

Permanent Shelter Strategy for Landslide Affected Families in Nuwara Eliya District

Piyal Ganepola, Technical Advisor, The Asia Foundation (TAF)

Abstract. Over 450 families in the Hanguranketha and Walapane Divisions were displaced due to a series of landslides caused in January 2007. The Divisional Secretariats of the respective Divisions had to face the challenge of resettling these families at alternative locations but were confronted with severe resource constraints to cater to the demanding needs of these resettled communities.

Creating Opportunities for Economic Revival and Development in Nuwara Eliya (CORD) Project was implemented by The Asia Foundation (herein referred to as the Foundation) in the Nuwara Eliya District of Sri Lanka, between June 2008 – June 2009, under a grant agreement with the Australian Agency for International Development (AusAID). Through CORD, the Foundation has assisted the divisional secretariat (DS) offices in Hanguranketha and Walapane as well as the Nuwara Eliya District Secretariat to improve their disaster management capacities and to make the disaster responding processes more efficient. CORD made its entry by helping the affected communities and the local administration to address the crucial issue of permanent shelter in the resettled sites.

CORD has also addressed wider institutional and policy constraints by involving national institutions -- the Disaster Management Center (DMC) and specialized agencies such as the National Building Research Organization (NBRO). The Foundation has also formulated a set of policy guidelines that will influence future government-assisted landslide relief and rehabilitation support mechanisms.

CORD has made remarkable progress in a relatively short period. This report describes the rational process introduced by CORD and its achievements in accelerating post disaster rehabilitation and development with community participation – notably with regards to shelter and livelihood.

Keywords. Landslides, Permanent shelter, Resettlement, Participatory approach

1. Background

Walapane and Hanguranketha Divisions of Nuwara Eliya District in Sri Lanka, where the landscape is very undulating with steep slopes are frequently affected by landslides. Unusually heavy rainfall in mid January 2007 has caused series of landslides in these areas causing immense damage to human life and properties. Over 450 displaced families in Hanguranketha and Walapane Divisions were resettled in 6 locations by the respective Divisional Secretaries (DS). 198 Families in Hanguranketha were resettled at a land called Johnston Estate and others from Walapane were resettled at Rockland Estate (92 families), Danilow Estate (77 families), Mahauwa watta-Egodakanda (16 families), Nildannahinna (42 families) and Theripehe-Galthotamulla (45 families).



Source: Production of Humanitarian Information Center, Sri Lanka

Under the **Creating Opportunities for Economic Revival and Development in Nuwara-Eliya'(CORD) Program**, The Asia Foundation (the Foundation) has provided assistance to the Nuwara Eliya District Secretariat and Walapane & Hanguranketha Divisional Secretariats, to accelerate the rehabilitation and development initiatives that have been undertaken by the respective divisional secretaries to resettle these affected communities. Disaster Management Center (DMC) and National Building Research Organization (NBRO) have partnered with The Asia Foundation in implementing the program.



Fig 01: Cracked Building due to Earth Instability

The government assistance offered to these resettled families were limited to a land plot of 20 Perches (500 sqm), 28 roofing sheets and a financial grant of Rs.50, 000.00 which was released in 3 installments. The above assistance alone was not at all sufficient for these families to build their permanent houses.

The lands allocated for resettlement are unfertile abandoned tea estates. Majority of families who made their living through farming in their fertile lands at the previous habitat have lost their means of livelihood too at the new location. This has resulted in substantial number of families to return to the previous habitat, ignoring the warnings of the authorities on possibility of future landslides.

By the time the Foundation commenced the site work in September 2008, the relief and rehabilitation phase was completed and people were shifted from transit camps to permanent relocation sites nearly one year back. But the affected communities were still remaining in temporary houses or tents on the plots they were allocated. Amidst some ad-hoc efforts made by the community members as well as numerous agencies and institutional partners to meet the needs in the resettled locations, nearly two years of efforts have not yet proven to be effective to ensure that the communities be move into better housing in the near future. Coordinated approach to meet the demanding needs of resettled families was not in place.

At the time the Foundation made its entry, the local officials were in a confused state without feasible solutions and resources to meet the needs of the settlers, mainly permanent shelter. The District Administration had a type plan of a house in possession with an estimate of Rs.500, 000/ per house and was looking up for a heavenly source to provide funding to build 400

houses. The settlers too were in desperation in the absence of any hope to regain their homes and livelihoods.

Through CORD, the Foundation improved the capacity of the District Secretariat, Divisional Secretariats and community-based organizations in Walapane and Hanguranketha to work together to ensure the sustainable resettlement of landslide-affected families and incorporate principles of disaster risk management into local-level planning and development. The CORD project promoted citizen involvement in the resettlement and rehabilitation process, and addressed broader institutional and policy constraints through engagement with national-level institutions responsible for different aspects of disaster management.

2. Resettlement Sites

Foundations' support through CORD was offered to resettled families in Johnston Estate Hanguranketha and 3 settlements from Walapone namely, Rockland, Danilow and Egodakanda. The number of families in actual occupation was less than the numbers originally resettled when the program started, as some families have gone to live with the relatives as the living conditions at the new sites were too harsh. Some others have returned to the original settlement where landslide has occurred.

HANGURANKETHA: Hanguranketha, Johnston estate resettlement was the first project undertaken by the Foundation under the program and was developed as a pilot project for testing the development strategy designed by the Foundation. The successful results from this project were subsequently adapted to 3 settlements in the Walapone Division through the Palm Foundation.

Johnston Estate: The Johnston Estate site is located about 1.5 km away from the Rikillagaskada town, in an abandoned tea plantation now in barren state. Topography is consisting mainly with lands of moderate slopes and some highlands with steep slopes, and environmentally sensitive areas unsuitable for habitation. Rock boulders are scattered all over the site. Soil appears suitable for housing, in terms of bearing capacity requirements. Relocation has been done based on a layout plan prepared by a land surveyor, prior to NBRO detailed investigations.

DS has allocated 198 land plots to displaced families, but by the time CORD made its entry in September 2008, there had been only 72 families occupying the land plots. 70 of them were yet living in tarpaulin tents. The others have not come to occupation by that time, due to very hard living conditions prevailed due to lack of shelter and basic infrastructure. Other reason was the lack of means of traditional livelihood.



Fig 02: Small Shop Owned by a Resettler

The settlers had to fetch water from nearly a kilometer away as the bowser supply arranged by the DS was not regular. They have built make-shift toilets using cadjan and polythene with squatting pans donated by a donor. In the absence of power supply, lighting was confined to kerosene bottle lamps which were later supplemented by solar lanterns provided by IOM.

By the end of the program end of June 2009, number of settlers has increased to 140 from the original number 72 and was yet in the increase due to the encouragement created on seeing the rapid development. Over 100 of them have made substantial progress in building their permanent shelters.

WALAPANE:Implementation of Walapane was through Palm Foundation and this arrangement offered an additional benefit to the settlers to receive the benefits of Palm Foundation's micro finance program which they combined with IOM implemented livelihood program.

Danilow Estate: This resettlement was the latest project resettled by the Walapone DS, started in February 2009, and the strategies tested in the pilot could be applied straight away at this site. The Foundation support available from the beginning of the project was an incentive for all the 72 resettled families to remain in the site and commence building their own homes immediately. All 72 families in the settlement have achieved very good progress in building their permanent shelters.

Rockland Estate: This is among the earliest resettlement sites of Walapone, and by the time the Foundation entered, 74 settlers (out of 92 allocated) have commenced shelter activities with the assistance from the state and with some additional support of a NGO. However, the quality of construction was far to reach the accepted standards. Some houses showed serious signs of distress while many others demanded minor to moderate structural improvements. Hence, the Foundation had to intervene in helping the people to improve structural stability of the constructed houses-retrofitting.

Egodakanda: The situation of 16 families was very similar to that of Rockland Estate.

3. Shelter Development

One of the main outputs of the program was the permanent shelter strategy, which created the gateway to reach the communities and the bureaucracy. CORD followed the well tested participatory, incremental shelter development strategy followed in several successful housing programs in Sri Lanka, with some value addition features introduced through improved technology.

The approach taken here is improving the capacities and skills of the resettled families to improve their own shelter development initiatives. Under this approach, novel strategies to meet the peoples' shelter aspirations within the available means were piloted first at Johnston estate resettlement. The successful results from this project were subsequently adapted to 3 settlements in the Walapane Division.

3.1 Principles

The strategy was developed based on the following principles considering sustainability;

- **Community centered-** enabling the communities to manage their affairs with facilitation by the stakeholders. **CBO strengthening** is an important element which finally resulted in creating empowered communities to win their equity rights in the society and exercise their responsibilities towards sustaining new settlements.

- **Participatory approach** to address their **specific shelter needs** and to **strengthen their self initiatives** without creating dependency on state or the other donors.
- Supporting to **enhance the indigenous skills** of the beneficiaries, utilize the resources they possess and enhance their **livelihood** opportunities.
- Several housing options (house plans) were offered to select based on their individual **affordability and taste** with the possibility of **incremental development**.
- Creating the feeling of the **ownership** of the program and assets collectively and individually, and recognizing the state and other stakeholders as facilitators in the development process.
- The State, through the Divisional Secretariat in collaboration with Local Authorities expected to play the roles of **coordination, monitoring and regulation**.
- Multitude of partners who include relevant State organizations ranging from Central Government, Provincial, District, Divisional and Local Authority and NGO/INGOO are involving in a **consultative process** with CBOO of the settlements in planning and implementing the projects and by sharing their resources.
- **Environmental consciousness** is a key focus through which recurrence of landslides in the new settlements are prevented by awareness creation on the good land development practices.
- **Technology options** introduced have linkages to **Livelihood support**. The families are trained to produce low cost, environmental conscious building products and in construction techniques, offering them opportunities to continue such activities as alternative livelihood means.
- Education of families on rights and responsibilities, individually and collectively, on issues on **long term maintenance** combined with ensuring local authority service delivery.

SUSTAINABILITY PRINCIPALS OF THE APPROACH

- Families participating in planning and implementation

- CBOO will be the focal point.
- Affordable to the people and to the state
- Options to select
- Encouraging incremental development
- Avoid recurrence of disaster
- Housing connected to livelihood
- Environmental friendly
- Owned by people- coordinated and monitored by state
- Consultative and sharing among stakeholders
- Livelihood supportive construction process.
- Long term management considered.

3.2 The Process

The shelter process was started by conducting a survey to identify the resources of the individual families possess, mainly materials and skills. Some of them salvaged materials like roof timber, tiles, doors and windows from their previously damaged house. Though there had been very few members with good skills in carpentry and masonry many have shown ability to involve in such work with little training. This survey was important to identify the resource gaps of individual families which helped The Asia Foundation (TAF) to fill such gaps through different forms of assistance without having to resort to uniform type of a package insensitive to the individual needs.

In the assessment to identify technologies appropriate to the area, it was observed that people are familiar with earth based technologies like sun dried bricks. Fire wood was scarce and expensive for burning the bricks. More over, there existed an important need to discourage use of firewood for environmental reasons. Few have started to sledge rubble from the boulders in the site using indigenous methods. Sand was scarce and expensive.

The process and new technologies were proposed based considering the above parameters and with affordability in mind. The proposals were always explained to the community members at CBO meetings and their willingness to participate was obtained. Those

who opted to deviate from using the proposed new technologies were too provided with technical advisory to improve the quality of construction. Alleviating recurrence of landslides and creating structural stability to resist the high winds in the area were too important considerations.

The basic activities in the shelter development process piloted were as follows:

1. Strengthening the Coordination Mechanism
2. Mobilizing trained Field Officers to coordinate activities and provide advisory services
3. Development of guide plans and material lists to suit the different site conditions and tastes.
4. Introducing low cost, eco friendly and structurally sound technologies.
5. Building a model house.
6. Skills enhancement
7. Material support to individual needs to fill gaps.

3.3 Strengthening the Coordination Mechanism

An important activity has been the convening of multi-stakeholder forums at the district and divisional level. The Foundation assisted the District Secretary in Nuwara Eliya to revive the District Disaster management Committee to plan medium- and long-term interventions to support the landslide-affected communities through its disaster management focal points.

In addition to the District Forum, The Asia Foundation supported the two Divisional Secretaries of Hanguranketha and Walapane to convene regular Divisional Disaster Coordination Meetings, which created a common platform for all the stakeholders to plan together and work towards a common goal.

Success of the approach lied with the Foundations strategy in accepting the lead role of the District/Divisional Secretary and supporting to meet the capacity needs and to develop an effective coordination mechanism.

Through these district and divisional forums, the Foundation initiated a process to formulate an

integrated and coherent action plan to develop the resettlement sites with appropriate disaster resilient safeguards.

Other than the above formal arrangements, many training sessions held for the District, Divisional, Provincial and Local Authority officials with Central level resource persons created opportunities to interact closely with each other eliminating the distances they had earlier.

The Foundation created a friendly atmosphere among all the stakeholders through creating coordination forums to share information. Distance existed between the Divisional Administration with central level organizations like National Building Research Organization (NBRO) and Disaster Management Center (DMC) in operational level too was closed by this coordination strategy.

The above approach of the Foundation brought in a synergy among the different programs of different NGOs. For example, Palm Foundation linked their micro credit program to the IOM conducted livelihood program by providing credit facilities to meet the running expenses of enterprises where IOM supported the capital expenses.

3.4 Mobilizing Field Coordinators (FC)

The Foundation, at the very inception appointed a fulltime, trained, Field coordinators to the sites who guided the families in organizing together towards collective activities and community surveillance in preventing ad-hoc excavation of embankments which could lead to future disasters.

Initial observations made by the Foundation at site revealed the need of a field coordinators. The families were allocated land plots to resettle by the Divisional Secretariats but no system was in place to provide them with guidance to do the development activities. In spite of recommendations of the NBRO on the need for careful excavation of plots and toilet pits to prevent the geological stability of the fragile landscape, the people were seen excavating their plots in ruthless manner. The NBRO instructions have not been communicated to the community. On identification of the need to regulate such activities the Foundation appointed resident field coordinators, who were given training by NBRO to guide the community in the proper excavation in site preparation. The same Field Coordinators received training in technology too from the National Engineering

Research Development Center (NERD) and other trainers to assist the communities by introducing new technology. The FCs were engaged in the initial surveys of the resources in the possession of the families to assess the real needs for individual requirements.



Fig 03: Guidance by the Field Coordinators

3.5 Development of Guide Plans and Material Lists

The Asia Foundation has mobilized the Human Settlement Division of the NBRO to develop several house plans to choose according to site conditions, family needs and affordability. An architectural house plan was a new experience to the families, which threw light to their future home, creating initial motivation to work with the Foundation.



Fig04: showing a House plan given by CORD project

The plans were developed as guide plans for the guidance of the families and could accommodate changes to meet the specific family requirements. The plans incorporated the features to suit the landscape of the sites. 5 house plans were developed for Hanguranketha site and 4 more were developed for Walapane, where the landscape was different. Each plan

accompanied a material list enabling the people to plan the work.

The design offered the possibility for incremental expansion to expand with income generation and family expansion. A **Core House** area accommodating one room and kitchen with the roof area which can be covered with 28 G.I. sheets already given by the DS was incorporated within the plan. This enabled the people to build the Core House immediately and move into it in a short time. The other basic areas like verandah, living and dining, will be incrementally expanded by the families later.

The design also incorporated features to face high wind situations. Wastage of materials was minimized by coordinating the building dimensions with dimensions of components like size of a brick, size of a roofing sheet etc.

3.6 Alternative Technology

One unique feature of CORD was introduction of alternative technologies to the affected people to fulfill their housing aspirations. The selection of technologies was based on the following principles;

- Affordable to the people
- Simple and produced by families themselves with little training
- Main resources can be drawn from the locality
- Better quality than traditional ones
- Eco friendly- not contributing to disaster recurrence
- Creating alternative livelihoods

During the initial site inspections it was observed that the people have started some self initiatives to fulfill their housing aspirations. Some of them have started casting mud bricks but were facing the problem of scarcity of fire wood to burn them. Some have already compromised for sun dried bricks (adobes) though they posed quality problems. The rubble for foundations was drawn from rock boulders blasted by an indigenous method of heating and sledging.

The basis of new technologies was built upon the above initiatives. They were not completely foreign to the people but were improved versions of traditional technologies familiar to them. This

has resulted in affordable superior quality houses with maximum community participation with skill improvement contributing to alternative livelihood.



Fig05: Mud Bricks Produced by Locals

3.6.1 Compressed Stabilized Earth Blocks (CSEB)

CORD obtained the expertise of the National Engineering Research and Development Centre (NERD) to introduce CSEB. CSEB is an improved version of mud bricks familiar to the people at site, produced with earth excavated from site, stabilized by mixing with little amount of cement and compressed in a simple mechanical press operated manually. The stabilization improves the strength and durability of bricks. Uniformity of the bricks are assured by casting them in a steel mould compressed manually using a lever mechanism. The blocks immediately after casting are placed in a covered area and moistened daily for two weeks to allow the cement to harden.



Fig06: Building the Wall using CSEB



Fig07: Building the Wall using CSEB

Building of walls too is easy with adjoining blocks interlocking. Jointing between blocks is done using a thin paste of earth mixed with little cement, there again reducing the quantity of cement and sand used.

Another benefit offered by CSEB is that walls made with the blocks need no plaster due to its uniform surface. Walls are usually painted with a low cost earth based paint, which too is produced at site.

The combined effects of all the above features make this technology;

1. Low cost due to low cement and sand usage and due to ability to work with family labor.
2. High quality due to higher strength and durability combined with aesthetics and comfort,
3. Eco friendly due to less sand usage, cement usage (contributing to reduce CO₂) no need of firewood for burning,
4. Creates alternative livelihoods through gained skills.



Fig08: Annually Compressing CSEB by a Mother and Daughter

Production initially started with two block making machines (manufactured by NERD) and with the increase of demand number was increased up to six. Trained group of three family members could cast an average number of 200 blocks per day. The block requirement of 2200 for the 'Core House' they could cast in two weeks on their plot itself.

3.6.2 Round Poles for Roofing

Round poles are another locally available material introduced to fabricate low cost roofs by CORD. Thin plants among the Eucalyptus plantations in the upcountry are removed by the Forest Department under their forest management plans and the round poles suitable for construction are selected from them. These round poles are a virtual waste material. The selected round poles should be straight and the diameter between 3-4 inches. These poles represent a low cost, environmentally friendly and structurally efficient resource. These poles are naturally non-durable, but this can be overcome with appropriate preservative treatment.



Fig09: Staked Treated Round Poles

(Expertise offered by Mr.Lionel Jayanetti of TRADA-UK is thankfully acknowledged)

Advantages of Pole Construction

- Poles are much cheaper (one tenth to one twentieth) than structural sawn timbers.
- Pole structures are easy to put up using simple tools and unskilled labor; construction costs therefore are relatively low
- Poles, which are generated when the planted Eucalyptus forests are thinned, are a virtual waste material. By putting it

to structural use, deforestation for structural timbers can be reduced.

- Poles are available locally and the transport is minimal.
- Maintenance and modifications do not generally present a problem.
- Architectural Harmony with Natural Environment

Preservation

These timber poles need to be treated in order to improve their durability and to keep the insects, fungi and other agents of decay away. The treatment is done using used engine oil removed from vehicles and it does not create a toxic environment. By heating the timber in a diffusion tank for two hours and leaving it in the tank for further some hours, water in the soft parts of timber is replaced by oil making it durable and not attracted to insects and fungi.



Fig10: Dip Diffused in Johnston Estate

The diffusion tank is made in a local mart by assembling half cut oil barrels welded lengthwise, reinforced with angle irons. This tank filled with oil is placed on brick or iron supports are heated with sawdust and paddy husk as fuel, with poles laid dipped in oil. After two hours the fire is extinguished and once the solution has cooled down, the poles are removed from the tank, stacked and wrapped in polythene or a similar material. After fourteen days, the treated poles are ready to use in the roof structure.



Fig11: Model House Roof Constructed Using Treated Round Polls

3.7 Model Houses

Two model houses were constructed with peoples' participation to motivate the beneficiaries to demonstrate good building practices. Two families were selected based on a criteria agreed with the community. Community endorsed the proposal that the family to be a one with children and able members to involve in construction activities. The family should show the urge to build a house by stacking the row materials to start the foundation. The other criteria was that the severity that has undergone in the disaster. Technology training was conducted at these model house sites allowing the community to gain hands-on skills.



Fig12: Model House

3.8 Skills Enhancement

The communities who were displaced from traditional villages had some instinct abilities in building work which they may have gained by involving in self-help building activities in their former villages. Both men and women readily offered their time and labour to learn the new technologies introduced by the program. It was women with children who made bricks when the men went out for making a living.

However their instinct skills were confined to traditional practices they have been following through generations and lacked exposure to modern good building practices. In addressing this issue, CORD offered several training opportunities to the interested individuals of the communities.

20 semi-skilled community members, from Walapane and Hanguranketha, were given training at Nuwara Eliya Technical College in Masonry and Carpentry. They were provided with basic masonry and carpentry tools.

The NERD Centre was mobilized to train the family members on the CSEB production and building.

Community members were trained to treat round poles supplied by TAF using used engine oil.

The skills enhancement created by the project is opportune to the community not only to build their own homes but also as a means alternative livelihood.

3.9 Material Assistance

This support was targeted to meet the resource gaps to reach the progress levels set by the DS office to qualify for the installments of Rs.50, 000 grant given by the government. The initial survey also helped to identify resource gaps of individual families. It was observed that many families were deprived of the grant due to their inability to reach the level of construction progress due to lack of money to buy few bags of cement etc., creating a vicious circle. In order to break this, the Foundation introduced this 'Targeted Assistance' scheme to help them to purchase the most critically needed items, after individually assessing the needs. This was also offered to introduce special structural features to make the structures disaster resilient.

The assistance was not uniform but aimed at meeting individual crisis situations hampering the progress of construction. The housing committee assisted the Field Coordinator to identify needed assistance and in procuring them.

The Foundation agreed with the CBO on the criteria for the assistance. It was carefully implemented without leading the people to be dependent on external aid. Therefore the assistance was minimal and was based on absolute needs that a particular individual family cannot meet by their own means. The criteria of the assistance was as follows;

- The assistance should stimulate the community to complete their houses fast and to improve the quality. Therefore in each case a time target should be agreed with the family.
- To qualify for the assistance, there should be clear commitment and preparedness to build the house.
- The upper limit of the accumulated value of material assistance to be Rs.25, 000/ per family.
- Assistance should be limited to construction of the core house, ie; the area that can be covered by 28 roofing sheets.
- Preference should be given to the material requirements for the new technologies introduced and the elements introduced by the Foundation for disaster resilience.
- Preference should be for the material needs of putting up the structure than for the finishes.
- Assistance to destitute or disable families who cannot implement their construction without external help should be given when the CBO or any voluntary organization is available to help the construction.
- Assistance should not be offered to support any activity harmful to the environment.

and based on raw materials they could draw from the area, thus making them affordable, yet, producing high quality housing.

This shelter development process has also resulted in creating skillful communities, opening them livelihood paths towards construction sector as an alternative to their traditional means of livelihood.

Due to the participatory character of the program, some deviations have been caused to the above criteria to meet special situations, as requested by the CBO.

4. Conclusion

CORD has successfully piloted a collective, participatory approach in assisting landslide affected communities, involving people, communities, the local administration, and NGOs. It has demonstrated a feasible approach to respond to the shelter needs of the disaster affected families in a very short time by introducing new technologies manageable by people relying on local resources, combined with improved coordination mechanisms.

The process was designed building upon on the latent skills and indigenous knowledge of the people and reinforcing mutual cooperation, which has eventually reduced the peoples' dependency on external support. Newly introduced technologies were improved versions of the traditional technologies familiar to them