

HUMANITARIAN LOGISTICS DISTRIBUTION IN NATURAL DISASTER RISK MITIGATION IN CENTRAL SULAWESI

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Submitted: 05 October 2022

Revised: 15 October 2022

Accepted: 25 October 2022

Abstrak: This research aims to find out the distribution model of humanitarian logistics applied when dealing with natural disasters in Pasigala (Palu, Sigi, and Donggala) and to find out the optimal humanitarian logistics distribution model in dealing with natural disasters in Pasigala, Central Sulawesi. The paradigm in this research is based on the phenomenological paradigm and is qualitative. The research was conducted in the affected area of Pasigala through data collection techniques in the form of interviews with informants consisting of disaster survivors and disaster management institutions from both government and non-government. The analysis tool in this research uses the NVIVO 12 Plus software. The results of the research show that the humanitarian logistics distribution model that has been carried out by the relevant institutions has a different structure. The distribution of logistics is still considered not optimal because there are obstacles that have an impact on new problems such as overlapping logistical assistance in several areas therefore it is necessary to propose a redesign of the humanitarian logistics distribution model based on the results of the analysis that has been carried out.

Keywords: Distribution, Logistics, Humanity, Pasigala, Disaster.

INTRODUCTION

Indonesia is a tropical country with a unique geological location. Indonesia is located between three confluence of the world's tectonic plates or lithospheric plates, namely the Indo-Australian, Eurasian, and Pacific plates. On the other hand, Indonesia is also located in the Pacific Ring of Fire and the Alpide Belt or the second most active earthquake route in the world, so that the potential for major disasters often occurs in Indonesia.

The phenomena that occurred in Palu, Sigi, and Donggala consisted of various types of events such as earthquakes, tsunamis, and liquefaction which were considered as new disasters in Indonesia. This is certainly a problem in itself in the distribution process of humanitarian logistics in Palu, Sigi, and Donggala.

In the research journal *Logistics Management in Disaster*, (Adiguzel, 2019) stated that the entire disaster management process must be carried out effectively. To support the entire process, stages such as humanitarian assistance and logistical support need to be considered.

But basically, humanitarian logistics has many problems. This is in line with the opinion of (Croucher et al., 2014) which explains that the current humanitarian logistics are far behind by twenty years from commercial logistics. While Farahani et al. (2011: 300) adds that humanitarian logistics is the most expensive part of the disaster relief process.

The distribution process of humanitarian logistics that is not running optimally will have an impact and become the attention of donors so that the

performance of humanitarian agencies in managing logistics can affect the trust of the donor. Bennett and Kottasz in Ikü et al. (2015) also stated that information related to distribution problems can inhibit someone's desire to donate.

The humanitarian logistics distribution model carried out by disaster management parties from both government and non-government institutions must run optimally so that it can be ensured that aid is distributed and reaches all targets or beneficiaries. The humanitarian logistics distribution model is expected to become a persuasive promotional strategy in order to increase donors' trust in institutions engaged in the humanitarian field.

Therefore, it is necessary to analyze the distribution model of humanitarian logistics when dealing with natural disasters in Palu, Sigi, and Donggala (Pasigala) Central Sulawesi so that through this research it can be seen how optimal the logistics distribution model is and how the model should be applied in dealing with natural disasters in Pasigala.

Humanitarian Logistics

According to (Farahani et al., 2011), humanitarian logistics is a very important part because the logistics system is usually needed for the procurement, storage, transportation, food, and injured victims both during the pre- and post-disaster periods.

(Keßler & Schwarz, 2011) stated that optimal humanitarian logistics services include the accuracy of goods (food, non-food, and medicine), the accuracy of the beneficiaries (the people most affected), the accuracy of the place, the timeliness, to the accuracy of quality. From this,

humanitarian logistics are able to alleviate the suffering of refugees and save many lives with an efficient budget.

Humanitarian Logistics Distribution

In the distribution of humanitarian logistics, (Farahani et al., 2011) stated that another aspect of the humanitarian logistics system is the distribution of relief goods to people in need using a short-distance transportation system.

Basic Functions of Distribution and Transportation Management

(Pujawan, 2020), stated that in order to create high service, basic functions in the distribution and transportation management process need to be carried out. The basic functions of distribution and transportation consist of:

1. Perform segmentation and determine service level targets.
2. Determine the mode of transportation to be used.
3. Consolidating information and delivery.
4. Perform scheduling and route determination.
5. Provide value added services.
6. Keep inventory.
7. Handling returns

MATERIALS AND METHODS

The approach in this research is a qualitative using the case study method. Data were collected through observation, interviews, and documentation. The aims of collecting data is to find a phenomenon related to the distribution flow of humanitarian logistics during the Pasigala natural disaster. At the data presentation stage, data analysis and determination of

the optimal humanitarian logistics distribution model were also carried out using NVIVO software.

RESULTS AND DISCUSSION

Basic Functions of Distribution and Transportation

The success of humanitarian logistics is inseparable from the distribution process which is based on the basic functions of distribution and transportation which consists of several elements including segmenting and determining service level targets, determining the mode of transportation to be used, consolidating information and delivery, scheduling and determining routes, providing value-added services, and keeping inventory.

A. Segmenting and determining service level targets

The segmentation and target service level of the entire distribution of humanitarian logistics for the Pasigala natural disaster is only aims at people who are truly affected, namely people who have lost their property, homes, and are in refugee camps or shelters.

This is in line with the explanation contained in the Sphere which states that in facing certain risks every effort must be made to pay attention to and provide protection to vulnerable communities such as women, children, the elderly, disabled, to minority groups (Charter, 2011).

The institutions that became the informants of this research acknowledged that all forms of assistance were prioritized for more vulnerable groups such as the elderly, pregnant women, toddlers, and people with disabilities.

"PMI prioritizes assistance for the vulnerable such as the elderly, pregnant women, nursing mothers, toddlers, female heads of families, people with disabilities, and those with low incomes on condition that they are disaster-affected residents who have lost their property, damaged or lost their house" (Hr).

In addition, the right of refugees to obtain assistance is very important to note. These rights include an adequate standard of living to obtain the needs of food, clothing, housing, health, life insurance, and guarantees of protection based on international law. All parties, both government and non-government, must be responsible for providing fairly and without discrimination (Charter, 2011).

Likewise, what has been done by various Pasigala natural disaster management institutions, one of which is the MDMC agency, which states that in the distribution of aid, human values must be prioritized.

"Despite being a disaster management institution promoted by the Islamic movement in Indonesia, MDMC puts forward human values without discrimination and elements of SARA" (B).

B. Determine the mode of transportation to be used

(da Costa et al., 2012) argue, although most humanitarian operations use land and air transportation, an evaluation process also needs to be carried out to use other modes of transportation so that distribution activities can run efficiently.

From the results of the research, it is found that the determination of the mode

of transportation in the distribution of humanitarian logistics for the Pasigala natural disaster is based on the number of requests for needs and the route to be taken.

"The determination of the vehicle is adjusted to distribution needs. If the list of needs for assistance is small, the assistance will be loaded with a pick-up car or a double cabin car. However, if the demand is large, in the distribution process, trucks must be used. As for the use of animal-powered vehicles such as oxcarts, it is intended to reach isolated locations and difficult to reach by motorized vehicles" (AR).

Most of the transportation is a vehicle that is rented so that the support for transportation facilities is still very standard and minimal innovation. This is as expressed in the following informant's statement:

"There is no special innovation because the vehicles used are generally standard vehicles that are temporarily rented and according to needs. Some personnel are also assigned to check the health of the vehicle" (B).

Whereas the technology that is growing should be able to handle all the existing problems (Adiguzel, 2019) mentions that vehicles that have technological innovations or those that have intelligent transportation systems such as unmanned vehicles can save many lives in less time.

C. Consolidating information and shipping

From the results of the research that has been carried out, it can be concluded that all personnel from each institution have their respective duties in carrying out

disaster management activities.

This was conveyed by (Purnama & Murdiyanto, 2013) who stated that successful disaster management did not escape communication between related parties. Good communication can ease and speed up the process of handling victims of natural disasters.

(Lomban, 2020) state that BNPB and BPBD have a role to coordinate and communicate all matters relating to disaster emergencies to all disaster management parties.

In Perka BNPB No. 8 of 2013 it is also stated that the unintegrated structure of the Disaster Emergency Management Command from the district to the provincial level will affect the impediment of information and communication processes in disaster management (Lomban, 2020).

From the results of the analysis carried out in this research, it shows that disaster management institutions and agencies have coordinated. However, the BPBD of Central Sulawesi Province as the organizer and director of the Pasigala natural disaster management cannot carry out its duties optimally.

This is due to the non-functioning of Pusdalops at the provincial and district and city levels. As the Head of Logistics and Emergency Division of BPBD Central Sulawesi Province, Andi Sembiring said:

"The Central Sulawesi Provincial BPBD should be able to function Pusdalops which is the center in regulating and controlling disaster management in accordance with the authority and duties of each existing institution. However, the BPBD of Central Sulawesi

Province is the only BPBD that does not yet have a Pusdalops. Whereas Pusdalops has been regulated in the disaster management constitution where every BPBD must have a Pusdalops. We have tried to propose to build a Pusdalops in Central Sulawesi, considering that Central Sulawesi is one of the areas that has become a disaster supermarket, but this is difficult to achieve because there are always constraints on budget allocation reasons" (AS).

This statement is also in line with the explanation of (Lomban, 2020) which state that there is a lack of clarity in the division of tasks, functions, and authorities in the implementation of the Central Sulawesi Pasigala disaster management operation, both from government agencies and other institutions.

At the time of a disaster the role of Pusdalops PB is very much needed where based on Perka BPNB Number 15 of 2012 it is stated that the task of Pusdalops PB is to support the Disaster Emergency Post which unites all institutions and figures for natural disaster management both from within the country and abroad. Another problem is that there are multiple commands that occur in the structure of disaster emergency management at the provincial, district, and city levels so that it has an impact on data and information management (Lomban, 2020).

The BPBD of Central Sulawesi Province stated that Pusdalops is the most important point in disaster management but it is unfortunate that the existence of Pusdalops is still very neglected.

"... the most important points for the

success of disaster management lie in Pusalops, regional regulations, human or personnel resources, and budgeting. From Pusalops we can decide what policies must be carried out both in the mitigation process and disaster risk reduction, including the aid distribution process."

Lomban, (2020) explained that obstacles also occurred because Perka 3 of 2016 had not gone well. This is influenced by the existence of a separate system from the Regional Head in determining the command structure and the establishment of posts from various agencies and institutions that are not integrated.

D. Scheduling and determining routes

From the results of the research that has been carried out, the determination of distribution points or locations is generally carried out in the Palu, Sigi, and Donggala areas based on data needs in the field.

In (Charter, 2011) it is explained that the conditions for the distribution of aid should be facilitated and safe for the beneficiaries so that disaster victims who need assistance do not have to walk far or pass through dangerous areas. For this reason, it is necessary to establish locations for distribution of aid in the vicinity of refugee camps or settlements for disaster victims.

In addition, disaster management should consider obstacles such as guard posts, road closures, and potential hazards. In addition, disaster management must strive to ensure the needs of disaster victims who are in remote or isolated locations (Charter, 2011).

In order for the distribution process to run efficiently, various efforts have been

made by disaster management agencies in planning distribution routes. From the results of this research, it can be assumed that the determination of schedules, routes, and distribution points in each disaster management agency has different policies.

Generally, disaster management carries out several stages in the distribution process, such as collecting data or assessing community needs, reviewing distribution points, and coordinating with the village or sub-district government.

E. Provide value added services, and keep inventory.

The disaster management party also strives to maintain the quality of the logistics that will be distributed, such as sorting and packaging packages based on the needs of disaster victims.

"Various efforts have been made by disaster management agencies to maintain the quality of aid, such as the possibility of damage to goods such as rain, but we deal with it with tarpaulins. We also prepare officers to guard and pay attention to logistics during the distribution process" (V)

In (Charter, 2011), it has been stated that if aid can endanger the health of disaster survivors, the aid items must be destroyed. Help items that are not worth trying to avoid entering the human food chain. In addition, in the extermination process, several procedures must be carried out so as not to damage and pollute the environment as has been attempted by several disaster management agencies.

"In order not to cause additional cases such as the spread of disease and others, we will certainly destroy any inappropriate assistance. For items that are not feasible,

such as expired, of course, must be destroyed or thrown away. However, during a natural disaster, it is rare to find damaged or expired goods" (I).

Humanitarian Logistics Service Value

The success of the humanitarian logistics distribution process can be judged from logistics services consisting of five principles of accuracy, namely accuracy of goods, accuracy of beneficiaries, accuracy of place, timeliness, and accuracy of quality.

A. Accuracy of goods

In this case, there are only five out of ten disaster survivors who think that humanitarian logistics or natural disaster assistance distributed to disaster survivors has a value for the accuracy of the goods in terms of the type of need and also the quantity of assistance provided.

The same has been stated by several parties to the Pasigala natural disaster management agency. From the results of the interview, it can be concluded that in conducting the distribution, logistical assistance items have been appropriate to be distributed even though Regional MDMC agency of Central Sulawesi still admits that the amount and type of goods are considered to be inappropriate and not suitable for distribution to beneficiaries.

B. accuracy of beneficiary

From the results of the research and analysis that has been carried out, it can be concluded that so far the distribution of humanitarian logistics for the Pasigala natural disaster has met the accuracy value of the beneficiaries.

C. Accuracy of place

The place for distribution of aid is considered to be very easy to reach, close

to refugee camps or shelters, and there is no damage to road access to the location due to natural disasters.

"Some places are easy to reach because they are close, but some are far away so you have to use a vehicle. The road access can be passed even though it is a bit split due to the disaster" (Rs)

In distributing humanitarian logistics in the event of a natural disaster in Pasigala, disaster management agencies such as BPBD, PMI, ACT, MDMC and IZI stated that the determination of the place or location for the distribution of aid had met the value of location accuracy.

D. Punctuality,

From the analysis, it can be seen that the distribution of logistics has the value of timeliness. Although the schedule for the distribution of aid is unpredictable, the delay in the distribution of aid is minimal.

"During receiving aid we never had to wait long because we gathered to collect aid after the aid arrived at the distribution location" (Rs)

E. Quality Accuracy

The quality of aid goods, especially the type of food aid, is very important to pay attention to so as not to cause various impacts of disease in the community.

The logistical assistance provided to disaster survivors has so far been very good in terms of the expiration period to the packaging of aid packages that are able to protect goods from weather threats and other things. Therefore, the humanitarian logistics that have been distributed have the value of quality accuracy.

"The assistance provided was not damaged. However, because we received so much aid, most of the aid

was damaged in our tents because of the expiration date" (Rs).

Existing Model of Humanitarian Logistics Distribution of Natural Disasters

Pasigala Various parties are involved in the management of Pasigala natural disasters ranging from government agencies or institutions to non-government institutions. The institutions include BPBD, PMI, ACT, MDMC, and IZI.

Each institution has policies and standards that have been implemented so that in the case of Pasigala disaster management there are various models of humanitarian logistics distribution.

A. Distribution Model of Humanitarian Logistics in BPBD Central Sulawesi Province

Distribution model of the humanitarian logistics in Figure 1 below shows that the humanitarian logistics are sent by sea, air, and land. Furthermore, the logistics are handled by the BPBD of Central Sulawesi Provincial to be stored in a warehouse located on Jalan Moh. Yamin Palu, Central Sulawesi.

So that the buildup does not occur in warehouses, the BPBD of Central Sulawesi Provincial directs the BPBD of Palu City, Sigi Regency, and Donggala District to distribute aid according to their respective working areas.

The determination of distribution routes is fluctuating so it must be based on reports from BPBD in district and city. In addition, in determining transportation, it must be in accordance with the number of requests and the route to be taken.

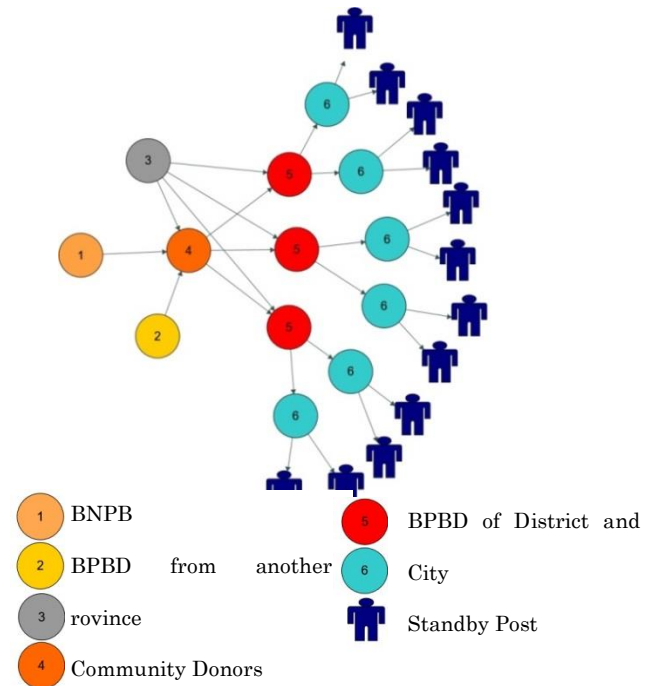


Figure 1. BPBD of Central Sulawesi Province Distribution Model of Humanitarian Logistics

(Source: Data analysis, 2021)

Some of the obstacles found by the BPBD of Central Sulawesi Province in determining the value of logistics services were the availability of the type of logistics to be distributed, budget problems, structural problems to regulatory problems or lack of support for BPBD of Central Sulawesi Province.

In addition, other obstacles are limited personnel on duty while in the field, damage to transportation access, and communication problems, and requests for needs and desires of disaster-affected communities.

B. Distribution Model of Humanitarian Logistics for PMI in Central Sulawesi Regional

The aid that had arrived in Central Sulawesi was then stored in the warehouse of the IFRC (International Federation of Red Cross and Red Crescent Societies) which

involved PMI of Central Sulawesi to manage logistics storage.

Furthermore, PMI for Palu City, Sigi and Donggala Districts, distributed aid to branch posts located in disaster-affected sub-districts or villages.

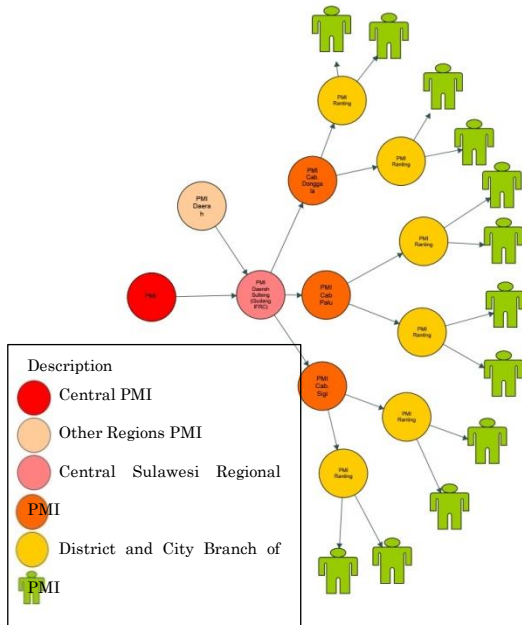


Figure 2. Distribution Model of Humanitarian Logistics for PMI in Central Sulawesi Regional

(Source: Data Processing, 2011)

The distribution must be based on a report on the results of data collection approved by the Central Sulawesi Regional PMI and the availability of existing assistance.

Some of the obstacles found in meeting the value of logistics services include the absence of several disaster survivors so that the aid distribution process does not run effectively, differences in potential beneficiaries with data obtained during the assessment process, road access, and availability of transportation in the emergency response phase.

C. Distribution Model of ACT Humanitarian Logistics, Central Sulawesi

Various logistical aids distributed by ACT Central Sulawesi cover food, shelter and clothing needs. The logistical assistance generally comes from community donations and cooperation with international institutions to corporate partners.

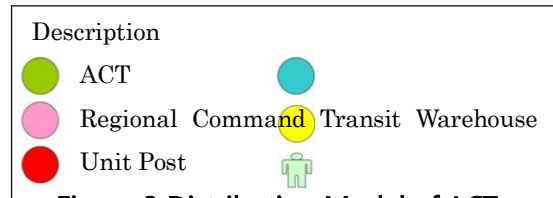
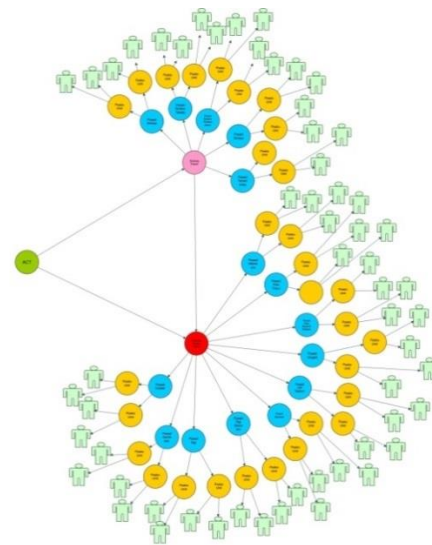


Figure 3 Distribution Model of ACT Humanitarian Logistics, Central Sulawesi

(Source: Data analysis, 2021)

The aid originating from the Sulawesi region was sent by land route and stored in the main warehouse. then aid from outside the island of Sulawesi is sent by sea and then stored in a transit warehouse located at the port of PT. Toloan.

After going through the checking process, the aid is distributed to be stored in the main warehouse. Then the aid in the main warehouse will be distributed to regional posts.

As for the regional post which is near the transit warehouse, the aid goods come

from the transit warehouse of PT. Toloan. In order to save costs and time, ACT Central Sulawesi distributes it to regional command posts that are adjacent to or in line with more urgent priority requests. Then if there are many. If there is an urgent need, ACT Central Sulawesi will prepare additional transportation.

The regional command posts consist of the Sigi District, West and South Palu, Banawa Regional, Sirenja Regional, Sindue Regional, East Palu Regional, Tanantovea Regional, Loli Tasiburi-Banawa Regional, Gumbasa Region, Sindue Regional, Sigi Biromaru Regional, and Kulawi Regional Command Post.

The aid that was already at the regional command post was then redistributed to the unit post or evacuation point to be given to beneficiaries who were disaster survivors. ACT prioritizes people who are elderly, sick, toddlers, pregnant women, and people with disabilities.

D. Distribution Model of MDMC Humanitarian Logistics, Central Sulawesi

In distributing humanitarian logistics, MDMC always refers to international humanitarian standards which distribute it to all beneficiaries fairly and without discrimination. This is the reason for MDMC to accept cooperation with other interfaith institutions where MDMC is also a member of the Humanitarian Forum Indonesia, which is a forum for interfaith institutions that focus on humanitarian issues.

The humanitarian logistics collected by the Central MDMC and Branches throughout Indonesia were sent to Central Sulawesi Province. Humanitarian logistics sent from outside the island of Sulawesi will be sent by sea and those from within the

island of Sulawesi will be distributed by land.

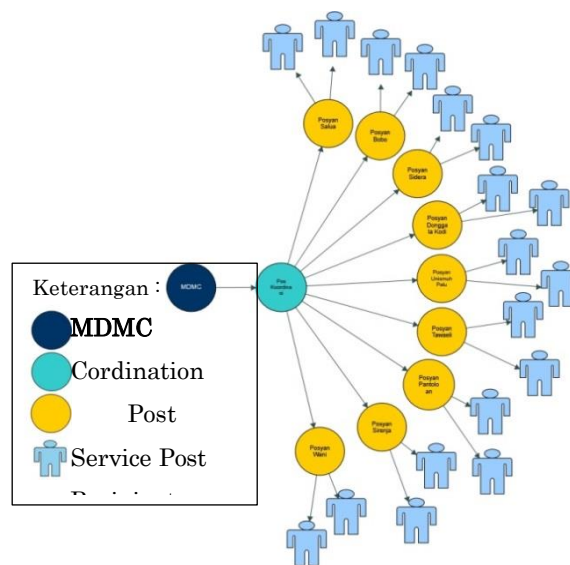


Figure 4

Distribution Model of MDMC Humanitarian Logistics

(Source: Data analysis, 2021)

The humanitarian logistics will then be stored in a warehouse owned by the coordination post which is located at Unismuh Palu. After going through the process of sorting and packing the packages, the aid was distributed at service posts consisting of Sirenja, Wani, Pantoloan, Tawaeli Donggala Kodi, Unismuh, Sidera, Bobo, and Salua.

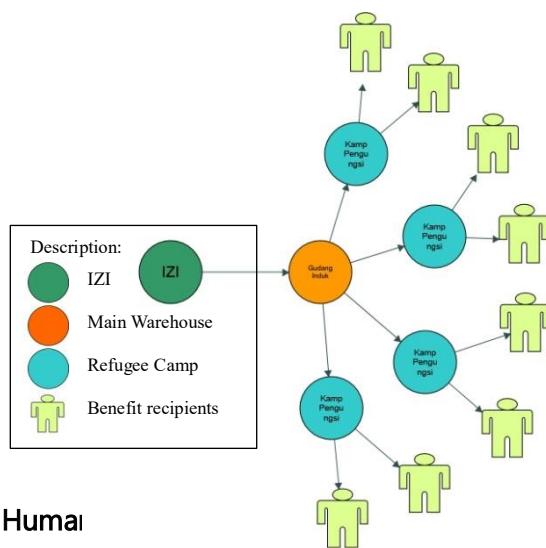
In the final stage, assistance from service posts will be distributed to refugee locations or to beneficiaries who are victims of natural disasters in areas affected by Palu, Sigi, and Donggala.

Several things that become obstacles in determining the value of logistics services are the attitude of the beneficiaries to obtain assistance which is far greater than the availability of logistics stock at MDMC, the difficulty of tracking beneficiary data, weather, infrastructure damage and the condition of disaster

victims who often experience social jealousy.

E. Distribution Model of IZI Humanitarian Logistics, Central Sulawesi

The assistance distributed by IZI is funds from the infaq and alms programs provided by muzakki or donors. Funds that have been collected will then be spent for logistics needs in the area around Central Sulawesi, to be precise in the areas of South Sulawesi and Southeast Sulawesi.



After the relief items were ready, the aid items were distributed to the main post and stored in the main warehouse located at SD IT AL-Fahmi Palu. Furthermore, relief goods will be distributed in areas affected by the Palu, Sigi and Donggala disasters to be given to disaster-affected communities. IZI Central Sulawesi provides assistance to all levels of society in need who have the status of asnaf zakat and are in accordance with the direction of the Sharia compliance board.

The obstacles found in meeting the value of logistics services are distribution channel problems, uneven distribution processes carried out by other institutions,

incompatibility of government policies with conditions on the ground to road access conditions which can have an impact on decreasing the quality of assistance.

Re-Design of Distribution Model of Humanitarian Logistics for Natural Disaster Pasigala Central Sulawesi

The model proposed in Figure 6 explains that the BPBD of Central Sulawesi must carry out its functions in accordance with the Law of the Republic of Indonesia Number 24 of 2007 regarding Disaster Management Article 20, namely:

- 1) Formulation and stipulation of disaster management policies and handling of refugees quickly and precisely, effectively and efficiently;
- 2) Coordinate the implementation of disaster management activities in a planned, integrated, and comprehensive manner

In addition, in the Law of the Republic of Indonesia Number 24 of 2007 regarding Disaster Management Article 19 it is explained that BPBD consists of two elements, namely the directing element of disaster management and the implementer of disaster management.

Therefore BPBD can determine the structure and responsibilities that must be carried out as well as standardize disaster management. BPBD also has the authority to direct government agencies and private institutions that take part in disaster management at the regional level.

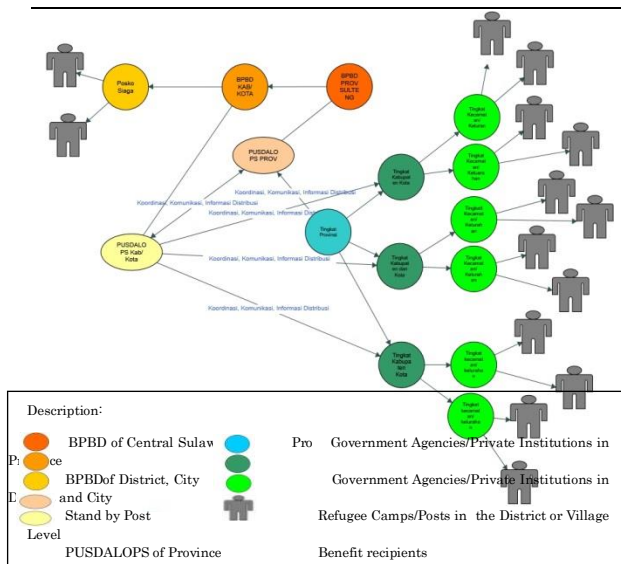


Figure 6

Re-Design Distribution Model of Humanitarian Logistics for Natural Disaster Pasigala Central Sulawesi

(Source: Data analysis, 2021)

Thus, the distribution of logistical assistance carried out by agencies and institutions for disaster victims can be carried out based on predetermined standards. The distribution process must prioritize the process of coordination, communication, and information through Pusdalops both at the provincial and district and city levels.

If the Pusdalops function can be implemented properly, the distribution of logistics will run more optimally. In addition, all programs of disaster management activities are carried out in an accountable and transparent manner. Where this will certainly increase a person's sense of generosity or desire to donate.

In addition, things that need to be considered are fulfilling the value of logistics services as well as distribution and transportation functions such as scheduling by preparing a work time line, preparing supporting transportation, conducting assessments or field

identification, coordinating with community leaders, determining distribution locations based on standard, to conduct personnel or volunteer training.

CONCLUSIONS

1. The humanitarian logistics distribution model that has been carried out by the relevant institutions has a different structure. In general, these institutions have carried out the logistics distribution process based on the distribution and transportation functions. In addition, the institution makes efforts to pay attention to the value of logistics services, namely aspects of accuracy of goods, accuracy of recipients, accuracy of place, timeliness, and accuracy of quality.
2. The distribution of logistics is still considered not optimal because there are still obstacles that have an impact on new problems. One of them is that there is overlapping logistical assistance in several areas so it is necessary to propose a re-design of the humanitarian logistics distribution model based on the results of the analysis that has been carried out.

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