



# CHALLENGES OF USING DRONES FOR HEALTHCARE DURING FLOOD

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## ABSTRACT

*An unmanned aerial vehicle, commonly known as a drone, is an aerial vehicle without a pilot, crew, or passengers. The application of drones has expanded to agriculture, patrolling, emergency response, infrastructure inspection, etc. Its application has expanded to Healthcare and Disaster management. This paper investigates the challenges of drones for healthcare during floods in Kuttanad.*

**KEYWORDS:** Drone, Telemedicine, Flood, Kuttanad

## INTRODUCTION

An unmanned aerial vehicle or drone is an aircraft, and it operates without a pilot. UAVs are now performing a much greater role in many areas such as agriculture, military operations, Delivery, wildlife conservation, disasters, and so on. Healthcare applications are the important application of drones Telemedicine is one of the important applications of drones. It can supply medicine and other devices, and transport blood, organs, etc.

Kuttanad, a taluk in Kerala. It is the lowest altitude in India. This region lies about 4 to 10 feet below sea level. (Suchitra, M 2003) Most of the area in Kuttanad is covered with water. Flooding is a recurring issue in Kuttanad during the monsoon season because of the area's four main rivers, the Pampa, the Achankovil, the Meenachil, and the Manimala. People in Kuttanad struggle during floods. People may even lose their lives due to a lack of better treatment.

In many areas, people implemented telemedicine during disasters. Telemedicine is a good choice to communicate with doctors and patients during a disaster and get medications Apart from these there are some challenges while using a drone for healthcare during a disaster. This paper focuses on the drawbacks of using a Healthcare drone in Kuttanad during a flood.

## CURRENT TRENDS IN APPLICATIONS OF DRONES IN HEALTHCARE

eHealth(2022) MGM healthcare and drone company in Chennai has introduced a drone that can transport organs within the city. This drone can fly about 15km-20km at 300ft. This will help to deliver organs on time without affecting any traffic. (2022) Aihik.S (2022) Aster healthcare and Sky Air Mobility have conducted trials of delivering medicines from Kozhikode to Malappuram districts. Sky Air mobility planning to undertake around 50 flights that can carry blood samples and medicines. Their specialist will keep medicines and other samples in a temperature-controlled payload box.

## LITERATURE REVIEW

P. L. Nedelea, T.O. Popa, and Catalin,(2022), this paper studied the possibilities of Drones and they developed drones that can carry medical devices and supply emergency aids.

Anna.M, Christopher.J Evan Arnold, Wayne.D, and Jessica K (2021) this paper describes the application of drone technology and its challenges and future scopes. drones have been able to bring such emergency medical care and relief to people during the 2010 and 2016 earthquakes.

Amritanand.S, Sruthy.A, Amrithesh.A (2020) this paper investigates the challenges during emergency response. One of the main challenges that they described was the Lack of power and network connectivity during the flood people were stuck in their houses for many days without electricity and network connection.

Sooryalekshmi.S (2019) This paper studied the impact of floods in Kerala. According to the National Centre for Earth Science Studies, more than 50% of Alappuzha is categorized as a flood-prone area. Most of the areas in Alappuzha district experienced flooding as a result of the South West Monsoon, particularly in Kuttanad Taluk, where numerous roads, bunds, etc. were damaged and transportation was prohibited. The worst-affected locations in the Alappuzha district were the Chengannur and Kuttanad Taluks, where hundreds of people became stranded in flood waters that quickly reached densely populated neighborhoods. Due to heavy monsoon rains and high tides in the sea, Kuttanad Taluk began to flood



## HEALTHCARE NEEDS OF A DISPLACED POPULATION DURING THE DISASTER.

A better healthcare system is essential during a disaster. Many people are suffering from numerous diseases. And there will be more chances to spread contagious diseases if they are in a refugee camp. Some people are facing a lack of medicines. Medical camps are established in refugee camps. But another challenge is the lack of proper medicine.

## HEALTHCARE IN KUTTANAD – A PERSPECTIVE OF A NATIVE.

A paddy farmer in Vezhapra village of Kuttanad was interviewed in November 2022. This farmer is a survivor of the 2018 flood in Kerala which, seriously impacted people in Kuttanad. The following conclusions have been drawn based on the interview.

Kuttanad is a low-lying area so the area remains submerged for months. Even though, during the flood Kuttanad people suffered from contagious diseases and lack of proper medication and treatment. Many people lost their lives only because of these reasons. If the health department or any other volunteers supply medicine and Kuttanad people can consult a doctor during a flood through drone-telemedicine technology. it will make Kuttanad people's life better. During heavy rainfall and flood, electricity connections will be disrupted as well as mobile network connections.

**Table-1**

Using google maps, the distance of all the hospitals located near the Vezhapra village was identified. Most of the hospitals are situated more than ten kilometers away from the location.

| Hospitals  | The district from the village Vezhapra |
|--|--|
| Mahajubilee Memorial Hospital                            | 10.0 km                                |
| Tiruvalla Medical Mission hospital                       | 18.7 km                                |
| General Hospital   | 12.9 km                                |
| Believer's Church Medical College Hospital               | 19.4 km                                |
| St. Jude Hospital  | 14.7 km                                |
| St. Gregorious Medical Mission Multi-Speciality Hospital | 23.9 km                                |
| T.D. Medical College Hospital, Vandanam                  | 28.2 Km                                |

## CAN DRONES BE USED IN KUTTANAD FOR HEALTHCARE?

### The Perspective of a Drone Engineer.

An aerospace graduate was interviewed in November 2022. The following conclusions have been drawn based on the interview.

Telemedicine is widely used in the context of disasters such as natural calamities and pandemics. During the pandemic, people are restricted from health consultations and treatments to reduce the number of outpatients in hospitals. So, most of healthcare facilities used this technology widely. In Kuttanad unpredictable climate change and catastrophes are common. The local administration usually considered health emergencies. Apart from it, there are high prevalence of non-communicable diseases and mental deprivation in the society. In most cases, they would not get enough care, treatment, and medicines. Telemedicine is very effective in those cases that also face a shortage of healthcare workers and facilities. However, it has several disadvantages.

- There is a high probability of clinical errors due to the lack of improper interaction and physical examination.
- Management of orthopedic and such clinical emergencies is limited with the virtual treatment methods.
- Any technical problems or regulation inconvenience occurring amidst treatment could affect the treatment.

### Perspective of a Doctor.

A doctor was interviewed in November 2022. The following conclusions have been drawn based on the interview.

Drone in the field of telemedicine is something uncommon. This is because the use of drones during harsh weather conditions is unsuitable. Drones have been used in many sectors of the country to improve lifestyle. During the flood of Kerala, it was seen that a large group of people needed medicines. They were either stuck or at places where they cannot be reached either by foot or road. In situations like this air, transportation was used. There are a lot of parameters to be followed, which include the temperature of storage when using drones for storage and transport of medicine, and the efficiency of these medicines gets compromised. Drones have been used in many different areas of telemedicine such as blood and rescue medicine transportation. But there are many challenges for this; for instance, stability of flight, weight, flight time, flight range, and emergency landing procedures. Another major drawback during calamities such as floods is that during heavy rain operating a drone is not feasible.



## CONCLUSION AND DISCUSSION

In this study, the challenges identified for using a drone for healthcare during floods are – electric power failure, network connectivity issues, bad weather conditions, and flight range

- Lack of electrical power and network connection will disrupt the communication between patient and doctor.
- During heavy rainfall and wind, it will be riskier to fly a drone due to atmospheric turbulence.
- It is necessary to develop a drone that can fly in any weather condition.
- It is important to develop an efficient drone that can fly long distances and operate under any conditions.

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