A Simple and Cheaper Means of River Crossing System in Nepal

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Background
There are more than 6000 rivers and streams in Nepal leaving many places without any means of crossing and countless people losing their lives or injuring themselves. Due to the lack of proper or alternative means of transportation people either have to swim or use grass rope with wooden pulley or simple boats to cross the rivers. Wire Bridges (Tuin) are an indigenous technology and one of the most common structures for river crossing in rural Nepal. It usually has single wire rope, pulley and a simple wooden trolley. To cross rivers using such Tuins is dangerous and sometimes life threatening.

The new design of Tuin
Practical Action in Nepal conducted a study to improve the existing Tuin technology. Ideas for improving the design came mainly from the local communities during discussions with Practical Action's technical experts. The community expressed deep concerns on safety of the traditional Tuins. Several people have lost their fingers while operating such traditional Tuins and there is always a danger of falling off the trolley while crossing. Technical personnel suggested low-cost improvements that addressed the users concerns.

Some changes to make the Tuin safer were to develop and add seats, and install sidebars. Practical Action further developed a new pulley system that makes the pulling of the trolley easier and eliminates the risk of trapping fingers in the mechanism. The pulley and bearing system also reduces friction and lessens the effort required to cross the river. The efficiency has been doubled.

The improved Tuin was developed and tested in Mahestar village about 60 km west of Kathmandu. Based on the experiences at Mahestar, the design was further developed into a double-cable design. Although it costs more, it provides improved balance and can carry heavy loads at the same time. Double-cable prototypes were then built in the villages of Kalleri, Pimaltar and Balkhu and Hiklung in Dhading and Gorkha districts respectively till 2007.
Learning from experience

Even though, these enhanced Tuins are safer and easier than traditional one during the operation, continuous improvement is necessary from Tuin designers and users for safety measures. On the contrary, the enhanced Tuin is still not feasible for more than 100 meters as it requires more strength to pull the Tuin from either side of the river banks.

Considering the technical setbacks of the Tuins and the user's concerns Practical Actions’ technicians have now improved the design by adding sag control cable and hauling cable to the pulley system. This addition of the sag control cable has made the labor of pulling the Tuin easier from both sides of the river bank even if the Tuin is longer than 100 meters. During the year 2007/2008 Practical Action Nepal with financial assistance from European Union has completed five such Tuins in Fisling and Bhuwanitar in Gorkha, Solung in Tanahaun, Khulalu in Kalikot and Saranigad in Achham districts.

There are many isolated villages in rural Nepal where other conventional type of suspension or motor bridge construction is only a dream for the local communities. Even though there are villages that have national highway on the other side of the river bank local people have to walk endless hours to get to the nearest bridge to cross the river. To provide access to such isolated and excluded villages, a 100 meter long Tuin can be constructed with a total cost of NRs\(^1\) 750,000. Among that total cost, external support equivalent to NRs. 600,000 is required for wire ropes, steel parts, cement, rods and skilled labor where as an amount equivalent to NRs. 150,000 for local materials and labor is being contributed from concerned beneficiaries.

Conclusion

Due to the topography of Nepal, sometimes construction of bridges is not a possible but an alternative means of transportation like the river crossing Tuin technology can provide a sustainable solution to the excluded and isolated people of rural and mountainous regions.

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References
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\(^1\) 1 USD = 68 Nepalese Rupees (NRs.)