

The Lao Government's Role in Reducing the Risk of Flash Floods Disasters in Attapeu Province

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ABSTRACT : In July 2018, the province of Attapeu experienced a major disaster, namely the collapse of the dam on the Xe-Pian Xe-Namnoy river. This incident resulted in loss of life, loss of property and environmental damage. In correcting the mistake that occurred, the Lao government carried out various disaster risk management efforts, especially flash floods. This research was investigated by descriptive qualitative research method using literature review from various journals and documents related to flash floods in Laos. This study shows the various efforts made by the Lao government and various related stakeholders to reduce disaster risk starting from structural and non-structural mitigation. The Lao government also gives orders to stakeholders to compensate for losses caused by the negligence of these stakeholders. The Lao government also involves the Lao people in community-based disaster risk reduction by conducting community preparedness training. Thus, the community is better prepared to face flash flood disasters in the future.

KEYWORDS-Role, Laos Government, Flash Floods, Attapeu Province

I. INTRODUCTION

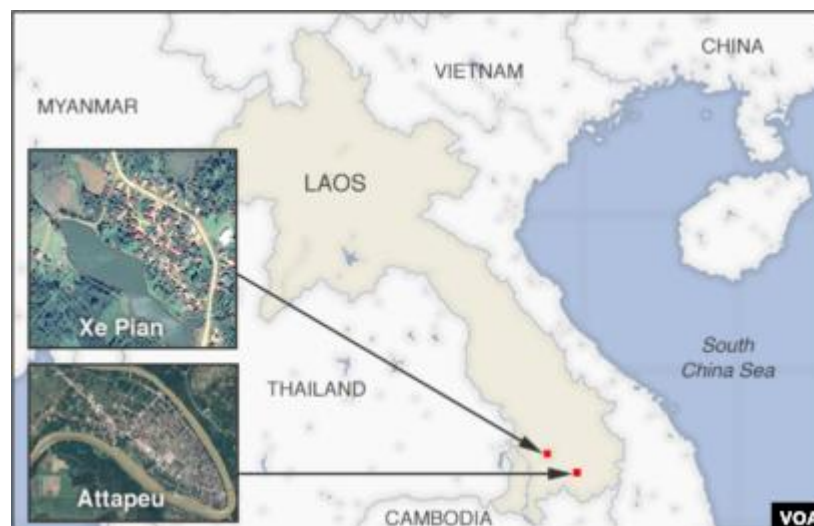
Lao PDR is exposed to high climate and disaster risks, including floods, landslides, droughts, and tropical storms and cyclones. Vast stretches of land are also heavily contaminated by unexploded ordinance (UXO). From 1970 to 2010, 33 natural hazard events (mostly floods and droughts) were registered, affecting almost 9 million people and causing economic damage of more than US\$400 million. Flooding is the major natural hazard in Lao PDR, with the Mekong River as its primary source. The river basin hydrology leads to extreme flooding in one portion of the basin, with average or below-average water levels prevailing elsewhere. The development of hydroelectric dams has led to the hydrology of the Mekong River being increasingly affected by the regulation of releases from them.

According to the 2019 Climate Risk Index which analyzes the extent to which the country has been affected by weather-related losses between 1998-2017, Laos ranks 89th with a low level of Risk. However, it should be noted that CRI may not provide an accurate presentation of future risk due to the fact that CRI measures data on past events (which may not always be available depending on the country). So, for example in the case of Laos, a low CRI score does not accurately indicate a low future climate risk. Laos is also ranked 75th with a moderate level of risk according to the INFORM risk index which is a global tool that measures the risk of humanitarian crises and disasters based on 50 indicators that assess hazard, vulnerability, and capacity (resources available to mitigate impacts) (INFORM, 2019).

Disaster risk is an event that is predicted to occur and designed to manage events that are not handled properly. An overview of disaster risk in Indonesia too identified by BNPB in the RBI book (Indonesia Disaster

Risk) with various kinds natural disaster risk assessment throughout the region Indonesia (RisikoBencanaIndonesia, 2015). Disaster risk is expressed as the likelihood of loss of life, injury or destruction and damage from a disaster in a given period of time (UNDRR Global Assessment Report, 2015). The definition of disaster risk reflects the concept of hazardous events and disasters as a result of persistent risk conditions (UNDRR Terminology, 2017).

Between July and September 2018, Laos experienced widespread floods that significantly affected its people and economy. On the night of July 23-24, a breach in the Xe Pien-Xe Nam Noy hydropower saddle dam caused an unprecedented flash flood in Attapeu Province; the result was over five billion cubic meters of water equal to two million Olympic-size swimming pools inundating an estimated 55,000 hectares of land and covering it with mud and sludge (PDNA, 2018). On 24 July, a significant increase in water levels due to the effect of the southwest monsoon, exacerbated by Son-Tinh tropical storm since 18 July, damaged one of seven dams comprising a large hydroelectric network built along the Xe-Pian river. Around 5 billion cubic meters of water were released in the valley, impacting principally six villages within Sanamxay district, Attapeu province: Ban Mai, Ban HinLath, Ban ThaSengchan, Ban Thahintai, Ban Sanong and Ban Nonghin. In these villages, almost the entire population was displaced to temporary shelters and around half of them have lost their homes. (Radio Free Asia, 2018) Villages along the Sekong River in neighboring Cambodia were also impacted and at least 6,000 people had to be evacuated (The Guardian, 2018). An estimated 16,256 people are affected by the floods in Attapeu province (representing around 10% of the total population) (ASEAN, 2018) At least 26 people



were killed while more than 130 others are still missing.

Figure 1. Map of Attapeu province and Xe-Pien Xe-Namnoy Dam Project
Sources: <https://www.voanews.com>

II. LITERATURE REVIEW

1. Role Theory

Role Theory emphasizes the individual's nature as a social actor who studies behavior according to the position he occupies in the work environment and society. Role Theory attempts to explain interactions between individuals within organizations, focusing on the roles they play (Kahn et.al, 1964).

The roles one plays in life are ubiquitous. Roles such as spouse, parent, charity volunteer, engineering professional, and manager fulfill important functions within one's family, community, and work lives. These roles also provide the individual with a sense of who one is and who one is becoming. Within organizations, everyone becomes, at one time or another, an employee, a subordinate, a manager, a department member, a customer, a supplier, a project team member, and the like. These roles are enacted or played either separately (e.g., giving a performance evaluation as a manager in the morning and receiving a performance evaluation as a

subordinate in the afternoon) or simultaneously (e.g., being a member of a product development team representing one's department of which one is manager). It seems as though individuals, as well as organizations, can not function without roles wherein structured interdependencies organize and create a network of intertwining tasks and responsibilities (Ashforth, 2001; Biddle, 1986; Katz & Kahn, 1978; Stryker & Burke, 2000). Roles, as such, become the nexus for how work is designed, communicated, accomplished, evaluated, and experienced (e.g., Welbourne, Johnson, & Erez, 1998).

2. Mitigation

The act of mitigating something or the state of being mitigated : the process or result of making something less severe, dangerous, painful, harsh, or damaging mitigation of suffering mitigation of punishment. There was, in sum, a period during the Cold War ... when a mitigation of the Cold War, including a renegotiation of some of its most troublesome tensions, was possible or even probable (<https://www.merriam-webster.com>).

Mitigation is all efforts and activities carried out to reduce and minimize the consequences caused by disasters, which include preparedness and preparation of physical readiness, vigilance, and ability to mobilize (Depdagri, 2003). Mitigation is actions to reduce or minimize the impact of a disaster on society (DKP, 2004). Mitigation is efforts or activities aimed at reducing the impact of natural or man-made disasters on the nation or society (Carter, 1991).

2.1 Non-Structural Mitigation

Non-Structural Measures (NSMs) can be considered as a set of mitigation and/or adaptation measures that do not make use of traditional structural flood defense measures. They reduce damage without influencing the current of the flood event (<http://daad.wb.tu-harburg.de>).

Non-structural measures are particularly important for the HKH region for several reasons:

- The high cost and short lifetime of structural measures
- Lack of capacity to build and operate structural measures
- Low involvement of local community, lack of feeling of ownership
- Other environmental impacts of structural measures

Non-structural measures tend to be more sustainable because they include the active involvement of the community. National and regional policy should favour non-structural alternatives due to their low cost and reduced number environmental side effects, and implement structural measures only as a last resort (Shrestha, 2008).

Non-structural mitigation is an effort to reduce the impact of disasters through policies and regulations. For example, the DM Law or the Disaster Management Law, making city spatial plans, or other activities that are useful for strengthening the capacity of citizens (<https://www.gramedia.com>).

2.2 Structural Mitigation

The first approach to mitigating flash floods is to reduce the likelihood of occurrence of landslides and debris flows, and thus the creation of landslide dams. This means taking measures to reduce the likelihood of slope failure. Slope failure mitigation measures can be divided into three categories: control, restraint, and other.

Structural measures are any physical construction to reduce or avoid possible impacts of hazards, or the application of engineering techniques or technology to achieve hazard resistance and resilience in structures or systems. Common structural measures for disaster risk reduction include dams, flood levies, ocean wave barriers, earthquake-resistant construction and evacuation shelters (<https://www.undrr.org>).

Structural Mitigation is the physical changes or act of protection from disasters or hazards. For example, structural mitigation would be when a family reinforces their home to make it more wind proof, or earthquake proof. In addition, other structural mitigation examples would be things like creating a sandbag

barrier around the home when a flood might occur. In general structural mitigation is the direct actions that people take, build, or move in order to better preserve their life and or property(Reed, 2015).

3. Community Based Disaster Risk Reduction

Community-based disaster risk reduction is a series of efforts to reduce disaster risk carried out in the face of disaster threats and or the application of physical and non-physical efforts carried out by community members in an actively participatory and organized manner (Direktorat Jenderal Cipta Karya, 2013). Community-Based Disaster Risk Reduction is a working perspective and methodology on disaster management that involves and is based on community communities (Indonesian Constitution No.24 2007)

Community-Based Disaster Risk Reduction is a disaster risk management process that actively involves at-risk communities to assess, analyze, manage, monitor and evaluate disaster risks in order to reduce their vulnerabilities and increase their capacity (Haghebaert, 2012).

III. RESEARCH METHODS

Data research conducted by researchers is using primary and secondary data. Primary data was obtained through interviews conducted from various sources and previous research from various journals as well as secondary data obtained through various websites and agency documents related to the flashfloods disaster (Sugiyono, 2017). This study focuses on the role of the Laos national disaster management committee in reducing the risk of flash floods caused the Xe-Pian Xe-Namnoy river. The research method used in this study applies a descriptive analysis qualitative research method, which means that after the researcher has obtained primary and secondary data from various sources, the researcher then describes the data so that it can form a written text can be analyzed.

IV. RESULT AND DISCUSSION

The 2018 saddle dam collapse of the Xe-Pian Xe-Namnoy hydroelectric project attracted widespread attention due to the lack of regulatory and compliance oversight in hydroelectric projects, increasing safety threats and risks to local communities. The tragedy highlights the way in which the risks inherent in a lack of protection are externalized to already vulnerable communities. Villagers who lost property and were displaced have not received compensation and remain in difficult and uncertain conditions, in some cases not having adequate access to food, water, health care and other basic needs. In addition to these highly visible events, issues around regulatory oversight and compliance are widely seen through substandard AMDALs, and the lack of environmental monitoring and oversight in project construction and operations.

Spanning parts of Champasak and Attapeu provinces in southern Laos, the 410-megawatt Xe Pian-Xe Namnoy hydropower project is a massive transbasin water diversion complex under construction on the Xe Pian and Xe Namnoy watersheds in the Xekong River basin. The project consists of three main dams and a large storage reservoir on the Xe Namnoy River enclosed by five auxiliary (or “saddle”) dams, which are used to reinforce the boundaries of the reservoir. The reservoir is 73 meters high and 1,600 meters long, with capacity to store 1,043 million cubic meters of water. The project also includes underground tunnels and waterways, including a 16kilometer tunnel to discharge water into the transboundary Xekong River, which flows from Laos into Cambodia (www.power-technology.com).

When saddle dam D collapsed in July 2018, work on the Xe Pian-Xe Namnoy project was approximately 90% complete. Despite ongoing safety concerns and lack of accountability for the devastation wrought by the collapse, construction resumed a short time later. The project is expected to be operational in late 2019 (Kungsri Securities, 2018).

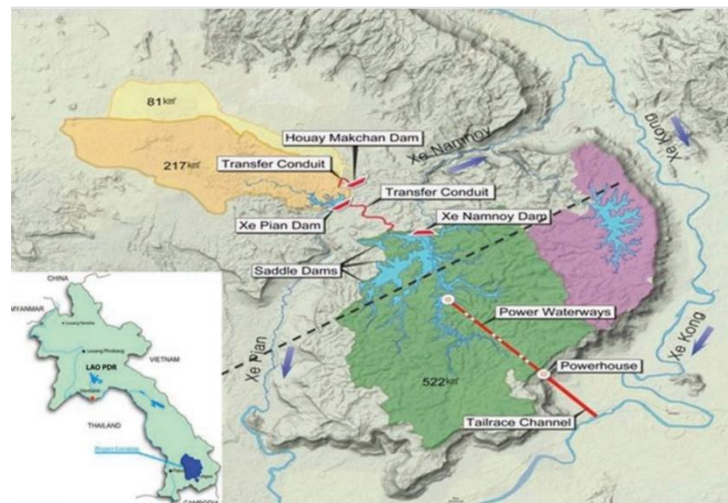


Figure2. Xe Pian-Xe Namnoy and Hydropower in Laos Map
Source: HydroWorld, Xe Pian-Xe Namnoy Project Update (2015)

The remaining 30%, or roughly USD306 million, is being provided by the project's four developers, each of which has taken an equity stake in a Laos-registered joint venture. That joint venture, Xe Pian-Xe Namnoy Power Company Ltd., is building and will operate the dam. The four consortium members that hold equity stakes in the project are:

- SK Engineering & Construction, with a 26% stake, is a subsidiary of the large multinational Korean conglomerate SK Group. The consortium members selected SK Engineering & Construction to be the project's engineering, procurement and construction (EPC) contractor, which means it is in charge of designing and building the dam, for which it will receive a substantial fee.
- Korea Western Electric Power Co., with a 25% stake, is a subsidiary of Korea's publicly listed national electricity utility, Korea Electric Power Corporation. The consortium members selected Korea Western Electric Power to be the project's operations and maintenance contractor, which means it is responsible for running the dam when it becomes operational.
- Ratchaburi Electricity Generating Holding Public Company, with a 25% stake, is a publicly traded Thai corporation. Ratchaburi is also the project's construction supervisor, making it responsible for oversight of SK Engineering & Construction's EPC work.
- Lao Holding State Enterprise, with a 24% stake, is fully owned by the Lao government. The company operates as a holding company through which the Lao government buys equity stakes in privately developed infrastructure projects. Lao State Holding Enterprise also acts as the dam's administrative supervisor (Inclusive Development International and International Rivers, 2019).

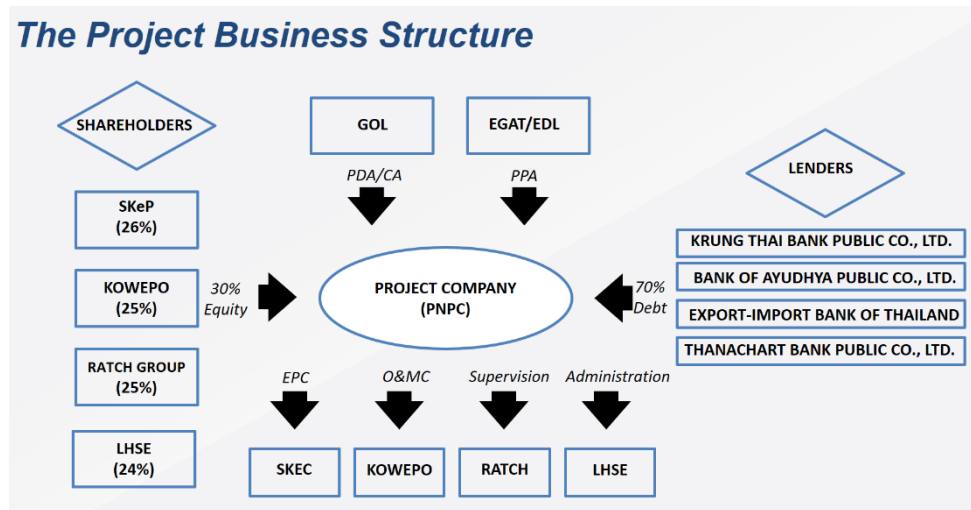


Figure 3. The Project Business Structure
 Source: <http://www.pnpclaos.com>

Non-structural measures can be grouped into two categories: risk acceptance and risk reduction measures:

a. Risk Acceptance

Acceptable risk is the level of loss a society or community considers acceptable given existing social, economic, political, cultural, technical, and environmental conditions (UN/ISDR terminology). Risk acceptance implies that the government or community accepts a degree of human and material loss due to a flash flood that could impact the area in the short-, medium-, and long-term. There are mainly three types of risk acceptance strategies: toleration, emergency response system, and insurance.

- Toleration

Toleration of risk implies that a competent authority (local, regional, or national) accepts that flash floods occur. Generally, proactive initiatives will not be carried out other than, perhaps, a risk analysis. In this case, it is very likely that the competent authority will accept the results of the risk assessment and not promote any complementary activities. Although risk analysis is gradually gaining ground with competent authority routines, it still needs to become common practice.

- Emergency Response Systems

The use of emergency response systems implies that the local, regional, or national competent authority is aware that their area of jurisdiction is prone to flash floods. Risk assessment and modelling, coupled with mapping, is probably carried out, but flash floods will mainly be dealt with via the elaboration of emergency plans and using already existing structures. All emergency plans (regional, district, local) should be based on a national emergency plan in order to carry out the same doctrine of civil protection emergency operations within a particular country in a concerted manner. In general, the various public authorities taking part in the emergency plan will play roles related to their day-to-day responsibilities. They must prepare themselves according to the mission statement established in the emergency plan. To achieve this, each competent authority (regional, district, local) must have its own emergency plan, accompanied by an operations manual. Furthermore, each collaborative unit (police, fire brigade, hospital, and so on) should also have its own emergency plan and operations manual.

- Insurance

Insurance against flash flood damage should be an integral part of risk acceptance. However, many countries in the HKH region still do not use flood insurance due to its high cost. Existing solutions to flood coverage are quite diverse, mainly due to the technical difficulties involved in providing insurance cover against flooding, differing views on the role of the state in managing flood risk, and last but not least, diverging perceptions of the dangers posed by flooding. The solutions in place range from unrestricted private insurance coverage to state aid for flood victims.

One way that the Laos government does in non-structural mitigation is by accepting the risks that occur with the flash floods that occurred in Attapeu province. The method taken is in the form of tolerance with the impact of disasters that have already been carried out by moving people in areas affected by flash floods to safer places. Each stakeholder responsible for this disaster carries out his responsibilities by assisting the Laos government in making temporary shelters and building new houses that will be inhabited by affected communities. Another way to accept this risk is by providing insurance to the affected community. in the form of food, clean water, shelter and other means for the survival of the affected community

b. Risk Reduction

Success in managing flood areas depends on selecting suitable measures based on flood characteristics, physical and morphological characteristics of flood areas, economic and social conditions, political and environmental conditioning, or floodcontrol works planning. Structural measures cannot reach these objectives if they are used alone; non-structural measures such as land use control and planning can be tools not only to reduce flood risk, but also to develop a sustainable approach to flood management. Risk reduction is one of the main goals in flash flood management. It can be dealt with in two ways: prevention strategies and mitigation strategies. The following section describes different approaches, tools, and activities for flash flood risk reduction.

To prevent what happened from happening again, the government made several agreements with stakeholders who are responsible for rebuilding damaged dams. one of the promised requirements is to make a dam that is stronger than before and must follow the operational standards that are applied. in order to reduce the risk of the possibility of a damaged dam occurring again which can result in losses and reoccurrence of casualties.

The failure by companies and government officials to respond to disasters in a timely manner, despite having information about threats prior to a collapse, raises further questions regarding oversight and compliance. The Environmental and Social Impact Assessment of the project and Prefabricated Housing for survivors of the dam collapse mitigation plan, carried out by Lao Consulting Group for Xe Pian-Xe Namnoy Power Company, showed that areas downstream of the project (this was identified in Laos, but excluding Cambodia) is considered vulnerable to flooding due to the project. The impact assessment suggested that the Xe Pian-Xe Namnoy Power Company should take responsibility for developing and implementing a warning system with a response plan agreed upon by the affected communities. Such systems do not appear to have been developed or implemented effectively. Construction of the Xe Pian-Xe Namnoy project continues. Several other dams continue to be built upstream and downstream of Xe Pian-Xe Namnoy. The survivors of the collapse, and communities living downstream of other hydroelectric projects, continue to express serious concerns and fears for their safety after the disaster. The legitimacy of these concerns is evident given the lack of accountability for the collapse. After the disaster, the media reported on donations and commitments of support for disaster relief and humanitarian response efforts. However, while the displaced villagers benefited from some of these gifts, other donations disappeared or appeared to have been taken to benefit others than the survivors of the dam collapse. The Lao military and authorities maintain a high level of control and oversight over the relief effort by UN agencies, the World Bank, the Asian Development Bank and other international aid agencies. Given the current state of the survivor community, it appears that some of the core principles of the United Nations

Interagency Guidelines for Post-Disaster Assistance, which stipulate adherence to a rights-based approach for all UN-affiliated entities involved in post-disaster assistance, have not been met. In particular, this includes principles related to the restoration of ownership and property and the planning and implementation of housing programs that meet the criteria for accessibility, affordability, habitability, security of tenure, cultural adequacy, site suitability and access to essential services(<http://pnpc Laos.com>).

Generally, households prepare for flash flood individually, taking care of everything from storing food, getting bedding, and finding easy roads and shelter during a flood. This results in maximum losses during flooding as individual households cannot carry out all the necessary preparations effectively. The participatory approach ensures that activities are coordinated with others and that there is a division of responsibilities; so that people are better prepared to avoid disasters. Community flash flood risk management committee. local institutional arrangements to increase the capacity of households and communities to withstand the damaging effects of natural hazards. Forming an organized committee brings the entire community under the umbrella and makes other stakeholders aware of available resources and ways to protect themselves from flood risk. The process of working and achieving something together can strengthen a community. It strengthens local organizations; increase confidence, skills and capacity to work together.

Communities should be part of risk identification, prioritization, plan formulation, implementation, monitoring, and evaluation (ADPC et al., 2004). People should be involved in all aspects of riskmanagement process, starting with assessment. Community-based risk assessments can be carried out using a participatory rural assessment tool (PRA), which can gather the information needed to assess community risk. Community risk assessment enables all community members to participate, and to identify the flood hazards they face and understand them. Assessments provide them with the information they need to enable them to participate in decision making. Risk mapping can be a community project that encourages participation and awareness. This is an exercise that not only produces a risk map that is understood by the participants, but also informs them of potential hazards, vulnerability of risk elements, and potential exposures. Figure 7 shows the conceptual framework for community participation. Community-based risk assessment is a simple method for assessing risk and designing community-level flash flood risk management plans. Has a low level of accuracy because the information collected is subjective and tends to be more qualitative. For example, community members may not remember events accurately, especially those that happened a long time ago. However, despite all the constraints, community resources cannot be underestimated. Participation is key to conducting a successful community-based risk assessment. Community opinions, knowledge and experiences can be utilized by building an active participatory process (Shrestha, et.,al, 2008).

After the incident that occurred in Attapeu province, the Lao government was more focused on building community preparedness in Laos, especially the people affected by the flash floods in Attapeu province. The way to reduce disaster risk is not only to increase the preparedness of the local community, but also to use a community-based disaster risk reduction system that aims to increase the capacity of the local community. with the existence of a community-based disaster risk reduction system, the community can participate in disaster management, especially in Attapeu province.

V. CONCLUSION

The flash flood disaster in Attapeu province resulted in loss of life and property loss. several stakeholders who have responsibility for these events, especially during the emergency response and rehabilitation and reconstruction stages carry out their responsibilities to compensate for losses caused by the negligence of the relevant stakeholders. There are several ways that the Lao government has taken to disaster victims in Attapeu province. In terms of non-structural mitigation, the Lao government ordered all stakeholders to repair damaged dams to become better dams in the future. in terms of structural mitigation, the Laos government, assisted by all relevant stakeholders, moved all victims affected by flash flood to a safer place. not only moving their homes but also providing them with food, clean water and new places to live. With the

victims in the flash flood incident in Attapeu province, the government through the National Disaster Management Committee also provides training to communities affected by flash floods so that people have preparedness in dealing with flash floods. It is also a form of community-based disaster risk reduction that invites the community to participate in the implementation of disaster management by increasing capacity.

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