Drones as a Two-Edged Sword in Disaster Management

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In recent years, India, as one of the most disaster-prone countries in the world, has witnessed an alarming rise in natural disasters, largely driven by climate change. Floods, cyclones, and droughts threaten to severely damage the country's infrastructure, economy, and population (Hunt & Menon, 2020; Mohanty et al., 2020). For reference, approximately 60% of India's territory is susceptible to earthquakes of varying magnitudes, while about 68% of India's cropped areas experience droughts annually and 40 million hectares are at risk of flooding (Chordia et al., 2022). As the importance of effective disaster management intensifies, India has turned to new tech-

nologies, particularly drones, to improve response times, assess damage, and assist in search-and-rescue operations. The Indian government aims to position India as a global hub for unmanned aerial vehicles (UAVs) by the year 2030, and has enacted a series of reforms to foster the industry's growth and expansion (Madan, 2022). But this enthusiasm risks overshadowing critical concerns about the ethical implications of widespread drone use. The sudden growth of drone technology also raises concerns about privacy and data misuse, challenging the current, sensitive balance between public safety and individual rights.

One of the key benefits of using drones in disaster management is the ability to provide real-time data over vast, hard-to-reach areas (Pathak et al., 2015). For instance, during the 2018 Kerala floods, drones played a crucial role in identifying flood-affected zones, delivering food supplies, and guiding rescue teams to stranded populations (Garud Survey, 2024). Using high-resolution cameras and sensors, drones can assess damage faster and more accurately than traditional methods, allowing authorities to prioritize rescue efforts and allocate resources more efficiently. In addition, drones can collect data that, when combined with artificial intelligence (AI) and big data analytics, can help predict future disasters, potentially preventing greater cost to life and property. These technological advances will certainly transform India's disaster response, saving countless lives and reducing the time and cost of reconstruction (Economic Times, 2024).

Yet, this promising technology comes with a downside. The same data-gathering capabilities that make drones such an effective tool in disaster management also pose significant privacy and security risks. India has a troubled history of data surveillance, especially after the controversial introduction of the Central Monitoring System (CMS) in 2013. CMS, a government initiative, was designed to monitor phone calls and internet activity across the country, but it came under heavy criticism for potentially violating citizens' privacy rights. Given this, the increasing use of drones sparked concerns that such technologies could be repurposed for further state surveillance. These reservations are fuelled by the lack of comprehensive data protection laws, leaving the public vulnerable to potential abuse of their personal information. More recently, the proposed data protection law in 2022 received backlash for providing exceptions to the government and creating an environment favourable to state surveillance (Human Rights Watch, 2022). Drones could easily become tools of surveillance, eroding trust between citizens and the state.

The risks extend beyond concerns of privacy. Resorting to drones in disaster management raises questions of accountability, especially in the context of India, where regulatory frameworks remain underdeveloped. Without the necessary laws and governance in place, citizens have no resources to protect themselves against invasions of their privacy. Who can be held accountable when their privacy is violated? The prospect of drone data being used for surveillance is particularly worrying in a democracy as

large and complex as India. It stands in sharp contrast to other Asian countries, such as China, where surveillance has already become commonplace. India, which prides itself on its democratic principles, should reflect these values in their deployment of drones.

In conclusion, the increasing use of drones in disaster management illustrates the dual nature of technological progress. While drones offer major benefits in limiting the impact of natural disasters, their data-mining capabilities pose significant privacy risks if left unregulated. In the future, it will be crucial for India to develop clear and transparent regulations for the use of such technologies, and for the government to ensure that the use of these technologies is in line with international standards. By maintaining a balance between innovation and privacy, India may utilize the power of drones without compromising the democratic rights of its citizens. The challenge lies not in rejecting new technologies but in learning to use them responsibly.

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