HUMANITARIAN LOGISTICS & WAREHOUSE MANAGEMENT

WAYANAD LANDSLIDES

NOVEMBER 2024

Background

On July 30, 2024, devastating landslides struck the villages of Mundakki, Chooralmala, and Vellarimala in Wayanad District, Kerala, following days of heavy rainfall. The landslides caused widespread destruction, claiming the lives of many, destroying homes, and severely damaging infrastructure. According to the State Emergency Operational Centre (SEOC) Kerala, 231 bodies and 212 body parts were recovered, with a total of 630 people injured, 214 rescued, and 119 still missing. Rescue operations were launched immediately, and 3069 people were relocated to 63 emergency camps for shelter and safety. At the height of the disaster, around 10,000 individuals sought refuge in 93 relief camps across the district.

In the face of such calamity, efficient logistics and warehouse management play a crucial role in the disaster response. In Wayanad, due to the geographical constraints and transportation difficulties, the logistics of humanitarian aid faced some challenges. But the tireless efforts of district authorities, local community and civil society organizations largely overcame these difficulties. From the event of the disaster, several members of the Inter-Agency Group were working in coordination with the district authorities for mobilising resources and providing accurate information of the immediate needs to partners outside Wayanad. However, to efficiently coordinate relief efforts from well-wishers and humanitarians within and outside the district a functional coordination desk was established at the District Emergency Operations Centre (DEOC) on 03rd August 2024 with support of the district administration and the Inter-Agency Group (IAG) in Wayanad. This desk identified potential donors and interested organizations, connecting them with the district authorities. Additionally, it tracked humanitarian activities related to the landslide and their future plans in the URS matrix.

At the initial stage of the disaster, a collection point was set up in the Kalpetta Civil Station/Collectorate of Wayanad and information on the requirements were passed through social media and media channels. Due to huge quantity of relief materials required and provided, the collection and storage point was shifted to St. Joseph's School in Kalpetta. In the intermediate phase, a large and scientific warehouse was acquired in the NFSA godown complex, and another warehouse was also opened for storing furniture for the back to home kits. The warehouse was managed by the cooperation of employees and volunteers from different organizations. A remarkable contribution was made by Faircode, a Kochi-based software company in association with the Amazon Disaster Rapid Response Team providing enterprise resource planning inventory management solution. Also, the Amazon Disaster Rapid Response Team forecasted camp needs up to 15 days as well as loading labour who provided free-of-charge services to the furniture warehouse. Through these combined efforts of government, NGOs and other organizations, 650 families were supported with all essential items from food to furniture following the disaster as well as in their recovery from the disaster.

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Figure 1: Relief Materials at St. Joseph's Convent School Kalpetta

On 01st August 2024, an emergency collection point was set up at Pazhassi Hall, Collectorate Wayanad, to gather essential relief items such as water bottles, gumboots, raincoats, and other commodities. While all items reaching the collection point were accepted, the demand for supplies was immense, and the hall quickly became insufficient to accommodate the incoming goods. Consequently, authorities sought alternative spaces for storage and selected St. Joseph's Convent School, Kalpetta, due to its proximity to major relief camps. On 02nd August 2024, the collection operations were shifted to St. Joseph's School. The school, serving as a temporary godown, operated efficiently until it

"In those first few hours, it felt like we were battling the landslide itself. But what stood out was the community's resolve - farmers, shopkeepers, students, everyone pitched in. It reminded me that disaster brings out the best in people."

Yesudas,
Disaster Response Team Leader
Revenue department

had to close on 13th August in preparation for the school's reopening on 15th August. By that time, not all the commodities received had been distributed. To manage the remaining items, they were transferred to NFSA godown in Pathiripalam, a well-equipped facility with ample space to store the remaining relief materials.

Enterprise Resource Planning

Figure 2: NFSA Godown (above); Sorting and Kitting at NFSA Godown (below)

Faircode, a Kochi-based software company supported to enhance Wayanad's warehouse and humanitarian logistics management through optimized dashboards. Within two days following the landslide, Faircode approached the district administration and implemented an Enterprise Resource Planning (ERP) solution for inventory management, streamlining the distribution of relief materials to camps while ensuring transparency through a public dashboard. On August 02, 2024, the dashboard was made publicly accessible, helping individuals interested in contributing to relief efforts and promoting transparency. This dashboard, initially utilized at the St. Joseph's School collection center in Kalpetta and later transferred to the NFSA warehouse, tracked items arriving at the collection points. Government employees inputted

"When we started distributing supplies, we realized it wasn't just about providing food—it was about listening to their stories. One elder told me, 'Our ancestors taught us to survive, but this time, we needed your help.' It was humbling to support people who had always lived in harmony with nature."

Meera,
KeyStone Foundation Volunteer

item quantities upon arrival and updated distribution details, enabling authorities to assess future needs and identify surplus items. By providing real-time data, it ensured the timely and accurate distribution of essential items, minimizing excess supplies. Additionally, Amazon Disaster Response Team supported to forecast camp needs at intervals of 03, 05, 07, 10, and 15 days, allowing for more accurate demand estimation and more effective communication with donors. This tool streamlined relief distribution to camps, improving efficiency and transparency. The inventory dashboard operated until the disbursement of the relief camps in late August.

Figure 3: Technological inventory management in progress (Photo credits: The Hindu)

In the early recovery phase, the dashboard operated in both the NFSA and furniture warehouses. However, it was discontinued in the furniture warehouse as furniture began to be distributed directly rather than stocked. At the NFSA warehouse, the dashboard continued to function successfully until all relief camps were closed. Once camps were fully dispersed, authorities shifted to manual stock entries for managing furniture and other kit distributions to affected individuals residing in rented houses.

Management & Operations of Emergency Warehouses
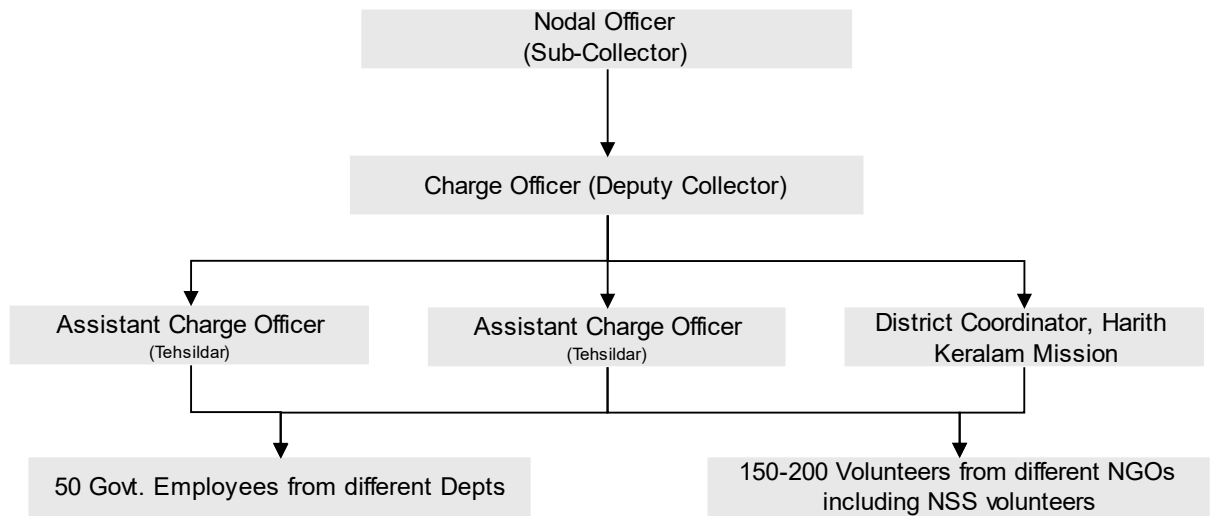
The warehouse operations at St. Joseph School and the NFSA godown in Pathiripalam were overseen by the Sub-Collector, acting as the nodal officer, and the Deputy Collector, serving as the charge officer. They were supported by two tehsildars and the District Coordinator of the Haritha Keralam Mission. Around 50 employees from various government departments, including the Revenue Department, were actively involved in managing the warehouse operations at both locations. Additionally, during the initial phase, 150-200 volunteers from NGOs, National Service Scheme (NSS), and other organizations contributed by assisting in the loading, unloading, and sorting of relief items.

Process of Relief Distribution

During the initial relief operations, all donations of relief materials were stored in a single warehouse. Requests from various relief camps were submitted by camp officers via official documents and handed to the warehouse. The requests were processed and verified by the

warehouse officer. After verification, the required items were delivered to the camps, with a warehouse representative overseeing transportation and distribution to ensure transparency. The supplies were distributed using civil supply vehicles, vehicles hired by the district administration, and those donated by individuals at no cost.

When there was a shortage of critical supplies, the district authorities were informed. The authorities then notified the GO-NGO coordination desk, which worked with NGOs and coordinated with both the authorities and the NGOs to source the necessary supplies. In case of urgency, items were purchased directly by the district administration. To manage the distribution efficiently, the district administration utilised the ERP solution developed by Faircode. The live dashboard reflected the emerging needs and evolved through the emergency response phase based on suggestions received from district administration and donating entities.

Challenges in Humanitarian Logistics in the immediate phase

- The lack of adequate facilities at previous warehouses had led to frequent relocations of stored goods. This has caused significant material damage and financial losses.
- Only one warehouse was responsible for handling all essential supplies, from food to rescue equipment. This created some logistical challenges and increased the risk of mismanagement.
- The warehouse did not have proper systems in place to differentiate between perishable and non-perishable goods. This created challenges and concerns related to spoilage and inefficient resource allocation.
- Commodities were not systematically organized within the warehouse, as items were simply piled together. This lack of organization hampered quick access to necessary supplies.
- There was no digital system in place at the initial stage to notify the warehouse of the specific needs of different camps. This gap in communication caused delay in the distribution of essential items to the relief camps.
- Additionally, camp officers conveyed requests on an immediate basis and did not forecast requirements for the shelters for upcoming days. Distribution of requested items from the single warehouse then caused delays across the chain starting from request processing, distribution and shortage of resources at the relief shelters.
- The challenging topography of the district posed significant barriers for direct donors in transporting relief materials to warehouse.

Key Learnings

Theme 1: Warehouse Management
- Pre-positioning of relief kits.
- Digital inventory management systems.
- Safety measures for workers.

Theme 2: Community Engagement
- Volunteer rotation plans.
- Vendor partnerships to support local economies.

Theme 3: Supply Chain Coordination
- GO-NGO collaboration for seamless communication.
- Efficient sorting, stacking, and labelling systems.

Theme 4: Health and Safety
- Improved working conditions in warehouses.
- Financial and logistical support for workers and vehicle owners.

Humanitarian Logistics for Early Recovery

Figure 4: Furniture Warehouse

Immediate Relief Distribution

In the early recovery phase, relief camps began to disperse as people moved into temporary housing, primarily, rented accommodation. To facilitate this transition, the government and various NGOs worked together to identify suitable homes and coordinated the relocation of affected individuals. The government provided financial support for rent and ensured essential items were supplied to help restore normalcy to the lives of those displaced. With the assistance of numerous NGOs, authorities ensured that sufficient supplies were delivered to these rented homes in the form

Figure 5: District Collector's social media appeal for back-to-home essential item donations

of back-to-home kits, which included furniture, kitchen utensils, food essentials, and hygiene items.
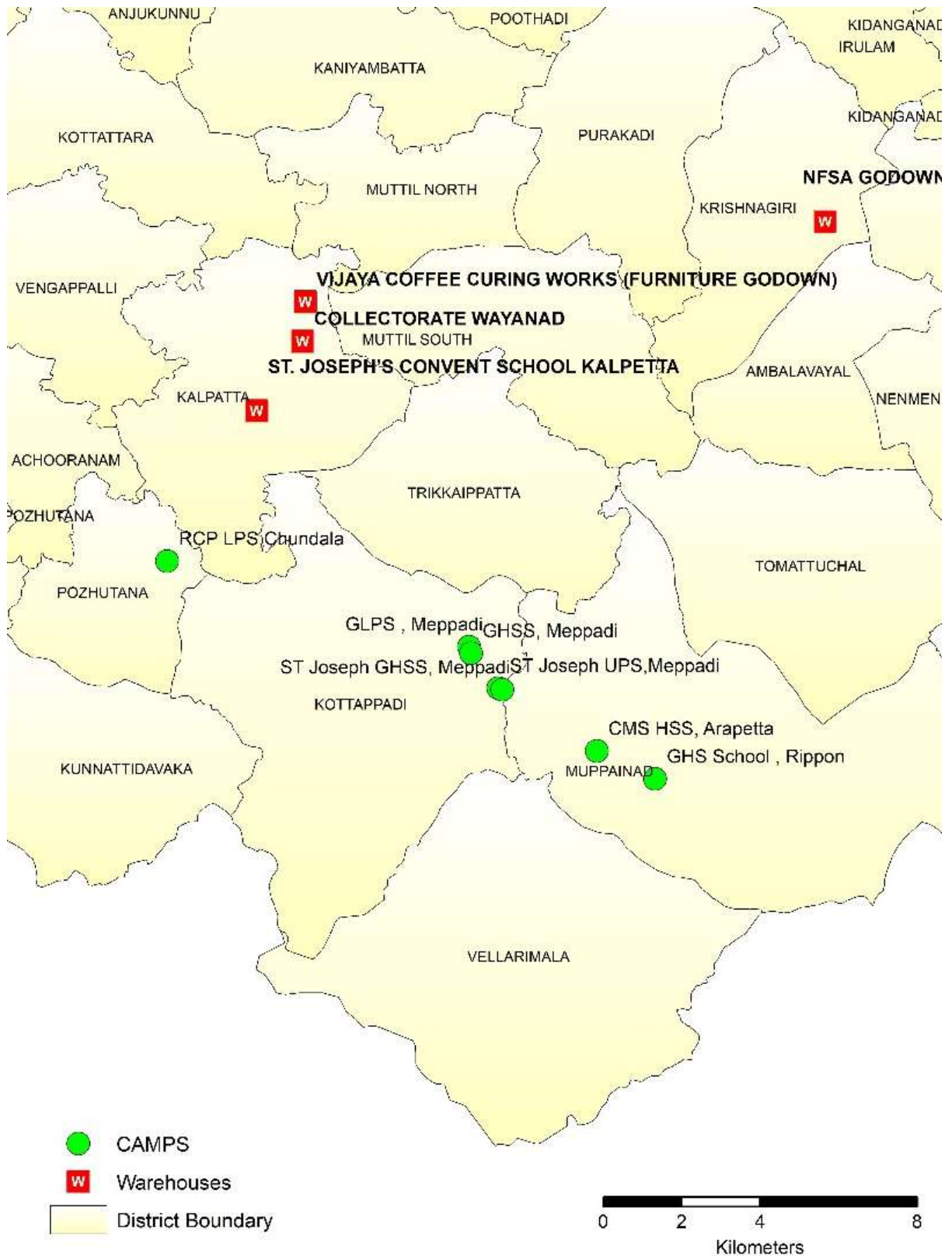
Figure 7: Location of Warehouses in Wayanad District

To further support the supply of furniture kits, the authorities acquired a godown in Vijaya Coffee Curing Works, Kainatti, on the 17th of August. This godown served as a central storage and distribution point for the furniture required in the back-to-home kits. Additionally, (NFSA) godown was operational during this period, playing a crucial role in supplying essential commodities to the remaining relief camps. As the recovery phase progressed, this godown also began providing kitchen kits, hygiene kits, clothes, and food kits as part of the back-to-home packages, in addition to its continued supply efforts for the camps.

"When I first walked into the warehouse, I was overwhelmed. But seeing everyone work together—even strangers—gave me a sense of purpose. A mother hugged me after receiving food for her children. That moment reminded me why I was here."

Vineeth,
Warehouse Volunteer

Moreover, food and hygiene items were distributed to all the flood-affected panchayats. The loading and unloading were done by the headload workers from different units in Wayanad free of cost.

BACK TO HOME KIT

Furniture	Kitchen Utensils	Food Essentials	Hygiene Items	Other essentials
Wardrobe	Cutlery	Tea powder (1 pack)	Dustbin	LED bulb
Cot	Knife	Sugar (1 pack)	Phenol	Emergency light
Table	Spoon	Chili powder	Mop	Rope Clip
4 Chairs	Water bottles	Coriander powder	Broom	
Cot	Jar	Sambhar powder	Detergent	
Wardrobe	Kadai	Chicken Masala/Meat Masala	Door Mat	
	Mixer + grinder	Rice 5 kg	Floor Mat	
	Saucepan	Atta / Rava (as available)		
	Tawa	Coconut oil/ oil (as available)		
	Casserole			
	Cooking stove			
	Cooker			

Management & Operations of warehouses in the early recovery phase
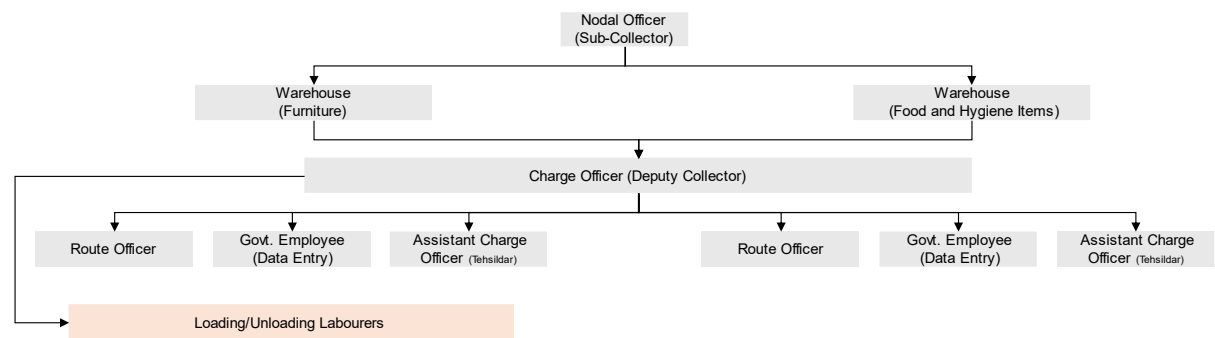
The Sub-Collector acts as the nodal officer for both warehouses. The furniture godown is operated by a team that includes a Charge Officer, Deputy Collector, and an Assistant Charge Officer, with a Route Officer overseeing transportation logistics. Additionally, staff members from various departments managed data entry concerning stock information, surplus, and supplies, working on a rotational basis. Currently, no volunteers are involved in the warehouse operations; instead, the district is utilizing the free services of loading workers from different units of the loading workers' union. In the NFSA godown, which is overseen by the Charge Officer, employees from various revenue offices are responsible for stock management, packing, and vehicle loading, in collaboration with the furniture warehouse.

Process of Relief Distribution

During the early recovery phase, there was a surge in demand for essential commodities as people relocated to rented houses. To address this, the GO-NGO coordination desk worked with district authorities and the Inter Agency Group (IAG) Wayanad to identify potential donor agencies and individuals. Donors were connected to the warehouse's nodal officer (the sub-collector). Some NGOs making direct donations while others contributed through local vendors who supplied the required items. Essential furniture was first distributed to government quarters before relocating the affected individuals. For those moving to rented houses, the local Panchayat informed the District Government's Disaster Management (DM) section, which prepared a list of beneficiaries with their current addresses and shared it with the furniture warehouse.

"I'll never forget the moment when we formed a human chain under the pouring rain, passing bags of rice and blankets to load the trucks. Despite the exhaustion, we all felt united by a shared purpose—to bring relief to those in need."

Arya, a first-time volunteer, Wayanad Relief Camp

At the warehouse, officers from various departments worked in shifts to process beneficiary information, establish contact, and confirm addresses and delivery routes. They also assessed the available space at the beneficiaries' locations to ensure that the furniture would fit. A detailed transportation plan was developed based on available labour and vehicles. The food kits, kitchen kits, and hygiene kits were gathered from the NFSA godown according to the

requirements, by officials designated from the furniture godown headload workers under the supervision of designated staff, loaded the furniture and essential kits for transportation to the beneficiaries. A route officer accompanied the deliveries to oversee the unloading process. Upon arrival, beneficiaries verified the kits using a checklist, and the route officer collected signatures and details to ensure accurate delivery and accountability.

Process of Humanitarian Relief for Recovery
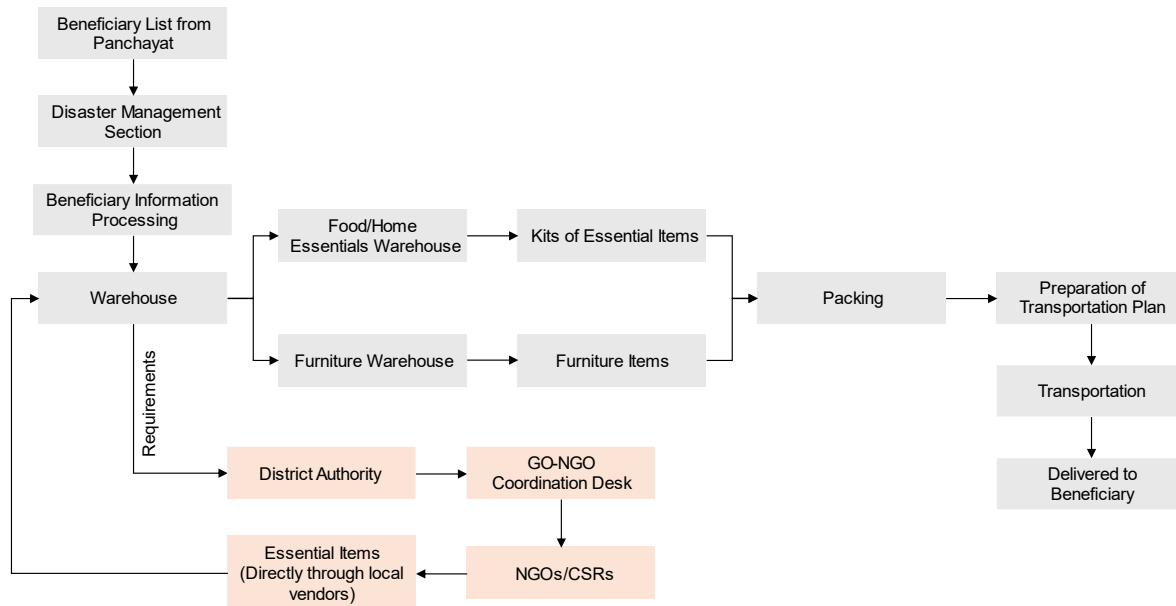
> *"When the landslide destroyed our home, I thought it was the end for my family. We had no food or water, and the children were falling sick. Then, the relief team came with supplies. The rice and medicines they brought saved us. It wasn't just aid—it was hope."*
>
> Priya,
> Wayanad Landslide Survivor

Currently, the supply of items to the godowns continues to operate similarly to the early recovery phase. The Disaster Management (DM) section prepares a list of beneficiaries, along with their current addresses, and communicates this information to the warehouse. In the warehouse, three officers from different departments work on a shift basis to process this information and connect with beneficiaries. They confirm the routes, addresses, and any inquiries related to space for the furniture. Subsequently, a plan is developed based on the availability of labour and vehicles to transport the kits. This information is updated in the software developed to manage the warehouse. The furniture, along with other kits, is moved by loading labourers under the supervision of designated employees. A Route Officer oversees the transportation, responsible for unloading items at their destinations and collecting signatures and details from beneficiaries on a checklist. The kits are then distributed to beneficiaries, who verify the items received using the provided checklist.

Challenges for Humanitarian Logistics in the Recovery Phase

- Unsafe working environment due to lack of air circulation and excessive dust, are creating

Key Learnings

Theme 1: Warehouse Management

- Pre-positioning of relief kits.
- Digital inventory management systems.
- Safety measures for workers.

Theme 2: Community Engagement

- Volunteer rotation plans.
- Vendor partnerships to support local economies.

Theme 3: Supply Chain Coordination

- GO-NGO collaboration for seamless communication.
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Theme 4: Health and Safety

- Improved working conditions in warehouses.
- Financial and logistical support for workers and vehicle owners

challenges for the health of workers. This leads to discomfort and potential long-term health issues for labourers.

- Free of charge services provided by loading workers causes them to lose income and face insufficient food provisions. This creates financial hardship and negatively impacts their well-being.
- As only the fuel cost of rented vehicles is covered, it results in financial strain for vehicle owners. This causes vehicle owners to experience losses and makes transportation unsustainable.

Recommendations

1. Warehouse Mapping and Preparedness

- Conduct a district-wide survey to identify potential warehouse locations, factoring in proximity to disaster-prone areas and accessibility.
- Initiate within the next six months and update the list annually.

2. Pre-Positioning Relief Kits

- Create standardized relief kits and store them at strategic locations identified during the mapping phase.
- Categorize kits by type (e.g., food, hygiene, shelter) and ensure a mix of perishable and non-perishable items.
- Start stockpiling before the monsoon season or other high-risk periods.

3. Digital Inventory System

- Deploy an easy-to-use, cloud-based inventory system for real-time stock tracking.
- Train government officials and volunteers on system usage to ensure efficient data entry and reporting.
- Develop and implement the system within three months, followed by training.

4. Community Engagement

- Form partnerships with local vendors for quick procurement and distribution of supplies.
- Establish a volunteer database, organized into rotational teams for warehouse support.
- Initiate vendor agreements and volunteer drives immediately, with reviews every quarter.

5. Adequate Storage Facilities

- Retrofit existing warehouses with ventilation, dust control systems, and partitioned sections for perishables.
- Apply for state or central government disaster management funds to upgrade facilities.
- Complete retrofitting of identified storage facilities in high-risk areas within 6-12 months.

6. Worker and Vehicle Owner Compensation

- Allocate disaster relief funds to provide fair wages to labourers and cover vehicle owners' operational costs fully.
- Implement a payment tracking system to ensure transparency to be implemented.
- immediately during the response phase of any disaster.

7. Workplace Safety Measures

- Establish clear safety protocols, conduct regular inspections, and provide personal protective equipment (PPE) to warehouse workers.
- Conduct health and safety workshops for labourers.
- Begin implementation immediately, with quarterly safety audits.

Conclusion

The landslide in Wayanad led to significant displacement, creating a surge in demand for essential goods and placing immense pressure on standard logistics and supply systems. However, the coordinated efforts of district authorities, NGOs, the local community, and civil society organizations effectively bridged these challenges, demonstrating exemplary humanitarian logistics. The timely establishment of a GO-NGO coordination desk streamlined the supply of necessities and support from technical organisations ensured efficient channels for stocking and distribution. The public dashboard supported seamless warehouse operations, and the engagement of local vendors, along with civil supplies vehicles and cost-free support from loading workers, helped reduce logistics expense. This experience illustrates how local communities can come together to support disaster recovery, providing a valuable model for humanitarian logistics in India. Despite challenges like limited warehouse space, difficulties in tracking items, and workforce management, there are valuable lessons here for the rest of the country to build a resilient and responsive humanitarian logistics system.