

PROGRESS REPORT FOR COMPONENT 3

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This chapter reports the progress of component 3 of the SATREPS⁽¹⁾-MNGD⁽²⁾ project, titled “The operation model of construction measures for problematic soil aimed at reducing rural road disasters is developed.” The members of this component, have been conducting their activities in South Omo Zone, Southwestern Ethiopia.

Component 3 Core Members for Interdisciplinary Research

Component 3 is led by 12 researchers from Japan and Ethiopia. Other participants in this project include graduate students from Kyoto University and lecturers from Jinka University. Component 3 assumes an interdisciplinary approach to research on activities for social implementation based on the research findings in the fields of engineering and social sciences. At the end of June 2021, two lecturers from Jinka University moved to Kyoto to pursue their Ph.D. studies. These lecturers made their presentations on their research progress in Part II of the Joint Coordination Committee meeting on 4th October 2021.

Component 3 aims to conduct activities considering three aspects. First, it aims to gather information on and analyze occurrences of road disasters, together with the current state of countermeasures taken in the South Omo Zone. Second, it plans to develop operation models pertaining to construction measures for problematic soil with additives for soil modifiers. The final objective is to establish an operating model involving construction measures for problematic soil and a road maintenance and management system.

Our previous face-to-face Joint Coordination Committee meeting had taken place in October 2019. However, owing to the COVID-19 pandemic, researchers from Japan could not travel to Ethiopia until September 2021(as of 4th October 2021). Consequently, the component 3 members began conducting Internet-based research activities, which continue at present (as of 4th October 2021). The next section explains the component 3 research activities based on the three objectives discussed in the previous Joint Coordination Committee meeting.

Research Activities from AY2019 to AY2021: Online Meetings and Research Achievement

Table 1 depicts the number of online meetings held from April 2020 to September 2021. Component 3 members attended online meetings almost every month, except in July and August 2020 and April 2021. The table below summarizes their research outcomes from March 2019 to September 2021. Component 3 publishes research activity reports in the ZAIRAICHI-MNGD issue at the end of each academic year. In addition, in February 2021, this project members participated in the international online workshop titled “The role of on-site research for innovation & STEAM (Science, Technology, Engineering, Arts, and Mathematics) education,” in which component 3 organized one session with the topic “road disaster reduction and community-road maintenance.”

Field Studies on Road Disasters and Disaster Countermeasures (October 2019 to September 2021)

For the first issue, component 3 members have been working primarily on three aspects. First, they began conducting online meetings in collaboration with Jinka University in May 2020. In November 2020, they have conducted the first seminar wherein two international students presented their preliminary doctoral theses in their respective fields. Furthermore, in this online seminar, we conducted fruitful discussions on literature reviews. In Part II of the Joint Coordination Committee meeting, these two students made their presentation on their research plans and progress.

In addition, since 2019, the project leader, Professor Kimura, has been encouraging researchers at Addis Ababa Science and Technology University (AASTU) and Jinka University to conduct their research by means of procuring research funds from outside fund of this project. Finally, since July 2021, Professor Gebre, in collaboration with Jinka University, has set up a research team to conduct fieldwork on road disasters (see chapter by Gebre Yntiso et al. in this issue).

Table 1. Online Meetings and Research Achievement

Issue No.	Academic year	2020																	
		Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.
3.1	Seminar with Jinka University		1					3	2	2	2	4	4	1	4	3	2	2	
3.2	Seminar/workshop with Ethiopian Roads Authority	1	3	1		1	2	1	1						2	3	1		

*Number shows the times of online meetings.

Academic year	2021																		
	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
Papers, proceedings															2				
Presentations in academic meetings															4				

*Number shows the times of achievements.

Sharing Laboratory Findings (April 2020–September 2021)

For the second issue, Dr. Miyazaki, Mr. Akagi, a graduate student in engineering from Kyoto University, and Mr. Haruta, a student from Miyazaki University, have been conducting online study meetings since April 2020 on the reports published by Ethiopian Roads Authority and Japan International Cooperation Agency. Although most findings have been based on the case of paved roads, they could refer to some factors—including the large seasonal variations in moisture content in the outer zones—to set a baseline for the comparison with the case of gravel roads.

In September and October 2020, Dr. Miyazaki and Dr. Fukubayashi conducted an online international workshop with Ethiopia Roads Authority, sharing the laboratory findings pertaining to the development of operating models concerning construction measures for problematic soil, black cotton soil.

Preparing the Establishment of a Small-Scale Soil Test Laboratory at Jinka University

As of 2019, Jinka University had been donating surveying instruments for road construction as well as testing equipment for quality control. Although such donations had not been included in the original plan for this MNGD project, they considered that they could obtain simple results and findings by means of instruments such as the Atterberg limit test, the free swelling and linear shrinkage test, and the CBR (California Bearing Ratio) and UCS (Uniaxial Compressive Strength) tests. The staff members at Jinka University have now cleared the existing props in the room earmarked for the establishment of the laboratory. They have also discussed the layout of the instruments and equipment to be set up in this room.

Demonstration of community-road construction (November–December 2019)

For the third issue, I briefly introduce the road-repair demonstration conducted from November to December 2019. Upon the selection of some model sites in the South Omo Zone for the purpose of preliminary research, villagers often

asked us about the technology adopted by us for community-road construction. Therefore, to demonstrate the technology developed by this project leader, Professor Kimura, Dr. Fukubayashi, Mr. Matsukuma, and Mr. Sato, graduate student from Miyazaki University, collaborated with the villagers and carried out the road-repair work from November to December 2019 at one of the model sites. Prior to this road repair, the former president and lecturers of Jinka University participated in the village meeting with Japanese members and they helped explain the project's objectives to the villagers. At the village meeting, it was decided that the villagers would learn how to construct community roads and provide their labor service to repair the road extending up to 150 meters from the elementary school premises. The report for this activity was published in the second issue of ZAIRAICHI-MNGD (Matsukuma et al., 2021; Kaneko, 2021).

Outreach Activities

Component 3 is also engaged in activities aimed at disseminating the initiatives and outcomes of the MNGD project. From October 2021 to February 2022, the MNGD project hold five open lectures at Kyoto University. In addition, from 2018 until September 2021, Japanese and Ethiopian members regularly posted on the MNGD project website their field reports pertaining to the research activities conducted by them in Ethiopia and Japan.

Planned Activities for Component 3 from October 2021 to March 2022

In the second half of this academic year, component 3 continues with its Internet-based research activities. For the first issue, they conduct an online seminar with international students and share our research progress with Jinka University and Professor Gebre. Furthermore, they collaborate with the Geographical information office at Jinka University to collect and analyze geographic data. For the second issue, component 3 conducts an online workshop with Ethiopian Roads Authority to share findings and prepare for a small-scale soil test laboratory in Jinka University by means of an online conference system. For the third issue, component 3 prepare educational materials for future training courses by integrating social science and engineering knowledge on road repair

and construction, referring to previous community-road construction cases.

Notes

- (1) The abbreviation of Science and Technology Research Partnership for Sustainable Development.
- (2) The abbreviation MNGD was proposed by Professor Shigeta, a member of the project. He chose M-N-G-D due to its proximity to the sound of the word *menigedi*, which means road in Amharic. He then created an English phrase to describe the purpose of the project that could be abbreviated M-N-G-D (Kaneko et al., 2020: 38).

References

- Kaneko, M. 2021. Notes on the introduction of road maintenance technologies: Preparation for implementation in village B in southwestern Ethiopia. *ZAIRAICHI No.3 MNGD Special issue 02*: 25–30.
- Kaneko, M., A. Ikeda & M. Shigeta 2020. Outreach activities undertaken in the MNGD project in 2019. *ZAIRAICHI No.2 MNGD Special issue 01*: 37–45.
- Matsukuma, S., S. Sato & Y. Fukubayashi 2021. Demonstration of road improvement by local inhabitants at the Baytsemal village in the South Omo Zone in southern Ethiopia. *ZAIRAICHI No.3 MNGD Special issue 02*: 1–23.