants, (ii) grants to local bodies, and (iii) disaster management grants. The Commission has also proposed a framework for sector-specific and performance-based grants. State-specific grants will be provided in the final report.

- Revenue deficit grants: In 2020-21, 14 states are estimated to have an aggregate revenue deficit of Rs 74,340 crore post-devolution. The Commission recommended revenue deficit grants for these states (see Table 4 in the annexure).
- Special grants: In case of three states, the sum of devolution and revenue deficit grants is estimated to decline in 2020-21 as compared to 2019-20. These states are Karnataka, Mizoram, and Telangana. The Commission has recommended special grants to these states aggregating to Rs 6,764 crore.
- Sector-specific grants: The Commission has recommended a grant of Rs 7,375 crore for nutrition in 2020-21. Sector-specific grants for the following sectors will be provided in the final report: (i) nutrition, (ii) health, (iii) pre-primary education, (iv) judiciary, (v) rural connectivity, (vi) railways, (vii) police training, and (viii) housing.
- Performance-based grants: Guidelines for performance-based grants include: (i) implementation of agricultural reforms, (ii) development of aspirational districts and blocks, (iii) power sector reforms, (iv) enhancing trade including exports, (v) incentives for education, and (vi) promotion of domestic and international tourism. The grant amount will be provided in the final report.

- Grants to local bodies: The total grants to local bodies for 2020-21 has been fixed at Rs 90,000 crore, of which Rs 60,750 crore is recommended for rural local bodies (67.5%) and Rs 29,250 crore for urban local bodies (32.5%). This allocation is 4.31% of the divisible pool. This is an increase over the grants for local bodies in 2019-20, which amounted to 3.54% of the divisible pool (Rs 87,352 crore). The grants will be divided between states based on population and area in the ratio 90:10. The grants will be made available to all three tiers of Panchayat- village, block, and district.
- Disaster risk management: The Commission recommended setting up National and State Disaster Management Funds (NDMF and SDMF) for the promotion of local-level mitigation activities. The Commission has recommended retaining the existing cost-sharing patterns between the centre and states to fund the SDMF (new) and the SDRF (existing). The cost-sharing pattern between centre and states is (i) 75:25 for all states, and (ii) 90:10 for north-eastern and Himalayan states.

For 2020-21, State Disaster Risk Management Funds have been allocated Rs 28,983 crore, out of which the share of the union is Rs 22,184 crore. The National Disaster Risk Management Funds has been allocated Rs 12,390 crore.

Table 2: Grants for disaster risk management (In Rs crore)

Funding Windows	National corpus	States' corpus
Mitigation (20%)	2,478	5,797
Response (80%)	9,912	23,186
(i) Response and Relief (40%)	4,956	11,593
(ii) Recovery and Reconstruction (30%)	3,717	8,695
(iii) Capacity Building (10%)	1,239	2,998
Total	12,390	28,983

Sources: Report for the year 2020-21, 15th Finance Commission; PRS.

Recommendations on fiscal roadmap

- Fiscal deficit and debt levels: The Commission noted that recommending a credible fiscal and debt trajectory roadmap remains problematic due to uncertainty around the economy. It recommended that both central and state governments should focus on debt consolidation and comply with the fiscal deficit and debt levels as per their respective Fiscal Responsibility and Budget Management (FRBM) Acts.
- Off-budget borrowings: The Commission observed that financing capital expenditure through off-budget borrowings detracts from compliance with the FRBM Act. It recommended that both the central and state governments should make full disclosure of extra-budgetary borrowings. The

outstanding extra-budgetary liabilities should be clearly identified and eliminated in a time-bound manner.

- Statutory framework for public financial management: The Commission recommended forming an expert group to draft legislation to provide for a statutory framework for sound public financial management system. It observed that an overarching legal fiscal framework is required which will provide for budgeting, accounting, and audit standards to be followed at all levels of government.
- Tax capacity: In 2018-19, the tax revenue of state governments and central government together stood at around 17.5% of GDP. The Commission noted that tax revenue is far below the estimated tax capacity of the country. Further, India's tax capacity has largely remained unchanged since the early 1990s. In contrast, tax revenue has been rising in other emerging markets. The Commission recommended: (i) broadening the tax base, (ii) streamlining tax rates, (iii) and increasing capacity and expertise of tax administration in all tiers of the government.
- GST implementation: The Commission highlighted some challenges with the implementation of the Goods and Services Tax (GST). These include: (i) large shortfall in collections as compared to original forecast, (ii) high volatility in collections, (iii) accumulation of large integrated GST credit, (iv) glitches in invoice and input tax matching, and (v) delay in refunds. The Commission observed that the continuing dependence of states on compensation from the central government (21 states out of 29 states in 2018-19) for making up for the shortfall in revenue is a concern. It suggested that the structural implications of GST for low consumption states need to be considered.

Other recommendations

- Financing of security-related expenditure: The ToR of the Commission required it to examine whether a separate funding mechanism for defence and internal security should be set up and if so, how it can be operationalised. In this regard, the Commission intends to constitute an expert group comprising representatives of the Ministries of Defence, Home Affairs, and Finance. The Commission noted that the Ministry of Defence proposed following measures for this purpose: (i) setting up of a non-lapsable fund, (ii) levy of a cess, (iii) monetisation of surplus land and other assets, (iv) tax-free defence bonds, and (v) utilising proceeds of disinvestment of defence public sector undertakings. The expert group is expected to examine these proposals or alternative funding mechanisms.

Annexure 5

Table 3: Share of states in the centre's taxes

State	14th Finance Commission		15th Finance Commission		Devolution for FY 2020-2021
	Share out of 42%	Share in divisible pool	Share out of 41%	Share in divisible pool	(In Rs crore)
Andhra Pradesh	1.81	4.31	1.69	4.11	35,156
Arunachal Pradesh	0.58	1.38	0.72	1.76	15,051
Assam	1.39	3.31	1.28	3.13	26,776
Bihar	4.06	9.67	4.13	10.06	86,039
Chhattisgarh	1.29	3.07	1.4	3.42	29,230
Goa	0.16	0.38	0.16	0.39	3,301
Gujarat	1.3	3.1	1.39	3.4	29,059
Haryana	0.46	1.1	0.44	1.08	9,253
Himachal Pradesh	0.3	0.71	0.33	0.8	6,833
Jammu and Kashmir	0.78	1.86	-	-	-
Jharkhand	1.32	3.14	1.36	3.31	28,332
Karnataka	1.98	4.71	1.49	3.65	31,180
Kerala	1.05	2.5	0.8	1.94	16,616
Madhya Pradesh	3.17	7.55	3.23	7.89	67,439
Maharashtra	2.32	5.52	2.52	6.14	52,465
Manipur	0.26	0.62	0.29	0.72	6,140
Meghalaya	0.27	0.64	0.31	0.77	6,542
Mizoram	0.19	0.45	0.21	0.51	4,327
Nagaland	0.21	0.5	0.23	0.57	4,900
Odisha	1.95	4.64	1.9	4.63	39,586
Punjab	0.66	1.57	0.73	1.79	15,291
Rajasthan	2.31	5.5	2.45	5.98	51,131
Sikkim	0.15	0.36	0.16	0.39	3,318
Tamil Nadu	1.69	4.02	1.72	4.19	35,823
Telangana	1.02	2.43	0.87	2.13	18,241
Tripura	0.27	0.64	0.29	0.71	6,063
Uttar Pradesh	7.54	17.95	7.35	17.93	1,53,342
Uttarakhand	0.44	1.05	0.45	1.1	9,441
West Bengal	3.08	7.33	3.08	7.52	64,301
Total	**42**	**100**	**41**	**100**	**8,55,176**

Sources: Reports of 14th and 15th Finance Commission; PRS.

Table 4: Some of the grants-in-aid for FY 2020-21 (in Rs crore)

State	Revenue deficit grants	Grants to rural local bodies	State's share in grants for rural local bodies	Grants to urban local bodies	State's share in grants for urban local bodies
Andhra Pradesh	5,897	2,625	4.32	1264	4.32
Arunachal Pradesh	-	231	0.38	111	0.38
Assam	7,579	1,604	2.64	772	2.64
Bihar	-	5,018	8.26	2,416	8.26
Chhattisgarh	-	1,454	2.39	700	2.39
Goa	-	75	0.12	36	0.12
Gujarat	-	3,195	5.26	1538	5.26
Haryana	-	1,264	2.08	609	2.08
Himachal Pradesh	11,431	429	0.71	207	0.71
Jharkhand	-	1,689	2.78	813	2.78
Karnataka	-	3,217	5.29	1549	5.29
Kerala	15,323	1,628	2.68	784	2.68
Madhya Pradesh	-	3,984	6.56	1,918	6.56
Maharashtra	-	5,827	9.59	2,806	9.59
Manipur	2,824	177	0.29	85	0.29
Meghalaya	491	182	0.3	88	0.3
Mizoram	1,422	93	0.15	45	0.15
Nagaland	3,917	125	0.21	60	0.21
Odisha	-	2,258	3.72	1087	3.72
Punjab	7,659	1,388	2.29	668	2.29
Rajasthan	-	3,862	6.36	1,859	6.36
Sikkim	448	42	0.07	20	0.07
Tamil Nadu	4,025	3,607	5.94	1737	5.94
Telangana	-	1,847	3.04	889	3.04
Tripura	3,236	191	0.31	92	0.31
Uttar Pradesh	-	9,752	16.05	4,695	16.05
Uttarakhand	5,076	574	0.95	278	0.95
West Bengal	5,013	4,412	7.26	2,124	7.26
Total	**74,341**	**60,750**	**100**	**29,250**	**100**

Sources: Report for the year 2020-21, 15th Finance Commission; PRS.