Improving the capacity of the alertness disaster group in managing the environment and disaster risk

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Abstract. Disaster Alertness Group (DAG) is a community group formed in the disaster-prone areas. DAG establishment is preceded by a briefing knowledge of threats and risks of disaster that may occur in the neighbourhood. By having the knowledge, DAG and the community identify the potential threats of disasters and plan the appropriate activities or actions to reduce the impact of the disasters in the future. Furthermore, the action conducted jointly activities based on the scale priority. All activities have been done in Nagari Salayo (Salayo village), District of Solok, West Sumatra by using Participatory Rural Appraisal (PRA) method. As a result, the capacity of DAG has been improved in managing the environment from threat disaster (hazards) in Nagari Salayo. Some actions have been done based on the discussions of the citizens who are members of DAG. There are some alternative plans to be done in order to reduce the disaster risks, such as tree planting, installing signals for evacuation on evacuation tracks, improving the irrigation and drainage canals, and facilitating a briefing knowledge of Bank Sampah or “Waste Bank” to the Disaster Alertness Group.

1. Introduction
According to [1], the government has established the Nagari Salayo as one of the disaster resilient villages since 2013 along with the Nagari Batu Bajanjang [2]. This establishment is the manifestation of Disaster-Resilient Village Program in West Sumatra. The resilient village is one of way to reduce disaster risk based on the community [3]. This community-based risk reduction is any effort to reduce disaster risk and vulnerability in the community to increase the preparedness capacity planned and conducted by the community as the main actors.

Nagari Salayo according to [4] is one of 8 villages found in Kubung Sub-district, Solok Regency. The position of Nagari Salayo is at the centre of Kubung Sub-district with a distance of 3 km from the centre of Solok City, 21 km from Arosuka, the capital of Solok Regency, and 60 km from Padang, the capital city of West Sumatra. The region of Nagari Salayo area is divided into 4 jorongs, namely Jorong Batu Palano, Jorong Galanggang Tangah, Jorong Sawah Suduik, and Jorong Lurah Nan Tigo. The area of the Nagari Salayo is 21.44 km square at an altitude of 390-550 meters from the sea surface and the precipitation of 2,141 mm per year and an average of rain days of 145.1 days per year. Nagari Salayo has the borders as follow: in the north is bordered with Solok city, in the south is bordered with Nagari Gantung Ciri and part of Nagari Koto Baru, in the west with Nagari Koto Hilalang and Bukit Barisan; in the east with Nagari Kotobaru and Nagari Panyakalan. Nagari Salayo is passed by Batang Lembang River which is the confluence of the Batang Sumani River from the direction of Nagari
Gantung Ciri and Batang Lawas River from the direction of Nagari Koto Baru. Map of Nagari Salayo as shown in figure 1.

![Map of Nagari Salayo](image)

**Figure 1. The Map of Nagari Salayo [5]**

Furthermore [1], explained that the purpose of the resilient village/nagari is based on the Regulation of Disaster Management No. 1 year 2012 about the General Guideline on Disaster-Resilient Village is to:

1. Protect the community living in disaster-prone areas from negative impacts.
2. Increase the participation of the community, especially the vulnerable groups in managing resources in order to reduce disaster risk.
3. Increase the capacity of community institutions in managing the resources and nurturing local wisdom for disaster risk reduction.
4. Increase the government capacity in giving the resource and technical support for disaster risk reduction.
5. Increase the cooperation between the stakeholders in disaster risk reduction, the local government, private sector, universities, Non Governmental Organizations, social organization and other groups who have concerns.

A village/nagari must meet 20 indicators to achieve a resilient village/nagari [3]:

1. Availability of policies/ regulations in the village about disaster management or disaster risk reduction,
2. Availability of disaster management plan, community action plan, and/or contingency plan,
3. Establishment of Disaster Risk Reduction (DRR) forums,
4. Establishment of disaster management volunteers (disaster alertness groups) in the nagari,
5. Corporation between actors and regions,
6. Availability of emergency alertness budget,
7. Availability of DRR budget,
8. Training conducted for village administrative/authority,
9. Availability of training for voluntary teams,
10. Availability of training for village inhabitants,
11. Involvement or participation of the inhabitants,
12. Involvement of women in volunteer teams,
13. Availability of maps and risk analysis,
14. Availability of maps and evacuation track and refugee sites,
15. Availability of early warning systems,
16. Physical structural mitigation is conductive,
17. Availability of economic resilience patterns to reduce vulnerability of the community,
18. Availability of medical protection for vulnerable groups,
19. Availability of natural resource management for DRR,
20. Availability of protection to the communities major productive assets.

To achieve the above targets, 2 established Disaster Alertness Groups (DAG) in 2 jorong in Nagari Salayo have been actively involved in the resilient village program since 2014. However, in 2 other jorongs have been established yet [5]. Therefore, through the activity of KKN-PPM (student community service program to empower the community), the learning process and the establishment of DAG will...
be conducted to finally realize the 4 DAG in Nagari Salayo, which in turn make Nagari Salayo as a disaster-resilient village and manage the environment well.

2. Method
The method used in increasing the capacity Disaster Alertness Groups (DAG) is PRA (Participatory Rural Appraisal). At first the community in four jorongs in Nagari Salayo who care their environment is given knowledge about disasters and effects of earthquake, floods and landslides, as well as whirlwinds. Through the PRA method, the community is actively involved in studying, analyzing, and planning the action plans for disaster risk reduction by using resources and be able to integrate the sustainable development policies [6]. The community discussion in DAG results in alternative action plan. Then, the action plan is conducted together based on the priority scale in a limited time.

3. Result and Discussion

3.1. Disaster Alertness Group (DAG)
One indicator of the resilient village is the establishment of disaster management volunteers in the Nagari (Disaster Alertness Group) [3]. In 2014 two DAG were established in two jorongs (Gelanggang Tangah and Batu Pelano). Both DAG have been active in activity of disaster risk reduction and environment management activities in the area of Solok Regency, West Sumatra. However, the other 2 jorongs (Sawah Suduik and Lurah Nan Tigo) have not got any volunteer organization so that there is an imbalance in overcoming disasters and the environment related to disaster resilient villages. Therefore, the starting step is to establish DAG and the results of community discussion in each jorong. As the results of community discussion, 2 new DAG have been established in Jorong Sawah Suduik and Lurah Nan Tigo so that the 4 jorongs have their own DAG. For 2 established DAG (Jorong Gelanggang Tangah and Batu Palano), regeneration is done by some administrators. The administration of the four DAG has been established by the local government on August 13, 2016. It shows that the local government has a concern and be serious to make Nagari Salayo a disaster-resilient village [1]. The concern of Solok regency government is not limited only to Nagari Salayo. Six nagaris in the subdistrict of Lembang Jaya with their respective DAG were established by the regent in 2014 [7].

3.2. The Improvement of Capacity of DAG
Another indicator to achieve a disaster-resilient nagari is the improvement of DAG [2]. It is done by giving the learning on the threat and effect of earthquake, floods, landslides, whirlwind climate change. Based on the knowledge, each DAG is asked to identify the disaster potential threatening them in each area. The results of the identification show that in beside the earthquake threatening the community of Nagari Salayo, flood is a major threat in the region of Jorong Gelanggang Tangah. Almost every year floods occurs as well as of the overflow of Batang Lembang River [1,5]. Jorong Sawah Suduik receives the overflow flood from Jorong Gelanggang Tangah. This flood is worsened by a pile of rubbish in the drainage channels and Batang Lembang River passing Nagari Salayo.

In the Jorong Nan Tigo, the major threat is critical land and drought caused by the effects of climate change. This effect has damaged the farming cycle of local inhabitants. Consequently, plant diseases by rats, pigs and plant hoppers often occur. Another threat is the high potential for landslides on the local people’s house location on the hillsides.

In the area of Jorong Batu Palano, there are threats of landslides and flash floods, whirlwinds and disturbance in some several irrigation canals passing Jorong Batu Palano. There is an isolated area in the region of Kayu Manang in Jorong Batu Palano. In this area, the major threat is critical land and landslides as well as the low level of education at the age of compulsory education. At the moment, there are only four local inhabitants studying at the Junior High School [5]. Generally, local people do not graduate from Elementary School. The low level of education will also be a threat on their environment management because of their low capacity to anticipate the situation and conditions of the environment.
3.3. The Action Plan and the Implementation

Based on the threats and identification disasters potential, DAG conducted the community discussions by the help of student facilitators who are the participant of KKN-PPM (student community service program to empower the community) to identify the alternative action plan to reduce disaster risk as well as to manage their environment. First the alternative action plan identified in Jorong Sawah Suduik are: (1) to determining the evacuation path/track, (2) to identify the gathering site to install the evacuation signals on the existing evacuation tracks, (3) to clean the drainage canals from rubbish, and (4) to manage the rubbish with waste bank.

Second, in Jorong Nan Tigo, the action plans are: (1) to plant the trees on the critical lands, (2) to conduct agricultural extension on plant diseases by plant hoppers and pigs and how to overcome them, (3) to spread the information about climate change and how to overcome the effects.

Third, in Jorong Batu Palano the action plan are: (1) to clean the existing evacuation track (2) to design, make and install evacuation signals and gathering sites/spots, (3) to plant the appropriate trees on the critical lands potential to landslides and flash floods especially in Kayu Manang, (4) to spread information on how important education is the age of compulsory education, (5) to fix the irrigation canals and broken drainage.

Finally, in Jorong Gelanggang Tangah the action plan are: (1) to design, make and install the evacuation signals and gathering spots/sites at the appropriate location, (2) to work together with the community on the gutters and the potential area to disturb the water flow, (3) to spread the information and do the coaching to establish and operate waste banks to the members and administrators of DAG, (4) to make the signals of water levels as the early detection to do the evacuation.

The action plans for the respective jorong are done based on the priority scale during the KKN-PPM program. The actions that can be done are (1) to clean the evacuation tracks, to determine the evacuation tracks and gathering spots, (2) to make and install evacuation signals in Jorong Sawah Suduik, Batu Palano, and Gelanggang Tangah; (3) to plant trees in the critical land areas in Jorong Batu Palano and Lurah Nan Tigo; (4) to coach the DAG with waste bank in Jorong Sawah Suduik and Gelanggang Tangah. By the operational of Waste Bank, the waste could be a blessing [8]. As well as to help DAG to get the capital cost in managing their environment.

The identified and conducted action plans in Nagari Salayo is the manifestation to be a disaster resilient nagari in Salayo gradually [1] as required to be disaster-resilient nagari [3]. Some action plans which are not yet done are (1) to install the signals for early flood detection in Jorong Gelanggang Tangah, and (2) to conduct the agricultural extension on plant diseases and how to overcome them. For this purpose, DAG is hoped to continuously bring the agricultural experts to help the people of Jorong Lurah Nan Tigo to overcome the threat on their agriculture land.

4. Conclusion

The establishment and affirmation of DAG in the 4 jorongs in Nagari Salayo is the concern of the community and the local government in managing the environment to realize a disaster resilient nagari. The learning on the potential and threat of disaster has contributed to improve the capacity of DAG in managing the environment and disaster threat in Nagari Salayo. The Disater Alert Group (DAG) have succeeded to identify the potential and threats of disaster in respective jorong. Floods, landslides, whirlwinds and climate change effects are the threats for local community. The action plans that can be done are planting the trees, installing the evacuation signals on evacuation tracks, improving irrigation canals and drainage, coaching on Waste Bank to the DAG. Two action plans which are not done yet, and supposedly to continue by DAG are installation the signals for early flood detection in Jorong Gelanggang Tangah and the agriculture extension in Jorong Lurah Nan Tigo.

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