

IPL New Project Proposal Form 2015

1. Project Title:

The Effect of Root Systems in Natural Slope Erosion Protection in the Hill Country of Sri Lanka

2. Main Project Fields - Capacity Building

B. Collating and Disseminating Information/ Knowledge

3. Name of Project leader : **Mr. PVIP Perera; B.Sc. (Env.Mgt.), M.Sc. (F.A.R. Mgt.), MIEPSL**

Affiliation: **Environmental Scientist,**

Contact: **Centre for Research & Development (CRD), Central Engineering Consultancy Bureau (CECB), No. 11, Jawatte Road, Colombo 05, Sri Lanka; fax:+94112598215; Tp:+94112505688; email: ishastha@gmail.com**

Core members of the Project

Ms. N.N. Katuwala, BSc (Computational Chemistry) Chemist, CRD, CECB

Ms H.M.J.M.K. Herath (BSc (Geology Special) Engineering Geologist ; CRD, CECB

Eng. A .A .Virajh Dias B.Sc. (Civil Eng); CEEng; PGDip; MASCE,MIESL;

AGM, NRM&LS, CECB

4. Objectives:

To Study the existing natural slope protections in over 30 sites in the hill country of Sri Lanka to document the observed details and patterns of vegetation which support slope protection and the roles played by different species in such scenarios. It is understood that not one, but a collection of species contribute to this end through the setting and functions of each type of vegetation and their positioning. Thus results of the study can be directly used for practical application in critical slopes.

5. Background Justification:

Natural slope instability is one of the major scientific concerns in the world today with landslides and slope erosion being encountered in different ecosystems. Sri Lanka's hill country too encounters many earth slips during heavy rainfall events, especially in and around tea estates where the natural cover has been disturbed. Landslide events too have occurred in these areas resulting in loss of life and much economic and social harm. Much attention has been focused on

predicting landslides and disaster mitigation, however a remedy to the problem seems distant. The use of natural systems already in place if reciprocated in these disturbed areas could be a solution or a major contributing factor to such a remedy and in that light this study would bridge the existing knowledge gap of natural solutions.

6. Study Area: **In the hill country of Sri Lanka where similar slope angles exists with different vegetation cover in comparison with tea grown areas.**

7. Project Duration: **3 years**

8. Resources necessary for the Project and their mobilization

Item	Description of Personnel and Facilities	Cost USD	Mode of Contribution
1	Laboratory facilities: CECB laboratory	2,000	By CECB
2	Field Activities	2,000	By CECB
3	Special training on ecological engineering applications and practicing	10,000	Through a research grant
	Total USD	14,000	
	Total grantee contribution USD	4,000	By CECB
	Total expected through funding	10,000	Through a grant

Personnel: Flora Specialist, Environmental and Agricultural Specialist, Engineering inputs

Facilities: Computers and tabs with relevant software, high resolution camera, GPS

9. Project Description:

Green belt concept is actually a systematic plantation of tolerant trees and shrubs. The originality of this concept is not new. The simplest example is our virgin forests reserves. Remarkable natural slope erosion control measures are visible in hilly regions of the country. The areas are subjected to various rainfall events. The diverse species contribute fundamental engineering mechanisms against the slope erosion and slope instability. The factors such as slow rate of surface saturation, retention of metric suction of soil, reinforcing deep and shallow depths can be considered as positively contributing factors of slope engineering. Reservation slopes contain a slope angle of 20 to 32 degrees, which is recorded as the most critical slope for possible landslide events. However, there are negatively contributing factors in vegetative slopes; these being of relatively low intensity in these reservations. The size and location of forest reservation depends upon catchment areas and observed hydraulic force acting along the stream supporting terrain. The observations of the Sri Lankan experiences in hill slope developments and its applicability for the selection of specific objectives of green engineering principles is sought from the project.

10. Work Plan/Expected Results:

1st Year:

- A.) Study of various natural slope protections in forest covered areas of the hill country having critical slope angles. Comparison of the type of vegetation in such scenarios and collecting data of any slope failures that have occurred in the recent past in such forested areas. Visiting over 30 such sites will be conducted to gather data.**
- B.) Study of disturbed slopes in the hill country (eg. Tea estates and developed areas) in the hill country having critical slope angles. Records of slope failures and the frequency will be gathered.**

2nd Year:

Compiling gathered data and analysis to identify patterns and type of vegetation present at different elevations and rainfall levels.

Further field studies on identified patterns for in-depth analysis

3rd Year:

In depth analysis and evaluation to formulate results and conclusions

11. Deliverables/Time Frame:

Selected sites for study:	End of 4 months
Complete Data base development:	End of Year 1
Patterns identified:	End of 18 months
Details of field studies and initial findings:	End of Year 2
Research Findings, Presentation of Findings:	End of 30 months
Completion of Research Paper:	End of Year 3

12. Project Beneficiaries:

The beneficiaries of this project would be the tea estate workers and other people residing in landslide prone areas in the hill country of Sri Lanka. The natural protection that can be provided would be environmentally friendly and cost effective while also being a long term solution.

13. References (Optional):

- Leiser, A.T., 1998, 'Biotechnology for Slope Protection and Erosion Control' paper presented to Peaks to Prairies: A Conference on Watershed Stewardship, Rapid City, South Dakota, 27-30 September, viewed 30 January 2015, <https://denr.sd.gov/dfta/wp/wqprojects/biotech.pdf>
- The Vetiver Network International, Available from http://www.vetiver.org/g/slope_protection.htm. [10th January 2015].