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Transport in the global logistics cluster 2020–2024 – selected good practices in humanitarian logistics

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Abstract. The research niche is the development of efficient transport in humanitarian logistics within the Global Logistics Cluster (GLC)through diversified good practices. The objective of the article is to explain example methods of implementing transport services to achieve the goals of humanitarian logistics within the GLC framework for the years 2020–2024. The article presents the hypothesis that the diversity of good transport practices was a condition for shaping flexibility in humanitarian logistics in that period. To achieve the objective and verify the hypothesis, desk research and document analysis were applied, using materials published by the World Food Programme (WFP) as the organisation coordinating actions within the GLC framework. The results indicate that humanitarian supply chain management within the GLC followed a process-oriented approach and relied predominantly on road transport, complemented by sea and air solutions when required. Good practices included integrating transport with warehousing services, using public–private partnerships, and planning activities based on mode-specific checklists. Further improvements involved decentralising operations by deploying air hubs, analysing performance using key performance indicators, promoting digital and IT solutions, and ensuring consistency of operational activities with the strategic HSCM framework. The conclusions suggest that maintaining a diversified portfolio of transport good practices supports flexibility and operational resilience in cluster-based humanitarian logistics.
Keywords: Global Logistics Cluster, humanitarian logistics, management, transport, WFP

Introduction. Identification of research gaps and the state of knowledge

The issue of transportation in humanitarian logistics is an interesting research topic. Transport is an integral part of humanitarian logistics, constituting its fundamental link. The popularisation of good practices in this field can help to raise social awareness of the problems faced by communities affected by crises caused by natural phenomena or armed conflicts. The topic addressed in the article covers complex phenomena, combining the use of infrastructure, means, and branches of transportation with the distribution of material aid and the management of the humanitarian supply chain (HSCM).

In practice, the provision of international humanitarian aid under the auspices of the United Nations involves humanitarian logistics within a cluster approach. The essence of this concept is to improve the coordination system of actions undertaken by various organisations and entities that specialize in specific areas of humanitarian aid. This aims to enhance efficiency, assign responsibility to the appropriate entities, and streamline operations organised on an international scale. It translates into building resilience at the HSCM level (Michel et al., 2023). The principles of the cluster approach in the development of international humanitarian aid in the 21st century have been extensively analysed in the scientific literature (Altay, Labonte, 2011; Fredriksen, 2012; Jahre, Jensen, 2010; Stumpenhorst et al., 2011). A characteristic example of a humanitarian cluster is the Global Logistics Cluster (GLC), with the World Food Programme (WFP) as the responsible entity for its development (Landmann, Ślusarczyk, 2022; Sijapati et al., 2025). The conceptualization of the role of transportation in humanitarian logistics can be carried out by looking at the solutions developed within the GLC framework.

The issue of transportation and humanitarian logistics is a well-researched area, considering the diverse analyses on the legal and organisational foundations as well as the practice of providing aid to people affected by natural disasters or armed conflicts. Of particular cognitive value are the analyses concerning the significance of individual branches of transport in the distribution of material aid and the movement of affected individuals. This includes separate considerations on maritime transport (Blank, 2021; Ozkapici et al., 2016), air transport (Dorn et al., 2019; Dorn, Cross, 2015), rail transport (Repik, Foltin, 2022), analysis of the potential of intermodal transport (Ertem et al., 2017; Hirschinger et al., 2016), as well as regional transport hubs located in various parts of the world (Sir, Caliskan, 2020; Stauffer et al., 2016; Zarei et al., 2019).

The area of transportation functioning within the framework of humanitarian logistics, particularly within individual clusters, including the Global Logistics Cluster (GLC), remains less developed. Tomasz Landmann and Stanisław Ślusarczyk (2022) discussed the organisational and institutional foundations of the humanitarian supply

chain developed within the GLC framework. The same authors presented a case study on the use of UNHAS for humanitarian air operations coordinated within the GLC at the turn of the second and third decades of the 21st century (Landmann, Ślusarczyk, 2024). The literature on the subject (Pawęska, Rawłuszko, 2024) also addressed the issue of international humanitarian aid within other clusters, such as the Global Shelter Cluster (GSC). Other authors emphasized the role of instruments used to create cluster solutions that integrate logistics and transport (Liu et al., 2022; Makarova, Lukashuk, 2020). From these considerations, the conclusion arises regarding the integration of transportation with other areas of the humanitarian supply chain. There is also a need to develop in-depth analyses on the role of transportation within the GLC and the associated good practices in providing humanitarian aid in the current decade.

Research methodology

This work aims to explain exemplary ways of providing transport services to achieve the objectives of humanitarian logistics within the GLC from 2020 to 2024.

The research problem in the work is as follows: What were the selected good practices in the organisation of transport within humanitarian logistics, implemented within the GLC from 2020 to 2024?

The research hypothesis in the article is as follows: The diversity of good transport practices was a condition for shaping flexibility in humanitarian logistics at the GLC level from 2020 to 2024. Transport was a key link in humanitarian logistics coordinated by the World Food Programme (WFP) at the GLC level, and the cluster's activities were focused on improving transport within the HSCM.

This work draws on a conceptual approach aimed at enhancing understanding of the challenges and issues associated with the use of transport in humanitarian logistics as defined at the GLC level from 2020 to 2024. Given the nature of the objective and the specificity of the issue addressed, an inductive approach has been adopted in this study.

The analysis relies on methodological approaches typical for examining issues within the cluster approach to international humanitarian aid (Bastos et al., 2014; Durrance-Bagale et al., 2020; Sijapati et al., 2025). It utilises desk research and document analysis of materials published by WFP as the entity managing transport within the GLC framework. For the purposes of retrospective analysis of databases, the key sources were reports prepared for individual countries, as well as summary statistical compilations for specific years or periods (WFP, 2025).

GLC and humanitarian logistics and transport – conceptualization of the topic

Transport in humanitarian logistics, despite similar processes and boundary conditions, is characterised by its specificity compared to solutions typical for transportation in commercial logistics. The operational goal of this activity, in addition to transporting people to temporary shelters, is to deliver material aid and bring it to populations affected by humanitarian crises caused by natural disasters or armed conflicts. The primary focus is on saving human lives and reducing suffering in the face of such threats. Transport integrates three main actors in the humanitarian supply chain: clients (donors), beneficiaries of humanitarian aid, and suppliers who have transport means and use the available infrastructure. Humanitarian logistics also features a significantly shorter development cycle for transport processes compared to commercial logistics (Thakur-Weigold et al., 2024).

Demand for transportation services in the humanitarian context is difficult to predict, and the shaping of these services takes place in a rapidly changing environment, with increasing uncertainty during individual crises (Kord, Samouei, 2023). This is related to the unpredictability of requirements and travel time, especially in the context of road transport (Gao et al., 2024; Yin et al., 2023). Meeting transportation needs in the humanitarian supply chain through the GLC is closely dependent on availability, procurement, and consequently, material flows. It requires the active involvement of the coordinating entity, which is the World Food Programme (WFP). Key performance parameters for transport in humanitarian logistics under GLC operations include delivery time, completeness, accuracy of needs assessments for affected communities regarding the procurement and shipment of goods, operational agility, supply chain flexibility, and the effectiveness of cooperation between chain participants (Charles et al., 2016).

The use of transport in humanitarian logistics organised through the GLC aligns with a process-oriented approach (Marciniak, 2024). The process-oriented approach sets the framework for managing the humanitarian supply chain (HSCM), as shown in Figure 1.

Figure 1 shows that managing humanitarian logistics within a process-oriented approach involves progressing through several stages, such as planning, procurement of supplies along with placing orders for services and works in the field, warehousing of humanitarian supplies, transport, as well as distribution of goods and financial loans to affected populations. The execution of these processes ensures the return of the population to temporary or permanent shelters. This is accompanied by the financing process until the closure of humanitarian aid. In the process-oriented approach, particular emphasis is placed on asset management, operational support,

reporting results, as well as monitoring and continuing cooperation with individual donors in the WFP database for the development of the GLC. Transportation services are treated, alongside supply deliveries, economic and living services, and medical services, as a key component of logistical support in the process-oriented HSCM. Transport also plays an integrative role in linking these elements of logistical support (Marciniak, 2023).

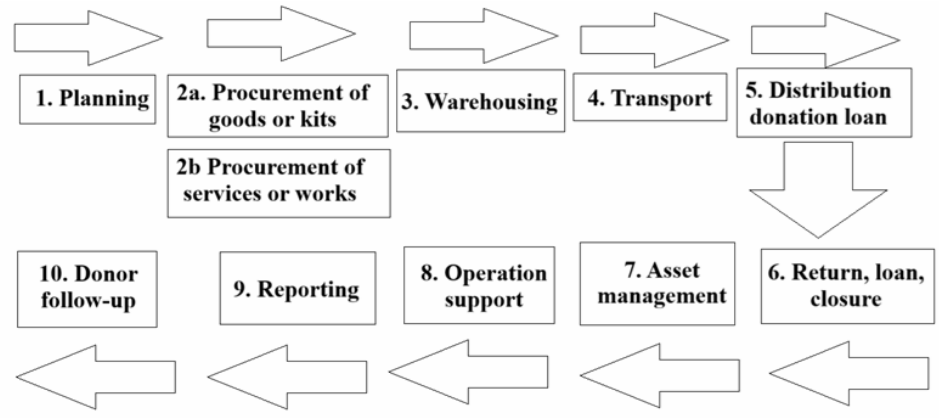


Fig. 1. Transport as part of the humanitarian logistics process in GLC
Source: Own study based on (NetHope, 2020)

The optimisation of transport and overall logistics processes in the humanitarian supply chain is a key issue is in the process-oriented approach. Optimisation criteria include factors such as reducing transport time, improving the quality of transport processes, effectiveness in route planning, rationalizing processes, reducing the staff responsible for their management, and cutting financial and material resources without compromising the primary goal, which is to assist the affected population and alleviate their suffering (Marciniak, 2024). Transport process planning in the GLC involves factors such as travel distance, availability of transport branches and means, total costs, types of supplies and their alignment with specific transport modes, and the potential for intermodal transportation. Practice shows that, on an international scale, truck transport significantly predominated, with auxiliary roles played by air and sea transport (Ertem et al., 2017; Zhang et al., 2011).

Figure 2 presents a more detailed view of humanitarian logistics and its translation into transport processes within the GLC.

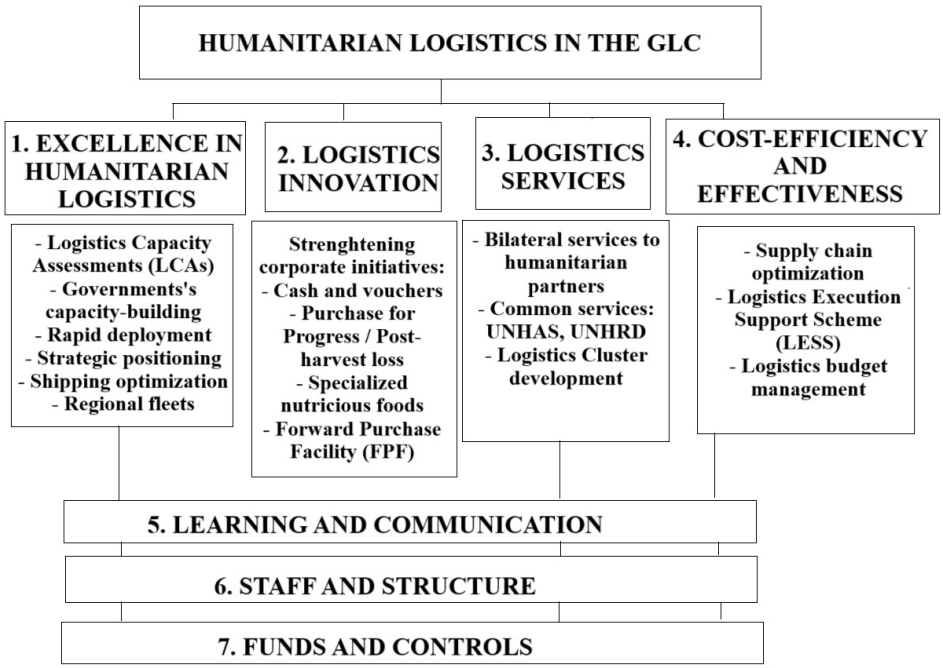


Fig. 2. Humanitarian logistics and its impact on transport in GLC – general model
Source: Own study based on (WFP, 2014)

Figure 2 shows that the pillars of humanitarian logistics within the GLC are the continuous improvement of processes and actions, the use of innovations, the provision of logistics services, as well as shaping cost efficiency and the effectiveness of logistics processes. Each of these pillars is based on continuous learning and communication between participants in the humanitarian supply chain, the development of human potential and organisational structures, as well as appropriate funding and control over the resources available within the GLC.

As for the impact of this model of humanitarian logistics on transport processes, in the area of improvement, it includes the optimisation of transport and the use of the potential assigned to regional transport fleets. In the area of innovation, it involves supporting partners in the humanitarian supply chain in strengthening broader corporate initiatives. In the area of logistics services, transport refers to, among other things, the use of the United Nations Humanitarian Air Service (UNHAS) and the establishment of connections with other logistics processes within the cluster. Cost management and the effectiveness of using transport resources have additional significance for the humanitarian supply chain identified at the GLC level. This includes planning costs in the logistics budget and optimizing the supply chain itself.

Selected good practices in transport as an element of humanitarian logistics in GLC

The humanitarian supply chain developed by WFP through the GLC is based on the criteria of flexibility and agility, recognizing the actual needs of the affected population, as well as the integration of different branches and means of transport, within the framework of close cooperation with government, private, and non-governmental organisations. The interbranch integration during the studied years was based on the use of the potential of various modes of transport (Fig. 3).

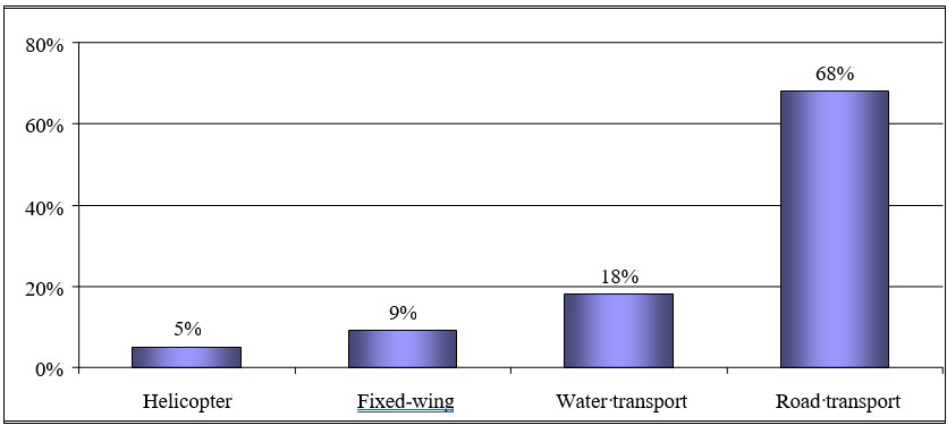


Fig. 3. Share of modes and means of transport in humanitarian transport within the GLC – an example from 2023 (cargo weight)

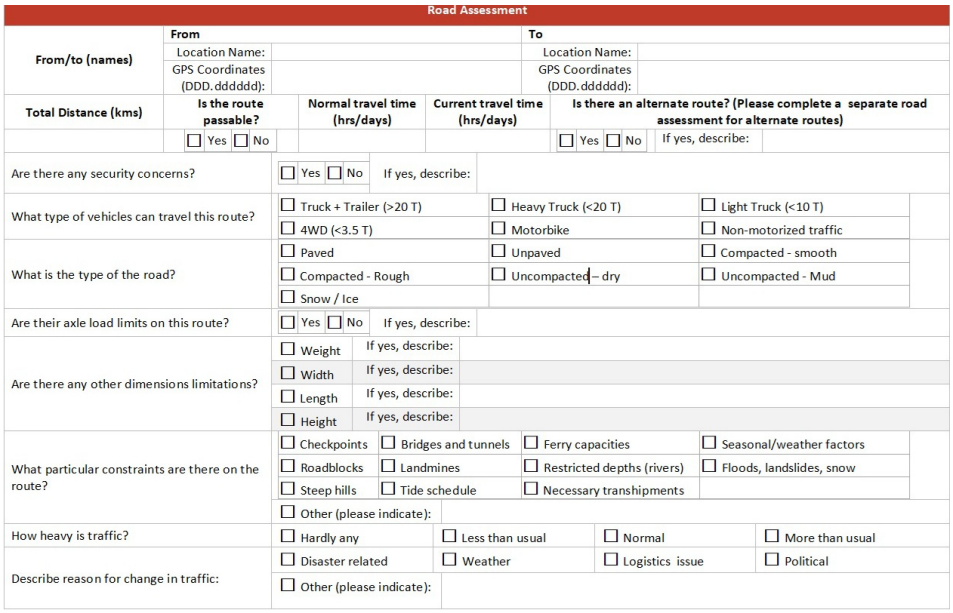
Source: Own study based on (WFP, 2025)

Figure 3 shows that for the example year covered by the studied time frame, humanitarian transport predominantly relied on trucks (specifically heavy-duty vehicles). They accounted for more than two-thirds of the total mass of all humanitarian deliveries. The second most used mode of transport was waterborne transport, with a predominance of maritime transport over inland waterway transport (a total of 18%). Air transport accounted for about 14% of all transports, with conventional aircraft (9%) surpassing helicopter transport (5%). Stakeholders in international humanitarian aid within the GLC preferred transport using commercial means rather than military vehicles. The main criteria for promoting this good practice were the greater availability of transport services, ease of organizing shipments, higher cost-effectiveness, and an accelerated coordination process for transport (WFP, 2025).

Transport management in humanitarian logistics within the GLC aligns with the requirements characteristic of a strategic approach. This is evidenced by the adoption of the Logistics Cluster Strategy 2022-2026, whose pillars include (WFP, 2025):

- Partnership Bases – concerns the creation of international partnerships to meet humanitarian needs based on the exchange of resources, experiences, and good practices by over 930 organisations participating in or supporting GLC activities from 2020 to 2024. It includes global partnerships, such as academic and private sector partnerships, as well as a network of field-level collaboration with stakeholders based in the affected countries.
- Standards and Policy – is based on the Logistics Capacity Assessment (LCAs) as a tool used for the standardized evaluation of logistics-transport infrastructure and services available in a given country. It also includes the functioning of the Letter of Intent, a common agreement format for organisations interested in participating in GLC activities. Additionally, it involves promoting green logistics through The Environmental Sustainability Project (WREC) and the resulting requirements for transport and warehousing centres in humanitarian logistics.
- Strengthening Response Capacity – takes two forms: shaping community readiness and learning, as well as building institutional and system readiness within the GLC. It is linked to the implementation of The Logistics Cluster Field Based Preparedness Project (FBPP) to create a coordinated and sustainable approach in the event of crises and the need for humanitarian transport within the HSCM framework.
- Operational Support – is based on the work of specialized teams such as the Logistics Cluster team, the Community Solutions team, and the Operations team (which includes The Impact Working Group operating within the latter), who support national clusters and working groups in planning and executing humanitarian logistics tasks. They participate in analysing logistical gaps in national transport systems and provide informational and training support to humanitarian services and personnel.

A lot of attention in the practice of transport development in GLC is devoted not only to the execution of the transports themselves but also to logistics planning that takes into account specific tools. The basis for planning transport services in the humanitarian supply chain in GLC are checklists, created separately for each mode of transport. This means separate tools for assessing maritime, inland waterway, air, road, and rail transport. Additional checklists concern planning fuel consumption, customs procedures, evaluating goods orders, and their storage. Figure 4 shows an example of a checklist that allows for planning and later evaluating humanitarian deliveries carried out by road transport.



Road Assessment					
From/to (names)	**From**			**To**	
	Location Name:			Location Name:	
	GPS Coordinates (DDD.dddddd):			GPS Coordinates (DDD.dddddd):	
Total Distance (kms)	**Is the route passable?**	**Normal travel time (hrs/days)**	**Current travel time (hrs/days)**	**Is there an alternate route? (Please complete a separate road assessment for alternate routes)**	
	☐ Yes ☐ No			☐ Yes ☐ No	If yes, describe:
Are there any security concerns?	☐ Yes ☐ No	If yes, describe:			
What type of vehicles can travel this route?	☐ Truck + Trailer (>20 T)	☐ Heavy Truck (<20 T)	☐ Light Truck (<10 T)		
	☐ 4WD (<3.5 T)	☐ Motorbike	☐ Non-motorized traffic		
What is the type of the road?	☐ Paved	☐ Unpaved	☐ Compacted - smooth		
	☐ Compacted - Rough	☐ Uncompacted – dry	☐ Uncompacted - Mud		
	☐ Snow / Ice				
Are their axle load limits on this route?	☐ Yes ☐ No	If yes, describe:			
Are there any other dimensions limitations?	☐ Weight	If yes, describe:			
	☐ Width	If yes, describe:			
	☐ Length	If yes, describe:			
	☐ Height	If yes, describe:			
What particular constraints are there on the route?	☐ Checkpoints	☐ Bridges and tunnels	☐ Ferry capacities	☐ Seasonal/weather factors	
	☐ Roadblocks	☐ Landmines	☐ Restricted depths (rivers)	☐ Floods, landslides, snow	
	☐ Steep hills	☐ Tide schedule	☐ Necessary transhipments		
	☐ Other (please indicate):				
How heavy is traffic?	☐ Hardly any	☐ Less than usual	☐ Normal	☐ More than usual	
Describe reason for change in traffic:	☐ Disaster related	☐ Weather	☐ Logistics issue	☐ Political	
	☐ Other (please indicate):				

Fig. 4. Road Transport Planning Checklist for the Humanitarian Supply Chain in GLC
Source: WFP, 2025

Figure 4 shows that the checklist in humanitarian transport includes the assessment of elements such as potential security concerns regarding the transport, types of vehicles suitable for road use, the classification of road types, and the maximum axle weight restrictions applicable on those roads. It evaluates possible size restrictions for loads fitted to specific vehicles, as well as specific restrictions on the route (e.g., temporary terrain obstacles or weather conditions). Other elements include analysing the traffic dynamics on the route and anticipating situations where changes in this dynamic may occur. The checklist also includes standard information such as the names of the starting and destination locations, the total transport distance, the expected time for transport service execution, an assessment of route passability, and identification of any alternative routes.

One of the characteristics of the global logistics chain coordinated by WFP is its high flexibility, as observed, for example, in response to the collapse of the global transport market during the Covid-19 pandemic. In response to the halt in the supply of commercial transport services, WFP organised the Common Services structure to ensure flexibility and adapt to the requirements of partners carrying out humanitarian transport. This allowed for the continuity of existing humanitarian operations and their adjustment to the growing needs in the health sector. A key good practice in quickly delivering humanitarian transports was the use of the capacity of logistics hubs located in strategic regions, based on air operations.

During the Covid-19 pandemic, special emphasis was placed on the distribution of medical supplies through the handling of large volumes of humanitarian cargo via logistics hubs, the locations of which are shown in Figure 5.

Fig. 5. Deployment of GLC logistics hubs in the transport of medical supplies to regions affected by humanitarian crises during the Covid-19 pandemic

Source: WFP, 2021

Figure 5 shows that the development of air transport within the GLC through logistics hubs involved utilizing the potential of airports located in cities such as Liège, Brindisi, Panama, Accra, Johannesburg, Addis Ababa, Kuala Lumpur, Dubai, and Guangzhou. The humanitarian aid delivery system during the studied years relied primarily on air transport because the logistics hubs served as distribution nodes, minimizing delivery times. They guaranteed cost and delivery time optimisation and were adaptable to changing conditions, such as the closure of national borders or shifts in domestic demand. The hubs operated as warehouses managed by WFP, located at key transport hubs. One of the goals was to deliver humanitarian aid within a maximum of 24-48 hours from the moment the need for goods was identified (Yuste et al., 2019).

Another good practice in the development of a hub-based approach within the GLC was the integration of partners through public-private partnerships and providing WFP with access to the existing infrastructure of large logistics corporations. An example of this was the collaboration with global companies such as Maersk, UPS, and DHL, as well as cooperation with locally operating businesses. The hub-based approach relied on the standardisation of processes through common procedures in inventory management, information acquisition and exchange, streamlining customs clearance (with the establishment of dedicated task groups for customs in individual countries), and the use of delivery tracking technologies. Furthermore, as the Covid-19 pandemic subsided, the humanitarian supply chain

within the GLC shifted to a mode of reducing its services where commercial capacity became available. This also contributed to shaping its flexibility, as countries and private carriers were ready to resume providing transport services for populations affected by humanitarian crises (WFP, 2021).

The partners involved in the GLC for individual countries were guided by the Operations Concept and Guidelines as operational documents in their transport activities. These documents outlined the objectives and general framework of transport services, supplemented by other logistics services. In an example of the guidelines for humanitarian operations in Ethiopia, the goals included ensuring access to land, air, sea, and inland waterway transport services on major routes, as well as providing support for the entry and exit of humanitarian convoys. Another goal was to strengthen the GLC's own capacity, including the integration of transport with warehousing services. This involved effective management of humanitarian warehouses and the creation of mobile warehousing units. Another goal was to support the government of Ethiopia in improving the visibility of the supply chain through data collection and analysis, as well as the development of guidelines and the enhancement of processes within HSCM. A good practice in providing transport services within the GLC was preparing and sharing reports and analyses with national authorities to provide advice on the development of transport infrastructure. Examples of such documents include strategic analyses, activity reports, situation updates, minutes from humanitarian staff meetings, physical maps covering humanitarian delivery routes, and field operation reviews. Therefore, transport in the GLC was based on the consolidation and sharing of information about logistical capacities in individual countries. Information support and the exchange of information were integral good practices in the development of transport services within this cluster in 2020-2024 (WFP, 2025).

In response to the challenges posed by the Covid-19 pandemic, the partners cooperating within the GLC placed greater emphasis on informatization and digitisation as processes supporting the development of transport in the humanitarian supply chain. An example of good practice in this area was the widespread use of The Relief Item Tracking Application (RITA). This is an internet-based application developed by WFP for the GLC to monitor and report on transport and warehousing services in countries with identified humanitarian crisis risks. The experience gained from using RITA was further developed during the response to humanitarian crises in North and Central Africa, as well as Southeast Asia. RITA is a tool used by partners within the GLC to manage the logistics aspects of cargo transportation, especially non-food items. The solution involves controlling incoming cargo, monitoring its receipt from client warehouses, and acceptance by a warehouse manager by the GLC. RITA allows for tracking cargo in transit, managing customs documentation, and confirming the delivery of goods to beneficiaries. It also enables basic reporting and warehouse management monitoring. Shipments are tracked at each

stage of transportation, similar to the online tracking offered by carriers providing commercial transport services. Furthermore, RITA sends automatic email notifications to various participants in the humanitarian supply chain to inform them of any changes in the transport process (WFP, 2025). RITA is an example of a solution that enables the standardisation of processes and the virtualization of services for different organisations participating in the GLC. It increases the potential for using Big Data and data analytics, which translates into improved efficiency and security in humanitarian logistics. It also impacts faster responses to crises by GLC partners, thanks to the real-time monitoring mechanism of transport processes.

Among the good practices in transportation within the GLC from 2020 to 2024, there was a noticeable improvement in the methodology for assessing the effectiveness of humanitarian operations, exemplified by the use of Key Performance Indicators (KPIs). KPIs should be defined as measurable values used to assess the effectiveness of an organisation's activities in a selected areas. The idea of KPIs is based on rationalization and the selection of an appropriate set of indicators that enable organisation managers to measure the achievement of business objectives. KPIs refer to fundamental organisational, economic, and technical parameters describing a company's operations. Examples of KPIs in the area of transport include transport work, average delivery time, delivery punctuality, unit cost, gross margin on transport, share of fixed costs in total operating expenses, number of damaged shipments, driver productivity, return rate, delivery completeness, and others.

KPIs play a fundamental role in transport assessment. This became possible as a result of the widespread adoption of information systems and new technologies that have been developing since the early 21st century. Transport KPIs are closely linked to KPIs considered at the humanitarian supply chain level, such as responsiveness, agility, reliability, cost minimization, and the effectiveness of dialogue with local authorities (Roh et al., 2022). From a specialized perspective, these KPIs are analysed, taking into account indicators assigned to key areas, such as vehicle fill, travel time, deviations from the transport service schedule, and the amount of empty runs (trips without cargo). Vehicle fill is calculated considering the weight of the cargo, the number of pallets, the average height of the pallets, and the planned capacity compared to the actual capacity under specific conditions on the route. Travel time is analysed by measuring the duration of each phase of the transport process, including loading, waiting for departure, the actual transport, possible repairs and maintenance on the route, and unloading at the destination. KPIs related to deviations from the transport service schedule include assessment elements such as the distribution of costs among different participants in the humanitarian supply chain within the GLC, timeliness of the transport service, transport congestion costs, physical protection of goods against theft, destruction, or damage during transit (for example, the percentage of goods damaged during transport), the quality of the transport service, and proper management of documentation and payments,

in accordance with legal regulations and contractual terms. Finally, the number of empty runs includes the measurement of the distance in kilometres that the vehicle travelled without carrying humanitarian cargo (WFP, 2025).

WFP was involved in organizing humanitarian transport within the GLC in response to both natural disasters and crises caused by armed conflicts. An example was the response to the needs of the population affected by the civil war in Sudan, which broke out in 2023. The conflict highlighted the typical challenges encountered when responding to crises caused by deliberate human actions. These included disruption of supply routes, damage to road and air infrastructure, reduced visibility and capacity of road networks, and increased transport costs for local populations due to the lack of access to fuel. In response, WFP established land corridors for food deliveries and air bridges crossing hard-to-reach areas. Humanitarian transport was coordinated with the Humanitarian Access Working Group, led by the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), as well as the unit responsible for civil-military coordination for humanitarian aid. The collaboration between WFP and OCHA should be considered a good practice in effectively delivering humanitarian aid through the GLC during the studied years (WFP, 2025).

The organisations participating in the GLC developed a number of good practices in providing transport services in Syria, another country affected by the crisis due to armed conflict, during the studied years. One of these practices involved identifying alternative routes to prevent bottlenecks caused by the constantly changing access conditions. Another practice involved establishing an international humanitarian corridor to coordinate aid deliveries through neighbouring countries. Regarding sea transport, the shipments were specialized, involving contracting regular cargo ships as well as temporary charters. Additionally, decentralized operations for the temporary storage of goods were implemented, allowing some distribution centres to function even amidst disruptions at others. This reduced the pressure on delivering goods to a single distribution and storage centre and the potential risks resulting from a lack of diversification (WFP, 2025).

In response to humanitarian crises in Uganda and Ethiopia, centralized management centres in the form of control towers were established at the initiative of the WFP. Their staff ensured real-time information exchange and developed performance indicators for transport resources in humanitarian logistics within the GLC framework. This facilitated oversight of goods and services supply and the monitoring of food losses. It contributed to more effective control of last-mile logistics, improving transparency and efficiency in the humanitarian supply chain. Another good practice in the Africa region was the establishment of the first Common Back Office (CBO) in Kenya in 2023, serving as a shared administrative and logistical hub supporting the transport operations of various organisations participating in the GLC activities. Another development in the region focused on promoting digitisation to optimise HSCM. This included implementing an IT

system for contracting local carriers, as well as a digital system for measuring the impact of transport and other logistics services on the environment, society, and the economy. The WFP also digitally tracked the inventory of GLC partners based on uniform standards for quality management and transport in last-mile logistics. To align transport with the sustainable development requirements of the supply chain, the WFP measured carbon dioxide emissions generated by transport vehicles. This contributed to further developing solutions to reduce emissions. Regional WFP offices conducted training and workshops on sustainable development in HSCM in countries affected by humanitarian crises. Some initiatives focused on the implementation of Energy Efficiency Programs (EEP), as exemplified by practices in Uganda and Djibouti (WFP, 2025).

In August 2024, at the initiative of the WFP, humanitarian operations were launched in response to the flooding in South Sudan. Humanitarian aid providers encountered specific obstacles related to transport services. These included a weak road network and insufficient capacity for road transport deliveries. Nearly 60% of the roads were deemed impassable or difficult to use for regular deliveries. Practical challenges included bureaucratic obstacles to transportation, the risk of attacks on humanitarian transport staff, and the threat of theft of transported goods. These issues resulted in increased logistics costs and delays in delivering aid. The international community worked to address these issues through appropriate operational planning procedures and information exchange between specialized groups such as the Access Working Group (AWG), Civil-Military Coordination (CMCoord), and the Civil-Military Advisory Group (CMAG). Among the good practices were acquiring and providing information about available air and river transport resources to reduce reliance on road transport for humanitarian deliveries. To ensure the safety of humanitarian staff and cargo, support from UN peacekeeping forces was also sought, utilizing the presence of the United Nations Mission in South Sudan (UNMISS). These efforts were coordinated by OCHA. Access to affected populations and the consideration of various transport options by humanitarian partners were monitored and analysed within the AWG's activities. The main logistics objectives during the South Sudan flood response included coordinating road and river transport to accessible areas, as well as organizing air transport for life-saving materials as part of ad-hoc services (WFP, 2025).

Conclusions

The article demonstrates that the development of humanitarian logistics within the GLC from 2020 to 2024 was based on the provision of transport services focused on a range of good practices. The hypothesis is confirmed that the diversification

of good transport practices is a condition for building flexibility in humanitarian logistics at the GLC level. Transport remained a key area of interest for the WFP, as the organisation coordinating the development of humanitarian logistics within the GLC. Effectiveness in HSCM was achieved through continuous improvement of transport operations, relying on decentralization via the placement of air hubs, measuring the impact of actions using Key Performance Indicators (KPIs), and the widespread adoption of digital and IT solutions, such as RITA or the transportation monitoring process.

During the studied years, there was consistency in operational activities within logistics at the GLC level with strategic HSCM. This consistency also concerned the integration of transport with warehousing services and the exchange of information between humanitarian organisations and national authorities receiving humanitarian supplies transported by various branches and means of transport. The development of humanitarian logistics in the GLC revealed the dominance of road transport, particularly carried out by trucks. However, an effective response to humanitarian crises also required the use of maritime, inland waterway, and air transport. Good practices implemented at the GLC level stemmed from the strategy established for the years 2022-2026. They implied a deepened public-private partnership, planning actions based on checklists tailored to different branches of transport, and the use of operational planning procedures and information exchange within specialized working groups.

The research implications of the article are relevant to a broad range of recipients. They include guidelines for other researchers on how to search for and analyse relevant principles of transport organisation in the humanitarian supply chain managed at the GLC level. The findings also help to popularize the topic of humanitarian logistics in the public's perception, highlighting the key role of transport in this area. The analysis emphasizes certain differences between humanitarian logistics and commercial logistics, and the resulting implications for carriers and organisations interested in participating in the GLC. The article may also be of practical use for logistics professionals interested in industry good practices.

The article does not provide detailed solutions used for specific branches of transport or in-depth analyses of actions carried out for each country individually. Instead, it aims to present a cross-sectional collection of principles, good practices, and leading areas of their implementation. The study does not include a statistical analysis of the effects for different countries in terms of volumes of humanitarian deliveries carried out by different transport branches and means. It also omits the issue of financing good transport practices in humanitarian logistics within the GLC. Future research may address these topics as valuable contributions to the state of knowledge.

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