

Appendices

APPENDIX-1 MEMBER LIST OF THE STUDY TEAM

1-1 Basic Design Study

Name	Assignment	Title/Organization
Mr. Tomoyuki TADA	Team Leader	Deputy Director, First Project Management Division, Grant Aid Management Department, JICA
Mr. Hajime FUKUDA	Project Coordination	First Project Management Division, Grant Aid Management Department, JICA
Mr. Wataru SHIGA	Chief Consultant/ Education Planning	UNICO International Corporation
Mr. Satoru HAMAMOTO	Equipment Planning 1/ O&M Planning	UNICO International Corporation
Mr. Yukihiisa TAKAHASHI	Equipment Planning 2	UNICO International Corporation
Mr. Takashi MORITA	Procurement Planning/ Cost Estimation	UNICO International Corporation

1-2 Explanation of Draft Report

Mr. Katsuro Saito	Team Leader	Resident Representative, JICA Papua New Guinea Office
Mr. Hiroshi Itoyama	Project Coordination	Assist. Resident Representative, JICA Papua New Guinea Office
Mr. Wataru SHIGA	Chief Consultant/ Education Planning	UNICO International Corporation
Mr. Satoru Hamamoto	Equipment Planning 1/ O&M Planning	UNICO International Corporation

APPENDIX-2 STUDY SCHEDULE

2-1 Basic Design Study

No.	Date	Day	CONTENTS					
			Official Team	Project Manager (Wataru Shiga)	Equipment Planner 1 (Satoru Hamamoto)	Equipment Planner 2 (Yukihisa Takahashi)	Procurement/ Cost Planner (Takashi Morita)	
1	8-Nov	Sat	Tokyo >>					
2	9-Nov	Sun	>>Port Moresby					
3	10-Nov	Mon	Courtesy calls on JICA Office, Office of Higher Education (OHE), Embassy of Japan (EOJ), Department of Education (DOE)			Tokyo>>		
4	11-Nov	Tue	Port Moresby >> Goroka Meeting at University of Goroka (UOG), Site survey					
5	12-Nov	Wed	Site survey at UOG		Site survey at UOG			
6	13-Nov	Thu	Site survey at UOG Goroka >> Port Moresby		Site survey at UOG			
7	14-Nov	Fri	Signing Minutes of Discussions Report to Embassy of Japan Report to JICA Office		Site survey at UOG			
8	15-Nov	Sat	Port Moresby >>Tokyo	Port Moresby >> Goroka	Site survey at UOG			
9	16-Nov	Sun	Internal meeting					
10	17-Nov	Mon	Visit Goroka Secondary School, Kamaliki Vocational Center, Goroka Business College					
11	18-Nov	Tue	Site survey at UOG					
12	19-Nov	Wed	Site survey at UOG					
13	20-Nov	Thu	Goroka >> Port Moresby Visit AusAID, EU		Site survey at UOG			
14	21-Nov	Fri	Visit OHE, DOE, PASTEP		Site survey at UOG			
15	22-Nov	Sat	Port Moresby >> Goroka Site survey		Site survey at UOG		Tokyo >>	
16	23-Nov	Sun	Internal meeting					>> Port Moresby >> Goroka
17	24-Nov	Mon	Site survey at UOG					
18	25-Nov	Tue	Site survey at UOG					
19	26-Nov	Wed	Site survey at UOG			Goroka >> Port Moresby		Site survey at UOG
20	27-Nov	Thu	Site survey at UOG			Port Moresby >> Tokyo		Site survey at UOG
21	28-Nov	Fri	Site survey at UOG					Site survey at UOG
22	29-Nov	Sat	Site survey at UOG					Site survey at UOG
23	30-Nov	Sun	Goroka >> Port Moresby					Goroka >> Port Moresby
24	1-Dec	Mon	Visit DOE, OHE Moresby>>Lae		Port		Procurement survey	
25	2-Dec	Tue	Visit University of Technology Lae>>Port Moresby				Procurement survey	
26	3-Dec	Wed	Report to JICA, EOJ				Procurement survey Port Moresby >> Lae	
27	4-Dec	Thu	Port Moresby >> Tokyo					Procurement survey
28	5-Dec	Fri						Procurement survey
29	6-Dec	Sat						Procurement survey
30	7-Dec	Sun						Lae >> Port Moresby
31	8-Dec	Mon						Procurement survey
32	9-Dec	Tue						Port Moresby >> Tokyo

2-2 Explanation of Draft Report

No.	Date	Day	ACTIVITY	
			Project Manager (Wataru Shiga)	Equipment Planner 1 (Satoru Hamamoto)
1	3-Feb	Tue	Tokyo (Dep. 21:15) >>	
2	4-Feb	Wed	Cairns (Arr.05:50/Dep. 12:00) >>Port Moresby (Arr. 13:25) Reporting to JICA Office, Embassy of Japan Courtesy calls on Department of National Plann	
3	5-Feb	Thu	Port Moresby (07:45) >> Goroka (08:50) <i>[Joined by Mr. H. Itoyam/JICA PNG Office]</i> Reporting and discussions at University of Goroka (UOG)	
4	6-Feb	Fri	Discussions at UOG	
5	7-Feb	Sat	<i>Discussions on Minutes of Discussions MOD) with DNPRD, UOG</i> <i>[Mr. H. Itoyam/JICA PNG Office-Leaving by afternoon flight]</i>	
6	8-Feb	Sun	Goroka (09:10) >> Port Moresby (10:15)	
7	9-Feb	Mon	Briefing of MOD at JICA Office Supplemental Market Survey	
8	10-Feb	Tue	Signing on Minutes and Discussions Report to Dept. of Education (DOE), Office of Higher Education (OHE), EOJ, JICA Office	
9	11-Feb	Wed	Supplemental Market Survey	
10	12-Feb	Thu	Port Moresby (09:30) >> Cairns (10:55/12:05) >> Tokyo (18:45)	

APPENDIX-3 LIST OF PARTIES CONCERNED IN THE RECIPIENT
COUNTRY

<u>Name</u>	<u>Designation</u>
<u>Dept. of National Planning and Rural Development (DNPRD)</u>	
Karl Sopol	Acting, First Assist. Secretary, Multilateral Development Assistance Branch
Paul Enny	Assist. Secretary, Bilateral Branch
Linda Taman	Program Officer, Japan Desk
Tony Miva	A/Assist. Secretary, Bilateral Dev. Assist. Branch
Samuel Petau	Assist. Secretary, Social Sector
Noel Geti	Senior Aid Coordination Officer, Japan Desk
Tokole Tura	Senior Monitoring & Evaluation Officer
Atsuo Susami	Advisor (JICA), Aid Coordination & Management Div.
Yasap Popoitai	Senior Planner, Social Sector
 <u>Department of Education</u>	
Peter M. Baki	Secretary for Education
Walipe Wingi	Superintendent, Staff Develop. Unit
Madako Suari	Director, Project Coordination
Simon Cholai	Project Coordinator (EU/Others)
Jeffrey Thompson	Corporate Data Div.
Hatsie Mirou	Acting Media Director
Akinori Ito	JICA Expert, Education Media Center
 <u>Office of Higher Education</u>	
Dr. Philip Kereme	Director General
Ted Alau	Director, Higher Education Support
William Tagis	Director, Higher Education Support Services
Amos Maso	Assist. Director, Financial & Administration
John Iso	Assist. Director, Policy, Planning & Monitoring
Joseph Morimai	A/Assist. Director, Student Support & Scholarship Branch
Dr. Obira Birug	A/Assist. Director, Institutional Development Branch

<u>Name</u>	<u>Designation</u>
<u>University of Goroka</u>	
Dr. David Rawlence	Vice Chancellor
Dr. Musawe Sinebare	Pro Vice Chancellor, Administration
Joseph Poimb Kata	Pro Vice Chancellor, Academic & Development
Eric Kombeakali	Acting Director, Planning
N. Amarasinghe	University Librarian
Dr. Michael Mel	Head, Ex. Arts & Rel. Education/Chairman, IT Committee
Helen Vetunawa	Head, Language & Literature Dept.
Michael Kapari	Head, Science, Agri. & Health Dept.
Dr. James K. Yoko	Head, Curriculum & Teaching Dept.
Dr. Goru Hane-Nau	Head, Social Science & Commerce Dept., Editor-PNG Journal
Edward Wanigasekera	Head, Design & Technology/ Home Economics Dept.
Amado Perez	A/Head, Design & Technology/ Home Economics Dept.
Dr. Roland Treu	Head, Science Section
K. Sriyaprabha	Head, Home Economics Section
Gordon Wallangas	A/Head, Agriculture Section
Dr. Kulange Banda	Senior Lecturer, Chemistry
Keith R. Galgal	Agri. Section Coordinator & Lecturer, Agri. Science
Dr. P. Jeyarathan	Lecturer, Science/ Acting Director, CNRPD
E. Ogoba	Lecturer, Home Economics Section
John Ga'a	Lecturer, Music Section
Simeon Yosam	Lecturer, Design & Technology Section
Dr. Agewa Zeming	Curriculum & Teaching
Paul Pinjik	Math. & Computing Dept.
John Khambu	Research Assistant, Planning & Development, UOG
Bernard Lote	Projects Technical Officer
Kal Onguko	Chief Technical Officer, AV Section
Takus David	Head, Printery Section (Graphic Designer)
Anson Barish	Acting Farm Manager
Yasunori Kawazumi	Senior Volunteer (Japanese Language Teacher)
Yoshihiro Nozaki	JOCV (Systems Engineer)
Yasutomu Kanbe	JOCV (Systems Engineer)

<u>Name</u>	<u>Designation</u>
<u>Goroka Business College</u>	
P. Bandara	Deputy Principal
<u>Goroka Secondary School</u>	
Christine Chu Palisa	Deputy Principal (Academic)
Lina Gui	IT Teacher
<u>Kamaliki Vocational Center</u>	
Ken Umasina	Head, Building Dept. (Teacher)
<u>Papua New Guinea University of Technology</u>	
Misty Baloiloi	Vice Chancellor
Wilson Tovirika	Pro Vice Chancellor, Administration
Dr. Philip Siaguru	Pro Vice Chancellor, Academic
<u>Name</u>	<u>Designation</u>
<u>Australian Agency for International Development (AusAID)</u>	
Romaine Kwesius	First Secretary - Education
Sam Takpakali	Senior Program Officer
Dr. Steve Pickford	Project Team Leader, PASTEP
<u>European Union</u>	
Neil Nicholls	Program Specialist - Education
<u>Embassy of Japan</u>	
Katsuo Yamashita	Ambassador of Japan
Shunji Shimizu	First Secretary
<u>JICA PNG Office</u>	
Katsuro Saito	Resident Representative
Hiroshi Itoyama	Assistant Resident Representative
Tony Ombo	Development Officer

MINUTES OF DISCUSSIONS
ON THE BASIC DESIGN STUDY
ON THE PROJECT FOR IMPROVEMENT OF EDUCATIONAL EQUIPMENT OF
UNIVERSITY OF GOROKA IN PAPUA NEW GUINEA

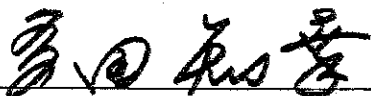
Based on the results of the Preparatory Study, the Government of Japan decided to conduct a Basic Design Study on the Project for Improvement of Educational Equipment of The University of Goroka (hereinafter referred to as "the Project").

JICA sent to the Government of Papua New Guinea (hereinafter referred to as "PNG"), the Basic Design Study Team (hereinafter referred to as "Team"), which is headed by Mr. Tomoyuki TADA, Deputy Director, First Project Management Division, Grant Aid Department, and is scheduled to stay in the country from November 8, 2003 to December 9, 2003.

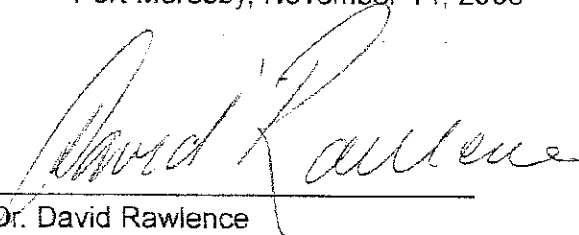
The team held discussions with the officials concerned of the Government of PNG and conducted a field survey at the study area.

In the course of the discussions and held survey, both parties confirmed the main items described on the attached sheets. The Team will proceed to further works on the Basic Design Study Report.

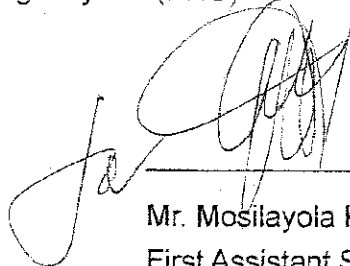
Port Moresby, November 14, 2003



Mr. Tomoyuki TADA
Leader
Basic Design Study Team
Japan International Cooperation Agency
(Japan)



Dr. David Rawlence
Vice Chancellor
University of Goroka
(PNG)



Mr. Mosilayola Kwayaila
First Assistant Secretary
Aid Coordination & Management Division
Department of National Planning
& Rural Development
(PNG)

ATTACHMENT

1. Objective of the Project

The objective of the Project is to improve the quality of teacher education courses in the University of Goroka by procuring educational equipment.

2. Project site

The site of the Project is at Goroka Town in Eastern Highland Province, Papua New Guinea.

3. Responsibility of the Implementing Agency

3-1 The responsible organization is the Department of National Planning & Rural Development.

3-2 The implementing organization is the University of Goroka. The current organization chart is attached as Annex-1, but note that the University is undergoing administrative restructure of its organization.

4. Items requested by the Government of Papua New Guinea

After discussions with the Team, the Government of PNG has finalized items for which it requests Japanese Grant Aid as listed in Annex 5. JICA will assess the appropriateness of the request and will recommend to the Government of Japan for approval.

5. Japan's Grant Aid Scheme

5-1 The PNG side has understood the Japan's Grant Aid Scheme explained by the Team according to the Inception Report, as described in Annex-2.

5-2 For smooth implementation of the Project, the PNG side will take necessary measures as described in Annex-3 which constitutes a condition for receiving Japanese Grant Aid.

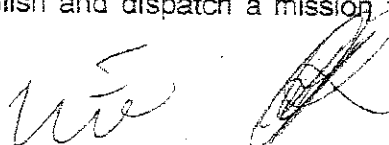
6. Nature of the Study

The PNG side has understood the purpose of the Basic Design Study and that no commitment of the implementation of the Project could be made by the Japanese side at this stage. Therefore, the Team will proceed to further study in Japan. As a result of the Study, the Government of Japan will decide final design of the Project.

7. Schedule of the Study

7-1 The Japanese study consultants will proceed to further studies in PNG until 9 December, 2003.

7-2 JICA will prepare a Draft Report in English and dispatch a mission to explain the



outline of the Basic Design around the end of January, 2004.

7-3 In the event of the Draft Report being acceptable in principle by PNG, JICA will complete the final report and send it to the Government of PNG by around March 2004.

8. Other relevant issues

8-1 Criteria for equipment selection

Both sides have agreed with the criteria for equipment selection as attached Annex 4.

8-2 New Curriculum

The PNG side has agreed to submit the current curriculum, including agricultural experiment and chemical and biological experiment.

8-3 Effective operation and maintenance

The PNG side has agreed to secure and allocate budget and staff necessary for the proper and effective operation and maintenance of equipment covered by the Project. Additionally, the PNG side has agreed to assign staff who are responsible for maintenance and securing of the equipment covered by the Project, and further agreed to submit to the Japanese side a list of such staff by the end of the stay of the study consultants.

8-4 Appropriate space

The PNG side has agreed to prepare appropriate space for the installation and storage of the equipment covered by the Project by the end of January 2004. In particular, PNG side has agreed to finish the renovation of the space for new printery section and site development of the new training farm including drainage.

8-5 Installation work

The PNG side has agreed to take responsibilities on preparation work for installation of the equipment covered by the Project.

8-6 Soft Component

The PNG side requested the consulting services for operation and maintenance as one of the components of the Grant Aid. Details of which will be finalized with the study consultants.

8-7 Gender Balance

Gender balance is considered for selection and allocation of the equipment.

Annex 1 Organization Chart

Annex 2 Japan's Grant Aid System

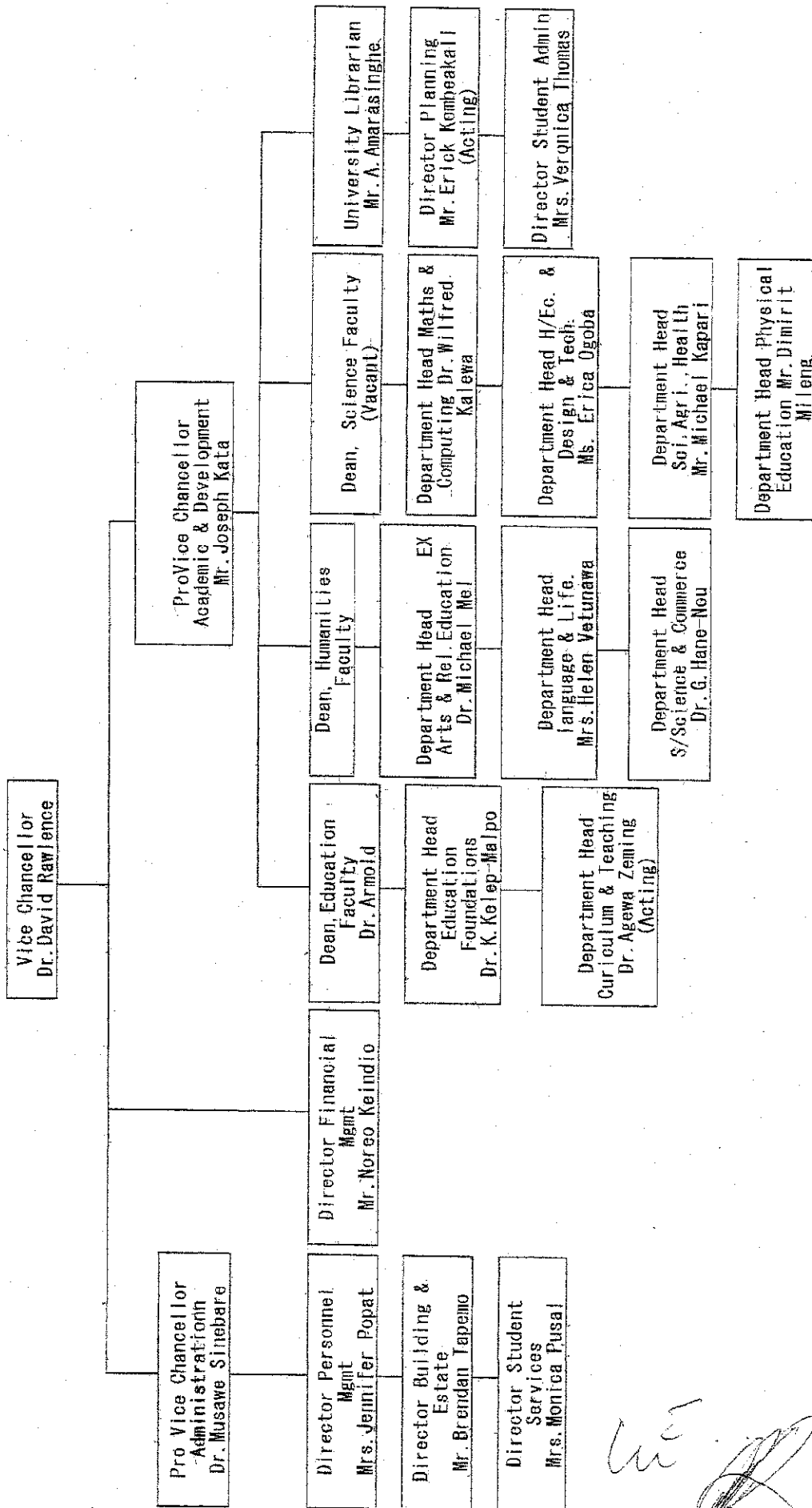
Annex 3 Major undertakings to be taken by Each Government

Annex 4 Criteria for equipment selection

Annex 5 List of requested equipment

Annex 1

Administrative Structure of the University of Goroka



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Annex-2 Japan's Grant Aid Scheme

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

(1) Grant Aid Procedure

1) Japan's Grant Aid Program is executed through the following procedures.

Application (Request made by a recipient country)

Study (Basic Design Study conducted by JICA)

Appraisal & Approval

(Appraisal by the Government of Japan and Approval by Cabinet)

Determination of Implementation

(The Notes exchanged between the Governments of Japan and the recipient country)

2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA to conduct a study on the request. If necessary, JICA send a Preliminary Study Mission to the recipient country to confirm the contents of the request.

Secondly, JICA conducts the study (Basic Design Study), using Japanese consulting firms.

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Programme, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

(2) Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project"), is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

- a) confirmation of the background, objectives and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation;
- b) evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from the technical, social and economic points of view;
- c) confirmation of items agreed on by both parties concerning the basic concept of the Project;
- d) preparation of a basic design of the Project; and
- e) estimation of costs of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even through they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For the smooth implementation of the Study, JICA uses a consulting firm selected through its own procedure (competitive proposal). The selected firm participates in the Study and prepares for a report based upon the terms of reference set by JICA.

At the beginning of implementation after the Exchange of Notes, for the services of the Detailed Design and Construction Supervision of the Project, JICA recommends the same consulting firm which participated in the Study to the recipient country in order to maintain the technical consistency.

(3) Japan's Grant Aid Scheme

1) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

2) "The period of the Grant" means the one fiscal year which the Cabinet approves the project for. Within the fiscal year, all procedure such as exchanging of the Notes, concluding contracts with consulting firms and contractors and final payment to them must be completed.

However, in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

3) Under the Grant, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However, the prime contractors, namely consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

5) Undertakings required to the Government of the recipient country

- a) to secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction;
- b) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities in and around the sites;
- c) to ensure all expenses and prompt execution for unloading and customs clearance at ports of

disembarkation in the recipient country and internal transportation therein of the products purchased under the Grant Aid;

- d) to exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts;
- e) to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such as facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work;

6) "Proper Use"

The recipient country is required to operate and maintain the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign the necessary staff for operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

7) "Re-export"

The products purchased under the Grant Aid shall not be re-exported from the recipient country.

8) Banking Arrangement (B/A)

- a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the verified contracts.
- b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay (A/P) issued by the Government of recipient country or its designated authority.

9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions to the Bank.

Annex-3 Criteria for equipment selection

1. Definite Criteria

- 1) Equipment that is indispensable for teacher training.
- 2) Equipment that is hardly obtained by the university, judging from the estimated budget allocation among concerned sections for the next several years.
- 3) Equipment for which appropriate space for installation and storage is ensured.
- 4) Equipment for which appropriate instructors and technicians are secured.
- 5) Equipment whose necessity is stated clearly in a practical training plan based on curriculum or syllabus.
- 6) Equipment that is not used for teacher training directly, such as furniture or the like, must be for the purpose of storing other equipment covered by the Project.
- 7) Equipment that can be maintained by the university economically and technically, concerning equipment that is used for the improvement of textbooks, such as printer and audio visual units.
- 8) Equipment that is used for offices, such as OA equipment, must be shared in use for the purpose of administration of teacher training courses.
- 9) Concerning expensive equipment or equipment that requires high maintenance cost, the proper maintenance environment, such as enough budget and appropriate staffs, that makes them durable for more than their lives must be ensured.
- 10) Equipment that comprises system, such as computer network, AV unit, and L.L. equipment, must be compatible with present equipment.


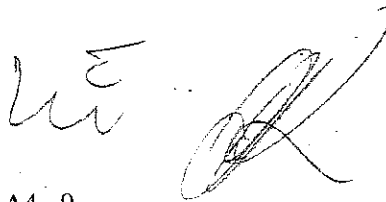
2. Criteria for giving high priority

- 1) Equipment that is used for lecture and practical training frequently.
- 2) Equipment that is lack of the necessary number for effective lectures or practical training.
- 3) Old equipment that is needed of improvement.
- 4) Equipment that can hardly be shared between different sections.
- 5) Equipment whose expendables, parts, and materials can be easily obtained in PNG (by PNG currency).

3. Criteria for elimination

- 1) Equipment that needs repair or extension of the building for installation.
- 2) Equipment that is scheduled to be improved by other aid agencies.
- 3) Equipment that is fragile, such as glass, that becomes old easily, that requires much cost or many kinds of expendables or spare parts for long-term use, and that is consumable, such as reagents, (except for these sorts of equipment that is necessary for effective initial use of other equipment covered by the Project).

- 4) Equipment that is mainly used for studies of university's staff, not for teacher training courses.
- 5) Equipment that is hardly secured from theft.
- 6) Equipment whose maintenance or operation staffs are hardly secured due to poor budget.



Annex-4 Major undertakings to be taken by Each Government

No.	Items	To be covered by Grant Aid	PNG
1	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
2	To ensure prompt unloading and customs clearance at the port of disembarkation in the recipient country.		
	1) Marine (Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	(●)	(●)
3	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.		●
4	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract.		●
5	To maintain and use properly and effectively the equipment provided under the Grant Aid		●
6	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for the transportation and installation of the equipment.		●

ANNEX 5 List of requested equipment

A. Equipment for Multipurpose Lecture Theater

No.	Items	Q'ty	Spec./Notes
1 Stage Lighting Equipment			
1.1	Boom for Spotlights	1 lot	*Motor-drive lifting system is required
1.2	Piano-convex Spotlight	12 units	
1.3	Fresnel Spotlight	36 units	
1.4	Follow Spotlights	3 units	
1.5	Lamp for Spotlight	100 units	ISO standard, 1 KW
1.6	Remote control system for 8 spotlights	1 set	
1.7	Poly Color Filter	100 units	
1.8	Code, cable, stand, hanger, arm, etc. for boom	1 set	
1.9	Power & Dimmer rack	1 set	
1.1	Cable Terminal Box	1 set	
1.11	Lighting Control Board	1 set	
1.12	Installation Material	1 lot	
2 Equipment for Presentation & Lecture			
2.1	Interactive White Board, Touch panel system	1 unit	Front type, 70 inch, RS23SC/USB
2.2	3D Object Presenter	1 unit	
2.3	Lap Top PC	1 unit	
2.4	Table for 3D Object Projector	1 unit	
2.5	Wireless Microphone System-2 channel	1 set	with 3 lavalier & 2 hand microphones

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B. Equipment for the New Library

No.	Items	Q'ty	Spec. / Notes
1	Stacks, Reading Table & Chair		
1.1	Ground Floor		
1.11	Book Stacks	44 units	500(L) x 50(W) x 180(H) cm, Double-sided, Wood
1.12	Reading Table	13 units	360 x 120 cm, Wood
1.13	Reading Chair	104 units	8 chairs per table
1.2	First Floor		
1.21	Book Stacks	44 units	500(L) x 50(W) x 180(H) cm, Double-sided, Wood
1.22	Reading Table	26 units	360 x 120 cm, Wood
1.23	Reading Chair	208 units	8 chairs per table
1.3	Mezzanine Floor		
1.31	Book Stacks	60 units	500(L) x 50(W) x 180(H) cm, Double-sided, Wood
1.32	Reading Table	1 unit	360 x 120 cm, Wood
1.33	Reading Chair	4 units	
2	Furniture for Staff offices and Rooms		
2.1	Ground Floor		
	Cataloging & Accession Room	1 lot	details are shown in ANNEX
	Office #1	1 lot	details are shown in ANNEX
	Office #2	1 lot	details are shown in ANNEX
	Community School Library Room	1 lot	details are shown in ANNEX
	AV Lounge	1 lot	details are shown in ANNEX
	Printery Room	1 lot	details are shown in ANNEX
2.2	First Floor		
	Librarian Office	1 lot	details are shown in ANNEX
	Librarian's Secretary Room	1 lot	details are shown in ANNEX
	Assistant Librarian Office	1 lot	details are shown in ANNEX
	Staff Meeting Room	1 lot	details are shown in ANNEX
	Office	1 lot	details are shown in ANNEX
	Seminar Room	1 lot	details are shown in ANNEX
	Maps Room	1 lot	details are shown in ANNEX
	AV Unit (Section)	1 lot	details are shown in ANNEX
2.3	Mezzanine Floor		
	Carrels (study booth)	1 lot	details are shown in ANNEX
3	Computers		
3.1	Computer - Ground Floor		
	Student Searching	10 units	Online Catalogue System
	Circulation Counter	2 units	Online Catalogue System
	Cataloging & Accession Room	3 units	Online Catalogue System
	Office	1 unit	Office use
	Community School Library Room	1 unit	Online Catalogue System, WWW search
	Printery Room	1 unit	Office use
3.2	Computer - First Floor		
	Student Searching	5 units	Online Catalogue System
	Librarian Office	1 unit	Online Catalogue System, Office use
	Librarian's Secretary Room	1 unit	Office use
	Assistant Librarian Office	1 unit	Office use
	Maps Room	1 unit	Information Searching
	AV Unit (Section)	1 unit	Office use
3.2	Computer - Mezzanine Floor		
	Carrels (study booth)	12 units	Online Catalogue System, Research study use

	Work Room	1 unit	Online Catalogue System, Office use
	<p>*Basic Specification of Computers: Windows PC with 15 inch monitor, Windows 2000, MS Office, UPS</p> <p>*Following computers may not equipped with MS Office software and UPS. Computers for Student Searching (15 units) Computer in Maps Room for Information Searching (1 unit)</p> <p>*Following computers may not equipped with MS Office software. Computers for Circulation Counter & Cataloging & Accession Room (5 units)</p>		
4	Equipment for Library Service - Ground Floor		
4.1	Laser Printer	2 units	
4.2	Scanner	1 unit	
4.3	Photocopy (heavy duty)	2 units	
5	AV Equipment for AV Lounge - Ground Floor (seating capacity : 20 persons)		
5.1	Multimedia Projector	1 unit	
5.2	Lap Top PC	1 unit	
5.3	VHS Video player	1 unit	
5.4	CD/DVD Player	1 unit	
5.5	Cabinet	1 unit	
5.6	Table for projector	1 unit	
5.7	Projector Screen, Ceiling mounted	1 unit	
6	Security System - Entrance		
6.1	Book Guard System	1 unit	

Handwritten signatures and initials:
 - A signature that appears to be "Ler" or similar.
 - A large, stylized signature or initials.
 - A small, stylized mark or signature at the bottom right.

ANNEX Furniture for the Staff Offices and Rooms - New Library

No	Location	Item/Specification	Qty
Ground floor			
1	School Library		
1.1		Shelving (wooden) 1.53m(h)x1m(w)x.3m(depth)	12
1.2		Reading table (wooden) 3.5m(l)x1.2m(w)x0.76m(h)	2
1.3		Reading Chairs (Armless)	20
1.4		Office Table (wooden) for Staff	1
1.5		Rotating Chair for Staff	1
1.5		Filing Cabinet (steel) with 4 drawers	1
2	AV Lounge		
2.1		Arm Chairs (wooden)	20
3	Office1 (Asst.Lib)		
3.1		Office Table (Wooden) 1.7m(L)x0.75m(w)x0.73m(h)	1
3.2		Rotating Chair with arms	1
3.3		Visitors Chairs (without arms)	2
3.4		Filing Cabinet (steel) with 4 drawers	1
		Bookshelf (2mx1m)	1
4	Printery		
4.1		Office Table (wooden) 3drawersx1 cabinet 1.7m(L)x0.75m(w)x0.73m(h)	1
4.2		Rotating Chair with arms	1
4.3		Steel cabinets (2 doors +4 shelves) 1.83m(h)x0.92m(w)x0.46m(depth)	3
4.4		Filing cabinets (steel) with 4 drawers	1
5	Cataloguing & Accession		
5.1		Shelves (wooden) 1.82m(h)x0.92m(w)x0.33m(depth)	4
5.2		Steel cabinet	1
5.3		Adjustable Chairs	4
5.4		Book Trolleys (wooden)	2

No	Location	Item/Specification	Qty
6	Office 2 (Reader Service Lib)		
6.1		Office Table (wooden) with 3 drawers & Cabinet 1.7m(L)x0.75m(w)x0.73m(h)	1
6.2		Chairs (Rotating)	1
6.3		Visitors Chairs without arms	2
6.4		Filing Cabinet	1
6.5		Bookself (wooden) 2mx1m	1
First Floor			
AV/ IT Section			
7	Director IT		
7.1		Office Table (wooden) with 3drawers&Cabinet	1
7.2		Chair rotating with arms	1
7.3		Visitors Chairs with arms (wooden)	2
	JICA Volunteer		
7.4		Office Table (wooden) with 3drawers&Cabinet	1
7.5		Chair rotating with arms	1
7.6		Visitors chairs with arms (wooden)	2
	Understudy to JICA		
7.7		Office table (wooden) with 3drawers&Cabinet	1
7.8		Chair with arms (wooden)	1
	AV/IT Secretary		
7.9		Office Table (wooden) with 3drawers&Cabinet	1
7.10		Chair rotating with arms	1
7.11		Filing Cabinets (steel)	1
7.12		Visitors chair with arms (wooden)	1
7.13		Storage cabinet (steel)	1
	AV Technicians		
7.14		Work Bench with drawers (wooden) 3m(L)x0.8m(w)x0.9m(h)	1
7.15		Stools (wooden)	4

No	Location	Item/Specification	Qty
	C/Technical Officer		
7.16		Office Table (wooden) with 3 drawers & Cabinet	1
7.17		Chair rotating with arms	1
7.18		Visitors chairs with arms (wooden)	2
7.19		Filing Cabinet (steel)	1
8	Maps Room		
8.1		Map Cabinets with 6 drawers (steel) 1.16m(l)x0.71m(h)x.83m(w)	2
8.2		Office table (wooden) 1.36m(L)x0.84m(w)x0.73m(h)	1
8.3		Chair armless (wooden)	1
9	Office		
9.1		Office table (wooden) 3 drawers 1.7m(L)x0.75m(w)x0.73m(h)	1
9.2		Chair Rotating with arms	1
9.3		Visitors chairs with arms	2
9.4		Filing Cabinet (steel) with 4 drawers	1
9.5		Bookshelf (wooden) 2m(h)x1.0m(w)x0.33m(depth)	1
10	Seminar room		
10.1		Tables, Collapsible 1.52m(L)x0.6m(w)x0.72m(h)	7
10.2		Chairs armless (wooden)	21
10.3		White board- Movable with casters	1
10.4		Storage cabinet steel	1
10.5		TV deck and screen	1
11	Staff meeting room		
11.1		Tables, collapsible 1.52m(L)x0.6m(w)x0.72m(H)	11
11.2		Chairs (Confrence type) wooden with arms	21
11.3		White board movable with casters	1
11.4		Chairs (wooden) with arms	6

No	Location	Item/Specification	Qty
12	Librarian's Secretary		
12.1		Office table (wooden) with 3drawers&cabinet	1
12.2		Chair -Rotating with arms	1
12.3		Visitors chair (wooden) without arms	1
12.4		Filing Cabinets (steel) 4 drawers	6
13	Librarian		
13.1		Office table (wooden) with 3drawers&Cabinet	1
13.2		Chair -Rotating with arms	1
13.3		Filing cabinet (steel) 4 drawers	1
13.4		Visitors chairs (wooden) with arms	2
13.5		Book self (2m(h)x1.2m(w)x0.3m(depth)	1
14	Assistant Librarian		
14.1		Arm Chairs (wooden)	8
14.2		Coffee tables (wooden)	2
14.3		Refrigerator (small)	1
14.4		Cabinet (wooden) with glass door , 2 shelves 2m(h)x1m(w)x0.5m(depth)	1
	Mezzanine		
15	carrels		
15.1		Carrels (wooden) <i>Refer details of carrels on p/copy already supplied</i>	12
15.2		Rotating chairs	12
15.2		Office table (wooden)for staff.	1
15.3		Rotating chair for staff	1
15.4		Filing cabinet	1

C. Equipment for AV Section (Common Use / in the New Library)

No.	Items	Q'ty	Spec. / Notes
1	Video Shooting for Students Practice^(**1) & Academic Staff User^(**2)		
1.1	DV-mini Camcorder with accessories	5 units	Home use level
1.1.1	Spare charger	2 units	
1.1.2	Spare battery	5 units	
1.2	Rain cover for Camcorder	5 units	
1.3	Tripod	5 units	
1.4	Carrying Case	5 units	
	(*1) ETE 001 Educational Technology (*2) Peer Teaching, etc. On-demand after training		
2	Non-linear Video Editing & DTP System for Students Practice^(**3) & Academic Staff User^(**4)		
2.1	Windows Personal Computer with 17 inch monitor	5 sets	with Video board, Audio-in, Speaker system, CD-RW
2.2	Software:		
2.2.1	Windows 2000 / XP	5	
2.2.2	Video Editing Software (Beginner level)	5	
2.2.3	Video Editing Software (Intermediate level)	5	
2.2.4	Graphic & Photo Work Software	5	
2.2.5	DTP Software	5	
2.2.6	Microsoft Office	5	
2.2.7	Power Point	5	
2.3	DV-mini Recorder/player	1 unit	
2.4	TV monitor for DV-mini Recorder/player	1 unit	
2.5	Scanner	1 unit	A4
2.6	Laser Printer	1 unit	A4
2.7	Headphone	5 units	
2.8	UPS	5 units	
2.9	Table & Chair for Computers	5 sets	
2.10	Table/rack	1 lot	
2.11	Steel Cabinet	1 lot	
	(*3) ETE 001 Educational Technology (*4) Teaching Material Production, etc. On-demand after training		
3	Video Shooting for AV Section		
3.1	DVCAM/DV-mini Camcorder with accessories	2 units	3CCD, Production level
3.1.1	Spare charger	1 unit	
3.1.2	Spare battery	4 units	
3.3	Rain cover for Camcorder	2 units	
3.4	Tripod	2 units	
3.5	Carrying Case	2 units	
4	Non-linear Video Editing & DTP System for AV Section		
4.1	Windows Personal Computer	1 set	with Video board, Audio-in, Speaker system
4.2	Software:		
4.2.1	Windows 2000 / XP	1	
4.2.2	Video Editing Software (Intermediate-production level)	1	
4.2.3	Graphic & Photo Work Software	1	
4.2.4	DTP Software	1	
4.2.5	Microsoft Office	1	
4.2.6	Power Point	1	
4.3	Video Monitor 21-inch	2 units	for editing work
4.4	DVCAM/DV-mini Recorder/player	1 unit	
4.5	Analog - Digital converter	1 unit	
4.6	VHS Recorder/player	1 unit	
4.7	CD/DVD Burner	1 unit	Copying of edited video programs from computer into CD/DVD
4.8	CD/DVD player	1 unit	
4.9	Portable Mini Disc Recorder/player	2 units	For voice over on video editing
4.10	Portable Cassette Tape Recorder/player	1 unit	
4.11	Scanner	1 unit	A4
4.12	Laser Printer	1 unit	A4
4.13	Headphone	1 unit	
4.14	UPS	1 unit	
4.15	Photocopier	1 unit	Table top, with stand

No.	Items	Q'ty	Spec. / Notes
4.16	Table & Chair for Computer	1 set	
4.17	Table/rack	1 lot	
4.18	Steel Cabinet	1 lot	
5	Tool & Instruments for Maintenance Work		
5.1	Cathode Ray Oscilloscope	1 unit	50MHZ
5.2	Digital Multimeter	3 units	
5.3	Digital LCR meter	1 unit	measure induction, capacitance and resistance
5.4	Color Picture Tube Rejuvenator	1 unit	
5.5	High Wattage Soldering Station	2 units	variable temp. control with replacement tips
5.6	240-240V Isolation Transformer	1 unit	2 amps rating
5.7	High Voltage Probe	1 unit	measure high voltage on computer monitor or TV screen
5.8	Color TV Pattern Generator	1 unit	test high tension leads on fly back transformers
5.9	L.O.P.T. Tester	1 unit	
5.10	Degaussing Wand	2 units	
5.11	Video Service Tool Kit	2 units	
5.12	Video Head Extractor Tool	1 unit	
5.13	Video Head Tester	1 unit	
5.14	Video Alignment Tools	1 unit	
5.15	Monitor Function Generator	1 unit	
5.16	Data Books 1) Diode Manual 2) Transistor Manual 3) Transistor Substitution 4) The C-MOS IC Manual 5) The Linear IC Manual 6) Towers Transistor Selector 7) Semi-conductor World Data Book (vol. 1&2) 8) Other necessary Data Books for PC repair or IC manuals	1 set	
5.17	Cabinet for Tool & Instruments	1 lot	
5.18	Work Bench	1 lot	
6	AV Equipment for Common Use (*5)		
6.1	Lap Top PC	4 units	
6.2	Multimedia Projector	4 units	
6.3	3D Object Presenter	2 units	
6.4	Digital Camera	2 units	
6.6	DV-minii Player	2 units	
6.5	CD/DVD Player	2 units	
6.7	21 inch TV Monitor	1-2 units	
6.8	Extension power reel	5 units	
6.9	Carrying Case	5 units	several sizes
	(*5) Q'ty of those items are subject to change depending on the q'ty of same items in other common lecture rooms and department		
7	Recording & Distribution of Educational TV Programs		
7.1	Satellite TV Dish	2 sets	with LNB
7.2	Decoder	3 units	CNN, National Geography, Discovery
7.3	S-VHS Videc Recorder/Player	3 units	CNN, National Geography, Discovery

D. Equipment for Printery Section (in the New Library)

No.	Items	Q'ty	Spec. / Notes
1	Offset press, A3 2-color/single-color	1 unit	w/drying unit
2	Dark room camera (Graphic camera)	1 unit	
3	Plate Maker (Exposure system)	1 unit	
4	Electric Guillotine	1 unit	cutting 520mm(L) x 80mm(H)
5	Electric Stapler	1 unit	22mm
6	Thermal Book Binder	1 unit	A3, Hot-melt glue, Desk top
7	Paper Holder	1 unit	A3
8	Paper Sorter	1 unit	
9	Digital Stencil Duplicator	1 unit	A3
10	Photocopy, Heavy duty	1 unit	
11	Work Bench	1 lot	
12	Shelves	1 lot	

E. Equipment for Language Laboratory, Dept. of Language & Linguistic

No.	Items	Q'ty	Spec. / Notes
1	Students' Self-learning system for tutorial class	30 units	For improving the English listening & speaking capability by self-study, Voice recording & listening function, Interactive study media is desired.
2	TV monitor 29 inch	1 unit	
3	VHS Video Recorder/Player	1 unit	
4	DVD/CD Player	1 unit	
5	Steel Cabinet for TV, VTR	1 unit	
6	OHP	3 units	
7	Projector Screen, Movable	3 units	
8	Cassette Tape Player, Portable	3 units	
9	DV Camera with stand for peer teaching	(1) unit	Use DVcam at the AV Section

Note : Not only for the Language Laboratory, but includes the equipment to be used in other classrooms.

F. Equipment for Educational Technology Section, Dept. of Curriculum & Teaching

No.	Items	Q'ty	Spec. / Notes
1	TV 21/25 inch	2 units	ETE 001 Educational Technology
2	Over Head Projector	3 units	ETE 001 Educational Technology
3	Electronic Stencil Cutter	3 units	ETE 001 Educational Technology
4	Electronic Stencil Duplicating Machine	2 units	ETE 001 Educational Technology
5	Video Player	4 units	ETE 001 Educational Technology
6	Slide Projector with magazine	5 units	ETE 001 Educational Technology
7	Stereo Amplifier	1 unit	ETE 001 Educational Technology
8	Double Deck Cassette Player	1 unit	ETE 001 Educational Technology
9	CD Player	1 unit	ETE 001 Educational Technology
10	Heavy Duty Photocopier	1 unit	ETE 001 & Preparation of materials for teaching practice

G. Equipment for Computer Laboratories

No.	Items	Qty	Spec./Notes
1	New Open Computer Laboratory		
1.1	Windows Personal Computer with 15 inch monitor	60 sets	1.5GHz, 20-40GB HD, 128MB or more, FD, CD-ROM, Network card(100Mbps), USB-Optical-Mouse
1.11	Windows Personal Computer for server	1 sets	use for Domain server and File server : HDDx2(for back up), Hi-spec PC
1.2	Software:		
1.21	Windows 2000 professional	60	
1.22	Microsoft Office	60	
1.23	Anti Virus Software	60	
1.24	SPPS(Statistics)	10	
1.25	Windows 2000 or 2003 Server	1	
1.3	Equipment/materials for Network system:		
1.31	Network Cable	700m	CAT5
1.32	RJ 45 plug	130 pcs	
1.33	Network point (wall mount)	160 pcs	Box-face plate-RJ45 keystone jack
1.34	Switch (HUB) - 24 port	2 units	
1.35	Switch (HUB) - 16 port	2 units	
1.36	UPS	2 units	for Switch
1.4	Laser Printer	2 units	with Network card
1.5	Scanner	1 unit	
1.6	UPS	61 units	for PCs
1.7	AVS	1 unit	to cover all 61PCs
1.8	Air Conditioner, Separate type	1-2 units	
1.9	Security system		for all equipment
2	Teaching Computer Laboratory, Dept of Maths & Computing (present number of PC : 35 units)		
2.1	LCD Projector	1 unit	SMAC 001 Information Technology skills
2.2	Projector Screen, Movable	1 unit	75 inch
2.3	AVS	1 unit	to cover all 35PCs
2.4	Security system		for all equipment
3	Male Open Computer Laboratory (present number of PC : 22 units)		
3.1	AVS	1 unit	to cover all 22PCs
3.2	Air Conditioner, Separate type	1 unit	
3.3	Security system		for all equipment
4	Female Open Computer Laboratory (present number of PC : 18 units)		
4.1	AVS	1 unit	to cover all 18PCs
4.2	Air Conditioner, Separate type	1 unit	
4.3	Security system:		for all equipment
5	IT ROOM		
5.1	UTP Cable(CAT5) Tester	1 unit	with TDR function
5.2	Fiber Optic Cable Tester	1 unit	
5.3	UPS for Data servers	3 units	3 KVA or more
5.4	Air compressor	2 units	for PC maintenance
5.5	Switch (HUB) - 16 port	4 units	for New Library
5.6	Windows Personal Computer for server	1 sets	Hi-spec

H. Equipment for Expressive Arts Education (Music section, Dept. of Exp. Arts & Rel. Education)

No.	Items	Q'ty	Spec. / Notes
1	Music Instruments		
1.1	Trombone	1	Instrument studies, small group teaching & practices Instruments are all intermediate level
1.2	Trumpet	3	
1.3	Cornet	2	
1.4	Alto sax	4	
1.5	Tenor sax	4	
1.6	Clarinet	3	
1.7	Flute	4	
1.8	Violin	2	
1.9	Electric Guitar	1	
1.10	Bass Guitar	1	
1.11	Lead Guitar Amp	1	
1.12	Bass Guitar Amp	1	
1.13	Drum Kit	1 set	
1.14	Music Stand	20	
1.15	Digital Piano with stand for classroom (student use)	12	Q'ty is based on the student number & room space.
1.16	Piano Seat-Padded regular	13	
1.17	Digital Piano with stand- Portable type for classroom (teacher use) & live application	1	
1.18	Electronic Synthesizer for live application (a)	1	piano and organ sounds
1.19	Electronic Synthesizer for live application (b)	1	orchestral and environment sounds
1.20	Power Amp	1	
1.21	16 Channel Mixer	1	
2	Music Composition		
2.1	Digital Sound Recorder (DAT)	1	
2.2	Monitor Speakers - studio application	1 set	
2.3	Computer for Music composition	4	eMAC/G4
2.4	Electric Keyboard for Music composition	4	
2.5	Music Scoring Software	4	
2.6	Music Recording Software	4	For equalization of recording material
2.7	Laser Printer	1	A4
2.8	CD Burner	1	
2.9	Compact Stereo System (CD, DVD, Tape)	1 set	
2.10	UPS	4	
2.11	AVS	1	
3	Peer Teaching		
3.1	TV Monitor 25/29 inch	1	
3.2	VHS Video player/recorder	1	
3.3	Steel Cabinet for TV, Video & Stereo system	1	
3.4	DV Camera with stand	(1)	Use DVcam at the AV Section

I. Equipment for Agriculture Education (Agriculture Section, Dept. of Science, Agriculture & Health)

No.	Items	Qty	Spec. / Notes
1 GENERAL LABORATORY EQUIPMENT			
1.1	Analytical lab balances	2	Reagent preparation for various soil and plant nutrient tests for student practical
1.2	Distilled water/ Deionised Water Machine	1	
1.3	Lab Drying Oven	1	General drying purposes for laboratory activities
1.4	Ammonia distillation apparatus	1 set	
1.5	Lab incubator	1 unit	Incubate samples for general laboratory work
1.6	Digital lab pH meter	2	For taking pH readings of various kind of samples – such as pH of different liquids
1.7	Desiccators	5	For sample cooling
1.8	Compact centrifuge at 2000/3000 rpm	1	Soil and plant sample extraction for analysing chemical nutrients
1.81	Screw cap polypropylene centrifuge tubes – 50 ml	2 dozen each	Sample collection for centrifuge
1.82	Polypropylene centrifuge tubes without caps – 50 ml	2 dozen each	Sample collection for centrifuge
1.9	Spectronic Digital Spectrometer	2	Measuring soil and plant chemical elements
1.10	Vacuum Pressure Pump	1	General laboratory work in analytical preparation
1.11	Mortar & Peste	5	Soil and plant sample preparation
1.12	Aluminum Heating Blocks – 7 rows of 6 blocks	1 set	For sample heating
1.13	Atomic Absorption Spectrometry	1	Measuring soil and plant nutrients,
1.14	Autoanalyzer	1	Measuring soil and plant nutrients
1.15	Conductivity Meter	4	Measuring ion conductivity in sample
1.16	Flame Spectrometry	1	For measuring potassium & related elements
1.17	Heating Mantles	1	Sample heating for analysis
1.18	Kjeldahl apparatus	1	For nitrogen analysis using Kjeldahl method
1.19	Liquid Dispensers	5	Measuring various laboratory solution (acid/alkaline) for sample preparation and analysis
1.20	Calorimeters	5	For measurement of nutrient elements
1.21	Peristaltic Pump	1	For general laboratory work such as nutrient solution movement
1.22	Lab Water baths	1	For general laboratory preparation of samples
1.23	Electronic Microscope	20	Analysing specimens
1.24	Dissecting/Stereo Microscope	20	Dissecting plants, flowers, insects, etc
1.25	Hand lenses	20	For quick viewing of plant parts, micro-organisms etc
1.26	Electric Cork Borer	1	Corking holes
1.27	Laboratory Blenders with Timer	1	Sample preparation
1.28	Laboratory sample storage fridge	1	Sample storage
1.29	Laboratory deep fridge for sample storage	1	Sample storage
2 Equipment for Soil Science and Plant Measurement			
2.1	Soil Bulk Density Corers – stainless	20	Measuring soil bulk density
2.2	Soil Shaker for soil samples – end over end shaker 50rpm	2	Soil sample preparation for nutrient analysis
2.3	Reciprocating shakers	2	Soil and plant sample preparation for nutrient analysis
2.4	Refractometers for measuring plant products juices concentration	5	For measuring plant products juice concentration
2.5	Tullgren Funnels – 6 and 12 Banks – soil animals extraction	1 unit	For the extraction of soil animals from plant litter and soil
2.6	Salt & Hoflick Soil Washing Apparatus – for extracting soil arthropods	1 unit	For extracting active and inactive arthropods from the soil and plant litter
2.7	Lab Bench Shakers	2	For sample preparation for nutrient test
2.8	Micro pH	2	Measuring pH in micro environment
2.9	Ion Analyzer	1	Analysing ions present in plant and soil samples
2.10	Standard Soil Test: Sieves for soil particle analysers – different sizes	1 set	For soil particle analysis
2.11	Standard Test Sieve Shaker	1 set	For shaking soil particle into different sizes using sieve sizes
2.12	Water quality Analyser	2	Measuring water samples for nutrient pollutants in streams or ponds
2.13	Hygrothermographs for recording temperature & relative humidity	2	Measuring temperature & relative humidity
2.14	Thermographs for measuring and recording air temperature & soil temp	2	Measuring and recording air and soil temperature

No.	Items	Q'ty	Spec. / Notes
2.15	Soil Density Hydrometers	5	Measuring soils density
2.16	Soil Thermometers	10	Measuring soil temperatures
2.17	Fruit gauge for measuring fruit size	5	Measuring fruit sizes of various fruit crops
2.18	Electronic Dendrometers for measuring fruit & stem growth	5	Measuring fruit and stem growth of most crops
2.19	Chlorophyll Meter for measuring chlorophyll present in leaves	5	Measuring amount of chlorophyll
2.20	Permeameter, Guelph for measuring soil hydraulic conductivity	5	Measuring soil hydraulic conductivity, soil sorptivity, soil matrix flux potential
2.21	Permeameter, Shelby Tube for measuring soil permeability tests	5	Measuring soil permeability on undisturbed soils
2.22	Permeameter, Combination for measuring soil hydraulic conductivity	5	Measuring soil permeability in controlled environment
2.23	Permeameter Compaction for soil compaction	5	Measuring flow of water in the soil
2.24	Infiltrometers for measuring soil infiltration rate	5	Measuring soil infiltration rate
2.25	Soil Tensiometer, Jet Fill for measuring soil moisture potential	5	Soil moisture potential
2.26	Capacitance Probe for measuring Volumetric Soil Water Content	5	Measuring volumetric water content in the field of crops
2.27	Time Domain Reflectometry System for measuring Volumetric Water Content	5	Measuring volumetric water content in soils
2.28	Penetrometer Static Cone for measuring soil consistency & soil Compaction	5	Measuring soil consistency & soil compaction
2.29	Pressure Extractors for measuring The Water Holding Capacity (WHC) of soils	5	Measuring water holding capacity of soils
2.30	Potentiometer for measuring soil temperature and water potential	5	Measuring soil temperature and water potential
2.31	Munsell Soil Color Charts	30	Soil colour description in soil profile
2.32	Wind speed anemometers	5	Measuring wind speed
2.33	Soil Core Samplers of different soil depths	5 each	Collecting soil samples at various depth for nutrient analysis
2.34	Soil Sampling augers of different soil depths	5 each	Collecting soil samples for soil nutrient analysis
2.35	Environmental Monitoring Equipment	2 unit	Mainly for environment purposes particularly for nutrient pollution
3	LABORATORY GLASSWARE		ANNEX 1
4	LABORATORY CONSUMABLES		ANNEX 2
5	EQUIPMENT FOR LECTURE & PRACTICAL PRESENTATION		
5.1	TV Monitor 25 inch	1	
5.2	VHS Video Player	1	
5.3	Steel Cabinet for the above	1	
5.4	Slide Projector	1	For slide presentation during lectures or practicals
5.5	Over Head Projector	3	For lecture & practical presentation
5.6	Projector Screen, Movable	1	75/100 inch
5.7	Digital Camera	1	Taking pictures and writing course materials
5.8	DV Camera with stand for peer teaching	(1)	Use DVcam at the AV Section
6	MODEL FARM EQUIPMENT & FACILITIES		
6.1	Tractor with PTO & Attachments	1	Land preparation for student practical on vegetable or crop production
6.11	Trailer	1	
6.12	Disc plough	1	Land preparation for student practical on vegetable or crop production
6.13	Disc harrow	1	Land preparation for student practical on vegetable or crop production
6.14	Mould board plough	1	Land preparation for student practical on vegetable or crop production
6.15	Rotary disk mower	1	Farm slashing
6.2	Generator 5kva - diesel	1	Farm electrical work
6.3	Portable lawn mower	1	For farm lawn cutting
6.4	Water pump - diesel	1	Pump water to head tank for watering, irrigation & drinking
6.5	Irrigation hose - standard size attached to pump	2	For irrigation of crops
6.6	Irrigation Sprinklers	20	For watering of crops
6.7	Poultry house to house broilers, layers, & breeders	1	
6.8	Pig unit to house breeders, weaners, piglets	1	
6.9	Nursery house (Nethouse)	1	

No.	Items	Q'ty	Spec. / Notes
6.10	Storage refrigerator - standard	1	Sample storage
6.11	Storage freezer - standard	1	Sample storage
6.12	Tools kit for maintenance of farm machinery	1	
6.13	Coffee pulpar	5	Pulping coffee cherry
6.14	Rice milling machine	2	
6.15	Hanging Scales - 50kg capacity	4	Weighing crop yield, animal feed etc
6.16	Weighing scale for animals	5	Life weight measurement for pigs, goat & sheep
6.17	Hammer mill	1	Crushing animal feed
6.18	Animal Feed mill / grinder	1	Grinding animal feed
6.19	Feed pelleter	1	Making feed pellet
6.20	Feeding bins	10	Storage bins for feeds
6.21	Feeding bucket	10	Carrying feed to animals
6.22	Ear tag applicator	2	Tagging tags on ears of animals
6.23	Metal cages	5	Metabolism measurement of animals used for animal courses
6.24	Emasculator	2	Used for castration
6.25	Tape measure - 5 m, 30m, 100m	2 each	Farm measurement