FOREST FIRE RESPONSE : ISSUES & CHALLENGES

INTRODUCTION

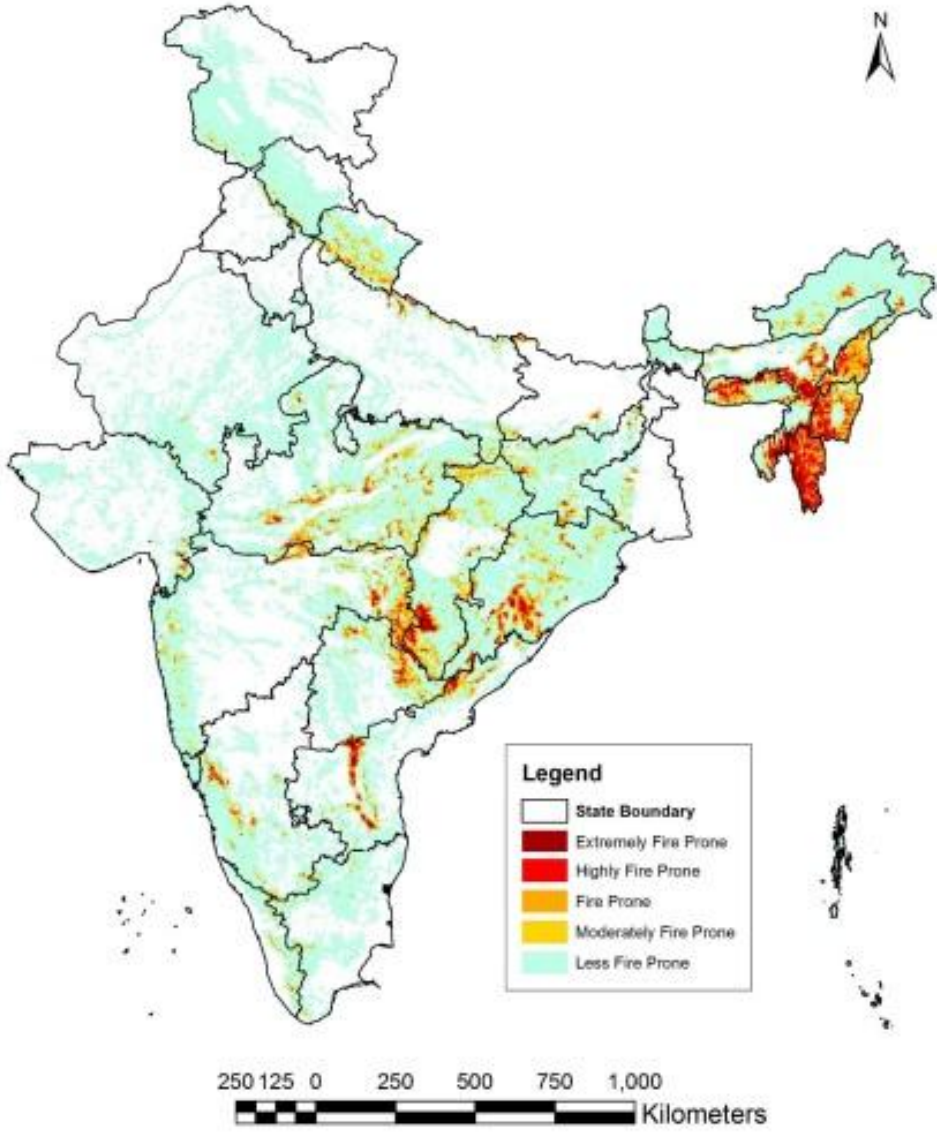
- **Forest fire; a violent and unmanageable spread of fire**
- **Order of national disaster**
- **Aerial fire fighting as a last resort to extinguish fires**

PREVIEW

- Forest fire: Indian context
- IAF: The preferred choice
- IAF's role in combating forest fires
- Assets of IAF
- Fire fighting ops
- Execution
- Challenges & flight safety
- Efficiency
- Lessons learnt
- Recommendations
- Way ahead

FOREST FIRE : INDIAN CONTEXT

- 54% of Indian forests are exposed to occasional forest fire
- 3,45,989 forest fires were detected from Nov 20 - Jun 21
- 4% forests extremely prone
- Satellite based sensing technology helps in better detection



SOURCE: FSI

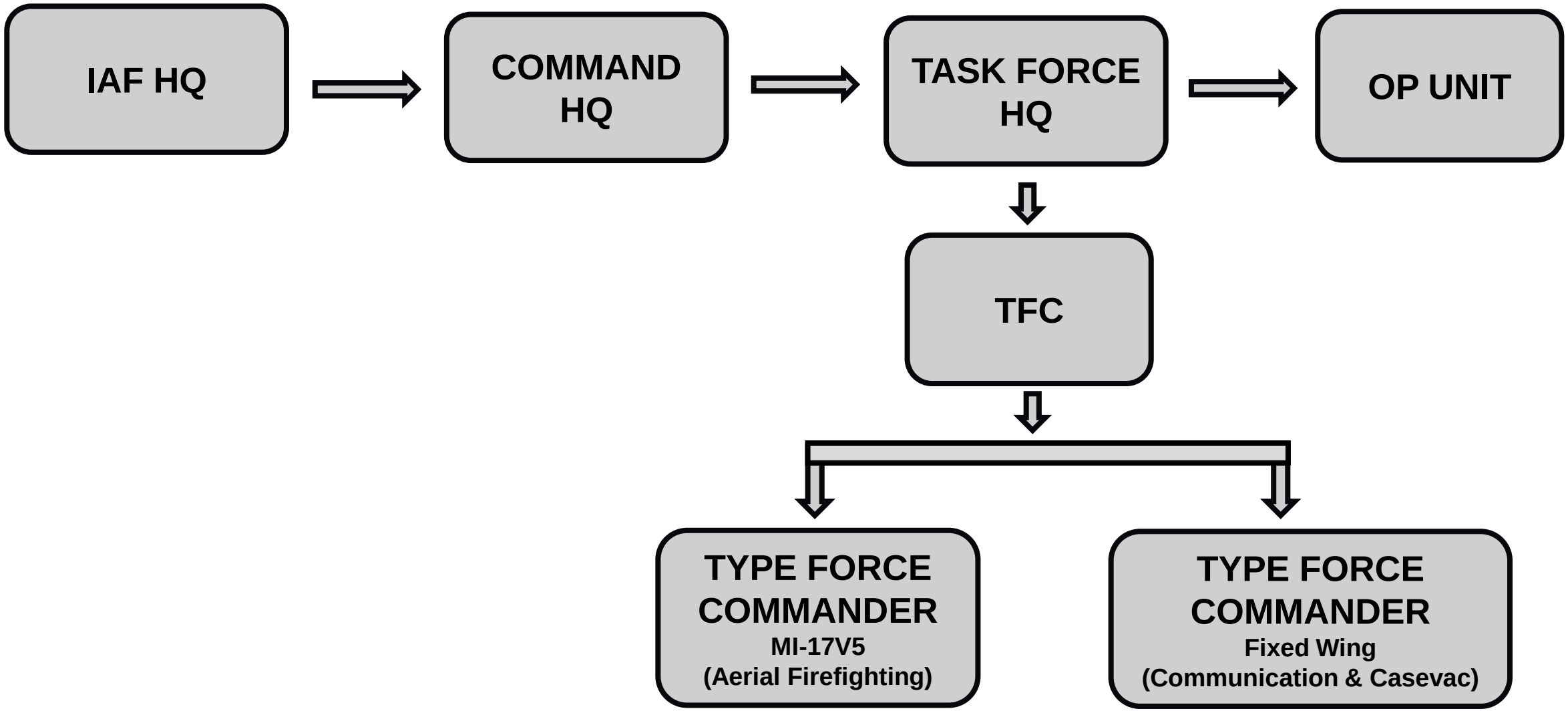
THE PREFERRED CHOICE

- **Disaster Management; Primary responsibility of civil administration**
- **Armed forces assist in disaster relief**
- **IAF's reaction time and reach; Preferred choice for response**

REQUISITION PROCEDURE

MINISTRY OF FOREST/ CIVIL ADMIN OFFICER → MHA/ MEA → DMA/ HQ IDS → IAF

COMMAND & CONTROL STRUCTURE



ROLE OF IAF IN FIRE FIGHTING

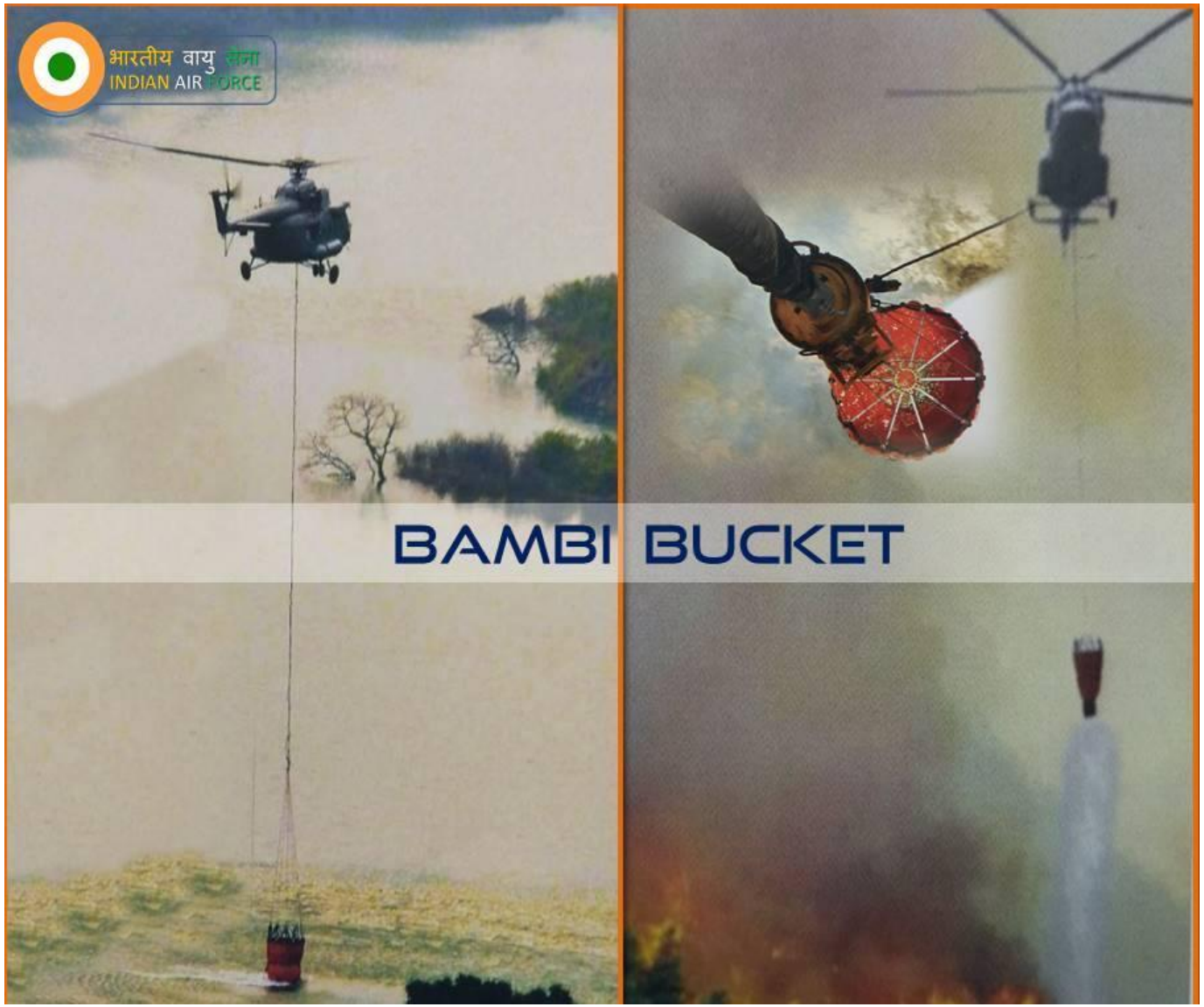
- Aerial reconnaissance
- Prevent evolution of fire
- Extinguishing fire

ROLE OF IAF IN FIRE FIGHTING

- Casualty evacuation
- Search and rescue victims
- Communication aid
- On-site fire control
- Establish enclosing lanes

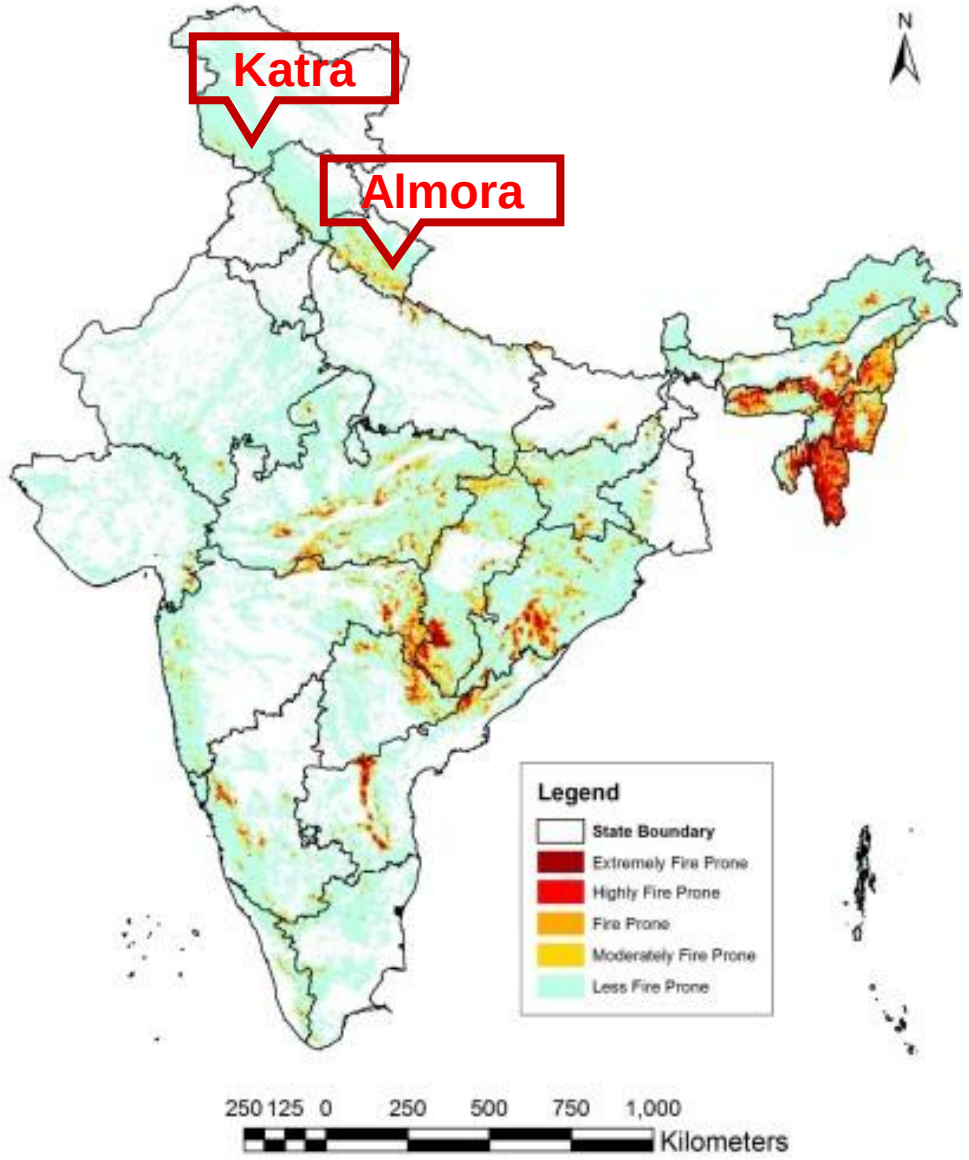
ASSESTS OF IAF

- Mi-17V5 helicopter
- Bambi bucket
- Capacity 3.5 tons
- New procurements



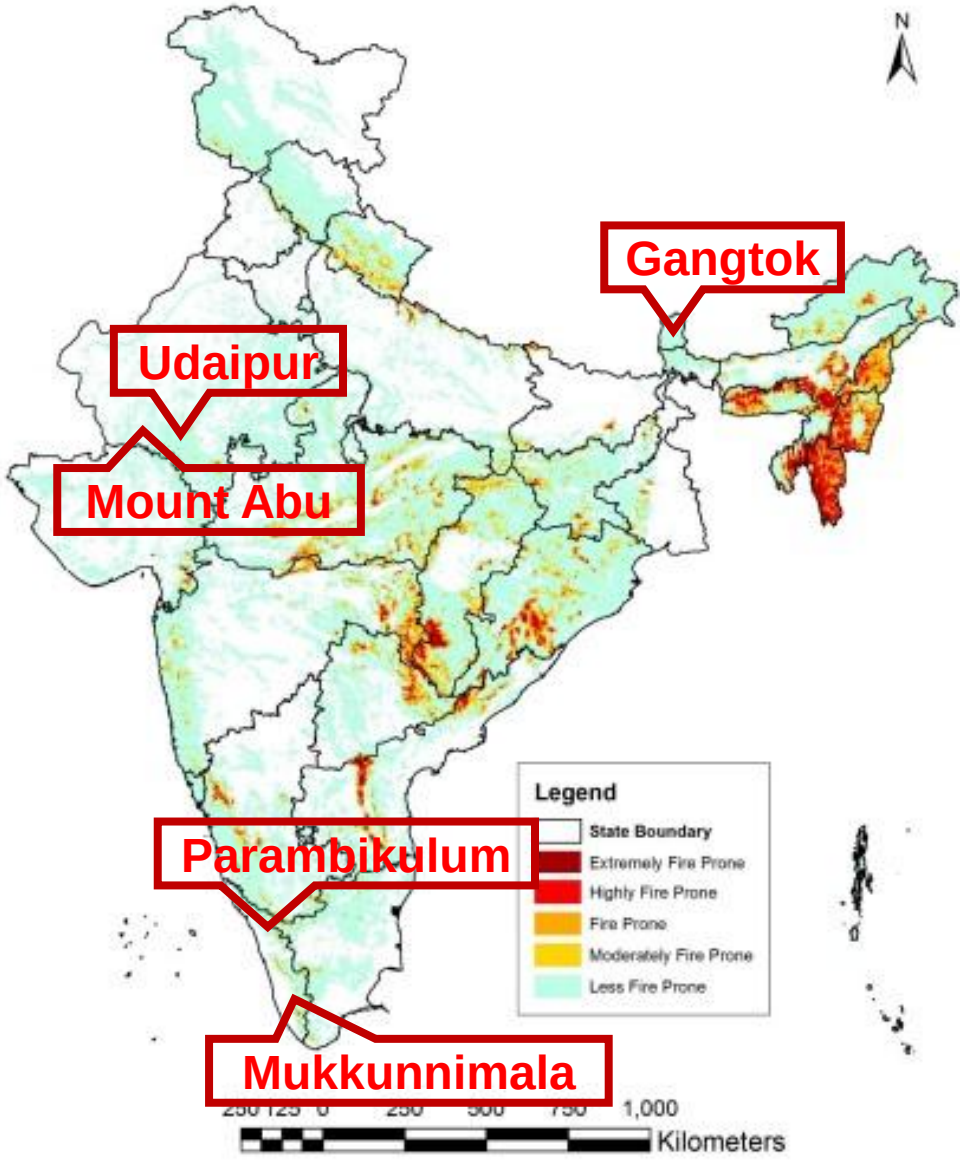
AERIAL FIREFIGHTING BY IAF: 2016

DATE	AGENCY/HADR TASK	PAX/LOAD
MAY	GOVT OF UTTARAKHAND, ALMORA	1,55,000 LTS
MAY	GOVT OF J&K, KATRA	35,000 LTS



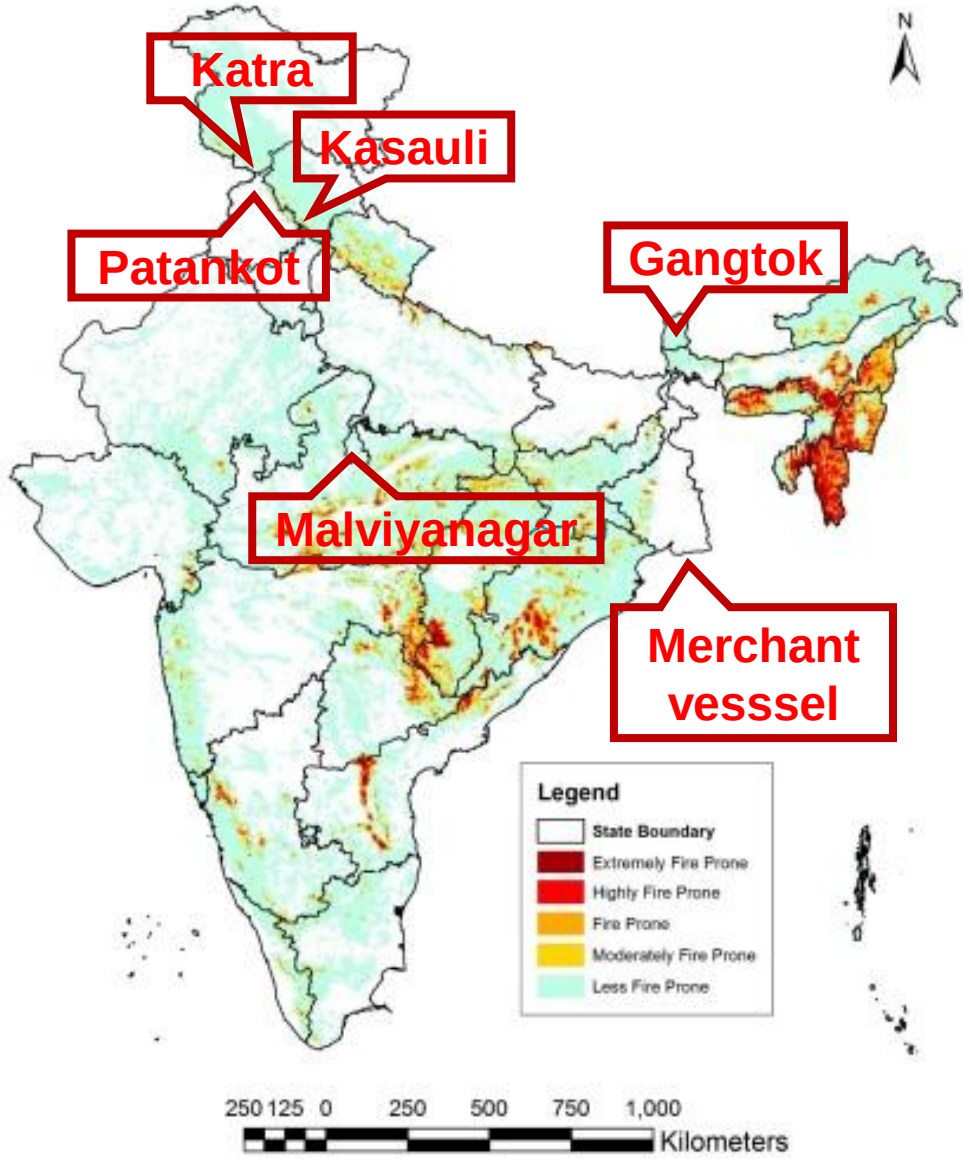
AERIAL FIREFIGHTING BY IAF: 2017

DATE	AGENCY/HADR TASK	PAX/LOAD
FEB	GOVT OF SIKKIM, GANGTOK	66,500 LTS
FEB	GOVT OF KERALA, MUKKUNNIMALA	61,250 LTS
MAR	GOVT OF KERALA, PARAMBIKULAM	21,600 LTS
MAR	GOVT OF RAJASTHAN, UDAIPUR	30,500 LTS
APR	GOVT OF RAJASTHAN, MOUNT ABU	4,25,700 LTS



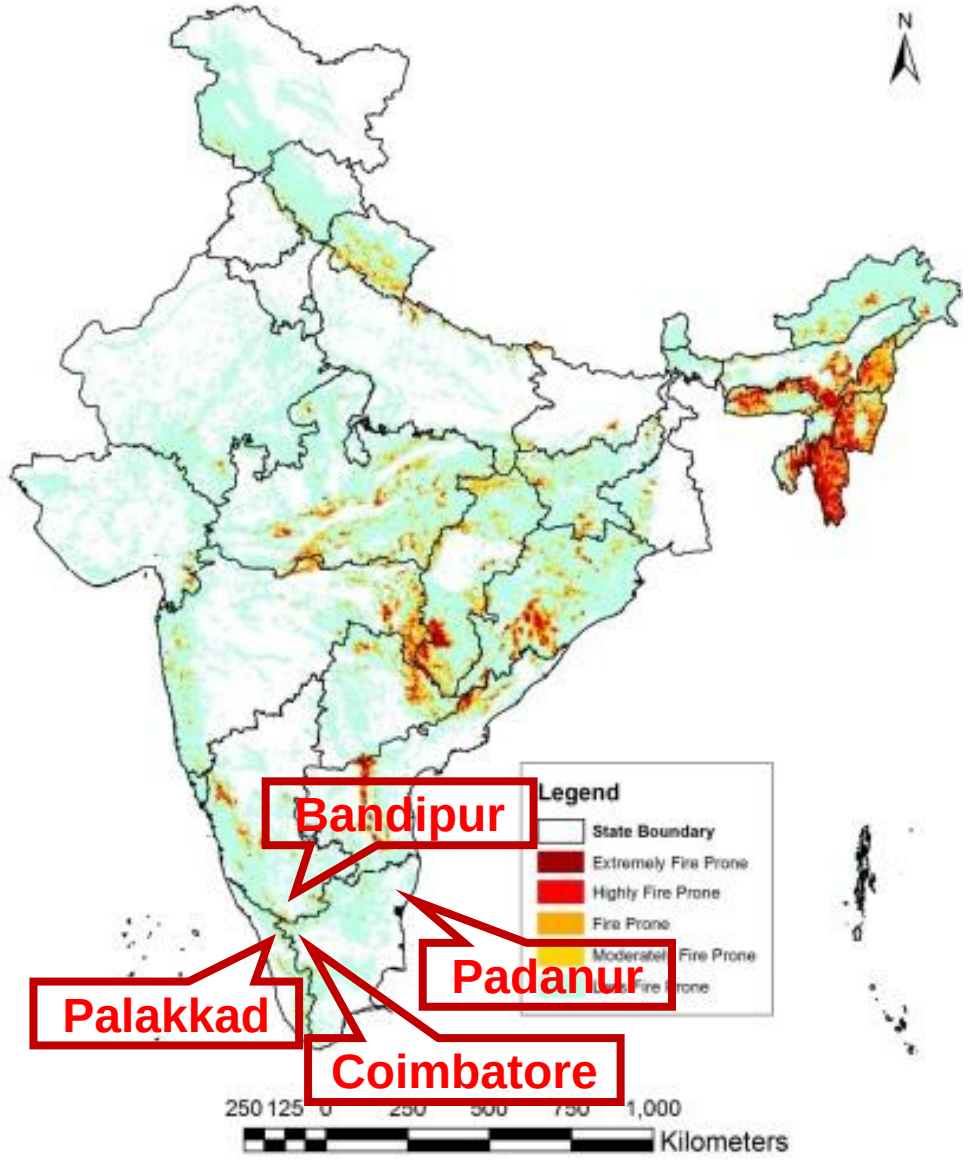
AERIAL FIREFIGHTING BY IAF: 2018

DATE	AGENCY/HADR TASK	PAX/LOAD
MAR	GOVT OF TN, THENI	15450 LTS/ 8 MR
MAY	GOVT OF HP, KASAULI	19,000 LTS
MAY	GOVT OF PUNJAB, PATHANKOT	8,400 LTS
MAY	GOVT OF DELHI, MALVIYANAGAR	24,500 LTS
MAY	GOVT OF J&K, KATRA	34,600 LTS
JUN	INDIAN MERCHANT VESSEL	15,000 LTS



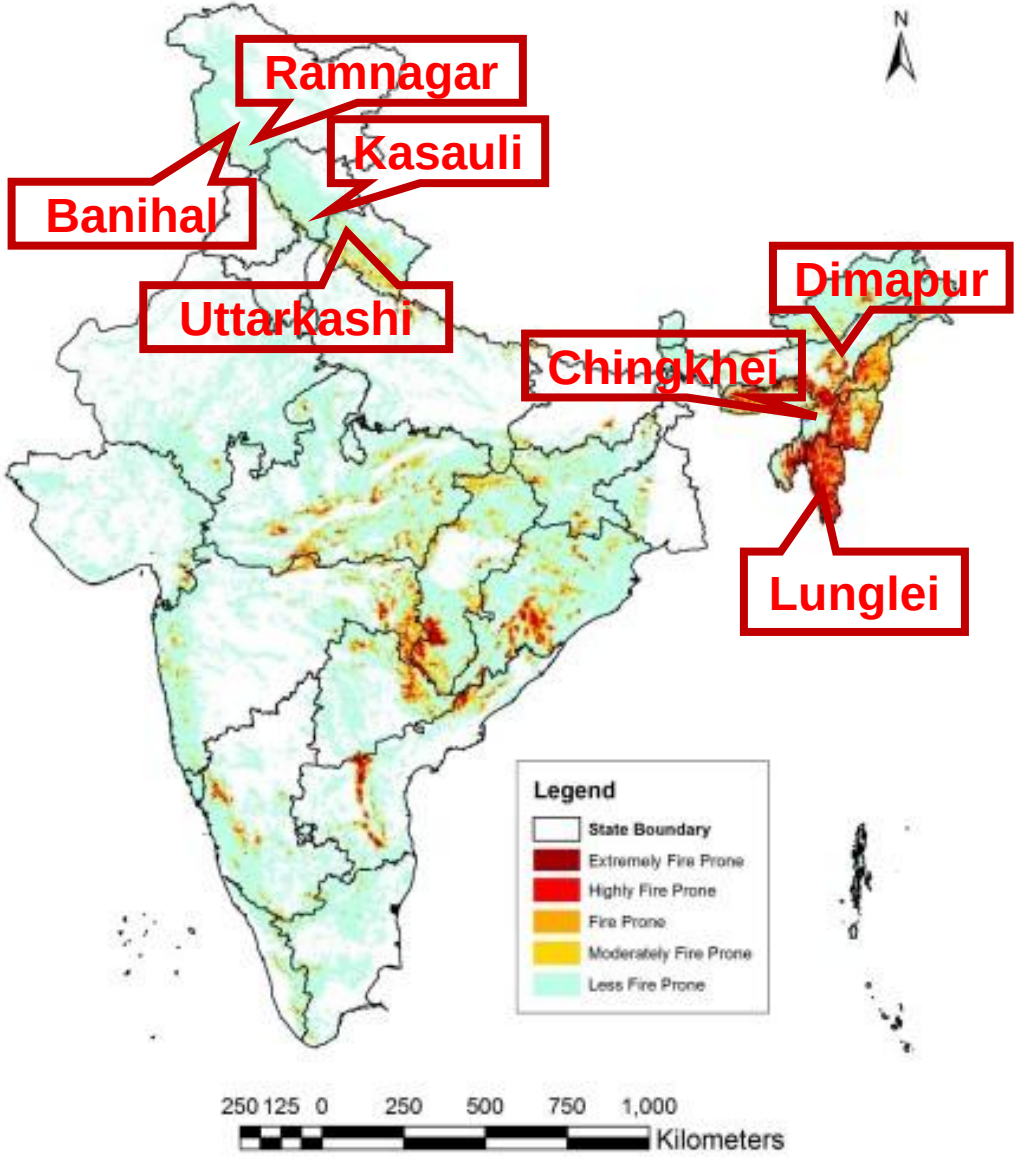
AERIAL FIREFIGHTING BY IAF: 2019

DATE	AGENCY/HADR TASK	PAX/LOAD
FEB	GOVT OF KARNATAKA, BANDIPUR	32,000 LTS
MAR	GOVT OF KERALA, PALAKKAD	2,000 LTS
MAR	GOVT OF TN, PADANUR	19,000 L
APR	GOVT OF TN, COIMBATORE	3,000 L



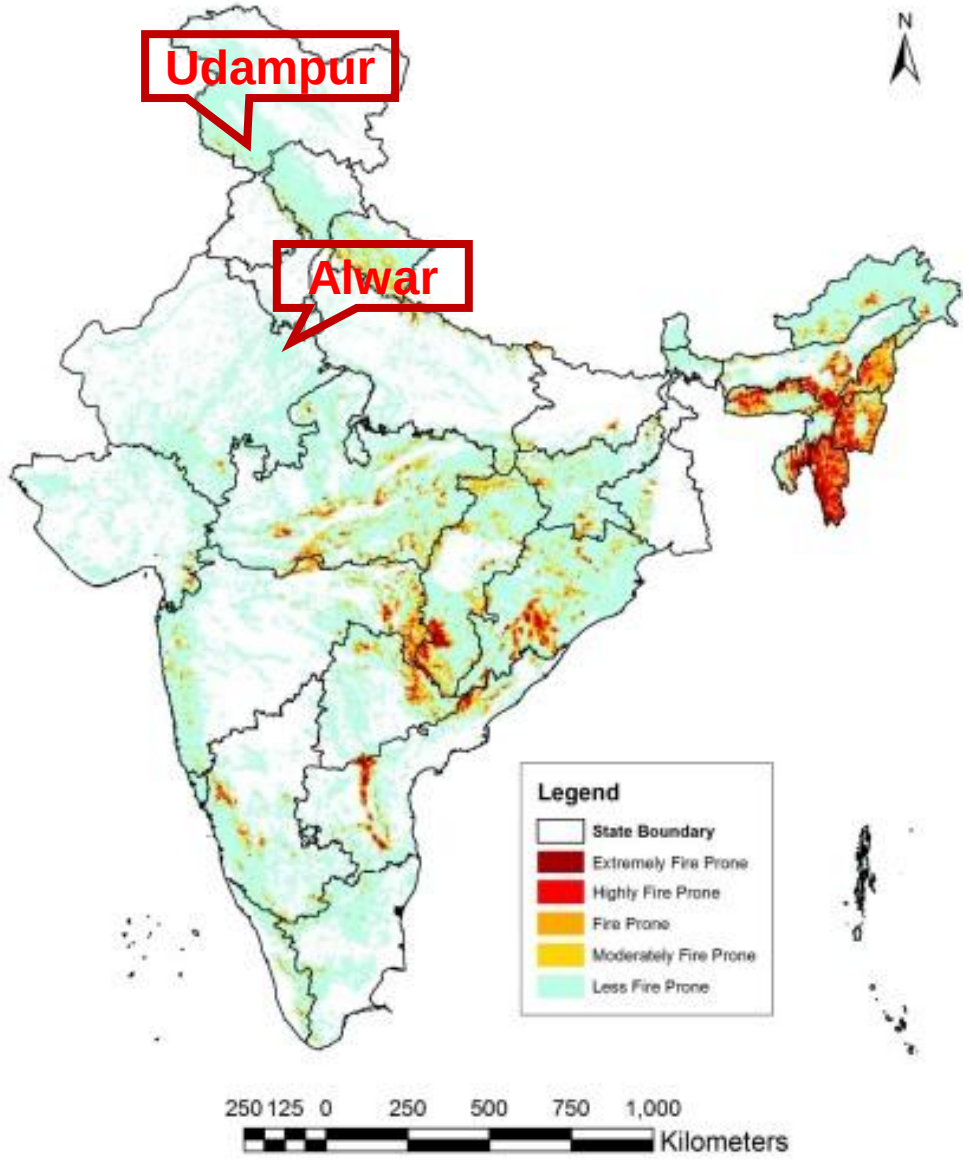
AERIAL FIREFIGHTING BY IAF: 2021

DATE	AGENCY/HADR TASK	PAX/LOAD
JAN	GOVT OF NAGALAND, DIMAPUR	114,950 L
MAR	GOVT OF MANIPUR, CHINGKHEI	4,000 L
MAR	GOVT OF HP, KASAULI	4,000 L
APR	GOVT OF UK, UTTARKASHI	15,000 L
APR	GOVT OF MIZORAM, LUNGLEI	23,100 L
MAY	GOVT OF J&K: RAMNAGAR & CHEMICAL FACTORY UDHAMPUR	22,000 L
JUN	GOVT OF J&K, BANIHAL	4,000 L



AERIAL FIREFIGHTING BY IAF: 2022

DATE	AGENCY/HADR TASK	PAX/LOAD
MAR	GOVT OF RAJASTHAN, ALWAR	89,400 L
APR	GOVT OF J&K, UDHAMPUR	60,200 L



AERIAL FIREFIGHTING OPERATIONS

- **Active : Attack fire with water**
- **Passive : Create an enclosing lane**

CHALLENGES TO FIRE FIGHTING FLIGHT

- Complex final stage of flight
- Turbulent and strong winds
- High temperature > 70^{0} C: Engine surge
- Temperature profile of 15m fire

Height	30m	50m	70m
Temperature	190^{o}C	110^{o}C	Ambient

- Crew fatigue
- Smoke & low visibility
- Low speed flight

EFFICIENCY OF AERIAL FIREFIGHTING OPS

- **Effectiveness = $\frac{\text{Water entering fire site}}{\text{Total water discharged}}$**
- **Factors affecting effectiveness**
  - **Pre-history of flight**
  - **Altitude and speed**
  - **Turbulence**
  - **Spatial position**
  - **Liquid flow rate**

EFFICIENCY OF AERIAL FIREFIGHTING OPS

- **Experimental analysis**
  - **30% loss due to evaporation**
  - **20-30% on tree tops**
  - **Extinguishing capability for 5-15 min**
  - **Moisturizing agent increases cooling efficiency by 2- 4 times**
- **Consistent water release: 5-6 min**
- **Most suitable for closed/ localised/ inaccessible terrain**

LESSONS LEARNT

- Close proximity of water body
- Increased flight time & reduced turn round
- Independent airport ops
- VFR flights only, no night ops
- Not suitable for urban fires
- Ground personnel safety
- Tailwind approach

RECOMMENDATIONS

- Aerial recce by drones
- Accurate fire assessment
- Turn around support
- Run-over flight
- Flight at low speed at minimum safe height
- Coordinated effort by aerial platform & ground troops
- Joint operations

WAY AHEAD

- **Civil Air Arm towards relief operations**
- **IAF capability enhancement**
  - **Suitable firefighting equipment**
  - **Fixed Wing: Roll-in roll-out equipment with retarders (MAFFS)**
  - **Isolation & combating fire by both air & ground**

CONCLUSION

- IAF; ATMA NIRBHAR BHARAT
- Prompt deployment with optimal planning
- Timely inputs
- Quick response time and highly mobile force
- IAF: ever ready

THANK YOU