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Dr. Saurabh Dalal is a National Professional Officer, Emergency Preparedness & Risk Management, World Health Emergencies Programme with the WHO – Country Office of India, He has qualifications in the field of Emergency & Disaster Medicine as well as Public Health and is the recipient of several prestigious international fellowships. Prior to WHO, Saurabh worked as a Specialist- Medical Preparedness and Biological Disasters with the National Disaster Management Authority (NDMA), Ministry of Home Affairs, Govt of India, and at the NIDM - National Institute of Disaster Management. He has served in various honorary positions with the Govt of India as part of a National Task Force, Subject Matter Expert, as and a Strategic Advisory group member, and in academia and has contributed to several national guidelines and modules in the area of Health , emergencies and disaster risk management.

His area of expertise ranges from Disaster Risk Reduction, Climate change and Extreme Weather Events, Public Health Emergency Management, Hospital safety & CBRN emergency Management, and Measures against Weapons of Mass Destruction.

Dr. Saurabh represents India as a member of the International Medical Commission of the Federation of International Motor Sport (FIM) and Chief – Medical Officer - for Formula One India & MotoGP BHARAT.





Lessons learned in WASH: Response during Floods

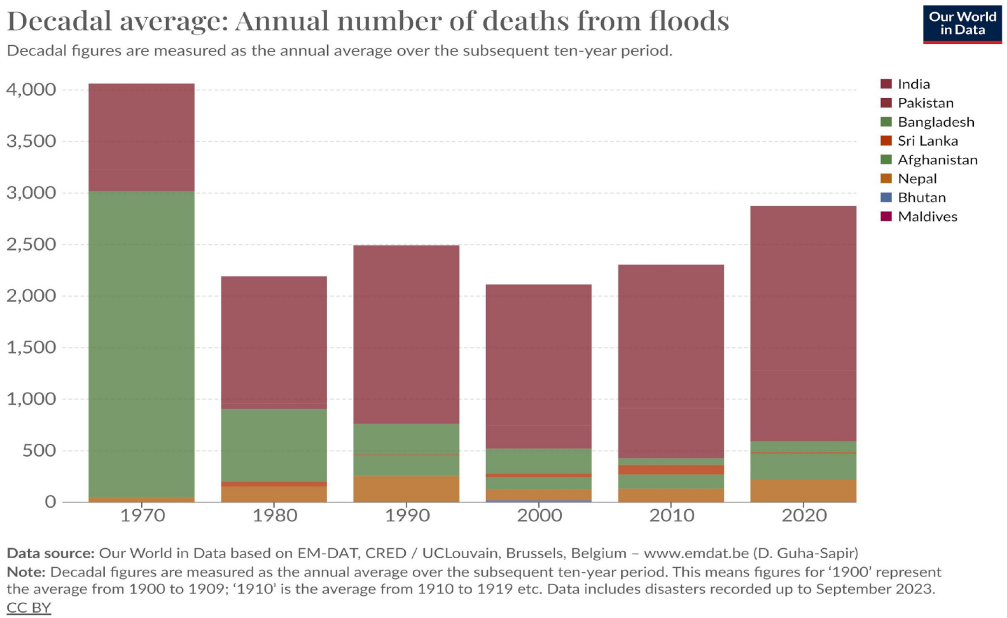
Dr Saurabh Dalal

NPO (Emergency Preparedness and Risk Management)

WHO India

BACKGROUND

- 1998-2017, floods affected more than 2 billion people worldwide
- India ranked 7th in the 2021, Afghanistan 6 th- Global Climate Risk Index 2021 released by Germanwatch
- **SDG 3-** *Target 3.3: By 2030, (…) combat hepatitis, water-borne diseases and other communicable diseases.*
- *reduce the number of deaths and illnesses from water and soil pollution*
- **SDG 6** - *universal and equitable access to safe and affordable drinking water and sanitation for all.*



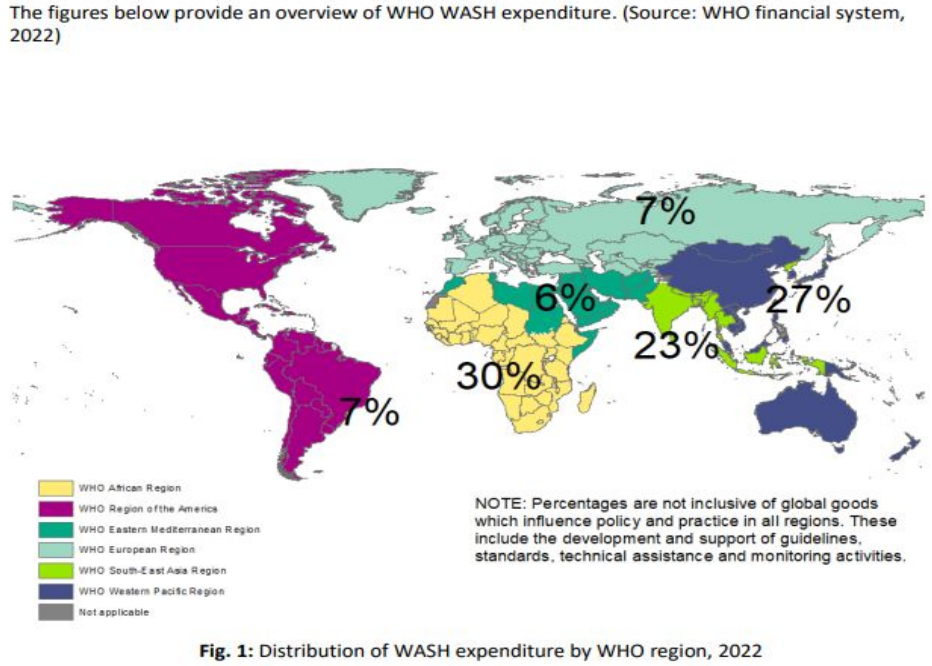


Fig. 1: Distribution of WASH expenditure by WHO region, 2022

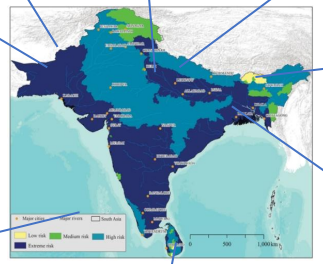
Recent Floods in South Asia

Afghanistan floods 2023

Urban Floods Delhi 2023

Nepal floods 2023

Punjab Pakistan floods 2023



Bhutan floods 2021

Tidal floods Maldives 2021

Cyclonic flood Sri Lanka floods 2021

Chittagong Bangladesh floods 2023

WASH & Floods

Contaminated water supplies - pollutants, pathogens- Cholera , Hep A , Dysentery

Overflowing of sewers, gutters, flooded toilets

Damage to infrastructure- Wastewater from industries , Agricultural land , households

Access to WASH affected

Disruption of water supplies – water treatment plants, the supply system

Displaced to Camps, Temporary shelter – **crowded areas-** WASH affected- issues of inclusivity

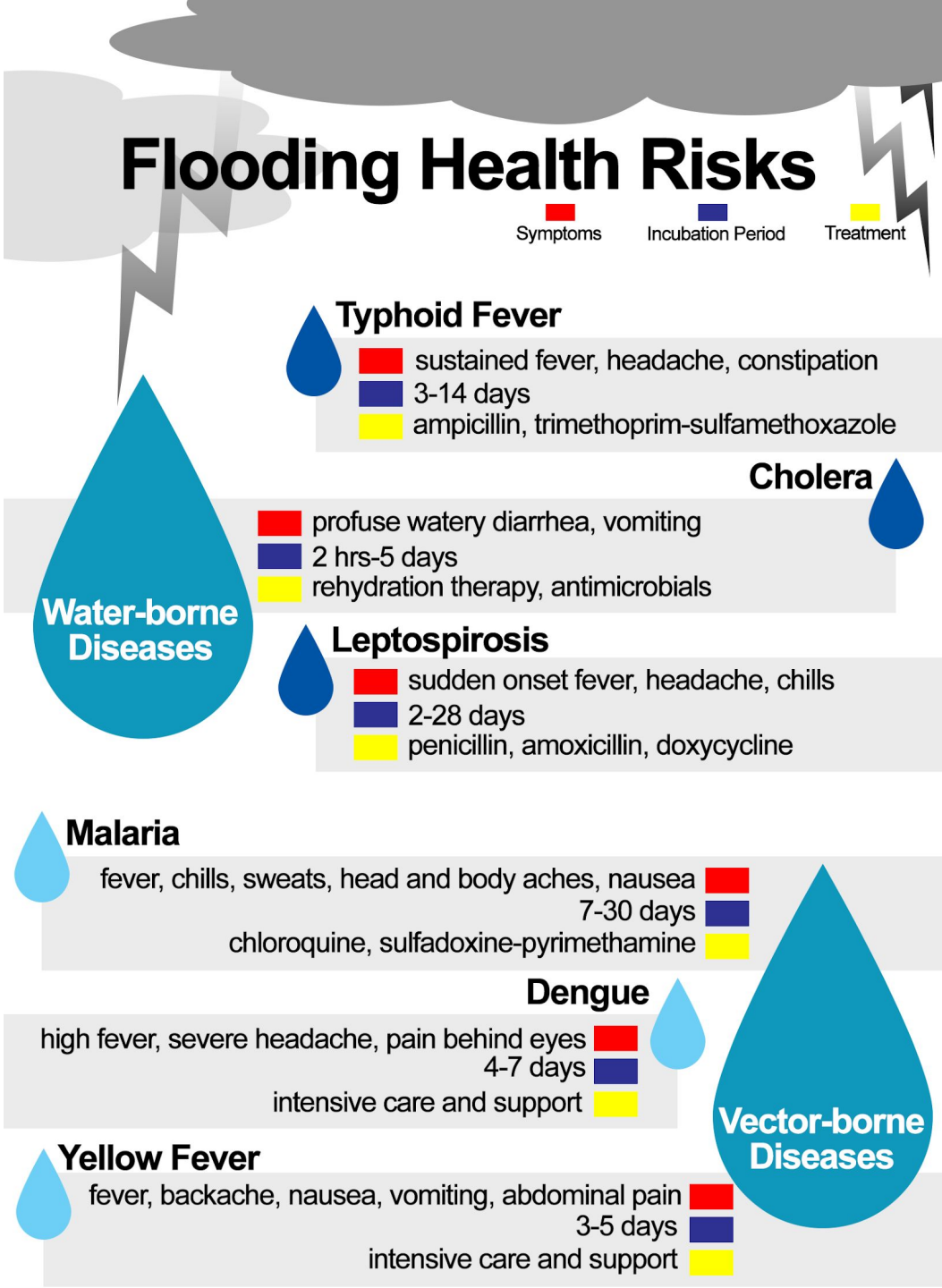
Increased chance of **Outbreak** – Waterborne diseases, Vector borne – Dengue , Malaria Zoonotic diseases - Leptospira

All **Health services disrupted** – damaged hospitals, Not flood resilient infrastructure

Health care waste released into water sources during floods

WATER BORNE DISEASES

- Conditions conducive to the occurrence of diseases may arise as a consequence of population displacement, poor infrastructure and limited access to health care.
- **Bacteria**; -Salmonella , Shigella, Cholera, Leptospira,E coli
- **Virus**- Hepatitis A& E , Rotavirus, Adenovirus
- **Protozoa** – Giardia, Naegleria fowleri
- **Vector Borne** – Malaria , Dengue
- **Rodent Borne**- Leptospirosis



What are a few health tips after floods?

Risk of diseases, like water-borne (typhoid, fever and leptospirosis) and vector-borne (malaria, dengue) increases after floods

Follow these tips to stay safe:

Drink water from a safe source

Maintain hand hygiene before using stored water

Cook food well, and store it at a safe temperature

Dispose food waste properly

Wash hands before eating and after using the toilet

Prevent children from walking in floodwaters

Clean surroundings to avoid mosquito breeding

Use mosquito nets to prevent malaria and dengue

Dispose of perished food or those that may have come in contact with flood water

Consult a doctor in case of symptoms to prevent infection

Continue to follow COVID Appropriate Behaviours (CAB) in evacuation centers

Wear a mask

Wash your hands

Watch your distance

World Health Organization
India

Critical Lessons- WBD outbreaks

- **Early Detection and Surveillance**: Inadequacies in a strong surveillance systems to detect water-borne diseases was visible and this led to delayed identification thereby response and control.
- **Early warning systems**- Absence of EWS that study trends in rainfall and flooding patterns and predicts of infectious diseases
- **Lack of Testing kits** for common water borne diseases was a noticed in many flood affected regions
- **Data sharing** – Data sharing among different sectors esp from private sector was inadequate leading to incomplete information and thereby ineffective utilization of resources
- **Crowded Relief camps** with inadequate WASH facilities leading to outbreak.
- Proper **Community Education** was missing in many areas
- **Misinformation** via social media was rampant and especially regarding health advices.

SANITATION & HYGIENE RELATED CHALLENGES

- **Temporary Sanitation Facilities**: The temporary facilities arranged were not Hygienic , Scientific, disable friendly, as these conditions are never prioritized
- **Gender/Age sensitive/PWD friendly** : A need to address the gender specific, age specific concerns especially with regard to toilets, menstrual hygiene, feeding rooms is there.
- **Disaster-resilient WASH infrastructure** and technical knowledge to maintain them was glaringly absent during flood.
- The lack of **proper sewerage network** was a problem that was visibly noticeable -metro areas like Delhi and Chennai and even in a state like Kerala which had an 100% toilet coverage.
- The **Sanitation staffs** of states were not trained or prepared to cope with the WASH challenges that occurred during the floods –Ukd floods, Chennai floods.

Bridge over troubled water :The Wayanad Initiative

- **Wayanad** – Kerala – flood and landslide prone
- Post 2018 Kerala floods
- WHO , Water Aid, Central Emergency Response Fund (CERF)
- Post flood no water supply in schools , presence of water snakes discouraged the children to step out of schools during WASH was affected.
- Immediate -access to safe drinking water through water filters to over 300 ICDS centers and healthcare facilities, and water testing kits (including H2S vials)
- Retro fitting of infrastructure restoration of dug wells and electric pumping system
- Rainwater harvesting storage tank, water supply and pipeline connection; handwashing facilities, patient friendly and child-friendly toilets, and segregation and safe disposal of health care wastes.
- Continuous access to water to cook, drink ,clean- better WASH

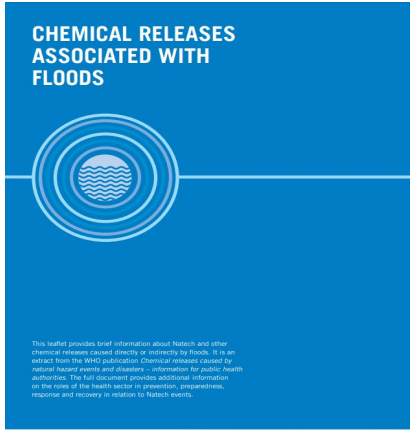
Over 300 ICDS centres and healthcare facilities have been provided with water filters

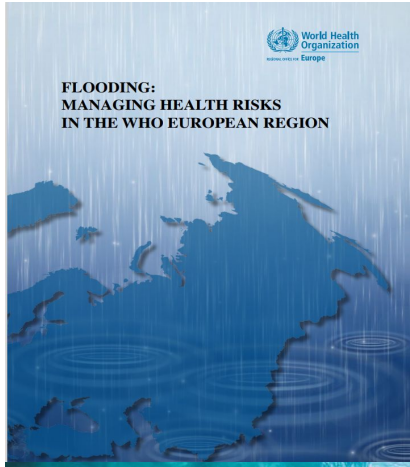
EMERGENCIES & OUTBREAKS

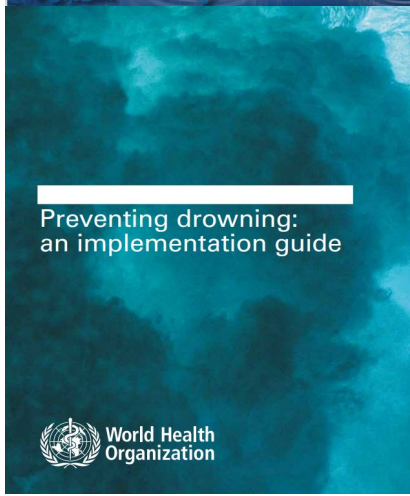
- An absence of an **Emergency Medical Team** to response to any types of emergencies set back the disease control efforts in many flood affected settings.
- Major challenge in Extracting affected persons and providing **Pre hospital** treatment
- The absence of an **Adequate Risk assessment tool** and IT enabled solution
- The deficiency of a **All-Hazard approach** in dealing with emergencies
- The Hospitals were **not disaster resilient** affecting the health care delivery very essential in SAARC countries which are continuously ravaged by floods.
- Existing hospitals had no plans in place to tackle the **surge** in cases.
- **OSL bottlenecks** where visible everywhere with inadequate supply of drugs, kits and supplies

EMERGENCIES & OUTBREAKS

- Outbreak of water borne diseases
- **Chemical hazards** – No proper plan in place with respect to preparedness, Prehospital management and medical management in relation to chemical hazards that might occur as part of flooding events
- **Drownings, Injuries and Trauma**
- **Mental health**
- **NCD** is a major factor -being overlooked during emergencies.eg: high increase in the complications related to NCDs because usually more priority is given to the control of communicable diseases
- Proper guidelines and manuals and training for personnals and volunteers taking part in **post disaster cleaning** activities because of the high number of injuries sustained by them







EMERGENCIES & OUTBREAKS

- **Inclusivity:** The vulnerable population like Women , children, differently abled, elderly are disproportionately affected ensure that these groups are prioritized and targeted
- **Accessible Healthcare Services:** Absence of accessible health care facilities and Mobile health units which can aid HCW reaching isolated areas.
- **Preparedness and Planning**: Absence of a comprehensive WASH emergency response plan that takes account of potential flooding related emergencies.
- **Coordination**: Whole of system and Whole of government approach had many gaps. Lack of Proper SOPs.

Kerala Floods – best practices

- **NGOs and CSOs** to support local-level implementation of WASH interventions was very effective and also will help in the long-term implementation of the program.
- **Small-scale mobile sludge treatment units** UNICEF coordinated with the WASH Institute in Dindigul, Tamil Nadu, which mobilized mobile sludge treatment units (MTUs) that served 105 relief camps.
- **Local self Government** were involved in program of cleaning of shallow dug wells, providing boiled water at camps
- **Regular water quality inspections** and installation of Water treatment units
- **Community was 1st responders** – SHGs like "Kudumbashree" and FBO provided food and essentials to the affected, fishermen in rescue
- **ICT** –Effective use of Social media and for transmission of ICT via form of posters, short videos

Climate Resilient FHC

- **Vazhakkad Family Health Centre, Malappuram ,Kerala**
- Completely **destroyed in 2018 Kerala Floods**
- Rebuilt following **WHO operational framework** for building Climate resilient health systems
- Government and NGO – “rebuild Kerala Initiative”
- Glass fiber reinforced gypsum, UPVC (Unplasticized Poly Vinyl Chloride)
- Water body (paddy field) is maintained to recharge groundwater and to restore the ecological balance.
- **10 observation beds, oxygen concentrators, a stabilization unit, a mini operation room, vision and dental clinic, an advanced laboratory, a modern imaging department, a conference hall, an open gym.**

Construction of climate-resilient latrine -Elevated latrine

- Rajanpur and Jhang, Pakistan
- UNICEF supported – best for the riverine flood prone areas -developing a comprehensive Manual for Masons on how to construct the different versions of the elevated latrine design with informative images and descriptions.
- Local masons were trained using on the construction of **low cost climate-resilient latrines.**
- Coordination between (Village WASH committee) VWCs and masons for each household based on their respective local knowledge and construction experience and also preference and resource availability
- Local entrepreneurs were trained on cost effective marketing solutions, climate-resilient sanitation services supply of materials

WAY FORWARD

Comprehensive response that includes emergency preparedness, timely interventions, and sustained efforts to rebuild infrastructure and communities.

Effective collaboration between government agencies, non-governmental organizations, and local communities is essential in mitigating the negative consequences of floods on public health and well-being.

Integration of WASH considerations within relevant climate change and health risks policies and processes, Support WASH stakeholders in mobilizing climate finance and other resources

Advocacy- Promotion of reliable access to WASH services as a critical requirement in policies relating to climate change, emergencies , disasters and health system strengthening.

Climate resilient WASH services and Climate resilient health systems

WAY FORWARD

Encouraging level of global WSP (**Water safety plan)** uptake at regional and country

Partnerships – Disaster risk infrastructure in collaboration with

Promotion of new technologies and engineering innovations

All hazard approach in disaster management

Multi-sectoral sanitation policies, planning processes and coordination – Prioritize flood prone area