Community-managed, Low-cost Ropeways

Learning from the Experience of Uttaranchal

Dr. Pushkin Phartiyal, CHEA, office@cheaindia.org

One of the major constraints to economic development in mountainous areas such as Uttaranchal in India is the challenge of accessibility. Out of thirteen districts in this state, ten are wholly mountainous, and one is partially mountainous, while only two are located entirely in the plains.

Although a good network of roads exists in these mountainous districts, a large number of river valleys, watersheds, and sub-watersheds are away from main tarmac roads. It is estimated that of approximately 15,000 villages, barely 20% to 25% are linked to all-weather roads. The construction of roads in the mountains, although much in demand, poses considerable environmental and financial challenges.

However, it is necessary to link 'pockets' of settlements with the nearest all-weather roads if markets are to be accessed, agricultural production diversified, and the economic development of mountain areas achieved. Since linking to roads is not always possible, an alternative, more cost-effective and ecologically suitable technology is required. Community-managed ropeways are an appropriate transportation technology for the mountain areas of the greater Himalayan region.

The Government of India began an innovative scheme, the 'Integrated Development of Horticulture in Tribal/Hilly Areas', in Almora District in the Central Himalayan State of Uttaranchal in 2000. The project area is rich in forests and lies within an altitude of 300 metres to 3500 metres above sea level. The total geographical area of Uttaranchal is 53,483 sq km, of which 65% is forest and less than 20% is used for agriculture. The feasibility study, 'Integrated Horticulture Development Project' (IDHP) conducted in 2000, stressed the need to link hamlets and compact areas situated in hinterlands with no access to roads. The study indicated that the communities in remote areas have not adapted diversification from traditional low-yielding agricultural crops to vegetables and fruits because of the problem of transporting perishable horticultural produce from villages to the main road. It recommended that the transport problem be resolved by focusing on a system that uses simple technology, which could easily be operated by the communities themselves and was not dependent on external assistance for routine operation and maintenance. It was decided to experiment with low-cost ropeways to transport materials and agricultural produce not human beings

Thus, the concept of low-cost, community-managed material ropeways, under the alternative marketing system component of IDHP was proposed. But it was found that no appropriate agency was available in the state to install such low-cost, user-friendly units. To overcome this constraint, the project identified 'barefoot technicians' from the adjoining state of Himachal Pradesh. Although material ropeways were used in Himachal to transport fruits from orchards and timber from high altitude forest areas, this was done by contractors only on a seasonal basis. Once the season was over the unit was relocated to another site. It was observed that the mobile system used by the barefoot technicians was crude and had limited or no safety measures. Accordingly, the IDHP team in consultation with technicians, made modifications to the system taking into account safety. Erecting material ropeways was carried out using steel girders, replacing the wooden loafs used on more basic mobile units.

Community-managed ropeways are an appropriate transportation technology for mountain areas.

Horticulture gives a higher economic return per unit area than traditional crops and is effective for poverty alleviation, especially of economically-disadvantaged farmers. When villagers of the hinterlands situated either on hilltops or in the valleys far away from roads initiated horticultural activities, the excessive cost of transportation made them reluctant to move into high-yielding horticultural cash crops.

Dr. Phartiyal is Executive Director of the Central Himalayan Environment Association (CHEA), Nainital, Uttaranchal. This article was written on the basis of his experiences gained as the Project Coordinator for the Integrated Development of Horticulture Project in Almora District, India.

The high cost of building roads and the difficulty of getting the necessary permission to fell trees for the purpose makes road construction an uphill task. Felling trees on mountain slopes can also lead to serious environmental problems. Introducing low-cost, self-sustaining ropeways is a viable alternative. These low-cost, community-managed material ropeways used is a viable alternative for for transporting horticultural produce of marginalised hill farmers and reduces the daily drudgery of carrying heavy back loads up and down steep mountainous slopes. It facilitates bulk transportation, and since the produce reach the markets quickly, their quality is preserved and transport costs remain low.

So far, 17.7 km of rope distance has been erected with 29 spans, both gravity and diesel engine operated, to cover 2850 farmer families. This is equal to a road distance of approximately 40 km. The approximate time of 23 hours on foot has been reduced to 2 hours and 20 minutes by ropeway. The intervention has saved forests, since the construction of one km of road requires felling one ha of forest. Taking into account the carbon being sequestered by these forests, which is observed as 3-4 t/ha/yr in Uttaranchal, the construction of ropeways has contributed significantly to carbon savings and could be considered for the Clean Development Mechanism projects. The material ropeways constructed were handed over to the farmers for their operation and maintenance using their own resources.

The project attempts to establish both gravity and diesel engine operated ropeways in accordance with site conditions. The ropeways are based on a bi-cable system with a payload capacity of 100 kg. While the gravity ropeways are mainly used to take materials downhill using gravitational force, diesel engine operated ropeways are required to take the materials from villages in the valleys to road heads located on hilltops. Accordingly, gravity ropeways have been installed in project villages situated on hilltops while diesel engine operated ropeways are for villages situated in the valleys with hilltop roads.

Ropeways allow farmers to access distant markets for cash crops which have a higher economic return than traditional crops.

Costs incurred differ from site to site depending upon the cartage, the length of the ropeway span, as well as type of ropeway. On average, a one km span of ropeway costs IRs 2.5 lakhs for a gravity ropeway, and IRs 3 lakhs (about US$ 7000) for a diesel engine operated ropeway. The project required a cash and/or labour contribution from the communities,

Case 1: Diesel engine operated ropeway
Shama Dana Village (Bageshwar District)

Commenced on:	April 2003
Length:	1300 m approximately
Village location:	Hilly slopes, 2.5 km below the road head
Items transported:	Vegetables, fertilisers/compost, plants, construction materials, grains etc.
Quantity transported:	1266 quintal (2003); 1608 quintal (2004); 471quintal (to June 2005); total: 3345 quintals
Families benefiting:	All 37 families of Shama Dana Village (18 of the families living below the poverty line)

Operation/maintenance mechanism (O & M)

Secretary of the village farmers' interest group (FIG) is responsible for O&M of ropeway for which the Secretary charges IRs 2 of every IRs 7 for transportation of goods of a load of 50 kg

Benefits as experienced by the villagers

- Prior to the installation of the ropeway, transport cost for 50 kg was IRs. 15. With the ropeway the cost has decreased by 50% to only IRs 7 (paid to FIG).
- Time is also saved, as villagers need not travel to take their produce to the market (more than an hour away). Farmers have used the time saved to tend their fields and enhance production. With the ropeway it takes only 5 minutes for the produce to reach the main road.
- Now perishable vegetables are transported to market on time.
- Villagers prefer to write notes to shopkeepers at the road head to convey messages (and vice versa) and have thus saved the time it takes to travel uphill on the road for 2.5 km.

Difficulties in operation

- One operator at both ends is necessary to operate the ropeway.
- Diesel has to be procured regularly.

Case 2: Gravity operated ropeway
Gyandhura Village (Bageshwar District)

Commenced:	May 2003
Length:	800 m approx
Village location:	Hilltop
Items transported:	Vegetables, construction materials, grains
Quantity transported:	1243 quintal (2003); 701 quintal (2004); 138 quintal (to June 2005); total 2082 quintal
Families benefiting:	All the 23 families of Shama Dana Village (including 17 families living below the poverty line)

Operation/maintenance mechanism: The community has appointed two technicians for O&M who collect IRs 2 out of each IRs 5 charged for transportation of a 50 kg load.

Benefits as experienced by the villagers: Prior to the ropeway, manual transportation of 50 kg from the village to the road head cost IRs. 10 which has reduced to IRs. 5.

- Travel time to road head carrying 50 kg took one hour, now it takes only 2 minutes.
- Reduced drudgery and travel time after installation of the ropeway has encouraged increased production of vegetables, floriculture, and other crops.

Difficulties in the operation:

- Bulk transportation of goods to village from lower terminal not very feasible.
- Some marginalised farmers prefer to carry their produce themselves to save money.

depending upon the cost of the ropeway, to ensure that the communities felt ownership of the infrastructure created. Civil construction was minimised to keep costs low. Expenditures included the construction of a small tin shed and a platform to protect and operate the system.

The ropeways have received mixed responses from the village communities. Some of the villages (Shama Dana in Kapkot Block, Bageshwar District: Case 1) are using the device extensively and have succeeded in establishing an operation and maintenance system. The villagers have found a sustainable answer to the problem of taking horticultural produce to the road head through a narrow 2.5 km uphill bridle path. The project has also assisted the construction of a storage and collection centre at the road head. In Dhaura Village (Lamgarah Block, Almora District) villagers made negligible use of the four spans of installed ropeway. The project is investigating other cases to develop a code of conduct for establishing low-cost, community-managed ropeways in the state.

The ropeways are envisaged to be used to transport horticultural produce from villages to road heads. Villagers have started using them for other purposes as well, such as for carrying the public distribution system's ration and construction materials for transporting water, taking compost to the fields, transporting planting materials in bulk, and so on.

Lessons learned

The experiences gained in Uttaranchal clearly indicate that low-cost ropeways are an effective intervention to promote the economic development of hinterland villages in mountain areas not accessible by road. Some important specific lessons are as follows.

- The availability or potential of exportable items such as horticultural or other produce from the villages needs to be properly assessed.
- Two-way transportation is better, i.e., if villages are also importing large amounts of goods.
- If villages are located in the valley and have to access a road head located on a hilltop, the gravity ropeway will be economically feasible if villages have exportable items such as vegetables or fruits.
- There has to be clear community ownership of the land that serves as landing site right from project design.
- If the time saved is not significant, villagers prefer to carry the load themselves rather than go to the unit to operate it. A ropeway span of more than 750 m contributes significant savings in both time and labour.
- Capacity building of the local communities to ensure full operation and maintenance must be part of the project. Safety aspects need to be built in the training package.

Villagers have started using the ropeways to carry construction materials and water, and to take compost to the fields.