

JAPAN INTERNATIONAL COOPERATION AGENCY
GEOLOGICAL SURVEY OF ETHIOPIA

**The Project for Developing
Countermeasures against Landslides in
the Abay River Gorge**

DRAFT FINAL REPORT
APPENDIX

November, 2011

KOKUSAI KOGYO CO., LTD.
JAPAN CONSERVATION ENGINEERS CO., LTD.

Appendix

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1. Scope of work for the project

SCOPE OF WORK

FOR

THE PROJECT FOR DEVELOPING COUNTERMEASURES AGAINST
LANDSLIDE IN THE ABAY RIVER GORGE

IN

THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

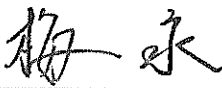
AGREED UPON BETWEEN

GEOLOGICAL SURVEY OF ETHIOPIA

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

ADDIS ABABA, December 16, 2009



Satoshi Umenaga

*Leader of Detailed Planning Survey Team
Japan International Cooperation Agency
Japan*




Tolesa Shagi
Director General

Tolesa Shagi

*Director General
Geological Survey of Ethiopia
Federal Democratic Republic of Ethiopia*

Witnessed by



Tilahun Tadesse

*Bilateral Cooperation Sub Process Owner
Ministry of Finance and Economic Development
Federal Democratic Republic of Ethiopia*

Witnessed by



Zaid Wolde Gabriel

*Director General
Ethiopian Roads Authority
Federal Democratic Republic of Ethiopia*

I. INTRODUCTION

In response to the official request of the Government of the Federal Democratic Republic of Ethiopia (hereinafter referred to as "GOE"), the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programmes of the Government of Japan, in consultation with the Government of Japan, decided to conduct the technical cooperation for development planning on "the Project for Developing Countermeasures against Landslide in the Abay River Gorge" (hereinafter referred to as "the Project") in accordance with the relevant laws and regulations in force in Japan. Accordingly, JICA will jointly undertake the Project with the authorities concerned of GOE.

On the part of GOE, Geological Survey of Ethiopia (hereinafter referred to as "GSE") shall act as the counterpart agency to the Japanese Project team (hereinafter referred to as "the Team") and as the coordinating body in relation to the other concerned organizations for the smooth implementation of the Project.

This document sets forth the Scope of Work of the Project.

II. OBJECTIVES OF THE PROJECT

The objectives of the Project are:

1. to figure out the mechanism for the landslide in Abay River Gorge
2. to transfer relevant skills and technologies to personnel concerned with the Project

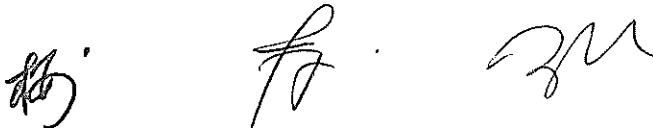
III. STUDY AREA

The Project shall cover the Abay River Gorge shown in APPENDIX 1.

IV. SCOPE OF THE PROJECT

In order to achieve the objectives mentioned above, the Scope of Work for the Project shall cover the following items:

0. The project implementing system is established.
 - 0-1. To identify the personnel and equipment of GSE
 - 0-2. To establish the implementing system for GSE
 - 0-3. To set up monitoring equipment at identified sites
1. The situation of the landslide is identified.
 - 1-1. To conduct aerial photograph interpretation and develop topographic map for landslide
 - 1-2. To prioritize landslide sites at risk and develop hazard map
 - 1-3. To conduct hydrological investigation
 - 1-4. To develop database based on the analysis of hydrological investigation with GIS
2. The topography and geological condition of the landslide is identified.
 - 2-1. To conduct field survey for the topography and geological condition of the landslide
 - 2-2. To develop a implementation plan for landslide survey
 - 2-3. To conduct topographic survey by local on-the-spot surveying
 - 2-4. To conduct boring geological survey
 - 2-5. To conduct physicality and chemistry tests
 - 2-6. To conduct geophysical exploration
3. The landslide characteristics due to seasonal changes is identified.



- 3-1. To conduct the surface displacement observation
- 3-2. To investigate sliding surface
- 3-3. To monitor groundwater level
- 3-4. To conduct rainfall monitoring
- 3-5. To develop an early warning system

- 4. The landslide mechanism is figured out.
 - 4-1. To identify the coverage (lateral and vertical) of landslide and differentiate the blocks within it
 - 4-2. To figure out the natural causes of landslide
 - 4-3. To figure out the human causes of landslide
 - 4-4. To conduct landslide stability analysis
 - 4-5. To differentiate landslide blocks by degree of risks

- 5. The survey and analysis of disasters other than the landslide is conducted.
 - 5-1. To conduct survey and analysis of rock fall
 - 5-2. To conduct survey and analysis of debris flow

- 6. The technical skill for the survey and analysis for the landslide is developed.
 - 6-1. To develop a manual for landslide survey and analysis applicable for the case of the Project area and its surroundings
 - 6-2. To conduct on and off the training for landslide survey and analysis

V. SCHEDULE OF THE PROJECT

The Project is estimated twenty-one (21) months in accordance with the tentative schedule as attached in the APPENDIX 2. The schedule is tentative and subject to be modified when both parties agree upon any necessity of the modification that will arise in the course of the Project.

VI. PROJECT IMPLEMENTATION MECHANISM

- 1. Steering Committee
GSE will establish the Steering Committee to provide overall policy, and Technical Committee to provide technical advice for the Project and sort out technical problems, if any.

- 2. Collaboration between JICA Project Team and Counterpart Team of GSE
GSE will assign the counterpart personnel to work together with the Team on a daily basis.

- 3. Technical Committee
Technical Committee which consists of both GSE and the Team is to review the findings by the Project and provide comments for improvement of the Project from time to time. The comments and recommendations suggested by the Technical Committee shall be integrated into the Project.

VII. REPORTS

JICA shall prepare and submit the following reports in English to GSE.

- 1. Inception Report:
Thirty (30) copies, at the time of one month after commencement of the Project

- 2. Progress Report 1:
Thirty (30) copies will be submitted at the time of seven (7) months after the commencement of the Project.

- 3. Interim Report:

Thirty (30) copies, at the time of about ten (10) months after the commencement of the Project.

4. Progress Report 2 :

Thirty (30) copies, at the time of about fifteen (15) months after the commencement of the Project.

5. Draft Final Report:

Forty (40) copies, at the time of about nineteen (19) months after the commencement of the Project.
The GOE shall provide JICA with its written comments within one (1) month after the receipt of the Draft Final Report.

6. Final Report:

Fifty (50) copies, within one (1) month after the receipt of the written comments on the Draft Final Report.

VIII. UNDERTAKINGS OF JICA

For the implementation of the Project, JICA shall take the following measures;

1. to dispatch, as its own expense, the Team to Ethiopia and
2. to pursue technology transfer to the counterpart personnel in the course of the Project

IX. UNDERTAKINGS OF THE GOE

1. To facilitate the smooth conduct of the Project; the GOE shall take necessary measures:

- (1) To permit the members of the Team to enter, leave and sojourn in Ethiopia for the duration of their assignments therein and exempt them from foreign registration requirements and consular fees;
- (2) To exempt the members of the Team from taxes, duties and any other charges on equipment, machinery and other material brought into Ethiopia for the implementation of the Project;
- (3) To exempt the members of the Team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Team for their services in connection with the implementation of the Project;
- (4) To provide necessary facilities to the Team for the remittance as well as utilization of the funds introduced into Ethiopia from Japan in connection with the implementation of the Study;

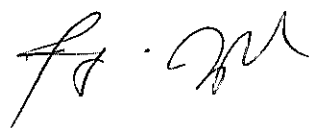
2. GOE shall bear claims, if any arises, against the members of the Team resulting from, occurring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Project, except when such claims arise from gross negligence or willful misconduct on the part of the Team.

3. GSE shall get approval for the aerial photography from related authority such as Ethiopian Mapping Agency and Military.

4. GSE shall act as a counterpart agency to the Team and also as a coordinating body with other relevant organizations for the smooth implementation of the Project, on behalf of the Ethiopian side.

5. GSE shall, at its own expense, provide the Team with the following, in cooperation with other organizations concerned:

- (1) Security-related information on as well as measures to ensure the safety of the Team;
- (2) Information on as well as support in obtaining medical service;

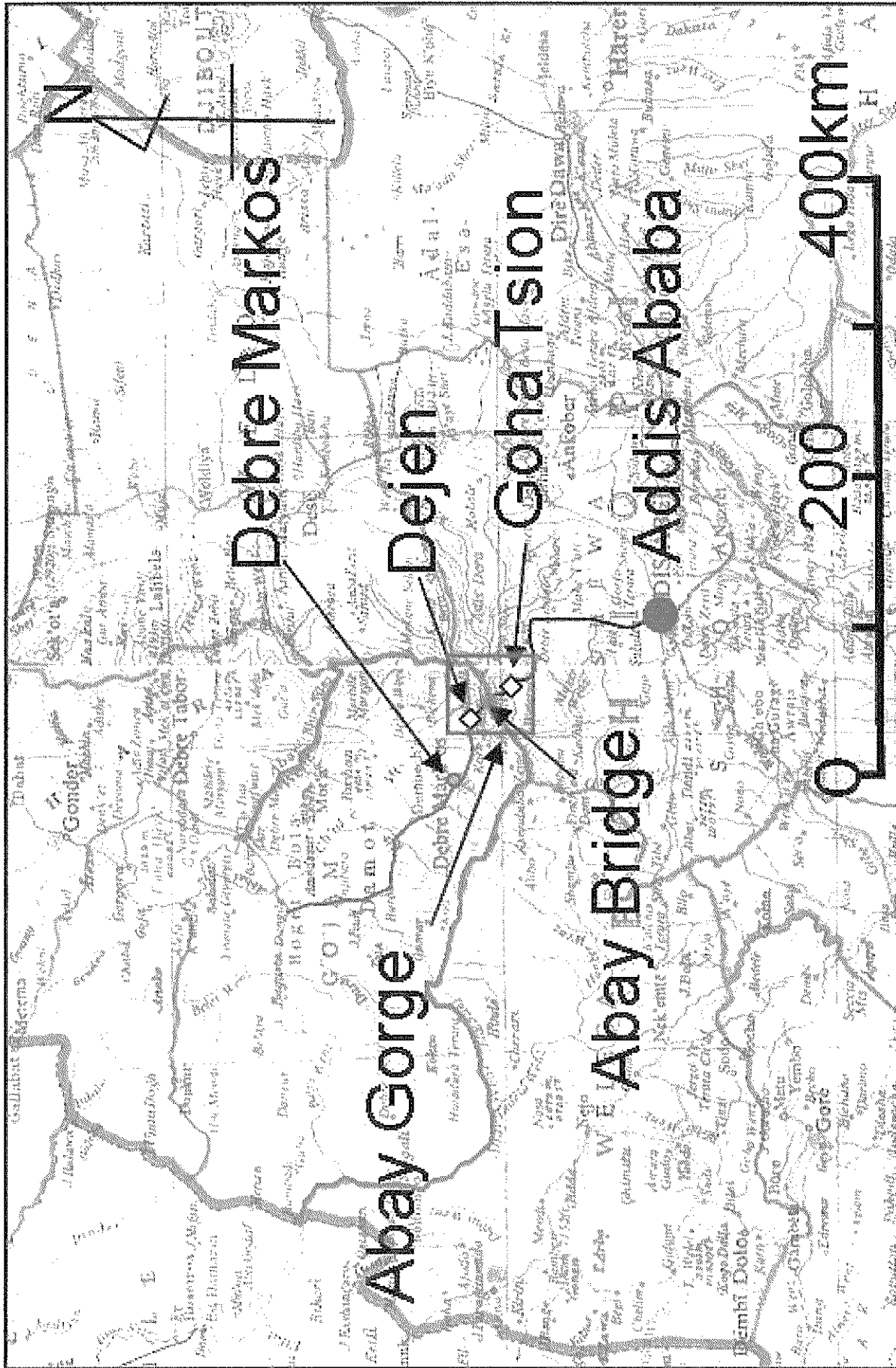


- (3) Available data (including maps and photographs) and information related to the Project;
- (4) Counterpart personnel;
- (5) Suitable office space with necessary equipment and facilities such as telephone line, internet, desks, etc. in Addis Ababa and Abay Gorge; and
- (6) Credentials or identification cards.

X. CONSULTATION

1. JICA and the GSE shall consult with each other in respect of any matter that may arise from or in connection with the Project.
2. The present document will become valid after authorization by JICA Headquarters and the GOE.

The image shows four handwritten signatures in black ink, arranged horizontally. From left to right: the first signature is a stylized 'H'; the second is a cursive 'F'; the third is a cursive 'M'; and the fourth is a large, bold signature that appears to be 'J' followed by a circle.



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TENTATIVE SCHEDULE

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
Work in Ethiopia																						
Work in Japan																						
Reports	△						△			△									△			△
	IC/R						PR/R1			IT/R									DF/R			F/R

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- IC/R: Inception Report
- PR/R: Progress Report
- IT/R: Interim Report
- DF/R: Draft Final Report
- F/R: Final Report

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MINUTES OF MEETING

ON

SCOPE OF WORK

FOR

THE PROJECT FOR DEVELOPING COUNTERMEASURES AGAINST
LANDSLIDE IN THE ABAY RIVER GORGE

IN

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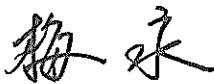
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Satoshi Umenaga
Leader of Detailed Planning Survey Team
Japan International Cooperation Agency
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Tolesa Shagi
Director General

Tolesa Shagi
Director General
Geological Survey of Ethiopia
Federal Democratic Republic of Ethiopia

Witnessed by



Zaid Wolde Gabriel
Director General
Ethiopian Roads Authority
Federal Democratic Republic of Ethiopia

In Response to the official request of the Government of the Federal Democratic Republic of Ethiopia (hereinafter referred to as “GOE”), Japan International Cooperation Agency (hereinafter referred to as “JICA”) , in consultation with the Government of Japan, dispatched the detailed planning survey team headed by Mr. Satoshi Umenaga (hereinafter referred to as “the Team”) from 11th to 18th December, 2009 to discuss the scope of work for “the Project for Developing Countermeasures against Landslide in the Abay River Gorge” (hereinafter referred to as “the Project”).

During the stay in Ethiopia, a series of discussions were held with Geological Survey of Ethiopia (hereinafter referred to as “GSE”) and other organizations related to the Project. The list of participants of the meetings is shown in Annex 1.

This document summarizes major items discussed between both sides and is intended to supplement the Scope of Work for smooth implementation of the Project.

1. Project Title

Both sides agreed that the title of the Project is “The Project for Developing Countermeasures against Landslide in the Abay River Gorge”.

2. Basic Stance of the Project

2-1 Both sides agreed that the duration of the Project shall include at least two rainy seasons (between June and September) to enhance the quality of the analysis and transfer the techniques.

2-2 In order to achieve the project objective which is to figure out the mechanism of the landslide in Abay River Gorge as early as possible, both sides agreed that the six (6) monitoring sites are the preferential monitoring project sites for the Project, which were selected as the highest-priority by “the Preparatory Survey for The Project on Countermeasure Works for Landslide in Abay Gorge” dispatched from 4th June to 22nd October, 2009. These monitoring sites are at the stations of 0+700~0+800, 0+800~1+100, 4+800~5+200, 5+200~5+500, 20+400~20+600 and 21+850~22+100. Although there are at least other eight (8) sites to be pointed out as a second priority, their study during the Project’s life will be decided by the Steering Committee taking into consideration the work progress of first selected six preferential sites and the conditions in Abay Gorge.

3. Cooperation among the related authority

3-1 The expected output of the Project is to reveal the mechanism of the landslide in Abay River Gorge, and the substantive countermeasure works for road disaster shall not contain in the Project. The output must be utilized by Ethiopian Roads Authority (hereinafter referred to as “ERA”), which is the responsible agency of maintenance of the road in Ethiopia, for the countermeasures against the road disaster. Therefore, the mutual cooperation between GSE and ERA is requested.

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3-2 Since the aerial photography is essential for the Project, GSE shall arrange the approval from related authority before the commencement of the Project.

4. Steering Committee

Both sides agreed that a Steering Committee (hereinafter referred to as “the Committee”) will be set up for effective and efficient implementation of the Project under the chair of GSE. The Committee will decide on important matters to promote the output of the Project. The Committee will comprise representatives from the following related organizations.

- (1) Geological Survey of Ethiopia
- (2) Ethiopian Roads Authority
- (3) JICA Project Team
- (4) JICA Ethiopia Office

GSE shall inform JICA Ethiopia Office of the members of the Committee before the commencement of the Project.

5. Transfer of Technology

5-1 The Project team will make an effort to transfer skills and technology through on and off the training. GSE is the main authority for this transfer, however the staff from ERA will be also included as an entity for the technical transfer.

5-2 With regard to the counterpart training in Japan for technology transfer, the Team will convey it to JICA headquarters. After approval of the request, the number, field and duration of the training shall be discussed after the commencement of the Project.

6. Counterpart and Project team

Both sides agreed that the Project should be conducted in close collaboration between the Ethiopian side and the Japanese side. In this context, GSE will establish the project team, which is a main implementation body of the Project along with the Project team, by the commencement of the Project. The leader of the Project team will be the focal point of the Ethiopian side.

7. Equipment for the Project

7-1 Both sides agreed that all equipment owned by GSE is available for the Project.

7-2 Both sides agreed that equipment for the Project is listed as follows.

- Automatic Waterlevel Recorder (25 units)
- Rain Gauge (2 units)
- Extensometer (10 units)



- Borehole Extensometer (20 units)
- Groundwater Resistivity Logging Equipment (1 unit)
- Engineering Seismograph (2 units)
- Software for Seismograph (1 unit)
- Pickup Truck (2)
- Slope Stability Analysis Software

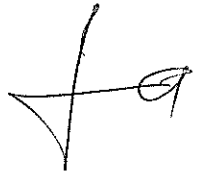
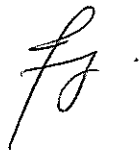
7-3 Equipment required for the Project, including Physical Laboratory Equipment and others than listed in 7-2 will be identified at the Technical Committee and be requested to JICA by the Ethiopian side.

8. Others

8-1 The Ethiopian side requested that the satellite image of high resolution would be required for the Project. The necessity and the level of the resolution would be discussed in the course of the Project.

8-2 The Ethiopian side requested that the trip allowance for the field survey would not be possible to provide from their own budget because of the budgetary constraint. The Team recognized the request and would convey it to the JICA headquarters. Also, the Team mentioned that this matter would be dealt with under the JICA regulation.

8-3 The Team notified that they would estimate to start discussion of the Inception Report in April or May, 2010, subject to JICA's internal procedures.



The List of Participants in the Meeting

ETHIOPIAN SIDE

Geological Survey of Ethiopia

Mr. Tolesa Shagi, Director General
Dr. Getnet Mewa, Head, Geo-hazards Investigation Core Process
Mr. Tadesse Dessie, Engineering Geologist

Ethiopian Roads Authority

Mr. Zaid Wolde Gabriel, Director General
Mr. Haddis Tesfaye, Road Network Management Division Manager

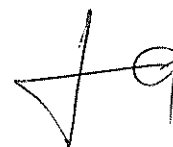
JAPANESE SIDE

The Detailed Planning Survey team, JICA

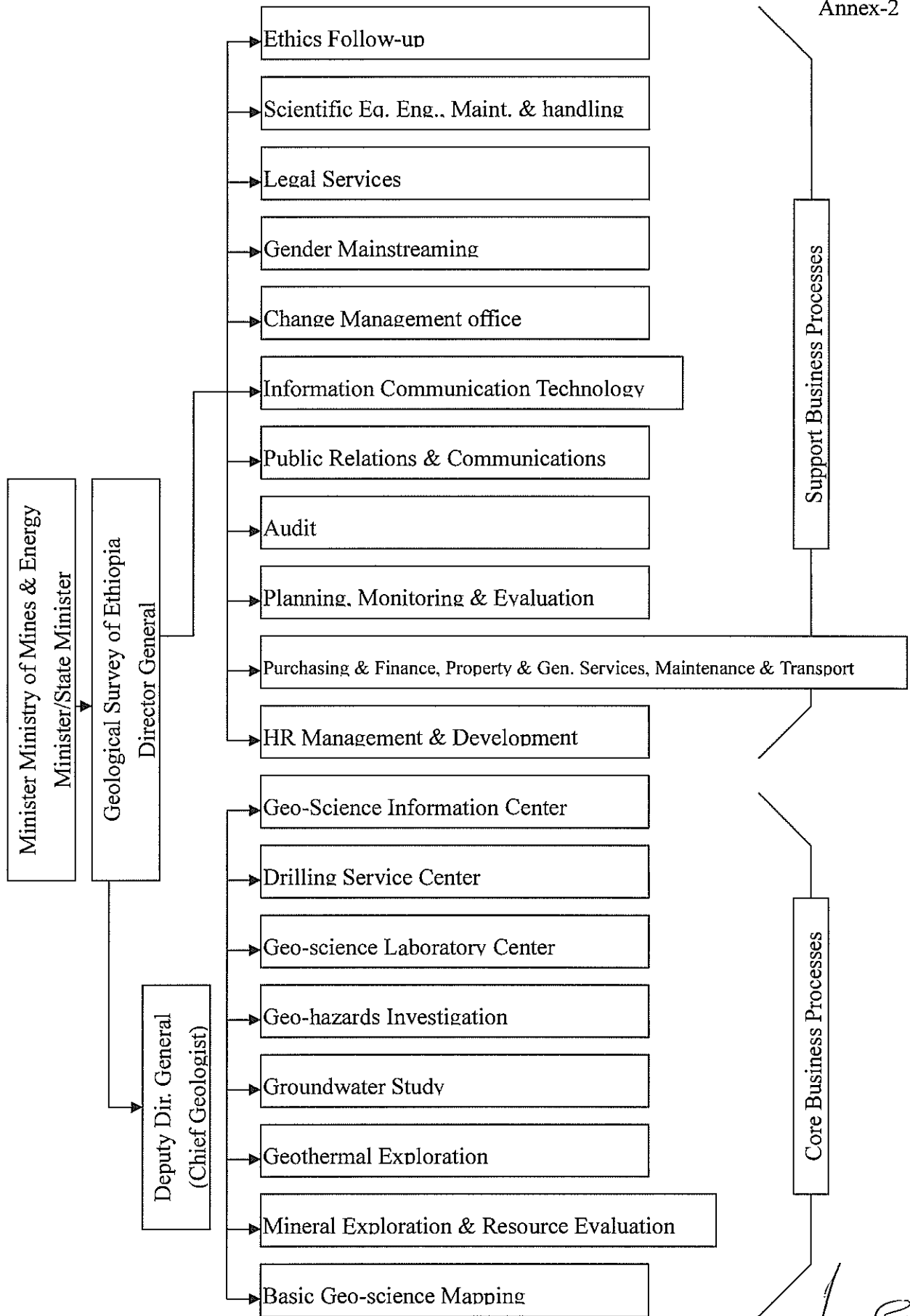
Mr. Satoshi Umenaga, Leader
Mr. Hiroyuki Yokoi, Project Coordinator

JICA Ethiopia Office

Ms. Momoko Suzuki, Representative



Organizations Chart of Geological Survey of Ethiopia



Annex-2

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**THE PROJECT OF DEVELOPING COUNTERMEASURES AGAINST
LANDSLIDE IN THE ABAY RIVER GORGE
IN THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA**

Minutes of Meeting

Counterpart:	Signature
Dr. Getnet Mewa	
Expert Team:	
Mr. Kensuke Ichikawa	for 

Subject: Biweekly Meeting

Date: April 14, 2010

Time: 9:00 – 10: 00 AM

Place: GSE Office

Attendance:

Counterpart:	Dr. Getnet Mewa	Head, Geo-hazard Investigation Core Process
	Mr. Bayu Wedaj	Senior drilling Engineer
	Mr. Haileselassie G/Selassie	Geo-technician
	Mr. Sisay Alemayehu	Geophysicist
	Mr. Geremew Negassa	Hydro-geologist
	Mr. TafeSse Lemma	Engineering Geophysicist
	Mr. Letta Alemayehu	Engineering Geologist
	Mr. Demis Alamirew	Hydrogeologist

Expert Team:	Mr. Kensuke Ichikawa	Chief Advisor
	Mr. Shigekazu Fujisawa	Hydrological Survey/Analysis
	Mr. Takeshi Kuwano	Geological Survey/ Analysis 1
	Ms. Masami Takahata	Project coordinator
	Ms. Yerom Moges	Secretary

No	Minutes	Actions
1	<p>Introduction</p> <p>Outline and role of the bi-weekly meeting: The bi-weekly meeting is aimed for smooth communication between GSE experts (the C/P) and JICA Study Team (the Team) and thereby facilitate effective transfer of technical skill. It is planned to exchange information on the on going progress of project implementation in a meeting to be held every 2 weeks.</p>	
2	<p>Assignment of the C/P members</p> <p>GSE have already assigned the concerned people who will engage in the project as C/P. The list of persons is given to the Team. It includes two coordinators, one engineering geologist and the other engineering geophysicist.</p>	GSE

3	<p>Schedule on preparation of the JICA project office</p> <p>GSE explained that the project office, which is found in GSE, will be available with all the agreed equipment as soon as possible.</p>	GSE
4	<p>Preparation of manpower on Topographical survey, Drilling and Geophysical survey.</p> <p>For the Topographical survey, Drilling and Geophysical survey, Japanese experts will be available on time.</p> <p>At the end of April, Geophysical equipment will be dispatched from Japan and will be available for the site investigation (If the equipments will not be arrive on time, GSE's equipments will be used for the time being).</p> <p>Topographic equipment, such as GPS system with total station of 6 boxes will be also transported from Japan at the early of May. For the topographic survey, additional 6 technician (1 or 2 survey experts among those 6 are preferred). Currently 3 people are available for the survey. GSE will coordinate other 3 people.</p>	GSE JICA Team
5	<p>Aerial photograph preparation</p> <p>GSE stated that EMA is responsible for this duty. But if cooperation is needed, they will send a letter for Ministry of Defense, and will also support by making things smooth by going with the Team members.</p> <p>GSE also advised the Team to communicate directly with Furgo Surveying Company and gather information about the price, line, purpose, flight schedule, processing.</p>	GSE JICA Team
6	<p>Preordered equipments and additional equipments to be procured</p> <p>1. Geophysical Survey Geophysical expert will come on middle of May. Electrical exploration machines, which are in GSE, are needed for the non-slide area.</p> <p>2. Drilling Survey Drilling expert will come on May 2, 2010. Discussion will be made between GSE with the Team focused on the following issues: 1) Assigning of the drilling crew (For three month period), 2) Two drilling machines.</p>	GSE JICA Team
7	<p>Activities for next period</p> <p>1. Activities planned on next two weeks: Preliminary investigation will be done by Mr. Fujisawa, Mr. Kuwano and Ms. Takahata for the geological and hydrological aspects. From this trip, the Team will identify the detail of the area, the geological and topographical conditions. They will also conduct a survey of the condition of the hotels, security issues. For the time being, GSE personal is not required for the next week's survey. But if necessary, GSE's human resource help will be requested for the future surveys.</p> <p>2. Request for the C/P or the Team Specific role of the GSE professionals will be mentioned. Particularly 14 experts will participate in data collection, interpretation, reporting. Because the project</p>	GSE JICA Team

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aims at knowledge and technical transfer, the GSE experts will be involved in all the steps.

3. Arrival and departure of the Team members

Departure: Mr. Ichikawa, chief advisor, will leave on April 16th.

4. Decision of the time on the next meeting

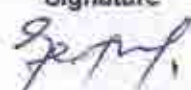

Next meeting will be held at April 30th, 2010.

5. Other issues to be discussed

Letter should be written from the Team to GSE for preparation of identification card to enter into GSE compound smoothly for all team members. It was requested by the Team to accelerate this step for an Ethiopian assistant, Ms. Yerom, who is working as secretary for the project.

**THE PROJECT OF DEVELOPING COUNTERMEASURES AGAINST
LANDSLIDE IN THE ABAY RIVER GORGE
IN THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA**

Minutes of Meeting

Counterpart:	Signature
Dr. Getnet Mewa	
Expert Team:	
Mr. Kensuke Ichikawa	for 

Subject: 2nd Biweekly Meeting

Date: April 30, 2010

Time: 8:45 – 9:45 AM

Place: GSE Office

Attendance:

Counterpart: Dr. Getnet Mewa Head, Geo-hazard Investigation Core Process
Mr. Solomon Gera Engineering Geologist

Expert Team: Mr. Shigekazu Fujisawa Hydrological Survey/Analysis
Mr. Takeshi Kuwano Geological Survey/ Analysis 1
Ms. Masami Takahata Project coordinator
Ms. Yerom Moges Assistant

No	Minutes	Actions
1	<p>Report of this period</p> <p>1. Determination of the drilling site The drilling sites (30 boreholes, total 885m) were selected during the joint field visit made on 27th and 28th of April 2010 by the JICA Team and C/P. Monitoring and Geophysical exploration may be changed depending on the situation.</p> <p>2. Progress of Hydrological Survey Locations of rain gauge are also pinpointed. There will be two stations: Abay Bride and Dejen / Kurara (not yet decided). The Team needs sufficient information about the Kurara site. Therefore, the C/P are requested to acquire further information on the Kurara station from NMA so that immediate decision was possible.</p>	GSE JICA Team
2	<p>Major Issues</p> <p>1. Laboratory Equipment to be procured The proposed equipments in GSE laboratory identified both by the Team and C/P, and which shall be used for the survey at Abay Gorge are the following:</p> <ul style="list-style-type: none"> - Direct shear strength test machine 1 set - Consolidation test machine 1 set 	GSE JICA Team

	<ul style="list-style-type: none"> • Cone penetrator for liquid and plastic limit 1 set • Compressive strength test machine 1 set <p>2. Preparation of manpower on Drilling survey (May 4), Topographical survey (May 10) and Geophysical survey (May 19) will be prepared as soon as possible. GSE side promised to prepare necessary assistants for these surveys. Discussions by each expert between the Team and C/P will be made about the relevant equipments and other issues.</p> <p>3. Aerial photograph preparation EMA already agreed to give some information about the negotiation with Furgo. GSE have a question regarding what is the use of interference of EMA. GSE expressed that they will call to EMA to confirm the aerial photograph preparation issue before they issue an official letter to EMA.</p>	<p>GSE</p> <p>GSE JICA Team</p>
3	<p>Activities for next period</p> <p>1. Activities planned on next two weeks Drilling survey and topographic survey will be started, and preliminary work for the survey will be held. C/P and the Team will work well together for the survey.</p> <p>2. Arrival and departure of the Team members Departure: Mr. Fujisawa (Hydrological survey/analysis) is leaving on May1. Arrival: Mr. Suzuki (Drilling Techniques) will arrive on May 2. Mr. Shimoda (Topographic Survey) and Mr. Furukata (coordinator) will arrive on May 7. Mr. Gonai (GIS/Database) and Mr. Fujisawa (landslide stability analysis) will arrive on May 14.</p> <p>3. Request for the C/P or the Team GSE's support by providing the necessary office equipments were appreciated by the Team. The materials that are not provided (internet, ID. card) will be available as soon as possible. GSE requested an advanced training from the GIS/Database for C/P on subjects related to the project's activities.</p> <p>4. Decision of the time on the next meeting Next meeting will be held at May 19, 2010.</p>	<p>GSE JICA Team</p>
4	<p>Other issues to be discussed</p> <p>The Team agrees that the petroleum cost of GSE's vehicles incurred during the survey trip should be covered by the Team. GSE prepares vehicles for GSE experts.</p> <p>Regarding overtime work, the Team members can work late at night and on weekend days. In case of the overwork, GSE will write a letter for the guards giving detailed things about this in advance.</p>	

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Minutes of Meeting

	Signature
Counterpart: Dr. Getnet Mewa	
Expert Team: Mr. Kensuke Ichikawa	

Subject: 3rd Biweekly Meeting

Date: May 19, 2010

Time: 16:30 – 17:30

Place: GSE Office

Attendance:

Counterpart: Dr. Getnet Mewa	Head, Geo-hazard Investigation Core Process
Mr. Solomon Gera	Engineering Geologist
Mr. Leta Alemayehu	Engineering Geologist
Mr. Tesfaye Shewa	Engineering Geologist
Mr. Melkamu Tegegne	Engineering Geologist

Expert Team:

Mr. Satoru Tsukamoto	Geomorphological Analysis 1/Hazard Mapping
Mr. Mitsuya Enokida	Geomorphological Analysis 2
Mr. Yoshimizu Gonai	GIS/Database
Mr. Takeshi Kuwano	Geological Survey Analysis 1
Mr. Shigekazu Fujisawa	Hydrological Survey/Analysis
Mr. Makito Isogai	Geophysical Exploration/Analysis
Mr. Takashi Suzuki	Drilling Technique
Ms. Yerom Moges	Assistant

No	Minutes	Actions
1	<p>Report of this period</p> <p>1. Geological Survey and Drilling Initially the Team has proposed 31 boreholes to a total depth of 1070 m on six landslide sites. However, after field visits the Team and C/P selected 24 boreholes with a total depth of 705 m on five sites. This reduction of volume of work is mainly caused by accessibility problem and technical suitability. However, after discussions it was agreed that the study will commenced with the currently selected 24 boreholes, which constitute the first phase of the work. In due course at about the remaining 7 boreholes technical justifications have to be presented at the JCC meeting so as to decide whether to continue with drilling on the remaining boreholes or to limit the drilling work on the currently selected ones. C/P and the Team have reconfirmed that quality of the drilling survey should be the first priority and will not be compromised by any other justification.</p> <p>2. Topographic Survey The Team requested the lack of professional expert for the required duty so it is preferable to hire experts with topographical survey who can deal with the topographical equipments as soon as possible. The equipments will be on hand at the end of this week. As the project aims at capacity building, C/P requested for knowledge transfers for the above mentioned issues.</p>	<p>GSE JICA Team</p> <p>GSE JICA Team</p>
2	<p>Major Issues</p> <p>1. Preparation of the detail plan and cost of the drilling activities by GSE C/P was requested to prepare estimation of cost for drilling operations and associated expenses as these would be covered neither by GSE nor the Study Team. Cost of consumable things should be estimated and some variable costs like basement costs were raised as one issue. The cost estimation will be submitted within this week from C/P to the Team, and it will be discussed and then submitted to JICA for financing.</p> <p>2. Guard of Extensometer and Rain Gauges at the site The Team provided brief description about the necessity of protection of monitoring devices on the site as listed below:: <ul style="list-style-type: none"> • Extensometer (with metal cover); • Water gauge (with metal cover); • Inclinator Cover (with very strong steel pipe); • Borehole Extensometer (with metal cover) etc C/P and the Team agreed that the protection should be implemented on the site based on the cooperation between both sides.</p> <p>3. How to contact between C/P and Japanese Experts The Team questioned how to communicate with the required C/P members. So far the Team asks the support of Mr. Leta and sometimes this is not convenient so the Team should communicate with appropriate C/P members directly. Both sides confirmed that the Team members can directly communicate the C/P members whenever it is necessary. If the person is not available, the Team can contact any other responsible person related to the subject or field of study.</p>	<p>GSE</p> <p>GSE JICA Team</p> <p>GSE JICA Team</p>

Ge-top

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3	<p>Activities for next period</p> <p>1. Activities planned on next two weeks: Drilling survey, Geomorphological analysis and Geophysical exploration will be started. Preliminary work (data collection and preparation for GIS/Database and Landslide stability analysis) will be held. Topographic survey is being continued.</p> <p>2. Arrival and departure of the Team members <u>Departure:</u></p> <ul style="list-style-type: none"> • Mr. Furukata (Project Coordinator for Topographic survey) is leaving on 26 May and • Mr. Kuwano (Geological Survey/Analysis 1) is leaving on 27 May. <p><u>Arrival:</u></p> <ul style="list-style-type: none"> • Mr. Tsukamoto (Geomorphological analysis 1/ hazard mapping), • Mr. Enokida (Geomorphological analysis 2) and • Mr. Isogai (Geophysical exploration/analysis) arrived on 18 May. • Mr. Ichikawa (Chief Advisor) will arrive on 21 May. <p>3. Request for the C/P or the Team The Team requested C/P's checking up for procured equipments from Japan. The equipments will be opened and be checked in the presence of both sides.</p> <p>4. Decision of the time on the next meeting Next meeting will be held at May 28, 2010.</p>	<p>GSE JICA Team</p> <p>JICA Team</p> <p>GSE JICA Team</p> <p>GSE JICA Team</p>
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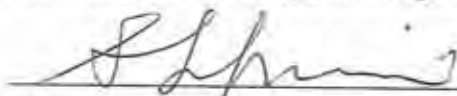
2. Minutes of meeting on the inception report for the project

MINUTES OF MEETING
ON
THE INCEPTION REPORT
FOR
THE PROJECT FOR
DEVELOPING COUNTERMEASURES AGAINST LANDSLIDES
IN THE ABAY RIVER GORGE
IN
THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

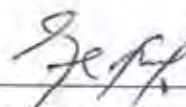
Addis Ababa,
April 12, 2010



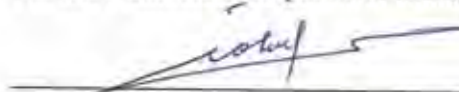
Mr. Kensuke Ichikawa
Chief Advisor
Study Team
Japan International Cooperation Agency (JICA)



Witnessed by
Mr. Makoto Shinkawa
Senior Representative
Ethiopia Office Japan International Cooperation
Agency (JICA)



Dr. Getnet Mewa
Head, Geo-hazards Investigation Core Process
Geological Survey of Ethiopia
Federal Democratic Republic of Ethiopia



Witnessed by
Mr. Haddis Tesfaye
Manager, Road network management division
Ethiopian Roads Authority
Federal Democratic Republic of Ethiopia

In response to the official request of the Government of the Federal Democratic Republic of Ethiopia (hereinafter referred to as "the Government of Ethiopia"), the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Study Team. The Japanese side and the Ethiopian side came to an agreement on the Scope of Work (hereinafter referred to as "S/W") which was signed on December 16th, 2009 (Appendix-1).

Accordingly, JICA sent to Ethiopia the JICA Study Team (hereinafter referred to as "the Team") for THE PROJECT FOR DEVELOPING COUNTERMEASURES AGAINST LANDSLIDES IN THE ABAY RIVER GORGE (hereinafter referred to as "the Project"). The Team held a meeting with the officials of the Geological Survey of Ethiopia (hereinafter referred to as "GSE"), Ethiopian Roads Authority (hereinafter referred to as "ERA") and other authorities concerned with the Project. The list of those who attended this meeting is shown in Appendix-2.

In the course of discussions made on April 6, 2010, all concerned parties have agreed that the Inception Report (hereinafter referred to as "IC/R") is well prepared within the framework of the already signed MoU and Minutes of Meeting on the S/W to be done by the Project. It is stated that the Team will submit the Final Report on January 2012, when the Project comes to an end.

1. Explanation of Inception Report (IC/R)

The Team submitted Thirty (30) copies of the IC/R to the GSE on April 5th, 2010. The inception report was presented by the Team to the GSE and ERA, and discussed in Addis Ababa on April 6th 2010 at the conference room of GSE.

The Team presented the basic objectives, outline and scope of the Project proposed in the IC/R, including scheme of knowledge transfer. Technical discussions were conducted between the Team and the GSE, ERA on each of the study items, surveys and data required for the Project.

The Ethiopian side agreed on the contents of the IC/R, understood the study objectives, schedule, activities and methodology, and promised close cooperation with the Team throughout the Project's life.

Major issues and discussions regarding the IC/R are as follows.

1) Joint Coordination Committee (JCC)

A Joint Coordination Committee (hereinafter referred to as "JCC") will be established to maintain and smooth and effective implementation of the project. JCC



will have dual functions, i.e. it will serve both as a steering and a technical committee.

[Members of JCC]

(1) The Chairperson: Head, Geo-hazard Investigation Core Process, GSE

(2) Permanent members

- GSE
- ERA
- JICA Ethiopian Office
- The Team
- Others as necessary

[Schedule of meeting]

The JCC shall meet anytime to discuss on relevant agendas and come to consensus on technical and administrative issues related to Project. The first JCC meeting is expected to be held in the middle of April, 2010 to discuss on issues related additional procurement of equipment required for the project and also to finalize list of C/P personnel to be involved in the Project.

2) Involvement of ERA

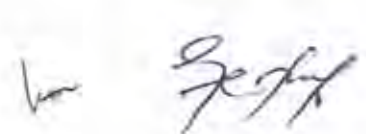
Involvement of ERA is extremely important for the Project. Both the GSE and the JICA sides agreed that i) ERA shall be involved in all phases of the Project's life; ii) ERA shall take part in the JCC; iii) although the survey/analysis/evaluation of slope instability problems is the role of GSE, it will be ERA's duty to design and implement the countermeasures using data generated by the study team and GSE.

3) Adjustment of survey/monitoring sites

Six (6) priority sites for the survey and monitoring in the Project, which are 0+700-0+800, 0+800-1+100, 4+800-5+200, 5+200-5+500, 20+400-20+600, 21+850-22+100, had been selected by S/W. The Team responded that these selected 6 sites are still tentative. ERA suggested the Team to refer the original number of the list, which had been proposed by the Preparatory Study Team, shall be reexamined. The Team agreed to assess the priority of the site when the site operation has been started.

4) Utilization of PDM

The Team explained the objective, methodology, contents and effectiveness of Project Design Matrix (hereinafter referred of to as "PDM") for the Project to the GSE and ERA. It was understood by the C/P that the PDM will be used for project management/monitoring and evaluation of the C/P's capacity development. The Ethiopian side agreed that PDM_01 will be utilized for the Project. The PDM_01 is



shown in Appendix-3.

2. Undertakings by the Government of Ethiopia

The Government of Ethiopia shall accord privileges, exemptions and other benefits to the Team in accordance with the Agreement on Technical Cooperation between the Government of Japan and the Government of Ethiopia, signed on December 16th, 2009 (Appendix-1).

3. Other relevant issues

1) Official language for the Project

Both sides agreed that English is the principal language for the Project documents, including this Minutes of Meeting.

2) Outline of study schedule:

The outline of study schedule is as follows:

Fisical Year	2010												2011											
Cal. Month	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1		
Report	▲							▲					▲			▲				▲		▲		
JCC	1							2					3		4					5				
Note:	IC/R: Inception report						IT/R: Interim Report						P/R: Progress report											
	DF/R: Draft Final Report						F/R: Final report																	

4) Dissemination of information and know-how transfer

Both sides agreed that the major aims of the Project is sharing of results and techniques of various surveys through knowledge and technical transfer to the related Ethiopian authorities.

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ATTENDANCE LIST**ETHIOPIAN SIDE****Geological Survey of Ethiopia (GSE)**

Ato Tolesa Shagi	Director General, GSE
Ato Masresha G/Selassie	Chief geologist, GSE
Dr. Getnet Mewa	Head, Geo-hazards Investigation Core Process
Mis Zulfa Abdurahman	Geologist
Mis Yewubnesh Bekelle	Geologist
Ato Solomon Gerra	Senior geologist (engineering geologist)
Ato Melkamu Tegegne	Junior geologist (engineering geologist)
Ato Beruke Abel	Engineering geologist
Ato Sisay Alemakhu	Engineering geophysist
Ato Tesfaye Shema	Engineering geophysist
Ato Tafesse Lemma	Engineering geophysist
Ato Yahannes Belete	Ground water resource assessment core process
Ato Hailelassi G/Selassie	Geotechnician

Ethiopian Roads Authority (ERA)

Ato Haddis Tesfaye	Road network management division manager
Ato Demelash G/Mariam	District engineering division manager
Ato Biniam Kebede	Design branch member

JAPANESE SIDE**JICA Study Team**

Mr. Kensuke Ichikawa	Chief Advisor
Mr. Shigekazu Fujisawa	Hydrological survey/analysis
Mr. Takeshi Kuwano	Geological survey/analysis 1
Ms. Masami Takahata	Project coordinator
Ms. Yerom Moges	Secretary economist

JICA Ethiopia Office

Ms. Momoko Suzuki	Representative
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ERA Japanese experts

Mr. Takashi Hara	JICA Expert
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3. Minutes of meeting of joint coordination committee for the project

**MINUTES OF MEETING ON 1st JOINT COORDINATION COMMITTEE
FOR
THE PROJECT FOR DEVELOPING COUNTERMEASURES AGAINST
LANDSLIDES IN THE ABAY RIVER GORGE**

DATE: April 16, 2010

TIME: 9:00-11:00

PLACE: GSE Conference Room

List of Participants

GSE

Ato Masresha G/Selassie

Chief Geologist

Dr. Getnet Mewa

Head, Geo-hazard Investigation Core Process

ERA

Ato Haddis Tesfaye

Manager, Network Management Division

JICA Ethiopia Office

Mr. Makoto Shinkawa

Senior Representative

Ms. Momoko Suzuki

Representative

JICA Study Team

Mr. Kensuke Ichikawa

Chief Advisor

Mr. Shigekazu Fujisawa

Hydrological Survey/Analysis

Mr. Takeshi Kuwano

Geological Survey/ Analysis 1

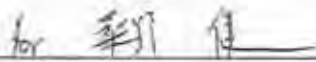
Observers

Ms. Masami Takahata

Project coordinator of JICA Study Team

Ms. Yerom Moges

Assistant of JICA Study Team

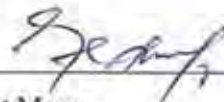


Mr. Kensuke Ichikawa

Chief Advisor

Study Team

Japan International Cooperation Agency (JICA)



Dr. Getnet Mewa

Head, Geo-hazards Investigation Core Process

Geological Survey of Ethiopia

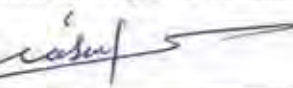
Federal Democratic Republic of Ethiopia



Mr. Makoto Shinkawa

Senior Representative

Ethiopia Office, Japan International Cooperation
Agency (JICA)



Mr. Haddis Tesfaye

Manager, Network Management Division

Ethiopian Roads Authority

Federal Democratic Republic of Ethiopia

1. Project Outline and Role of JCC

Project outline and the role of Joint Coordination Committee (hereinafter referred to as "JCC") were explained by Chief Advisor of JICA Study Team. Accordingly, following issues were discussed and agreed:

- Work plans of the project for each phase were formulated and reviewed;
- Progress of the annual work plan was reviewed;
- Major issues anticipated during the implementation period were discussed and opinions were exchanged;
- Discussions on other relevant issues were made.

It was agreed that JCC will meet:

- Every phase after formulation of actual work schedule;
- Any time when important issues are raised.

2. The expected role of ERA in the project

GSE and ERA will be involved on landslide measures; It is understood that GSE, the counterpart (hereinafter referred to as "C/P") of the Project will implement the investigation, monitoring and analysis, and ERA will implement the design and countermeasures on landslide. GSE, ERA, JICA and JICA Study Team have agreed that ERA will participate in the project so that ERA's engineers could share experience on methods of landslide investigation and analysis of results that in turn will help ERA adequately prepare design for countermeasures.

3. The proposal of a Joint Task Force

The JICA Study Team has raised an idea of establishing a Joint Task Force for landslide hazard prevention and mitigation. Although JCC has found appropriate to have such a force, the details have to be worked later considering experiences that will be gained from this project and also adapting techniques of investigations, managements and countermeasures on landslides in Japan to conditions on GSE and ERA.

4. The members of JCC

Permanent members of the JCC will be Representative of GSE (Chief Geologist or Deputy Director General), Representative of ERA (Manager, Network Management Division or Deputy General Manager, Engineering and Regulatory Department), C/P manager (Head, Geo-hazards Investigation Core Process), experts form JICA Study Team (Chief Advisor, Geomorphological analysis i/ hazard map, Hydrological Survey/Analysis or Geological Survey/ Analysis 1), and representatives form JICA Ethiopia Office (Senior Representative). Other participants (such as EMA, MoFED, or others) shall be involved in the JCC if it

schedule.

2) Project office for JICA Study Team

The project office will be furnished until April 20th 2010 with desks, chairs, direct telephone line, carpet and photocopy machine.

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THE LIST OF COUNTERPARTS

Geo-hazards Investigation Core Process, Geological Survey of Ethiopia (GSE)

Dr. Getnet Mewa	Head, Geo-hazards Investigation Core Process
Mis Zulfa Abdurahman	Geologist
Mis Yewubnesh Bekelle	Geologist
Ato Demis Alamerew	Hydrogeologist
Ato Solomon Gerra	Engineering geologist
Ato Melkamu Tegegne	Engineering geologist
Ato Beruke Abel	Engineering geologist
Ato Letta Alemayehu	Engineering geologist
Ato Tadesse Lema	Engineering geophysist
Ato Sisay Alemakhu	Engineering geophysist
Ato Tesfaye Shema	Engineering geophysist
Ato Tafesse Lemma	Engineering geophysist
Ato Haile Selassie G/Selassie	Geotechnician
Ato Bayu Wedajo	Drilling technician


Ethiopian Roads Authority (ERA)


Ato Biniam Kebede	Designer, Design branch member
Ato Mulugeta Abebe	Engineer, District engineering division
Ato Kibru Bereda	Engineer, District engineering division

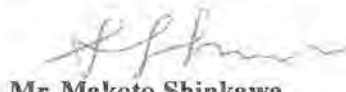
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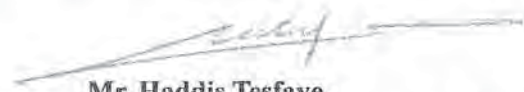
**MINUTES OF MEETING OF THE 2nd JOINT COORDINATION COMMITTEE
(JCC)
FOR
THE PROJECT FOR DEVELOPING COUNTERMEASURES AGAINST
LANDSLIDES IN THE ABAY RIVER GORGE**

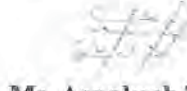
**DATE: July 1, 2010
TIME: 14:00-16:00
PLACE: GSE Conference Room**


Mr. Kensuke Ichikawa
Chief Advisor
Study Team
Japan International Cooperation Agency (JICA)


Mr. Masresha G/Selassie
Chief Geologist,
Geological Survey of Ethiopia (GSE)
Federal Democratic Republic of Ethiopia


Mr. Makoto Shinkawa
Senior Representative
Ethiopia Office
Japan International Cooperation Agency (JICA)


Mr. Haddis Tesfaye
Manager, Network Management Division,
Ethiopian Roads Authority (ERA)
Federal Democratic Republic of Ethiopia


Ms. Asnakech Teferra
Senior Expert
Ministry of Finance and Economic Development
(MoFED)
Federal Democratic Republic of Ethiopia

LIST OF PARTICIPANTS

GSE

Mr. Masresha G/Selassie	Chief Geologist
Dr. Getnet Mewa	Head, Geo-hazard Investigation Core Process
Mr. Assefa Zerihun	Head, Planning, Monitoring & Evaluation Process
Mr. Solomon Gerra	Engineering Geologist
Mr. Demis Alamirew	Hydro-Geologist
Mr. Letta Alemayehu	Engineering Geologist
Ms. Zulfa Abdurahman	Engineering Geologist

ERA

Mr. Haddis Tesfaye	Manager, Network Management Division
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MoFED

Ms. Asnakech Teferra	Senior Expert
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JICA Ethiopia Office

Mr. Makoto Shinkawa	Senior Representative
Ms. Momoko Suzuki	Representative

JICA Study Team

Mr. Kensuke Ichikawa	Chief Advisor
Mr. Takashi Suzuki	Drilling Technician
Mr. Takeshi Kuwano	Geological Survey/ Analysis I

Reporter

Ms. Yerom Moges	Assistant of JICA Study Team
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I. Clarification of JICA's basic technical cooperation concept

The principal roles and responsibilities (burden sharing) of GSE and JICA Study Team as well as basic concepts JICA's technical cooperation projects were elaborated by the Study Team and JICA's representatives in order to create clear understandings among all sides. The main points discussed during the meeting and the outcomes are summarized below.

1. The budget and burden sharing

The budget arrangement has been confirmed and accepted between GSE and JICA. It is agreed that

A) The cost of drilling operations for the 2003 Ethiopian fiscal year will be covered by JICA, and

B) GSE will cover the running cost of drilling operations for the 2004 Ethiopian fiscal year. An agreement is also reached that due to JICA's budget constraints, in the 2003 Ethiopian fiscal year there will not be a budget for counterpart training in Japan. However, GSE has requested JICA to allow the training in the 2004 Ethiopian fiscal year while it bears the financial burden of the running cost of drilling operations. In general, the detail budget arrangements set for the 2003 Ethiopian fiscal year will enter into force after the signing of this Minutes of Meeting by GSE and JICA.

2. Reporting system of the Japanese technical cooperation project to MoFED

It was pointed out that the understanding of GSE about the system and manner of operation of this Japanese technical cooperation project was different from that of JICA. Therefore, representatives of JICA have explained that every quarter they provide necessary financial reports to MoFED. For follow-up purpose GSE and MoFED can consult each other to share information in this regard.

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MoFED's representative has made clear that if GSE has no financial contribution and disbursement to the project, it can concentrate on the accomplishments of physical work plans and report them quarterly. This is due to the nature of the Japanese technical cooperation projects which have no day to day financial transactions between JICA and implementing institutions and different disbursement procedures. Therefore, GSE can report its own contribution and physical performance of the project to MoFED. Similar suggestion was forwarded by ERA's representative; he explained that GSE's concern must be limited on the physical work plan performance as it doesn't have any budget contribution for the 2003 Ethiopian fiscal year.

Finally, participants have agreed that physical work performance reports will be sent to MoFED quarterly through GSE by identifying and comparing the work progress against the program and schedule set before. Therefore, JICA will not be requested to deliver any kind of financial information to GSE unless and otherwise both sides equally agreed to do so under specific circumstances.

3. The Drilling Program

It was understood that due to drilling budget problem the project's performance was lagged behind the schedule. However, during the meeting both JICA and GSE have expresses that an agreement is already reached and for the 2003 Ethiopian fiscal year the drilling cost will be covered by JICA. Therefore, on the basis of this general agreement GSE is ready to deploy drilling personnel and machinery immediately in order to start the work as of July 6, 2010.

II. Current project status

The topographic, geo-morphological, geological, geophysical, hydrological surveys, landslide monitoring as well as transfer of technical know-how to counterpart personnel are being realized since May 2010 as per schedule indicated in the inception report of April 10, 2010 (Attachment 1). Using results of analyses of the above mentioned surveys,

the draft landslide map of the project area is prepared (Attachment 2). Based on landslide mapping and rainfall monitoring results, risk zoning and hazard maps will be compiled. In relation to this issue the following points were also raised and discussed.

1. Assistance to be required during drilling operations

In order to implement the drilling operation smoothly, GSE and JICA Study Team have requested ERA to cooperate to ease the accessibility of few drilling sites. In general, ERA has agreed to cooperate with both sides and will do its best to assist preparation of limited accesses to drilling sites. Meanwhile, ERA raised its concern that GSE should take into account and discuss with local administrators and people about land compensation issues (wherever required) as they could have adverse effects on the timely performance of the project. In this regard, ERA has expressed its readiness to share experiences on how such issues are handled in different parts of the country.

2. Provision of site depot

Site depot in Abay River Gorge will be needed for equipments, such as borehole inclinometers, guild pipes for borehole inclinometer, extensometers, borehole extensometers, etc., which were procured for the project. GSE and the JICA Study Team have requested ERA whether it has any safe place to store office and field items in the nearby site, for instance, like KAJIMA's camp, which is currently used by the Study Team and planned to sell by the end of July 2010. Therefore, a safe place to store the equipment and a working place for the Study Team has to be sought.

It was also discussed that the safety of installed monitoring equipment must be ensured by hiring responsible guards through appropriate bodies. Based on the discussions, this problem has to be handled by GSE. Nevertheless, ERA is also requested whether it has any possibility to contribute to the safety of the installed monitoring equipment. Accordingly, ERA has pointed out that although it will not take any responsibility to ensure such safety, it will make efforts to assist GSE on such matter through nearby district site.



MINUTES OF MEETING OF THE 3rd JOINT COORDINATION COMMITTEE (JCC)

FOR

**THE PROJECT FOR DEVELOPING COUNTERMEASURES AGAINST
LANDSLIDES IN THE ABAY RIVER GORGE**

DATE: December 3, 2010

TIME: 14:00-16:00

PLACE: GSE Conference Room



Mr. Kensuke Ichikawa

Chief Advisor

Study Team

Japan International Cooperation Agency (JICA)

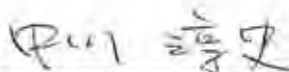


Mr. Masresha G/Selassie

Director General

Geological Survey of Ethiopia (GSE)

Federal Democratic Republic of Ethiopia



Mr. Atsushi Nakagawa

Representative

Ethiopia Office

Japan International Cooperation Agency (JICA)



Mr. Alemayehu Ayele

Leader, Highway Research Team,

Ethiopian Roads Authority (ERA)

Federal Democratic Republic of Ethiopia



Mr. Ibrahim Worku

Expert

Ministry of Finance and Economic Development

(MoFED)

Federal Democratic Republic of Ethiopia



Mr. Leta Alemayehu

for Geo-hazards Investigation Core Process,

Geological Survey of Ethiopia (GSE)

Federal Democratic Republic of Ethiopia

List of Participants

GSE

Mr. Masresha G/Selassie	Director General
Mr. Assefa Zerihun	Head, Planning, Monitoring & Evaluation Process
Mr. Yiheyis Amdebrahan	Head, Drilling S.C.
Mr. Solomon Gerra	Senior Engineering Geologist
Mr. Letta Alemayehu	Engineering Geologist
Ms. Yewubnesh Bekele	Geologist

ERA

Mr. Alemayehu Ayele	Leader, Highway Research Team
Mr. Takashi Hara	JICA Expert for ERA

MoFED

Mr. Ibrahim Worku	Expert
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JICA Ethiopia Office

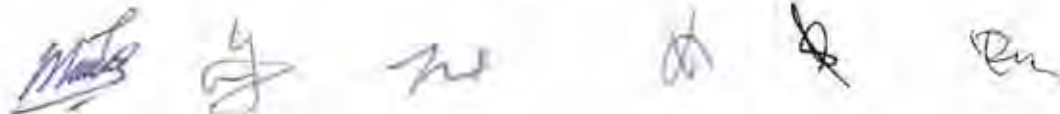
Ms. Atsushi Nakagawa	Representative, JICA Ethiopia Office
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JICA Study Team

Mr. Kensuke Ichikawa	Chief Advisor
Mr. Takeshi Kuwano	Geological Survey/ Analysis I

Observer, Secretariat matter

Ms. Yerom Moges	Assistant of JICA Study Team
Ms Roman Alemu	Assistant of JICA Study Team



I. Clarification of Achievement on Phase 1 Activities

JICA Study Team, on behalf of the Project, presented the achievements of Phase 1 and the outstanding issues. The activities of phase 1 were mainly focused on the site survey, installation of devices and measurement on the targeted landslide area. Japanese Experts have been sharing the practical skills and know how on landslide survey method to the counterpart members. In all this the drilling program was suspended for about 2 months due to certain misunderstandings on the budget of the drilling program. This issue has been resolved, after the JCC 2 (Joint Coordination Committee) meeting. However, the drilling program has been delayed until mid July which was the heaviest rainy season. Hence, the drilling points were limited to the vicinity of the road due to difficulty of access. The measurements (Inclinometer, Borehole Extensometer and Automatic Groundwater Level measurements) in turn were also delayed by two months despite the initial schedule. Despite these obstacles, Progress Report 1 was prepared and handed over to the concerned organizations, and Technical Seminar 1 was successfully delivered.

II. Plan of Operation on Phase 2 Activities

The plan of operation in Phase 2 of the Project was introduced by JICA experts. The activities of phase 2 are largely focused on the interpretation of landslide mechanism and formulation of general idea of the measures to be taken against the landslide movement utilizing the collected measurement data. On site activity such as drilling program and installation of devices were also presented.

1. Plan of drilling operation in Phase 2 and 3

The phase 2 and 3 site operation is aimed to make additional drilling for the installation of monitoring devices into the proper position to understand the mechanism of the targeted landslides. Most of the planned drilling locations fall in farmlands or hillsides which requires preparation of access road and compensation to owners of the land.

2. Confirmation of the budgetary issues decided in JCC2

After the JCC 2 meeting, it was understood that GSE shall formulate its own budget for the drilling activities of upcoming planned boreholes. The principal roles and responsibilities (burden sharing) of GSE and JICA Study Team as well as basic concepts JICA's technical cooperation projects were elaborated by the Study Team and JICA's representatives in order to create clear understandings among all sides. The main points discussed during the meeting and the outcomes were explained.



III. Discussion on the arrangement of drilling and budget

Among the outstanding issues, most critical items for the smooth implementation of phase 2 and 3 project are recognized as drilling and budget arrangements. In regard to the JCC 2, the budget for the drilling shall be arranged by the GSE. However, the Ethiopian fiscal year is starting July 2004 E.C (2011 G.C) when the rainy season starts. The past Project experiences indicate that drilling in the rainy season is not effective, and also another rainy season's monitoring measurement would be lost. Hence it has been concluded that drilling should be completed well ahead of the rainy season (before June, 2011). In view of this the drilling plan is scheduled to start from middle of April, 2011 G.C. Nevertheless no budget can be made available before July, 2011 G.C, as we are still in the 2003 E.C (2009-2010 G.C) Ethiopian fiscal year. In addition the drilling activity includes such matters as compensation to the landowner and preparation of access roads. To cope with these matters discussion was held as described below.

I. The budget arrangement

Considering the above mentioned concern, discussion was made whether the GSE can secure the budget within the fiscal time frame of this year (Ethiopian fiscal year 2003), i.e., any remaining budget of GSE program which might be transferred to the project for early drilling activity. However MoFED representative stressed that it is not possible to transfer the budget among completely deferent projects. He also suggested the use of external budget from different source of donors or NGO's (from such funds as those not fully utilized in their different projects). This has been found to be not possible, as the donors have their own restriction on their usage of the budget.

During the discussion only two options were left. One was to continue the drilling program with the budget from JICA by fully compensating the consumables of the previous drilling program and allocate the remaining budget to drill as many boreholes as can be from the 19 planned ones. The other is to ordinarily prepare the budget for drilling in 2004 E.C (2010-2011 G.C) by GSE, and start drilling after June, 2010 G.C. The first was considered less practical as certain number of boreholes would still be left undone while the second option would even be worse that all the boreholes would be drilled after the important time of the rainy season leading to the same problem as before of losing information at critical time. Following this a compromising option was forwarded by the Study team.

It was suggested that the drilling of most of the 19 Boreholes, which are supposed to be drilled in 2004 E.C but due to the above mentioned technical problem are planned to be completed before June 2003 E.C, JICA will use about 40% of the expense it owes to the GSE for the drilling consumables used during the phase 1 drilling of 22 Boreholes in 2002 E.C to cover the drilling cost of some of the 19 boreholes, and use the remaining (about 60 %) for the purchase of GSE drilling consumables.

In the mean time GSE would request full budget for drilling of 19 boreholes in 2004 E.C. This



budget will be mainly used for the above mentioned drilling replacement items and the rest will be for the infill Boreholes drilling, monitoring activities and assuring the safety of the monitoring instruments through temporarily hiring local laborers.

In reply, the MoFED confirmed that detail budgets allocations can be rearranged within the proposed project provided there is sufficient justifications made. The detail explanation and reasonable backgrounds of the usage of the budget was also discussed.

For the implementation of this option, it was concluded that the most reasonable and demand-oriented resolution was to take the following steps.

1. JICA shall make the detailed calculation on JICA drilling budget and clarify current balance
2. GSE shall prepare proposal for budget of drilling a total of 19 Boreholes for 2004 E.C, which will be used to compensate. The requested budget would partly be used to compensate for the expense of the remaining drilling consumable items that are not paid for from the phase 1 drilling program of 22 Boreholes. In addition the budget would also include the expense of monitoring activities and any remaining infill drilling in the year 2004 E.C.
3. The drilling section of GSE shall calculate the minimum cost required for drilling of the 19 Boreholes in the year 2003 E.C.
4. JICA study team shall re-examine the budget anticipated to start drilling in coming April 2010 G.C.
5. At the end of June 2011 G.C (end of Ethiopian fiscal year 2003), the remaining drilling and the consumables expense shall be calculated.
6. Based on the original budget allocated for the project by GSE, detail reconciliation will be made between MoFED and GSE to modify the expense items in the budget.

It was agreed by all parties to take such action for the smooth implementation of the drilling program for year 2011.

2. Compensation for the landowner and local government authorities

The issue of getting permission and making the proper compensation for the access road preparation and drillings on the premises of local people has also been raised. To this effect GSE has been called in to facilitate the process of settling negotiations with the land owners while all expenses would be covered by JICA. It was also concluded that the action shall be taken as soon as possible, early next year (2011 G.C)

3. The access road construction

Due to the budget constraints, the Project does not have enough funds to make access road. Hence the possibility of assistance by ERA has been requested. Accordingly the ERA representative stated that ERA neither has the budget nor the mandate to make any construction as it is undergoing organizational restructuring where the part of ERA that does the construction work is being separate from the rest. However, if GSE (or the Project) request with official letter



to the top management, assistance may be granted. ERA representative also promised to seek any kind of possibility to support the activity. The access road construction shall seek further possible way to complete the access road construction in the mean time.

II. Discussion on the Involvement of ERA and its role

In the scope of the study the participation of ERA personnel for the purpose of sharing the analytical skills of landslide investigations has been offered as means of paving ways for future collaboration. Accordingly two schemes were offered either as intensive short term (one week) or long term (one month) elaborate participation of certain one staff from ERA. The second scheme has been preferred by ERA representative and is expected to be effective around March 2011 G.C. This will be the base for the future joint task force for the landslide counter measures to be devised.



MINUTES OF MEETING OF THE 4th JOINT COORDINATION COMMITTEE (JCC)

FOR

THE PROJECT FOR DEVELOPING COUNTERMEASURES AGAINST
LANDSLIDES IN THE ABAY RIVER GORGE

DATE: May 10, 2011

TIME: 15:30 – 17:00

PLACE: GSE Conference Room



Mr. Kensuke Ichikuwa

Chief Advisor

Study Team

Japan International Cooperation Agency (JICA)



Mr. Hunde Melka

Chief Geologist

Geological Survey of Ethiopia (GSE)

Federal Democratic Republic of Ethiopia



Mr. Atsushi Nakagawa

Representative

Ethiopia Office

Japan International Cooperation Agency (JICA)

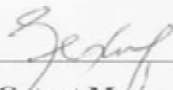


Mr. Alemayehu Ayele

Leader, Highway Research Team

Ethiopian Roads Authority (ERA)

Federal Democratic Republic of Ethiopia



Dr. Getnet Mewa

Geo-hazards Investigation Core Process

Geological Survey of Ethiopia (GSE)

Federal Democratic Republic of Ethiopia

List of Participants

GSE

- Mr. Hunda Meliso Chief Geologist
- Mr. Assefa Zerihem Head, Planning, Monitoring & Evaluation Process
- Dr. Getnet Merara Head, Geo-hazard Core Process
- Mr. Bayu Wodaj Drilling Engineer

ERA

- Mr. Alemayehu Ayala Leader, Highway Research Team
- Mr. Takeshi Hara JICA Expert for ERA

JICA Ethiopia Office

- Ms. Atsushi Nakagawa Representative

JICA Study Team

- Mr. Kensuke Ichikawa Chief Advisor
- Mr. Satoru Tsukamoto Geomorphologic Analysis / Hazard Map
- Mr. Shigekazu Fujisawa Hydrological Survey/ Analysis, Landslide stability Analysis
- Mr. Takashi Suzuki Drilling Techniques
- Mr. Yoji Kazuhara Geophysical Exploration

Reporters

- Mr. Yarom Mogus Assistant of JICA Study Team
- Ms Roman Alemu Assistant of JICA Study Team

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I. Activities on Phase I and II

JICA Study Team, starts up the meeting by notifying the purpose of JCC, which is to discuss every matter whenever needed. The team explained major activities conducted during phase I and II, which included several site training, field investigation, workshops on landslide analysis and GIS data base. In addition to the accomplishment of achievements and schedules of phase I and II, reports & seminars also been prepared.

It was pointed out that phase III will be done by counterpart members with limited support of the Japanese experts.

II. Submission of Interim Report

The Study Team clarified about the preparation of reports with appendix and their distribution to GSE and other concerned authorities. The reporting plans and schedules of Inception report, Progressive report and Interim reports were mentioned and the content of the important parts were briefly presented. The main contents were:- Landslide survey (Chapter three), Landslide Analysis and interpretation (Chapter four) and Landslide counter measures (Chapter 5).

In Chapter 3 (i.e. landslide survey), the major aspects of the hydrological, geomorphological, geological, geophysical, rockfall surveys as well as monitoring, drifting and GIS database issues are presented.

Similarly, the landslide analysis and interpretation part (chapter 4) discusses the rainfall data analysis and interpretation, landslide assessment, landslide block interpretation, discussion on the slip surface and stability analyses.

III. Activities of Phase III

- **Plan of Phase III** -Phase III is the final and the key phase of the project as most of the technical transfers have been made throughout Phases I and II. Therefore, the counterparts are expected to manage and handle the phase III operations by themselves. The operations will emphasis on field investigation, landslide analysis and preparation of report and seminar.

GSE Head of Planning, Monitoring & Evaluation Process, Mr. Assefa Zerihun expressed that GSE will be responsible for covering the expense of drilling for the coming fiscal year stating the organization has prepared budget plan and submitted to the government for approval.

- **Plan of drilling operation in Phase 3** -As it was discussed and approved during the 3rd meeting, drilling program is one of the most essential components of phase III.

The Study Team mentioned obstacles that are hindering the current status of drilling operation. In order to achieve the goal and to implement the drilling operation smoothly, GSE and JICA Study Team reminded ERA that they requested to cooperate to ease the accessibility of drilling sites by preparing access routes. The Study Team requested ERA the date of commencement of access road construction for drilling.

Although the date of commencement of drilling operations is approaching, things have not been yet prepared so the Study Team described that it is important to stick the schedule and give priority to the implementation.

Drilling expert of GSE also described the status of the drilling department by showing the availability of man power and materials (Rig) and ready to start before the rainy season.

On the other hand, GSE has explained the reason of compensation payment delay by specifying that discussions with the local farmers (land owners) should be done after marking specified places and after ERA has prepared access roads to each specific drilling sites. Above all, the Study Team stressed the need of negotiation and compensation fee as soon as possible so that the drilling operation could go on smoothly without delay.

➤ **Joint work with ERA**

ERA briefly explained that after preparing internal arrangement, they have agreed to cover the expense of the construction of the access road and the operation will start by the coming week even though it was very difficult to come up with the budget. But the main problem is lack of availability of special dozer for constructing access road. ERA confirmed that the Director General of ERA is well aware of the project and issues about the access road for the project so they will proceed as quickly as they can when they get the dozer (machinery). In addition, ERA requested GSE and the Study Team for the assignment of one person for communication while the road construction is carried out. The person will be working with the contractor in the Central Region (Mr. Nebiyu) and will have knowledge about resolving any arising problems. At last, ERA has shown willingness to the project by performing laboratory tests of samples to be collected from the field.

GSE has discussed about the situation on the site and specifically, places which need access routes and those which doesn't, and issues about equipment mobilization before the starting date.

Mr. Hara, Japanese expert from ERA, recommended the importance of joint work of ERA and GSE in conducting landslide monitoring mentioning the usefulness of sharing information even after this project ends. He also discussed about detail data analysis, design, and the counter measure works to be conducted etc. based on the result of Phase I.

➤ **Closing comment**

JICA representative, Mr. Nagakuwa, expressed a great appreciation about the progress of the project implementation. He ended up the meeting by expressing gratitude for all concerned bodies and mentioning that coordinated work is very essential because this project is a foundation for the capacity building of ERA and GSE in dealing with landslide problems.

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MINUTES OF MEETING OF THE 5TH JOINT COORDINATION COMMITTEE
(JCC)
FOR
THE PROJECT FOR DEVELOPING COUNTERMEASURES AGAINST
LANDSLIDES IN THE ABAY RIVER GORGE

DATE: November 25, 2011

TIME: 9:00 - 12:00

PLACE: GSE Conference Room



Mr. Kensuke Ichikawa

Chief Advisor

Study Team

Japan International Cooperation Agency
(JICA)



Mr. Masresha G/Selassie

Director General

Geological Survey of Ethiopia (GSE)

Federal Democratic Republic of Ethiopia



Mr. Atsushi Nakagawa

Representative

Ethiopia Office

Japan International Cooperation Agency (JICA)

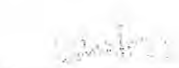


Ms. Abeba Berhanu

for, Highway Research Team,

Ethiopian Roads Authority (ERA)

Federal Democratic Republic of Ethiopia



Mr. Samuel Molla

for Geo-hazards Investigation Core Process,

Geological Survey of Ethiopia (GSE)

Federal Democratic Republic of Ethiopia



Mr. Hundie Melka

Chief Geologist

Geological Survey of Ethiopia (GSE)

Federal Democratic Republic of Ethiopia

List of Participants

GSE

Mr. Masresha G/Selassie	Director General
Mr. Hunde Melka	Chief Geologist
Mr. Assefa Zerihun	Head, Planning, Monitoring & Evaluation Process
Mr. Leta Alemayehu	Engineering Geologist
Mr. Samuel Molla	Engineering Geologist
Mr. Taddesse Lemma	Senior Geophysicist
Mr. Sisay Alemayehu	Geophysicist
Ms. Zulfa Abdurahman	Engineering Geologist
Mr. Habtamu Eshetu	Geologist

ERA

Ms. Abeba Berhanu	Acting lead Engineer
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JICA Ethiopia Office

Mr. Atsushi Nakagawa	Representative
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JICA Study Team

Mr. Kensuke Ichikawa	Chief Advisor
Mr. Takeshi Kuwano	Geological Survey/ Analysis 1
Mr. Mitsuya Enokida	Geomorphological Analysis 2
Mr. Masao Yamada	Landslide Integrated Analysis
Ms. Yerom Moges	Assistant of JICA Study Team

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I. Activities of project up to date

Representative of Geological Survey of Ethiopia (GSE) Mr. Masresha opened up the meeting by mentioning the success of the final technical seminar on Nov. 24, 2011. In addition, the achievements of geological, geophysical, drilling at site and knowledge transfers in Japan as well as in-house training which helped them to gain capacity building and knowledge were presented.

JICA Study Team presented the activities of entire project. The Study Team also mentioned about geological survey, monitoring, geophysical exploration, drilling survey as well as interpretation issues which includes identifying and assessing the landslide area, landslide block interpretation, stability analysis, countermeasures on landslide. It was also mentioned that the technical transfer is also made through seminars, workshops, onsite training and training in Japan.

II. Submission of final draft report

Draft final report is prepared which includes the main report (40 copies), summary report (40 copies), Landslide Investigation Manual (5 copies) and Appendixes (10 copies) to be handed over to Geological Survey of Ethiopia by the end of November, 2011. Regarding final report, GSE will add up some feedbacks on the basis of the draft final report. In addition, the deadline for the feedback comments was agreed to be Dec. 9, 2011. The submission of final report which includes the main report (50 copies), summary report (50 copies) and digital data (1 set) together with Manuals and Appendixes to JICA will be on middle Jan. 2012 and JICA will deliver it to ERA and GSE.

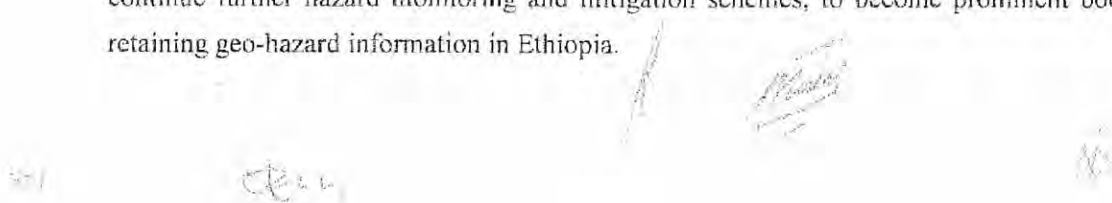
III. Wrap up of the entire project

1. Summary of the project

The Study Team summarized the purpose, outline, background, outputs and achievements made on the all the three phases of the project.

2. Major achievements from the project

Major achievements of the project which was focused on technical skill enhancement and technological transfer were presented. The future prospects was also discussed, which would be undertaken independently by GSE, to develop geo-hazard emergency response system, to continue further hazard monitoring and mitigation schemes, to become prominent body for retaining geo-hazard information in Ethiopia.



3. Outstanding issues

From the Project point of view, it was concluded that the technical transfer was successfully made. However the JICA experts pointed out some aspects to be considered by GSE for their future operation.

- Environmental impact assessment- when countermeasures would be conducted, all the negative impact shall be assessed.
- GSE's capacity to extend the landslide project; GSE shall continue service and promotion of capability of outside organization, and extend the relation with ERA and set up a system to avoid human loss or infrastructure damage due to landslide hazard.
- The equipment which is not handed over; Ground water resistivity logging equipment and Laboratory soil testing equipments will arrive until Feb. 2012 in GSE.
- Regarding future plan for GSE the Study Team proposed landslide investigation and analysis in the following manner:
 - Ethiopian landslide location map and geo-hazard map (1:50,000)
 - Geo-hazard information database
 - Establishing Standard of landslide survey and emergency system
 - Permanent assignment of consultation unit for geo-hazard

IV. Discussion on the above issues

1. Delay of the equipment

GSE representatives mentioned that the Laboratory equipment still expected from Japan could be new and might create gap in its utilization. GSE reminded that the project is supposed to support the usage of the equipment and requested technical experts for demonstration of using the equipment. JICA representative mentioned that the equipments which is included in TOR and M/M of JCC (Seismograph (1 unit) and soil testing machine (5 units)) will be delivered on February 2011.

2. Supply of drilling equipment, exploration device and related data

Drilling equipment and its consumables for current drilling survey were already ordered and are supposed to be delivered to GSE on middle Dec. 2011.

GSE requested JICA to support to overcome future drilling problems which GSE cannot access in hard terrain for landslide survey. In order to solve the issue, GSE requested consideration for

provision of a portable drilling machine. GSE also requested switch hummers for the seismic exploration that quickly damage in seismic investigations for future landslide survey. JICA will discuss these issues with the headquarters.

Satellite image data, GIS database and the related data on the project will be submitted to GSE.

3. Delay in the completion of the project.

GSE has mentioned that the project has been delayed due to unavoidable reasons and requested JICA for extension of the project completion time of at least three months in order to give a chance for proper delivery of the promised but delayed Laboratory equipment and in so doing also giving chance for demonstration of the usage of the equipment to the Technicians at GSE Laboratory. The extension also is for purpose of incorporating still ongoing drilling program of Landslide sites in the Abay River Gorge. Hence JICA agreed to further examine the matter.

4. Collaboration with ERA

GSE proposed the integrated work and cooperation with other organization for landslide problems. The discussion on the involvement of (Ethiopian Road Authority (ERA) and its role shall be summarized as a Memorandum of Understanding (MoU) being drafted by ERA. ERA promised that they will announce how they are going to be engaged in the landslide issues and to make cooperation about it.

5. Future projects on GSE with JICA

GSE have highly improved the ability and capability on landslide hazard assessment and they desired new project with JICA, such as integrated Geo-Hazard mapping, establishment of evacuation standard, provision of portable drilling machine which allows GSE access in hard terrain for landslide survey and etc. JICA advised that new project with JICA should be fit in policy of JICA; therefore more detailed discussion is needed for the new project issue.

6. Conclusion of the project

Finally, GSE expressed how the activities and outcomes of the project is beneficiary for the country future trends in both macro and micro level. GSE also appreciated the efforts and supports of JICA and great participation in the project, by mentioning that GSE have gained a lot of new experience.