

Strengthening Disaster Risk Governance to Manage Disaster Risk

Case Study from Tamakoshi River Basin of Central Nepal

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Key words: earthquake, disaster, risks management, governance

SUMMARY

The notion of earthquake disaster is pre-occupied in Nepali people for long time based on legacy of 1934 quake AD. Government and INGOs have worked, to some extent, in disaster risk management centralizing their activities in Kathmandu. In this respect the first quake of April 25 with magnitude of 7.6 in Richter scale and subsequent quake of 7.3 magnitudes on May 12, 2015 devastated northern part of Tamakoshi River Basin completely. Most of the houses and structures of upper part (Singati, Dolakha, Charikot) area which had withstood first quake with some crack were razed entirely by the second quake. The disaster has challenged the expert judgment of Scientist/Geologist and even changed the local people's perception and mentality towards magnitude, extent and disaster of earlier beliefs. The process of decision on disaster risk management and its implementation has to face cumulative challenges. Even under-going construction works of Upper Tamakoshi Hydropower Project came to halt. The continued aftershock also concentrated (70 per cent) in Dolakha district of Tamakoshi River Basin. The spatial distribution of risks over time, space and people are not in existing model and can occur at any time. The assessment of the present study found that more damages occurred in upper part than southern part. The objectives of this paper are

- to analyze the assessment of the existing pattern of disaster,
- to understand disaster risk governance and
- to analyze the disaster based on "Transparent Model" on the observation of the study area from June and July (26th June to 3rd July) 2015, Key Informant Interview(KII) and literature review.

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1. Introduction

Risk governance involves the transition of the substances and core principles of governance to the context of risk related decision making (Gunningham et al ,1998). It includes, but also extends beyond, three conventionally recognized elements of risk analysis (risk assessment, risk management and risk communications). It requires the consideration of the legal institutional, social and economic contexts in which risks is evaluated and important of the actors and stakeholders who represent then. Governing choices in modern societies is seen as aninterplay between government institutions, economic forces and civil society actors as NGO's CBO's. In these perspectives non- state actors play an increasingly relevant role and became more important since they have decisive advantages of information and resources compare to single states.

Risk governance denotes both the institutional structure and the policy process that guide and restrain collective activities of a group, society or international community to regulate, reduce or control risk problems. The contemporary handling of collectively relevant risk problems has been shifted from traditional state-centric approaches with hierarchically organized governmental agencies as the dominant locus of power to multi-level governance systems, in which the political authority for handling risk problems is distributed to separately constituted public bodies (cf. Rosenau 1992; Lidskog 2008; Lidskog et al. 2011).

Furthermore, risk governance incorporates expert, stakeholder, and public involvement as a core feature in the stage of communication and deliberation. The reliance on expanded inclusion of stakeholders in the risk governance process was the central theme of the contributions by Lidskog et al. (2011) as well as by Karlsson et al. (2011).

It includes formal institutions and regimes and informal arrangements. It refers to the totality of actors, rules, conventions, processes, and mechanisms concerned with how relevant risk information is collected, analyzed, and communicated, and how regulatory decisions are taken (IRGC 2005, 2007; van Asselt 2007). The ambition is that risk governance similar to governance in general provides a conceptual as well as normative basis for how to deal responsibly with uncertain, complex and/or ambiguous risks in particular (van Asselt and Renn in press).

2. Brief Historical Background

Over the last century, the Himalayan arc has been struck by six devastating earthquakes e.g. 1897 (M 8.1) Shillong earthquake, 1905 (M7.8) Kangra earthquake, 1934 (M8.2), Bihar-Nepal earthquake, 1950 (M.8.7) Assam earthquake, 1988 (M6.6) Udayapur earthquake, and 1991 (M6.9) Uttar Kashi earthquake claiming lives of thousands of people in the region. As the eastern Nepal witnessed two devastating earthquakes namely Bihar-Nepal earthquake (1934) and Udayapur earthquake, among within former earthquake ruptured hundreds of kilometers in eastern Nepal causing wide spread damage in the region (Bhattraai and Bhandari, 2011). People of Nepal experienced deadly earthquake disaster risks. The quake of disaster shake the middle part of country 58 seconds (April 25, 2015) and 30 seconds (May 12, 2015) loss more than 8800 lives and billions of property and destroyed environmental economic, social and cultural system too. Within the 18 days from the first to the second earthquake a total of 178 aftershock with magnitude of 4 Richter was recorded in Department of Mines and Geology (DMG) while similar types of shock was recorded only 130 during period of five year from 2010 to 2014. (Table:1)

Table 1: Number of Earthquake within the last five years from 2010 to 2015

Year	Number	Remarks
2010	15	
2011	42	Taplijung and Sikkim epicenter with 6.8 magnitude
2013	25	
2014	11	Solukhumb epicenter with 5.9 magnitude

During the second earthquake of May 12 2015, the major area ruptured was in Dolakha (See Table -2)

The earthquake magnitude of the earthquake area:

Date/Time	Magnitude	Epicenter	Shaking Time	Category
April 25 , 2015	7.6	Barpak , Dolakha		Strong/Violent
May 12 , 12:52	6.8	Dolakha	About 30 second	Strong/Hign
1:02	5.8	Dolakha		Medium
1:21	6.2	Dolakha		
1:51	5.3	Dolakha		Medium
1:58	5.3	Sindhupalchowk		Medium
2:06	5.3	Dolakha		Medium
2:44	5.3	Dolakha		Medium

Source: Republica , May 13, 2015

Within Dolakha district, the epicenter was in middle part of Jhyanku, Suri and Chilankha and Sunkhani lying at the distance of 19 km to 40 km north from Charikot, district headquarter. The second major quake was also surprisingly strong and definitely related to main magnitude 7.8 Gorkha rupture on first earthquake and likely to set off its own series of aftershocks and raised series of question concerning the earthquake like :

What aftershocks really are? How to best make people aware of their likelihood as well as chances of another major rupture. Is first rupture which came after 82 years is enough for releasing the energy of earth crust ? What is temporal and spatial extent of major and aftershock ? How much energy releases from one major earthquake ? What is the probability of earth quake hazard occurrence in one particular region ? What is the susceptibility/probability of hazard exposed ? What is the existing capacity of community? what would be the appropriate measures to reduce the vulnerability and what are the significance means of risk assessment ?.

Among the natural disaster, earthquake is considered as a peculiar and the most destructive because it has almost no onset time and can cause massive and wide spread damages to life and property in a few seconds. In addition,, it can induce several secondary disaster like flood , fire landslides, land subsidence, tsunami etc. The present loss due to hazard of the earth quake is more than other calamities in the country. For example, Nepal losses more than 300 lives each year due to water induced disasters which are likely to be aggravated further in coming years due to climate change /variability induced factors. (MoHA, 2009). Among the major hazards, floods and landslides are the most recurrent in Nepal, claiming on average of 2111 lives annually in the past ten years. Flood is considered natural hazard event which may occur on a regular basis in river and it is the largest cause of material losses (in terms of infrastructures, property and lives of people) while landslides appear to be the largest killer-hazards

The northern part of Tamakoshi River Basin has been known for Glacial Lake Outburst Flood (GLOF) and related climatic hazard along with historical cultural, tourism, conservation and hydropower potential zone. The earth quake of the May 12 devastated the area totally.. The detail geological phenomena is not known but some kind of regional phenomena is found. There is no possible link to this with present damage caused by the quake. However, general pattern of district is available in various documents The purpose of this paper is to understand the existing pattern of disaster risk governance and its management collectively and through disaggregation by basin.

3. METHODS AND DATA

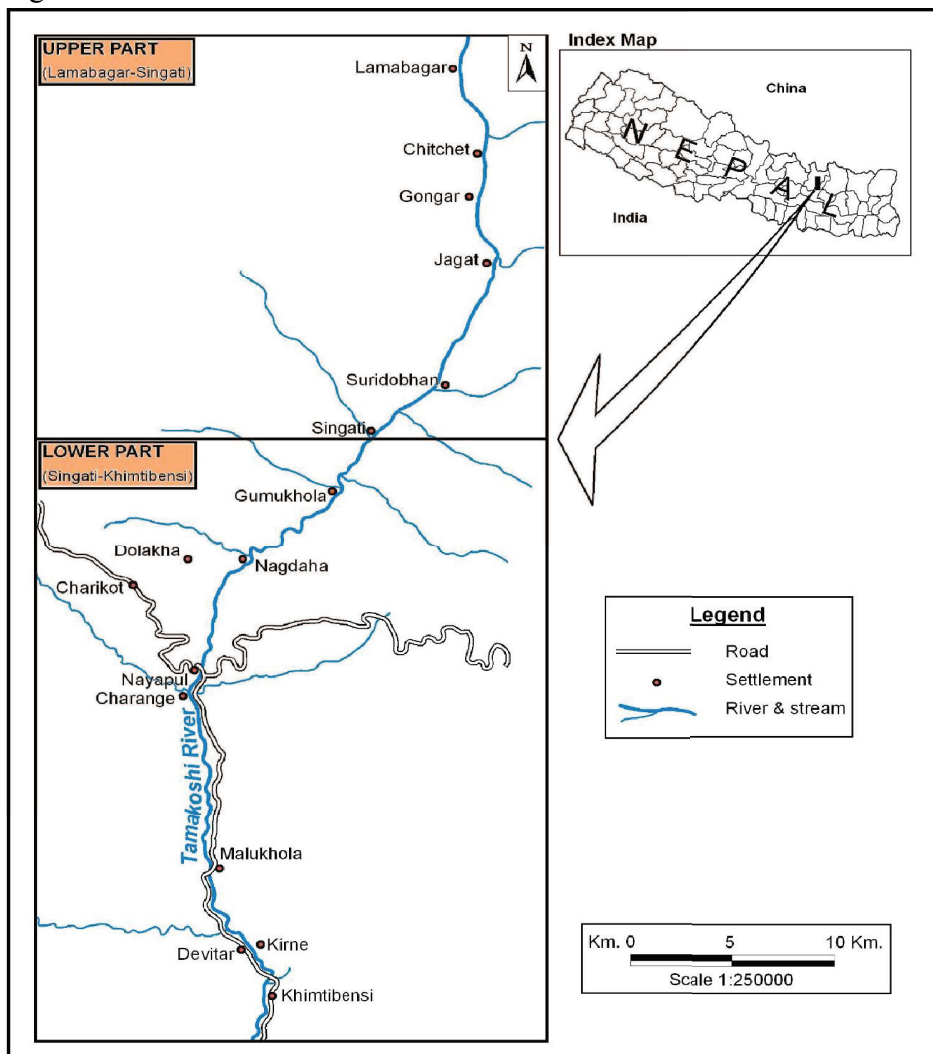
The present paper is based on field survey of the area from June and July (26th June to 3rd July) 2015. Similarly, the and secondary data has been derived from daily national news, Feasibility reports, key interview informants and Conservation related reports and news

covered by various weekly papers. For this paper, available disaster data for two districts namely, Dolakha and Ramechhap have been utilized.

3.1 Study Area

The study area is located in Lamabagar VDC of Dolakha District, Janakpur Zone in the Central Development Region (CDR) of Nepal. Geographically it lies between the latitudes $28^{\circ} 10' 00''$ N and $27^{\circ} 50' 00''$ N and longitudes $86^{\circ} 15' 00''$ E and $86^{\circ} 05' 00''$ E. The area is accessible from Kathmandu via 122 km long asphalt road up to Charikot bazaar and by another gravel road of 68 km up to Lamabagar village. (Fig.1). Similarly, southern part of the study lies at distance of 58 km south east from Charikot. The southern part is also accessible through Banepa – Bardibas road which is more shorter than Charikot bazaar.

Fig.1: Tamakoshi River Basin



by: Chhabi Lal Chidi, Central Department of geography, T.U.

The area comprising Dolakha and Ramechhap districts is located at Janakpur Zone, Central Development Region. Dolakha district is situated towards the north-east of Kathmandu at a distance of 133 km. It is extended over 2,141 sq. km. from an altitude of 840 meters to 7,183 meters above the sea level. Similarly Ramechhap district is situated toward the south east of the Kathmandu at distance of 185km.

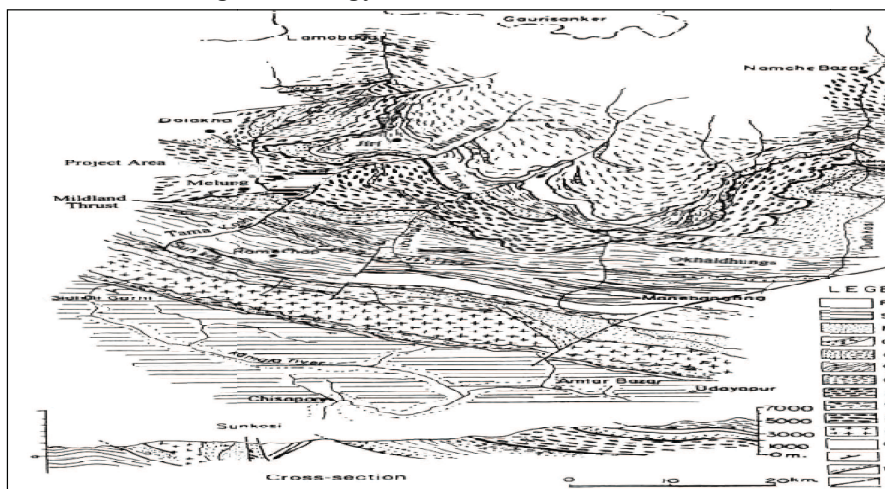
Dolakha District is composed of 51 VDCs and two municipalities and Ramechhap 51 VDCs and two municipalities. The VDC and municipality are further sub-divided into wards. There are nine wards in each VDC's and the number of wards in a municipality ranges from 9 to 35. Bhimeshwor Municipality, the municipality of Dolakha district, is divided into 13 wards and Manthali municipalities into 15 wards.

3.2 Brief Geology of Tamakoshi River Basin

The study area lies within the Lesser Himalaya to Higher Himalaya zone from south to north (Figure 2). The Main Central Thrust separates Higher Himalayan and Lesser Himalayan zones. The Main Boundary Thrust further separates lesser Himalayan rocks from the Siwaliks lying in the south. These are two major geological structures that extend approximately east to west, throughout the Himalayas. Besides, there are other minor faults and folds. The MBT is approximately located 45 km south and the MCT is located 35 km north from the district head quarter Charikot of Dolakha district

The upper part of the basin is composed of gneiss, slate, Dolomite and phyllite and southern area consists of recent alluvium deposits, old alluvium terrace, colluviums, and quartzite hyalite with inter bedded schists and Gneiss rock. The lithological structure of the Kirne site was found consisting of grey slate quartzite with some quartzite inter calculation of black slate and green schist, mica schist with occasional garnets. The rocks were represented by low to high grade metamorphic rocks of Precambrian age. The gneiss were well exposed in along Tamakoshi and its tributaries like Khimti, Ranjhor, Sukajhor Bhatauli rivers.

Fig.2: Geology of Tamakoshi River Basin



4. Theoretical Framework

Risk and uncertainty are two central concepts considered as two separate entities in decision theory of risk management. Risk is present when future events occur with measurable probability and uncertainty is present when the likelihood of future events is indefinite or incalculable. The paper is based on the principles of disaster risk governance.

The present article is based on “Transparent model”. The core component of the models is risk assessment policy related with socioeconomic policy of risk and disaster management. The theory is based on three components:

Risk Assessment (Scientific consideration)

Risk Evaluation (Technical, economic and social consideration)

Risk Management (Policy outcomes, regulations and communication).

4. Existing Pattern of Disaster

The entire country falls in a high earthquake intensity belt: almost the whole of Nepal falls in high seismic risk scale of MMI IX and Xi for the generally accepted recurrence period. The seismic zoning map of Nepal, which depicts the primary (shaking hazard), divides the country into three zones elongated in northwest-southeast direction; the middle part of the country is slightly higher than the northern and the southern parts. The flat plains of Tarai in the south of the country show the highest level of susceptibility to liquefaction. The middle hills and the higher mountains are highly susceptible to landslides including earthquake-induced ones. The middle hills and the high mountains are typically also susceptible to the phenomena of debris flow, including those due to landslide damming, cloudbursts and the resulting debris slides and flows, excessive erosion on the hill slopes, and rock falls.

A recent study (UNDP/BCPR, 2004) ranked Nepal, in terms of relative vulnerability to earthquakes, as the eleventh most at risk country in the world, and thirtieth with respect to floods. Another report (World Bank, 2005) classifies Nepal as one of the global ‘hot-spots’ for natural disasters. The Disaster database in Nepal prepared for 1971-2003, shows the trend of one disaster event with two resultant deaths occurring every day over this period.

Tamakoshi area is prone for natural calamities of landslide, Glacial lake Outburst Flood (GLOF) and monsoon related activities. The first earthquake of April 25 made moderate loss in the basin with development of cracks in cemented building and devastating of the mud house too. The pattern of sample locality is presented below;

Table 2: Devastation of Settlements of Tamakoshi River Basin

Locality	Relative Location km/Direction	% Disaster	Remarks
Lamabagar	68 N	98	22 houses damaged except cement one
Gonger	58N	98	20 houses devastated
Jamune	53N	98	12houses damaged except cement one
Bhorle	56N	98	17 houses divested
Gurumphi,	53N	98	23 houses divested
Suri Dovan,	49N	98	17 houses divested
Manthali of Orang	42N	99	9 Houses Divested
Jhangreli	39N	99	7 houses Divested
Singati	38N	99	Out of 350 houses, three pillar system houses standing, More devastated in Laduk Singati than Lamidanda Even pillar system houses are overturned, Almost dead settlement
Kholikehm Bzar	39N	99	32 HH devastated
Gumukhola	34N	98	29 Houses Divested
Pikhuti	33N		7 Household damaged
Dolakha Old bazaar	4 N	95	Devastated all mud houses Except pillar system houses
Jeelu	4E	95	
Nagdaha	11E	95	8 houses divested and remaining crack and tilt
Marbu	24E	95	150 houses damaged
Kiratichhap	5E	95	23 houses damaged
Mainapokhari	38E	20	12/15 house develop crack damage
Hat danda	40E		Except cement houses all remaining demolished
Charikot	HQ(O)	90	Cemented structures Charighyang, Old bazaar overturned and devastated, liquefied in some places , structures of simpani liquefied,
Malepu	11N	90	8 hh devasted

Barbise	22S	90	60 outd of 90 housheld damage
Malukhola	26S		18 out of 25 household damaged completely
Kirnetaar	34S	75	Old houses ruined but cracks developed in pillar structures houses .
Nayabasti	30S	70	12 hh out of 20 damaged
Majhi gaon	22S	90	33 Houses damaged o
Khimti	34S	70	14 huses damage out o 30
Tilbun	42	70	12 housed damage out of 20
Haldibensi	46		10 houses damafd out of 20
Chisapani	50	67	135 houses damaged out of 270
Karembote	52		14 hh damaged out of 33
Manthali	54S	70	Old mud houses are ruined, but cracks developed in some pillar structures, bt bazaar remain unstable
Odare	58S	65	7 houses
Kanauri	60S	00	30 houses
Hattitaar	64S	60	22houses
Pakarbas	64S	60	35 Houses divested (Hattitar)
Seleghat	70S	60	47 Houses divested
Urban Settlements		70	
Rural settlements		95	

Source: Field Survey 2015 and Shrestha, 2015

The devastation occurred in VDC's like Gairimudi, Ghushaphadi, Namdu, Lamidanda Suri, Phaksu and Sunkhani and rural part of Bhisiehoswr municipality like Cha thali, Nagdaha, Sokla.

6. Disaster Risk Governance and Management

Different governance systems have been evolved rapidly in the country after changing political system in 1990. Prior to that the Ministry of Home Affairs with some powerful NGO's and INGO were involved in disaster risk matter. Following set up of Parliamentary system in the country 1991, decentralization of power at the local government level became a subject to discussion and different amendment of the rules and regulation of decentralization were amended which made local people responsive to work in such a disaster management level too. Different types of NGO's Community Based Organizations (CBO's) became powerful in the local area. Similarly the Local Self –Governance Act 1998 has made the local government bodies more responsive to devise and oversee the development works being carried out by themselves or by thought agencies within their jurisdictions. Further changes occurred in

governance rules and regulations after set up of republications in the country in 2005. The brief activities on the governance system carried out during the risk period are presented below

6.1 Line Agencies of Government Stakeholders - Government authorities at the district level, enforces the law and regulation, provide budget for implementing disaster relief activities, and carry out the strategic decision made at the central level. Under the coordination of line agencies from the government side Chief District Officer (CDO) is responsible for disaster relief work. The Nepal Army and the Nepal police of the Bardbhadur Gaulem from Charikot did a remarkable job. However, but the government filed as they are not able to make decision promptly and help the needy people.

6.2 Inter- coordination matter/Issues Coordination of Ministry of Home Affairs and DMG is essential. The relief materials including tarpaulin come to boarder and diverted to other district due to ineffective of government decision. Similarly, people who came to Nepal with relief material from Gujarat has to stranded for more than half day to get inside the district. The decision taken by bureaucratic has negative impact locally. Government only tried on the basis of command and control though bureaucratic process to control unwanted due advantages to some business persons,

6.3 Local Government -There has been lacking of consolidation of power with local governments and committees with a socio- political consensus. It is because of lack of local representative in the local unit. Due to lack of proper geological knowledge the local administration seemed poor success in field of disaster understanding and its management. Local people are now divided into different units and different political wing always conflict in power sharing, but consensus seemed in getting benefit from the government and forget own responsibility.

There were no local body and local political representatives are more aggressive and victim people seemed quite harassh for the government. The area is more remote and VDC secretaries are going with million of money. In such a situation how government can manage this issues safely. Where local people are trying to loot money of VDC secretariat. Similarly the local people even divided themselves separately to get more money from relief from the government.

6.4 Civil Society – Civil society is engaged in providing emergency services to earthquake victims. The area consists of 305 NGO's and over 75 per cent of most of them have worked in the disaster. But over fifty per cent of them were concentrated in district headquarter. It was civil society who come foreword. They came to help with whatever resources they had to help victims. Their responses was faster to meet the need of time. The NGOs, Clubs and youth from various organizations were the first to respond responses to the earthquake victims.

6.4.1 International society - Due to devastation in the area different types of international agencies have assisting in the area with establishment of several camps in the area. This has become a successful of minimizing the gap between the people and government. On the other hand the government itself has changed the CDO and other office bearers in the area. The overall natural conservation providing the power to local people. The properly. country lack the governance system. Not only that they even were confused to get proper location to assist people. The one of the member Surender Singh from Gujart reported, people had no trust for the government neither did the international ,partners had.

6.5 Private Organization - Since initiation of Khimti Hydropower in the middle part of the basin, the several development activities have been started in the basin. The two renowned hydropower which is undergoing to produce is Upper Tamaoshi Hydropower Project (456 MW) and running Khimti Hydropower (60 MW) recognized the basin famous for hydropower potential. Moreover, there is potentiality of about 2000 MW of different types of hydropower. But the role of private hydropower company seemed not so much encouraging in combating the disaster risk management during entire period.

After 1980's with SWISS and government efforts the successfully activity in the area is afforesting in the district. Due to that the area which was bare before were converted into greenery area. Many patches along the sloppy land are now converted in to greenery land.

6.6 Public Voice and perception

The recent earthquake brings many ups and down in the country. The Relief Rehabilitation and Reconstruction is done by government as per international rule and regulation of the world. The action taken by the government in the later stage is worth mentioning but its transparency and accountability is still doubt.

Government is not seen so active to curb disaster of the country when it was in the second jolt and epicenter was in Sunkhani of TRB. Each one has right to raise the voice. Their voice was to see their area whether it is safe or not. But it seemed that they seemed kept silent. Nepal government has already established Water Induced Disaster Prevention Centre under the financial assistance of Japanese government . However, the present need to create earth quake disaster prevention Centre in country to help all victims

People of Dolakha could not sleep well even after three months after quake disaster. Still the road of four and 8 km on way to Jhorong and Lapilang of road is completely destroyed and the undergoing construction of Upper Tamakoshi will be halt for another one year more . These issues should bb totally handled by the government.

GCAP established in 2009 has initiated awareness of nature or environmental conservation in the basin through public awareness program among local people. On an average nearly 100

tourists used to visit GCAP area every day during tourist season. It has been learnt that more tourist were stranded in the upper part of the basin.

7.0 Current Challenge in Disaster, Governance, Management and Risks

- Illegal deforestation /encroachment into forest land are now being encroached since hit by earthquake. There is absence of mechanism for protecting even community forest.
- In GCAP area the problem is encroachment and illegal works seemed more acute. There is absence of security mechanism of the district and security personnel are not safe over the area. They have posted sign for risk zone and non of them are present, as the area seemed more vulnerable.
- The villagers are divided in to open party politics and most of them have been influenced by party politics and works according to will of party politics, vested interests creating often conflicts in the society itself on the matter of management of disaster.
- The local people of the rural part themselves are success to build houses in their locality with materials available. But most of them are waiting of relief from the government and they are not allowed to do that due to present system of government decision.
- Lack of local body accepted by all communities is a problem for the disaster works in the village. Many of the youth and people who have alternate houses have left their villages and most of them are in foreign employment, leaving only the old people, women and children who have no lead roles in the society.
- Following the earth quake the number of family division of the household in the districts have raised more than fifty percent. The initial number of families was only 50,000 households but it was reached to 70 thousand and later the record came to 90 thousand. In 072/4/10 people belong to Dolakha residing in Kathmandu went to Jiri to get certificate of earthquake victim. They wanted to draw money from low interest rate of 2 per cent and want to invest in high rate of interest. This annual make lot of problem even real victim of the local area of basin.

According to a report presented by the team of lawmakers and Geologist after visiting the affected settlements of Dolakha, at least 15,277 households of 50 settlements need to be relocated at the earliest to minimize the damage caused by the monsoon while, 5,548 families of Ramechhap were recommended for relocation (The Himalayan Times July 10,2015, Ashad 25 2072)

8. Conclusions

The pattern of disaster is diminishing from north to south and existing knowledge of disaster risk in the basin is very weak. Movement of the surface needs to study more detail. Even Geologist does not substitute risk assessment easily saving people to provide assure not to fear with aftershock and saying with pure “better safe than sorry” attitude. The disaster risk

governance is also suffer from effective management due to lack of scientific and technological knowhow. The rupture of the rock makes tremendous loss in the basin and more devastating due to its geological structure and unsafe building materials. The entire devastation locality shows that the building was made of mud and they are near epicenter. The rate of ruins is diminishing from north to south. The proposed planning of any infrastructure should be based on the local geological condition and risk governance could be successful only with participation of local people, NGO's without any selfish nature and political bias. The country need special autonomous body with fair representation in the that committee to combat disaster risk management.

REFERENCES

Aven T, Renn O. (2010) Risk Management and Governance. : Springer, Heidelberg and New York.

Bhattraï G. K and Bhandari Deepak , (2011), Seismic Hazard Assessment for Eastern Nepal Using 1934 and 1988 Earthquake , Journal of Nepal Geological Society , Depart of Geology , 2011, Vol 42, pp85-93, Kathmandu.

Karlsson, M., M. Gilek, and O. Udovyk. (2011). Governance of Complex Socio-environmental Risks—The Case of Hazardous Chemicals in the Baltic Sea. *AMBIO*. doi:10.1007/s13280-010-0126-0.

Lidskog R. (2008)Scientised Citizens and Democratized Science. Re-assessing the Expert-lay Divide. *Journal of Risk Research*. ;11(1):69–86. doi: 10.1080/13669870701521636.

Rosenau JN. Governance (1992) Order, and Change in World Politics. In: Rosenau JN, Czempiel E-O, editors. *Governance Without Government. Order and Change in World Politics*. : Cambridge University Press;. pp. 1–29. Cambridge

Shrestha (2015) Interaction between River Ecology and Localo Communités in the Tamkoahi river Basin Central Mountain Region, Nepal, *Report Submitted to Faculty of Humanities and Social Science, Dean Office, Kathmandu*

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