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RISK ANALYSIS AND COMMUNITY BASED DISASTER MANAGEMENT PLAN OF SATEEK VILLAGE, AIZAWL DISTRICT, MIZORAM, INDIA

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ABSTRACT

Sateek village is vulnerable to plenty of disasters such as earthquake, landslide, forest fire and disease outbreak. Some other features like poverty, remote area from the city, lack of hospital and other emergency services make the people of this village more vulnerable.

The present study deals with the idea of community based disaster management (CBDM) and their risk assessment in Sateek village, which is located in Aibawk block of Aizawl District, Mizoram, India. The data used in this research include collection of primary data through interview, questionnaire and Secondary data. Landslide risk analysis was carried out in quantitative approach. The study seized disaster assessment, resource analysis, risk and vulnerable profile and response plan and interpretation in various disaster of Sateek village and how community based disaster management (CBDM) plan can help the people to cope with hazards.

Keywords: Sateek Village, PRA Tools, Hazards, Risk Assessment, Response Plan.

Introduction

Any unexpected events which brings the loss of life and even property; disrupting the socio-economic conditions of a place is disaster. Disaster can occur any time and at any place in a small or large scale. During

disaster, people at the community are the first responder and have more to lose since they are vulnerable to the effect of hazardous event (Priyanka & Ravindra, 2012). “Communities are actively engaged in the identification, assessment, treatment

and planning for hazards and vulnerabilities of various kinds” (Krummacher, 2014). In order to reduce the loss due to disaster to a minimum, community plays an important role (Jonathanet, *al.*, 2009). The present study emphasizes the importance of community base disaster management (CBDM) since it is the people of the community who knows best what their hazard and risk are. Through CBDM, capacities of the people to respond to emergencies caused by disaster can be increased and strengthened to enable to cope with hazards (Surya Prakash, 2008).

The study area is Sateek, a medium size village located in Aibawk block of Aizawl District, Mizoram, India. It is apt to a number of disasters such as earthquake, landslide, forest fire and disease outbreak. Increasing population with unplanned development are the other two key factors for increase in the risk of disaster. In order to manage the high risk in disaster requires systematic, long-term and reconciled disaster risk management intercession. In order to meet this, a survey on risk and hazards of the village is required which is the initial for Disaster Risk Management in the village.

Methodology

Collection of primary data is done using Participatory Rural Appraisal (PRA) tools such as surveying and sampling of the study area employing transect walk and wealth ranking and also conducting interviews to the villagers. Attitude of the rock bed (angle of inclination of the rock bed and dip direction) was collected using Brunton compass in order to analyze the risk

of landslide. Secondary data was also collected for analyzing and combine with the primary data for interpretation.

Village Profile

Sateek is a medium size village occupying Aibawk Block of Aizawl district, Mizoram with total 188 families residing; having its own post office with pin code 796005. The sub district head quarter is Aibawk; 2 km from Sateek village. The district headquarter of the village is Aizawl.

Geology, Geography and Demography

The study area is within Aizawl District, about 32 kms to the south of Aizawl city with coordinates of 21°32'33''N to 21°32'54''N latitudes and 92°42'14''E to 92°42'25''E longitudes with an elevation of approximately 940 m above sea level. The geology is mostly sandstone with alternation of shale and siltstones with average dip of approximately 49° due East. The Sateek village has population of 859 where 431 are males and 428 are females as per Population Census 2011 (Census India, 2011) but the present population nowadays is 1022, of which 506 are male and 516 are female with an increase in population of 163 from Population Census 2011. The life expectancy is around 60 yrs.

Socio-economy

The agriculture sector employs more than 80% of the village population of Sateek village. People heavily depends on agriculture to ends meet. Agriculture outputs are mostly used to daily consumptions and a little surplus is slow in the local market.

Administrative arrangements

Village council President is the political head of the village and under him are three village council members. The public service of the village is overseen by the Block Development Officer (BDO) and is also responsible for developing plans and provide advice and support to the Village council members.

Housing and other infrastructure

Housing: Maximum number of the houses of Sateek village are single to double storey generally build of light bamboo and wooden materials.

Roads: Sateek village is connected by a National Highway 306 which runs almost parallel to the north-south mountain ridges of Mizoram from Aizawl and the connection road is diverted towards east from the main road of about 1 to 1.2 km only. There is only one entry and exit road existing as of now. RCC road is also common inside the village. All the roads are in proper condition.

Communication: The village has good mobile connectivity of BSNL, Airtel, Vodafone, JIO network and communication media like radio, TV and newspapers are also available in Sateek.

Climate

The village has three seasonal calendars namely the cold season or winter, the warm season or spring and the wet season or summer. The cold season start-off from November till February while the warm season initiate from March and generally last till May. The wet season or rainy season which holds the longest season onset from

May and last till October (Rintluanga, 2009).

Capacity/Resource Analysis

- a) **General Resource:** It includes the resources of the villages as given in Table 1.1.
- b) **Social Infrastructure**
 - i) **Community Resource:** The resources of community of Sateek village is given in Table 2.1
 - ii) **Livelihood:** The subsistence of villagers of Sateek is given in Table 2.2
 - iii) **Medical skilled person:** The type and quantity of medical skilled person of Sateek Village is represented in Table 2.3
 - iv) **Search and Rescue Equipment:** The type and quantity of equipment available for search and rescue of Sateek Village is represented in Table 2.4
 - v) **Skilled Human Power other than Medical related:** In case a disaster strike the village, other than the medical people, skilled people among the community plays an important role in rescue. The type and number of skilled human power other than medical people of Sateek village is given in Table 2.5
 - vi) **Water Reservoir:** The total number of reservoirs including private reservoir and their conditions of Sateek Village are given in Table 2.6
 - vii) **Open Space:** A place for self-shelter or a vast place suitable for temporary/refuge shelter/Relief camp of Sateek village is given at Table 2.7.

Table 1: General Resources of Sateek Village (Data collected using transect walk of PRA Tools)

Sl. No.	Particulars	Total No.	Contact person/ Mobile number	Distance from Village
1.	Nearest Police Station/ Out post	Nil	Kulikawn P.S.	32 km
2.	Nearest Fire Station	Nil	Aizawl P.S.	36 km
3.	Petrol Pump	Nil	Ngaizel	31 km
4.	Power Transformer	3 (250 KV, 150 KV & 100 KV)	P&E Department	Inside the Village
5.	Water pump station	1	Tuirivang	15 km

Table 2.1: Community Resources of Sateek Village (Data collected using transect walk of PRA Tools)

Sl. No.	Particulars	Total No.	Contact person/ Mobile number	Distance from Village
1.	Fair price shop	1	H. Zokhuma	Inside the Village
3.	Hospital	Nil	Falkawn hospital	15 km
4.	Health sub-center	1	Lalrinkimi (Health worker) Mb- 8014446750	Inside the Village
5.	Medicine Shop	Nil	N.A.	N.A.
6.	Community Hall	1	Zothankima	Inside the Village
7.	Cottage Industry	Nil	N.A.	N.A.
8.	Godown	Nil	N.A.	N.A.
Institution (Government & Private)				
9.	Primary School	2	-	Inside the Village
10.	Middle School	2	-	Inside the Village
11.	High School	2	-	Inside the Village
12.	Higher Sec. School	Nil	Aibawk	2 km
13.	College	Nil	Aizawl	32 km
14.	University	Nil	Mizoram University	45 km

Table 2.2: Livelihood of villagers of Sateek (Data collected by interview)

Sl. No.	Name of work	Total no.
1.	Government employee (Regular)	20
2.	Government employee (Master roll)	10
3.	Business	12
4.	Farmer	80% of the population
5.	Others (Teachers, BDO Office, Sub center)	16

Table 2.3: Medical skilled person of Sateek village (Data collected using transect walk of PRA Tools)

Sl. No.	Designation	Total No.	From
1.	Doctor	Nil	Aibawk PHC
2.	Nurse	Nil	Aibzawk PHC
3.	Pharmacist	Nil	Aibzawk PHC
4.	Health worker	2	Inside the Village
5.	Veterinary Doctor	Nil	N.A.

Table 2.4: Search and Rescue Equipment of Sateek Village (Data collected using Surveying and sampling method of PRA Tools)

Sl. No.	Particulars	Total No.
1.	Crane	Nil
2.	Bulldozer	1
3.	Tree Cutter	5
5.	Chain Saw	3
6.	RCC Cutter	Nil
7.	Generator	1
8.	Tarpaulin	216 (approximately)
9.	Excavator	Nil

Table 2.5: Skilled human power other than Medical related of Sateek village (Data collected using Surveying and sampling method of PRA Tools).

Sl. No.	Particulars	Total No.
1.	Carpenter	4
2.	Mason	7
3.	Mechanics	6
4.	Engineer	Nil
5.	Electrician	4
6.	Army Pension	6
7.	Journalist	Nil

Table 2.6: Water Reservoir of Sateek Village (Data collected using Surveying and sampling method of PRA Tools).

Sl. No.	Particulars	Total No.	Total Liter	Conditions
1.	PHE Reservoir	2	8 lakh	Good
2.	Personal Reservoir	195	N.A.	Good
3.	Pond	1	N.A.	Good
4.	Surface water (Tuikhur)	6	N.A.	Good

Table 2.7: Open Space of Sateek Village (Data collected using Surveying and sampling method of PRA Tools).

Sl. No.	Particulars	Total No.	Area	Conditions
1.	Indoor Stadium	Nil	N.A.	N.A.
2.	VC/ YMA Hall	1	72 X 35 ft.	Poor Structure
3.	Playground	1	100 X 50 m	Good
4.	School	3 Total		
	Govt. Primary School	1	72 X 32 ft.	Moderate
	Govt. Middle School	1	72 X 32 ft.	Moderate
	Govt. High School	1	150 X 50 ft.	Moderate
5.	Kawn	3	150 X 100 ft.	Good
6.	Church Hall	2 Total		
	Presbyterian Church Hall	1	100 X 40 ft.	Good
	UPC Church Hall	1	24 X 15 ft.	Good

c) Village Risk Profile

Part of the recent disasters that have been recorded in and around Sateek village is illustrated in the table 3.1

i) Disaster History and its impact

Table 3.1: Disaster History and it's impact of Sateek village

Sl. No.	Disaster	Year	Impact
1.	Earthquake (Region: Myanmar-India border, Magnitude- 6.8) Source: Indian Meteorological Department website	13.04.2016 (7:25 p.m.)	Earthquake does not have any impact on this event. There was no record of loss of life and property to the community.
2.	Earthquake (Region: Champhai, Mizoram, Magnitude- 3.5) Source: Indian Meteorological Department website	14.04.2016 (9:53 p.m.)	Earthquake does not have any impact on this event. There was no record of loss of life and property to the community.
3.	Landslide (Source: through interview of villagers)	July 2017	The landslide took place at the outskirts of the village at the plantation site and a vast area of cultivated land was lost.
4.	Forest fire (Source: through interview of villagers)	February 2015	About 70 sq. m of forest was totally burnt

5.	Cyclone	Nil	N.A.
6.	House fire	Nil	N.A.
7.	Vehicle accident	Nil	N.A.
8.	Others	Nil	N.A.

ii) Vulnerable Profile

- Food Insecurity: Of the total population, Majority of Sateek families rely upon agriculture and incase it is destroyed by forest fire, landslide or any other disaster, the vulnerability is very high as cold storage for food is absent in the village.
- Village on hill slope: Since the village is located on a hill slopes with a mean dip angle of 49° , it is highly vulnerable to landslide especially during earthquake and monsoon season.
- Limited Access: The village is located at 2 km away from National Highway and have no access to wide roads. Thus, communities are highly vulnerable as speedy emergency evacuation is very difficult.
- Limited response capacity: The village as well as neighboring areas have very little limited capacity in terms of emergency evacuation, warning dissemination equipment, search and rescue and emergency health services. This vulnerability can aggravate small disaster.

iii) Risk Profile and Hotspot

Sateek village has a high-risk profile on earthquake since it lies at the Indo-Burma accretionary prism

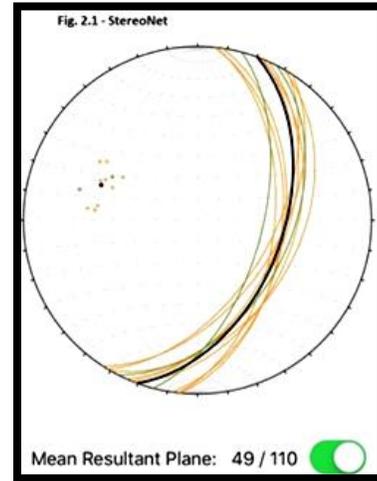
(Nandy, 2017) which is one of the largest accretionary prisms in the world that is still growing till date. The growing of this accretionary prism is due to the collision of Indian plate with the Eurasian plate towards North-North East at the rate of 5 mm/year and the collision of Indian plate with the Burmese Plate towards South-South west which forms a north-south trending mountain ridge (Steckler *et. al.*, 2016). According to the Indian Standard criteria for earthquake resistance design of structure [IS 1983 (Part 1): 2002] North-east India falls under zone V which is the most prone area in terms of earthquake in India.

Sateek village has also a high-risk profile on landslide which can be triggered both by earthquake and heavy rainfall. Since the village lies at the top of anticlinal limb, the slope angle is very high and also the rocks are structurally weak as they are mostly weak siltstone that have a low resistant to weathering and can easily break. Data of Rock attitude collected using Brunton compass and are given in the table below:

Table 4.1: Rock attitude of Sateek village.

Sl. No	Dip Direction	Slope angle	Lithology
1.	150 (SSE)	59°	Sandstone
2.	117 (SEE)	46°	Sandstone
3.	112 (SEE)	50°	Siltstone
4.	111 (SEE)	43°	Shale
5.	98 (SEE)	48°	Siltstone
6.	121 (SEE)	55°	Shale
7.	123 (SEE)	52°	Siltstone
8.	96 (SEE)	53°	Sandstone
9.	114 (SEE)	48°	Siltstone
10.	96 (SEE)	49°	Siltstone
11.	120 (SEE)	41°	Siltstone

These data are used to plot at Stereo net which can tells us the direction of failure during landslide. So, from the stereo net plotting (Fig. 2.1), mean dip direction is 110° i.e. SSE which depict bedding failure of rocks and debris will occur along South-South East direction. The high slope angles with a mean of 49° also depict that rock sliding can occur anytime in and around Sateek village.



Result and Discussion

Based on the past experience, present field data and literature review, the following hotspots with likely impact have been identified in table 5.1:

Table 5.1: Hotspot and likely impact of disaster of Sateek Village

Sl. No.	Hazard	Hotspots	Likely Impact	Probable months
1.	Earthquake	Whole village	<ul style="list-style-type: none"> Human and animal live lost Houses, schools, Hall and other infrastructure damage Law and order 	Any time
2.	Landslide	Whole village especially SEE	<ul style="list-style-type: none"> Houses blown away 	June to October.

		region	<ul style="list-style-type: none"> • Cash crop destroy 	Can also be trigger by earthquake
3.	Cyclone	Whole village	<ul style="list-style-type: none"> • Houses destroy • Cultivated land 	June to October
4.	Public Health emergency	Whole village	<ul style="list-style-type: none"> • Human live lost • Livestock lost 	Any time

Response Plan:

It includes the setting up of Disaster Management Committee (DMCs) and Disaster Management Team (DMTs) in the village.

Disaster Management Committee:

So far, Sateek village has already setup Disaster Management Committee (DMCs) under the chairmanship of Mr. Lachenpuia, President, Village Council Court. The DMCs OB select one member each from other NGO’s such as MHIP, MUP, MZP and self-help group of the village.

Disaster Management Team:

The DMCs have appointed members for Disaster Management Team and each group has been given responsibilities like Warning team, Evacuation and Response team, First aid team, sanitation team, Shelter management team, Relief management team, Counseling team, Damage assessment team, Rehabilitation and response team.

Conclusion:

As per the studies, Sateek village is very susceptible for disaster especially Landslide, earthquake, forest fire and disease outbreak. The study also reveals that incase a disaster strike, vulnerability is very

high since the village is located on a hill slopes with a mean dip angle of 49° with weak siltstone which is highly vulnerable to landslide especially during earthquake and monsoon season. High vulnerability is also due to absence of cold storage of food; limited access and limited emergency evacuation; absence of hospital, doctor and nurse; absence of Police and fire stations; low livelihood of the villagers; limited skilled human power and limited search and rescue equipment while response plan is very low. The role of Sateek village people is very inconsiderable to manage and mitigate such kind of disaster. With Community Based Disaster Management, people in the communities have been able to systematize and act quickly. So, formulation of Disaster Management Committee and Disaster Management Team and awareness campaign in the community will help the poor people of Sateek to work collectively to solve their problems when in case a disaster hit, which in turn will not only decrease their dependence on Government but also make them disaster resilient.

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