

Development of Minangkabau Women's Roles as an Effort to Reduce Risk in Disaster-prone Cities in Indonesia A Case Study of Western District of Padang, Padang City, West Sumatra, Indonesia¹

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Abstract

Sumatra is a disaster-prone area, and Padang is located in the ring of fire. Potentials for disaster and vulnerability in urban areas is high, so to reduce the risk of disasters, knowledge and understanding for the whole community, especially through women's roles, are required. The aim of this study is to clarify the role of women in disaster mitigation in disaster-prone cities and to identify factors that affect development of women's roles. This paper applies a qualitative approach of observation and in-depth interviews conducted with people, especially women, in West Padang. The result illustrates that the improvement of understanding and knowledge of disaster mitigation and efforts to reduce disaster risk affect public perception. The expanding women's roles in the Minangkabau tribe are significant in developing an understanding of the families because women are considered the first and primary teachers in the family. Therefore, by increasing women's role in implementing mitigation plans in disaster-prone cities, the family's ability to mitigate disaster becomes a strategy within the life of the sustainability community.

Keywords: *Minangkabau women's roles, disaster risk reduction efforts, disaster-prone city*

1. Introduction

Indonesia is a disaster-prone area. Disasters can be natural in character (earthquakes, tsunamis, floods, volcanic eruptions, landslides, hurricanes) and non-natural (failures of technology and human behavior). Based on the potential for disaster and vulnerability, the

¹This paper was presented at the 3rd International Workshop on Soft Computing and Disaster Control (SocDic2013) on 9-10 November 2013 in Bali, Indonesia.

risk of disasters in Indonesia is high. Another factor that increases disaster risk is the number of people living in disaster-prone areas. City government has a strategic role and function in attempting to reduce the risk of disaster. Efforts to anticipate earthquakes is in accordance with the direction and objectives of the *UU No. 24 Year 2007* on disaster management, particularly Article 37 paragraph 2 item b, which states that disaster risk reduction is done to reduce the bad effects that may arise, especially in a non-disaster situation.

Aside from the number of fatalities, the biggest impact of natural disasters is that people's lives, which were once well-ordered, become disorganised after a disaster. The evidence confirms the magnitude of the disaster: Aceh on 26 December 2004 (9.2 Richter), Nias in March 2005 (8.6 Richter), Yogyakarta in May 2006 (6.2 Richter), Pangandaran in July 2006 (7.8 Richter), Mentawai-Bengkulu in September 2007 (8.5 Richter), Mentawai in August 2009 (6.9 Richter) and Tasikmalaya in September 2009 (7.3 Richter), flash floods in some areas, and the earthquake in West Java and Padang in September 2009.

Sumatra Island is one of the most disaster-prone areas. It lies among three of the earth's fault lines: Crust Eurasian continent, Indian Ocean-Australian plate and the Pacific Ocean plate. The interaction of the three plates creates the volcanic strip, earthquake strip and mountains strip, known collectively as the geological disasters strip (land movement/landslides, volcanic eruptions, earthquakes and tsunamis), stretching from the northwest tip of Aceh through the Bukit Barisan to Lampung.

Padang is located on the volcanic line and consequently is very prone to geological threats. Earthquake datum show the epicenter spreading out evenly on the coast of Padang. Casualties from the earthquake in Padang included 2 missing, 383 dead (including 11 whose addresses are unknown and 39 from outside of Padang), 411 sustaining major injuries and 771 suffering minor injuries. Most victims died in the District of West Padang (81) and the least in the District of Lubuk Kilangan (5). Based on the data about the victims, the District of West Padang is the district with the most deaths, casualties and minor injuries, because the District of West Padang is the center of government, home to many business offices and an economic center, and consequently had a large and dense population.

The realities of living in disaster-prone areas need to be addressed in a wise way so that residents will know how to coexist with the natural conditions (Respati, 2009). Because of the risk of earthquakes in Padang, it is necessary to anticipate and prevent disasters by understanding and improving the public's perception. Knowing and understanding the factors that influence public perception will allow for better planning process and mitigation implementation. Changes have been made in disaster research that not only address technical aspects and the handling of disaster victims, but also the emphasis on community aspects, including proposed mitigation management in an integrated community development (Blaikie, 1994; Quarentelli, 1989; Twigg and Bhatt, 1998; Shaw and Okazaki, 2003). The impact of natural disasters is directly felt by the community, so reducing the risk of disaster is achieved by increasing awareness and the capacity of community regarding the effect of the disaster (Suryanti, 2010). Communities have direct experience of a disaster, so the understanding becomes the point for disaster risk reduction. The community's response to disaster is very important to understand (Zein, 2010). Response is the beginning of an adaptation strategy generated by the community through an understanding of the natural disasters that have occurred. Public understanding is actualised as perception and attitudes or actions in the face of a disaster. The results of the attitudes or actions of society in facing a disaster make up the adaptation strategy, meaning made due to environmental threats (Marfai, 2008).

The readiness of society, especially of women, in facing a disaster is an important indicator of risk reduction and disaster effects specially in Indonesia. On the other hand, people do not understand the warning signs of disasters and the dangers they cause. Lack

of public knowledge about the signs and dangers of a disaster emerge when an earthquake happens. There were changes in the structure and form of the city due to the disaster. To clarify the understanding and perception formation process, a model was created that illustrate the connection of knowledge factors, readiness and availability of infrastructure mitigation in disaster-prone cities by increasing women's roles. In general, women in West Sumatra have a low education level. Increasing women's roles by providing knowledge and understanding about disaster risks for their family members is one aspect of disaster mitigation.

2. Research Method

This study uses the qualitative method to explain the factors of disaster, facilities and infrastructure for disaster mitigation in disaster-prone cities, and the quantitative method to explain the relationship between public perception of efforts to enhance the role of women in disaster risk reduction. The study starts by examining exploration theories and concepts of the role of women in relationship with the psychological environment by means of comprehension and knowledge. This research approach also uses observation and in-depth interviews of several women.

The research focuses on knowledge and comprehension of women to develop an appropriate model for disaster risk reduction in a disaster-prone city. It also uses the qualitative method through psychological perception of disaster management to identify factors that influence the increasing role of women. The data collection method in this research uses psychology of scales, because the measurement object is psychological attributes.

The population in this research is women, with housewives being the criteria for the population sample. The sample takes into account the size of population, which is 19,745 women aged between 20 to 64 years, and the sample includes about 10%, or 197 people in total. (Kota Padang's Civilization Office, 2010).

The location is the Subdistrict West Padang, West Sumatra, chosen because it had the largest number of victims—81 people killed, 110 people seriously injured and 264 people slightly injured (source BPBN Kota Padang), This subdistrict was declared a red zone disaster-prone area.

3. Women's Roles in the Minangkabau Tribe

One of the fundamental questions used to measure the level of women's knowledge is what is meant by natural disasters and what causes an earthquake. In general, the community already knew that Padang is earthquake-prone and is in danger of an earthquake disaster. Women know about earthquakes because of their past experience, and they know earthquakes will happen again in the future. Existing environmental susceptibility factors make it imperative that women anticipate the earthquake threat and the consequent disaster. People already understand the characteristics of great earthquakes.

As a housewife, women have a very big role in educating their children. As co-heads of the family, women can affect the understanding and knowledge of the head of the family as well. In the social community, women also have a central role for social cohesion such as (Family Program Welfare (Program Kesejahteraan Keluarga in Bahasa/PKK activities, Arisan (social gathering), and others.

"At that time until the present it has been formed groups for disaster response," said the Madam Ifa who is the coordinator of the group PKK in disaster response formed by the Head of the Padang's District, Mr. Desmon, there are these groups in every village....they always do simulation after an earthquake regularly every three months to face disaster....Karang Taruna, the youth in villages all deployed into disaster response

group.....they already knew their duties....who works as evacuation officer, paramedics, public kitchen or officer restore the post-disaster trauma....they've trained and trained...," she said.

In Padang where most people are of Minang ethnic origin, disaster mitigation is becoming more complex. It is caused by the culture of the Minang community, in which men generally migrate to places far from Padang, leaving the women and children at home. In other words, this cultural practice puts women in disaster-prone areas without the help and support of men as heads of households.

On the other hand, culture in Minangkabau society is matriarchal, which puts women in a unique position. The absence of men in their daily lives and the value system in the society have made Minangkabau women the decision-makers. Because they live in disaster-prone areas, the concept of mitigation is certainly needed. Women's domestic role ultimately makes them decision-makers who determine what needs to be done in the event of a disaster.

But women's lack of awareness and knowledge about disaster mitigation will lead to their making bad decisions in the event of a disaster. This certainly increase the risk of casualties. The women of Padang need to be education about disaster mitigation so they can be well-prepared and participative in facing coming disasters.

3.1. Knowledge and Perceptions of Women

Perception of the potential for earthquake disasters in terms of awareness of the actions to be taken by individuals and households is based on questions submitted to the informant who tells people how to react when they are in a house or building. Most will say they should run out of the house immediately and look for a safe place, such as open spaces that are far away from the beach.

It is hard to go through streets full of people running around, cars lined up, motorcycle which left by the owner....The five 5 meter wide road seemed like narrow pinhole, crowded with people, men and women, young and old all running out of town seeking refuge. They mostly come from the nearby beach, gripped by fear of tsunami Aceh happening again.

This suggests that under uncertain conditions, people will spontaneously try to save themselves by running to safe place.

Observing the natural signs before a large earthquake is one of the skill still handed down by the indigenous people of Padang. A rise in temperature is one sign.. Mrs. IW said,

I felt uncomfortable and trapped heat around the body. There is something wrong with the environment around me this afternoon. I said to myself, "What happens?" This is very unusual. After the Asr prayer, it was too late because my busy time in mushollah. In my working place, I felt lonely and strange. Everyone had returned to their homes. All of a sudden, I fell something has collapsed in the mushollah. O God...there was an earthquake. I immediately ran out. O God. I saw my office collapsed to the ground.

3.1. Disaster Risk Reduction

Valuable lessons that emerge from disasters may show that efforts to reduce the impact of disasters are still far from the best that could be expected. Thus, it is necessary to change the paradigm of post-disaster handling to concentrate more on pre-disaster preparation. This is an attempt to prepare the community to prepare for disasters that can come at anytime. Activities that involve the community begin with risk assessment, dissemination and technical direction. It is expected that doing a study and application in the environment will reduce the level of risk as significantly as possible in terms of the number of victims and losses from the disaster. Public can be aware of and trained independently to perform initial responses during and after a disaster for the benefit of

themselves, their families and their community environment. Mr. Demon, the head of the Padang's District, observed:

Minor earthquakes often occur...but people in Padang are used to it...they now think they read the natural signs and do a lot of prayer... as instructed by the trustees....we had a dzikir joint program (communal praying), dawn prayer and wirid together....in addition to the technical regulations on building strength, we also identified zones as red zone, green zone, yellow zone. This is meant to control the development of post-disasters, and the community approved the policy considering that our area is prone to natural disasters.

The mitigation concept has been applied in Japan and other developed countries that also are prone to disaster for a long time. Risk assessment for the Western District of Padang was conducted jointly with representatives of existing communities such as groups from Pengajian and Karang Taruna, community leaders and the local government. The results emerged in the form of hazard identification and vulnerability in their areas, the level of tsunami threat, the condition of houses that do not meet standards for earthquake-resistant buildings and the condition of evacuation lanes. Once the risk assessment was agreed upon, participants devised a plan of action for mitigation efforts to minimize the potential for local hazards.

"Our kids, security officers are trained", said a teacher of SMAN 1 Padang. "When the second earthquake occurred, some people were in charge of security, opening access of our schools. Through the existing emergency staircases on the right and left of the building, we could rescue to the fourth floor. Our kitchen is also on the fourth floor, serving all the kids and us, and the teachers have all been trained in their role and position. The building was designed to be sturdy, strong, and there is a helicopter pad, but when disaster strikes, we are still able to continue the teaching and learning process because the evacuation access does not interrupt the class. In front of the school buildings there is a large hall that functioned as an evacuation area and warehouse logistics", explains the teacher.

Disaster mitigation socialization for women is an effort to strengthen local capacity, establish communications with disaster readiness groups in village district level and city government, disseminate information about the early warning signs and to simulate evacuation in the event of a local disaster. The core activity is to combine the science of disaster with the volunteer spirit and arrange implementation of disaster management activities to minimize the impact of disasters.

3.3. Disaster-pron Cities

The existence of natural hazards makes development risky, but on the other hand, construction techniques can cause or raise the risk of disaster. On the other hand, activities that are carried out in accordance with the character of an area that can reduce the risk of disaster. Based on these ideas, planning should be done to avoid and reduce potential hazards. Development in disaster-prone areas must consider the safety of the people, buildings and environment.

Public safety arises from the availability of evacuation routes. There is no standard size, but in general, the evacuation lane must be able to be traversed quickly away from the source of the threat. It should accommodate two vehicles passing each other so as not to hinder the evacuation process. There should a temporary shelter, a safe place and a final refuge. The members of the community must agree upon where these amenities are situated, and they must be safe and orderly. For a city that is in the opposite condition, arrangements must made that take into consideration road networks that will spread people out to areas designated as evacuation areas via radial highways equipped with a ring road (Soehartono, 2005).

Other efforts related to disaster-prone cities are the effective application of information and educational programs. People can use brochures, instruction sheets, trial alert systems, print and electronic media and other resources. These efforts should be conducted regularly and comprehensively. Policies implemented by the city government should be aimed to reduce losses and damage caused by disasters.

Other efforts are evacuation and rescue drills to practice for disasters. Similarly, the media can help by airing programs that provide information about earthquake rescue efforts, conducted to increase people's knowledge through counseling, training and socialization.

Other important policies should evaluate and revise The Plan of Urban City Space (in Bahasa Rencana Tata Ruang Kota/RTRK) to the development plans for the region. Implementation of this policy is done through the addition of open spaces to facilitate social integration as well as evacuation in the event of a disaster. Such efforts should be properly organised and efficient.

Disaster readiness includes forecasting and decision-making about preventive actions before threats emerge. This includes education people about the signs of an impending disaster, development and regular testing for early warning systems, evacuation plans or other actions to be taken during the alert period.

Rescue systems include rescue lanes and rescue buildings. After an earthquake, a rescue building can be housed in places of worship, schools, meeting halls, offices and other buildings that have solid construction, that can be reached in 15 minutes, that have a maximum service within 2 km and that can accommodate many people.

In Japan, there are four types of rescue buildings that are grouped into two categories. The first is a temporary shelter; the second includes both a shelter and an enclosed area for longer accommodations (Misumi, J, 1998). Based on the typology of the region, the provision of green space in the living environment is needed in an evacuation location (Permen PU No. 05/PRT/M/2008).

Padang has is highly vulnerable to natural disasters, including earthquakes, tsunamis, landslides, soil liquefaction and flooding. In addition, as a city where the concentration of activity is quite high, it is also vulnerable to fire hazards. Related to this, the city needs spaces that can be used as evacuation areas for its residents. Some criteria for identifying evacuation spaces are:

- a. Public spaces such as open fields, parking areas, moor or dry farming area;
- b. Located no more than 1 km from the concentration of population to be saved;
- c. Not located in dense settlement areas or densely built-up areas;
- d. Located on an accessible road network/easily accessible from all directions at a run/walk;
- e. Not located in areas that are predicted to have more vulnerability to hazards;
- f. Every person would need a minimum of 2m² space, so the rescue space capacity can be calculated; and
- g. Location for disaster evacuation could be developed as a multi-layer space, which at the time of natural disaster can be used as an evacuation area and does not function as a public open space (whether it is a green open space or non-green open space).

4. Results and Discussion

4.1. General Description of Kota Padang (Macro)

4.1.1. Physical Condition

4.1.1.1. Geographic Position and Administrative Borders: Kota Padang is the capital city of West Sumatra Province, located on the west coast of Sumatra Island.

Geographically, Kota Padang is located at 00°44'00"-01°08'35" S and 100°05'05"-100°34'09" E, with an area of 1.414,96 km² that consists of mainland and sea area, each measuring 694,96 km² and 720,00 km² (effective areas including rivers are 205 km² or 29%, and the hill including rivers areas are 486.209 km²). It also has shoreline of 68,13 km (excluding small islands). It also has 19 islands. Kota Padang has 11 subdistricts and 104 villages.

Administrative borders of Kota Padang are as follows:

North	Border with Padang Pariaman District
South	Border with Pesisir Selatan District
West	Borders with Indonesia Ocean and Mentawai Islands
East	Border with Solok District

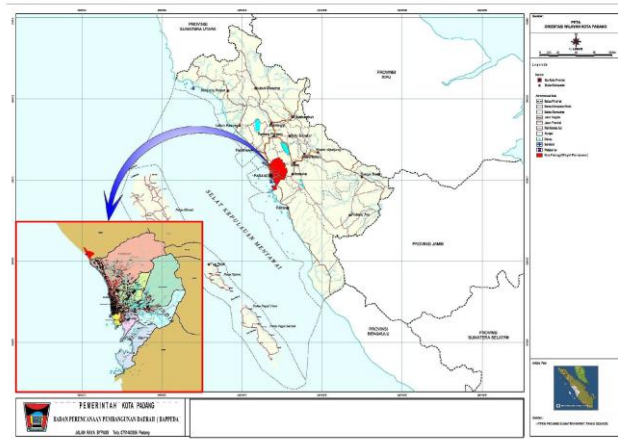
The borderlines are based on Government Regulation Number 17, 1980 implemented by Law Number 22, 1999 and Government Regulation Number 25, 2000. Details are shown in Table 4.1 below:

Table 0.1. Area of District of Kota Padang and Wide Range by Sub-District

No.	District	Area (km ²)	%	District's Capital	Number of Villages	
					Before Local Autonomy	After Local Autonomy
1	Bungus Teluk	100,78	14,50	Pasar Laban	13	6
2	Lubuk Kilangan	85,99	12,37	Bandar Buat	7	7
3	Lubuk Begalung	30,91	4,45	Lubuk Begalung	21	15
4	Padang Selatan	10,03	1,44	Mata Air	24	12
5	Padang Timur	8,15	1,17	Simpang Haru	27	10
6	Padang Barat	7,00	1,01	Purus	30	10
7	Padang Utara	8,08	1,16	Lolong Belanti	18	7
8	Nanggalo	8,07	1,16	Surau Gadang	7	6
9	Kuranji	57,41	8,26	Pasar Ambacang	9	9
10	Pauh	146,29	21,05	Pasar Baru	13	9
11	Koto Tengah	232,25	33,42	Lubuk Buaya	24	13
	Jumlah	694,96	100,00		193	104

Source: *Badan Pusat Statistik Kota Padang, 2010 (Kota Padang's Statistic Agency)*

Table 4.1 shows that the subdistrict of Koto Tengah is the biggest area in Kota Padang, with 232,25 km², or 33.42%, from Kota Padang in total size. This size enables urban development to be directed towards this subdistrict, including development of housing and settlement. On the other hand, the smallest subdistrict is West Padang at 7,00 km², or 1.01%.



Source: Kota Padang's Profile, 2009

Figure 4.1. Padang Administrative Border

4.1.1.2. Demography—Socio-cultural

Population Growth: Padang's population has increased each year. Based on resident registration in 2005, the population in Padang reached 801,344 and in 2009 increased to 875,750. This number indicates significant growth; in four years, the population increased by 74,406. More details about Padang's population growth are shown in Table 4.2

Table 0.2. Population Growth based on Kota Padang's District in 2005-2010

No.	District	Population Growth (people)					
		2005	2006	2007	2008	2009	2010
1	Bungus Teluk Kabung	23.197	23.400	23.592	24.116	24.417	22.896
2	Lubuk Kilangan	40.538	41.560	42.585	43.531	44.552	48.850
3	Lubuk Begalung	97.560	100.912	104.323	106.641	109.793	106.432
4	Padang Selatan	60.022	61.003	61.967	63.345	64.458	57.178
5	Padang Timur	83.151	84.231	85.279	87.174	88.510	77.868
6	Padang Barat	59.657	59.895	60.102	61.437	62.010	45.380
7	Padang Utara	72.766	73.730	74.667	76.326	77.509	69.119
8	Nanggalo	55.669	56.604	57.523	58.801	59.851	57.275
9	Kuranji	110.316	113.976	117.694	120.309	123.771	126.729
10	Pauh	50.204	51.354	52.502	53.669	54.846	59.216
11	Koto Tangah	148.264	153.075	157.956	161.466	166.033	162.079
	Jumlah	801.344	819.740	838.190	856.815	875.750	833.562

Source: Badan Pusat Statistik Kota Padang, 2010 (Kota Padang's Statistic Agency)

Table 4.2 shows that in 2010, the population Padang population dropped by 42,188, a decline that resulted from the devastating earthquake that occurred on 30 September 2009.

4.2. West Padang Subdistrict

4.2.1. Administrative Borders

The West Padang Subdistrict has an area of 7,00 km² and consists of 10 villages, geographically located at 0⁰ .58'4" S and 100⁰ .21'11" E.

Administrative Borders West Padang Subdistrict are:

North: North Padang Subdistrict

South: South Padang Subdistrict

West: Indian Ocean

East: East Padang Subdistrict

More details about West Padang subdistricts based on villages are shown in Table 4.3.

Table 0.3. Area of West Padang Subdistricts by Villages

No.	Village	Area (km ²)
1	Berok Nipah	0,31
2	Kampung Pondok	0,65
3	Belakang Tangsi	0,57
4	Kampung Jao	1,63
5	Olo	0,89
6	Purus	0,68
7	Padang Pasir	0,71
8	Ujung Gurun	0,71
9	Rimbo Kaluang	0,42
10	Flamboyan Baru	0,43
	Total	7,00

Source: West Padang in Figures, 2009

4.2.2. Population: According to the population census of 2010, the total population in West Padang Subdistrict is 45,380. The most populous is Purus Village with a total population of 6,721, while the least populous village is Belakang Tangsi with total population of 2,863. Table 4.4 shows more details about the total population in West Padang.

Table 0.4. Population in West Padang Subdistrict 2009-2010

No.	Villages	Year	
		2009	2010
1	Berok Nipah	6.405	4.791
2	Kampung Pondok	6.366	3.876
3	Belakang Tangsi	4.163	2.863
4	Kampung Jao	6.207	4.153
5	Olo	6.776	5.044
6	Purus	9.556	6.721
7	Padang Pasir	6.277	4.598
8	Ujung Gurun	5.291	4.717
9	Rimbo Kaluang	4.386	3.919
10	Flamboyan Baru	5.983	4.698
	Total	62.010	45.980

Source: West Padang in Figures, 2009

Population density in West Padang Subdistrict decreases from year to year. The greatest density is in Berok Nipah village with 15,454 people/km², while the lowest density is in Kampung Jao with 2,547 people/km².

4.2.3. Public Knowledge and Perception: Two fundamental questions used to measure public knowledge are: What is a natural disaster? What causes earthquake. In general, people already know that Padang is an earthquake-prone city. Knowledge about seismicity assures people that earthquakes will occur again in the future, and the environmental vulnerability factor causes a high level of interest in anticipating an earthquake and its aftermath. Most people are knowledgeable about the causes of earthquakes and their impact.

Knowledge about earthquakes is indicated by the answers given by the informants. Many of them know that Padang is located in a volcanic belt with the potential for earthquakes and tsunami. A small scale earthquake is common occurrence, but the 29 September 2009 event was a massive earthquake followed by a tsunami.

Shocked by the massive earthquake and fearful that a tsunami could occur like the one in Aceh, people panicked and ran to higher places, causing traffic jams along the way.

Awareness of actions that should be taken by individuals or households when a disaster occurs showed in their answers to questions about they should do to save themselves when they are in their houses or buildings.

This suggests that under uncertain conditions, people will spontaneously try to save themselves by running to safe places.

Understanding the natural signs that occur before a large earthquake is still a skill handed down by the indigenous people of Padang society. A rise in temperature is one sign, as Mrs. IW observed:

I felt uncomfortable and trapped heat around the body. There is something wrong with the environment around me this afternoon. I said to myself "What happens?" This is very unusual. After the Asr prayer it was too late because my busy time in mushollah. In my working place I felt lonely and strange. Everyone had returned to their homes. All of a sudden, I felt something had collapsed in the in mushollah. O God...there was an earthquake. I immediately ran out. God. I saw my office collapsed to the ground.

Seismic or other disasters haunt people in Padang because we cannot predict when they are going to happen. It would be wise to understand those disasters from risk factors, vulnerability and the danger they cause. The participants' descriptions of their shared experiences show that disaster risk and its impact made a deep impression, especially in the research area, West Padang Subdistrict.

Most of West Padang is on the west coast of Sumatra Island, with latitude 0-8 meter above sea level and an area of 7 km². Population density in 2009 was 8.859 jiwa/km², decreasing to 6.482 jiwa/km². The decreasing population suggests that people left West Sumatra after the earthquake.

Many people who can afford to buy a new house in a safer place have moved because of trauma, while those who can't afford it were forced to stay here....We want to move to a safer place like our neighbours who get taken by their son to Pekanbaru, but we cannot do so. After the earthquake, we returned to our home, despite the damage here and there. (Interview with Mr. Desmon, the head of Kota Padang District)

The decision to stay in disaster-prone areas is due to economic factors, because many people do not have any other option.

The post-disaster time is a recovery process for those affected by the disaster. Infrastructure must be restored to its original condition through rehabilitation and reconstruction with consideration of seismic risk. Equally important is psychological rehabilitation for fear, trauma or depression. The worst condition was aftershock, which can be worse than the original earthquake, Mr. Desmon said.

It took three months to get over the trauma, sometimes in his sleep my son cried.

Descriptions of the impact of the disaster show that efforts to recover were still far from what we expected. Consequently, it is necessary to change the paradigm from post-disaster to pre-disaster management. This is an effort to prepare society for disasters, which can happen at any time, via activities that include all of society, starting from risk studies, socialisation and technical direction. After the studies are completed and applied, we hope that these actions will not only decrease the risk, whether it casualties or other losses cause by the disaster, but also that they will produce people who are already aware and trained and who can independently respond both during and after a disaster for themselves, their families and society.

“...small earthquakes often occurs...but people here are used to it...they now read natural signs and pray a lot...as instructed by Pak Wali...we have programmes to dzikir, subuh praying wirid together....In addition to technical regulation about building strength...there is also regulation of red zone, yellow zone and green zone. This is to control the development after a disaster has occurred. Society agrees on this regulation, considering that this area is a disaster prone”

Risk assessment for West Padang Subdistrict has been conducted with community representatives, one from communal Quran recital, youth organisation, community leaders and local government. The results of the meeting include identification of the danger and vulnerability in their area, such as tsunami threat, home conditions that do not meet the standards for earthquake-resistant buildings and the evacuation route. Once risk assessment has been approved, the next step is to create a mitigation action plan to minimize potential danger that can happen in the area.

4.2.4. Mitigation Socialisation: The word "safety" become one of the goals in spatial planning on Act no 26 year 200. Disaster evacuation space must be identified in every space arrangement plan. Implementation mitigation in Padang spatial planning is disaster mitigation by raising awareness of the need to be adaptive and trained so one can independently respond during and after a disaster. The motto is to live safely, peacefully and comfortably in an earthquake-prone land (said by Dr. Ir. Badrul DEA, chairman of Geophysic Indonesia West Sumatra Association).

“At that time until now, has been formed disaster response groups”, said ibu, who is coordinator for the disaster response group from the family welfare organisation (PKK) formed by the head of the subdistrict....These groups are in every village...after the earthquake, every three months, they perform a simulation for disaster...the youth organisation (karang taruna) and youngsters in the village all take part as a disaster response group...they already know their jobs...who works as evacuation officer, paramedic, kitchen, or post-trauma officer...they have trained”, he added.

"Our students and security officer are trained", said a teacher from SMAN 1 Padang. When the second earthquake occurred, the security officer immediately opened all access to our school through emergency stairs on the left and right of the building, people who are looking for a safe building can go directly to the fourth floor...our kitchen is also on the fourth floor...which can serve all students and teachers....all are trained in their roles and their positons....this building was designed to be sturdy, strong, and there is a helipad....When disaster strikes, we still can be teaching since access for evacuation will not disturb classrooms....in front of the school building there is a big hall which can be used for evacuation area and logistic warehouse...”, said the teacher.

Socialization of disaster mitigation into the local community is an effort to strengthen local capacity, establish communication with disaster response groups at the village and city level, spread information about early warning signs and stage disaster and local evacuation simulations. The point of these activities is to equip society with seismic knowledge and a volunteer spirit to minimize the impact of disasters.

A provision and utilisation evacuation space plan is integral to city spatial planning. Furthermore, such a plan is required to carry out city functions as a center of economic and social services, in this case, for seismic problems. A provision and utilization evacuation space plan helps develop mitigation infrastructures to reduce the impact of the damage in the future.

4.2.5. Local Wisdom Potential in Mitigation: Padang policy-makers undertake spatial planning based on local wisdom, which can be employed to mitigate disaster. The West Padang community has great integrity, with tradition values, philosophy, vision and mission that they uphold.

a. Values

- a.1. Prosperity: The people in West Padang can live in prosperity, "*kok padi manjadi, kok jaguang maupiah*" (growing rice yielding up, growing corn it well turned). This means the people have prosperous lives.
- a.2. Faith: Faith and gratitude to Allah
Independence: Can independently build with all the potential they are given.
- a.3. Equality: '*Duduak samo randah, tagak samo tinggi*' (sat together and stand as tall). All individuals can express their opinions equally.
- a.4. Togetherness: together giving '*kok tatungkuik makan tanah, tatalantang makan ambun*' (face down all eat dirt, lie on the back all drink dew) and '*ka lurah samo manurun kabukik samo mandaki*' (to the cliff all go down, to the hill all climb up).
- a.5. Democracy: Democracy and mannered, means democracy based on tradition and custom (based on Islam/Kitabullah).

b. Philosophy

Tungku tigo sajarangan, Tali tigo sapilin (philosophy in Minangkabau includes in Agama): Perangkat nagari (Wali Nagari, BPRN, Ninik Mamak, scholar and clergy) rules based on custom and syara'. Working hard, like a proverb '*kok duduk mambuek ranjau, kok tagak memandang jarak*' (sitting to create crafts, standing up to look at the distance) means no time wasted. All have jobs to do.

c. Vision

To reach/create West Padang people to be prosperous, hard-working, tenacious, and faithful and to act according to their customs.

d. Mission

- d.1. To enhance human resources in West Padang institutions (KAN/LAN, MUI, Bundo Kanduang, Mamas, etc.) both personally and as a member of institutions in West Padang.
- d.2. To restore the spirit of mutual cooperation (gotong royong). To have mutual cooperation, we don't need to call upon people. Instead, we create a schedule so they will come of their own accord. West Padang is known for what they call '*gotong royong badunsanak*'. *Gotong royong* means like a brother. It can be separated by *orong* or village.
- d.3. To increase their faith and devotion: Returned to surau (mosque): as a place to socializing. Surau is not only a place to pray or read the Quran but also a center of

human activity. An honest, clean, dignified, open and accountable government (Good Government) is based on traditional custom and *Syara*'.

Table 0.5. Research Hypothesis Significance Test Results based on Structural Model Test Research

Correlation Between Latent Variable	t score	Standard Coefficient	Hypothesis Significance Test Conclusion
H1: There is correlation between understanding variable (<i>Understanding</i>) and perception (<i>Persep</i>).	3.01	0.15	H1 is accepted, t score > 1.96 there is positive correlation between understanding and <i>Persep</i>.
H2: There is correlation between understanding variable (<i>Understanding</i>) and mitigation (<i>Mitiga</i>).	1.63	0.10	H2 rejected, t score < 1.96 There is no correlation between <i>Understanding</i> and <i>Mitiga</i> .
H3: There is correlation between mitigation variable (<i>Mitiga</i>) and perception (<i>Persep</i>).	2.66	0.12	H3 is accepted, t score > 1.96 There is positive correlation between <i>Mitiga</i> and <i>Persep</i>.

Source: Data Processing Result, 2012

5. Discussion on City Sustainability Model

Interactions between humans and the environment is a natural process and part of survival dynamics. The discontinuity of a city can be measured by indicators that can be evident in the condition of society. In disaster-prone cities, spatial planning links structural and cultural mitigation activities. As a condition, land use has a quality measure that does not merely describe the quality of the layout and hierarchical linkages both between activities or centers, but also describes the quality of space components. The quality of the space itself can be determined by the realization of harmony and balance of spatial use, which considers environmental supporting factors, environmental function, location and structure and a connected infrastructure with central residency and services.

Cultural mitigation through an anthropological approach to individual and organisational behaviour responses to disasters centers on societal efforts to anticipate the worst possibility of the disaster. In this study, culture is seen as an adaptive system that can help society anticipate disaster. The development of religious systems, science and technology systems, occupations and social organisation can be seen as humans' efforts to adapt to their environment, including public perception about the disaster potential in that environment (Oliver and Smith, 1996).

A sustainable city allows its citizens to fulfill their needs and improve their welfare without degrading the natural environment or others in the present or the future (Girardet, 2004). The environmental condition of Padang as a disaster-prone city still can fulfill the needs of its people and improve their welfare. Sustainable development principles can be a guide in planning and developing the city.

Understanding natural conditions can help maintain development by prioritizing information, regulations and establishments that secure the people. Therefore safety, comfort and prosperity remain communal goals.

The role of Minangkabau women became very important in sharing knowledge and understanding about their disaster-prone city and how to reduce the risk of disaster. The provision of this knowledge and understanding can be carried through their local wisdom.

6. Conclusion

The ability and role of Minangkabau women can be described in terms of perception factors that influence and determine women's ability to relay information about the risks involved in living within a disaster-prone city. It is also important to facilitate the establishment of infrastructures to support women's needs. The role of women as the first and foremost teachers within the family is significant. Therefore, increasing women's knowledge and access to information will facilitate a better disaster mitigation implementation for their families and future generations. In the long run, this mitigation effort will become society's life strategy.

Acknowledgements

Apart from my efforts, the success of any project depends largely on the encouragement and guidelines of many others. We take this opportunity to express our gratitude to the Japan Society for the Promotion of Science JSPS through Japan-East Asia Network and Directorate General of Higher Education, Ministry of National Education, Indonesia, as our main supports and people who have been instrumental in the successful completion of this project for research grant in 2011-2013 FY. Also we would like to show our greatest appreciation to Dr. Hajime Nobuhara and the team from Tsukuba University; Head of Postgraduate Program, Prof. Dr. Chandra Wijaya, M.Si., M.M. Prof. Dr. Hanny Wijaya from Directorate General of Higher Education, Ministry of National Education, Indonesia. We can't say thank you enough for their tremendous support and help.

The guidance and support received from all the members who contributed and who are contributing to this project was vital for the success of the project. I am grateful for their constant support and help.

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