

PROJECT OVERVIEW: IMPROVING YEAR-ROUND ACCESSIBILITY BY LOCALIZING TECHNOLOGY

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Backgrounds: Issues and Problems

Road infrastructure is the key to socioeconomic development in all communities. Adequate road infrastructure is crucial for people in developing countries, especially in rural areas, to secure access to markets, hospitals and schools to fulfil basic human needs or generate income for sustainable development.

However, there have been many financial and technical constraints on the establishment of adequate road infrastructure, especially in developing countries. One of the technical constraints in Ethiopia is the existence of expansive soil which covers over 10% of the surface area of the country. This soil poses as a significant obstacle to the establishment of road infrastructure. This soil drastically changes its volume according to its moisture content: It swells when it absorbs water and shrinks when dry. As a result of the volume change, swelling pressure causes roads to heave and lift, while shrinkage pressure causes cracks and subsidence on the roads. Thus, the expansive soil makes the construction and maintenance of rural roads in Ethiopia difficult.

In the past, it has been a common practice in most of the affected areas to replace this expansive soil with other, weightier soils which do not present the same problem, but to procure and transport replacement soil is both difficult and expensive. One solution is to mix cement with the expansive soil, but this also requires a high budget.

Project Purpose

This project proposes to address the issues outlined above. The project will,

first, identify the physical mechanisms of the expansive soil and, secondly, develop soil additives, made from local plants, to improve the stability of unpaved roads. The goal is to find simple and convenient methods to construct and maintain roads without relying on expensive machinery or materials and to develop an operational model in collaboration with local governments and communities.

The project also aims at contributing to the mission of the Universal Rural Road Access Program (URRAP), which is to connect all *kebeles*, Ethiopia's smallest administrative unit, by all-weather roads, and thereby provide communities with year-round access to towns and villages.

Project Outline

The overall goal of this project is to contribute to connecting all *kebeles* to all-weather roads and thereby provide affordable, easily-maintainable all-weather access. It will also contribute toward the infrastructural and transportation needs of rural communities by applying innovative soil-stabilizing technology that makes use of local resources.

To achieve this overall goal, the project will develop plant-derived soil additives and standardize the technology for effective application of these additives to the national and local road infrastructure. Additionally, by adopting a local resource-based approach utilizing local materials and unskilled labor, the project improves rural accessibility. This will, furthermore, create employment for rural women and youth by providing jobs in the construction and maintenance work of rural road networks.

Project Title

The title of the project is “Project for Development and Operation Model of Plant-derived Soil Additives for Road Disaster Reduction on Problematic Soil.” This title is long, and the project is called MNGD Project for short. MNGD is named after the Amharic word መንገድ, pronounced *menigedi* and meaning “road(s)” by omitted vowel sounds. Instead of vowels, the subtitle given to MNGD is “Making Network for Glocal Development.” The term “glocal” is relatively new and fits the idea and purpose of the project, which tackles the

global issue of securing year-round access for all people and simultaneously seeks to be harmonious with the local community by using localized technology and appreciating local skills and knowledge.

Project Scheme

This project is under the scheme of Science and Technology Research Partnership for Sustainable Development (SATREPS). As it is described on its website:

SATREPS is a Japanese government program that promotes international joint research. The program is structured as a collaboration between the Japan Science and Technology Agency (JST), which provides competitive research funds for science and technology projects, and the Japan Agency for Medical Research and Development (AMED), which provides competitive research funds for medical research and development, and the Japan International Cooperation Agency (JICA), which provides development assistance (ODA). Based on the needs of developing countries, the program aims to address global issues and lead to research outcomes of practical benefit to both local and global society.

<https://www.jst.go.jp/global/english/about.html>

The scheme has three main aims. First, it aims to enhance international cooperation between Japan and developing countries in the fields of science and technology. Second, it aims to address global issues and advance science. The projects under this scheme should therefore consider the resolution of global issues and advancement of science and technology by developing new knowledge and technology. The third aim is to develop the capacity of developing countries. This scheme is not simply international aid but joint research and that means the projects in the SATREPS scheme should be collaborations between Japan and developing countries to boost self-reliant research and develop capacity in both countries.

Project Site

The project is implemented in Addis Ababa and Jinka, South Omo Zone in the Southern Nations, Nationalities and Peoples' Region (SNNPR) of Ethiopia. The road sector development in the SNNPR has been neglected: Only 66% of the *kebeles* in the SNNPR have been connected by all-weather roads, while 76% of the *kebeles* are connected at the national level.

Implementation Structure

The Project is implemented by several institutions from both Ethiopia and Japan as below (Figure 1):

- Addis Ababa Science and Technology University (AASTU)
- Jinka University (JKU)
- Ethiopian Roads Authority (ERA)
- Kyoto University (KU)
- University of Miyazaki (UOM)
- Ehime University (EU)
- Nagoya Institute of Technology (NIT)

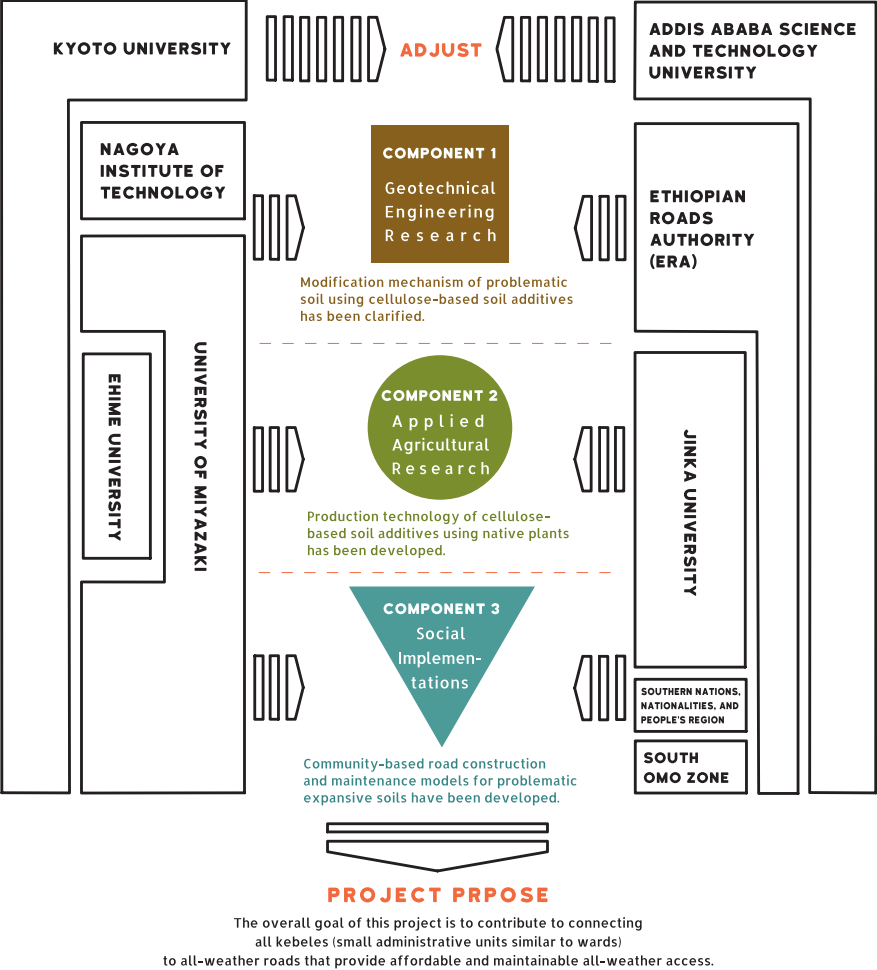


Figure 1. Implementation System