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RIM4 is ISET platform's intellectual quest to build a Community of Practice on Disaster risk reduction, climate change, adaptation and resilience. The Ms in RIM4 represents Mechi-Mahakali-Mustang-Marchawar which are Nepal's border regions in the east, west, north and south respectively.

We welcome comments and suggestions to take the conversation forward.

STRENGTHENING Disaster Risk Reduction Capacity of Community Rural Electricity Entities

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Context

Nepal is the 20th most multi-hazard prone country in the world, ranking 4th, 11th and 30th in terms of climate change, earthquake and flood risks respectively.[I] This multi-hazardous environment of the country underscores the importance of developing effective recovery mechanisms that would allow restoring access to basic services (such as drinking water, operational health posts and community-based services including electricity) as quickly as possible in the aftermath of any disaster.

Electricity is one of the basic services that a country can provide for its citizens. However, around 25 per cent of the population of Nepal do not have access to electricity[2] and among these almost 90 per cent live in rural areas.[3] In 2003, the Nepal Electricity Authority (NEA) approved the 'Nepal Electricity Authority Community Electricity Distribution Bye Laws, 2060' to provide services to such non-electrified areas. These bye laws allowed locally organized communities to purchase electricity in bulk from the national grid[4] and to operate and manage the local distribution of electricity through Community Rural Electrification Entities (CREE). Today, as evolving local service providers, 276 CREEs are active across 52 districts of Nepal and they supply electricity to approximately 350,000 households.[5] These CREEs are organized under the National Association of Community Electricity Users-Nepal (NACEUN).

Learning from the Gorkha Earthquake of April 2015

The 7.8 Mw[6] Gorkha Earthquake that shook central Nepal in April 2015 damaged the distribution infrastructure that was managed by the CREEs. This disrupted electricity supplies to homes, health and police posts, government offices and local grain mills for several weeks. During late 2015, researchers from ISET-Nepal and NACEUN visited 26 such CREEs in the districts of Gorkha, Dhading, Kavrepalanchowk and Lalitpur that served around 28,570 households, to perform a preliminary assessment of the damages and of the status of electrical services. The assessment was part of a reconstruction and recovery project which was funded by Give2Asia and facilitated by The Asia Foundation. The researchers also enquired about the rescue and relief actions that CREEs' members undertook

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Damaged distribution remains suspended, Gorkha District (Photo: Krishna Gautam)

immediately after the earthquake and explored management and institutional deficiencies responsible for the damages.

The major findings of the assessment are as follows:

- Almost 50-90% of the distribution infrastructure was damaged either totally or partially.[7]
- Using temporary means, the technicians of CREEs were able to restore supply to some of the households but many settlements in remote areas still remain without electricity.
- Immediately after the earthquake, landline phones were damaged and, because electricity supply was disrupted, people were unable to charge their mobile phones. As a result, many could not keep in contact with family members and friends or provide immediate assistance to the rescue and relief efforts.
- Security agencies and community members approached the representatives of the CREEs to ensure that electricity was immediately reconnected so that communication could be restored.
- The health workers demanded immediate restoration of electricity services to health posts so that the injured and the sick could be treated.
- The CREEs' representatives and technicians had to take risky steps to restore the supply of electricity, as they were hamstrung by the lack of appropriate tools to cut wires, break concrete blocks and undertake other tasks. They had to resort to using kitchen knives to cut through wires and reconnect broken lines without using insulating gloves. These ad-hoc measures compromised their safety gravely. In one of the CREEs in Kavrepalanchowk, where the earthquake had damaged a 11-KV transformer, a few villagers were electrocuted and among them one was seriously injured. Lack of appropriate tools delayed restoration, compromised technicians safety and also decreased the reliability of the supply.
- Members of the CREEs and the local communities were unsure about what actions to take and whom to inform

Temporary shelters receiving electricity service, Kavrepalanchowk District (Photo: Krishna Gautam)

regarding the damage to distribution system and about such accidents. Safety awareness among the local communities was inadequate and the CREEs were not prepared to deal with such disasters or with potential electrocution accidents.

- Most of the CREEs did not have any reserve funds that could be utilized during the earthquake which caused delays in immediate actions to restore connections.
- The CREEs lacked division of responsibility and there were no established procedures or protocols in place that would dictate the appropriate actions in case of an emergency pertaining to immediate rescue and recovery efforts.

Recommendations

The findings presented above are useful in formulating strategies to improve the capacity of CREEs for effective recovery and restoration. Such strategies should focus on a) improving management of the distribution system by identifying points of weakness in the infrastructure, b) building the capacity of managers and technicians and c) enhancing governance to ensure the sustainability of the CREEs. Specifically, the following measures should be taken to ensure that CREEs play an effective role during the delivery of community services and during recovery efforts:

- *Maintenance and reserve fund:* By allocating a percentage of its income every year, each CREE should maintain and ensure a steady growth of its reserve fund so that it can be utilized during the aftermath of a disaster (an earthquake, a flood or a landslide). Although the bye laws dictate that every CREE should maintain such a fund, it often does not exist in practice.[8]
- *Rural electrification regime:* Active and regular stakeholder participation is essential for the effective operation of CREEs. The post-earthquake orientation meetings in each district highlighted two key limitations regarding stakeholder involvement: a *passive district chapter* (i.e. the representatives of CREEs at district level) and the *lack of*

public policy on community electrification. The members of the CREEs suggested that their activities were affected by the limited involvement of district chapters who should function as the main negotiator between communities and government agencies. Moreover, the stakeholders felt that the formulation of a Rural Electrification Act would accord a legal status to CREEs which would enable it to play a more effective role in disaster response.

- *Tools and equipment*: Lack of tools and equipment not only delayed restoration of electricity services but also exacerbated unsafe working conditions. Since communities sought to receive services as soon as possible, CREE technicians had to work without adequate protection and appropriate tools. Incomplete or substandard repair, maintenance and restoration due to the absence of essential tools and spare parts affects efficient recovery efforts and could also lead to fatal accidents. Thus, CREEs need to maintain a stock of tools such as clamp meters, cable cutters, gloves as well as spare meters, cables and poles so that technicians are better prepared to deal with the impacts of any future hazards.
- *Solar panels:* Each CREE should install solar panels to charge devices such as mobile phones and FM radios. Mobile phones allow uninterrupted access to information and maintain a means of communication that can be used in future disasters while FM radios can also play an important role in the dissemination of general information during emergencies.
- *Capacity building:* The role of CREEs in the future is dependent on having sufficient capacity to develop effective strategies, policies and procedures, build organizational performance and the skills of technicians. CREEs also need capacity building support in areas of accounting, bookkeeping and managing database. Well-designed and implemented capacity building activities are crucial to effectively deliver electricity services as well as become prepared to deal with disasters in the future.

While these recommendations were formulated after analyzing 26 CREEs from Gorkha, Dhading, Kavrepalanchowk and Lalitpur districts, they can be used to enhance the services of most CREEs in Nepal, especially during any future disasters.

NOTES

1. Koirala, P. K. (2014)
2. Different figures of the percentage of Nepal's population with access to electricity are available. DoE (2012) estimated that in 2010 Nepal population was 28.04 million and 2.64 million households were served with electricity. This number of households multiplied by 5.4 would yield 14.256 million which is 50.8 per cent of the total population. The report projected that in 2020 Nepal's population would be 33.59 and 31.7 million households will be served by electricity. The number of households when multiplied by 5.4 would give 33.18 million as Nepal population served by electricity (99.1 per cent). The average of the two is 75 per cent. This is the percentage we assume served by electricity (25 per cent not served) in 2015. According to 2011 census 67% of households used electricity as their main source of lighting. A World Bank portal mentions that 76.3 of Nepal's population has access to electricity. See http://data.worldbank.org/indicator/EG.ELC.ACCS.ZS accessed on 24th August 2016 at 17 pm Kathmandu. This figure however does not indicate reliability or quality of service as Nepal's national grid faces as long as 18 hours of power cuts in winter and dry months.
3. http://www.naceun.org.np/site/dynamic/what-are-we-doing
4. Nepal Electricity Authority Community Electricity Distribution Bye Laws, 2060
5. According to NEA there are 480 CREEs in Nepal. Of the total CREEs only 276 are associated with NACEUN.
6. United States Geological Survey, 25 April 2015. Retrieved on 12 May 2016.
7. Damage varied from one CREE to another.
8. See Nepal Electricity Authority Community Electricity Distribution Bye Laws, 2060.

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