

TRAINING ON

Bioengineering Nature-based Solutions for Linear Infrastructure Slope Stabilization and Protection

ADB

1, 2 and 4 August 2022 • Bangladesh time • via Zoom



The potential contribution of bioengineering to the maintenance of slope stability and in the construction and maintenance of roads in Bangladesh has been known for some time. This contribution is now being increasingly recognized as a nature-based solution (NbS). As a consequence, there is a need for engineers to understand and contribute to the implementation of NbS bioengineering works and to their effective maintenance.

To support this initiative, ADB's technical assistance [REG: Protecting and Investing in Natural Capital in Asia and the Pacific](#) (TA-9461), administered by the Environment Thematic Group (ETG), will conduct bioengineering training with the Local Government Engineering Department (LGED) of Bangladesh. The intervention is expected to help in mainstreaming NbS, through roadside bioengineering, in government policies to inform and complement overall project design and implementation. With associated engineering options, the roadside bioengineering can increase the resilience of roads to extreme climatic events by providing the surface protection of roadside slopes and riverbanks.

TARGET PARTICIPATION

This training has been designed to provide the knowledge and skills in bioengineering required by Engineers in the LGED and staff engaged in other work on unstable slopes. It does not seek to provide them with all the skills and answers but to give them the necessary basic knowledge of bioengineering which will enable them to conduct their work more effectively. During the training, a range of reference material will be provided, and further references indicated. This material will enable them to research and take forward their learnings in bioengineering. The training course is designed for Managers and Field Engineers. ADB staff and consultants are welcome to attend and observe the training.

OBJECTIVE AND KEY TAKE-AWAYS

The overall objective of this training course is to equip the participants with the knowledge and skills they require for conducting site appraisal, and designing, implementing and managing bioengineering works. The following is the scope of expected knowledge outputs and key take-aways for achieving the overall training objective:

1. Slope instability, types, causes and mechanisms of failure
2. Introduction to bioengineering principles and design
3. Nursery design, construction and plant production
4. Bioengineering site implementation, management and maintenance
5. Rate analysis norms and standard specification for bioengineering works

REGISTER IN ADVANCE FOR THE BIOENGINEERING TRAINING COURSE

DAY 1: 1 August 2022 (10:00 a.m. to 3:00 p.m. Bangladesh time / 12:00 p.m. to 5 p.m. Philippine time) <https://bit.ly/3yQ9ky8>

DAY 2: 2 August 2022 (10:00 a.m. to 3:00 p.m. Bangladesh time / 12:00 p.m. to 5 p.m. Philippine time) <https://bit.ly/3PaUHUK>

DAY 3: 4 August 2022 (10:00 a.m. to 3:00 p.m. Bangladesh time / 12:00 p.m. to 5 p.m. Philippine time) <https://bit.ly/3arVMO8>

TRAINING PROGRAM FOR MANAGERS AND FIELD ENGINEERS

Day/Time (Bangladesh time)	Modules	Technical Content
1 August 2022 DAY 1: Introduction to bioengineering training course		
10:00 a.m.-10:05 a.m.	Opening of Bioengineering Training Course: Asian Development Bank (ADB) and Local Government Engineering Department (LGED)	
10:05 a.m.-12:00 p.m.	MODULE 1: Slope instability, failure and protection measures	Introduction to the training course
		Type of slope instability and components of an unstable slope
		Causes and mechanisms of slope failure
		Slope protection practice and bioengineering
12:00 p.m.-1:00 p.m.	MODULE 2: Introduction to bioengineering and designing structures with nature	Engineering design and functions in bioengineering systems
		Bioengineering structures and their design
		Site assessment and selection of bioengineering techniques
		Selection of plant species for bioengineering
1:00 p.m.-2:00 p.m.	Health Break	
2:00 p.m.-2:50 p.m.	MODULE 3: Programming bioengineering works, rate analysis norms, and standard specifications	Bioengineering works for slope protection
		Bioengineering maintenance task and seasonal work programming of bioengineering works
		Rate analysis norms and standard specifications for bioengineering works
2:50 p.m.-3:00 p.m.	Open Discussion and Announcements	
2 August 2022 DAY 2: Bioengineering nursery construction and collection of materials		
10:00 a.m.-10:05 a.m.	Recap of Day 1 Training Session	
10:05 a.m.-12 noon	MODULE 4: Bioengineering nursery site selection, design and construction	Siting bioengineering nursery
		Nursery components and size
		Nursery layout, design and nursery bed construction
12:00 p.m.-1:00 p.m.	MODULE 5: Collection of seed and vegetative plant materials	Seed collection and storage
		Collection of vegetative plant materials
1:00 p.m.-2:00 p.m.	Health Break	
2:00 p.m.-3:00 p.m.	Open Discussion and Announcements	
4 August 2022 DAY 3: Bioengineering nursery operations and bioengineering works		
10:00 a.m.-10:05 a.m.	Recap of Day 2 Training Session	
10:05 a.m.-12:00 p.m.	MODULE 6: Bioengineering nursery operations	Compost production and filling polypots
		Seed sowing and planting cuttings in nursery
		Care of young plant in nursery
		Hardening, lifting and transporting to site
		Scheduling nursery work and record keeping
12:00 p.m.-1:00 p.m.	MODULE 7: Site preparations and bioengineering works	Site preparation and spoil disposal
		Construction of vegetative structures
		Practical application of bioengineering works
		Application of rate analysis norms and standard specification for bioengineering works
1:00 p.m.-2:00 p.m.	Health Break	
2:00 p.m.-2:50 p.m.	Open Discussion and Training Course Evaluation	
2:50 p.m.-3:00 p.m.	CLOSING SESSION: ADB	

Day 2 and 3 are dedicated to Field Engineers that provide details on technical and practical applications of bioengineering.

THE BIOENGINEERING TRAINING TEAM



SHANKAR RAI is the Lead Trainer. He is a bioengineering practitioner with 32 years of professional experience in assessment, design, implementation and supervision of slope protection and erosion control works of roadside slope and watershed adopting bioengineering techniques in Nepal, Timor Leste, Indonesia and Viet Nam. In doing so, he delivers practical field-based training on landslide assessment and bioengineering applications for Road Engineers, Sub-engineers, Supervisors and Foresters. He has a long experience of working in Nepal on bioengineering applications with Department of Roads, and Department of Local Infrastructure Development and Agriculture Roads in Nepal with various projects funded by Department for International Development (DFID), Asian Development Bank (ADB), German Technical Support (GIZ), and Swiss Agency for Development and Cooperation (SDC).



JOHN HOWELL is the Quality Assurance Advisor in the team. John brings to the team a range of expertise that bridges the natural resources, mining, infrastructure development and energy sectors, mainly in rural areas. He is highly acclaimed for his works in bioengineering, particularly in the context of Nepal, and is a lead contributor in developing globally used manuals, handbooks, guidelines and specifications used for bioengineering works. His technical background is as a soil scientist and a specialist in soil conservation and slope stabilization, but his work has also covered environmental assessment, sustainability, policy and institutional activities. Countries of work are the United Kingdom, Nepal as well as Liberia, Vietnam, South Sudan, Bangladesh, Bhutan, Pakistan (AJK), Uzbekistan, India, Lao PDR, Cambodia, Sri Lanka, Belize, Trinidad and Tobago, and Guinea. His professional experience in long and short overseas assignments has been continuous since 1985.



SHUVA SHARMA leads the expert team for this project. He is an infrastructure development professional with focus on participatory and green development approach, working closely with the local government institutions and professionals. He comes with a range of demonstrated professional skills in holistic local infrastructure program design, implementation and monitoring as well as quality assessment services for leading donor partners. He offers an excellent combination of skills in wider range of engineering practices responding to environment and climate change priorities as well as economic and social development. He has applied and trained on a range of nature based solutions for a number of infrastructure development initiatives and has coordinated events to promote and apply bioengineering in different contexts.



MOHAMMAD SHARIFUL ISLAM is a Professor of Civil Engineering in Bangladesh University of Engineering and Technology. He obtained his PhD from Saitama University, Japan in 2002 and later pursued Japan Society for the Promotion of Science postdoctoral research. His research specialization includes bioengineering, climate resilient infrastructures and disaster resilient rural housing. He has made significant contributions in the field of Vetiver based Bioengineering and conducted many trainings at different organizations including Local Government Engineering Department. He is contributing to several national and international mega projects. He has published more than 150 research articles. Notable ones from the 23 awards he received are, The King of Thailand Vetiver Awards, The Vetiver Network International Award, Best Paper Awards, Dr. Rashid Gold Medal and Sharfuddin Gold Medal.



SYED ABDUR RAHIM is a professional Civil engineer with over 32 years of engineering experience in the public sector, rural and urban roads, and related physical infrastructure development and maintenance. He also worked as Project Director in the Local Government Engineering Department, Bangladesh, for the Village Road Rehabilitation Project (VRRP), where he played a key role in project management, execution, contract preparation, and administration of rural and urban infrastructural works. Syed earned an MS in Environmental Science from the State University of Bangladesh and a Bachelor of Science degree from Dhaka University of Engineering Technology.