

Bachelor's thesis

An institutional review of disaster management and its implications into economic inequality in Japan and Nepal

Sylvia Elisabeth Titulaer – 6443788

Abstract:

Economic inequality, the disparity between poor and rich, is a pressing case in the world. Japan and Nepal are two examples of where inequality is present, with both a current Gini index of 0.52 and 0.51 respectively; these are two contrasting countries regarding their economies, yet with similarities as well. One of the similarities that the countries share is that each case is highly prone to natural disasters, of which large disasters have had great economic effects on both cases. As countries that are prone to disasters, appropriate disaster management is necessary to ensure that risks are decreased and that citizens are safeguarded. Disaster management in these two cases is managed by institutions; with both bottom up and top down designs. The thesis aims to develop a connection between institutions that manage natural disasters, and the role of this management in the fluctuation of economic inequality. To assess this connection, the dominance of bottom up and top down designs is reviewed in connection to collective action efforts. Additionally a selection of Ostrom's design principles on common pool resources is applied, revealing that top down dominant collective action measures are the most effective in disaster management, but do not always directly influence economic inequality. Bottom up institutions can be fairly effective in disaster management, but lack power to influence economic inequality drastically. Further research can develop more distinct links between economic inequality and governmental response in particular.

Final version: 11,641 words

18 June 2021



Utrecht University

Major supervisor: Merve Burnazoglu, PhD

Minor supervisor: Dr. Frank Sterkenburgh

Table of Contents

1. <i>Introduction</i>	3
2. <i>Theoretical framework</i>	6
3. <i>State of the art</i>	11
3.1 Case studies: Japan’s history	12
3.2 Case studies: Nepal’s history.....	13
3.3 Economic status compared	14
3.4 Justification of the cases	17
4 <i>Methods and research design</i>	18
5 <i>Analysis</i>	19
5.1 Nepal.....	20
5.1.1 Institutional response and historical embedding.....	20
5.1.2 Disaster analysis and design principles	21
5.2 Japan	27
5.2.1 Institutional response and historical embedding.....	27
5.2.2 Disaster analysis and design principles	29
6 <i>Conclusion</i>	33
7. <i>Literature</i>	35

1. Introduction

Natural disasters are phenomena that cover a broad span of concepts, areas and time, as they occur all over the world and take different shapes. One problem about natural disasters, if we use David Alexanders' (2018) definition, is the effect of a natural disaster on the economic system; one event can cause bulk amounts of damage to a system. This definition of a natural disaster illustrates that humans have made a direct link with such a natural phenomenon and the influence of humans on nature and nature on humans therefore is reciprocal, depending on the type of disaster. Humans can live symbiotically or parasitically in relationship with nature, which partly reflects the awareness as well as recognition of humans to disasters. A symbiotic relationship would translate itself in sustainable development and protection against environmental extremes, while a parasitic relationship would be rather exploiting and attempting to reduce hazards as Alexander further illustrates (2018).

This relationship is important to distinguish, as it plays a role in the response and especially the prevention of hazardous natural phenomena. The reaction of institutions is important here. Institutional response and prevention mainly decide whether there is a symbiotic or a parasitic relationship with the earth. The effect on a nation's residents also comes into play. In some cases, such as the Nepalese earthquake of 2015 or the 2011 earthquake and tsunami in Japan, many citizens are affected, leaving the poorest with nothing (Rayamajhee and Bohara 2021). Nepal already is ranked 4th of the world's poorest countries, thus a disaster may be devastating for the nation (The World Bank 2021c). Japan has more economic stability (The World Bank 2021c), but also suffered greatly from the effects of the disaster. Disaster management by institutions may play a crucial role in the reaction to such disasters.

To get to the root of it: various reasons for the occurrence of natural disasters may be found, such as earthquakes near hotspots or fault lines, which are breaking points in the earth's crust, volcanic regions, tropical storms due to its latitudinal position and many more that fall under the category. They can occur anywhere, and not all of them can be foreseen. High risk regions are regions with an enhanced chance of being affected by a natural disaster and therefore require a more extensive risk management plan. The economy and therefore also the state of economic inequality in high-risk regions differs, and the institutional response and background of the country as well. A contrast in economic inequality levels exists within these countries, yet each has a high risk of disaster

(World Bank 2021). Comparing these cases can give insight in the economic effects of natural disasters and whether these effects depend on the prosperity of the country. Literature shows that currently, these countries all deal differently with the disasters that they face. Even though one might suggest that a welfare state as Japan would be well adapted to disasters, the 2011 earthquake has shown flaws in their socio-political system (Cho 2014; Umeda 2013). The role of institutions, which specifically are organizations founded for a religious, educational, professional, or social purpose, shows how well a country can adapt to the damage of a disaster (Cho 2014).

Institutions, and institutional actions are not limited to governmental response or prevention. Multiple other actors can play a role in the recovery of an area, and it does not solely happen from a top down perspective, meaning from a level that overarches the population. This introduction brings forward the applied research question of the thesis: does such a top down perspective dominate the recovery of an area or is that fuelled by bottom up initiatives and what is the effect of this dominance on economic inequality levels in a country? Grass root organizations may play an increasing role in the tackling of problems that exist from disasters; therefore, a set of actors need to be recognized. The thesis will shed light on institutional, thus top down response and prevention as well as citizen or grass root response and prevention from a bottom up approach. Non-governmental organizations, henceforth NGO's, are institutions where the design depends on the nature of the organization. Grassroots thus are bottom up NGO's, but multinational NGO's such as Oxfam, and ALNAP are considered top down as they are operating from an umbrella perspective.

The assessment of specifically the nations of Japan and Nepal derived from a short research into the economic circumstances of both countries. The economic indicators of inequality will be further developed in the state of the art. Also the geological situation of the countries, which will be elucidated in section 3 of the thesis, accounted for the assessment of these cases in the thesis. Both located in Asia with deviating characteristics, the countries have a similar risk level of natural disasters. Their economic status differs greatly on the other hand. Past studies have shown that a sequence of law developments have resulted in adequate adaptations into Japan's disaster management (Umeda 2018), while simultaneously the most recent large-impact disaster in Nepal has resulted in a broad "lessons learned" report as the Nepali recovery appears to conquer a rockier road (Sanderson & Ramalingam 2015). Although inequality numbers are similar in both countries,

Japan's overall economy has experienced more prosperity than the Nepali economy (World Bank 2020). The actors at play in each country when it comes to disaster management as well as disaster risk reduction, are similar, yet they conduct different tasks based on the countries needs and preparedness, showing that the bureaucratic approach in Japan is relatively effective, whereas Nepal needs more pro-activity in their disaster preparedness (Sanderson and Ramalingam 2015).

The sequence of disasters in the past have been not only pillars of testing the response and prevention measures, but more so moments in time where disaster management strategies could be revised (Cho 2014). Previous research illustrates that governments approaches to disasters has nuanced over the years, and the increasing amount of aid service by non-governmental organisations has also increased, but centres around the nations in more need (Paudel & Ryu 2018). Existing research focuses primarily on pre- and post-disaster recovery and resilience (Cho 2014) yet does not zoom into the particular institutional efforts that is compared in a situation where two countries with an equal amount of risk and different economic status follow different recovery paths. This thesis will therefore aim to shed light on a comparison from a new perspective, where existing research is merged to formulate new conclusions.

Furthermore, natural disasters are unpredictable and will proceed to occur, therefore it can be fruitful in academics to see the relationship between institutional response on disasters and what factors, if any, are ground-breaking in the reduction of economic inequality. This illustrates what makes the thesis unique. A comparative analysis of Japan and Nepal based on existing literary research makes for a refreshing approach where disaster management, the role of institutions and economic inequality intertwine.

The thesis will consist of a theoretical framework that is applied in the analysis to clarify why certain actions occur and others do not. To amplify this premise: the theories form a basis to understand wherefore each disaster management is tackled in the way it is at this moment in time, as well as the connection to economic inequality.

In this research three key concepts comprise the thesis; these are economic inequality, institutions and natural disasters as mapped in figure 1. To assess this field of inequality the discipline of economics is an evident tool to develop an analysis that will shed light on its circumstances. Economics is in fact intrinsically embedded in all concepts; economic inequality is derived from economic incentives, but also the formation of many institutions comes from economic incentives

(Bowles et al. 2018). Apart from incentives, governmental institutions especially have a large influence on the economy and therefore economic inequality as subordinate of the economy. To assess these concepts in relation to natural disasters, which can result in economic losses, an overview needs to be created that assesses past developments. Such an overview can also create an understanding of the decisions in disaster management and institutional interplay. Both individually and in relation to each other, economics and history form the key of finding connections between the concepts as well as events that are a consequence of the other, this will be perfectly combined in the analysis of the design principles by Elinor Ostrom (2015c) which will be elaborated on in the theoretical framework. As this study conveys an interdisciplinary approach, evidently, as two disciplines are assessed, it follows the lines of an interdisciplinary method, by Menken and Keestra. This will be furtherly expounded in the method section. The use of interdisciplinarity primarily entails that this research question cannot simply be answered by means of one of the disciplines only. Therefore, the disciplines are interchangeably assessed to create an understanding of institutional response, economic inequality and natural disaster response.

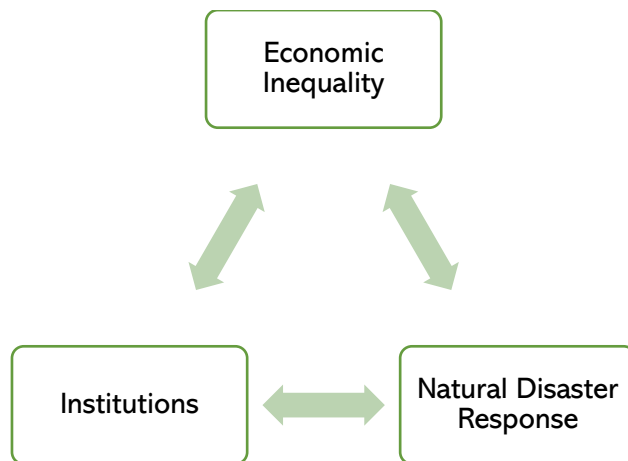


Figure 1: The three factors that will be assessed in this thesis and of which the connection will be investigated. This will be done for both Nepal and Japan.

2. Theoretical framework

The problematization of the thesis concerns the different methods and approaches of institutions that may affect economic inequality. This section will provide argumentation for theoretical grounding that supports the analysis of the thesis. The theoretical framework will cover collective action theory, the design principles of Ostrom based on common pool resources and bottom up and

top down institutional approaches. Each will be thoroughly clarified, moreover a motivation is given for the use of these theories as they serve as a foundation for the analysis.

The emergence of economic inequality can be perceived on different levels. This thesis will follow the assumption that economic inequality exists, and it will take a conflict theory approach to emphasize that economic inequality is perceived as problematic and results in unequal opportunities for residents of the country that experiences economic inequality (Strasser 1980). This emphasis also serves as an explanation for a conflict theory approach. In these cases, economic inequality mainly focuses on centre-periphery in the country itself. This implicates that in the non-rural areas the income is appallingly higher than in the rural areas. The goal of disaster management is primarily focused on the aid of citizens and recovery of the area. As will be further discussed in the analysis, the level of severity is heightened because poor households are unable to restore or recover as they do not possess insurance, or a form of savings (Tselios and Tompkins 2019).

Van Bavel and Scheffer (2021) as well as Yamamura (2015) argue that inequality may increase in case of disaster management. An example that comes back in both researches, is the occurrence of floods. In the occurrence of floods, there is a likeliness that inequality is shocks catalyse inequality as a result of pre-existing inequalities in the present area of research. This notion will be assessed in the analysis.

Additionally, collective action and collective benefits are central in this research, as they influence the level of recovery and the speed of recovery in events of natural disasters. Mancur Olson (1965) developed the accepted view that groups tend to act in support of their group interest. This is developed based on rational self-interested group behaviour. If the members of such group acquire a common interest or object and they would all be better off once they choose the collective objective, it would be logical, as well as rational, that they would achieve that objective. The focus here is achieving a collective benefit that individuals face. Within this theory exists the free rider's problem as well; whenever one person cannot be excluded from the benefits that others provide, each person is motivated not to contribute to the joint effort but freeride on the efforts of others. The free rider's problem occurs often in a large group of people, when the actors do not contribute evenly. These implications are comprehensive to understand the principles of collective action. Ultimately, collective action is the main driver of citizen initiatives that arise from a disaster or are

preventive in damage control for disasters (Olson 1965, Ostrom 2015a). In the analysis collective action efforts will be reviewed as they lead to improvement of institutional efforts (Ostrom (2015b).

Another theoretical framework that will be applied consists of the design principles for common pool resources by Elinor Ostrom (2015c). The emergence will be briefly touched upon in this paragraph. Hardin evaluated environmental change in 1968 and discussed two factors that fuelled its emergence, namely the increasing demand for natural resources and environmental services as well as the way humankind has managed to organize themselves; by means of institutional arrangements, that yields the extraction of environmental resources. His view on the core problems of governing commons is contested and seen as too old to be considered appropriate in the current light of governing the commons (Dietz et al. 2003). Effective monitoring of resources and of the use of resources can be verified and understood at relatively low cost, as elaborated by Dietz, Ostrom and Stern. The idea of governing commons, which could be natural extractable resources for common use such as rivers, was brought about by Hardin but applied in depth by Eleanor Ostrom, as collective action, commons governance and their implications merge. The very merging of these cases has resulted in the development of her theory on design principles that would be desirable in governing commons. In this research the design principles from Ostrom will be touched upon and its connection to collective action will be made. For instance initiatives in Nepal serve as an example where collective action is represented well (Rayamajhee and Bohara 2021).

The extensive amount of case studies that have been examined in Ostrom's work, give a representation of what could be effective solutions and what not. These principles will be referred to as successful in the analysis of the cases in this thesis. A governance system is viewed as successful once it has been in operation for several generations, rules are obeyed, and the people contribute towards maintenance of commons. These criteria are the foundation for the eight design principles that make a community more successful (Ostrom 2015b; Ostrom 2015c) and are developed on the basis of regulating environmental resources.

Such environmental resources, in other words, commons, can become scarce after an unanticipated environmental disaster and therefore require adequate governance. Commons are organised by institutions that design regulations to manage them. A brief example is appropriation rights in Japanese mountains that are assigned to established family units in a village, and in Spain the right to irrigation water is based on the parcel of land inherited, purchased or leased, not in relationship

to the attached village (Ostrom 2015c, 89). These examples show a different governance strategy. The connection to the research of the thesis comes into play here. This theory portrays how common pool resources can be effectively governed by institutions to ensure proper recovery of regions that are affected by disasters. The design principles provide conditions that account for the success of institutions in sustaining common pool resources, hence the research analyses the institutional approaches of Nepal and Japan by magnifying a small set of design principles. These will be enlightened in the following paragraph.

The design principles that will be applied in the thesis, consist of collective-choice arrangements (1) , congruence between appropriation and provision rules and local conditions (2), conflict-resolution mechanisms (3) and, lastly, minimal recognition of rights to organize (4) (Ostrom 2015b). All these principles will be applied in a post-disaster atmosphere on governance of common pool resources in affected areas of disasters in Nepal as well as Japan. These principles are highlighted as for each can be made a direct connection to disaster management in relation to institutions. The number in brackets accounts for the design principle if noted in the analysis. The visualization in figure 1 gives a brief overview of the principles in an organized manner.

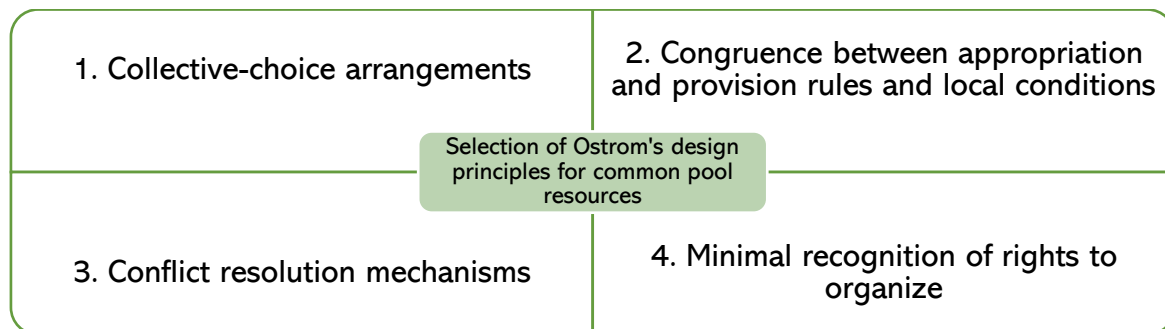


Figure 2: Selection of the design principles for common pool resources by Ostrom (2015b) that have been applied in the thesis.

The principle of collective choice arrangements indicates a bottom up approach (explained further in the theoretical framework) and reflects why the influence of individuals is important to manage common pool resources. This principle will be applied in the analysis of governance of disasters when common pool resources need to be reorganized. Collective actions between top down institutions that serve as appropriators, and individuals, which are, in this thesis, regarded as the citizens in the researched cases, are necessary to maximize effect of arrangements. The analysis will focus on its non-adherence to this principle.

The principle of congruence between appropriation and provision rules and local conditions, holds that appropriation rules are based on the local circumstances and conditions, as it helps to account for the perseverance of these common pool resources. The rules reflect the specific attributes of the particular resource (Ostrom 2015c, 92). As in rural areas in Nepal and Japan, there is still high dependence on commons by the use of farmers and a remaining high percentage in the primary sector (Sanderson and Ramalingam 2015), this principle holds that also in post-disaster conditions, appropriation rules need to be adjusted well to the conditions of the area at that moment. An example would be an earthquake that damages a riverbed in a mountain area. The provision rules need to be adjusted to improve the recovery of the area as well as the redistribution of appropriation by the affected farmers.

The principle of conflict resolution mechanisms focuses on the fact that appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators. There is a risk of conflict in a situation where survival mode is turned on, such as in the situation of a natural disaster. The conflict mechanism contrasts collective action quite well, which highlights the importance of conflict resolution in stressing situations (Ostrom 2015b, 100).

Lastly, the principle of minimal recognition of rights to organize highlights that the rights of appropriators to devise their own institutions are not challenged by external governmental authorities. When a disaster occurs, this principle allows locals to create their own regulations for common pool resources, by obtaining minimal recognition of authorities. For this principle collective action goes hand in hand. This allows grass root institutions to function properly and thus can foster a successful recovery of a devastated area after a disaster. Proper operating of grass roots could improve collective action efforts and maximize the function of this institution.

The use of these principles provides a thorough understanding of the mechanisms of the institutions in the research areas with a direct focus on common pool resources. These emphasized design principles reflect best what institutional effect creates a malfunction in the management of common pool resources, post-disaster, and can be a stepping stone for analysis of economic inequality.

In addition, the core of this research reflects on institutional response. These institutions arise from different backgrounds and may have a longstanding or a rather short history, nevertheless they reflect prevention and response of areas affected by disasters. The bottom up and top down

approach is a key feature that separates these institutions characteristics. A top down design, in an organisational structure, is an hierarchical approach that operates from an overarching organisation. The government thus operates from a top down perspective and is determined by laws. A bottom up view of an institution is emerged spontaneously and is derived from social norms, customs, beliefs and values that represent a society. Laws can be in place, however they represent the attitude of the group of individuals that forms the bottom up institution (Clark 2018). These bottom up institutions could be grassroots, and in this collective action groups from local areas that are affected by the disasters. The dominance of a type of institution, either top down or bottom up, could be a determinant for the development of a country in the circumstances of disasters. Easterly (2008) additionally argues that institutions do not necessarily require a top down approach to become successful. Regarding the nature of the institution and its development, the theory gives a basis for institutional response and the power of institutions. These concepts provide a twofold of an institutional format that gives an answer to what type of format dominates the disaster response of the cases and can be connected to plausible inequality levels.

All above mentioned theories that will be integrated, need historical backing that clarify the socio-economic and political situation of the countries. The political developments in both cases that are necessary to understand the economic developments and developments in the disaster management systems of each country will therefore be enlightened in the analysis as well.

3. State of the art

For each case an overview shall be given on the situation of natural disasters, their economic situation based on a set of economic indicators and how this has resulted in the development of a degree of economic inequality. The economic situation will have a comparative nature. Lastly, an overview is given that justifies the implementation of the two countries into the thesis. The elaboration of institutions per case is highlighted in the analysis of the research.

3.1 Case studies: Japan's history

Japan: island that lies on four tectonic plates and therefore extremely prone to earthquakes, and as a result from earthquakes, also tsunamis, as it is situated in the northwest Pacific Ocean. The 2011 earthquake in Japan signifies the elements that all come into play when a disaster occurs on a grand scale. The 2011 earthquake resulted in a tsunami, a wave accumulation because of an earthquake that can be originated from the sea, and the final domino ensued in a nuclear disaster: the Fukushima power plant was destroyed (Umeda 2018).

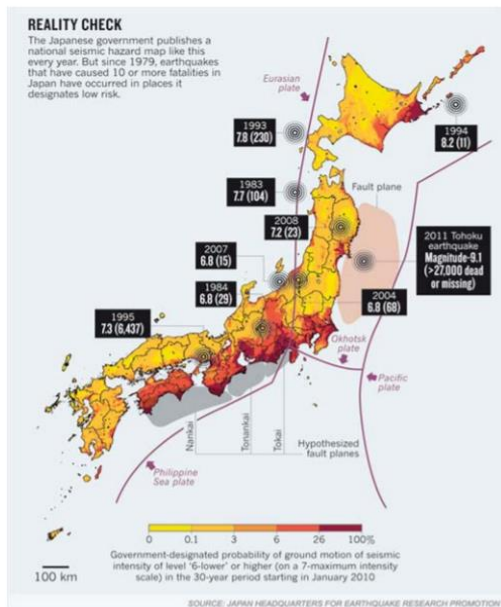


Figure 3: Hazard map of Japan: Probability-of-exceedance for Japan Meteorological Agency 6- in Japan for the 30-year period starting January 2010. This is an update of the 2005 existing JMA 6- maps (Hanks, Beroza, and Toda 2012).

The Japanese government publishes a yearly seismic hazard map, of which the example in figure 3 is shown, including the history of hazardous events since 1984. JMA (Japan Meteorological Agency 6- is an earthquake-damage intensity measure that is associated with fairly strong ground motion that can be damaging to well-built structures and is plausibly devastating to poor constructions (Hanks, Beroza, and Toda 2012). The Japanese government has multiple institutions in place that track the hazardous areas and ensure the development of disaster prevention and reduction (Umeda 2013).

The Japanese government is aware of the hazard that the seismicity and location of Japan brings. Therefore it has developed the Disaster Basic Response Law, which provides guidance in actions that need to be taken after the prevalence of a disaster. After the Great East Japan Earthquake, the

2011 earthquake, the Law was revised again to ensure a more detailed disaster management model. A historical analysis in section 5 of the thesis will show what series of events has led up to the current disaster management model.

3.2 Case studies: Nepal's history

Nepal is situated on the verge of the Himalaya mountain range, which is a natural phenomenon the country shares with its neighbours India, Bhutan and China mainly. In figure 4, the situation is depicted in a map, showing in red the situation of Nepal and the dots represent earthquake measurements in terms of severity. The high density of dots emphasize that Nepal is prone to natural disasters in the form of earthquakes especially.

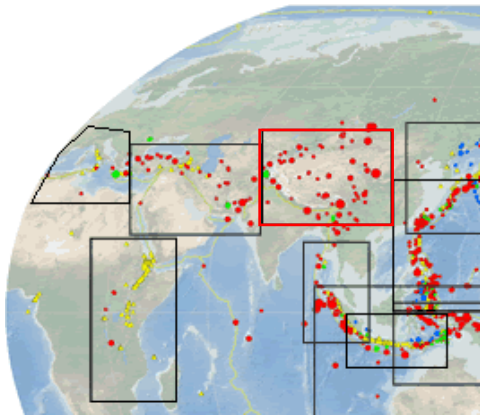


Figure 4: Localisation of Nepal in Seismic perspective. The red dots depict risks of seismic activity. [\(Turner et al. 2013\)](#)

Nepal ranks 4th in terms of climate risk according to the Global Climate Risk Index which assesses the impacts of meteorological events in relation to economic losses and human fatalities and 11th and 30th in terms of earthquake and flood risk respectively(UNDRR 2019; Nepal et al. 2018, 2), indicating the importance of disaster management in the country.

The Himalaya mountain range is the natural border of Nepal and marks the key area which accounts for most of the earthquakes that occur in the region. The disasters that occur the most are earthquakes and landslides. Geologically there is a reason for all these earthquakes to take place still. The Indo-Australian plate continues to be driven horizontally below the Tibetan Plateau, which forces the plateau to move upwards; the plateau is still rising at a rate of approximately 5 mm (0.2 in) per year (UNDRR 2019). Tectonically, Nepal is therefore at high risk of earthquakes.

All these mentioned factors indicate that Nepal's geological situation is prone to disasters occurring. A historical data analysis by Aryal (2012) found that between 1900 and 2005 over

7,400,000 casualties fell, caused by non-earthquake disasters alone. The author concludes that especially in the researched period small-scale and local disasters are of great importance and relevance for disaster prone areas in Nepal, as the large amount of casualties has fallen mostly in local and small-scale disasters. These findings show an important factor; regional disasters have not been taken into account on a grand scale in Nepal by institutions.

In the economic history of the country, the dependency on agriculture clearly shows one of the problems in the Nepali economy. As a region prone to agriculture, and this being a major contributor to the economy, they are prone to economic risk as well, as the risk of floods and earthquakes is present in the areas where agriculture takes place (ibid.). Devastation of agriculture can also influence food availability, which may influence economic damages and fosters economic inequality once solely the rich population is able to purchase food due to its scarcity (ibid.)

3.3 Economic status compared

The Japanese and Nepalese economic status will be evaluated on a comparative basis, thus no particular individual circumstances will be highlighted. Solely the situations per case will be put in a comparative perspective.

Japan has a big free market economy, and has been a steadily growing economy, since the 1960s¹ as shown in figure 5, based on GDP per capita. This indicator portrays the vast difference with Nepal's economy. It must be noted that the growth of the economy of the country in its entirety is not simply portrayed by solely the GDP per capita, yet it does picture the difference in economic power per person, on average, and serves for comparative purposes.

¹ Both Nepal and Japan have been assessed on the longest available period, as the historical analysis on institutions reaches beyond the 1960s and also covers the beginning of the 20th century.

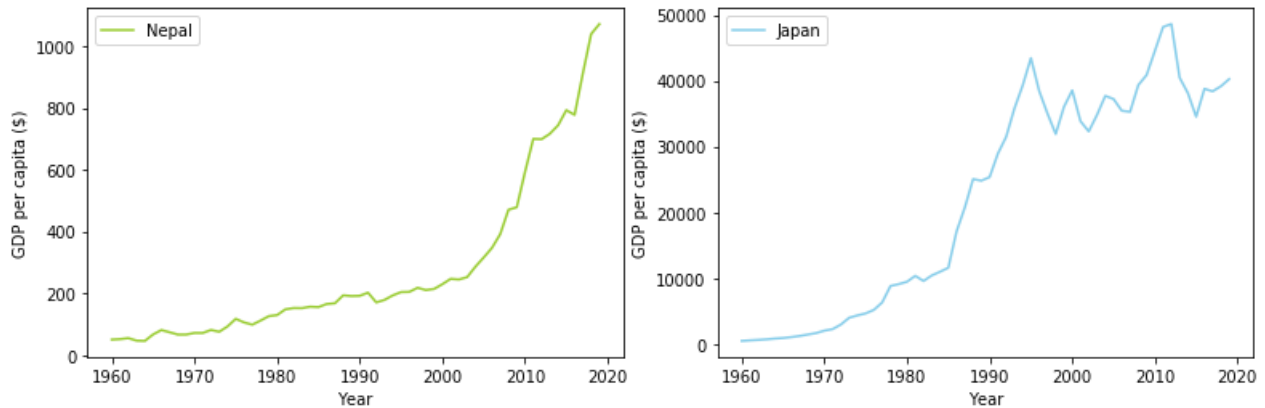


Figure 5: Gross Domestic Product per capita in US Dollars for the countries Nepal and Japan based on current US\$. The y-axes hold a different scale (The World Bank 2020).

The Nepalese GDP per capita has encountered a steep increase in GDP per capita, especially from 2000 until 2019, with a brief stagnation in 2016. The most recent calculated GDP per capita holds 1071.05 current US\$. Although its growth, it amounts to a sheer contrast with the Japanese GDP per capita, which has reached over 40,000 current US\$ in 2019 (The World Bank 2021). While both economies thus have experienced growth on the basis of GDP per capita, the Nepalese GDP has a appallingly lower GDP per capita in general. The y-axes in figure 5 show this difference in amount, per country. Additionally, dependency on agriculture and in Japan only 1.3% of GNP and 27,59% for Nepalese GDP, showing that the secondary and tertiary sectors are not as present as in Japan.

The economic prosperity therefore is low in Nepal. In terms of economic inequality, the countries do not differ substantially. To identify economic inequality in this thesis, two indicators will be used to identify this: the Gini index and income distribution. The Gini index or Gini coefficient qualifies as a measure of the average difference in income between every pair of individuals in the population. If everyone has the same income, so that there is no income inequality, the Gini coefficient takes a value of 0. If a single individual receives all the income, the Gini coefficient takes its maximum value of 1 (Bowles et al. 2017). A larger population also provides a more accurate Gini coefficient. Figure 6 pictures the Gini coefficient in the available period 1980 until 2019, which is the broadest available period, and therefore gives the broadest overview.

Japan's Gini coefficient, has been fluctuating between 1980 and 2020. In 1992, Japan's Gini coefficient dropped, but it slowly rose until 2009. It has barely fluctuated since 2013. The Gini coefficient in Nepal has steeply increased since 1985, but has decreased to a similar height as the

Japanese coefficient. No changes have been recorded since 2016. It appears remarkable that although having a contrasting Gini coefficient in the 1990s, approximately 0.45 for Japan and 0.56 for Nepal, their Gini's have had a similar value since 2014.

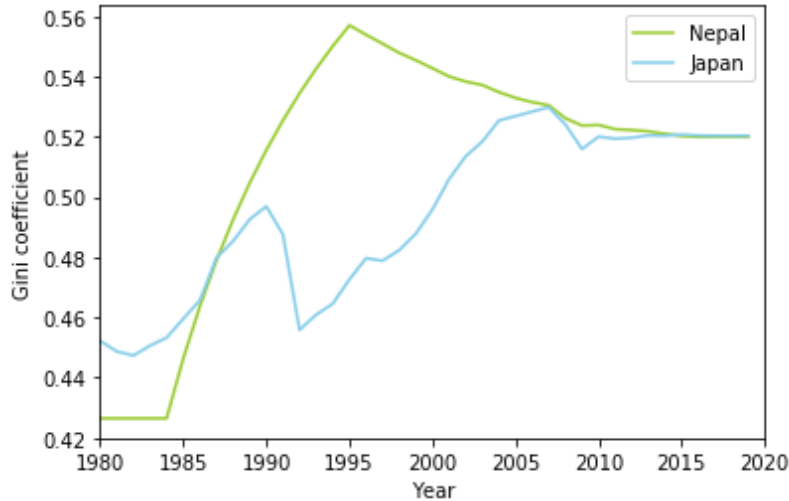


Figure 6: Gini coefficient for Nepal and Japan from the period 1980-2020. Both cases are applied in the same diagram. (The World Bank 2021a)²

The income distribution was assessed based on data retrieved from the World Inequality Database and depicted in figure 7. The figure shows the percentage of the total pre-tax income of the country, and the curves depict the top 10% of the incomes of the cases and their share of thus the total income as well as the bottom 50% of the incomes and their share of the total income. The Nepal curves are depicted in green and Japan curves are depicted in blue. The further the curves deviate from each other the more unequal the income is distributed. The 1995 peak from Nepal shows that its unequal distribution was at a high, and it has been decreasing since. According to Macours (2011), this is an interesting turn of events, as it happened during the civil war in Nepal from 1996 until 2006. Japan has experienced a more unsteady distribution over the years, but it has been constant from 2013 onwards and has generally increased since the 1990s (World Inequality Database 2021b).

² The Nepal data is based on one limited dataset. This may influence the outcomes slightly. The Japan data is based on multiple datasets.

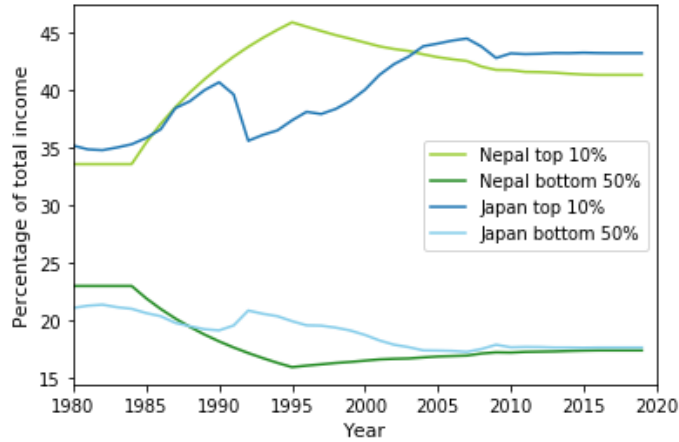


Figure 7: Inequality scale based on the share on the total income in percentage for the top 10% richest and the bottom 50 % poorest of Japan and Nepal respectively. Both are incorporated in the same graph. (World Inequality Database 2021)

Thus, after reviewing the GDP per capita and the two inequality indicators, the current state of affairs shows that inequality is an occurring phenomenon in both Nepal and Japan. In the analysis a historical connection will be made, and the economic indicators will be reviewed further.

3.4 Justification of the cases

The following paragraphs will enlighten the choice for these particular areas and what specific factors drive the interest to compare them. Both Nepal and Japan as illustrated are listed in tectonically active regions, Japan is near to the merge of the Pacific plate whereas Nepal is in the Himalaya region therewith being on the edge of two converging tectonic plates. Nepal borders India, yet the plate boundary is exactly located in the north of India, touching the Nepalese state borders simultaneously. The constant movement of these continental plates while encountering friction, has been frequently resulting in tectonic activity along the plate boundaries. For Japan the same phenomenon holds, it is however the Pacific Plate and Philippine Sea Plate oceanic subduction plates that slide underneath the continental Eurasian Plate and a set of smaller continental plates (Turner et al. 2013). These brief facts into plate tectonics account for an extensive risk of seismicity as well as the emergence of tsunamis, which can be defined as a measure for earthquake occurrences. History has proven that indeed this seismic risk has resulted in the great number of natural disasters occurring in each case (Aryal 2012).

Apart from the natural risk that the countries face in light of disasters, both countries have generally developed differently, economically and socially. Both countries have experienced economic inequality and it has been an issue in both countries up until present day, but the difference in their

overall economy is massive (World Inequality Database 2021). Similar risk regions, with different economic growth: the activity of institutions added to this combination will yield a fruitful research.

4 Methods and research design

The analysis consists of a qualitative meta-analysis of two case studies. The research is based on mainly secondary literature and conducts a comparative analysis. Secondary literature is supported by the use of primary sources that were deemed relevant in the thesis, such as government documents that include laws and regulations.

To assess the inequality levels beforehand, data from accredited data sources were generated. These were retrieved from the World Bank and the World Inequality Database, which combines national accounts and survey data with fiscal data sources. The data for Nepal may give an incomplete overview of the factual circumstances as it is based on solely one dataset, yet it gives an overall indication of the circumstances in the country.

The high risk of the countries is determined by its level of natural disasters that have taken place over the past 20 years. The choice for these cases lies in their geographical nature and their economic circumstances. Each case was distinctively investigated and grounded with literature from international data sources (Google Scholar, WorldCat, etc.).

As economics and history are the main disciplines that have been studied for this thesis, for each discipline according indicators were employed. An economic analysis on inequality rests its focus on the Gini-index and income distribution. For the sake of clarity, *income* inequality, on e.g. personal and household levels, will thus be used as a main indicator for economic inequality. The historical analysis will be based on literature and primary sources that construct an overview of historical events related to the case studies and covers two separate historical timelines. Furthermore, the time frame that is focused on in the analysis, apart from the economic indicators, will range from 1980 up until the most recent data for Nepal and Japan, 2021. The institutional actions that happened before this period will be implemented for the purpose of providing a complete chronology, yet they will not be analysed in depth.

The literature on which the research is based is further evaluated by means of the theoretical framework. Ostrom's design principles and bottom up and top down dominance form the narrative of the institutional evaluation. Additionally, literature and other forms of data will provide for the connection between institutional response and enlarged or decreased economic inequality levels.

Throughout the course of the analysis the Menken & Keestra method of integrating perspectives is used, to integrate the disciplinary findings. A trilogy of integration techniques illustrates the integration methods: add, adjust and connect (Keestra and Menken 2016). Mainly the method "connect" will be integrated in the thesis. The connection will be integrated in the application of the design principles.

This methodology was adopted throughout the course of the research. By means of a qualitative analysis, the integrated research question could be best answered. As the study covers an interdisciplinary field, a methodology for interdisciplinary work is necessary and the Keestra & Menken method fits properly into the area of research.

5 Analysis

This section will cover the results yielded from the literature research as well as an analysed overview of the research. Japan and Nepal are both countries that are prone to disasters and have been experiencing inequality. Therefore, firstly, the level of inequality will be assessed for each case sequentially. The analysis will consist of an institutional review of the countries and the actions taken by the key institutions. These institutions are based on top down and bottom up design: top down perspectives are formed by laws that one adheres to, the bottom up design is an institution emerged from social norms, customs, beliefs and values that represent a society as previously mentioned in section 2. The review is accompanied by a historical analysis of natural disasters in each case where major laws, derived from institutional response, that have been imposed are highlighted. This is mostly focused on the top down perspective. A bottom up perspective subsequently follows by creating a historical overview of bottom up institutions. Based on the institutional response from the two types of institutions, their effectiveness is assessed by means of four of the seven design principles by Elinor Ostrom (2015b) and collective action responses are highlighted in this part as well. The institutional response will then be connected to

the inequality levels and thus supported by the theoretical framework that has been introduced in section 3 and 4 respectively.

Per case, one natural disaster is highlighted to assess a clear case of disaster management. For Nepal this entails the 2015 earthquake with its epicentre in Sindhupalchowk, for Japan this entails the 2011 Great East Japanese Earthquake.

5.1 Nepal

Although Nepal has a rapidly growing economy, 8.1 million people are living in poverty which accounts for almost 30 percent of the entire population, according to literature from humanitarian organization Oxfam (2018). The poverty level has been addressed in section 3, figure 7, where it is guiding for the inequality level. It showed that a vast increase of the top 10% income share peaked in 1995, and has not grown since then. On the basis of this data and its income share, the fact that Nepal's top 10% income share has slowly decreased but remained constant in the past decade and the bottom 50% income share has slowly increased but remained constant in the past decade as well, accounts for little change in the status quo of inequality in the country.

5.1.1 Institutional response and historical embedding

Nepal has been dealing with hurdles over a long time span; armed conflict and disasters happened simultaneously since 1980 and the country is still on the list of Least Developed Countries, although urbanisation is happening as one of the most rapid in its region (Harrowell and Özerdem 2018). Apart from having to deal with disasters, there was also the Nepalese civil war in 2006 that resulted in a heavy toll on impoverished rural communities. Before this, in 2005, political conflicts were highly present and the Maoist group sought to abolish the monarchy as they were dissatisfied with the persisting inequality and eventually managed to cooperate with the King to have political input. The United Nations then also intervened and economically supported Nepal to yield peace efforts. Contrastingly, as a new constitution was implemented in 2015, a bloody political conflict emerged again, which resulted in extreme political instability at the time of the 2015 earthquake that took its toll on the country. As authors Harrowell and Özerdem put it: "These two events, and perhaps even more significantly their aftermaths, have had an immense impact on the political, social and economic landscape of the country" (ibid.) Thus, the country has been facing political and economic instability while having to deal with disaster management at the same time.

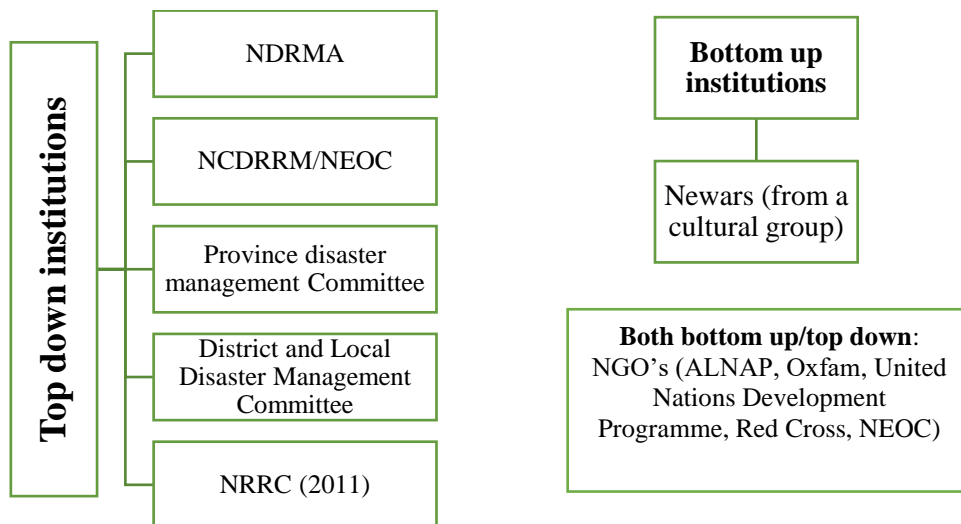


Figure 8: The governmental institutions in the Nepali disaster management, thus the top down institutions and the bottom up institutions in Nepali disaster management. Data from Nepal et al. (2018), (Sanderson and Ramalingam 2015).

Concerning this management, there is a set of top down identified institutions that form the country’s disaster response team. This team consists of the National Council for Disaster Risk Reduction and Management (NCDRRM), the National Disaster Reduction and Management Authority (NDRMA) and the National Emergency Operation Centre, the Province disaster management Committee and the District and Local Disaster Management Committee (Nepal et al. 2018). Each is structured on a different level and thus has a different influence. The most recent addition to this team is the Nepal Risk Reduction Consortium (NRRC) which was set up in 2011, combining government, aid agencies, donors and international financial institutions. As the focus of the Nepalese disaster management concerns past earthquakes that have affected the country, the relevant actors and institutions were established for that matter particularly. The goal of identifying these particular actors is to provide an overview of the governmental institutions and the distribution of management in the country.

5.1.2 Disaster analysis and design principles

Figure 9 depicts a chronological mapping of disaster management laws in Nepal. The distribution of acts is significantly lower than in Japan, where a broad set of actions is set up.

Disasters that triggered law system	Disaster management laws	Explanation
Unclear	1982 Natural Calamity Relief Act	Detailed action plan, clarifies role and division of responsibility, no hazard mitigation and disaster risk management
Unclear	2002/2005/2006 Water Resources Strategy, National Water Plan, Water Induced Disaster Management Policy	Focused plans on different sectors in disaster management
	The Disaster Management Act	
Unclear	2009 National Strategy for Disaster Risk Management	
Unclear	2011 Local Disaster Risk Management Planning Guideline	
	2013 National Strategic Action Plan on Search and Rescue	Implementation of additional factors that need be considered in disaster management
Unclear	2017 Disaster Risk Reduction and Calamities Act	Made provision to effective disaster risk management throughout the disaster management cycle-preparedness, response and rehabilitation and mitigation
Multiple disasters	2015-2030 Sendai Framework	Ensuring disaster risk management stays on the agenda → international agenda

Figure 9: Chronology of natural disasters in Nepal with law implementations based on available literature (ALNAP 2017; Nepal et al.2018)

Nepal's initial response to disasters was on an ad-hoc basis. This meant that disasters were only responded to and anticipated on after they occurred. For the first time, in 1982 the Natural Disaster Relief Act (NDRA) also known as the Natural Calamity Relief Act (NCRA) was formulated which is replaced by currently endorsed Disaster Risk Reduction and Management Act, 2017. Although the Act has been revised plenty of times, no significant disaster loss reduction has taken place (Nepal et al. 2018).

This can be traced back to the poor politics that have been occurring in the country, especially with respect to economic inequality. Nepal has suffered financially due to the foreign exchange crisis

by excessive deficit financing and by means of an economic stabilizer by the IMF, the economic model of the country changed. The value of the Nepali currency dropped significantly and the government had to cut its budgets and implement wide-scale privatization of goods and services. Additionally, the country's agriculture sector has been neglected as subsidy was withdrawn abruptly after the crises, especially in 2008, which has been devastating for this sector (Raj Khanal et al. 2018). As mentioned previously in the thesis, 26% of Nepali economy is dependent on agriculture, which also accounts for the poorest sector in the country. Due to the high susceptibility for disasters, the poorest are also affected the most in natural disasters. They are more likely to suffer death or injury and damage to property as they live on more hazard-exposed areas. They also do not have the economic ability to invest in risk-reducing measures (ibid.). Additionally, there was a severe lack of immediate government response mechanisms according to the same research. These facts show that, thus the top down institutions on a governmental perspective have failed to serve input into proper disaster response.

The Acts that are provided in figure 9 show that there have been developed Acts in place, these are however based on a national perspective only. Nepal et al. (2018) also concludes that there is limited coordination between the national government and regional government, according to response to the Koshi Flood in 2008. The development of the Acts also show that the awareness of necessity has become more present over the years, yet, a full plan that considers the long-term future is solely taken on later. This generally reflects poor coordination between top down institutions in itself.

Additional to the governmental realisations, recovery by households and communities also comes to the surface and is highly differential as disasters do not occur in the same places. The poor reaction from governmental institutions results in a need for collective action from communities, but the very communication and guidance between the government and collective action groups also falls behind (Nepal et al. 2018). The problem of collective action formation occurs when individual interests and social interests are not aligned and the free riders problem occurs in a large group of people or uneven distribution of benefits (Ostrom 2015b). The non-effectivity of governmental actions thus resulted in a collective action problem, specifically in the Sindhupalchowk earthquake of 2015 with the earthquake of 7.8 in magnitude.

Taking the collective action problem under the microscope, there is a connection between collective action and social capital. This concept is defined as a network of relationships among people who live and work in a particular society, enabling that society to function effectively, thus a low social capital means small amount of social relationships. Furthermore, social capital fosters the preconditions of collective actions in three related ways: by establishing norms of compliance and participation, by improving the communication of information and knowledge and by increasing trustworthiness both within and between groups (Panday et al. 2018).

Apart from governmental actions, multiple studies have shown that social capital determines resilience after disasters, which is highly dependent on the regional circumstances (ibid.). This shows that from the bottom-up design, it is essential for effective disaster response that there is enough social capital in the community.

In the Nepalese district of Sindhupalchowk after the earthquake in 2015, the indigenous group called Newars in Kathmandu responded collectively on the basis of the Guthi cultural system, which shows that there was a small reaction of collective action present (Rayamajhee and Bohara 2021). The aftermath of the 2015 Nepal earthquake gives a steppingstone to evaluate disaster recovery and response by institutions in the country. General citizen initiatives and grassroots have emerged in Nepal in that period, as shown in the overview of institutions in figure 8. Yet, studies have also shown that in the 2015 earthquake, especially in remote areas there was a low level of community participation and vulnerable groups were excluded (Lam and Kuipers 2019; De Juan et al. 2020). The same studies also pointed out that the implementation of reconstruction programs was heavily centralized and discouragement of community-level initiatives and participation. These results show that if there was any collective action from community building going on, it appeared solely in non-rural areas such as Kathmandu, and even for these institutions there was poor government support.

Furthermore, ALNAP's disaster report, which focused on what improvements need to be made by Nepali governmental agencies, was extensive and requires the agencies mainly to improve on aid efficiency, effectiveness, which includes logistics, cooperation in general, and much more structure regarding regional focus (Sanderson and Ramalingam 2015). Humanitarian aid provides guidelines in which Nepali government should act: such as anticipation of the tourism sector: it needs to be

mitigated. The advice goes beyond the government as well; humanitarian aid entities are addressed as well. This sector should work closely with national private sector actors at a strategic and operational level to ensure mutual benefits. For example, cash-based assistance to local shops to replenish stocks and start trading again can help kick-start local economies (Sanderson and Ramalingam 2015). Thus, this empirical study shows the low effectiveness of the governmental institutions on improvement of the management that the government should impose. As also international humanitarian aid could work more effectively, locally, it can be concluded that top down institutions in general should thus work more effectively. Although the bottom up approach is visible in the country; for instance the LGCDM (Local Governance & Community Development) derives from a locally organized level, there is still a lack of community support from governmental institutions.

The low level of government support for regional recovery suggests that inequality in remote regions is not mitigated could be supported by Yamamura (2015) as she suggests that there is at least a short term influence on income inequality due to natural disasters. Additionally, inequality may be increased once social capital of the elites, meaning the top 10% or even top 1% share of the income, is dominant. Therefore, top down institutions, such as the government, but also NGO's such as ALNAP could focus on the furthering of use of social capital for the non-elites. Damage and devastation of affected disaster areas increase local level cooperation and cohesion; common threats and challenges supersede pre-existing communal cleavages, yet still, communities depend on their own resilience and often lack social capital to form collective action efforts (Panday et al. 2021). This is an indicator for the need for enhancement of social capital to increase collective action efforts.

Furthermore, within-group ties and between-group ties that already exist as examples of social capital promote post-disaster collective action. Where there is greater mutual trust among members of a homogenous group, there is more collective action (Rayamajhee and Bohara 2021). Post-disaster public policies have failed to account for the fact that the mobilization of such collective action is fostered by social capital based on mutual trust. Policy makers ought to enact measures that take into account an enlargement of trustworthiness on the government's account. Policy makers need to consider the importance of the social-capital formation process and keep the continuation in place rather than implement rules that combat antisocial behaviour (ibid.).

Reviewing the information that is available on previous actions, and therewith applying the design principles, new insights are yielded. The application of the principles will be mainly focused on the most recent large disaster: the 2015 earthquake. The emergence of new laws and regulations is seen as a developmental process, therefore the thesis will assume that the design principles can be similarly applied in earlier disaster cases.

Firstly, the design principle of collective-choice arrangements is applied to the Nepal case. The principle is in this case not fully met, hence, collective choice arrangements for bottom up institutions derived from collective choice arrangements *between* bottom up institutions and top down institutions fail. By the institutional review papers on the organisation of post-disaster management, the governmental institutions structurally fail to provide proper aid for the very poor (Raj Khanal et al. 2018). Moreover, collective action between bottom up institutions such as community groups and top down institutions is limited. The reason for this could lie in the political turmoil that Harrowell and Özerdem (2018) pointed out that preceded around the time of the earthquakes.

The principle of congruence between appropriation and provision rules holds a similar explanation as the previous paragraph for why it is not met. As reconstruction was necessary on a large scale after the earthquakes, and there were great delays in this process, there was a lack of governmental aid to reconstruct the appropriation and provision rules as well. This does not have a direct notable effect on the economic circumstances of the residents.

Principle three, on conflict resolution mechanisms, is a complex matter. As the pace of reconstruction after the 2015 earthquake was not at a high pace, additional to the fact that residents of affected areas felt that their concerns were not adequately addressed, small conflicts arose between residents and the government (Harrowell and Özerdem 2018). These conflicts may on the other hand also have been a resonance of the civil war that was also affecting the country simultaneously. This makes the matter rather complex, therefore no anchored conclusions can be made for this principle.

In addition, in the fourth design principle, the focus lays on minimal recognition of rights to organize. This principle is neither met in the Nepal case. Collective action, as mentioned in section 2, can benefit a large group of people, which is especially the case after natural disasters such as the 2015 earthquake bring large quantities of damage. Similar to the analysis of the previous

principle, the insufficient coordination between government and community-based institutions the government fails to meet the principle of recognition, therewith being a collective action problem. Nepali community groups were dependent on social capital and little active government support was in place in the 2015 earthquake aftermath. Therefore, the principle would solely be met in the case of active government support and mere recognition for local communities.

As none of the design principles were met in the Nepal case with a focus on the 2015 earthquake, some general malfunctions of the disaster management by institutions were brought to light. This is affirmed by a limited development of laws and a non-functioning political environment at the time and aftermath of the 2015 earthquake.

5.2 Japan

Economically, Japan is a prosperous and wealthy country relative to Nepal, although there is still an apparent gap between poor and rich, as shown in section 2. Based on the Gini index and the income distribution, Japan has known fluctuating inequality levels since 1980 (World Inequality Database 2021a; 2021b). The historical analysis will thus focus on the period of 1980 till present day.

5.2.1 Institutional response and historical embedding

Japan is nevertheless a developmental state, economically, see GDP per capita in figure 5, and politically. According to Cho (2014), the 1980s was a period of stagnation in the economy and caused substantial economic and political changes in the country's society. The 1990s appear to be a turning point as inequality levels decreased, the Gini index dropped rapidly, and the income distribution was more even according to figure 6 and 7 in section 3. In this period, the decentralisation of the Japanese government was occurring, which resulted in the thriving of local governments. Additionally, although inequality was already a pressing issue before 1990, the low income populations still voted for the Liberal Democratic Party that substantiated inequality. After 1990 this changed, and they refrained more from voting for conservative parties. This may have had an effect on economic advances in the country, as the LDP started to lose their influence in the country. In the 2000s more clarification between central and local governments was made. Although more power went to the local governments, they suffered financially due to lower tax

transfers, which had an indirect effect on local municipalities. After a turbulent decentralisation process, the LDP regained power, and became the ruling party again (Cho 2014; Gethin 2021).

After the 2011 earthquake, recovery was delayed, even though a constructive set of disaster laws were implemented. The magnitude of the earthquake was poorly anticipated, yet, it also had wept away complete cities and municipalities. The government implemented the principle of “local empowerment”. This principle states that towns should be empowered to preside over reconstruction as they are closer to residents and have a better understanding of local issues.

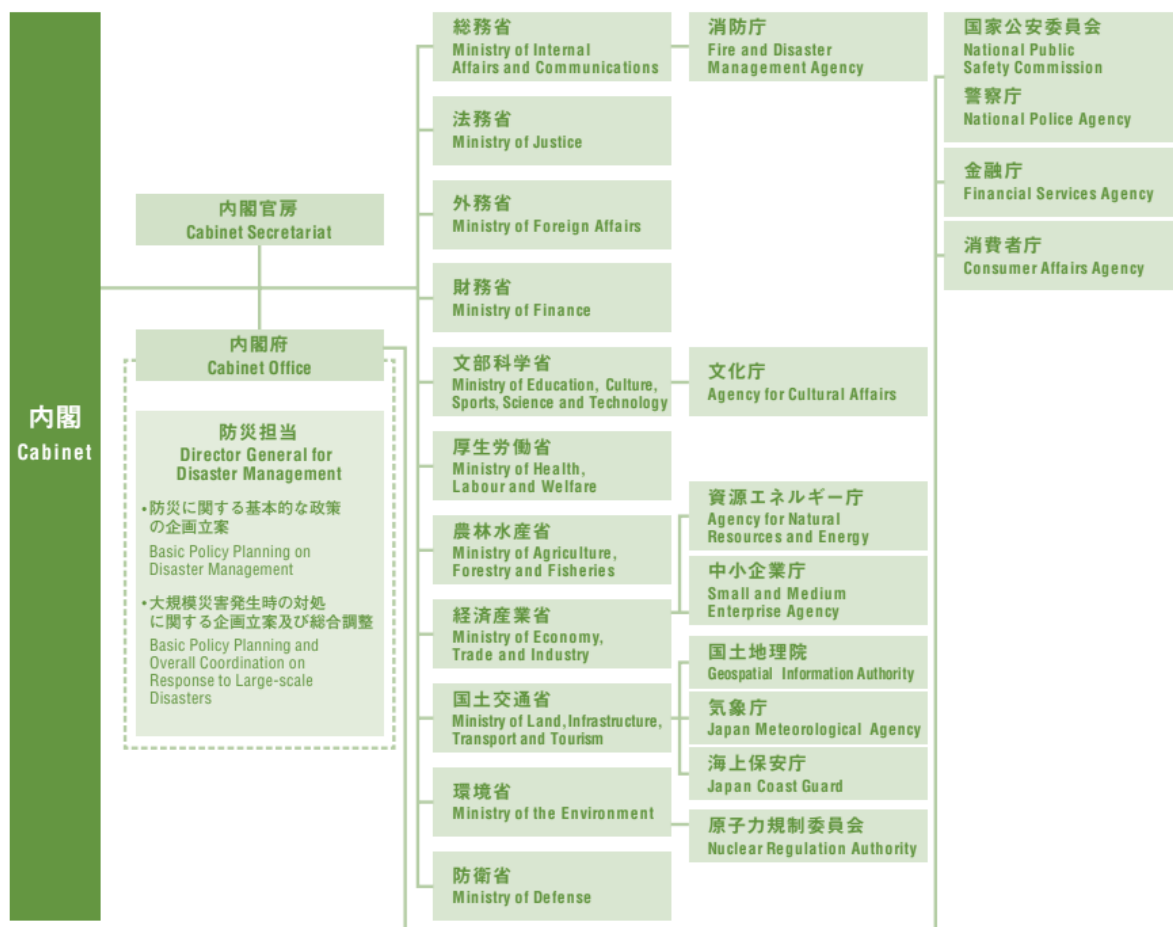


Figure 10: Relevant actors on with a top down design: governmental derived from the Cabinet office of Japan (Cabinet Office, Government of Japan 2015)

Figure 10 indicates the actors that are relevant in the institution of the national government. Eventually the decisions around disaster management are handled in the Cabinet Office.

The magnitude of Japan has also resulted in bottom up institutional organizations as shown in figure 11. The *Jishubo*, an autonomous organization for disaster preparedness was developed to reduce disaster risks in their residential areas (Bajek, Matsuda, and Okada 2008). The 2011 Great East Japan Earthquake was of such great magnitude that communities within affected areas formed bottom up initiatives under the term *Kizuna*, which emphasizes social capital, mutual aid, and community spirit. Although the initiative was supported by the government, it did not persevere, as it only got sufficient victim support due to financial aid focused on privatization. Very small community initiatives were in the end poorly supported, thus they suffered more economic losses (Cho 2014).

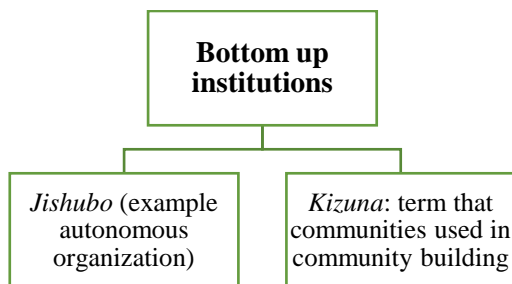


Figure 11: Bottom up institutions that emerged from grand disasters in Japan.

5.2.2 Disaster analysis and design principles

Japan has developed a set of measures that assess natural disaster prevention and response. Disaster management contains multiple branches, Health risk management, food security, financial aid for victims, yet also material damage recovery, debris removal and waste management. The Disaster Response Basic Law, which is the main law that has been amended and developed throughout the years referring to prevention and response section, will be viewed under national level and the municipal and regional as a local level and is the first law that revises all these aspects of disaster management. Next to this Law, financial aid laws were subsequently set up to help victims of the disasters. Households received prefectural aids and were able to obtain a grant with the height of up to a converted US\$ 30,000 per household to rebuild a house (Umeda 2013).

The development of the Disaster Response Basic Law was imposed and amended as a result of a set of disasters that had previously occurred in Japan (Disaster Countermeasures Basic Act 1997). What makes this notable is that severe disasters resulted in amending the Law every time a new disaster took place, therefore it is specified and ameliorated in the past. The Law is an overarching law for the entire state and requires localized disaster plans that are distributed across

regions and municipalities. This is illustrated in figure 12. The arrows depict the follow up to a lower level of management in the disaster distribution. The indication of multiple layers in the organisation of risk reduction, shows that Japan made efforts to reduce the risks in the build up of a disaster as well as ensure a functional regional efforts plan. There is a clear distribution of governmental institutions that are responsible for taking action in disaster control.

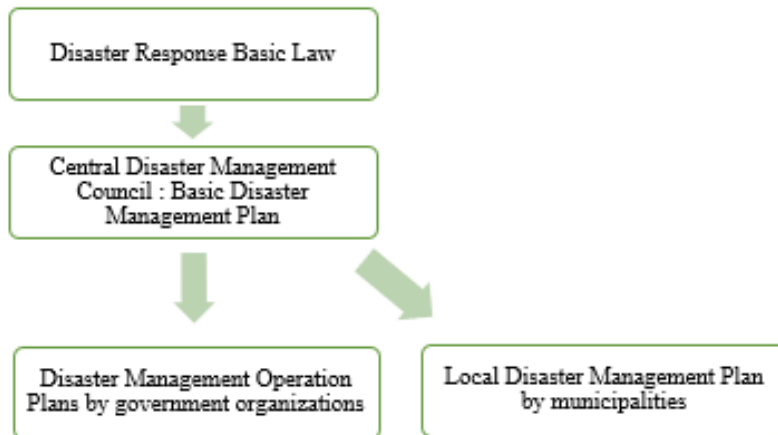


Figure 12: Disaster Management Distribution Japan from a centralized law to local distributions (Umeda 2013).

An additional loan was imposed especially for residents that fall under the category of low-income victims. Often no interest was imposed, and repayment deadlines were extended and subsequently guidance was set up to ensure people were guided in how to stay out of debts in July 2011. Financial aid is provided for families as “condolence money” and other special loans (Umeda 2013, 21). For the 2011 earthquake, it was hard to distinguish survivors, missing people and passed away people. Aid in the 2011 earthquake was thus provided for citizens of all classes and focused on the financial losses of households in particular. The focus is on the localized and affected areas, rather than a centralized disaster management system.

Disasters that triggered law system	Disaster management laws	Explanation
1946 The Nankai Earthquake	1947 The Disaster Relief Act	
1948 The Fukui Earthquake	1950 The Building Standards Act	
1959 Typhoon Vera	1960 Soil Conservation and Flood Control Urgent Measures Act	
1961 Heavy Snowfalls	1961 Disaster Countermeasures Basic Act	Establishment of the fundamental disaster prevention laws: clear assignment of federal responsibilities, development of cumulative and organized disaster prevention structures etc.
1964 The 1964 Niigata Earthquake	1962 Central Disaster Management Council established	
1967 Torrential Rains in Uetsu	1963 Basic Disaster Management Plan	
1973 Mount Sakurajima Eruption	1962 Act on special financial support to deal with extremely severe disasters	
1976 Possible earthquake detection	1980 Multiple Acts on Special Measures	Induction of current earthquake engineering laws
1995 The Southern Hyogo Earthquake	Countermeasures earthquakes, specific Acts for densely populated areas.	Establishment of disaster management mechanisms based on volunteer groups and private organizations, loosening of requirements for the establishment of a Central Disaster Management Council
1999 Torrential Rains in Hiroshima Tokaimura Nuclear Accident	Acts for nuclear disasters	
2000 Torrential Rains in Niigata, Fukushima	Flood control, Special Measures Acts	
2004 Torrential Rains in the Tokai Region & The 2004 Chuetsu Earthquake	Flood Control Act was amended	Expansion of list of designated rivers in expected inundation area, etc., Increased efforts in public education through use of Sediment Disaster Hazard Maps, etc.
The 2011 Tohoku Earthquake and Tsunami	First and second amendment based on The Great East Japanese Earthquake	Multiple extra measures were taken and there was an increased focus on large-scale and widespread

		disasters. Earthquake measurements were also improved.
2014 Heavy Snowfall	Amendment of Disaster Countermeasures Basic Act	
2014 Hiroshima Landslide Disaster	Disaster Countermeasures for Sediment Disaster Prone Areas	Identification of disaster prone areas

Figure 13: Chronology of natural disasters in Japan with corresponding law implementations (Cabinet Office, Government of Japan 2015). The 2011 Earthquake in Tohoku is highlighted

These examples of loans portray the active response of the Japanese government. The extensive information and explanatory nature of the translated documents provide guidance for victims as well as interested parties in how the Japanese disaster system operates on a governmental level.

Umeda (2013) has listed a set of acts and laws that Japan imposed to ensure victims of disasters in the country are aided. Figure 13 summarizes these acts and provides a timeline of the implemented laws, based on previous disaster management systems. A few factors have a vital role in the prevention of damage accumulation and the response to this disaster. Therefore, a distinguishment will be made between the earthquake as such and the earthquakes that resulted in the tsunami (Umeda 2013). Pre-earthquake emergency measures from a governmental perspective have proven to be their strength in this case, and there has been an extensive pre- and post-disaster law system set up.

Additional to the governmental laws, organizations, such as the *Jishubo*, are not legally mandated, however, local governments exercise a great deal of persuasion on the inhabitants of their community to organize and participate in disaster management activities. The interplay between the government and these community based organizations shows that collective action is successfully taken. Both parties are better off by acquiring the common interest that is safeguarding the communities and inhabitants of the country.

Here the connection to the design principle of collective-choice arrangements can be made. By successful arrangements between communities and governmental institutions, the principle is partially met, according to the literature that was assessed for the thesis. This means that in this case for the reviewed timeline of 1980-2021, top down institutions managed to yield a collective-choice arrangement with bottom up institutions, on a community based level. On the other hand, multiple sources also emphasize a more thorough coordination between governmental

organizations, but also non-profit organizations, such as humanitarian institutions is necessary (Bajek et al. 2007; Cho 2014). Cho also mentions that the government should partner with citizens more, rather than issue instructions to them; it wants to increase community building but not financially motivate it. Although there is a recognition and support from local governments, there is also a lack of true cooperation, thus, the principle is partially met.

Additionally, the principle of minimal recognition of rights to organize is met. The government has emphasized on taking action in locally organized disaster response teams such as *Jishubo*, thus in this niche of disaster management, there is effort from local government to foster community initiatives. The accordance with this principle depends per region and can thus differ if there is only zoomed in on a particular area. In this case a national approach is taken based on the reviewed literature, which suggests that there is a level of accordance with the principle.

In both Nepal and Japan, the magnitude of the earthquakes resulted in ad-hoc disaster management, yet the Japanese appeared more prepared from a top down perspective. As many design principles were met, the conclusion can be made, in light of the connection between economic inequality and disaster management (Yamamura 2015), that Japan's institutional approach has not resulted in increased economic inequality. Nepal has suffered more and was already instable at the time of the 2015 earthquake, regarding their historical context. The influence of poor disaster management and its effects on the already poor sector has not reduced the already existing inequality levels.

6 Conclusion

The two largest disasters in the previous decade, the 2015 earthquakes and the 2011 earthquake, that have taken big tolls on Nepal and Japan respectively, formed a base to assess each country's disaster management system, their institutional approaches and the effect of this on inequality levels. Notable is that cooperativeness between top down institutions and bottom up institutions has been failing, therewith resulting in poor activity by local communities. The design principles by Ostrom that were assessed indicated that each country, to a different degree, has been encountering mostly malfunctions between these governmental institutions and collective action with communities. This lack of cooperativeness has proven to be significant for short term inequality enhancement, therefore, failure of governmental actions can be indirect result of fostering economic inequality. This statement does not imply that this connection of concepts holds

for every case. The political and economic implications of Nepal were not helpful for their inequality levels, although the implications for Japan lie more in their political agenda as it wants to increase community activeness but not financially foster it. The principle of conflict resolution mechanisms was not applied in the case of Japan, as it is not clear if any conflicts emerged due to economic inequality as a result of poor disaster management. To develop an analysis for this, more thorough research into conflicts during disasters needs to be performed.

Overall the thesis aimed to shed light on the implications of economic inequality in disaster management by different institutions. After conducting the research, a clear gap emerged. A number of assumptions were made in the writing of this thesis as the course of the research showed that the problem was rather complex. The research takes on a broad perspective on disasters, institutions and economic inequality and had to refocus to a particular case to assess, and make the assumption that the conclusions also fit previous disaster management efforts, although this is not researched in particular throughout the thesis.

During the course of the research more hurdles arose; it is difficult to determine whether a connection between two concepts is significant if there is no statistical analysis that confirms this. Therefore future fruitful research could review correlations between certain data to see if there is also a statistical significance between institutional response to natural disasters and inequality levels. Furthermore, inequality entails more than solely an economic income gap, *social* inequality, which briefly touched the surface in the analysis was also reviewed in the analysis, has a close link to economic inequality as well. Future research could thus also focus on particular fractions that are reviewed in this thesis, such as more in depth historical turning points in natural disaster management, or the assessment of inequality development over the past decade. This notion also serves as a reflection on the research, there was a large topic at hand where multiple questions ought to be answered. The results of the research can thus be given more depth in future research, rather than its shallowness in the current study. Lastly, the broadness of the research made the results also general. There could be more focus on niches in the research as there are interesting developments in both Nepal and Japan.

Nevertheless, the thesis has provided an insight into the history of disaster management in two cases, where a new approach was connected to the assessment of disaster management and economic inequality in particular. Ostrom's design principles have shed light on the economic

(mal)functioning of disaster management based on the approach by the involved institutions, which is a new take on reviewing institutions in combination with disaster management and its economic implications. The assessment of historical relevant studies that provided context for the thesis, give more insight in the motives of certain developments; disaster management in Nepal could have turned out rather different had there not be an optimum of political instability at the same time. The interdisciplinary nature of the thesis signifies its uniqueness and brought renewed perspectives to the surface.

7. Literature

Alexander, David. 2018. *Natural Disasters*. London: Routledge.

Aryal, Komal Raj. 2012. 'The History of Disaster Incidents and Impacts in Nepal 1900–2005'. *International Journal of Disaster Risk Science* 3 (3): 147–54. <https://doi.org/10.1007/s13753-012-0015-1>.

Bajek, Robert, Yoko Matsuda, and Norio Okada. 2008. 'Japan's Jishu-Bosai-Soshiki Community Activities: Analysis of Its Role in Participatory Community Disaster Risk Management'. *Natural Hazards* 44 (2): 281–92. <https://doi.org/10.1007/s11069-007-9107-4>.

Bavel, Bas van, and Marten Scheffer. 2021. 'Historical Effects of Shocks on Inequality: The Great Leveler Revisited'. *Humanities and Social Sciences Communications* 8 (1): 76. <https://doi.org/10.1057/s41599-021-00763-4>.

Bowles, Samuel, Wendy Carlin & Margaret Stevens. 2017. 'Property and Power: Mutual Gains and Conflicts'. In *The CORE Team, The Economy*. Oxford University Press. www.core-econ.org.

Cabinet Office, Government of Japan. 2015. 'Disaster Management in Japan'. http://www.bousai.go.jp/1info/pdf/saigaipanf_e.pdf.

Central Bureau of Statistics Nepal. 2019. 'National Accounts of Nepal 2018/19'.

Cho, Ara. 2014. 'Post-Tsunami Recovery and Reconstruction: Governance Issues and Implications of the Great East Japan Earthquake'. *Disasters* 38 (s2): s157–78. <https://doi.org/10.1111/disa.12068>.

- De Juan, Alexander, Jan Pierskalla, and Elisa Schwarz. 2020. 'Natural Disasters, Aid Distribution, and Social Conflict – Micro-Level Evidence from the 2015 Earthquake in Nepal'. *World Development* 126 (February): 104715. <https://doi.org/10.1016/j.worlddev.2019.104715>.
- Dietz, Thomas, Elinor Ostrom, and Paul C. Stern. 2003. 'The Struggle to Govern the Commons'. *Science* 302 (5652): 1907–12. <https://doi.org/10.1126/science.1091015>.
- Disaster Countermeasures Basic Act*. 1997. National Land Agency Japan. Vol. 223. <https://www.adrc.asia/documents/law/DisasterCountermeasuresBasicAct.pdf>.
- Easterly, William. 2008. 'Institutions: Top Down or Bottom Up?' *American Economic Review* 98 (2): 95–99. <https://doi.org/10.1257/aer.98.2.95>.
- Gethin, Amory. 2021. 'Political Cleavages and the Representation of Social Inequalities in Japan 1953-2017'. World Inequality Lab. https://wid.world/wp-content/uploads/2021/03/WorldInequalityLab_WP2021_10_PoliticalCleavages_Japan.pdf.
- Hall, M.L., A.C.K. Lee, C. Cartwright, S. Marahatta, J. Karki, and P. Simkhada. 2017. 'The 2015 Nepal Earthquake Disaster: Lessons Learned One Year On'. *Public Health* 145 (April): 39–44. <https://doi.org/10.1016/j.puhe.2016.12.031>.
- Hanks, Thomas C., Gregory C. Beroza, and Shinji Toda. 2012. 'Have Recent Earthquakes Exposed Flaws in or Misunderstandings of Probabilistic Seismic Hazard Analysis?' *Seismological Research Letters* 83 (5): 759–64. <https://doi.org/10.1785/0220120043>.
- Harrowell, Elly, and Alpaslan Özerdem. 2018. 'The Politics of the Post-Conflict and Post-Disaster Nexus in Nepal'. *Conflict, Security & Development* 18 (3): 181–205. <https://doi.org/10.1080/14678802.2018.1468531>.
- Keestra, Machiel, and Steph Menken. 2016. *An Introduction to Interdisciplinary Research: Theory and Practice*. Amsterdam University Press.
- Lam, Lai Ming, and Rob Kuipers. 2019. 'Resilience and Disaster Governance: Some Insights from the 2015 Nepal Earthquake'. *International Journal of Disaster Risk Reduction* 33 (February): 321–31. <https://doi.org/10.1016/j.ijdrr.2018.10.017>.

- Macours, Karen. 2011. 'Increasing Inequality and Civil Conflict in Nepal'. *Oxford Economic Papers* 63 (1): 1–26.
- Ostrom, Elinor. 1998. 'A Behavioral Approach to the Rational Choice Theory of Collective Action: Presidential Address, American Political Science Association, 1997'. *The American Political Science Review* 92 (1): 1–22. <https://doi.org/10.2307/2585925>.
- , ed. 2015a. 'A Framework for Analysis of Self-Organizing and Self-Governing CPRs'. In *Governing the Commons: The Evolution of Institutions for Collective Action*, 182–216. Canto Classics. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9781316423936.007>.
- , ed. 2015b. 'An Institutional Approach to the Study of Self-Organization and Self-Governance in CPR Situations'. In *Governing the Commons: The Evolution of Institutions for Collective Action*, 29–57. Canto Classics. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9781316423936.003>.
- , ed. 2015c. 'Analyzing Long-Enduring, Self-Organized, and Self-Governed CPR's'. In *Governing the Commons: The Evolution of Institutions for Collective Action*, 58–102. Canto Classics. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9780511807763.005>.
- . 2015d. *Governing the Commons: The Evolution of Institutions for Collective Action*. Canto Classics. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9781316423936>.
- , ed. 2015e. 'Reflections on the Commons'. In *Governing the Commons: The Evolution of Institutions for Collective Action*, 1–28. Canto Classics. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9781316423936.002>.
- Panday, Sarita, Simon Rushton, Jiban Karki, Julie Balen, and Amy Barnes. 2021. 'The Role of Social Capital in Disaster Resilience in Remote Communities after the 2015 Nepal Earthquake'. *International Journal of Disaster Risk Reduction* 55: 102112. <https://doi.org/10.1016/j.ijdr.2021.102112>.

- Pashupati Nepal, Narendra Khanal, and Bishnu Pangali Sharma. 2018. 'Policies and Institutions for Disaster Risk Management in Nepal: A Review'. *Geographical Journal of Nepal* 11 (0). <https://doi.org/10.3126/gjn.v11i0.19546>.
- Paudel, Jayash, and Hanbyul Ryu. 2018. 'Natural Disasters and Human Capital: The Case of Nepal's Earthquake'. *World Development* 111 (November): 1–12. <https://doi.org/10.1016/j.worlddev.2018.06.019>.
- Raj Khanal, Dilli, Debendra Adhikari, Bal Krishna Mabuhang, and Deuja. 2018. 'Fighting Inequality in Nepal: The Road to Prosperity'. Oxfam, Humanitarian Accountability Monitoring Initiative (HAMI), South Asia Alliance for Poverty Eradication (SAAPE). <https://doi.org/10.21201/2019.3903>.
- Rayamajhee, Veeshan, and Alok K. Bohara. 2021. 'Social Capital, Trust, and Collective Action in Post-Earthquake Nepal'. *Natural Hazards* 105 (2): 1491–1519. <https://doi.org/10.1007/s11069-020-04363-4>.
- Sanderson, David, and Ben Ramalingam. 2015. 'Nepal Earthquake Response: Lessons for Operational Agencies'.
- Strasser, Hermann. 1980. 'Stratum and Class Formation: Principles of a Theory of Social Inequality'. *The Canadian Journal of Sociology / Cahiers Canadiens de Sociologie* 5 (2): 103–20. <https://doi.org/10.2307/3339951>.
- The World Bank. n.d. 'GDP per Capita (Current US\$) - Japan, Nepal'. Accessed 12 June 2021. <https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?end=2019&locations=JP-NP&start=1960&view=chart>.
- Turner, Bethan, Jennifer Jenkins, Rebecca Turner, Amy L. Parker, Alison Sinclair, Sian Davies, Gavin P. Hayes, Antonio Villaseñor, Richard L. Dart, Arthur C. Tarr, Kevin P. Furlong, and Harley M. 2013. 'Seismicity of the Earth 1900–2010 Himalaya and Vicinity'. Open-File Report ver. 1.1, Jan. 28, 2014. Open-File Report. U.S. Geological Survey Open-File Report 2010–1083-J. <https://pubs.usgs.gov/of/2010/1083/j/>.
- Umeda, Sayuri. 2013. 'Japan: Legal Responses to the Great East Japan Earthquake of 2011', 51.

- UNDRR. 2019. 'Disaster Risk Reduction in Nepal Status Report 2019'. Bangkok, Thailand: United Nations Office for Disaster Risk Reduction, Regional Office for Asia and the Pacific.
https://www.preventionweb.net/files/68257_682306nepaldrmstatusreport.pdf.
- USGS. 2010. 'USGS Open-File Report 2010–1083–J: Seismicity of the Earth 1900–2010 Himalaya and Vicinity'. 2010. <https://pubs.usgs.gov/of/2010/1083/j/>.
- William Roberts Clark, Matt Golder, and Sona Nadenichek Golder. 2018. *Principles of Comparative Politics*. Pennsylvania State University: Sage, CQPress.
- World Inequality Database. 2021a. 'Gini Coefficient 1980-2019 - Nepal, Japan'.
<https://wid.world/data/>.
- . 2021b. 'Pre-Tax National Income Top 10% and Bottom 50% 1980-2019 - Nepal, Japan'.
<https://wid.world/data/>.
- World Inequality Database. n.d. 'National Income Range 1946-2019 Japan and Nepal'. *WID - World Inequality Database* (blog). Accessed 26 May 2021. <https://wid.world/data/>.
- Yamamura, Eiji. 2015. 'The Impact of Natural Disasters on Income Inequality: Analysis Using Panel Data during the Period 1970 to 2004'. *International Economic Journal* 29 (3): 359–74.
<https://doi.org/10.1080/10168737.2015.1020323>.