

Project Number: 41461

Capacity Development Technical Assistance (CDTA)

Socialist Republic of Viet Nam: Promoting Climate Resilient Rural Infrastructure in the Northern Mountain Provinces of Viet Nam

I BACKGROUND

1. Since 2006, the Government of Viet Nam (Government) has discussed with the Asian Development Bank (ADB) and the United Nations Development Programme (UNDP) the need to take steps to protect rural infrastructure from the anticipated effects of climate change.

2. Viet Nam is one of the most disaster-prone countries in the world. It suffers from typhoons, floods, droughts, and landslides. Flooding and landslides triggered by typhoons are the most prevalent natural disasters.¹ Many of Viet Nam's rivers, especially in mountainous areas, are short and steep. Heavy rainfall in their upper catchment areas thus produces intense, short duration flash floods that frequently occur without warning, taking lives and destroying infrastructure, houses, and farmland in their path. These problems are expected to worsen with increasing climate fluctuation and intensification of climate events. In response, the Government launched the National Target Program to Respond to Climate Change.

3. The ADB-funded investments in rural infrastructure, includes roads, irrigation, markets, water supply, and post-harvest facilities. Rural infrastructure is particularly vulnerable to damage caused by climate change-attributed impacts. The most potentially damaging effect is increased intensities and duration of rainfall causing increases in the volume and velocity of surface water movement. This can cause severe erosion, leading to rural infrastructure damage. The damage results in high maintenance and rehabilitation costs as well as the loss of benefits while rural infrastructure remains in poor condition. At present, few mainstreamed measures are practiced in Viet Nam that can affordably prevent or mitigate these impacts.

4. There are, however, engineering options to counter the anticipated impacts of climate change on rural infrastructure. These options range from technically sophisticated civil engineering approaches to far less costly bioengineering approaches. For rural infrastructure, where the risk of failure is usually less catastrophic in comparison to that of major infrastructure, solutions need to be low-cost and consequently rely upon local resources and inputs.

5. Bioengineering approaches are techniques that involve the protection of exposed earth surfaces and structures through the use of live vegetation complemented by simple civil works. These measures provide a low-cost means of supplementing current technical standards to prevent soil erosion and to reduce slope instability in hilly areas. Bioengineering entails an element of carbon capture, and thus contributes to counter the causes of climate change. This approach is highly labor-intensive and can provide employment and livelihood opportunities for rural people, increasing their capacities to cope with the impacts of climate change. The application of bioengineering approaches could be quickly scaled up.

6. The latest ADB-funded rural infrastructure project to be approved for Vietnam is the Sustainable Rural Infrastructure Development Project for Northern Mountain Provinces (SRIDP). This project aims at the implementation of 45 rural infrastructure subprojects covering the upgrading and rehabilitation of roads, irrigation schemes and markets in 15 provinces. Being located in the Northern Mountains the infrastructure to be improved is especially vulnerable to

¹ On the average, four to six typhoons hit Viet Nam each year and batter the eastern seaboard over much of its 3,260-kilometer length, causing extensive damage to a wide range of rural infrastructure: bridges, roads, irrigation works, market places, and schools.

water-induced and land instability stresses and thus is especially vulnerable to the likely effects of climate change.

7. A technical assistance (TA) project will be financed by a grant and will be implemented in conjunction with the SIRDP, to strengthen the ability of government agencies to address the risk of climate change induced damage to rural infrastructure. The TA will be carried out in parallel by the Asian Development Bank (ADB) and the United Nations Development Program (UNDP). The TA will consist of five complementary components.

8. UNDP will carry out the following four components over a period of four years: (i) mainstreaming of climate risk reduction into policy formulation and infrastructure development planning; (ii) capacity development to increase understanding about current and emerging climate risks and to promote the use of climate resilience techniques during local planning activities; (iii) dissemination of lessons learned and best practices; and (iv) project management.

9. The ADB managed component will be in the form of a Capacity Development Technical Assistance (CDTA). The CDTA will demonstrate and initiate the mainstreaming into practice of measures that can be taken to reduce the anticipated climate change impacts on rural infrastructure. The demonstrations will illustrate the value of low-cost, climate-resilient techniques selected according to specific site conditions. The techniques will be demonstrated in provinces that represent different environments and anticipated climate change effects. The demonstrations will be carried out on different kinds of rural infrastructure such as roads, irrigation structures, and river embankments. This will enable the compilation of a range of environments and infrastructure with corresponding appropriate approaches.

10. The demonstrations will optimize the potential social benefits. They will rely on local resources that can be sustainably sourced from nearby communities. Careful selection and use of materials—such as specific plants that can be used for food, animal fodder, or medicinal purposes—will enhance the interests of local people in maintaining the condition of the sites in the long term. Construction or landscaping operations will be designed to optimize labor-based approaches in order to provide local employment opportunities.

11. The CDTA will survey, design, cost, and train key stakeholders (including local contractors, government officials and community members and leaders) to implement climate resilient demonstration measures on four SRIDP subprojects. Civil works for the demonstration sites will be undertaken via a subcontract funded through the consultants' contract. The CDTA will address technology issues, capacity development needs and post-project operation and maintenance arrangements for measures. The CDTA will have the initial responsibility for performance and deterioration monitoring and analysis of both the demonstration and control sites.

12. A knowledge dissemination and communication strategy (KDCS) and associated action plans will be designed and implemented to guide the flow of information about the demonstrations to the stakeholders. The KDCS will include such activities as field trips to the demonstration sites for government personnel, contractors, and interested private sector parties to view firsthand the demonstrations and their impact; and videos and slide shows will be produced to provide material for lectures on a range of approaches for in-house training of key government personnel as well as related engineering schools, colleges, and institutes.

13. The Ministry of Agriculture and Rural Development (MARD) will be the executing agency (EA) for the CDTA. The ADB loan funded Sustainable Rural Infrastructure Development Project in Northern Mountain Provinces' (SRIDP) central project management unit (CPMU) will be the implementing agency (IA). The TA will be implemented over a three year period.

II SCOPE OF SERVICES

14. The consultants will be responsible for implementing the CDTA under the guidance of the CPMU and in coordination with the UNDP managed components. In doing so they will be responsible for:

- (i) identification of low-cost climate-proofing measures suitable for rural infrastructure in northern Viet Nam;
- (ii) demonstration of climate change resilient techniques in the provinces of Bac Kan and Son La on two rural roads, one irrigation scheme, and one river embankment;
- (iii) establishment of a trained cadre of technical personnel familiar with the protection measures;
- (iv) preparation of recommendations for the integration of the demonstrated approaches into training curricula, standard design procedures, and contract specifications; and
- (v) identification of climate change risks and vulnerabilities, and the potential for applying the measures used in the demonstrations for strengthening the resilience of nearby communities.

III EXPERTS REQUIRED

15. The consulting services will require 83 person months of consultant expertise consisting of 25 person months of international expertise and 58 person months of national expertise as indicated below:

Summary of Consulting Services Requirement: Name of Position and Person Months (PM)

International	PM	National	PM
Team Leader/Bio-Engineer	14	Deputy Team Leader/Agricultural Engineer	34
Climate Change Specialist	1	Agronomist/Forester	4
Civil Engineer	3	Civil Engineer	5
Technical Trainer	2	Geotechnical Engineer	2
Geotechnical Engineer	1	Technical Trainer	4
Social Development Specialist	2	Meteorologist/Hydrologist	2
Unallocated	2	Gender Specialist	1.5
		Indigenous Peoples Specialist	1
		Poverty Specialist	1.5
		Unallocated	3
Total	25		58

Individual terms of reference for the experts are provided below.

IV INDIVIDUAL TERMS OF REFERENCE

A. International Consultants

16. All international consultants shall:

- (i) Be fluent in the English language; and
- (ii) Prepare detailed work plans for, and provide guidance to, the national consultants.

17. **Team Leader and Bioengineering Specialist (14 person-months)**

Qualifications: A master's degree or equivalent in engineering, agronomy, or a related discipline.

Experience: At least 15-years' experience undertaking related research, demonstrating or providing consulting services in bioengineering with at least 5-years' experience in rural infrastructure development in developing countries in the humid tropics, preferably in environments with similar characteristics to the mountainous areas of northern Viet Nam.

Duties: Specific tasks include but are not limited to:

- (i) manage the consulting team;
- (ii) liaise with government organizations at the central and provincial levels, the United Nations Development Programme (UNDP), and other stakeholders;
- (iii) formulate, implement, and update a knowledge dissemination and communication strategy and action plan on the use of low cost techniques for the protection of rural infrastructure;
- (iv) carry out an orientation and training program on the use of low cost techniques for the protection of rural infrastructure from climate induced damage for key staff of the central project management unit (CPMU), provincial project management units, and Department of Agriculture and Rural Development (DARD) staff of provinces where the demonstrations will be undertaken, and engineering staff of contractors likely to bid for implementation works;
- (v) prepare a susceptibility–hazard–risk prioritizing framework;
- (vi) assess the chosen subprojects and, together with CPMU, PPMU staff and representatives of the local communities, design meaningful demonstrations on the use of low cost techniques to protect rural infrastructure from climate-induced damage;
- (vii) prepare the bid packages for the demonstrations and manage the tendering process according to ADB regulations;
- (viii) supervise the construction of the demonstration sites;
- (ix) monitor the results of the demonstrations and determine any remedial or corrective work needed;
- (x) work with the training specialists and the CPMU and the PPMU to prepare a training program based on the outcome of the demonstrations;
- (xi) initiate a series of field trips for MARD and DARD staff as well as provincial government representatives from other provinces to visit the demonstration sites;
- (xii) document the reactions (if any) of the local affected population and civil administration to the demonstrations;
- (xiii) design the long-term monitoring framework and train the organization tasked to carry out the long-term monitoring and demonstration of low cost techniques;
- (xiv) prepare the quarterly reports, the five technical reports, and the final report; and
- (xv) agree with the CPMU the documents that should be translated and arrange for translation as required.

18. **Climate Change Specialist (1 person-month)**

Qualification: A master's degree or equivalent in meteorology, environmental sciences, or a related discipline.

Experience: At least 10-years' experience researching and/or documenting climate change effects, preferably in tropical countries, as well as disseminating information on climate change to the public, policy makers, and planners, preferably in developing countries.

Duties: Specific tasks include but are not limited to:

- (i) assess and to the extent possible, quantify the likely climate change related trends in the areas of the demonstration sites;
- (ii) identify the likely effects and impacts of climate change on rural infrastructure and current practices and techniques used to mitigate these effects;
- (iii) provide input to the susceptibility-hazard-risk framework; and
- (iv) provide input to the long-term demonstration monitoring framework for climatic information and analysis.

19. **Civil Engineer (3 person-months)**

Qualifications: A master's degree or equivalent in civil engineering or a related discipline.

Experience: At least 15-years' experience in developing countries, with experience in the design and construction of rural infrastructure, including rural roads and water resources structures. At least-10 years' experience working in the humid tropics, preferably in countries with similar environmental conditions to Viet Nam. The specialist will also, preferably, have had experience working on projects that have used bioengineering techniques.

Duties: Specific tasks include but are not limited to:

- (i) identify civil engineering techniques applicable within the context of the selected demonstration subprojects;
- (ii) provide input to the preparation of a susceptibility-hazard-risk framework;
- (iii) provide input to the design of the demonstrations;
- (iv) assist the team leader in supervising the implementation of the works;
- (v) assist the team leader in documenting the results of the demonstrations from a civil engineering (i.e., structure sustainability) point of view; and
- (vi) draft construction technical specifications.

20. **Technical Trainer (2 person-months)**

Qualifications: A master's degree or equivalent in engineering or a related discipline, with formal teaching/training qualifications.

Experience: At least 15-years' experience in engineering and technical training in developing countries, with experience in rural infrastructure and bioengineering. At least-10 years' experience working in the humid tropics, preferably in countries with similar environmental conditions to Viet Nam.

Duties: The specialist's primary duty will be the design and implementation of the knowledge dissemination and communication strategy and action plan. Specific tasks include but are not limited to:

- (i) review the intent of the CDTA and the target audience for training activities;
- (ii) review the results of the demonstrations and determine the best approach to disseminating the demonstration results to as wide as possible an audience;

- (iii) work with the team leader and deputy team leader, the CPMU (including the experts of the UNDP components) and the PPMU to prepare a training program which would best impart the results of the demonstrations and encourage their adoption both within the demonstration provinces and in other provinces; and
- (iv) work with potential trainers from the institute chosen to take long term responsibility for the demonstrations to test a training and demonstration program and refine the training program appropriately.

21. **Geotechnical Engineer (1 person-month)**

Qualifications: A master's degree or equivalent in geotechnical engineering or a related discipline.

Experience: At least 15-years' experience in geotechnical engineering in developing countries, with experience in the design and construction of roads and water resources structures. At least 10-years' experience working in the humid tropics, preferably in countries with similar environmental conditions to Viet Nam. The specialist will also, preferably, have had experience working on projects that have used bioengineering techniques.

Duties: Specific tasks include but are not limited to:

- (i) inspect the selected demonstration sites for any geotechnical issues that may have a bearing on the design, and provide advice to the team leader accordingly;
- (ii) provide input to the preparation of a susceptibility–hazard–risk framework;
- (iii) provide input to the design of the demonstrations; and
- (iv) assist the civil engineer to draft construction technical specifications.

22. **Social Development Specialist (2 person-months)**

Qualifications: A master's degree or equivalent in social sciences or a related discipline.

Experience: At least 15-years' experience in poverty and social development in developing countries, including rural infrastructure. At least 5-years' experience working in countries in Southeast Asia. The specialist should be familiar with ADB's social and resettlement and indigenous peoples safeguard policies and guidelines.

Duties: Identify, document, and implement measures to optimize the social benefits of the rural infrastructure climate resilience activities. Specific tasks include but are not limited to:

- (i) review and provide recommendations regarding the Sustainable Rural Infrastructure Development Project in Northern Mountain Provinces (SRIDP) poverty and social assessment for the selected demonstration sites;
- (ii) ensure the demonstrations conform to the SRIDP social safeguards;
- (iii) prepare a work plan and detailed duties for the national gender specialist, indigenous people specialist, and poverty specialist inputs;
- (iv) identify potential gender-sensitive social benefits and opportunities in the demonstrations whereby disadvantaged groups can be included;
- (v) design and implement a plan to integrate social inclusive aspects into the demonstrations;
- (vi) establish monitoring mechanisms for community involvement in subproject implementation and long-term management;
- (vii) document the results of the social inclusion process and make recommendations for future projects; and

- (viii) consult with communities near the demonstrations on how to improve their climate change resilience based on the techniques demonstrated.

23. **Unallocated (2 person-months)**

This is a first project in Viet Nam of this nature. There will be areas that need to be strengthened or addition expertise that cannot be determined prior to implementation. This provision will be used for additional or supplemental inputs as needed during the course of implementation. Specific terms of reference will be prepared by ADB based on identified needs.

B. National Consultants

24. All national consultants shall:

- (i) Be proficient in the English language; and
- (ii) Assist the international consultants to carry out their tasks in their respective fields, following the detailed workplans and guidance provided to them.

25. **Deputy Team Leader and Agricultural Engineer (34 person-months)**

Qualifications: An undergraduate degree in civil or agricultural engineering or a related discipline.

Experience: The agriculture engineer will have had at least 10-years' experience in designing physical structures (roads, irrigation systems, water supply systems) in Viet Nam. Experience in working with slope stabilization, erosion prevention, and stream flow hydrology will be a valuable asset.

Duties: Assist the Team Leader (TL) to deliver the CDTA, manage CDTA national team and, liaise with Government, ADB and other stakeholders. Specific tasks will include but will not be limited to:

- (i) Support the duties of the TL as described above;
- (ii) Replace the TL as necessary;
- (iii) Carefully supervise the field teams; and
- (iv) Carry out briefings and seminars as required.

26. **Agronomist and Forester (4 person-months)**

Qualifications: An undergraduate degree in agronomy, forestry, or a related discipline.

Experience: The agronomist/forester will have 10-years' experience working with a variety of upland plant species, preferably undertaking research or implementation work aimed at erosion prevention, slope stabilization, or land rehabilitation. The specialist will be familiar with indigenous Vietnamese species as well as species from other parts of Southeast Asia that could be used for (a) erosion control, slope stabilization, and the protection of physical structures; and (b) commercial production such as the production of traditional medicines, human food (such as herbs and spices), animal fodder, firewood, pulp and paper, or wood products.

Duties: Specific tasks include but are not limited to:

- (i) identify plant species best suited techniques being proposed;
- (ii) determine sustainable sources of plants and other materials for use in the demonstrations;
- (iii) assist in the design of demonstration plots;
- (iv) participate in the monitoring of demonstration sites and dissemination of results; and

- (v) assist in the documentation of the results of the demonstrations.

27. Civil Engineer (5 person-months)

Qualifications: An undergraduate degree in civil engineering.

Experience: At least 10-years' experience in the field of engineering, including the provision of rural infrastructure, preferably in mountainous areas.

Duties: Assist the international civil engineer and be available when needed throughout the design and construction periods. Specific tasks include but are not limited to:

- (i) identify civil engineering techniques applicable within the context of the selected subprojects, and present related technical information at the orientation program;
- (ii) provide input to the design of the demonstrations; and
- (iii) assist with the drafting of construction technical specifications.

28. Geotechnical Engineer (2 person-months)

Qualifications: An undergraduate degree in geotechnical engineering or a related discipline.

Experience: At least 10-years' experience in geotechnical engineering, with experience in mountainous areas.

Duties: Assist the international counterpart and be available when needed throughout the design and construction periods. Specific tasks include but are not limited to:

- (i) assist in the inspection of the selected demonstration sites for any geotechnical issues that may have a bearing on the design;
- (ii) provide input to the design of the demonstrations; and
- (iii) assist in the drafting of construction technical specifications for consideration by the Government.

29. Technical Trainer (4 person-months)

Qualifications: An undergraduate degree in civil or agricultural engineering or a related discipline, with formal qualifications in teaching and training.

Experience: At least 8-years' experience in engineering and technical training.

Duties: The national trainer will assist the international trainer to carry out his/her duties.

30. Meteorologist and Hydrologist (2 person-months)

Qualifications: An undergraduate degree in meteorology, hydrology, or a related discipline.

Experience: At least 5-years' experience in measuring climate and stream flows and be familiar with the sources of historical climate data and hydrological data as well as the current technology used for climatic and hydrological measurements. Experience in the mountainous areas of Viet Nam is preferable.

Duties: Specific tasks include but are not limited to:

- (i) assist the international climate change specialist to determine and gather the types of data to be recorded that will best reflect the impact of climate change in the SRIDP project areas; and
- (ii) document extreme events (typhoons, floods) and examine the impact of these events on the demonstrations and the degree to which the structures being protected withstood them.

31. **Gender Specialist (1.5 person-months)**

Qualifications: An undergraduate degree in the social sciences or a related discipline.

Experience: At least 7-years' experience in poverty and gender analysis, with experience in rural infrastructure. The specialist should be familiar with ADB's gender and social safeguard policies and guidelines.

Duties: Assist the international social development specialist to carry out his/her duties. Specific tasks include but are not limited to:

- (i) supervising the demonstrations for conformity to the SRIDP gender action plan;
- (ii) supervising implementation of the plan to integrate social inclusive aspects into the demonstrations;
- (iii) monitoring community involvement with respect to gender in subproject implementation and long-term management; and
- (iv) consulting with communities near the demonstrations on how to improve the climate change resilience of their communities based on the techniques demonstrated.

32. **Indigenous People Specialist (1 person-month)**

Qualifications: An undergraduate degree in the social sciences or a related discipline.

Experience: At least 7-years' experience in poverty and indigenous peoples development, with experience in rural infrastructure. The specialist should be familiar with ADB's indigenous peoples social safeguard policies and guidelines.

Duties: Assist the international social development specialist. Specific tasks include but are not limited to:

- (i) supervising the design and implementation of the demonstrations for conformity to the SRIDP indigenous people's framework and ADB safeguards;
- (ii) supervising implementation of the plan to integrate the social inclusive aspects with respect to indigenous people into the demonstrations;
- (iii) monitoring community involvement in subproject implementation and long-term management; and
- (iv) consulting with communities near the demonstrations on how improve the climate change resilience of their communities based on the techniques demonstrated.

33. **Poverty Specialist (1.5 person-months)**

Qualifications: An undergraduate degree in the social sciences or a related discipline.

Experience: At least 7-years' experience in poverty analysis, including rural infrastructure. The specialist should be familiar with ADB's gender and social safeguards policies and guidelines.

Duties: Assist the international social development specialist to carry out his/her duties. Specific tasks include but are not limited to:

- (i) supervising the design and implementation of the demonstrations for conformity to the SRIDP social safeguards;
- (ii) supervising implementation of the plan to integrate the social inclusive aspects into the demonstrations;
- (iii) monitoring community involvement in subproject implementation and long-term management; and

- (iv) consulting with communities near the demonstrations on how improve their climate change resilience based on the techniques demonstrated.

34. **Unallocated (3 person-months)**

This is a first project in Viet Nam of this nature. There will be areas that need to be strengthened or additional expertise that cannot be determined prior to implementation. This provision will be used for additional or supplemental inputs as needed during the course of implementation. Specific terms of reference will be prepared by ADB based on identified needs.

V EXPECTED OUTPUTS

35. The CDTA will produce quarterly progress reports and five technical reports. The technical reports will include:

- (i) A report with the: identification of approaches to increase rural infrastructure climate resilience; the knowledge dissemination and communication strategy and action plan; and the susceptibility–hazard–risk prioritizing framework;
- (ii) Demonstration site construction report;
- (iii) Training completion report;
- (iv) A report with recommendations for the integration of the measures in training curricula, standard design procedures, and contract specifications; and
- (v) A report with assessments of climate risk and vulnerability, with potential measures for strengthening the resilience of communities near the demonstrations.