# Appendices

# Appendices

## Preparatory Survey (from May 6, 2015 to June 5, 2015)

| Name | Assignment | Authority/Firm |
|---|---|---|
| Mr. Kazuya SUZUKI | Team Leader | Director, Agricultural and Rural Development Group 1<br>Rural Development Department<br>JICA |
| Mr. Masayuki HAYASHI | Grant Aid Planning | Deputy Director, Grant Aid Project Management Division 3,<br>Financial Cooperation Implementation Department, JICA |
| Ms. Yuko SASA | Chief Consultant/Architectural Planning (Agricultural Higher Education) 1 | Oriental Consultants Global Co., Ltd. |
| Mr. Kazuhiro MIYATAKE | Vice Chief Consultant/Architectural Planning (Agricultural Higher Education) 2/Natural Conditions Survey 1 | Oriental Consultants Global Co., Ltd. |
| Mr. Tomoo NITTA | Architectural Planning /Natural Conditions Survey2 | Oriental Consultants Global Co., Ltd. |
| Mr. Harunobu YOSHINO | Research & Agricultural Equipment Planning | Earl Consultants, Inc. |
| Dr. Pachakkil BABIL | Agricultural Education & Research (Crops) | Oriental Consultants Global Co., Ltd. (Tokyo University of Agriculture) |
| Mr. Ado KAMAGATA | Facility Design/Operation and Maintenance Planning | Oriental Consultants Global Co., Ltd. |
| Mr. Daigo YANO | Research & Training Farm Planning | Oriental Consultants Global Co., Ltd. |
| Mr. Haruhisa ISHIKAWA | Construction Planning/Cost Estimation (Facilities) | Oriental Consultants Global Co., Ltd. |
| Mr. Yo TAKAHASHI | Equipment Procurement Planning/Cost Estimation (Equipment) | Earl Consultants, Inc. |

Draft Report Explanation Study (from November 25, 2015 to December 5, 2015)

| Name | Assignment | Authority/Firm |
|---|---|---|
| Ms. Tomoko TAIRA | Team Leader | Director, Team 1, Agricultural and Rural Development Group 1, Rural Development Department<br>JICA |
| Ms. Hana OSHIRO | Project Planning | Agricultural and Rural Development Group 1, Team 1, Rural Development Department<br>JICA |
| Ms. Yuko SASA | Chief Consultant/Architectural Planning (Agricultural Higher Education) 1 | Oriental Consultants Global Co., Ltd. |
| Mr. Kazuhiro MIYATAKE | Vice Chief Consultant/Architectural Planning (Agricultural Higher Education) 2/Natural Conditions Survey 1 | Oriental Consultants Global Co., Ltd. |
| Mr. Tomoo NITTA | Architectural Planning /Natural Conditions Survey2 | Oriental Consultants Global Co., Ltd. |
| Mr. Harunobu YOSHINO | Research & Agricultural Equipment Planning | Earl Consultants, Inc. |

## Preparatory Survey (from May 6, 2015 to June 5, 2015)

| | Date | | JICA Mission (Headquarters & JICA Sri Lanka Office) Mr. Suzuki and Mr.Hayashi | Chief Consultant /Architectural Planning (Agricultural Higher Education) 1 | Vice Chief Consultant / Architectural Planning (Agricultural Higher Education) 2 / Natural Conditions Survey 1 | Architectural Planning / Natural Conditions Survey2 | Research & Agricultural Equipment Planning | Agricultural Education & Research (Crops) | Facility Design / Operation and Maintenance Planning | Research & Training Farm Planning | Construction Planning / Cost Estimation (Facilities) | Equipment Procurement Planning / Cost Estimaion (Equipent) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Yuko SASA (Ms.) | Kazuhiro MIYATAKE (Mr.) | Tomoo NITTA (Mr.) | Harunobu YOSHINO (Mr.) | Pachakkil Babil (Mr.) | Ado KAMAGATA (Mr.) | Daigo YANO (Mr.) | Haruhisa ISHIKAWA (Mr.) | Yo TAKAHASHI (Mr.) |
| 1 | 6-May | Wed | | NRT→(SIN)→CMB<br>*@Colombo* | | | | | | NRT→(SIN)→CMB<br>*@Colombo* | | |
| 2 | 7-May | Thu | | Colombo ⇒Kilinochchi<br>Meeting at FoAg, Jaffna Univercity<br>*@Kilinochchi* | | | | | | Colombo ⇒Kilinochchi<br>Meeting at FoAg, Jaffna Univercity<br>*@Kilinochchi* | | |
| 3 | 8-May | Fri | | Consulation and survey on FoAg, Jaffna University<br>Meeting at FoAg, Jaffna University<br>*@Kilinochchi* | | | | | | Consulation and survey on FoAg, Jaffna University<br>Meeting at FoAg, Jaffna University<br>@Kilinochchi<br>*@Kilinochchi* | | |
| 4 | 9-May | Sat | | Field Survey (FoAg)<br>*@Kilinochchi* | | | | | | Field Survey<br>*@Kilinochchi* | | |
| 5 | 10-May | Sun | NRT→CMB<br>*@Colombo* | Killinochchi ⇒ Colombo<br>*@Colombo* | | Documentation<br>*@Kilinochchi* | | | | Documentation<br>*@Kilinochchi* | | |
| 6 | 11-May | Mon | 8:30 Meeting at JICA Sri Lanka Office<br>10:00 Courtesy Call at Embassy of Japan<br>11:30 Department of Fiscal Policy, Ministry of Finance<br>14:00 Ministry of Higher Education<br>15:00 Leave Colombo to Kandy | 8:30 Meeting at JICA Sri Lanka Office<br>10:00 Courtesy Call at Embassy of Japan<br>11:30 Department of Fiscal Policy, Ministry of Finance<br>14:00 Ministry of Higher Education<br>15:00 Leave Colombo to ⇒Kandy<br>@Kandy | | Meeting (FoAg) Survey on the Situation of Local Construction and Site Conditions Kilinochichi =>Kandy<br>*@Kandy* | Meeting (FoAg) Survey on the Situation of Local Construction and Site Conditions Kilinochichi =>Kandy<br>*@Kandy* | | NRT→(SIN)→CMB<br>*@Colombo* | Meeting (FoAg) Survey on the Situation of Local Construction and Site Conditions Kilinochichi =>Kandy<br>*@Kandy* | | |
| 7 | 12-May | Tue | 8:30 Meeting at Peradenia University<br>– interview to Dean of Faculty of Agri.<br>– visit labolatories and livestock farm<br>– visit food processing practice workshop<br>etc. | Survey on Peradeniya University<br>Kandy ⇒ Jaffna<br>*@Jaffna* | | | | NRT→(SIN)→CMB<br>*@Colombo* | Colombo ⇒ Kandy University of Peradeniya<br>Kandy ⇒ Jaffna<br>*@Jaffna* | Survey on Peradeniya University<br>Kandy ⇒ Jaffna<br>*@Jaffna* | NRT→(SIN)→CMB<br>*@Colombo* | |
| 8 | 13-May | Wed | 8:00 Jaffna University<br>10:30 Provincial Director of Animal Health and Production<br>11:30 Provincial Director of Agriculture<br>13:30 District Secretary (Kilinochchi)<br>15:00 Provincial Director of Irrigation (Kilinochchi)<br>16:00 District Director of Animal Production and Health (Kilinochchi) | Along with JICA Mission<br>@Kilinochchi | | Consultation and Survey of FoAg, University of Jaffna<br>*@Kilinochchi* | Along with Chief Consultant<br>*@Kilinochchi* | Colombo ⇒Kilinochichi<br>*@Kilinochchi* | Consultation and Survey of FoAg, University of Jaffna<br>*@Kilinochchi* | | Colombo ⇒Kilinochichi<br>*@Kilinochchi* | |
| 9 | 14-May | Thu | 9:00 Jaffna University (Kilinochchi Campus)<br>– Kick off meeting<br>15:00 Rice Research Station Paranthan | Along with JICA Mission<br>*@Kilinochchi* | | Consultation and Survey on FoAg, UoJ<br>*@Kilinochchi* | Along with Chief Consultant<br>*@Kilinochchi* | Consultation and Survey on FoAg, UoJ<br>*@Kilinochchi* | | | Survey of construction & procurement program<br>*@Kilinochchi* | |

## Preparatory Survey (from May 6, 2015 to June 5, 2015)

| | Date | | JICA Mission (Headquarters & JICA Sri Lanka Office) Mr. Suzuki and Mr.Hayashi | Chief Consultant /Architectural Planning (Agricultural Higher Education) 1 | Vice Chief Consultant / Architectural Planning (Agricultural Higher Education) 2 / Natural Conditions Survey 1 | Architectural Planning / Natural Conditions Survey2 | Research & Agricultural Equipment Planning | Agricultural Education & Research (Crops) | Facility Design / Operation and Maintenance Planning | Research & Training Farm Planning | Construction Planning / Cost Estimation (Facilities) | Equipment Procurement Planning / Cost Estimaion (Equipent) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Yuko SASA (Ms.) | Kazuhiro MIYATAKE (Mr.) | Tomoo NITTA (Mr.) | Harunobu YOSHINO (Mr.) | Pachakkil Babil (Mr.) | Ado KAMAGATA (Mr.) | Daigo YANO (Mr.) | Haruhisa ISHIKAWA (Mr.) | Yo TAKAHASHI (Mr.) |
| 10 | 15-May | Fri | 9:00 Jaffna University (Kilinochchi Campus)<br>– M/D Discussion<br>16:15 Jaffna University (Jaffna Campus)<br>– M/D Discussion with Vice Chancelor | Along with JICA Mission *@Kilinochchi* | | Building Survey, Site Condition Survey *@Kilinochchi* | Along with Chief Consultant *@Kilinochchi* | Agricultural Education & Research Survey *@Kilinochchi* | Facility Survey *@Kilinochchi* | Farm Condition Survey *@Kilinochchi* | Survey of construction & procurement program *@Kilinochchi* | |
| 11 | 16-May | Sat | 10:00 Mahailluppallama Sub Campus of Faculty of Agriculture, University of Peradenia<br>13:00 CIC Farm(Pelwehera)<br>15:00 Leave Pelwehera for Colombo | Along with JICA Mission *@Colombo* | | Site Condition Survey, Team Meeting *@Kilinochchi* | Along with Chief Consultant *@Colombo* | Inspection of Farmers Villages, Team Meeting *@Kilinochchi* | Site Survey, Team Meeting *@Kilinochchi* | | | |
| 12 | 17-May | Sun | Data compilation and documentation | Document Analysis *@Colombo* | | Document Analysis *@Kilinochchi* | Document Analysis *@Colombo* | Document Analysis *@Kilinochchi* | | | | NRT→(SIN)→CMB *@Colombo* |
| 13 | 18-May | Mon | 14:00–14:30 ERD<br>15:00–18:00 Ministry of Higher Education<br>– Discussion on M/D | Along with JICA Mission *@Colombo* | | 9:50 Meeting FoGS<br>10:45 Meeting FoAg<br>14:30 Head/Agchemi<br>15:00 Head/Agri.Economics<br>15:30 Head/Agri.Eng *@Kilinochchi* | Along with Chief Consultant *@Colombo* | 9:50 Meeting at FoAg<br>10:45 Meeting FoAg<br>12:00 Head/Agri.Sci<br>14:30 Head/Agchemi<br>15:00 Head/Agri.Economics<br>15:30 Head/Agri.Eng *@Kilinochchi* | PM Meeting at Sri Lanka Telecom<br>Meeting at NWSDB<br>Meeting at CEB *@Kilinochchi* | Survey of FoAg, Jaffna University Campus *@Kilinochchi* | Meeting at FoAg *@Kilinochchi* | Along with Chief Consultant *@Colombo* |
| 14 | 19-May | Tue | 12:00–12:30 ERD<br>15:00–16:00 Ministry of Higher Education<br>Signing of Minutes of Discussion<br>17:00 Meeting at JICA Sri Lanka Office | Along with JICA Mission Colombo⇒Kandy *@Kandy* | Along with JICA Mission | Survey of Jaffna University Campus Jaffna⇒Kandy *@kandy* | Along with Chief Consultant Colombo⇒Kandy *@Kandy* | Survey of Jaffna University Campus Jaffna⇒Kandy *@kandy* | | 9:30 Meeting Farm Manager (FoAg) Kilinochchi⇒Kandy *@ Kandy* | Survey of Jaffna University Campus Jaffna⇒Kandy *@kandy* | Along with Chief Consultant Colombo⇒Kandy *@Kandy* |
| 15 | 20-May | Wed | NRT | Survey of Peradeniya University *@Kandy* | CMB→(SIN)→NRT | Survey of Peradeniya University Kandy ⇒ Killinochchi *@Kilinochchi* | Survey of Peradeniya University *@Kandy* | | Survey of Peradeniya University Kandy ⇒ Killinochchi *@Kilinochchi* | | | Survey of equipment procurement *@Kandy* |
| 16 | 21-May | Thu | | Survey of Peradeniya University Campus Kandy ⇒ Killinochchi *@Kilinochchi* | | Meetig with Head/Animal.Science, Consultation for Outline Design *@Kilinochchi* | Survey of Peradeniya University Campus Kandy ⇒ Killinochchi *@Kilinochchi* | Survey of Peradeniya University Campus *@Kandy* | Meeting with Contractor, Operation and Maintenance Management Survey *@Kilinochchi* | Survey of crop farm development program *@Kilinochchi* | Meeting with Contractor, Survey of construction & procurement *@Kilinochchi* | Survey of Peradeniya University Campus Kandy ⇒ Killinochchi *@Kilinochchi* |
| 17 | 22-May | Fri | | Survey of Agriculture related institutions and NGOs *@Kilinochchi* | | Consultation for Outline Design *@Kilinochchi* | Equipment Survey *@Kilinochchi* | Survey of Peradeniya University Campus Kandy ⇒ Colombo | Operation and Maintenance Management Survey *@Kilinochchi* | Survey of crop farm development program *@Kilinochchi* | 13:00 Meeting Port Authority in Trincomalee *@Kilinochchi* | Survey of equipment procurement *@Kilinochchi* |
| 18 | 23-May | Sat | | Internal meeting *@Kilinochchi* | | Internal meeting *@Kilinochchi* | | CMB→(SIN)→NRT | Internal meeting *@Kilinochchi* | | Internal meeting Meeting with subcontractors *@Kilinochchi* | Internal meeting *@Kilinochchi* |
| 19 | 24-May | Sun | | Documentation *@Kilinochchi* | | Documentation *@Kilinochchi* | | | Documentation *@Kilinochchi* | | | |

## Preparatory Survey (from May 6, 2015 to June 5, 2015)

| | Date | | JICA Mission (Headquarters & JICA Sri Lanka Office) Mr. Suzuki and Mr.Hayashi | Chief Consultant /Architectural Planning (Agricultural Higher Education) 1 | Vice Chief Consultant / Architectural Planning (Agricultural Higher Education) 2 / Natural Conditions Survey 1 | Architectural Planning / Natural Conditions Survey2 | Research & Agricultural Equipment Planning | Agricultural Education & Research (Crops) | Facility Design / Operation and Maintenance Planning | Research & Training Farm Planning | Construction Planning / Cost Estimation (Facilities) | Equipment Procurement Planning / Cost Estimaion (Equipent) |
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| | | | | Yuko SASA (Ms.) | Kazuhiro MIYATAKE (Mr.) | Tomoo NITTA (Mr.) | Harunobu YOSHINO (Mr.) | Pachakkil Babil (Mr.) | Ado KAMAGATA (Mr.) | Daigo YANO (Mr.) | Haruhisa ISHIKAWA (Mr.) | Yo TAKAHASHI (Mr.) |
| 20 | 25-May | Mon | | Meeting with FoAG Documentation *@Kilinochchi* | | Meeting with FoAG Documentation @Kilinochchi | | | Meeting with FoAG Documentation @Kilinochchi | | Meeting with FoAG Documentation Killinochchi ⇒ Colombo *@Colombo* | |
| 21 | 26-May | Tue | | Arranging Site Survey, Meeting with Building Ept. and UDA, Inspection of Medical Faculty Jaffna Hospital *@Kilinochchi* | | Arranging Site Survey, Meeting with Building Ept. and UDA, Inspection of Medical Faculty Jaffna Hospital *@Kilinochchi* | Meeting at FoAg, Consultation for Equipment and Maintenance Plan *@Kilinochchi* | | Arranging Site Survey, Meeting with Building Ept. and UDA, Inspection of Medical Faculty Jaffna Hospital @Kilinochchi *@Kilinochchi* | Meeting at FoAg, Planing and Consultation for Cultivated land *@Kilinochchi* | Survey of construction & procurement *@Colombo* | Survey of equipment procurement *@Colombo* |
| 22 | 27-May | Wed | | Meeting with UNDP, Consultation for Outline Design *@Kilinochchi* | | Consultation for Outline Design *@Kilinochchi* | Consultation for Equipment and Maintenance Plan *@Kilinochchi* | | Consultation of OD for M&E Works *@Kilinochchi* | Planing and Consultation for Cultivated land *@Kilinochchi* | Survey of construction & procurement *@Colombo* | Survey of equipment procurement *@Colombo* |
| 23 | 28-May | Thu | | Meeting for Technical note *@Kilinochchi* | | Consultation with FoAg. Meeting for Technical note *@Kilinochchi* | | | Meeting for Ttechnical note *@Kilinochchi* | | Survey of construction & procurement *@Colombo* | Survey of equipment procurement *@Colombo* |
| 24 | 29-May | Fri | | Meeting with UNWFP Preparation of Technical note *@Kilinochchi* | | Consultation with FoAg.Preparation of the technical note *@Kilinochchi* | | | Preparation of the Technical note *@Kilinochchi* | | Survey of construction & procurement *@Colombo* | Survey of equipment procurement *@Colombo* |
| 25 | 30-May | Sat | | Signing of the Technical note @Kilinochchi | | Signing of the Technical note *@Kilinochchi* | | | Signing of the Technical note *@Kilinochchi* | Kilinochchi ⇒ Colombo (move by car) *@Colombo* | Documentation *@Colombo* | |
| 26 | 31-May | Sun | | Killinochchi ⇒ Wayamba *@Colombo* | | Killinochchi ⇒ Wayamba *@Colombo* | Killinochchi ⇒ Wayamba *@Colombo* | | Killinochchi ⇒ Wayamba *@Colombo* | CMB→(SIN)→NRT | Killinochchi ⇒ Wayamba *@Colombo* | Killinochchi ⇒ Wayamba *@Colombo* |
| 27 | 1-Jun | Mon | | Survey of Wayamba University Campus Wayamba ⇒ Colombo MOHER,MOF *@Colombo* | | Survey of Wayamba University Campus Wayamba ⇒ Colombo *@Colombo* | Survey of Wayamba University Campus Wayamba ⇒ Colombo *@Colombo* | | Survey of Wayamba University Campus Wayamba ⇒ Colombo MOHER,MOF *@Colombo* | | Survey of Wayamba University Campus Wayamba ⇒ Colombo Survey of construction & procurement *@Colombo* | Survey of Wayamba University Campus Wayamba ⇒ Colombo *@Colombo* |
| 28 | 2-Jun | Tue | | Team meeting, data analysis *@Colombo* | | Team meeting, data analysis *@Colombo* | | | Team meeting, data analysis *@Colombo* | | Team meeting, data analysis *@Colombo* | |
| 29 | 3-Jun | Wed | | Report to JICA , team meating *@Colombo* | | Report to JICA , team meating *@Colombo* | | | Report to JICA , team meating *@Colombo* | | Report to JICA , team meating *@Colombo* | |
| 30 | 4-Jun | Thu | | CMB→(SIN)→NRT | | CMB→(SIN)→NRT | | | Survey of construction & procurement *@Colombo* | | Survey of construction & procurement *@Colombo* | CMB→(SIN)→NRT |
| 31 | 5-Jun | Fri | | | | | | | CMB→(SIN)→NRT | | CMB→(SIN)→NRT | |

NRT:Narita International Airport 、SIN：Singapore Changi International Airport 、CMB：Colombo International Airport (Bandaranaike International Airport)
NMAC: National Mine Action Center

## Draft Report Explanation Study (from November 25, 2015 to December 5, 2015)

| No. | Date | | JICA Mission (Headquarters & JICA Sri Lanka Office) Ms. Taira and Ms.Oshiro | Chief Consultant /Architectural Planning (Agricultural Higher Education) 1 Yuko SASA (Ms.) | Vice Chief Consultant / Architectural Planning (Agricultural Higher Education) 2 / Natural Conditions Survey 1 Kazuhiro MIYATAKE | Research & Agricultural Equipment Planning Harunobu YOSHINO (Mr.) | Architectural Planning / Natural Conditions Survey2 Tomoo NITTA (Mr.) | Stay |
|---|---|---|---|---|---|---|---|---|
| 1 | Nov.25 | Wed | NRT>>BKK>>CMB | NRT>>SIN>>CMB | | NRT>>SIN>>CMB | | Colombo |
| 2 | Nov.26 | Thu | JICA, MOUEH | | | JICA, MOUEH | | Colombo |
| 3 | Nov.27 | Fri | ERD, MOER | | | ERD, MOER | | Colombo |
| 4 | Nov.28 | Sat | CMB >> Kilinochchi<br>Meeting with FoAg_UOJ | | | Meeting with FoAg_UOJ | | Kilinochchi |
| 5 | Nov.29 | Sun | *Additional Survey, Rev.* | | | Rev. & Additional Survey | | Kilinochchi |
| 6 | Nov.30 | Mon | Meeting with FoAg_UOJ | | | Meeting with FoAg_UOJ | | Kilinochchi |
| 7 | Dec.1 | Tue | Kilinochchi >> Colombo | | NRT>>SIN>>COL | Kilinochchi >> Colombo | | Colombo |
| 8 | Dec.2 | Wed | | Meeting with MOER | | | | Colombo |
| 9 | Dec.3 | Thu | | Meeting with MOER | | | | Colombo |
| 10 | Dec.4 | Fri | | Meeting with MOER, ERD, JICA | | | | Colombo |
| 11 | Dec.5 | Sat | CMB>>BKK>>NRT | CMB 01：10 >> 07:40 SIN (SQ0469)<br>SIN 09:20 >> 17:05 NRT (SQ0012) | | | | |

## List of Parties Concerned in the Recipient Country

1. Embassy of Japan in Sri Lanka

| | | |
|---|---|---|
| Mr. Masayuki Nakatsukuma | : | Second Secretary, Economic Cooperation Section |

2. JICA Sri Lanka Office

| | | |
|---|---|---|
| Mr. Kiyoshi Amada | : | Chief Representative |
| Mr. Hiroyuki Abe | : | Senior Representative |
| Mr. Makoto Asai | : | Representative |
| Ms. Namiko Yamada | : | Assistant Representative (Project Formulation) |
| Mr. Prasad Nissanka | : | Project Specialist |

3. Ministry of Higher Education

| | | |
|---|---|---|
| P. Ronepura | : | Secretary |
| A. M. R. D. Aponsu | : | Director(PI) |
| H. A. R. P. Fernando | : | AD (PI) |

4. Ministry of Finance and Planning

| | | |
|---|---|---|
| Ms. W. Thanuja A. Perera | : | TAX Policy Advisor, Dept. of Fiscal Policy |
| Ms. H.D. Aneesha Rukshini | : | Assistant Director, Dept. of Fiscal Policy |

5. Department of External Resources (ERD)

| | | |
|---|---|---|
| M. H. H. Perera | : | Assistant Director |
| Madara De Silva | : | Assistant Director |
| J. D. G. Senanayake | : | Assistant Director |

6. Department of Irrigation

| | | |
|---|---|---|
| N. Suthakaran | : | Deputy Director |
| S. Sivapatham | : | Senior Engineer |
| T. Sivanantharajah | : | Senior Engineer |

7. Department of Animal Production &Health

| | | |
|---|---|---|
| Dr. S. Gowrithilagan | : | Assistant Director, Kilinochchi District |
| H. M. J. J. K. Kadigamuwa | : | Livestock Officer |

8. University of Jaffna/ Faculty of Agriculture

| | | |
|---|---|---|
| Prof. Ms. V. Arasaratnam | : | Vice Chancellor |
| Dr. Mrs. S. Sivachandiran | : | Dean/Faculty of Agriculture |
| Dr. G. Mikunthan | : | Dean/Faculty of Graduate Studies, Professor/Agricultural Biology |
| Dr. Nalina Gnanavelrajah | : | Head/ Agricultural Chemistry |
| Dr. Thushyanthy Mikunthan | : | Head/ Agricultural Engineering |
| Dr. Miss. J. Sinniah | : | Head/ Agricultural Science |
| Dr. G. Thirukkumaran | : | Head/ Agricultural Biology |
| Dr. K. Sooriyakumar | : | Head/ Agricultural Economics |
| Mrs. Loha Pradheeban | : | Senior Lecturer |
| Mrs. Anushiya Sireerangan | : | Senior Lecturer |
| Dr. S. Vagantharuba | : | Senior Lecturer, Agricultural Chemistry |
| Dr. P. Alvappillai | : | Senior Lecturer |
| Mr. K. Venugoban | : | Senior Lecturer |

| | | |
|---|---|---|
| Mr. K. Jeyavanan | : | Lecture |
| Mrs. Vanathy Kandeepan | : | Lecture |
| Mr. S. Thatchaneshkantn | : | Lecturer |
| Kaefthipeu Tegavaran | : | Lecturer |
| V. Kandeepan | : | Resistor |
| N. Rajavisahan | : | Deputy Resistor |
| Mr. S. Branavan | : | Assistant Resistor |
| Mr. A. Aravinthan | : | Work Engineer |
| Mr. G. Guberan | : | Assistant Farm Manager |
| N. Devorajon | : | Consultant Engineer |
| Mr. S. Branavan | : | Instructor in IT |
| K. Venugoban | : | Instructor of Computer unit |
| K. Jeyakuumar | : | Technician |
| S. Santhelamor | : | Technical Office, Agri. Chemistry |
| S. Navarctlhrcn | : | Professor, Animal Science |

9. Embassy of India in Sri Lanka

| | | |
|---|---|---|
| Mr. Chandru. A | : | Second Secretary, Development Cooperation |

10. Department of Buildings

| | | |
|---|---|---|
| Ms. Sabdya Mendis | : | Additional Director General |

11. Building Department, Jaffna Regional Office

| | | |
|---|---|---|
| Ms. Vinothine | : | Chief Engineer |

12. Urban Development Authority

| | | |
|---|---|---|
| Ms. Thushani De Alwis | : | Dy Director (Planning) |

13. Urban Development Authority, District Office Jaffna

| | | |
|---|---|---|
| Mr. Michelthasan | : | Engineer |

14. Seed and Planting Material Development Center

| | | |
|---|---|---|
| Mr. Satheeswaran | : | Assistant Director |

15. University of Peradeniya

| | | |
|---|---|---|
| Prof. K. Samarasinghe | : | Dean, Faculty of Agriculture |
| Dr. S.P. Nissanka | : | Senior Lecturer in Crop Physiology, Forestry and Agroforestry, Department of Crop Science |
| Dr. W.A. Udaya Vitharana | : | Head/ Department of Soil Science |
| Mr. Chandrapaln | : | Livestock Farm |

16. University of Wayamba

| | | |
|---|---|---|
| Prof. DPSTG Attanayake | : | Dean, Faculty of Agriculture & Plantation Mgt |
| O. Madhari Prasadani Dassanayaica | : | Lecture, Department Biotechnology |
| Dr. Anoma Chandrasekara | : | Head of Department of Applied Nutrition, Faculty of Livestock, Fisheries and Nutrition |

17. UN United Nations World Food Programme (UN WFP) Sri Lanka

| | | |
|---|---|---|
| Kayathiri Kumaran | : | Field Coordination Officer |
| Nadarajah Thayaharan | : | Field Coordination Officer |

18. United Nations Development Programme (UNDP) Sri Lanka

| | | |
|---|---|---|
| Sivaprakasam Kusalavan | : | Field Project Associate |
| Sivanathan Senthuraan | : | Field Project Specialist |

19. Sri Lanka Port Authority of Trincomalee

| | | |
|---|---|---|
| Mr. M.U.R. Dharmawardane | : | Resident Manager, Port of Trincomalee |

20. Ceylon Electricity Board (CEB)

| | | |
|---|---|---|
| Mr. Theiveegan, Superinedant | : | Area Electrical Enigeers Office, Kilinochchi |
| Mr. N. Nakkeevan | : | District office, Jaffna commercial division |

21. National Water Supply & Drainage Board ( NWSDB) Project Office, Kilinochchi

| | | |
|---|---|---|
| Ms. P. Jintha | : | Project Engineer |

22. Sri LankaTelecom PLC ( SLT) Rigional Telecom Office, Kilinochchi

| | | |
|---|---|---|
| Mr. P. Sri Puveehan | : | Regional Office Manager |

23. Maga Engineering (Pvt) Limited

| | | |
|---|---|---|
| Mr. M.G. Kularatne | : | Chairman & Managing Director |
| Mr. Nihal Chandrasiri | | Asst. General Manager, Construction |

24. Sanken Construction (PVT) LTD

| | | |
|---|---|---|
| Ms. Sarojiani Karunaratne | : | Chief Quantity Surveyor |
| Mr. S. G. Jayasinghe | : | Project Manager, Kilinochchi Site Office |
| Mr. P.K.C Jayacreera | : | QA/QC, Kilinochchi Site Office |
| Mr. J. Terensan | : | Planning Engineer, Kilinochchi Site Office |
| Mr. K. Sulaxon | : | M&E Engineer, Kilinochchi Site Office |
| Mr. A.M.S.U.K Dissanajake | : | SM, Kilinochchi Site Office |

25. International Construction Consortium (Pvt) Ltd.

| | | |
|---|---|---|
| Mr. V. S. Nagodavithane | : | Executive Director (Design & Estimation) |
| Mr. Palitha Ranasinghe | : | General Manager (Contracts & Estimates) |

26. Asiri Construction

| | | |
|---|---|---|
| Mr. L.M.S. Nishantha Wanigasekara | : | Construction Manager |
| Mr. Kavindu Silva | : | Quantity Surveyor |

27. Olympus Construction (PVT) LTD

| | | |
|---|---|---|
| Mr. Nishad Dissanayake | : | Chairman |
| Mr. S.A.Mayadunne | : | Quantity Surveyor |

28. Citigardens

| | | |
|---|---|---|
| Mr. Hilru Siddeeque J.P | : | CEO |
| Mr. M.S. Ahamed Muneer | : | Extension Coordinator |

29. Tokyo Cement Company (Lanka) PLC at Mirusuvil

| | | |
|---|---|---|
| Mr. S. Rukshan A.Q.C | : | Engineer |

30. Sanken Ready Mixed Concrete at Navatkuli

| | | |
|---|---|---|
| Mr. Lakrish | : | QA &QC Engineer |

31. Hayleys Lifesciences Ltd.

| | | |
|---|---|---|
| Mr. Athula Wijayananda | : | Business Unit Head |

| | | |
|---|---|---|
| Mr. Himasu Jayasiri | : | Sales & Marketing Manager |
| Mr. Priyantha Mahesh Welagedara | : | Head of Admin & Finance |

32. Microtech Biological (Pvt) Ltd.

| | | |
|---|---|---|
| Mr. Kumara Ekanayake | : | Director |
| Dr. Thilan Wickramarachchi | : | General Manager |
| Mr. Surin Dias | : | Business Development Manager |

33. Main Gate (Private) Limited

| | | |
|---|---|---|
| Mr. Anil Wijewardene | : | Chief Operating Officer |

34. Analytical Instruments (Pvt) Ltd.

| | | |
|---|---|---|
| Mr. Praba Ranga Jayakody | : | Assistant Project Manager |

35. Biomed International (Pvt) Ltd.

| | | |
|---|---|---|
| Mr. Ranjana D. Wijesinghe | : | Marketing Manager |

36. ABC Dynamic (Pvt) Ltd.

| | | |
|---|---|---|
| Mr. Deepthi Pathiratne | : | Director |

37. Photon Technologies (Pvt) Ltd.

| | | |
|---|---|---|
| Mr. Tharanga Bandara | : | Business Development Manager |

38. Avon Pharmo Chem (Pvt) Ltd.

| | | |
|---|---|---|
| Mr. Dilip K. Fernando | : | General Manager |
| Mr. Hasun S. Wickramasinghe | : | Sales Manager |

39. Asian Trading House (Pvt) Ltd.

| | | |
|---|---|---|
| Mr. P. Sivakumaran | : | Director |

40. Techno Instruments (Pvt) Limited

| | | |
|---|---|---|
| Mr. Sujeewa Liyanaratne | : | Director |

41. Hemsons International (Pte) Ltd.

| | | |
|---|---|---|
| Mr. Amir Esufally | : | Managing Director |
| Mr. P.K.G.Ranjith | : | General Manager, Marketing (Laboratory Division) |
| Mr. Hariharan Balachandran | : | Product Specialist |

42. M.K.Electronics (Pvt) Ltd.

| | | |
|---|---|---|
| Mr. H. Mahendra Karunaratna | : | Director |

43. Hayleys Agriculture Holdings Limited

| | | |
|---|---|---|
| Mr. Amjad Rajap | : | General Manager-Agri Equipment |

44. Dave Tractors & Combines (Pvt) Limited

| | | |
|---|---|---|
| Mr. Anil De Silva | : | Assistant General Manager |

45. Yusen Logistics & Kusuhara Lanka (Pvt) Ltd.

| | | |
|---|---|---|
| Mr. Roshan Perera | : | Manager – Customer Service & Project Operations |

**Minutes of Discussions on**
**the Preparatory Survey for the Project for**
**Establishment of Research and Training Complex at the Faculty of Agriculture, University of Jaffna in the Democratic Socialist Republic of Sri Lanka**

In response to the request from the Government of Sri Lanka, the Government of Japan decided to conduct a Preparatory Survey for the Project for Establishment of Research and Training Complex at the Faculty of Agriculture, University of Jaffna (hereinafter referred to as "the Project"), and entrusted the Preparatory Survey to Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent the Preparatory Survey Team for the Outline Design (hereinafter referred to as "the Team") to the Government of Sri Lanka, headed by Mr. Kazuya Suzuki, Deputy Director General of Agricultural and Rural Development Group 1, Rural Development Department, JICA, and is scheduled to stay in the country from 10 May to 19 May, 2015.

The Team held a series of discussions with the officials concerned of Government of Sri Lanka and conducted a field survey in the Project area. In the course of the discussions, both sides have confirmed the main items described in the attached sheets. The Team will proceed to further works and prepare the Preparatory Survey Report.

Colombo, 19 May, 2015

Mr. Kazuya Suzuki
Leader,
Preparatory Survey Team,
Japan International Cooperation Agency,
Japan

Mr. Piyasena Ranepura
Secretary,
Ministry of Higher Education and Research,
The Democratic Socialist Republic of
Sri Lanka

Mr. R. M. P. Rathnayake
Director General,
Department of External Resources,
Ministry of Policy Planning, Economic Affairs, Child, Youth and Cultural Affairs,
The Democratic Socialist Republic of
Sri Lanka

Prof. Ms. V. Arasaratnam
Vice Chancellor,
University of Jaffna,
The Democratic Socialist Republic of
Sri Lanka

## ATTACHMENT

1. Objective of the Project

The objective of the project is to improve effective research, education and promotion activities of dry zone agriculture in the Northern Province by establishment of Research and Training Complex which includes the functioning of Information and Communication Center (hereinafter referred to as "ICC"), and Research and Training Farms with essential equipment at the Faculty of Agriculture, University of Jaffna (hereinafter referred to as "UOJ"), thereby contributing to the improvement of agricultural productivity in the dry zone of the Northern Province.

2. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey on the Project for Establishment of Research and Training Complex at the Faculty of Agriculture, University of Jaffna" (hereinafter referred to as " the Survey").

3. Project Site

Both sides confirmed that the site of the Project is in Kilinochchi, Northern Province, which is shown in Annex-1.

4. Line Agency and Executing Agency

Both sides confirmed the line agency and executing agency as follows:

4-1. The line agency is the Ministry of Higher Education and Research, which would be the agency to supervise the executing agency.

4-2. The executing agency is UOJ. The executing agency shall coordinate with all the relevant agencies to ensure the smooth implementation of the project and ensure that the Undertakings are taken by the relevant agencies timely and appropriately. The organization chart is shown in Annex-2.

5. Items requested by the Government of Sri Lanka

5-1. As a result of discussions, both sides confirmed the items requested by the Government of Sri Lanka, which described in Annex-3.

5-2. JICA will assess the appropriateness of the above requested items through the Survey and will report findings to the Government of Japan. The final components of the Project would be decided by the Government of Japan.

5-3. Both sides confirmed that the condition to consider the Goat Rearing Unit as priority A is the completion of all arrangements by Sri Lankan side by the end of June, 2015 for

operating the existing livestock farms such as supply of water and electricity, procurement of cattle, recruitment of necessary staff and generation of budget for operation.

6. Japan's Grant Aid Scheme

6-1. The Sri Lankan side understands the Japan's Grant Aid Scheme and its procedures as described in Annex-4, and Annex-5, and necessary measures to be taken by the Government of Sri Lanka.

6-2. The Sri Lankan side understands to take the necessary measures, as described in Annex-6, for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented. The detailed contents of the Annex-6 will be worked out during the Survey and shall be agreed no later than by the Explanation of the Draft Preparatory Survey Report.

The contents of Annex-6 will be used to determine the following:

(1) The scope of the Project.

(2) The timing of the Project implementation.

(3) Timing and possibility of budget allocation.

Contents of Annex-6 will be updated as the Survey progresses, and will finally be the Attachment to the Grant Agreement.

7. Schedule of the Survey

7-1. The Team will proceed with further survey in Sri Lanka until 5 June, 2015.

7-2. JICA will prepare a draft Preparatory Survey Report in English and dispatch a mission to Sri Lanka in order to explain its contents around November, 2015.

7-3. If the contents of the draft Preparatory Survey Report is accepted in principle and the Undertakings are fully agreed by the Sri Lankan side, JICA will complete the final report in English and send it to Sri Lanka around March, 2016.

7-4. The above schedule is tentative and subject to change.

8. Other Relevant Issues

8-1. Acceptance of the Inception Report

The Team explained the Inception Report and the Government of Sri Lanka accepted it.

8-2. Policy for Facility Planning

(1) In order to make the Project effective for the socio economic development of dry zone agriculture in the Northern Province, both sides confirmed to consider the following items for planning the scope of the facility.

(a) Current and planned education program, curriculum and research.
(b) Current and planned student number.
(c) Current and planned number of teachers / researchers.
(d) Qualification of teachers and researchers
(e) Operation and maintenance system

(2) In order to avoid inefficient investment and excessive budgetary burden after completion of the Project, both sides confirmed to consider the following items for planning the scope of the ICC function.
(a) Existing similar facility operating under other universities or faculties.
(b) Operation and maintenance plan, including budgetary plan and management structure.

8-3. Policy for Equipment Planning

Both sides confirmed to screen the type, specifications and amount of equipment based on the following points. Detailed screening criteria (a to e) will be set by the consultant through the outline design work.

(a) Consistency with the facility plan (especially, the consistency between the planned number of students and planned number of equipment, and the balance between education and research)
(b) Current equipment in UOJ (such as quality, age, utilization and maintenance)
(c) Purpose of proposed equipment
(d) Local procurement condition
(e) Technical suitability (high technology high maintenance equipment should be avoided)

8-4. Unexploded Ordnance (UXO) Clearances

Both sides agreed on the following items for UXO clearance.

(a) The Government of Sri Lanka will conduct the land surface survey in the whole Project site in accordance with the procedures of land mine technical clearance survey and ensure the non existence of mines in the Project site before the Draft Outline Design mission.
(b) The Government of Sri Lanka will conduct the underground survey in the areas of Project site where the construction will be carried out with certain depth by using technically appropriate instrument such as Ground Penetrating Rader and ensure the non existence of UXO in the above mentioned areas before the Draft Outline Design mission.
(c) The Project will not start before the completion of UXO clearance.
(d) In case that UXO would be found during construction, the Government of Sri

Lanka will be responsible for clearing the UXO with its own expense.

(e) UXO clearing procedure shall be confirmed by the Government of Sri Lanka before Draft Outline Design mission.

8-5. Project cost borne by Sri Lankan side and its budget allocation

(1) Ministry of Higher Education and Research and UOJ shall have Sri Lankan government budget for tax exemption related to the Project implementation including, but not limited to VAT (Value Added Tax), NBT (Nation Building Tax), PAL (Port and Airport Levies), CID, CESS, Excise Special Provision, and Construction Industry Guarantee Fund Levy, which may be imposed in Sri Lanka with respect to the supply of the products and services under the verified contract. Ministry of Higher Education and Research will obtain the approval to categorize the project as the Special Project after signing of contract(s). UOJ explained that they need preliminary cost estimation of the Project by the end of July, 2015 for their budget request. Both side agreed that Japanese side will show the rough estimation of the budget to be secured for 2016 by the end of July, 2015.

(2) Both side confirmed the necessity of further discussions on the matter of direct tax such as income tax, corporate tax and PAYE tax, etc.

(3) UOJ shall bear the cost for site preparation, infrastructure connection such as electricity, water supply and drainage at the Project site. UOJ agreed to complete these work before the commencement of the construction, currently supposed to be in October, 2016.

8-6. Approval of the Project

The both sides confirmed that the approval of the Project would be subject to the decision by the Government of Japan.

8-7. Questionnaire

Ministry of Higher Education and Research and UOJ shall answer to the Questionnaire submitted by the Team in English with relevant documents by 22 May, 2015.

Annex-1 Map of the Project Site

Annex-2 Organization Chart of the Executing Agency

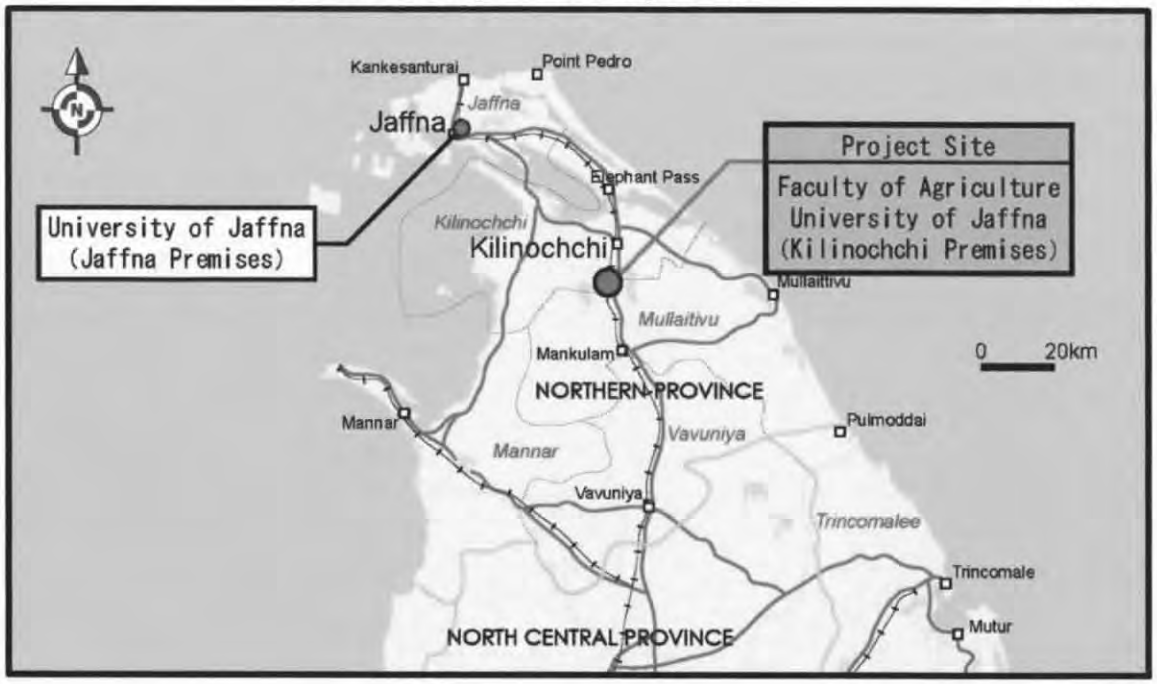
Annex-3 Revised contents requested by the Government of Sri Lanka

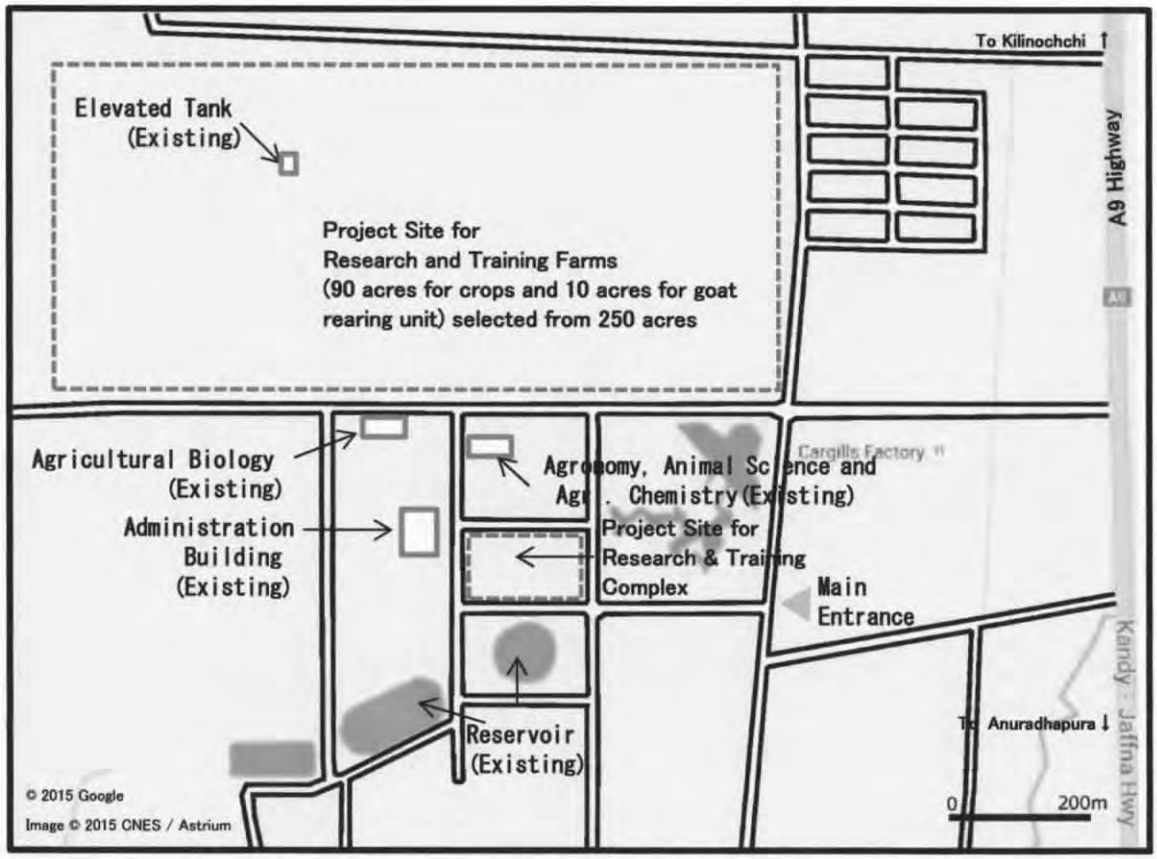
Annex-4 Japan's Grant Aid Scheme

Annex-5 Financial Flow of Japan's Grant Aid

Annex-6 Major Undertakings to be taken by Each Government

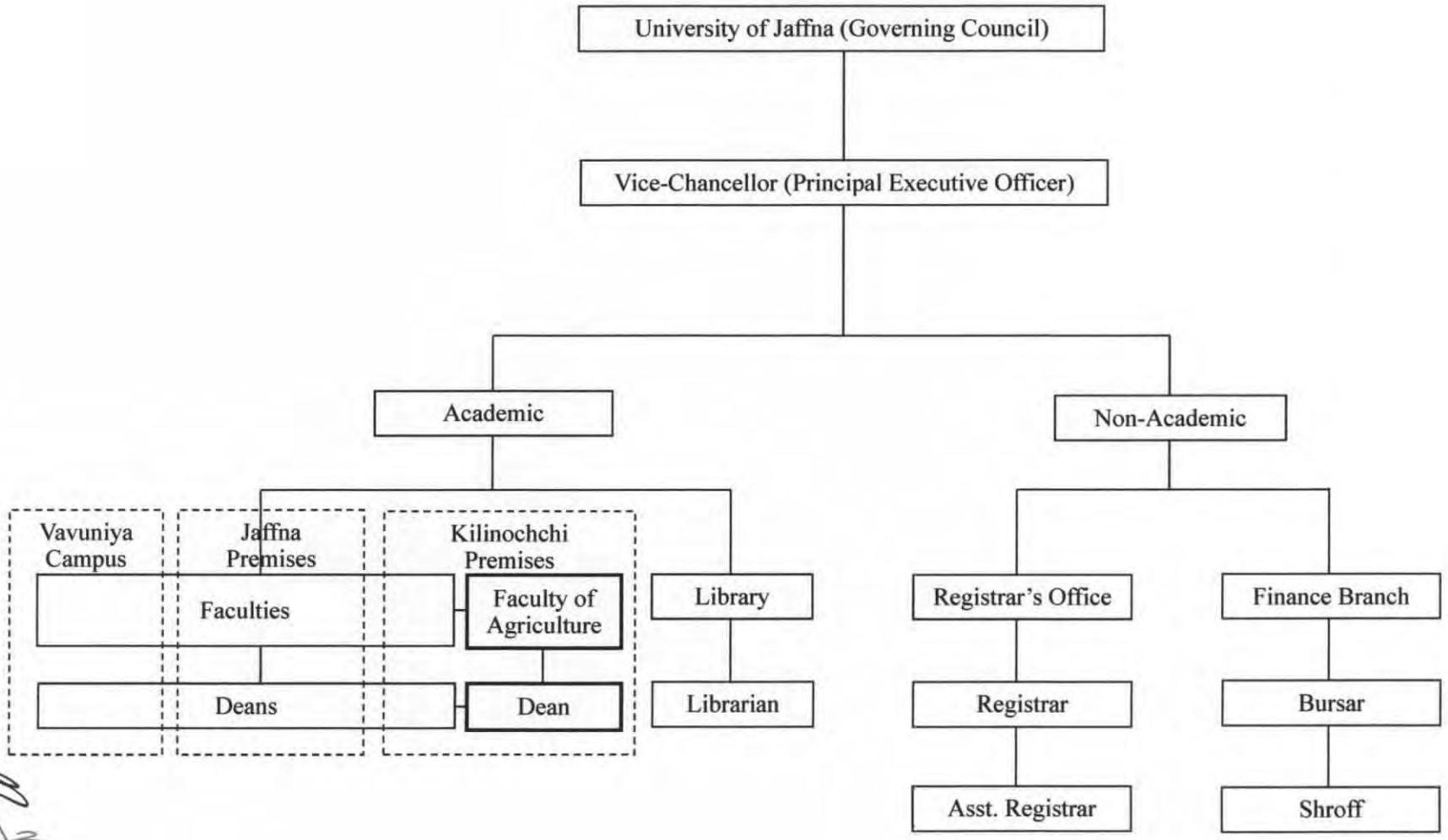
19/5/15




The Project Site at the Kilinochchi Premises, Faculty of Agriculture, University of Jaffna.

Organization Chart of the Executing Agency



**Annex-3**

## Revised contents requested by the Government of Sri Lanka

The following major functions and activities of requested facilities were confirmed by the both parties. Requested facilities and equipment were revised and prioritized based on these functions and activities.

### A. Expected functions/activities of requested facilities

| No | Function/Activity | Priority Order* |
|---|---|---|
| 1 | Practical laboratory experiments/exercise of students who take specialization courses | A |
| 2 | Practical farm training of the faculty students (core courses & specialization courses) | A |
| 3 | Laboratory experiments for the research by academic staff and post-graduate students | A |
| 4 | Field experiments for research activity of academic staff and postgraduate students | A |
| 5 | Laboratory test/analysis services (to be charged) | B |
| 6 | Trainers training (science teachers) (to be funded by the Ministry of Education) | A |
| 7 | Training, certificates, diplomas, and degree courses (to be charged from the participants) (government staff, school leavers and private sector) | B |
| 8 | Training for farmers (to be funded by NGOs/donors) | C |
| 9 | Practical farm training for the visiting trainees (to be charged) | B |
| 10 | Consultancy services (to be charged) | C |
| 11 | Development of technical databases | A |
| 12 | Development of leaflets, booklets, and other visual materials for sale in relation to farming technology | A |
| 13 | Demonstration of advanced farming technology/systems, e.g., integrated farming (crop & livestock), animal breeding, micro-irrigation, farm mechanization, etc. | A |
| 14 | Production of quality seeds and planting material (seedlings) (fruit crops, local vegetables, etc.) | A |
| 15 | Keeping germ-plasm of fruit trees | A |
| 16 | Keeping parent stock of poultry | B |
| 17 | Artificial insemination service to farmers (to be charged) | C |
| 18 | Commercial production & sales of bio-fertilizers, bio-control agents & value-added farm products | C |
| 19 | Providing farm mechanization services to farmers (to be charged) | C |

Note: *Priority Order

A: Activities to fulfill the primary roles of FoAg

B: Preferable activities to back up the primary roles of FoAg, if appropriate budget and staff are secured

C: Ambitious activities to enhance the subsidiary roles of FoAg.

## B. Contents of Requested Facilities

| Department | Facility | Priority Order |
|---|---|---|
| Research and Training Complex | Department of Agronomy | |
| | Crop Science Laboratory | A |
| | Department of Animal Science | |
| | Animal Nutrition Laboratory | A |
| | Reproductive Physiology Laboratory | A |
| | Department of Agri. Chemistry | |
| | Soil Testing and Bio fertilizer Laboratory | A |
| | Food Analysis and Processing Laboratory | A |
| | Department of Agri. Biology | |
| | Plant Protection and Bio control Laboratory | A |
| | Bio-Technology and Tissue Culture Laboratory | A |
| | Department of Agri. Engineering | |
| | Environment and Hydro Research Laboratory | A |
| | Common | |
| | Lecture Hall | A |
| | Administration Office | A |
| | Common Space (Lobby/WC/Corridor/Storage Rooms etc.) | A |
| Information and Communication Center | Multi- Purpose Training Room | B |
| | Lecture Hall | C |
| | Administration Office | C |
| | Dormitory | C |
| | Canteen | C |
| | Audio Visual Laboratory for extension | C |
| | Econometrics Laboratory | A |
| | Common Space (WC/Corridor/Storage Rooms etc.) | A |
| Facilities attached to Farm | Meteorological Data Collection Unit | A |
| | Dairy Processing Unit | A |
| | Food Processing Unit | A |
| | Crop Post-harvest Unit | A |
| | Primary Sample Preparation Unit | A |
| | Farm Machinery Storage Unit | A |
| | Farm Machinery Workshop | A |

Note:

1. Priority Order
   A: Essential B: Preferable C: Less Priority
2. Size and details of each facility mentioned above will be examined through further survey.

## C. Contents of Requested Research and Training Farms

C1. Crop, Horticultural and Agro-forestry Research and Training Farm

| Unit | Purpose | Priority |
|---|---|---|
| 1. Plant Propagation Unit | For Students | A |
| | For Farmers | C |
| 2. Protected Agriculture Unit | For Students | A |
| | For Farmers | C |
| 3. Fruit Crop Germ-Plasm Collection Unit | For Students | A |
| 4. Field Corp Experimental Unit | For Students | A |
| | For Farmers | C |
| 5. Plantation and Agro-forestry Unit | For Students | A |
| | For Farmers | C |
| 6. Agri. Business Center | For Students | A |
| | For Farmers | C |
| | For Public | C |
| 7. Model Home Garden Unit | For Students | A |
| | For Farmers | C |
| 8. Horticulture Unit | For Students | A |
| | For Farmers | C |
| 9. Floriculture Unit | For Students | A |
| | For Farmers | C |
| 10. Agro-Tourism Unit | For Students | A |
| | For Farmers | C |

Note: Priority Order A: Essential B: Preferable C: Less Priority

Crop, Horticultural and Agro-forestry Research and Training Farm will be prepared for education purpose and will include:

(i) land leveling works;
(ii) irrigation and drainage system;
(iii) farm road; and,
(iv) related structures.

The conditions for preparation of the farm are:

(i) groundwater from the existing well in the farm shall be used as irrigation purpose;
(ii) irrigation and drainage system shall be installed to the area covered by the well water only;
(iii) area of the land leveling works shall be determined through further survey; and,
(iv) the farm to be developed by the Project will be determined in accordance with the further study.

C2. Integrated Livestock Research and Training Farm

| Unit | Plan | Priority |
|---|---|---|
| 1. Daily Cattle Rearing Unit | For Students/Farmer/Others | C |
| 2. Goat Rearing Unit | For Students/Farmers/Others | A |
| 3. Layer Unit | For Students/Farmers/Others | C |
| 4. Broiler Unit | - | C |
| 5. Rabbit Unit | - | B |
| 6. Piggery | - | B |
| 7. Sheep Rearing Unit | - | B |
| 8. Duck – Fish Integration Unit | - | C |
| 9. Waste Recycling Unit & Fodder Conservation Unit | | B |

Note: Priority Order A: Essential B: Preferable C: Less Priority

## D. Outline of Requested Research & Training Equipment

1. Equipment to be Considered

| No | Department/Lab. |
|---|---|
| 1 | Department of Agronomy |
| (1) | Common Lab. (for core courses) |
| (2) | Crop Science Lab. (for special courses & research) |
| 2 | Department of Animal Sciences |
| (1) | Common Lab. (for core courses) |
| (2) | Animal Nutrition Lab. (for special courses & research) |
| (3) | Reproductive Physiology Lab. (for special courses & research) |
| 3 | Department of Agri. Chemistry |
| (1) | Common Lab. (for core courses) |
| (2) | Soil Testing and Bio Fertilizer Lab. (for special courses & research) |
| (3) | Food Analysis and Processing Lab. (for special courses & research) |
| 4 | Department of Agri. Biology |
| (1) | Common Lab. (for core courses) |
| (2) | Plant Protection and Bio Control Lab. (for special courses & research) |
| (3) | Biotechnology and Tissue Culture Lab. (for special courses & research) |
| 5 | Department of Agri. Engineering |
| (1) | Common Lab. (for core courses) |
| (2) | Environment and Hydro Research Lab. (for special courses & research) |
| 6 | Department of Agri. Economics |
| (1) | Common Lab. (for core courses) |
| (2) | Econometrics Lab. (for special courses & research) |
| 7 | Experimental & Training Farm |
| (1) | Land Preparation Implements & Plant Protection Equipment |
| (2) | Post-harvest Equipment |
| (3) | Workshop equipment & cut-models |
| (4) | Meteorology data measurement equipment |

2. Criteria of Equipment to be Procured
   1) Equipment selection
      All equipment;
      a. shall be selected in conformity with FoAg's syllabus of practical experiments/trainings or priority research themes of academic staff from the standing point of the regional agricultural development
      b. should not be overlapped with existing equipment of FoAg
      c. shall be properly maintained with available backup services in Sri Lanka
      d. should not require huge O&M costs which will be a financial burden to FoAg
   2) Quantity of each equipment shall be examined based on the target number of students and academic staff

## JAPAN'S GRANT AID

Based on a JICA law which was entered into effect on October 1, 2008 and the decision of the GOJ, JICA has become the executing agency of the Grant Aid for Projects for construction of facilities, purchase of equipment, etc.

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

### 1. Grant Aid Procedures

The Japanese Grant Aid is supplied through following procedures :

- Preparatory Survey
  - The Survey conducted by JICA
- Appraisal &Approval
  - -Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Authority for Determining Implementation
  - -The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as "the G/A")
  - -Agreement concluded between JICA and a recipient country
- Implementation
  - -Implementation of the Project on the basis of the G/A

### 2. Preparatory Survey

(1) Contents of the Survey

The aim of the preparatory Survey is to provide a basic document necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of a outline design of the Project.

- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant Aid project. The Outline Design of the Project is confirmed based on the guidelines of the Japan's Grant Aid scheme.

JICA requests the Government of the recipient country to take whatever measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization of the recipient country which actually implements the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA employs (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the Report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the appropriateness of the Project.

**3. Japan's Grant Aid Scheme**

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes(hereinafter referred to as "the E/N") will be singed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles, in accordance with the E/N, to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the recipient country to continue to work on the Project's implementation after the E/N and G/A.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. The Grant Aid may be used for the purchase of the products or services of a third

country, if necessary, taking into account the quality, competitiveness and economic rationality of products and services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals", in principle.

(4) Necessity of "Verification"

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

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex. The Japanese Government requests the Government of the recipient country to exempt all customs duties, internal taxes and other fiscal levies such as VAT (Value Added Tax), NBT (Nation Building Tax), PAL (Port and Airport Levies), CID, CESS, Excise Special Provision, and Construction Industry Guarantee Fund Levy, which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract, since the Grant Aid fund comes from the Japanese taxpayers.

(6) "Proper Use"

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

(7) "Export and Re-export"

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

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"), in principle. JICA will execute the Grant Aid by making payments in Japanese yen, in principle, 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 JICA under an Authorization to Pay (A/P) issued by the Government of the 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 paid to the Bank.

(10) Social and Environmental Considerations

The Government of the recipient country must carefully consider social and environmental impacts by the Project and must comply with the environmental regulations of the recipient country and JICA socio-environmental guidelines.

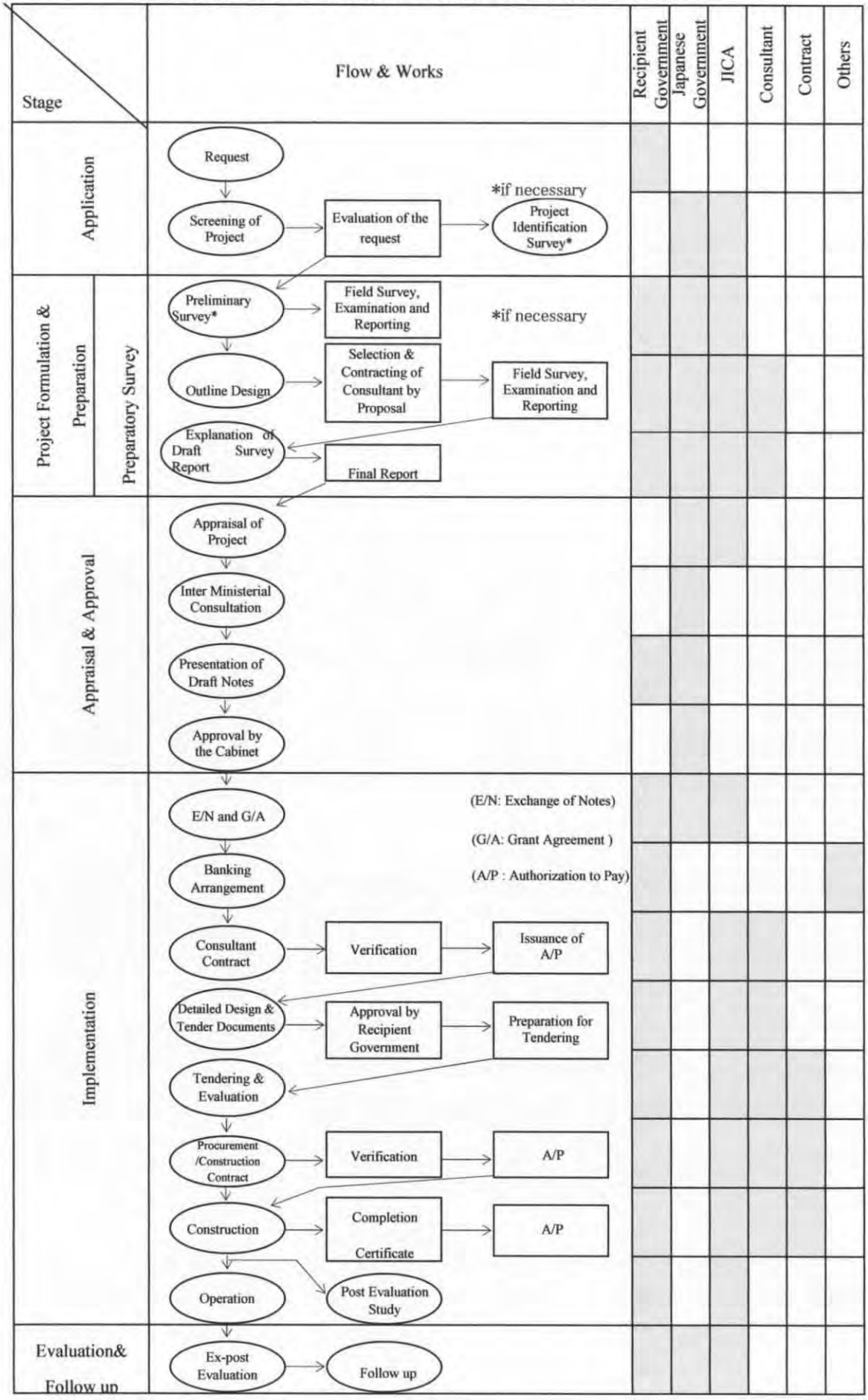
(11) Monitoring

The Government of the recipient country must take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and must regularly report to JICA about its status by using the Project Monitoring Report (PMR).

(12) Safety Measures

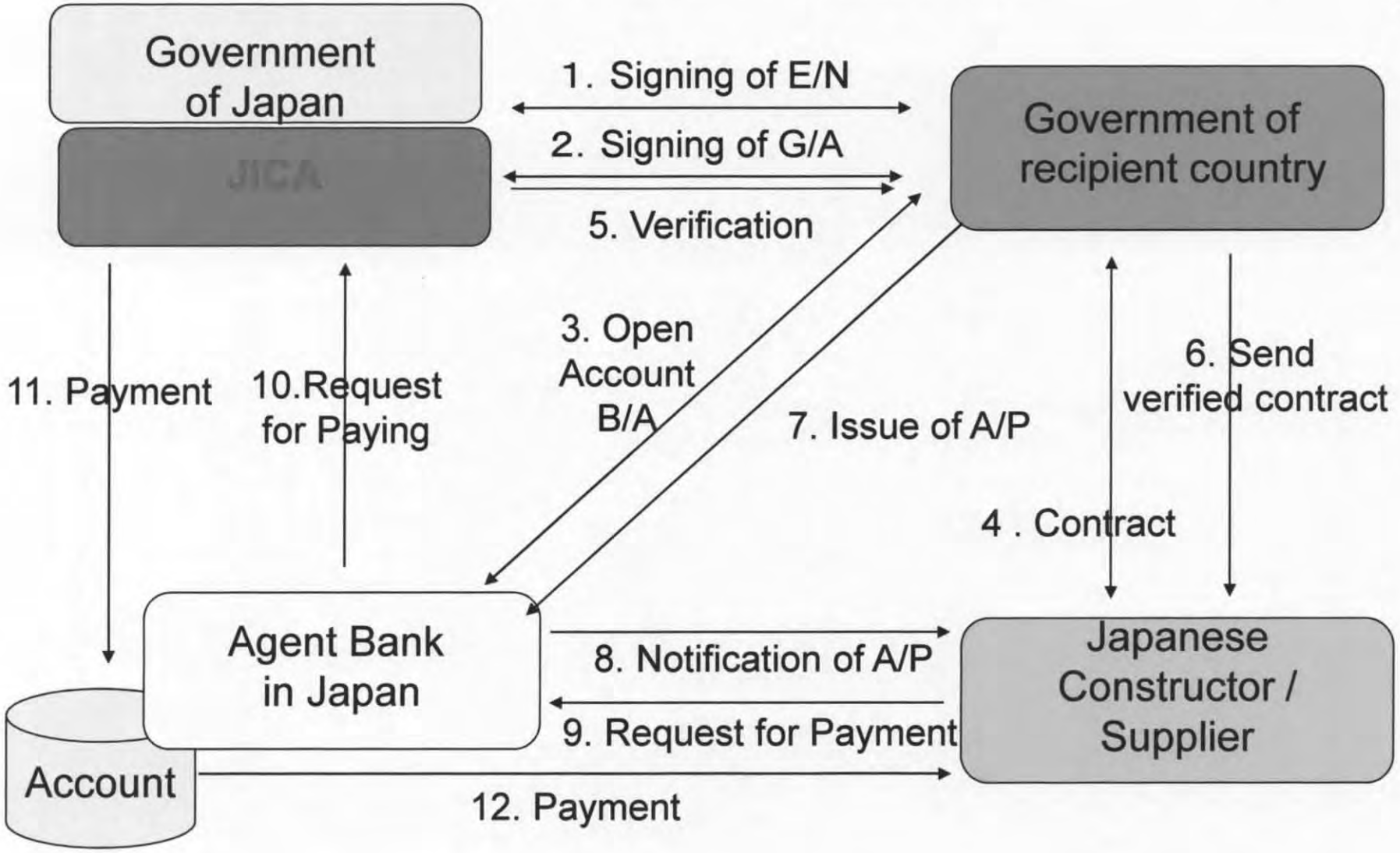
The Government of the recipient country must ensure that the safety is highly observed during the implementation of the Project.

# FLOW CHART OF JAPAN's GRANT AID PROCEDURES



Annex-5

# Financial Flow of Grant Aid



Annex-6

## Major Undertakings to be taken by Each Government

| No | Items | Responsibility | | Major Undertakings to be taken by Recipient | | | |
|---|---|---|---|---|---|---|---|
| | | To be covered by Grant Aid | To be covered by recipient side | Deadline | In charge | Cost | Remarks |
| | **Before Tender** | | | | | | |
| 1 | To bear the following commissions paid to the Japanese bank for banking services based upon the B/A | | | | | | |
| | 1) Advising commission of A/P | | • | | ERD | | |
| | 2) Payment commission | | • | | ERD | | |
| 2 | To give due environmental and social consideration in the implementation of the Project | | • | | MoHER | | |
| 3 | To secure the following land necessary for the implementation of the Project | | | | | | |
| | 1) Project sites for the Research and Training Complex and the research and training farm. | | • | | UOJ | | |
| | 2) Temporary stock yard for construction near the Project area | | • | | UOJ | | |
| 4 | To clear, level and reclaim the project site | | | | | | |
| | 1) Clearance of landmines and unexploded bombs from the project site | | • | | MoHER<br>UOJ | | |
| | 2) Demolition of unnecessary existing buildings | | • | | UOJ | | |
| | 3) Removal of unnecessary existing trees | | • | | UOJ | | |
| | 4) Leveling and reclaiming the site for the building | | • | | UOJ | | |
| 5 | To obtain the building permission | | • | | UOJ | | |
| | **During the Project** | | | | | | |
| 6 | 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 | | • | | ERD | | |
| | 2) Payment commission for A/P | | • | | ERD | | |
| 7 | To ensure prompt unloading and customs clearance of the products at ports of disembarkation in the recipient country and to assist internal transportation of the products | | | | | | |
| | 1) Marine (air) transportation of the Products from Japan to the recipient country | • | | | Contractor<br>Supplier(s) | | |
| | 2) Tax exemption and customs clearance of the products at the port of disembarkation | | • | | MoHER | | |
| | 3) Internal transportation from the port of disembarkation to the project site | • | | | Contractor<br>Supplier(s) | | |
| 8 | To accord Japanese nationals whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work | | • | | ERD<br>MoHER | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9 | (To exempt Japanese nationals from, without using the Grant,) customs duties, internal taxes and other fiscal levies such as VAT(Value Added Tax), NBT(Nation Building Tax), PAL(Port and Airport Levies), CID, CESS, Excise Special Provision, and Construction Industry Guarantee Fund Levy, which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract | | • | | ERD<br>MoHER | | |
| 10 | To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment | | • | | MoHER<br>UOJ | | |
| 11 | Construct temporary access road for the construction work. | | • | | UOJ | | |
| 12 | To construct the following facilities: | | | | | | |
| | 1) The building | • | | | Contractor | | |
| | 2) The farm | • | | | Contractor | | |
| | 3) The gates and fences in and around the site | | • | | UOJ | | |
| | 4) The parking lot | • | | | Contractor | | |
| | 5) The road within the site | • | | | Contractor | | |
| | 6) The road outside the site | | • | | UOJ | | |
| 13 | To provide facilities for distributing electricity, water supply and drainage, and other incidental facilities necessary for the implementation of the Project outside the site | | | | | | |
| | 1) Electricity | | | | | | |
| | a. The distribution power line to the site | | • | | UOJ | | |
| | b. The drop wiring and internal wiring within the site | • | | | Contractor | | |
| | c. The main circuit breaker and transformer | | • | | UOJ | | |
| | 2) Water Supply | | | | | | |
| | a. The potable water distribution main to the site | | • | | UOJ | | |
| | b. The water supply system within the site | • | | | Contractor | | |
| | 3) Drainage | | | | | | |
| | a. The city drainage main (for storm sewer and others to the site) | | • | | UOJ | | |
| | b. The drainage system (for toilet sewer, common waste, storm drainage, and others) within the site | • | | | Contractor | | |
| | 4) Gas Supply | | | | | | |
| | a. The city gas main to the site | | N/A | | | | |
| | b. The gas cylinders | | • | | UOJ | | |
| | c. The gas supply system within the site | • | | | Contractor | | |
| | 5) Telephone System | | | | | | |
| | a. The telephone trunk line to the main distribution frame/panel (MDF) of the building | | • | | UOJ | | |
| | b. The MDF and the extension after the frame/panel | • | | | Contractor | | |
| | 6) Data Communication System | | | | | | |
| | a. Internet access to the site | | • | | UOJ | | |
| | b. Local area network within the site | • | | | Contractor | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 7) Furniture and Equipment | | | | | | |
| | a. General furniture | | • | | UOJ | | |
| | b. Project equipment | • | | | Supplier(s) | | |
| | c. Installation of existing equipment, if any | | • | | UOJ | | |
| | **After the Project** | | | | | | |
| 14 | To ensure that facilities and the products be maintained and used properly and effectively for the implementation of the Project | | • | | UOJ | | |
| 15 | To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project | | • | | MoHER | | |
| 16 | To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid | | | | | | |
| | 1) Allocation of maintenance cost | | • | | MoHER | | |
| | 2) Operation and maintenance organization and staff | | • | | MoHER<br>UOJ | | |
| | 3) Routine check/periodical maintenance | | • | | UOJ | | |

(B/A: Banking Arrangement, A/P: Authorization to pay)

*; The cost estimates are provisional. This is subject to the approval of the Government of Japan.

**Minutes of Discussions**

**on**

**Preparatory Survey for the Project**

**for**

**Establishment of Research and Training Complex at the Faculty of Agriculture, University of Jaffna in the Democratic Socialist Republic of Sri Lanka**

**(Explanation on Draft Preparatory Survey Report)**

On the basis of the discussions and field survey in the Democratic Socialist Republic of Sri Lanka (hereinafter referred to as "Sri Lanka") in May and June 2015, and the subsequent technical examination of the results in Japan, the Japan International Cooperation Agency (hereinafter referred to as "JICA") prepared a draft Preparatory Survey Report on the Project for Establishment of Research and Training Complex at the Faculty of Agriculture, University of Jaffna (hereinafter referred to as "Draft Report").

In order to explain the Draft Report and to consult with the concerned officials of the Government of Sri Lanka on its contents, JICA sent to Sri Lanka the Preparatory Survey Team for the explanation of the Draft Report (hereinafter referred to as "the Team"), headed by Tomoko TAIRA, Director of Team 1, Agricultural and Rural Development Group 1, Rural Development Department, JICA, from 25 November to 4 December, 2015.

As a result of the discussions, both sides confirmed the main items described in the attached sheets.

Colombo, 4 December , 2015

**For JICA**

Ms. Tomoko TAIRA
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

**For Sri Lanka Side**

Mr. D.C. Dissanayake
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Director General
Department of External Resources,
Ministry of National Policies and Economic Affairs,
The Democratic Socialist Republic of
Sri Lanka

## ATTACHMENT

1. Contents of the Draft Report

   After the explanation of the contents of the Draft Report by the Team, the Sri Lanka side agreed in principle to its contents.

2. Cost Estimation

   Both sides confirmed that the Project cost estimation described in the Draft Report was provisional and would be examined further by the Government of Japan (hereinafter referred to as "GoJ") for its final approval.

3. Confidentiality of the Cost Estimation and Specifications

   Both sides confirmed that the Project cost estimation and technical specifications in the Draft Report should never be duplicated or disclosed to any third parties until all the contracts of the Project are concluded.

4. Japan's Grant Aid

   The Sri Lanka side understood the Japan's Grant Aid Scheme and its procedures as described in Annex 3, Annex 4 and Annex 5, and necessary measures to be taken by the Government of Sri Lanka (hereinafter referred to as "GoSL").

5. Project Implementation Schedule

   The Sri Lanka side understood the expected implementation schedule is as attached in Annex 6.

6. Expected Outcomes and Indicators

   Both sides agreed that key indicators for expected outcomes are as follows. The Sri Lanka side has responsibility to monitor the progress of the indicators and achieve the target in year 2021.

   (a) Quantitative Effect

| Indicators | Base (Actual value in 2014) | Target (2021)<br>(3 years after the completion of the Project) |
|---|---|---|
| Number of undergraduate students and graduate students | Undergraduate students: 280<br>Graduate students: 14 | Undergraduate students: 480<br>Graduate students: 30 |
| Number of teachers | 24 | 43 |
| Number of research paper related to improvement on Dry Zone agriculture of the northern region (Referred) | 12 / a year | 24 / a year |
| Hours of practical training on the Training Farm | 0 hours / a year | 105 hours / a year |
| Number of training programs | 2 times /a year | 6 times /a year |

(b) Qualitative Effect

- Improvement of practical knowledge and skills of students.
- Improvement of research capacity of staff.
- Enhancement of knowledge and skills of government officer, extension staff and private sector personnel in agriculture sector who are trained by the Faculty of Agriculture, University of Jaffna for improvement of Dry Zone agriculture and animal husbandry in the northern region.

7. Technical Assistance ("Soft Component" of the Project)

Considering the sustainable operation and maintenance of the facility to be provided, technical assistance is planned to be provided under the Project. The Sri Lanka side confirmed that they would assign necessary number of competent and appropriate C/Ps as described in the Draft Report.

8. Monitoring during the Implementation

Ministry of Higher Education and Highways (hereinafter referred to as "MoHEH") and University of Jaffna (hereinafter referred to as "UoJ") agreed to monitor the Project every three (3) months during the implementation by using the Project Monitoring Report form as attached as Annex-9.

9. Ex-Post Evaluation

Both sides confirmed that JICA would conduct ex-post evaluation three (3) years after the project completion, with respect to five (5) evaluation criteria (Appropriateness, Impact, Effectiveness, Efficiency, Sustainability) of the project. Result of the evaluation will be publicized. The Sri Lanka side will provide necessary support for JICA.

10. Schedule of the Study

JICA will complete the final report of the preparatory survey in accordance with the confirmed items and send it to the Sri Lanka side around March 2016.

11. Undertakings Taken by Both Sides

Both sides agreed to undertakings described in Annex 7. The Sri Lanka side assured to take the necessary measures and coordination including allocation of the necessary budget which were preconditions of implementation of the Project. It was further agreed that Annex 7 would be the attachment to Grant Agreement, and the costs were indicative at Outline Design level.

12. Other Relevant Issues

12-1. Taxes borne by Sri Lanka side and its budget allocation

In reference to Annex-3 and Annex-7, both sides further agreed on the following items.

(a) GoSL through Ministry of Higher Education and Highways (hereinafter referred to as "MoHEH") shall ensure indirect taxes and levies related to the Project implementation will be exempted and/or borne by GoSL by categorizing the Project as the Specialized Project.

(b) GoSL through MoHEH shall bear the direct taxes levied on corporations and individuals involved in the Project implementation including Cooperate Tax and PAYE.

12-2. Unexploded Ordnance (UXO) Clearance

(a) Both sides agreed that in case an UXO is found during construction, GoSL at its own expense shall promptly clear the UXO following the procedure as described in Annex-10.

(b) The Sri Lanka side agreed to take necessary measures including safety measures to be taken during the construction in case an UXO is found from any construction sites in Kilinochchi Campus, UoJ before and during the Project.

12-3. Necessary Measures for Monitoring and Reporting of the Project

Both sides agreed that MoHEH and UoJ have the responsibility to implement, monitor and report the progress of the project, and necessary allowances / remunerations for the existing staff should be borne by the GoSL.

Annex 1 Revised contents requested by the Government of Sri Lanka
Annex 2 Project Cost Estimation
Annex 3 Japan's Grant Aid
Annex 4 Flow Chart of Japan's Grant Aid Procedures
Annex 5 Financial Flow of Japan's Grant Aid
Annex 6 Implementation Schedule
Annex 7 Major Undertakings to be taken by Each Government
Annex 8 Annual C/P Fund Requirement during the Project Implementation
Annex 9 Project Monitoring Report form
Annex 10 UXO Clearance Procedure

END

**Annex-1**

## Revised contents requested by the Government of Sri Lanka

### A. List of building components

| | Department | Room Name | Area (㎡) |
|---|---|---|---|
| Research & Training Complex | Deparment of Crop Science | Crop Science Laboratory | 160.3 |
| | | Staff Room | 120.2 |
| | Department of Animal Science | Reproductive Physiology Laboratory | 199.3 |
| | | Animal Nutrition Laboratory | 181.2 |
| | | Staff Room | 121.5 |
| | Department of Agricultural Chemistry | Soil testing and bio fertilizer Laboratory | 183.3 |
| | | Staff Room for Soil testing and bio fertilizer Laboratory | 97.1 |
| | | Food analysis and processing Laboratory | 183.3 |
| | | Staff Room for Food analysis and processing Laboratory | 97.1 |
| | Department of Agricultural Biology | Plant Protection and Bio control Laboratory | 208.6 |
| | | Bio-Technology and Tissue Culture Laboratory | 136.0 |
| | Department of Agricultural Engineering | Environment and Hydro Research Laboratory | 160.3 |
| | | Staff Room | 120.2 |
| | Department of Agricultural Economics | Econometrics Laboratory | 119.7 |
| | | Staff Room | 121.5 |
| | Common Rooms | Freezer Room | 27.5 |
| | | Water Purification Room (GFL) | 12.2 |
| | | Water Purification Room (1FL) | 12.2 |
| | | Analytical Measurement Room | 27.5 |
| | | Microbial Analysis Room | 26.8 |
| | | Lecture Hall | 107.7 |
| | | Common Meeting Room A | 39.0 |
| | | Common Meeting Room B | 58.5 |
| | | Multi-Purpose Training Room | 103.5 |
| | | Display Zone | 243.3 |
| | | Entrance Lobby | 106.8 |
| | | Lobby | 59.8 |
| | | Pantry A | 11.3 |
| | | Pantry B | 13.0 |
| | Common Area | WC / Electrical Room / Mechanical Room / Stair / Slope / EPS / Storage/ Elevated Water Tank Room | 525.2 |
| | Reserch & Training Complex Sub-total | | 3,583.5 |
| | Outside Corridor | | 1,138.1 |
| | Reserch & Training Complex Total (including Outside Corridor) | | 4,721.6 |
| Processing Training Building | | Meat Processing Unit | 76.6 |
| | | Dairy Processing Unit | 84.4 |
| | | Food Processing Unit | 98.1 |
| | | Entrance of Processing Units | 13.5 |
| | | Changing Rooms | 13.5 |
| | | Preparation Space | 13.5 |
| | | Garbage Collection | 16.4 |
| | | WC / EPS | 8.0 |
| | | Processing Training Building Total | 324.0 |

| | | |
|---|---|---|
| Farm Management Building | Office | 16.0 |
| | Farm Lecture Room | 64.0 |
| | Demonstration Space | 64.0 |
| | Primary Sample Preparation Unit | 64.0 |
| | Crop Post-harvest Unit | 64.0 |
| | Farm Machinery Storage Unit | 128.0 |
| | Farm Machinery Workshop | 96.0 |
| | Changing Rooms | 8.0 |
| | WC / Storage | 39.1 |
| | Farm Management Building Sub-total | 543.1 |
| | Washing Place (Outside Space) | 32.9 |
| | Farm Management Building Total (including Outside Corridor) | 576.0 |
| Animal Measurement Shed | Weigh Room | 7.5 |
| | Digestion Chamber (Cow) | 9.0 |
| | Digestion Chamber (Goat) | 6.0 |
| | Animal Measurement Shed Total | 22.5 |
| Goat Shed | Goat Shed Total | 48.0 |
| Grand Total | | 4,521.1 |
| Grand Total (including Outside Space) | | 5,692.1 |

**B. Research and Training Farm**

| Name of the Unit | Type of crops | Areas (Acre) |
|---|---|---|
| 1. Plant propagation unit | 1.1 Fruits crops<br>1.2 Field crops<br>1.3 Floriculture crops<br>1.4 Vegetable crops<br>1.5 Plantation & export crops<br>1.6 Cut-foliage crops | 0.26 |
| 2. Protected agriculture unit | 2.1 Cole crops<br>2.2 Floriculture crops<br>2.3 Vegetative propagated fruit plan<br>2.4 Cut-foliage<br>2.5 Department sharing | 0.74 |
| 3. Fruit crops germ-plasm collection unit (1)<br>Fruit crops germ-plasm collection unit (2) | 3.1 Fruit crops<br>3.2 Grapes | 4.20 |
| 4. Field crops experimental unit (1)<br>Field crops experimental unit (2) | 4.1 Coral crops<br>4.2 Oil crops<br>4.3 Tuber crops<br>4.4 Spices and condiments<br>4.5 Pulses<br>4.6 Fiber crops<br>4.7 Vegetable crops | 1.60 |
| 5. Plantation & agro-forestry unit | 5.1 Silviculture crops<br>5.2 Fencing crops<br>5.3 Valuable crops<br>5.4 Plantation crops<br>5.5 Fruit crops<br>5.6 Other crops | 4.20 |
| 6. Agr. Management unit | | 0.72 |
| 7. Model home garden unit | 7.1 Fruit crops<br>7.2 Vegetable crops<br>7.3 Floriculture crops<br>7.4 Field crops<br>7.5 Medicinal plants<br>7.6 Spices and condiments<br>7.7 Export crops<br>7.8 Plantation crops | 1.00 |
| 8. Agro-tourism unit | 8.1 Plantation crops<br>8.2 Spices and condiments<br>8.3 Fruit crops<br>8.4 Vine crops<br>8.5 Medicinal crops | 2.00 |
| 9. Goat rearing unit | 9.1 CO3&CO4<br>9.2 GLYRICIDIA 1/4Ac and Pasture grasses | 5.00 |
| Total | | 19.72 |

## C. Equipment List

ANNEX-1

| No | Equipment | Basic Specifications | Q'ty | Use Application |
|---|---|---|---|---|
| **A. Department of Agronomy Lab. (Existing)** | | | | |
| 1 | Stereo microscope (1) | binocular, x45 | 24 | To observe plant body and plant tissue/cells |
| 2 | Dissection kit set (2) | 9-item set | 26 | To dissect plant body |
| **B. Crop Science Lab.** | | | | |
| 1 | Stereo microscope (2) | x300 | 2 | To observe plant & plant cells |
| 2 | Dissection kit set (3) | 9-item set | 2 | To dissect plant organ |
| 3 | Seed dividers | centrifugal type | 1 | To divide seed samples equally |
| 4 | Seed cleaner (1) | air jet flow | 1 | To clean seed samples |
| 5 | Spiral seed separator | double spiral | 1 | To separate mature seeds |
| 6 | Oven (1) | 160lit, 10~250℃ | 1 | To dry samples & glassware |
| 7 | Electronic balance (1) | 200g, 0.1mg | 1 | To weigh samples & chemicals |
| 8 | Weighing balance (1) | 3kg, 0.001g | 1 | To weigh samples |
| 9 | Weighing balance (2) | 12kg, 0.1g | 1 | To weigh samples |
| 10 | Seed germination incubator | 170lit, 5~50℃ | 2 | To encourage germination of seed samples |
| 11 | Plant growth chamber | 400 lit., temp & humid & light control | 1 | To encourage or inhibit plant growth by controlling growing environment |
| 12 | Polyethylene sealer | W:5mm, L:350mm | 1 | To making pots for raising seedlings |
| 13 | EC meter (1) | desk top, EC: 0~199.9S/m | 1 | To measure electric conductivity of medium solution & sample soil |
| 14 | Soil moisture meter | portable, 0~40% | 1 | To measure moisture content of soil samples |
| 15 | Green leaf area meter | portable, Max W: 100mm, | 1 | To measure leaf area of plant samples |
| 16 | Chlorophyll meter | portable, double wave length | 1 | To measure leaf area of plant samples |
| 17 | Lux meter | portable, 0~199,999Lux | 1 | To measure amount of sunlight upper/under sample plants |
| 18 | CO2 dissolved sensor | 10 - 1000mbar CO2 | 1 | To measure CO2 gas concentration |
| 19 | Vernier caliper | 150, 200, 300mm (3-item set) | 1 | To measure stem diameter of sample plants |
| 20 | Clinometer | Graduation: 0~90°, 1/4° | 1 | To measure strike and slope of geological |
| 21 | Diameter tape | 10 m | 1 | To measure diameter of wood samples |
| 22 | Increment borer | 50cm length | 1 | To collect wood samples for counting annual growth ring |
| 23 | GPS | handheld, color LCD, 240x400 | 1 | To determine latitude, longitude and altitude |
| 24 | Water bath, with shaker | 23 lit., 10~80℃, horizon-reciprocated | 1 | To heat samples under constant temp. condition |
| 25 | Magnetic stirrer | 50-1200rpm, 5-300℃ | 2 | To stir water solution |
| 26 | Dispenser pipettes | 5 viable steps, with syringe | 6 | To dispense water solution |
| 27 | Autoclave | 76 lit., 45~135℃, Max: 0.25MPa | 1 | To sterilize glassware, tools and samples by high temp. & pressure |
| 28 | Fume hood (draft chamber) | 1,500(W) x 750~800(D) x 1,950~2,700(H)mm | 1 | To exhaust toxic gas occurred during experiment |
| 29 | Refrigerator (1) | 340lit., 2~14℃ | 1 | To store samples and chemicals under low temp. condition |
| **C. Department of Animal Science Lab. (Exisiting)** | | | | |
| 1 | Animal models of cattle | 2,800x1,500x500mm | 1 | To display visual images |
| 2 | Animal models of poultry | 450x260x490mm | 1 | To display visual images |
| 3 | Animal models of rabbit | 520x200x330mm | 1 | To display visual images |
| 4 | Animal models of pig | 1020x260x480mm | 1 | To display visual images |
| 5 | Animal models for monogastric (pig) | 210x180x390mm | 1 | To display visual images |
| 6 | Animal models for ruminants digestive system | 280x180x350mm | 1 | To display visual images |
| 7 | Reproductive system of male and female ruminant | 700x650x1,500mm | 1 | To display visual images |
| 8 | Reproductive system of male and female pig | 600x70x370mm | 1 | To display visual images |
| 9 | Fish model to illustrate the internal and external anatomy of fish | 490x150x350mm | 1 | To display visual images |
| 10 | Poultry vaccine syringe | automatic, 0.2~1.0ml | 1 | To give vaccination to poultry |
| 11 | Electronic vernier | Egg measurement | 1 | To measure dimensions of poultry egg |
| 12 | Egg candling light | LED white light, 45lm | 1 | To inspect sperm eggs and development of |

| | | | | |
|---|---|---|---|---|
| 13 | Chick brooder | 2,600x750x800mm | 1 | To rear chicks after hatching |
| 14 | De-beaker (for poultry) | | 1 | To cut chick-beak |
| 15 | Yolk color fan (checking egg color) | 10 charts set | 1 | To check color of egg yolk |
| 16 | Sphero meter (measuring egg, internal size) | Accuracy: 1/100mm | 1 | To measure height of dense albumen |
| 17 | Fish measuring board | 1,200x250x25mm, gauge unit: | 1 | To measure size of fish |
| 18 | Electronic balance (2) | 600g, 0.1g | 1 | To weigh samples & chemicals |
| 19 | Water sampler | 2 lit., with 30m rope | 1 | To collect water samples |
| 20 | Sacchi disk (water transparency) | 30cm diameter | 1 | To measure water color and transparency |
| 21 | Ekmnman grab sampler | stainless, 240x210x350mm | 1 | To collect soil samples from bottom of a water body |
| 22 | pH meter (1) | portable, pH0.00～14.00 | 1 | To measure pH of water solution |
| 23 | EC meter (2) | portable, EC:0.00～ | 1 | To measure electric conductivity of water |
| 24 | Thermometer (1) | portable, dual channe: -100～1300℃ & -100～1000℃ | 1 | To measure temp. of samples |
| 25 | BOD meter | portable, 0～20ppm, | 1 | To measure water quality by BOD |
| 26 | Salinity meter | portable, 0.0～7.0%(g/100g) | 1 | To measure salinity of water solution |
| 27 | Plankton nets | φ200x500mm | 1 | To collect plankton |
| **D. Animal Nutrition Lab.** | | | | |
| 1 | Grass sampler | stainless, 300～1200rpm | 1 | To collect grass (feed) samples |
| 2 | Digestion chamber | Goat:1,260x760x1,550mm Cattle:1,300x2,120x1,900mm | 1 | To hold animals for measuring coefficient of feed digestibility |
| 3 | Animal fistula | Cattle:φ100/270x75mm Goat:φ35/150x50mm | 1 | To observe a digestive function of animals |
| 4 | Cannula fit | gastric juice collection | 1 | To shut an animal fistula |
| 5 | Dissection set (for small animals) | 18-item set | 1 | To dissect animal body/organ |
| 6 | Electric pressurized washer | 27lit/hr, 6.5MPa | 1 | To cattle house and cattle body |
| 7 | Weigh bridge for cattle | 3000kg, 0.2kg, 1100x2000mm | 1 | To measure cattle weight |
| 8 | Animal weighing scale (small animals) | table type | 1 | To measure weight of small animals |
| 9 | Chicken weighing scale | 4kg | 1 | To measure weight of chicken |
| 10 | Electronic balance (1) | 200g, 0.1mg | 2 | To weigh samples & chemicals |
| 11 | Weighing balance (3) | 2,000g, 0.1g | 1 | To weigh samples & chemicals |
| 12 | Analytical balance | 200g, 0.01mg, with hood | 1 | To weigh samples & chemicals |
| 13 | Drying cabinet | 300 lit, 10～35℃ | 1 | To dry glassware and tools |
| 14 | Autoclave | 76 lit., 45～135℃, Max: 0.25MPa | 1 | To sterilize glassware, tools and samples by high temp. & pressure |
| 15 | Centrifuge | 300-6000rpm, Max: 1000ml | 1 | To separate substance from water solution |
| 16 | pH meter (2) | desk-top, pH0.000～14.000 | 1 | To measure pH of water solution |
| 17 | Feed crushing mill | 500-800kg/hr | 1 | To pulverize feed samples |
| 18 | Grinder | 20000rpm or more, 150ml | 1 | To pulverize samples |
| 19 | Mixer (1) | 1000ml, 20000rpm | 1 | To mix samples |
| 20 | Homogenizer | 5000～10000rpm, 0.25ml～10lit. | 1 | To atomize and disperse substance in water solution |
| 21 | Oven (2) | 97 lit., 10～250℃ | 1 | To dry samples & glassware |
| 22 | Water bath, with shaker | 23 lit., 10～80℃, horizon-recinrocated | 1 | To heat samples under constant temp. condition |
| 23 | Shaker | 20～200rmp | 1 | To mix and agitate water solution |
| 24 | Voltex mixer | 600～3000rpm | 2 | To mix water solution in tube |
| 25 | Magnetic stirrer | 50～1200rpm, 5～300℃ | 1 | To stir water solution |
| 26 | Vacuum pump (Lab.) | 12lit/sec, 6.65Pa or more | 1 | To aspirate air for accelerating filtration time |
| 27 | Dispenser pipettes | 5 viable steps, with syringe | 6 | To dispense water solution |
| 28 | Fiber analyzer | NDF, CF, ADF, ADL, Sample size: 0.5～1.0g | 1 | To make quantitative analysis of plant fiber content of samples |
| 29 | Micro Kjeldhal apparatus | 6 flasks | 1 | To make quantitative analysis of nitrogen and protein content of samples (small quantity) |
| 30 | Macro Kjeldhal apparatus | 0.1-200mgN, sample tube: 100-300ml | 1 | To make quantitative analysis of nitrogen and protein content of samples |
| 31 | Soxhlet apparatus | 150～250ml x 4 holes | 1 | To extract subsistence with solvents from solid samples |

| | | | | |
|---|---|---|---|---|
| 32 | Muffle furnace | 11 lit., 100～1150℃ | 1 | To burn or dry samples |
| 33 | Bomb calorimeter | Max:33500 joule | 1 | To measure calorific value of solid/liquid |
| 34 | Flame photo meter | Na, K, Li: up to 199ppm, Ca: 10-199ppm | 1 | To make quantitative analysis by emission from samples |
| 35 | Fume hood (draft chamber) | 1,500(W) x 750～800(D) x 1,950～2,700(H)mm | 1 | To exhaust toxic gas occurred during experiment |
| 36 | Refrigerator (2) | 150 lit., 2～14℃ | 2 | To store samples and chemicals under low temp. condition |
| **E. Reproductive Physiology Lab.** | | | | |
| 1 | Biological microscope | binocular, x400, with micro-warm plate | 1 | To observe sperms |
| 2 | Inverted microscope | x400, phase-contrast, mechanical stage, camera | 1 | To observe viable cells (eggs) |
| 3 | Kamar pressure-sensitive mount detector | Double-stick tape, 400pcs set | 1 | To detect the time of estrus (cattle) |
| 4 | Dummy cow | manual height adjustment | 1 | To collect sperm from cattle |
| 5 | Artificial vagina for cattle | Plastic, L:385mm | 1 | To collect sperm from cattle |
| 6 | Artificial vagina for goat | Plastic, L:200mm | 1 | To collect sperm from goat |
| 7 | Blood Cell counter | Thoma type | 1 | To measure number of blood cells |
| 8 | Sperm (semen) counting | Thoma type | 1 | To count number of sperms |
| 9 | Needle pipette for semen dispensing | φ1.25x100mm, 10pcs set | 1 | To dispense sperm |
| 10 | Thawing device for frozen semen | φ20x150mm, room temp.～65℃ | 1 | To thaw frozen sperm |
| 11 | Vaginal speculum for cow | horizon open type, L:300mm | 1 | To examine vagina and uterus, and injecting sperm (cattle) |
| 12 | Vaginal speculum for goat | horizon open type, L:90mm | 1 | To examine vagina and uterus, and injecting sperm (goat) |
| 13 | Semen injector & sheath tube for cow | φ4x450mm | 1 | To inject sperm (AI of cattle) |
| 14 | Semen injector & sheath tube for goat | L: 230mm | 1 | To inject sperm (AI of goat) |
| 15 | AI kit for the field | AI kit, LN2 tank, Freezer for cattle semen | 1 | To carry out AI on site (cattle) |
| 16 | Ultra sound pregnancy detector | portable, 60～240mm | 1 | To diagnose pregnancy and condition of baby in the womb (animals) |
| 17 | Embryo transfer equipment and accessories | Injector & sheath tube, thawing device, dilating bougie, LN2 | 1 | To carry out embryo transfer of cattle |
| 18 | Automatic irrigator for embryo flushing | Room temp.～50℃ | 1 | To collect fertilized egg from cows |
| 19 | Catheter for removing vagina mucous | φ6x400mm, 30pcs set | 1 | To collect mucus in the cervix for measuring pH (cattle) |
| 20 | Embryo collector | φ80x53mm, 100pcs set | 1 | To collect fertilized egg from cows (separation of egg from mucus) |
| 21 | Dilating bougie for cow and heifer, sugie-type | Sugie type | 1 | To carry out embryo transfer of cattle |
| 22 | Liquid Nitrogen Gas | 30 lit. | 2 | To preserve sperm and eggs |
| 23 | Embryo (cell) transporter | 0.25ml x 20pcs, 37～38.5℃ | 1 | To transport fertilized eggs |
| 24 | CO2 Incubator | 165lit., CO2:0～20%, Temp.5 | 1 | To incubate fertilized eggs and mammalian |
| 25 | Laminar flow cabinet | Class100, 1,300(W) x 750～800(D) x 1,700～2,100(H)mm | 1 | To carry out experiment under aseptic condition (to avoid contamination from dust |
| 26 | Electronic balance (1) | 200g, 0.1mg | 2 | To weigh samples & chemicals |
| 27 | Analytical balance | 200g, 0.01mg, with hood | 1 | To weigh samples & chemicals |
| 28 | Drying cabinet | 300 lit, 10～35℃ | 1 | To dry glassware and tools |
| 29 | Autoclave | 76 lit., 45～135℃, Max: 0.25MPa | 1 | To sterilize glassware, tools and samples by high temp. & pressure |
| 30 | Centrifuge, refrigerated (1) | Max: 21000rpm, -9～35℃ | 1 | To separate substance from water solution under low temp. condition |
| 31 | Micro centrifuge | Max:13500rpm, refrigerated | 1 | To separate substance from small quantity of water solution |
| 32 | pH meter (2) | desk-top, pH0.000～14.000 | 1 | To measure pH of water solution |
| 33 | Oven (2) | 97 lit., 10～250℃ | 1 | To dry samples & glassware |

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|---|---|---|---|---|
| 34 | Water bath, with shaker | 23 lit., 10～80℃, horizon-reciprocated | 1 | To heat samples under constant temp. condition |
| 35 | Shaker | 20～200rpm | 1 | To mix and agitate water solution |
| 36 | Voltex mixer | 600～3000rpm | 2 | To mix water solution in tube |
| 37 | Magnetic stirrer | 50～1200rpm, 5～300℃ | 1 | To stir water solution |
| 38 | Dispenser pipettes | 5 viable steps, with syringe | 6 | To dispense water solution |
| 39 | Fume hood (draft chamber) | 1,500(W) x 750～800(D) x 1,950～2,700(H)mm | 1 | To exhaust toxic gas occurred during experiment |
| 40 | Refrigerator (2) | 150 lit., 2～14℃ | 2 | To store samples and chemicals under low temp. condition |
| **F. Department of Agro-chemistry Lab. (Existing)** | | | | |
| 1 | Fume hood (draft chamber) | 1,500(W) x 750～800(D) x 1,950～2,700(H)mm | 1 | To exhaust toxic gas occurred during experiment |
| **G. Soil Testing and Bio-fertilizer Lab.** | | | | |
| 1 | GPS | handheld, color LCD, 240x400 | 1 | To determine latitude, longitude and altitude |
| 2 | Soil auger (1) | L:600mm (handle), 8-auger | 1 | To collect soil samples |
| 3 | Soil sieves | φ200x45mm (4 sieve sizes), φ150x45mm (4 sieve sizes), φ100x45mm (4 sieve sizes) | 1 | To separate different particle sizes of soil |
| 4 | Soil effective volumetric capacity meter | 0～100ml, 0.01ml | 1 | To measure cubic volume of sample soil |
| 5 | Soil texture analyzer | vertical movement: 30 times/min., amplitude: 38mm | 1 | To analyze soil texture |
| 6 | Pressure plate apparatus | pressure: 5 bar | 1 | To measure water retention capacity of soil |
| 7 | Wet sieving equipment | sieveφ: 200～360mm | 1 | To assess stability of soil aggregated structure |
| 8 | Soil grinder | 500～1000ml, 100rpm | 1 | To crush soil samples |
| 9 | Electronic balance (1) | 200g, 0.1mg | 2 | To weigh samples & chemicals |
| 10 | Analytical balance | 200g, 0.01mg, with hood | 1 | To weigh samples & chemicals |
| 11 | Drying cabinet | 300 lit, 10～350℃ | 1 | To dry glassware and tools |
| 12 | Autoclave | 76 lit., 45～135℃, Max: 0.25MPa | 1 | To sterilize glassware, tools and samples by high temp. & pressure |
| 13 | Oven (2) | 97 lit., 10～250℃ | 1 | To dry samples & glassware |
| 14 | Centrifuge | 300-6000rpm, Max: 1000ml | 1 | To separate substance from water solution |
| 15 | Magnetic stirrer | 50～1200rpm, 5～300℃ | 1 | To stir water solution |
| 16 | Voltex mixer | 600～3000rpm | 2 | To mix water solution in tube |
| 17 | Shaker | 20～200rpm | 1 | To mix and agitate water solution, and to incubate microorganisms |
| 18 | Water bath, with shaker | 23 lit., 10～80℃, horizon-reciprocated | 1 | To heat samples under constant temp. condition |
| 19 | Dispenser pipettes | 5 viable steps, with syringe | 6 | To dispense water solution |
| 20 | Rotary evaporator | 20～180rpm, 1 lit. flask | 1 | To evaporate solvent |
| 21 | Fume hood (draft chamber) | 1,500(W) x 750～800(D) x 1,950～2,700(H)mm | 1 | To exhaust toxic gas occurred during experiment |
| 22 | Micro Kjeldhal apparatus | 6 flasks | 1 | To make quantitative analysis of nitrogen and protein content of samples (small quantity) |
| 23 | Soxhlet apparatus | 150～250ml x 4 holes | 1 | To extract subsistence with solvents from solid samples |
| 24 | Flame photo meter | Na, K, Li: up to 199ppm Ca: 10～199ppm | 1 | To make quantitative analysis by emission from samples |
| 25 | Refrigerator (2) | 150 lit., 2～14℃ | 2 | To store samples and chemicals under low temp. condition |
| 26 | Muffle furnace | 11lit., 100～1150℃ | 1 | To burn or dry samples |
| **H. Food Analysis and Processing Lab.** | | | | |
| 1 | Weighing balance (3) | 2000g, 0.1g | 1 | To weigh samples |
| 2 | Electronic balance (1) | 200g, 0.1mg | 2 | To weigh samples & chemicals |
| 3 | Analytical balance | 200g, 0.01mg, with hood | 1 | To weigh samples & chemicals |
| 4 | Drying cabinet | 300 lit, 10～35℃ | 1 | To dry glassware and tools |
| 5 | Autoclave | 76 lit., 45～135℃, Max: 0.25MPa | 1 | To sterilize glassware, tools and samples by high temp. & pressure |
| 6 | Oven (2) | 97 lit., 10～250℃ | 1 | To dry samples & glassware |
| 7 | Centrifuge | 300～6000rpm, Max:1000ml | 1 | To separate substance from water solution |
| 8 | Grinder | 20000rpmor more, 150ml | 1 | To crush food samples |

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|---|---|---|---|---|
| 9 | Homogenizer | 5000～10000rpm, 0.25ml～10lit. | 1 | To atomize and disperse substance in water solution |
| 10 | Magnetic stirrer | 50～1200rpm, 5～300℃ | 1 | To stir water solution |
| 11 | Voltex mixer | 600～3000rpm | 2 | To mix water solution in tube |
| 12 | Shaker | 20～200rpm | 1 | To mix and agitate water solution, and to incubate microoreganisms |
| 13 | Water bath, with shaker | 23 lit., 10～80℃, horizon-reciprocated | 1 | To heat samples under constant temp. condition |
| 14 | Hot plate | 250℃, 400 x 300mm | 1 | To heat solution |
| 15 | Dispenser pipettes | 5 viable steps, with syringe | 6 | To dispense water solution |
| 16 | Rotary evaporator | 20-180rpm, 1 lit. flask | 1 | To evaporate solvent |
| 17 | Fume hood (draft chamber) | 1,500(W) x 750～800(D) x 1,950～2,700(H)mm | 1 | To exhaust toxic gas occurred during experiment |
| 18 | Macro Kjeldhal apparatus | 0.1～200mgN, sample tube: 100～300ml | 1 | To make quantitative analysis of nitrogen and protein content of samples (small quantity) |
| 19 | Micro Kjeldhal apparatus | 6 flasks | 1 | To make quantitative analysis of nitrogen and protein content of samples |
| 20 | Soxhlet apparatus | 150～250ml x 4 holes | 1 | To extract subsistence with solvents from solid samples |
| 21 | Fibre anayzer | NDF, CF, ADF, ADL Sample size: 0.5～1.0g | 1 | To make quantitative analysis of plant fiber content of samples |
| 22 | Muffle furnace | 11 lit., 100～1150℃ | 1 | To burn or dry samples |
| 23 | Flame photo meter | Na, K, Li: up to 199ppm Ca: 10-199ppm | 1 | To make quantitative analysis by emission from samples析 |
| 24 | Bomb calorimeter | Max:33500joule | 1 | To measure calorific value of solid/liquid |
| 25 | Water activity measuring meter | Aw:0.10～0.98 | 1 | To measure free water in food samples |
| 26 | Rapid viscosity analyzer | 0～100Pa·s, sample volume: 2～10ml | 1 | To measure starch gelatinization |
| 27 | Force gauge | 500N | 1 | To measure hardness of food samples |
| 28 | Texture analyzing machine (meat & fish) | 100N | 1 | To measure texture (hardness, solidity, elasticity, etc.) of meat and fish meat |
| 29 | Fruit firmness tester (hardness meter) | 0～13kg, 0.5kg | 1 | To measure hardness of fruits |
| 30 | Gerber centrifuge | 1130rpm, room temp.～65℃ | 1 | To separate butterfat from raw milk |
| 31 | Milk fat tester | 0～100%, sample 1.0～2.0g | 1 | To measure butterfat content in milk |
| 32 | Alcohol gun | For milk inspection | 1 | To judge freshness of milk |
| 33 | Ultrasonic milk analyzer | sample 20ml, with printer | 1 | To analyze milk quality, e.g. fat amount, non-fat solid, density, protein content, moisture, |
| 34 | Refractometer | portable, Brix 0～33% | 1 | To measure sugar content of fruits juice and beverage |
| 35 | Salinity meter | portable, 0.0～7.0%(g/100g) | 1 | To measure salinity of water solution |
| 36 | Ebulliometer | 0～17% | 1 | To measure alcohol content of water solution |
| 37 | Thermometer (2) | bimetal type, 0～100℃ | 1 | To measure temp. of water solution |
| 38 | Digital moisture meter | ～100% | 1 | To measure moisture content of food samples |
| 39 | Food chromometer | 410～660nm, LED lamp, Min sample: 1.0ml | 1 | To measure color and concentrations of food samples |
| 40 | Blood cell counter | x2-3 | 1 | To count number of colonies of bacteria |
| 41 | Haemocyto-meter | Thoma type | 1 | To count number of cells |
| 42 | Stereo microscope (3) | x115, camera adopter | 1 | To observe microorganisms |
| 43 | Refrigerator (2) | 150 lit., 2～14℃ | 2 | To store samples and chemicals under low temp. condition |
| 44 | pH meter (2) | desk-top, pH0.000～14.000 | 1 | To measure pH of water solution |
| 45 | EC meter (1) | desk top, EC: 0～199.9S/m | 1 | To measure electric conductivity of medium solution & sample soil |
| **I. Department of Agricultural Biology Lab. (Existing)** | | | | |
| 1 | Magnifier | x10, φ90mm, LED light | 26 | To observe insect body |
| 2 | Dissection kit set (5) | 8-item set | 26 | To dissect insect body |
| 3 | Ganong's potometer | 1mm gauge | 25 | To measure transpiration |
| **J. Plant Protection and Bio-control Lab.** | | | | |
| 1 | Stereo microscope (4) | x115, digital camera syatem, CCD camera | 1 | To observe insect body and nematode |

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|---|---|---|---|---|
| 2 | Inverted microscope | x400, phase-contrast, mechanical stage, camera | 1 | To observe microorganisms and cells |
| 3 | Research binocular microscope | x1000, with phase contrast lens & florescent filter, digital camera system | 1 | To observe microorganisms and cells |
| 4 | Dissection kit set (1) | 9-item set | 1 | To dissect insect body |
| 5 | Soil auger (2) | Hole auger: φ10mm (1m deep), Auger: φ4cmx50cm | 1 | To collect soil samples |
| 6 | Nematodes sieve | 33-item set | 1 | To collect nematode from soil |
| 7 | Sprayer (1) | laboratory portable type, 4 lit | 1 | To spray insecticides |
| 8 | ULV sprayer (1) | 14 lit., 10～20μ particle | 1 | To spray ULV insecticides |
| 9 | Thermo-hygrometer | Temp.:-10～45℃, Humid:20～95% | 1 | To measure atmosphere temp. & humidity |
| 10 | Electronic balance (1) | 200g, 0.1mg | 2 | To weigh samples & chemicals |
| 11 | Drying cabinet | 300 lit, 10～35℃ | 1 | To dry glassware and tools |
| 12 | Oven (2) | 97 lit., 10～250℃ | 1 | To dry samples & glassware |
| 13 | Autoclave | 76 lit., 45～135℃, Max: 0.25MPa | 1 | To sterilize glassware, tools and samples by high temp. & pressure |
| 14 | pH meter (2) | desk-top, pH0.000～14.000 | 1 | To measure pH of water solution |
| 15 | Grinder | 20000rpm or more, 150ml | 1 | To crush samples |
| 16 | Mortar and pestle | φ150mm | 1 | To crush and mix samples |
| 17 | Mixer (1) | 1000ml, 20000rpm | 1 | To mix samples |
| 18 | Homogenizer | 5000～10000rpm, 0.25ml～10lit | 1 | To atomize and disperse substance in water solution |
| 19 | Voltex mixer | 600～3000rpm | 2 | To mix water solution in tube |
| 20 | Magnetic stirrer | 50～1200rpm, 5～300℃ | 1 | To stir water solution |
| 21 | Water bath, with shaker | 23 lit., 10～80℃, horizon-recinrocated | 1 | To heat samples under constant temp. condition |
| 22 | Hot plate | 250℃, 400 x 300mm | 1 | To heat solution |
| 23 | Shaker | 20～200rpm | 1 | To mix and agitate water solution, and to incubate microorganisms |
| 24 | Centrifuge, refrigerated (2) | 300～15000rpm, -9～35℃, Max: 1000ml | 1 | To separate substance from water solution under low temp. condition |
| 25 | Dispenser pipettes | 5 viable steps, with syringe | 6 | To dispense water solution |
| 26 | Rotary evaporator | 20-180rpm, 1 lit. flask | 1 | To evaporate solvent |
| 27 | Fume hood (draft chamber) | 1,500(W) x 750～800(D) x 1,950～2,700(H)mm | 1 | To exhaust toxic gas occurred during experiment |
| 28 | Laminar flow cabinet | Class100, 1,300(W) x 750～800(D) x 1,700～2,100(H)mm | 1 | To carry out experiment under aseptic condition (to avoid contamination from dust |
| 29 | Inoculation needle | Loopφ3mm, handle 150mm, 24 gauge | 1 | To transplant cultivated bacteria to petri-dishes |
| 30 | Liquid Nitrogen container | 30 lit. | 2 | To preserve bacteria |
| 31 | Incubator | 150 lit., room temp. +5～60℃ | 1 | To incubate insects and bacteria |
| 32 | Low temp. incubator | 140 lit., -10～50℃ | 1 | To incubate insects and bacteria |
| 33 | Plant growth chamber | 400 lit., temp & humid & light control | 1 | To encourage or inhibit plant growth by controlling growing environment |
| 34 | Refrigerator (1) | 340lit., 2～14℃ | 1 | To store samples and chemicals under low temp. condition |
| **K. Bio-technology and Tissue Culture Lab.** | | | | |
| 1 | Stereo microscope (4) | x115, digital camera system, CCD camera | 1 | To observe plant body and plant tissue/cells |
| 2 | Dissection kit set (4) | 13-item set | 1 | To dissect plant body |
| 3 | Electronic balance (1) | 200g, 0.1mg | 2 | To weigh samples & chemicals |
| 4 | Analytical balance | 220g, 0.01mg, with hood | 1 | To weigh samples & chemicals |
| 5 | Drying cabinet | 300 lit, 10～35℃ | 1 | To dry glassware and tools |
| 6 | Oven (2) | 97 lit., 10～250℃ | 1 | To dry samples & glassware |
| 7 | Autoclave | 76 lit., 45～135℃, Max: 0.25MPa | 1 | To sterilize glassware, tools and samples by high temp. & pressure |
| 8 | Microwave oven | 2.8kW, 420x470x340mm | 1 | To fuse culture medium by heating |
| 9 | pH meter (2) | desk-top, pH0.000～14.000 | 1 | To measure pH of water solution |
| 10 | Grinder | 20000rpm or more, 150ml | 1 | To crush samples |
| 11 | Mortar and pestle | φ150mm | 1 | To crush and mix samples |
| 12 | Voltex mixer | 600～3000rpm | 2 | To mix water solution in tube |

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|---|---|---|---|---|
| 13 | Magnetic stirrer | 50～1200rpm, 5～300°C | 1 | To stir water solution |
| 14 | Water bath, with shaker | 23 lit., 10～80°C, horizon-reciprocated | 1 | To heat samples under constant temp. condition |
| 15 | Membrane filter | With funnel and decompression flask + suction | 1 | To eliminate microorganisms in water solution by filtration |
| 16 | Centrifuge, refrigerated (2) | 300～15000rpm, -9～35°C, Max: 1000ml | 1 | To dispense water solution |
| 17 | Dispenser pipettes | 5 viable steps, with syringe | 6 | To evaporate solvent |
| 18 | Fume hood (draft chamber) | 1,500(W) x 750～800(D) x 1,950～2,700(H)mm | 1 | To exhaust toxic gas occurred during experiment |
| 19 | Laminar flow cabinet | Class100, 1,300(W) x 750～800(D) x 1,700～2,100(H)mm | 1 | To carry out experiment under aseptic condition (to avoid contamination from dust |
| 20 | Incubator | 150 lit, room temp. +5～60°C | 1 | To incubate plant tissue/cells |
| 21 | Shelves with lighting | stainless, 5 shelves, 900x450x1800mm | 10 | To cultivate plant tissue in incubation room |
| 22 | Refrigerator (1) | 340lit., 2～14°C | 2 | To store samples and chemicals under low temp. condition |
| **L. Department of Agricultural Engineering Lab. (Exisiting)** | | | | |
| 1 | Plane table | A2 size | 6 | To carry out plane-table survey |
| 2 | Alidade | | 6 | To find direction on the plane table |
| 3 | Dumpy level | X32-34, view: 1° 20' | 6 | To take a level (surveying) |
| 4 | Theodolite(transit) | x30, view: 1°20'～1°30' | 6 | To measure angle between two objectives (surveying) |
| 5 | Compass | 5' gauge (horizontal) | 6 | To find direction (surveying) |
| 6 | Tri pod | Aluminum | 6 | To fix plane table and other instruments during surveying |
| 7 | Leveling staff | 5m (5 steps) | 6 | To measure distance (surveying) |
| 8 | Measuring tape | 50 m | 6 | To measure distance |
| 9 | Drafting board and drafter | A1 size, with chair | 6 | To make drawings |
| 10 | Oven (2) | 97 lit., 10～250°C | 1 | To dry sample grains |
| 11 | Seed cleaner (2) | Winnowing of cereal seeds, laboratory-type | 1 | To clean sample grains |
| 12 | Paddy sample divider | 36 divisions, Max sample: 5kg | 1 | To divide sample grains equally |
| 13 | Grain moisture meter | portable, MC: 11～30% | 1 | To measure moisture content of sample grains |
| 14 | Milling machine | laboratory-type, friction type + abrasive type (set) | 1 | To mill sample rice |
| 15 | Rice grader | laboratory-type, indent cylinder | 1 | To separate milled sample rice for grading |
| 16 | Vernier caliper | 150, 200, 300mm (3-item set) | 1 | To measure dimension of sample grains |
| 17 | Water bath | room temp. +10～200°C, 37 lit. | 1 | To soak paddy grain in parboil processing (with constant temp.) |
| 18 | Water pump (1) | 4hp gasoline engine, Centrifugal type | 1 | To explain working principle of single cylinder 4-stroke engine |
| 19 | Steamer | drawer type, gas boiler | 1 | To steam soaked paddy grain in parboil processing |
| 20 | Pressure cooker | 2.4 lit. | 1 | To cook paddy grain in parboil processing |
| 21 | Thermometers (3) | thermistor -20～250°C | 1 | To measure storage temp. |
| 22 | Humidifiers | 1200ml/hr | 1 | To measure storage humid. |
| 23 | Cut models (six cylinder four stroke diesel engine) | 5200cc | 1 | To display visual images |
| 24 | Cut models (four cylinder four stroke petrol engine) | 1000～1300cc | 1 | To display visual images |
| 25 | Cut models (synchromesh gear box) | Front 4～5 speeds, Rear 1 speed | 1 | To display visual images |
| 26 | Cut models (sliding mesh gear box) | | 1 | To display visual images |
| 27 | Cut models (constant mesh gear box) | Multistage clutch | 1 | To display visual images |
| 28 | Cut models (fully floating differential and rear wheel mechanism) | Large-scaled truck type | 1 | To display visual images |
| 29 | Cut models (hydraulic brake unit-four wheel type) | Wall-hanging panel type | 1 | To display visual images |

| | | | | |
|---|---|---|---|---|
| 30 | Cut models (board of fuel supply system of diesel engine) | | 1 | To display visual images |
| **M. Environmemt and Hydro Research Lab.** | | | | |
| 1 | CAD System | PC, digitizer, scanner, A1 | 1 | To make computer-aided drawing |
| 2 | Staff for water elevation | 5m, 5 steps | 2 | To measure water level of canals/rivers |
| 3 | Water-level gauge (1) | self-recording, 10 m | 1 | To measure water level of canals/rivers |
| 4 | Water-level gauge (2) | throw-in type, 0~12 m | 2 | To measure water level of canals/rivers |
| 5 | Current meter (1) | filed type, 0~3m/sec. | 1 | To measure current speed of canals/rivers |
| 6 | Current meter (2) | laboratory type, about 200cm/sec. | 2 | To measure current speed of experimental canal/river models |
| 7 | Hydrothermograph logger | Temp.: -15~65°C Humid.: 10~99% | 1 | To measure and record temp. & humid. with a certain interval |
| 8 | Tensiometer | pF0~2.7, self-recording | 2 | To measure soil moisture content |
| 9 | Gypsum block moisture | Measurement: 1~100% | 2 | To measure soil moisture content |
| 10 | Soil moisture meter | 0~40%, TDR method | 1 | To measure soil moisture content |
| 11 | Lysimeter | For examining evapotranspiration of plants. | 1 | To make simulation on soil environment |
| 12 | Water sample collector | 2 lit., with 30m rope | 1 | To collect water samples |
| 13 | Water temperature meter | portable, 0~40°C, with 50m | 1 | To measure temp. of water samples |
| 14 | EC meter (2) | portable, EC:0.00~ | 1 | To measure electric conductivity of water |
| 15 | DO meter | portable, DO:0~19.9mg/lit | 1 | To measure dissolved oxygen of water |
| 16 | Turbidity meter | 0-3000FNU, with data logger | 1 | To measure turbidity of water samples |
| 17 | Colorimeter | portable | 1 | To analyze water quality (absorptiometer) |
| 18 | Refrigerator (2) | 150 lit., 2~14°C | 1 | To store samples and chemicals under low temp. condition |
| **N. Econometrics Lab.** | | | | |
| 1 | Computer | OS: Microsoft, i7 or more, with 19 inch color monitor & | 6 | To process vast amount of data |
| **O. Common Rooms** | | | | |
| **<Water Purification Room>** | | | | |
| 1 | Water deionizer | Max: 1 lit./min. | 2 | To produce deionized water |
| 2 | Water distiller | About 20 lit./hr. | 2 | To produce distilled water |
| 3 | Ultra-pure water equipment | Max: 0.65 lit./min. | 1 | To produce ultra-pure water |
| **<Freezer Room>** | | | | |
| 1 | Freezer (1) | -20~-30°C, 270 lit. | 2 | To preserve samples and chemicals under very low temp. condition |
| 2 | Deep freezer | -30~-40°C, 380 lit. | 1 | To preserve samples and chemicals under extremely low temp. condition |
| 3 | Ultra-deep freezer | -70~-80°C, 330 lit. | 1 | To preserve samples and chemicals under ultra-low temp. condition |
| 4 | Freezer, programmable | -40~30°C, 3.3 lit. | 1 | To make soft freezing of tissue cells |
| 5 | Ice cube/flake machine | 180kg/day | 1 | To produce ice cube & flake |
| **<Analytical Measurement Room>** | | | | |
| 1 | Flourimeter | 200~900nm | 1 | To analyze vitamin and microclements |
| 2 | UV Visible Spectrophotometer | 190~1100nm | 1 | To analyze DNA, protein and cell density of samples |
| 3 | Spectrophotometer | Min. sample: 1~2μL | 1 | To make quantitative analysis of various substance & DNA/RNA in samples |
| 4 | PCR (Tnermo-cycler) | 4~99°C, 96x0.2ml tubes | 1 | To amplify DNA |
| 5 | Electrophoresis | horizontal | 1 | To separate DNA and protein |
| 6 | Trans illuminator | UV: 300nm, UV lamp:90w | 1 | To analyze DNA band after electrophoresis operation |
| 7 | GC (Gas chromatography) | Temp.: room +5~450°C, No. of injectors: 3, Inflection volume: 0~1200ml/min | 1 | To identify and measure tiny amount of compounds (inorganic gas, carbon hydrides, pesticides, etc.) |
| **<Microbial Analysis Room>** | | | | |
| 1 | Laminar flow cabinet | Class100, 1,300(W) x 750~800(D) x 1,700~2,100(H)mm | 1 | To carry out experiment under aseptic condition (to avoid contamination from dust |
| 2 | Incubator | 150lit., room temp.+5~60°C | 1 | To incubate food microbes |
| **P. Food Processing Room** | | | | |
| 1 | Fruits pulper | 0.2~0.3 ton/hr. | 1 | To remove fruit pulp |

| | | | | |
|---|---|---|---|---|
| 2 | Squeezer | Oil press, press tank cap.: 40 lit. (φ350x400mm) | 1 | To express juice from fruit |
| 3 | Mixer (2) | 6.7 lit. | 1 | To crush and mix vegetables & fruits |
| 4 | Dough mixing machine | 30 lit. | 1 | To mix up dough |
| 5 | Baking oven | 900x840x370mm | 1 | To bake bread |
| 6 | Twin screw extruder | 1～180rmp, 5Nm/screw, 300℃, manual feeding | 1 | To mix, blend, mush and shape food materials |
| 7 | Cabinet drier | For food drying, 3 trays | 1 | To dry food materials |
| 8 | Freeze dryer | -45℃, 1.5 lit. | 1 | To make freeze-dried foods |
| 9 | Spray drier | 250℃, 3kg/hr.(evaporation volume) | 1 | To make dried powder from liquid mixture |
| 10 | Autoclave | 79 lit. 45～135℃, 0.25MPa | 1 | To sterilize spices by heating |
| 11 | Bag sealing machine | Foot pedal operation | 1 | To seal plastic film bags |
| 12 | Vacuum packaging | 2～3 cycle/min | 1 | To seal plastic bags after vacuuming |
| 13 | Vacuum gas-filling, Packaging equipment | Vacuum pump: 167lit./min. | 1 | To seal plastic bags after filling nitrogen gas |
| 14 | Refrigerator (3) | 1000 lit., -5～10℃ | 1 | To store food materials under low temp. |
| 15 | Weighing balance (2) | 12kg, 0.1g | 1 | To weigh food materials |
| 16 | Weighing balance (3) | 2000g, 0.1g | 1 | To weigh food materials |
| 17 | Electronic balance (1) | 200g, 0.1mg | 1 | To weigh seasonings and additives |
| 18 | Microwave oven | 2.8kW, 420x470x340mm | 1 | To fuse culture medium by heating |
| **Q. Daily Processing Lab.** | | | | |
| 1 | Homogenizer (for milk) | 100 lit/hr., 19.6MPa | 1 | To homogenize raw milk to prevent from fat separating |
| 2 | Yoghrt incubator | 50 lit/day, with homogenizer | 1 | To produce yoghurt |
| 3 | Butter churner | Processing capacity: 4～10 lit., stainless | 1 | To produce butter by churning |
| 4 | Cheese presser | stainless, plate:300x300mm | 1 | To produce cheese by pressing curd |
| 5 | Cream separator | 125lit. /hr. | 1 | To separate cream from milk |
| 6 | Milk pasteurizer tank set | 150 lit., stainless | 1 | To sterilize milk with low temp. and to blend milk and flavor materials, e.g. coffee, fruits juice essence, etc. |
| 7 | Sterilizing milk processer | 150 lit., stainless | 1 | To sterilize milk with very high temp. (long life milk) |
| 8 | Refrigerator (3) | 1000 lit., -5～10℃ | 1 | To store milk and dairy products under low temp. condition |
| 9 | Weighing balance (3) | 2000g, 0.1g | 1 | To weigh seasonings and additives |
| 10 | Electronic balance (1) | 200g, 0.1mg | 1 | To weigh seasonings and additives |
| 11 | Milk packing machine (1) | for plastic bags (250ml, 500ml & 1000ml) | 1 | To pack milk |
| 12 | Milk packing machine (2) | for carton packages (250ml, 500ml & 1000ml) | 1 | To pack milk |
| **R. Meat Processing Lab.** | | | | |
| 1 | Shear force test machine | single column, Max. load 2kN | 1 | To measure tenderness of meat |
| 2 | Meat grinder | 100～150kg/hr., table-top | 1 | To make minced meat |
| 3 | Bowl chopper | 5 lit., table-top | 1 | To chop meat |
| 4 | Linking machine | Max: 2000kg/hr. | 1 | To make sausage (linking) |
| 5 | Meat stuffer | Manual operation1 | | To stuff meat into sausage casing |
| 6 | Meat tumbler | 6.8kg, table-top | 1 | To cut connective tissue of meat |
| 7 | De boning and butchering knives | 8-item set | 1 | To debone and cut meat |
| 8 | Ham & bacon moulding | 2-item set | 1 | To hold ham & bacon for smoking |
| 9 | Brine injector | table-top, pump injection | 1 | To inject brine to meat (for making ham & |
| 10 | Steamer | drawer type, gas boiler | 1 | To process ham |
| 11 | Smoke chamber | 20～100℃, stainless, Cap.:40kg of meat | 1 | To process ham& bacon |
| 12 | Meat thermometer | 0～100℃ | 1 | To measure temp. of meat |
| 13 | Ice cube/flake machine | 180kg/day | 1 | To produce ice cube & flake |
| 14 | Refrigerator (3) | 1000 lit., -5～10℃ | 1 | To store meat and meat products under low temp. condition |
| 15 | Freezer (2) | 220lit., -30℃ | 1 | To preserve foods and meat materials under very low temp. |
| 16 | Weighing balance (2) | 12kg, 0.1g | 1 | To weigh meat |

| | | | | |
|---|---|---|---|---|
| 17 | Weighing balance (3) | 2000g, 0.1g | 1 | To weigh meat |
| 18 | Electronic balance (1) | 200g, 0.1mg | 1 | To weigh seasonings and additives |
| **S. Research and Training Farm** | | | | |
| 1 | 4-wheel tractor | 45hp | 1 | To pull and operate attached farm equipment |
| 2 | Mould board plough (attachment of 4W tractor) | 2 boards | 1 | To plow field |
| 3 | Disc plough (attachment of 4W tractor) | 2 discs | 1 | To plow field |
| 4 | Harrow (attachment of 4W tractor) | 14 harrow discs | 1 | To crush soil after plowing |
| 5 | Rotor cultivator (attachment of 4W tractor) | 1700mm width | 1 | To crush soil and level field |
| 6 | Intercultivator (attachment of 4W tractor) | | 1 | To inter-till and weed out field |
| 7 | Seed drill (attachment of 4W tractor) | 8 rows | 1 | To seed in line or dot with fertilizers |
| 8 | Broadcaster (attachment of 4W tractor) | 450kg capacity | 1 | To broadcast compost, fertilizers and crop seeds |
| 9 | Grass cutters | shoulder hold type, engine operation | 2 | To cut weeds surroundings of filed |
| 10 | Sprayer (2) | 24 lit. with engine | 1 | To spray pesticides, etc. (liquid) |
| 11 | Duster | 26 lit. with engine | 1 | To blow pesticides, etc. (powder) |
| 12 | Water pump (2) | 2", centrifugal, with engine, 0.40m3/min. | 1 | To lift water for irrigation |
| 13 | Water pump (3) | 0.08~0.15m3/min. | 1 | To lift water for irrigation |
| 14 | Grass cutters (attachment of 4W tractor) | Tractor mounted | 1 | To cut weeds surroundings or in the filed |
| 15 | Refrigerator | 1000 lit., -5-10°C | 1 | To store crop seeds and farm products |
| **T. Farm Machinery Workshop** | | | | |
| 1 | Gas welder | | 1 | To joint metal materials |
| 2 | Metal cutting machine | manual operation | 1 | To cut metal materials |
| 3 | Metal bending machine | manual operation | 1 | To bend metal materials |
| 4 | Bench vice | Opening: about 200mm | 1 | To fix materials (metals & woods) for |
| 5 | Workshop tool box | 52 tool item set | 1 | To adjust and maintain farm machinery in good condition |
| 6 | Workshop table | 1800x900x740mm, metal top | 1 | To do various processing works |
| 7 | Lathe machine | mini desk-top type | 1 | To process metal materials |
| **U. Meteorology Station** | | | | |
| 1 | Sun shine recorder | 300-2800nm, self-recording | 1 | To measure and record sunshine hours |

## D. Soft Components

| Topics | Output | Achievement Indicators |
|---|---|---|
| I. Experiments and practical training | Classes will be given that incorporate experiments and practical training.<br>(1) Reference books/materials will be made for experiments and practical training conducted in classes.<br>(2) Experiments and practical training will be conducted | · The development of reference books/materials.<br>· The number of experiments and practical training increases<br>· There will be an increase in the number of research plans that incorporate experiments. |
| II. Management of laboratory's equipment | A system to properly manage the laboratory's equipment shall be built.<br>(1) Equipment and tools shall be properly stored and managed.<br>(2) Inventory management shall be properly conducted. | · The development of an organized equipment and glassware checklist<br>· The development of a Manual for cleaning, organizing, and managing the equipment and glassware.<br>· The development of an Inventory List |
| III. Management of training and research farm | The training and research farm shall be properly managed.<br>(1) Farm management plan shall be prepared.<br>(2) The farm management implementation system shall be established. | · The development of annual plan regarding crop acreage and water supply management.<br>· The development of farm management handbook.<br>· The establishment of farm training committee.<br>· The calculation of the necessary farm management annual cost.<br>· The development of agricultural machine maintenance plan. |

<Confidential>

Annex-2

(1)Project Cost to be borne by Japan's Grant Aid

| Category | Cost (Million Japanese Yen) |
|---|---|
| 1) Construction | |
| 2) Equipment procurement | |
| 3) Soft component | |
| 4) Design and supervision | |
| 5) Contingency | |
| Total | |

(As of November, 2015)

Note:

(1) The cost estimates in the above table are provisional and will be further examined by the Government of Japan before the approval of the Grant.

(2) Estimation Conditions

a) Date of estimation :June 2015

b) Foreign exchange rate :US$ 1= JPY121.21

:LKR 1= JPY0.91

Annex-3

# JAPAN'S GRANT AID

Based on a JICA law which was entered into effect on October 1, 2008 and the decision of the Government of Japan (GOJ), JICA has become the executing agency of the Grant Aid for Projects for construction of facilities, purchase of equipment, etc.

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

## 1. Grant Aid Procedures

The Japanese Grant Aid is supplied through following procedures :

- Preparatory Survey
  - The Survey conducted by JICA
- Appraisal &Approval
  - -Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Authority for Determining Implementation
  - -The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as "the G/A")
  - -Agreement concluded between JICA and a recipient country
- Implementation
  - -Implementation of the Project on the basis of the G/A

## 2. Preparatory Survey

(1) Contents of the Survey

The aim of the preparatory Survey is to provide a basic document necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of a outline design of the Project.
- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant Aid project. The Outline Design of the Project is confirmed based on the guidelines of the Japan's Grant Aid scheme.

JICA requests the Government of the recipient country to take whatever measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization of the recipient country which actually implements the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA employs (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the Report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the appropriateness of the Project.

**3. Japan's Grant Aid Scheme**

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes(hereinafter referred to as "the E/N") will be singed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles in accordance with the E/N, to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the recipient country to continue to work on the Project's implementation after the E/N and G/A.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. The Grant Aid may be used for the purchase of the products or services of a third country, if necessary, taking into account the quality, competitiveness and economic rationality of products and services necessary for achieving the objective of the Project. However, the prime contractors, namely constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals", in principle.

(4) Necessity of "Verification"

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

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex. The Japanese Government requests the Government of the recipient country to exempt all customs duties, internal taxes and other fiscal levies such as VAT, commercial tax, income tax, corporate tax, resident tax, fuel tax which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract, since the Grant Aid fund comes from the Japanese taxpayers.

(6) "Proper Use"

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

(7) "Export and Re-export"

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

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"), in principle. JICA will execute the Grant Aid by making payments in Japanese yen, in principle, 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 JICA under an Authorization to Pay (A/P) issued by the Government of the 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 paid to the Bank.

(10) Social and Environmental Considerations

The Government of the recipient country must carefully consider social and environmental impacts by the Project and must comply with the environmental regulations of the recipient country and JICA socio-environmental guidelines.

(11) Monitoring

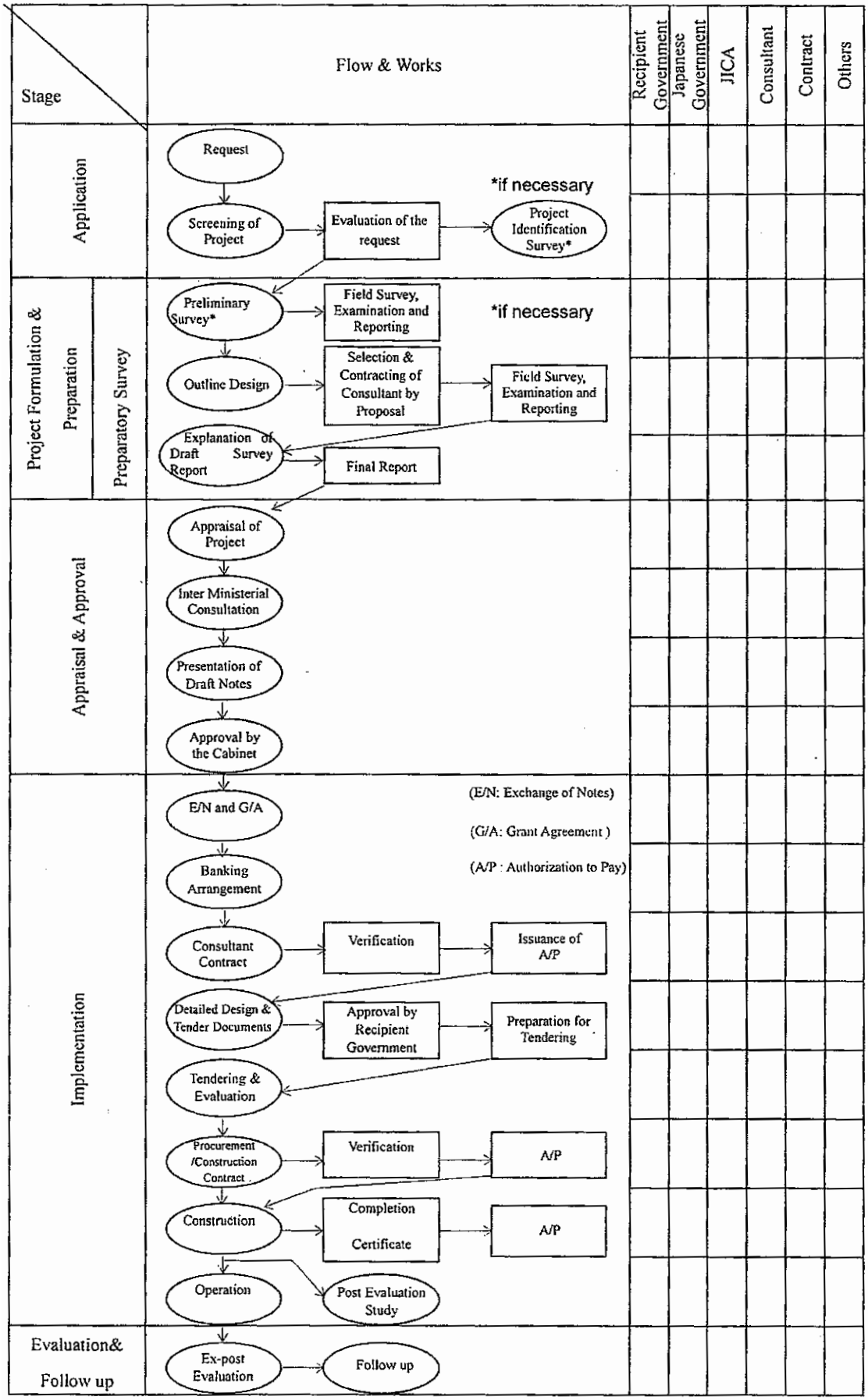
The Government of the recipient country must take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and must regularly report to JICA about its status by using the Project Monitoring Report (PMR).

(12) Safety Measures

The Government of the recipient country must ensure that the safety is highly observed during the implementation of the Project.

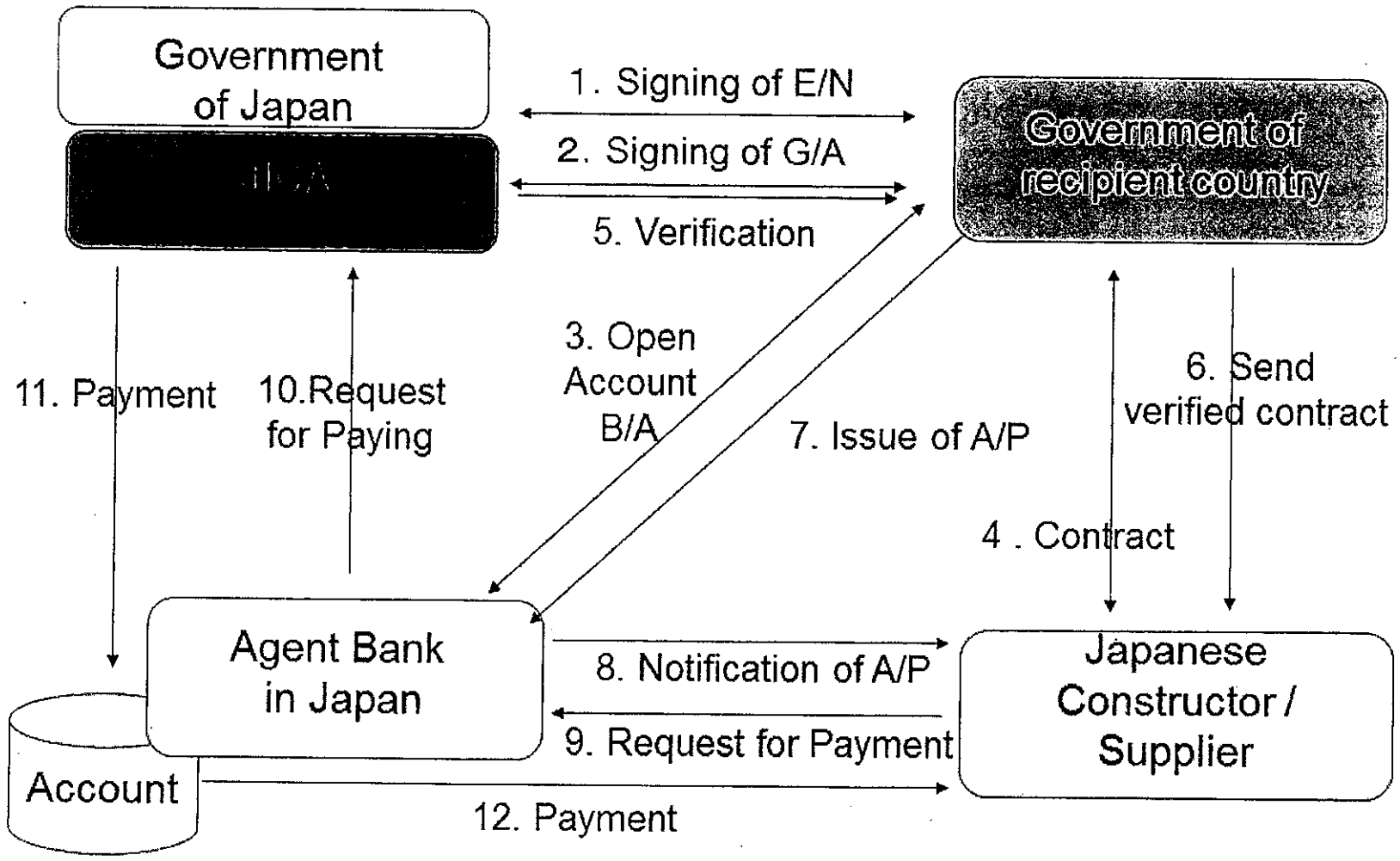
Annex-4

# FLOW CHART OF JAPAN's GRANT AID PROCEDURES

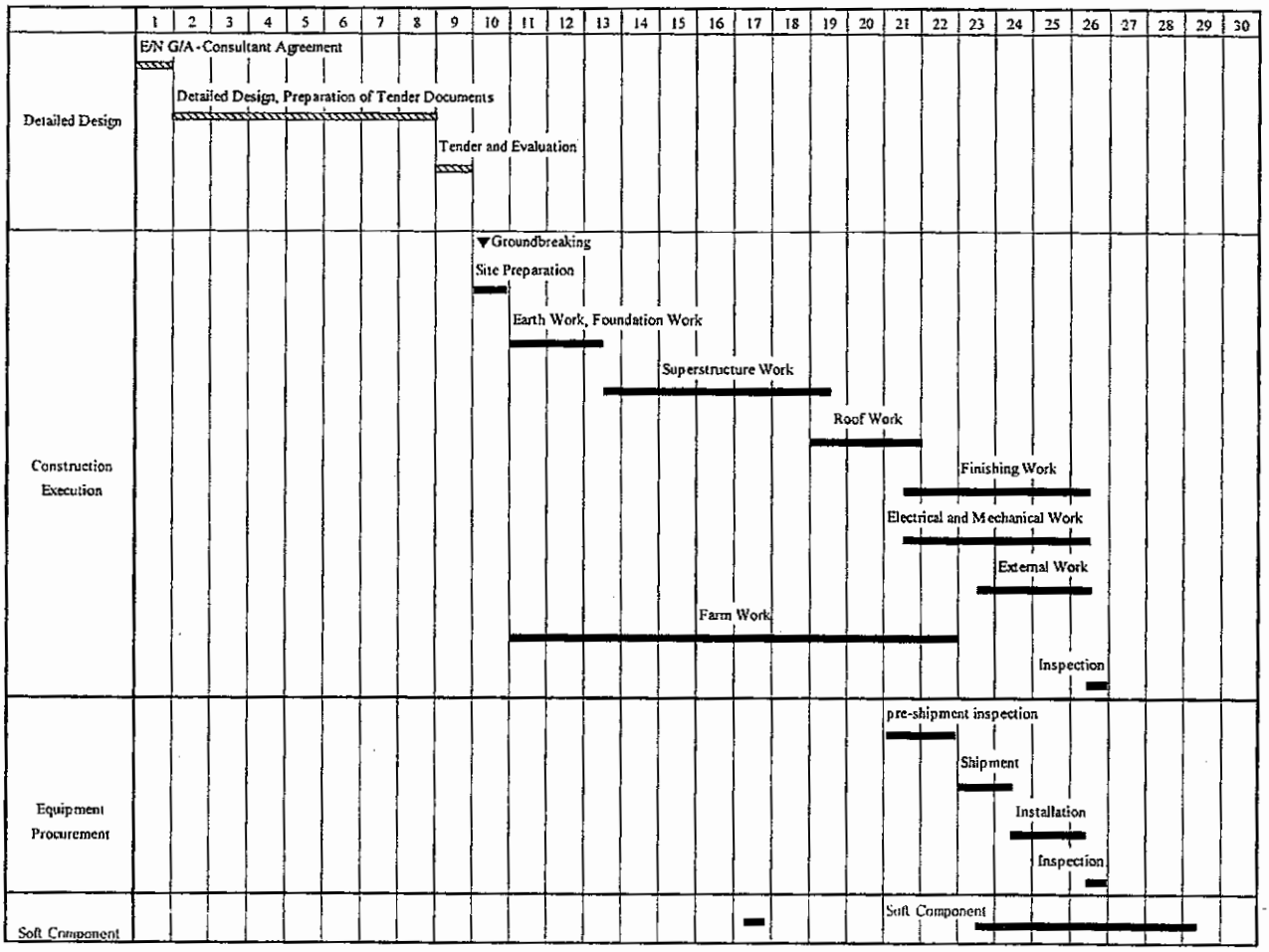


Annex-5

# Financial Flow of Grant Aid



# Project Implementation Schedule



## Annex 7 Major Undertakings to be taken by Each Government

1. Specific obligations of the Recipient

The Recipient shall undertake the specific obligations for the Project as listed in the table below. JICA and the Recipient may agree from time to time separately in writing on the items, deadlines and other matters described in the tables below and the specific obligations of the Recipient.

1) Before the Tender

| NO | Items | Deadline | In charge | Cost | Ref. |
|---|---|---|---|---|---|
| 1 | To open Bank Account (Banking Arrangement (B/A)) | within 1 month after G/A | ERD | 1,500,000 | |
| 2 | To secure the following lands<br>1) Project sites for the Research and Training Complex and the research and training farm. | before notice for prequalification | UoJ | | |
| | 2) temporary access road for the construction<br>3) temporary construction yard and stock yard near the Project area,secure pit and disposal site near the Project area | before commencement | | | |
| 3 | To obtain the planning, zoning, building permit | before commence of the construction work | UoJ | 171,500 | |
| 4 | To clear, level and reclaim the following sites | | | | |
| | 1) Clearance of landmines and unexploded bombs from the project site | before tender | MoHEH<br>UoJ | | |
| | 2) Demolition of unnecessary existing building<br>3) Removal of unnecessary existingtrees<br>4) Leveling and reclaiming the site for the building | before commencement of the construction work | UoJ | 4,800,000 | |

2) During the Project

| NO | Items | Deadline | In charge | Cost | Ref. |
|---|---|---|---|---|---|
| 1 | To bear the following commissions to a bank of Japan for the banking services based upon the B/A | | | | |
| | 1) Requesting budget for the Project | at the initial occasion to request a budget for the Project | MoHEH | | |
| | 2) Advising commission of A/P | within 1 month after the budget of the Project gets authorized by the national congress | ERD, MoHEH | | |
| | 3) Payment commission for A/P | every payment | ERD, MoHEH | | |
| 2 | To ensure prompt unloading, customs clearance of the products at ports of disembarkation in the recipient country and to assist internal transportation in the country of the Recipient of the products | | | | |
| | 1) Marine (air) transportation of the Products from Japan to | during the Project | Contractor<br>Supplier(s) | | |

| | | | | | |
|---|---|---|---|---|---|
| | 2) Tax exemption and customs clearance of the products at the port of disembarkation | during the Project | MoHEH | | |
| | 3) Internal transportation from the port of disembarkation to the project site | during the Project | Contractor Supplier(s) | | |
| 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 | during the Project | MoHEH | | |
| 4 | To exempt corporations and individuals from, without using the Grant, customs duties, internal tax and other fiscal levies such as VAT, commercial tax, income tax, corporate tax, resident tax, fuel tax which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract | during the Project | MoHEH | 56,102,000 for direct tax 237,375,000 for indirect tax | |
| 5 | To bear all the expenses, other than those to be borne by the Japanese Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment | during the Project | MoHEH | | |
| 6 | Construct temporary access road for the construction work | before completion of the construction | UoJ | | |
| 7 | To construct the following facilities: | | | | |
| | 1) The building | before completion of the construction | Contractor | | |
| | 2) The farm | | Contractor | | |
| | 3) The gates and fences in and around the site | | UoJ | 400,000 | |
| | 4) The parking lot | before completion of the construction | Contractor | | |
| | 5) The road within the site | | Contractor | | |
| | 6) The road outside the site | | UoJ | | |
| 8 | To provide facilities for distribution of electricity, water supply, drainage and other incidental facilities necessary for the implementation of the Project outside the site(s) | | | | |
| | 1) Electricity | | | | |
| | a. The distribution power line to the site | before completion of the construction | UoJ | 14,000,000 | |
| | b. The main circuit breaker and transformer | | UoJ | | |
| | c. The drop wiring and internal wiring the site | | Contractor | | |
| | 2) Water Supply | | | | |
| | a. The potable water distribution main to the site | before completion of the construction | N/A | | |
| | b. The water supply system within the site | | Contractor | | |
| | 3) Drainage | | | | |
| | a. The city drainage main ( for storm, sewer and others to the site) | before commencement of the project | UoJ | | |
| | b. The drainage system (for toilet sewer, common waste, storm drainage, and others) within the site | before completion of the construction | Contractor | | |
| | 4) Gas Supply | | | | |
| | a. The city gas main to the site | | N/A | | |
| | b. The gas cylinders | After completion of the construction | UoJ | | |
| | c. The gas supply system within the site | Before completion of the construction | Contractor | | |
| | 5) Telephone System | | | | |
| | a. The telephone trunk line to the main distribution frame/panel (MDF) of the | 1 month before | UoJ | 150,000 | |

| | | | | | |
|---|---|---|---|---|---|
| | building | completion of the construction | | | |
| | b. The MDF and the extension after the frame/panel | before completion of the construction | Contractor | | |
| 6) | Data Communication System | | | | |
| | a. Internet access to the site | 1 month before completion of the construction | UoJ | | |
| | b. Local area network within the site | before completion of the construction | Contractor | | |
| 7) | Furniture and Equipment | | | | |
| | a. General furniture | immediately after completion of the construction | UoJ | | |
| | b. Project equipment | before completion of the construction | Supplier(s) | | |
| | c. Installation of existing equipment, if any | immediately after completion of the construction | UoJ | | |

3) After the Project

| NO | Items | Deadline | In charge | Cost | Ref. |
|---|---|---|---|---|---|
| 1. | To maintain and use properly and effectively the facilities constructed and equipment provided under the Japanese Grant | after completion of the construction | | | |
| | 1) Allocation of maintenance cost | | MoHEH | | |
| | 2) Operation and maintenance structure | | MoHEH UoJ | | |
| | 3) Routine check/Periodic inspection | | UoJ | | |
| | 4) Others | | MoHEH UoJ | | |

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

(Note) Progress of the specific obligations of the Recipient may be confirmed and updated from time to time with written agreement between JICA and the Recipient in the form other than the amendment of the G/A.

Annex-8

# Portions to be borne by the Sri Lankan side

(provisional estimation as of Nov.2015)

Nov.26, 2015
Consultant Team for the Preparatory Survey

## Site Preparation, Infrastructure, and Application Works

Unit LKR

| Item | Q'ty | Total | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|
| 1) Site Clearance and Preparation Works | | | | | | |
| ・Detection of landmines and UXO, and their clearance | 1 set | - | O | | | |
| ・Removal of unnecessary existing trees. | 1 set | 1,200,000 | | 1,200,000 | | |
| ・Demolition of concrete floors at the training farm site | 1,200m$^2$ | 3,600,000 | | 3,600,000 | | |
| ・Gate for the training farm | 2 unit | 400,000 | | | 400,000 | |
| 2) Installation of Utility Work | | | | | | |
| ・Electrical Works | 1 set | 14,000,000 | | | | 14,000,000 |
| ・Network and Telecommunication Works | 1 set | 150,000 | | | | 150,000 |
| 3) Application Procedures | | | | | | |
| ・Planning Clearance (UDA) | 1 set | 170,000 | | 170,000 | | |
| ・Building Construction Application | 1 set | 1,500 | | 1,500 | | |
| 4) Banking Arrangement Fee | 1 set | 1,500,000 | | 1,500,000 | | |
| Total | | 21,021,500 | | 6,471,500 | 400,000 | 14,150,000 |

## Direct Tax

Unit LKR

| Item | Q'ty | Total | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|
| 1) PAYE Tax | 1 set | 3,302,000 | | 194,000 | 2,331,000 | 777,000 |
| 2) Corporate Tax | 1 set | 52,800,000 | | 21,120,000 | 21,120,000 | 10,560,000 |
| Total | | 56,102,000 | | 21,314,000 | 23,451,000 | 11,337,000 |

**Indirect Tax**

Unit LKR

| Item | Q'ty | Total | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|
| 1) VAT | 1 set | 91,875,000 | | 9,187,500 | 45,937,500 | 36,750,000 |
| 2) NBT | 1 set | 60,000,000 | | 6,000,000 | 30,000,000 | 24,000,000 |
| 3) PAL | 1 set | 22,500,000 | | | 11,250,000 | 11,250,000 |
| 4) CIGFL | 1 set | 18,000,000 | | 1,800,000 | 9,000,000 | 7,200,000 |
| 5) CID | 1 set | 45,000,000 | | | 22,500,000 | 22,500,000 |
| Total | | 237,375,000 | | 16,987,500 | 118,687,500 | 101,700,000 |

***Project Monitoring Report***
***on***
***Project for Establishment of Research and Training Complex at the Faculty of Agriculture, University of Jaffna***

***Grant Agreement No. XXXXXXX***
20XX, Month

**Organization Information**

| | |
|---|---|
| **Authority (Signer of the G/A)** | Person in Charge _____<br>Contacts Address: _____<br>Pho ne/FAX: _____<br>Email: _____ |
| **Executing Agency** | Person in Charge _____<br>Contacts Address: _____<br>Pho ne/FAX: _____<br>Email: |
| **Line Agency** | Person in Charge _____<br>Contacts Address: _____<br>Pho ne/FAX: _____<br>Email: _____ |

**Outline of Grant Agreement:**

| | |
|---|---|
| **Source of Finance** | Government of Japan: Not exceeding JPY .<br>Government of Sri Lanka: |
| **Project Title** | |
| **E/N** | Signed date:<br>Duration: |
| **G/A** | Signed date:<br>Duration: |

## 1: Project Description

### 1-1 Project Objective

### 1-2 Necessity and Priority of the Project

- Consistency with development policy, sector plan, national/regional development plans and demand of target group and the recipient country.

### 1-3 Effectiveness and the indicators

- Effectiveness by the project

| Quantitative Effect (Operation and Effect indicators) | | |
|---|---|---|
| Indicators | Original (Yr 2013) | Target (Yr 2021) |
| | | |
| | | |
| | | |
| **Qualitative Effect** | | |
| | | |

## 2: Project Implementation

### 2-1 Project Scope

Table 2-1-1a: Comparison of Original and Actual Location

| | **Original:** *(M/D)* | **Actual:** *(PMR)* |
|---|---|---|
| **Location** | **Attachment(s):Map** | **Attachment(s):Map** |

Table 2-1-1b: Comparison of Original and Actual Scope

| Items | Original | Actual |
|---|---|---|
| | | |

**2-1-2** Reason(s) for the modification if there have been any.

| |
|---|
| |

## 2-2 Implementation Schedule

### 2-2-1 Implementation Schedule

Table 2-2-1: Comparison of Original and Actual Schedule

| Items | Original | | Actual |
|---|---|---|---|
| | DOD | G/A | |
| Cabinet Approval | | - | - |
| E/N | | | |
| G/A | | | |
| Approval of consultant contract | | | |
| Early Mobilization of consultant | | | |
| Detailed Design | | | |
| Budget Request for FY2016 | | | |
| Tender Process of contractor and supplier | | | |
| Approval of contractor and supplier contract | | | |
| Budget Appropriation and Issuance of A/P | | | |
| Construction Period | | | |
| Shipment | | | |
| Custom Clearance | | | |
| Installation and acceptance Check | | | |
| Soft component | | | |
| Project Completion Date | | | |
| Defect Liability Period | | | |

*Project Completion was defined as Completion of Soft component a t the time of G/A.

**2-2-2** Reasons for any changes of the schedule, and their effects on the project.

| |
|---|
| |

## 2-3 Undertakings by each Government

### 2-3-1 Major Undertakings

See Attachment 2.

### 2-3-2 Activities

See Attachment 3.

2-3-3 Report on RD

See Attachment 4.

## 2-4 Project Cost

### 2-4-1 Project Cost

Table 2-4-1a Comparison of Original and Actual Cost by the Government of Japan
(Confidential until the Tender)

| Items | | | Cost (Million Yen) | |
|---|---|---|---|---|
| | Original | Actual | Original | Actual |
| Construction of Facilities | | | | |
| Equipment | | | | |
| Soft Component | | | | |
| Consulting Services | | | | |
| Contingency | | | | |
| Total | | | | |

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar =**Yen

Table 2-4-1b Comparison of Original and Actual Cost by the Government of **

| Items | | | Cost (Thousand MMK) | |
|---|---|---|---|---|
| | Original | Actual | Original | Actual |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Please state not only the most updated schedule

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar =(local currency)

**2-4-2** Reason(s) for the wide gap between the original and actual, if there have been any, the remedies you have taken, and their results.

| |
|---|
| |

## 2-5 Organizations for Implementation

### 2-5-1 Executing Agency:

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

| |
|---|
| **Original:** *(M/D)* |
| **Actual, if changed:** *(PMR)* |

## 2-6 Environmental and Social Impacts

- The environmental monitoring is not required in the Project as this project was categorized as category C in accordance with the GUIDELINES FOR ENVIRONMENTAL AND SOCIAL CONSIDERATIONS of JICA as of April 2010.

# 3: Operation and Maintenance (O&M)

## 3-1 O&M and Management

- Organization chart of O&M
- Operational and maintenance system (structure and the number ,qualification and skill of staff or other conditions necessary to maintain the outputs and benefits of the project soundly, such as manuals, facilities and equipment for maintenance, and spare part stocks etc)

| |
|---|
| **Original:** *(M/D)* |
| |
| **Actual:** *(PMR)* |

## 3-2 O&M Cost and Budget

- The actual annual O&M cost for the duration of the project up to today, as well as the annual O&M budget.

| |
|---|
| **Original:** *(M/D)* |

| |
|---|
| **Actual:** *(PMR)* |

## 4: Precautions (Risk Management)

- Risks and issues, if any, which may affect the project implementation, outcome, sustainability and planned countermeasures to be adapted are below.

| **Original Issues and Countermeasure(s):** *(M/D)* | |
|---|---|
| Potential Project Risks | Assessment |
| 1. Delay of budget appropriation | Probability: H/M/L |
| | Impact: H/M/L |
| | Analysis of Probability and Impact: |
| | |
| | Mitigation Measures: |
| | |
| | Action during the Implementation: |
| | |
| | Contingency Plan (if applicable): |
| | |
| 2. | Probability: H/M/L |
| (Description of Risk) | Impact: H/M/L |
| | Analysis of Probability and Impact: |
| | |
| | Mitigation Measures: |
| | |
| | Action during the Implementation: |
| | |
| | Contingency Plan (if applicable): |
| | |
| 3. | Probability: H/M/L |
| (Description of Risk) | Impact: H/M/L |
| | Analysis of Probability and Impact: |
| | |
| | Mitigation Measures: |
| | |
| | Action during the Implementation: |
| | |
| | Contingency Plan (if applicable): |
| | |
| **Actual issues and Countermeasure(s)** | |
| (PMR) | |

## 5: Evaluation at Project Completion and Monitoring Plan

**5-1 Overall evaluation**

Please describe your overall evaluation on the project.

**5-2 Lessons Learnt and Recommendations**

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

**5-3 Monitoring Plan for the Indicators for Post-Evaluation**

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

Attachment

1. Project Location Map
2. Undertakings to be taken by each Government
3. Monthly Report
4. Report on RD
5. Yearly disbursement plan
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)

(Final Report Onl y)

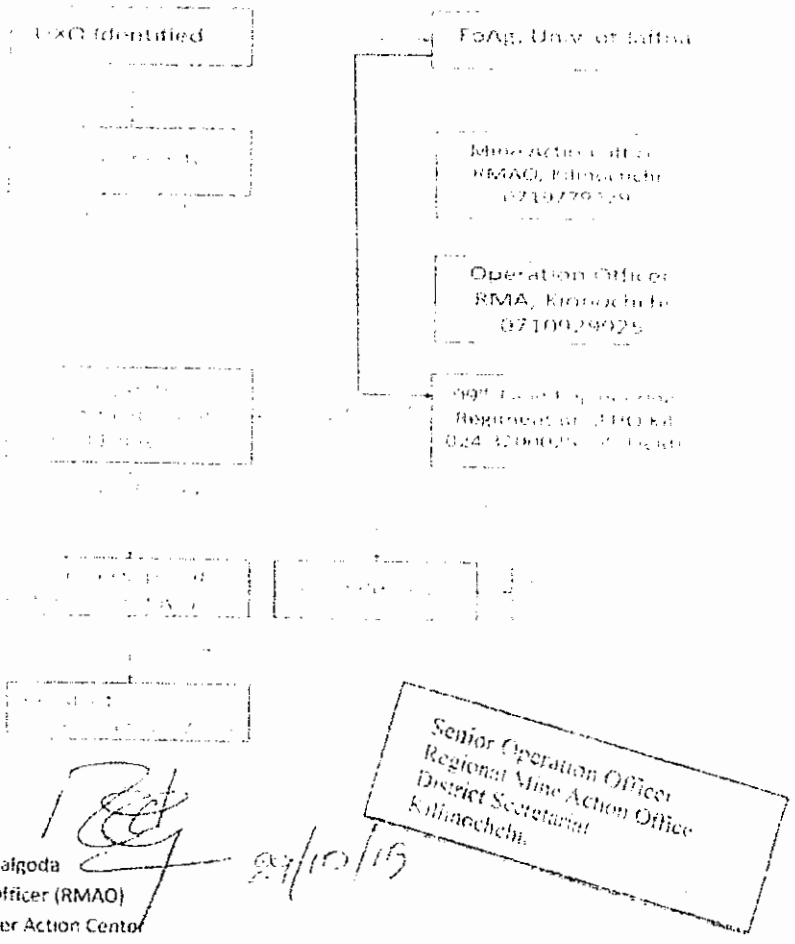
Annex 10

## UXO Clearance Procedure

නැවත පදිංචි කිරීම, ප්‍රතිසංස්කරණ හා හින්දු ආගමික කටයුතු අමාත්‍යාංශය
மீள்குடியேற்றம்,புனர்நிர்மாணம் மற்றும் இந்துமத அலுவல்கள் அமைச்சு
**Ministry of Resettlement, Reconstruction and Hindu Religious Affairs**
බිම්බෙවසි සඳහා කියාකාරී ජාතික මධ්‍යස්ථානය
தேசியநிலக்கண்ணிவெடிசெயற்பாட்டுநிலையம்
**National Mine Action Centre (NMAC)**

No.302, Galle Road, Colombo 04

MRRHRA/NMAC/RMAO/OPS/37 — 29th Oct 2015




29/10/15

DAND Iddamalgoda
Operations Officer (RMAO)
National Miner Action Center
Ministry of Resettlement, Reconstruction and Hindu Religious Affairs

# Preparatory Survey on the Project for Establishment of Research and Training Complex of Faculty of Agriculture, University of Jaffna, Sri Lanka

## Soft Component Plan

November 2015

Oriental Consultants Global Co., LTD

Earl Consultants Incorporated

# Table of Contents

## Contents

## 1. Background of planning the Soft Component

”Preparatory Survey on the Project for Establishment of Research and Training Complex of Faculty of Agriculture, University of Jaffna” which is being conducted in Democratic Socialist Republic of Sri Lanka (hereinafter referred to as “Sri Lanka”)is to support in building the necessary research facilities and farm as well as procuring equipment for the Faculty of Agriculture(hereinafter referred as “FoAg”) of University of Jaffna((hereinafter referred as “UOJ”), which was evacuated to the Jaffna under the influence of civil war and was later moved back and rebuilt its campus in Kilinochchi.

After end of the civil war in 2009 in the Northern and Eastern area of Sri Lanka, the internally displaced people started to return and resettled and the destroyed infrastructure was started to be rebuilt. Now, 5 years after the civil war, efforts are being made in improving the livelihood of the resettled residents and in facilitating the regional economic activity. However, in agriculture in which most of the residents are engaged, many of the farmers are not receiving enough administrative support of appropriate knowledge and agricultural technology, leaving them under a vulnerable environment for agriculture that caused low productivity, making improvement of agricultural productivity a pressing issue.

Because FoAg is the only higher education institution in agriculture in the northern area, the role expected in education and research activities is great. During the 25 years of evacuation to Jaffna, although education towards student, research, as well as training to the agricultural extension workers from the Agriculture Department have been continuously conducted, the facilities and equipment were very constrained, resulting in a limited learning and research activity. In order to improve agricultural technology and develop a more effective and efficient human resource development in the Northern Province, it is important to carry out practical research and education that meet the climate and soil conditions in the Northern area. Therefore, the implementation of this project holds a significant meaning in supporting the development of research facilities, equipment, and agricultural field.

When evacuating in Jaffna, since experiments and practical training have been conducted with the help of other departments or other universities by borrowing the necessary facilities and equipment, the opportunity for experimental and practical training in the class and for the teaching staff to conduct research were very limited. In view of the limited opportunities for the teaching staff to conduct research and practical training, improving training implementation and research capability of the teaching staff in the FoAg is necessary for the effective use of facilities and equipment to be procured in this project.

Moreover, the norm in Sri Lanka is to have the “technical officer” in charge of the laboratory to do the general management of the laboratory (including the equipment, tools, and reagents) whereas the “assistant” to support the experiment. In order to maintain and carry out effective experiments and practical training using the equipment installed in this project, guidance to these “technical officers” and “laboratory attendants” is very important.

The situation is same for the research and training farm, which will be developed under this project, since FoAg does not have one. Although currently staff recruitment is still underway, it is important to establish an operation and management system for the research and training farm.

## 2. Objectives of the Soft Component

By conducting Soft Component, the objectives below shall be achieved.

I. A condition where classes that incorporate experiments and practical trainings are provided in the faculty of Agriculture of University of Jaffna

II. A condition where the management of each laboratory, specifically: laboratory instruments, reagents, and samples are appropriately conducted and the experiments are efficiently carried out in the faculty of Agriculture of University of Jaffna.

III. The training farms are properly managed in the Faculty of Agriculture, University of Jaffna.

## 3. The Output of Soft Component

By conducting Soft Component, the expected direct outputs are as follow:

I. The teaching staff will learn experiments and teaching methods of practical classes using the equipment and facilities developed under this project, and will give lessons that incorporate them.
(1) Reference books/materials shall be made for experiments and trainings conducted in practical classes
(2) Teaching staff shall learn experiments and teaching methods of practical classes, and conduct experiments and trainings.

II. In each department, a system that focuses on the Technical Officers and Laboratory Attendants to properly manage the laboratory's equipment and materials for experiments shall be built.
(1) Equipment for experiments shall be properly stored and managed.
(2) Inventory management shall be properly conducted.

III. Farm Manager and other farm management staff will be able to properly manage the farm.
(1) Farm management plan shall be prepared.
(2) The farm management implementation system shall be completed.

## 4. Results achievement verification method

The results and its verification method of Soft Component are as follow Note that the teaching staffs' capacity building is considered achieved only when Output I to III are achieved.

Table1. The Outputs and Their Achievement Indicators

| Outputs | | Achievement Indicators | Indicating Method |
|---|---|---|---|
| Level 1 | Level 2 | | |
| I. Classes will be given that incorporate experiments and practical training | (1) Reference books/materials will be made for experiments and practical training conducted in classes. | ・The development of reference books/materials. | Visual confirmation of reference books/ materials by Soft Component Expert |
| | (2) Experiments and practical training will be conducted | ・The number of experiments and practical training increases<br>・There will be an increase in the number of research plans that incorporate experiments. | Visual confirmation of class implementation report and research plan by Soft Component Expert |
| II. A system to properly manage the laboratory's equipment shall be built | (1) Equipment and tools shall be properly stored and managed. | ・The development of an organized equipment and glassware checklist<br>・The development of a Manual for cleaning, organizing, and managing the equipment and glassware. | Visual confirmation of organized checklists and equipment management manual by Soft Component Expert |
| | (2)Inventory management shall be | ・The development of an Inventory List | Visual confirmation of Inventory List by Soft |

| | | | |
|---|---|---|---|
| | properly conducted. | | Component Expert |
| III. The training and research farm shall be properly managed. | (1) Farm management plan shall be prepared.<br>(2) The farm management implementation system shall be established. | ・The development of annual plan regarding crop acreage and water supply management.<br>・The development of farm management handbook.<br>・The establishment of farm training committee.<br>・The calculation of the necessary farm management annual cost.<br>・The development of agricultural machine maintenance plan. | Visual confirmation of farm management plan , handbook, maintenance cost estimation, and equipment maintenance plan by Soft Component Expert |

## 5. The activity of Soft Component (Input Plan)

The activities towards achieving each result are as follow.

### (1) Activity Plan

Table 2. Activity Plan by Outputs

| Outputs | | Activity Items | Indicating Method |
|---|---|---|---|
| Level 1 | Level 2 | | |
| I. Classes will be given that incorporate experiments and practical training | (1) Reference books/materials will be made for experiments and practical training conducted in classes.<br>(2) Experiments and practical training will be conducted | ・Confirm the experiment & training implementation status of each department and the knowledge of instructors.<br>・Introduce experiment & training from the syllabus and develop its implementation objectives together with the instructors of each department.<br>・Make a list of experiments & training that require reference books.<br>・Create reference and handbooks together with the instructors of each department<br>・Give guidance towards instructors of each department based on the reference and handbooks. | ・Visual confirmation of reference books/ materials by Soft Component Expert<br>・Visual confirmation of class implementation report and research plan by Soft Component Expert |
| II. A system to properly manage the laboratory's equipment shall be built | (1) Equipment and tools shall be properly stored and managed. | ・Explain in details the method of cleaning, organizing, and managing the equipment.<br>・Create and use the equipment's organized checklist.<br>・Create equipment's management manual together with the person in charge. | ・Visual confirmation of organized checklists and equipment management manual by Soft Component Expert |
| | (2)Inventory management shall be properly conducted. | ・Explain the management method.<br>・Confirm the inventory of equipment, glassware, and chemicals.<br>・Teach how to manage the inventory list. | ・Visual confirmation of Inventory List by Soft Component Expert |

| | | | |
|---|---|---|---|
| III. The training and research farm shall be properly managed. | (1) Farm management plan shall be prepared.<br>(2) The farm management implementation system shall be established. | ・ Develop an annual plan regarding crop acreage and pumping management together with the farm administrator and farm users (Faculty of Agriculture).<br>・ Establish "Farm training committee (tentative)"<br>・ Put together a handbook on how to manage the farm along with farm administrator and farm users (both used and unused).<br>・ Calculate the necessary farm management annual cost along with farm administrator and farm users.<br>・ Put together a plan for agricultural machine maintenance and its method along with farm administrator and farm users. | ・ Visual confirmation of farm management plan , handbook, maintenance cost estimation, and equipment maintenance plan by Soft Component Expert |

Table 3. Activity Plan by Dispatch Time

<table>
<tr><th colspan="2">I Experiment & training implementation</th><th colspan="2">II Equipment management</th><th colspan="2">III Farm management</th></tr>
<tr><td>1st dispatch (on 10th, 1 week in Sri Lanka)</td><td>・ Confirm experiment & training implementation status<br>・ Plan the target subjects and content outline</td><td>In Japan</td><td>Pre-dispatch preparation</td><td>In Japan</td><td>Pre-dispatch preparation</td></tr>
<tr><td>In Japan</td><td>Pre-dispatch preparation</td><td rowspan="5">1st dispatch (on 30th)</td><td rowspan="5">[Experiment & training equipment]<br><br>・ Explain the detailed method of cleaning, organizing, and managing the equipment and glassware.<br>・ Create and use the organized equipment checklist.<br>・ Create equipment maintenance manual along with the person in charge from the FoAg.<br><br>[Tools & reagents]<br><br>・ Give guidance on inventory management method.<br>・ Confirm the inventory of tools and reagents.<br>・ Create an inventory lost and teach the filling method.</td><td>1st dispatch (on 15th)</td><td>Together with the Farm Managers and farm users (Faculty of Agriculture), create the following:<br>・ Confirm the implementation status and issues of farm management<br>・ Prepare annual plan about crop acreage and pumping management.<br>・ Establishment of "Farm training committee"<br>・ Give instruction to prepare arm (used and unused) management handbook。</td></tr>
<tr><td>2nd dispatch (on 10th , 1 week in Sri Lanka)</td><td>・ Confirm the detailed implementation status and issues of experiment & training by department<br>・ Confirm the knowledge and skill level of each department's experiment & training instructors<br>・ Confirm the syllabus' content and set the implementation goals of experiment & training<br>・ Study the experiment & training that require reference books</td><td rowspan="2">In Japan</td><td>・ Prepare the farm management handbook (via email)</td></tr>
<tr><td>In Japan</td><td>・ Prepare the specific reference documents (adjust with Sri Lanka by email)</td><td>2nd dispatch (on 15th)</td><td>・ Finalize the farm management handbook<br>・ Calculation of the necessary farm management annual cost<br>・ Agricultural machine maintenance plan</td></tr>
<tr><td>3rd dispatch (on 14th, 10 days in Sri Lanka)</td><td>・ Give experiment & training guidance based on the prepared reference and handbooks.<br>・</td><td colspan="4"></td></tr>
</table>

| | | | | | |
|---|---|---|---|---|---|
| | ・ Review and revise the reference and handbooks based on the practice | | | | |
| In Japan | Create completion report | In Japan | Create completion report | In Japan | Create completion report |

### （2） Input plan

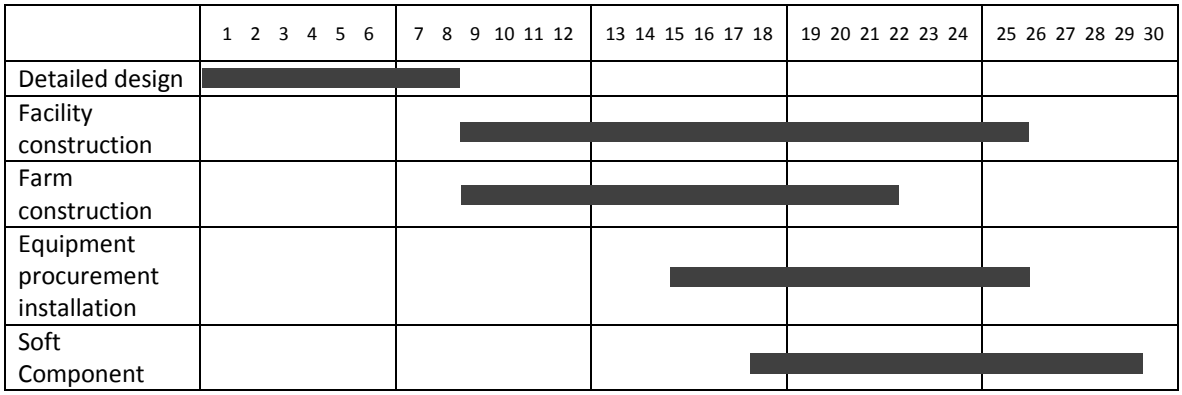
In order to carry out the above activities, the advisors below need to be dispatched. Since the expertise differs based on the department, other than Agricultural economy (because only conduct few experiment & training), we are considering to dispatch 1advisor per department for all departments (except for department of agricultural economy).

| | | |
|---|---|---|
| 1） | Crop science experiment advisor | 1 person |
| 2） | Animal husbandry experiment advisor | 1 person |
| 3） | Soil analysis and organic fertilizers experiment advisor | 1 person |
| 4） | Food analysis and processing experiment advisor | 1 person |
| 5） | Agriculture biology experiment advisor | 1 person |
| 6） | Agricultural engineering experiment advisor | 1 person |
| 7） | Farm management advisor | 1 person |
| 8） | Equipment maintenance and management advisor | 1 person |

## 6． Procurement Methods of Soft Component Implementation Resources

In implementing this Soft Component in this project, advisors from Tokyo University of Agriculture will be dispatched to Sri Lanka to give guidance.

## 7． Implementation Process of Soft Component




## 8． Deliverables of Soft Component

Below are the deliverables:

1） Soft Component Completion Report (Japanese & English)
2） Reference books for the experiment & training

## 9. Responsibility of the Implementing Agency in Sri Lanka

Each target department in the Faculty of Agriculture, University of Jaffna, will assign the teaching staff, technical officers and laboratory attendants to participate in the skill advisory for Soft Component. Regarding the reference/ handbook as one of the deliverables, it is necessary to make sure its full use in the experiment and training as well as laboratory management.

# TECHNICAL NOTES

**Preparatory Survey on the Project for**
**Establishment of Research and Training Complex at the Faculty of Agriculture,**
**University of Jaffna in the Democratic Socialist Republic of Sri Lanka**

The preliminary planning for the project components, which were agreed and attached on the Minutes of Discussion (M/D) signed on May 19, 2015 (herein after described as "the components"), was discussed between members of the Faculty of Agriculture, University of Jaffna (UoJ), and the JICA survey team(JST) from May 7 to May 30, 2015. The result of discussions were summarized as follows. The components and plans described here are subject to further study and discussions with JICA in Japan.

## 1. Architectural Planning

Through the series of discussions, the facility components and conceptual plan of the proposed buildings were developed and agreed as shown in the following appendices.

- Appendix 1 Floor area schedule of the proposed facility components
- Appendix 2 Site plan of the proposed facility
- Appendix 3 Floor plan of the proposed facility

These conceptual plan will be a base for developing outline design of the buildings including room layout plan, and cost estimation.

## 2. Research and Training Farm Planning

### 2.1 Size of Crop- and Livestock Research and Training Farms

(1) Crop Research and Training Farm

Size of crop farm is decreased from 90Ac to 14.15 Ac with consideration of the followings:

a) Area of sports complex with 58 Ac within the proposed farm site; and,

b) Capacity for operation and maintenance.

Components of the farm is shown in the Appendix-4. The size of each unit will be adjusted in accordance with the result of topographic survey.

(2) Livestock Research and Training Farm

In the Goat rearing unit, total 30 goats are planned to be reared annually. The daily consumption amount of green fodder grass per a goat is around 6 kg in Sri Lanka. Therefore the fodder grass of 65,700kg (30 goats x 6kg/goat/day x 365) will be needed in a year.

Based on the yield of pasture crops below, total 5.0 Ac of fodder grass farm will be developed.

a) 4 Ac of Fodder grass, Coimbatore 3 (CO3) and Coimbatore 4 (CO4) (18,000kg/Ac/year):

72,000kg/year

b) 1 Ac of fodder trees and pasture: (supplemental use)

(3) Area developed by UoJ

The area of 15 Ac nearby livestock barn funded by WB, has been developed by the UoJ, is not included in this Project.

## 2.2 Design of the Irrigation facilities

(1) Water Requirement for Crops- and Livestock Research and Training Farms

a) Evapotranspiration (ETo) and Effective Rainfall

- ETo with effective rainfall is estimated by using the data of Jaffna Meteorological Station.
- Analysis of water requirement will be based on the criteria of FAO.

b) Crop Calendar

- Crop calendar prepared by Department of Agronomy will be used to estimate the water requirement of the all units including pasture land.

c) Availability of Water for the Training Farm of Crops and Livestock

- Capacity of existing well in the farm is estimated by the pumping test. Based the test result, total design water volume will be fixed.

(2) Irrigation System

a) Pipeline system

- Closed pipeline system will be installed connecting with existing pipeline system of UoJ.
- Performance of the irrigation system has been determined by the existing well facility with elevated tank. From the hydraulic analysis, should the head losses be large, JICA study team will request UoJ to replace the main supply pipe having adequate size.

b) Hydrant in the Unit

- Hydrant (outlet) will be installed to each unit.
- In case of water shortage against the demand, UoJ shall select the unit to be irrigated according to importance of the target crops

c) Irrigation hour

- 8 hours from 8:00 to 16:00 is adopted to the irrigation system
- However, according to the result of hydraulic analysis, the operation of more than 8 hours will be required.

(3) Drainage canal

Earthen drainage canal will be installed to each unit. Used water will be drained to the out of farm therefore UoJ shall prepare the main drainage canal around the farm.

(4) Farm Road

Farm road within the site will be developed as follows:

- Width of farm road installed in each unit will be 3.0m.

- The width of main farm road shall meet with the one of existing road.

### 2.3 Construction Work Items for the Crop- and Livestock- Research and Training Farms

(1) Land leveling works

Land leveling works will be applied to the unit in case the irregularity of plus or minus 10cm would be detected from the topographic survey result.

Scope of the land leveling work is shown in the Attachment-5.

(2) Trees to be maintained

a) Manilhara hexandra (Palu tree)

b) Chlroxylon switenia (Brutha)

c) Deypetus ebonum (Ebony)

d) Azadiracta indica (Neem)

e) Cassia spp.

f) Albizzia

## 3. Equipment Planning

Based on the review of curriculum, syllabus, and research themes of each department, the draft list of candidate equipment attached as Annex-10 were confirmed and agreed by both side. Contents of equipment for the Department of Agricultural Engineering shall be carefully examined, so that the "Environment and Hydro Research Laboratory" under the Department function well in accordance with the Syllabus.

It was confirmed that the list of equipment, priority of these equipment and specifications of each equipment will be studied and developed in accordance with the following criteria.

### Criteria for selection of equipment

(1) Following equipment will be excluded from the project.

- Equipment which is overlapped with the existing equipment. (Number of necessary equipment will be considered.)
- Simple equipment & tools which can be purchased easily at low-cost, or easily made in Sri Lanka.
- General glassware and chemical agents
- Equipment which operation and maintenance cost is very high

(2) Criteria for prioritizing equipment

A: Essential equipment for general experiments and practices of students and research activities with high versatility and high frequency of use.

B: Necessary equipment for the general experiments and practices, or prioritized research activities, even though which versatility and frequency of use are limited. (e.g. analytical devices)

C: Other equipment (e.g. high-degree analyzing devices with limited usage, equipment which can

be replaced by other equipment with high versatility, accessories less related to the substantial function of the main equipment, software for computer, etc.)

## 4. Utility Planning

### 4.1 Basic Concept of Utility Design

As a result of the series of discussions, it has been identified that the new Research and Training Complex will be provided with the following utilities:

| **Electrical work** | **Plumbing work** |
|---|---|
| 1) Electrical Power Supply System | 1) Water Supply System incorporating a new deep well |
| 2) Stand-by Generator | 2) Sewerage Drainage System |
| 3) Main Feeder Wiring System | 3) Plumbing Fixtures |
| 4) Lighting Fixtures | 4) Liquid Petroleum Gas Supply System |
| 5) Telephone System | 5) Fire Extinguishers |
| 6) Local Area Network System | 6) Sewerage Treatment Plant (Septic tanks & Soaked tanks) |
| 7) Manual Fire Alarm System | **Air conditioning &Ventilation work** |
| 8) Lightning Protection System | 1) Air conditioning System |
| | 2) Mechanical Ventilation System |

### 4.2 Utilities to be equipped in each room including laboratory:

Both parties have confirmed that the items of utility such as Air condition system, socket outlets, telephone outlets and LAN Outlets should be reflected precisely with the equipment schedule and the Sri Lankan side's requests in each room including laboratories.

Please refer the following plans:

| | |
|---|---|
| Appendix-7 | Schedule of Utilities per Room |
| Appendix-8 | Power Supply Plan |
| Appendix-9 | Network Extension Plan |

## 5. Establishment of Operation and Maintenance System

The human and financial resources being allocated currently have not been sufficient for proper operation and maintenance of the existing utilities, and the document system for maintenance, such as O&M manuals, operation records, etc. has not been established properly.

The Faculty of Agriculture is recommended to establish an appropriate integrated O & M system for the existing and new facilities and equipment.

## 6. Unexploded Ordinance (UXO) Clearance

(1) UoJ officially requested to the District Secretary Kilinochchi for land surface survey with the land mine technical clearance, and implementation agency the Halo Trust conducted the preliminary investigation. (refer to Appendix-12)

(2) UoJ officially requested to the District Secretary Kilinochchi to issue the official document of UXO clearance procedure.

(3) UoJ assured to obtain the certificate of mine clearance as mentioned in the M/D before end of June.

## 7. Project Cost born by Sri Lankan Side

Both parties have mutually confirmed the major undertakings to be implemented by both side described in the Attachment-11, and agreed that JICA study team will prepare the necessary budget for these works, and UoJ will provide necessary information for that purpose.

## 8. Information on future budget and staffing

The UOJ agreed information on the budget and staff for 2016 will be provided to JICA Study Team apon approval.

Kilinochchi, May 30, 2015

Dr. S. Sivachandiran,
Dean,
The Faculty of Agriculture,
University of Jaffna

Ms. Yuko SASA
Chief Consultant
Preparatory Survey Team
Japan International Cooperation Agency

Appendices:

| | |
|---|---|
| Appendix 1 | Building Area Schedule |
| Appendix 2 | Site Layout Plan of Research and Training Complex |
| Appendix 3 | Floor Plan of Research and Training Complex |
| Appendix 4 | Area Schedule of the Farm |
| Appendix 5 | Scope of Leveling Work |
| Appendix 6 | Site Layout Plan of Research and Training Farms |
| Appendix 7 | Schedule of Utilities per Room |
| Appendix 8 | Power Supply Plan |
| Appendix 9 | Network Extension Plan |
| Appendix 10 | List of Candidate Equipment |
| Appendix 11 | Extent of Works |
| Appendix 12 | Letter to request UXO clearance and flow chart of clearance procedure |

## Appendix-1 Building Area Schedule

### Current Situation

| Existing Building | Area (m2) | Remarks |
|---|---|---|
| **Department of Agronomy** | | |
| Agronomy Laboratory | 288 | Labo space. + Rooms for Lecturer's and Tech.l Officer's, Equipment, Preperation and Storage |
| | | |
| **Department of Animal Science** | | |
| Animal Scienc Laboratory | 288 | Labo space + Lecturer's and Technical Officer's rm, Storage, etc. |
| | | |
| | | |
| **Department of Agri - Chemistry** | | |
| Laboratory A | 288 | Labo space + Technical Officer's space and Prep. space |
| Laboratory B | 288 | Half used for Labo space, and half used for Lecturer's and Technical Officer's. |
| **Department of Agri - Biology** | | |
| Student Laboratory | 270 | Labo space + staff room, storage |
| Reserch Laboratory | 170 | Labo space + staff room, storage |
| Staff Room GFL | 157 | Room for Head, lecturers, Technical Officer, Internet Lab.etc. |
| Hall | 121 | |
| **Department of Agri - Engineering** | | |
| Drawing Room | 114 | |
| Workshop | 39 | |
| Laboratory | 39 | |
| Staff Room 1FL | 135 | 1 Room for Head, 6 Rooms for lecturers |
| **Department of Agri - Economics** | | |
| Lecture Hall | 135 | |
| Staff Room | | 1 Room for Head, 6 Rooms for lecturers |
| | | |
| | | |
| | | |
| | | |
| | | |
| **Common** | | |
| Lecture Hall (Admin. Building) | 147 | 2 Lecture Halls |
| Lecture Hall (Next to Adm. Building) | 212 | 2 Lecture Halls |
| | | |
| | | |
| | | |
| | | |

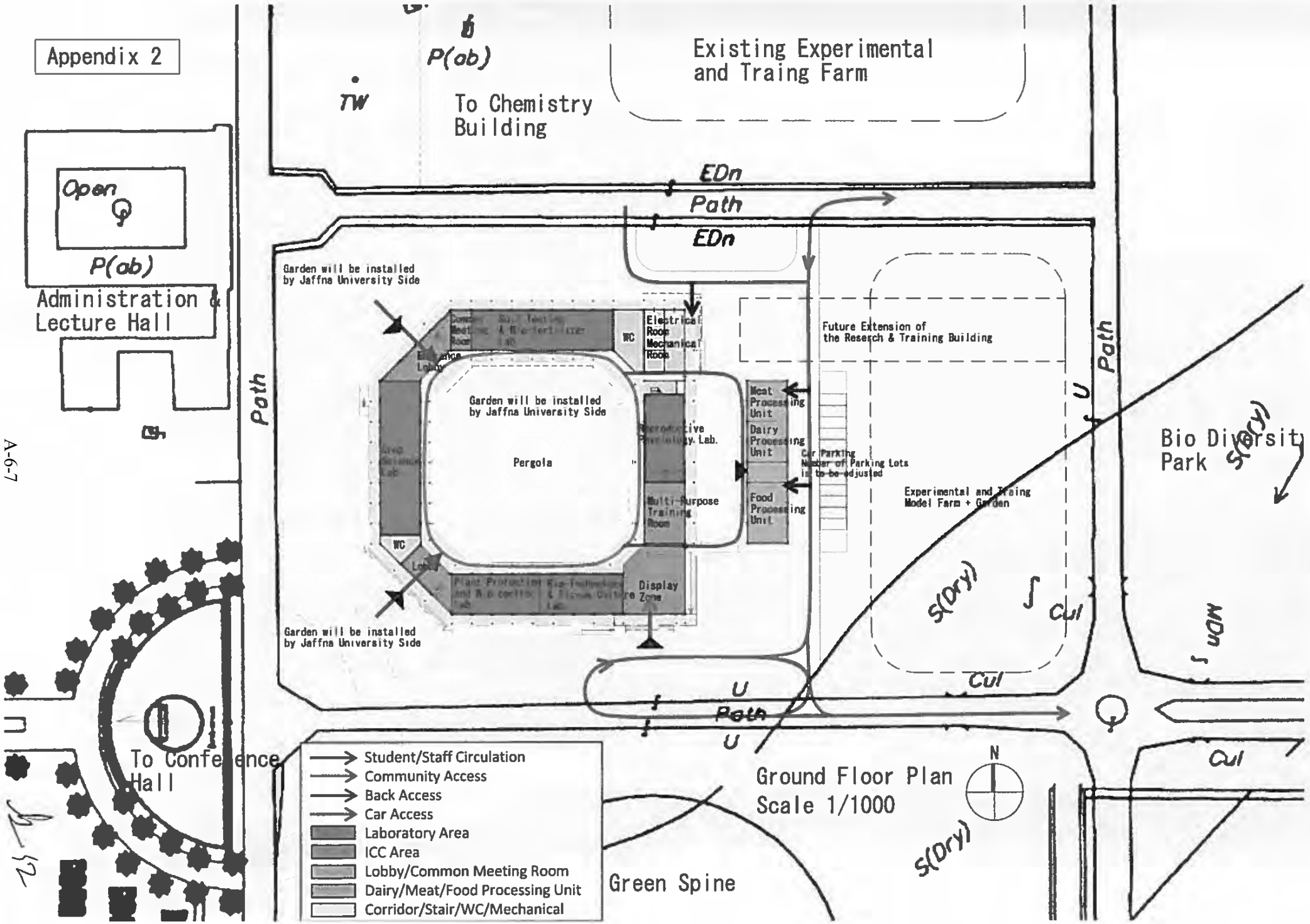
### Future Plan

| Existing Building | Area (m2) |
|---|---|
| **Department of Agronomy** | |
| Laboratory for Core Course (including Tech. Officer's rm) | 288 |
| | |
| **Department of Animal Science** | |
| Laboratory for Core Course (including Tech. Officer's rm) | 288 |
| | |
| | |
| **Department of Agri - Chemistry** | |
| Laboratory for Core Course (including Tech. Officer's rm) | 288 |
| Laboratory for Core Course (including Tech. Officer's rm) | 288 |
| **Department of Agri - Biology** | |
| Laboratory for Core CourseA | 270 |
| Laboratory for Core CourseB | 170 |
| Staff Room GFL | 157 |
| Hall | 121 |
| **Department of Agri - Engineering** | |
| Drawing Room | 114 |
| Workshop | 39 |
| | |
| | |
| **Department of Agri - Economics** | |
| Lecture Hall | 135 |
| | |
| | |
| | |
| | |
| | |
| | |
| **Common** | |
| Lecture Hall (Admin. Building) | 147 |
| Lecture Hall (Next to Adm. Building) | 212 |
| | |
| | |
| | |
| | |

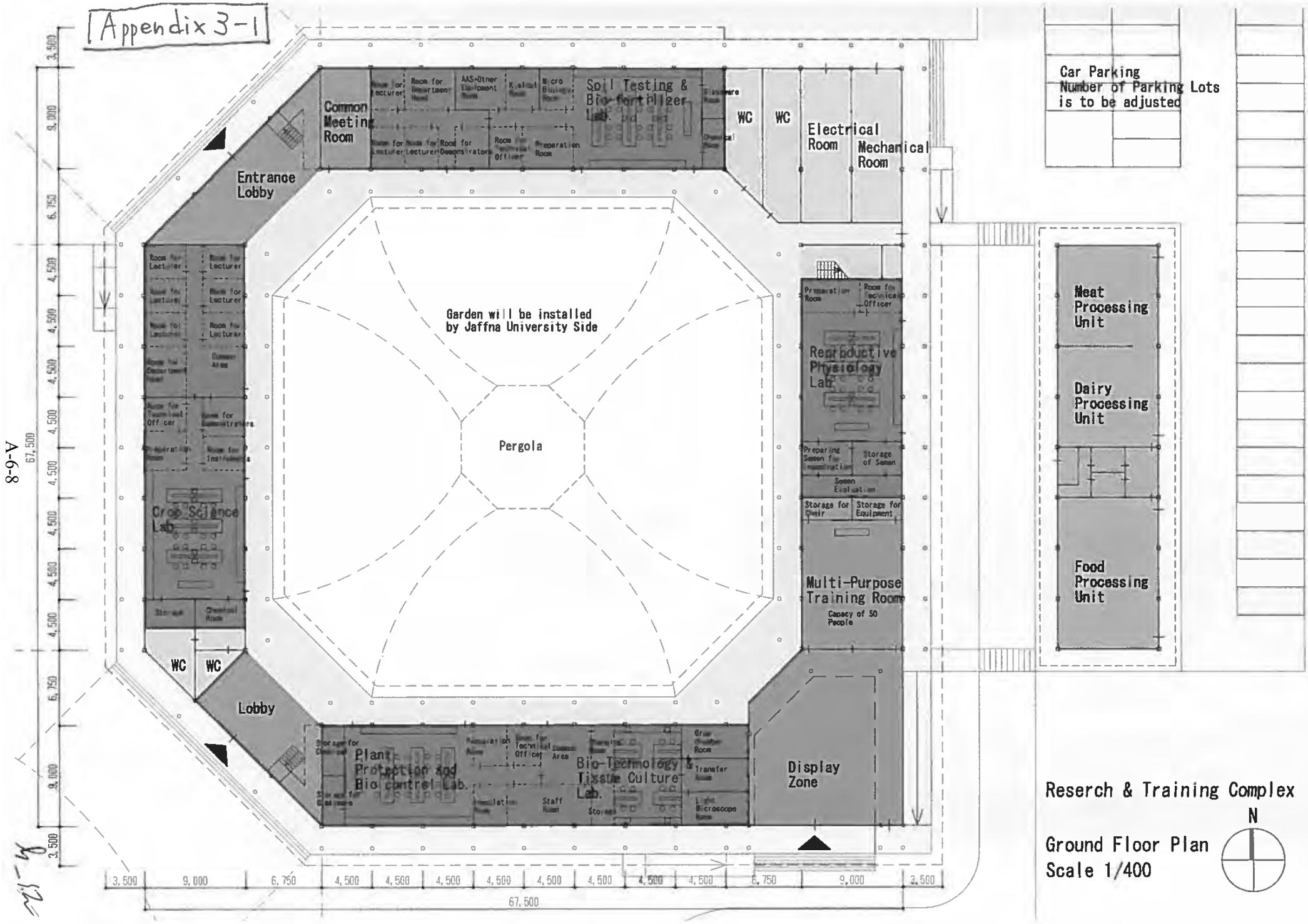
| Reserch & Training Complex | Area (m2) | Remarks |
|---|---|---|
| **Department of Agronomy** | | |
| Crop Science Laboratory | 172 | Capacity of 20 Students, 1 Room for Technical Officer |
| Staff Room | 135 | Rms for Head, 6 Lecturers, 4-5 Demonstrators with Common Area |
| **Department of Animal Science** | | |
| Animal Nutrition Laboratory | 189 | Capacity of 20 Students, 1 Room for Technical Officer |
| Staff Room | 108 | Rms for Head, 6 Lecturers, 4-5 Demonstrators with Common Area |
| Reproductive Physiology Laboratory | 176 | Including 1 Room for Technical Officer |
| **Department of Agri - Chemistry** | | |
| Soil testing and bio fertilizer Laboratory | 200 | Capacity of 20 Students, 1 Room for Technical Officer |
| Staff Room | 83 | Rms for Head, 6 Lecturers, 4-5 Demonstrators with Common Area |
| Food analysis and processing Laboratory | 200 | Capacity of 20 Students, 1 Room for Technical Officer |
| Staff Room | 83 | Rms for Head, 6 Lecturers, 4-5 Demonstrators with Common Area |
| **Department of Agri - Biology** | | |
| Plant Protection and Bio control Laboratory | 175 | Capacity of 20 Students, Rooms for Staff and Technical Officer |
| Bio-Technology and Tissue Culture Laboratory | 167 | 1 Room for Staff and 1 Room for Technical Officer |
| | | |
| | | |
| **Department of Agri - Engineering** | | |
| Environment and Hydro Research Laboratory | 148 | Capacity of 20 Students, 1 Room for Technical Officer |
| Staff Room | 135 | Rm for Head, 6 Lecturers, 4-5 Demonstrators with Common Area |
| | | |
| | | |
| **Department of Agri - Economics** | | |
| Econometrics Laboratory | 100 | Capacity of 25 Students, |
| Staff Room | 156 | Rm for Head, 6 Lecturers, 4-5 Demonstrators with Common Area |
| **Dairy/ Meat/ Food Processing Unit** | 324 | |
| | | |
| **ICC Zone** | | |
| Multi- Purpose Training Room | 122 | Capacity of 75 people |
| Display Area | 205 | |
| **Common** | | |
| Lecture Hall | 56 | Capacity of 50 students |
| Common Meeting Room | 41 | |
| Analitical Room | 54 | |
| Lobby | 182 | Including Business Unit |
| WC/Mechanical Room/Storage | 637 | |
| Total | 3848 | |
| **Corridor (Outdoor)** | 1178 | |

| Farm Related Facilities | | Remarks |
|---|---|---|
| Crop Harvest Processing Unit | 64 | |
| Primary sample preparation Room | 64 | |
| Farm Machinery Storage | 128 | |
| Farm Machinery Workshop | 96 | |
| Farm Lecture Room | 128 | |
| Office/WC/Storage/Gas Room | 87 | |
| Total | 567 | |

Appendix 2


Existing Experimental and Traing Farm
To Chemistry Building
P(ob)
TW
EDn
Path
Open
Administration & Lecture Hall
Garden will be installed by Jaffna University Side
Pergola
Multi-Purpose Training Room
Display Zone
WC
Electrical Room
Mechanical Room
Meat Processing Unit
Dairy Processing Unit
Food Processing Unit
Future Extension of the Reserch & Training Building
Experimental and Traing Model Farm + Garden
Bio Diversity Park
To Conference Hall
Green Spine
Ground Floor Plan
Scale 1/1000
N
Student/Staff Circulation
Community Access
Back Access
Car Access
Laboratory Area
ICC Area
Lobby/Common Meeting Room
Dairy/Meat/Food Processing Unit
Corridor/Stair/WC/Mechanical

Appendix 3-1



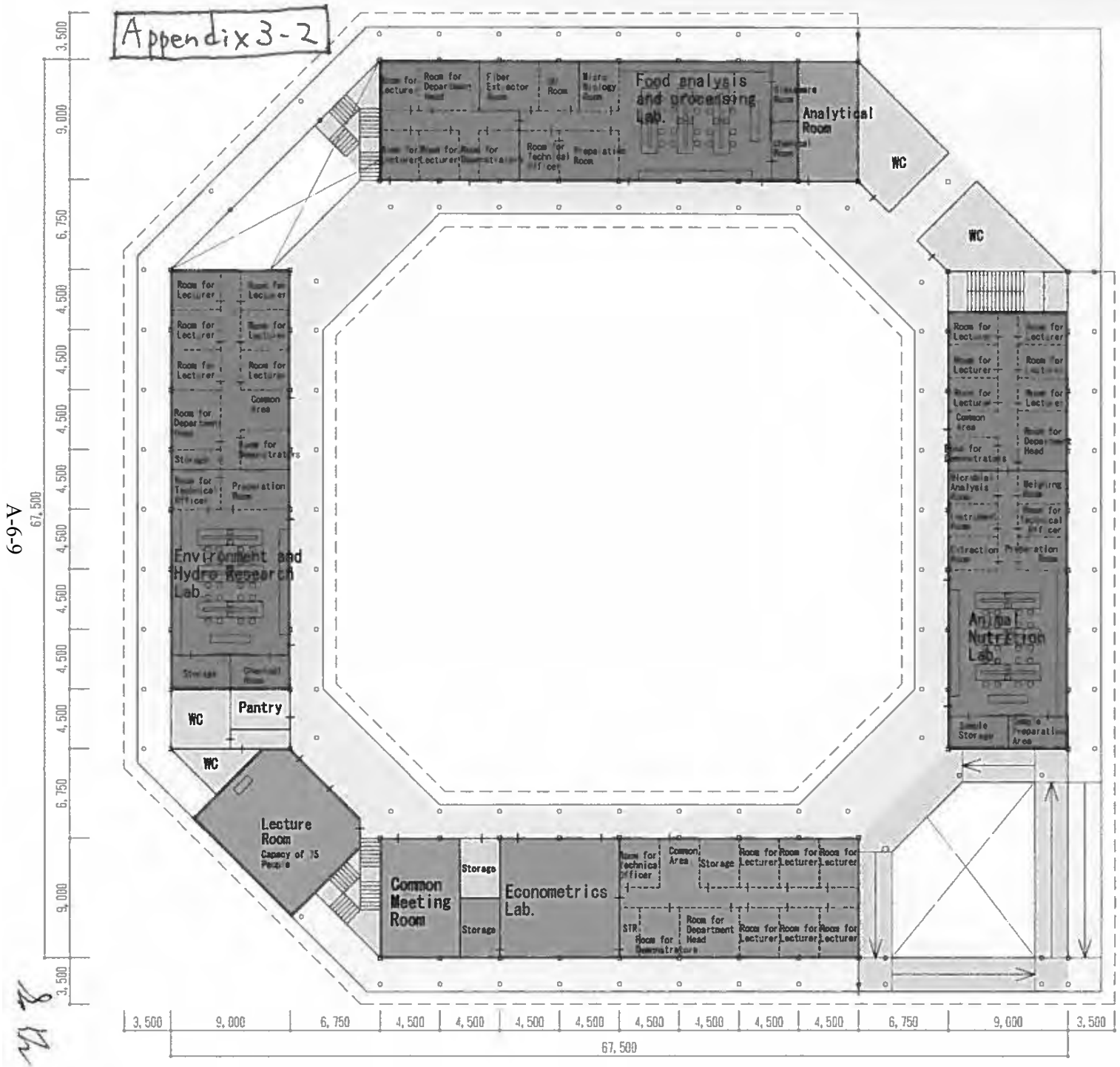

A-6-8

Reserch & Training Complex

Ground Floor Plan
Scale 1/400

N

Appendix 3-2



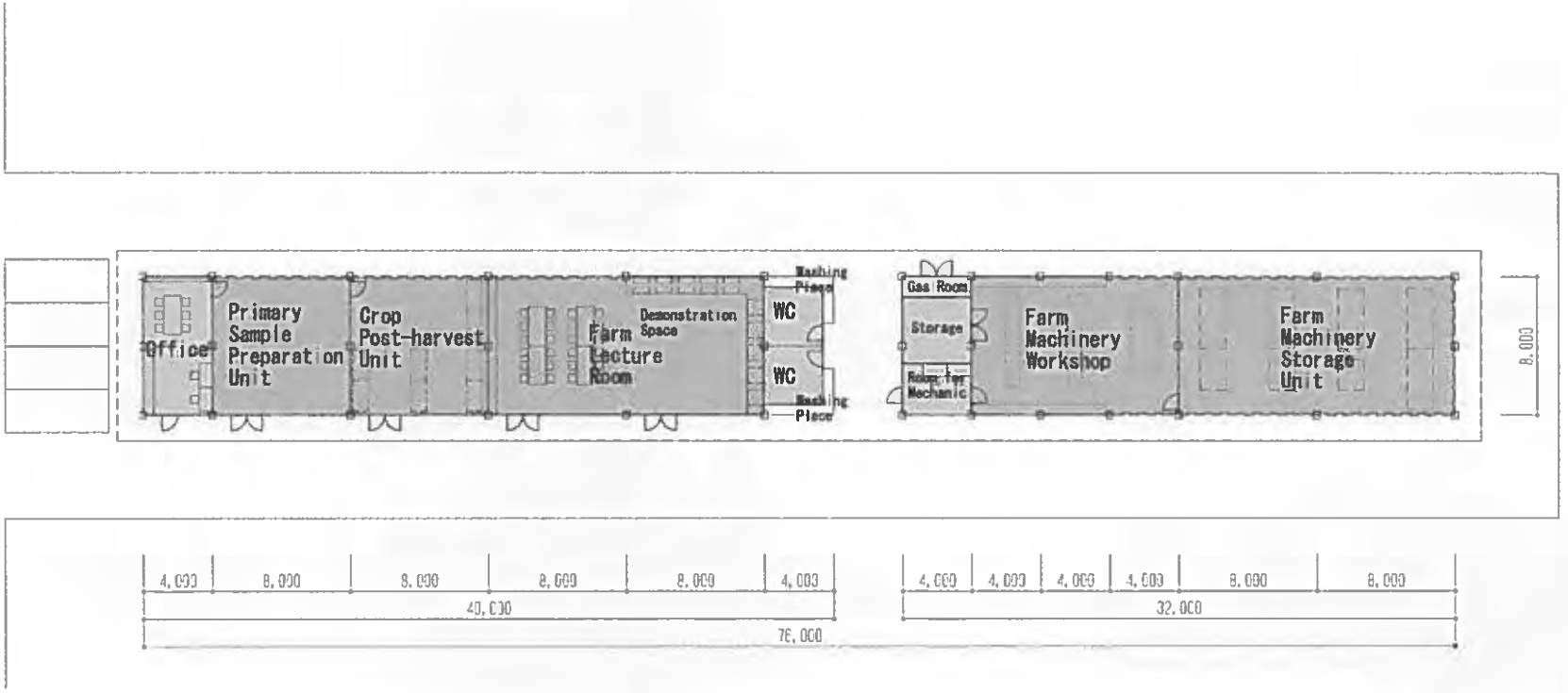

A-6-9

Reserch & Training Complex

1st Floor Plan
Scale 1/400

N

Appendix 3-3




Farm Management Center

Ground Floor Plan
Scale 1/400

N

Appendix-4 Farm area schedule

## Farm Area Schedule

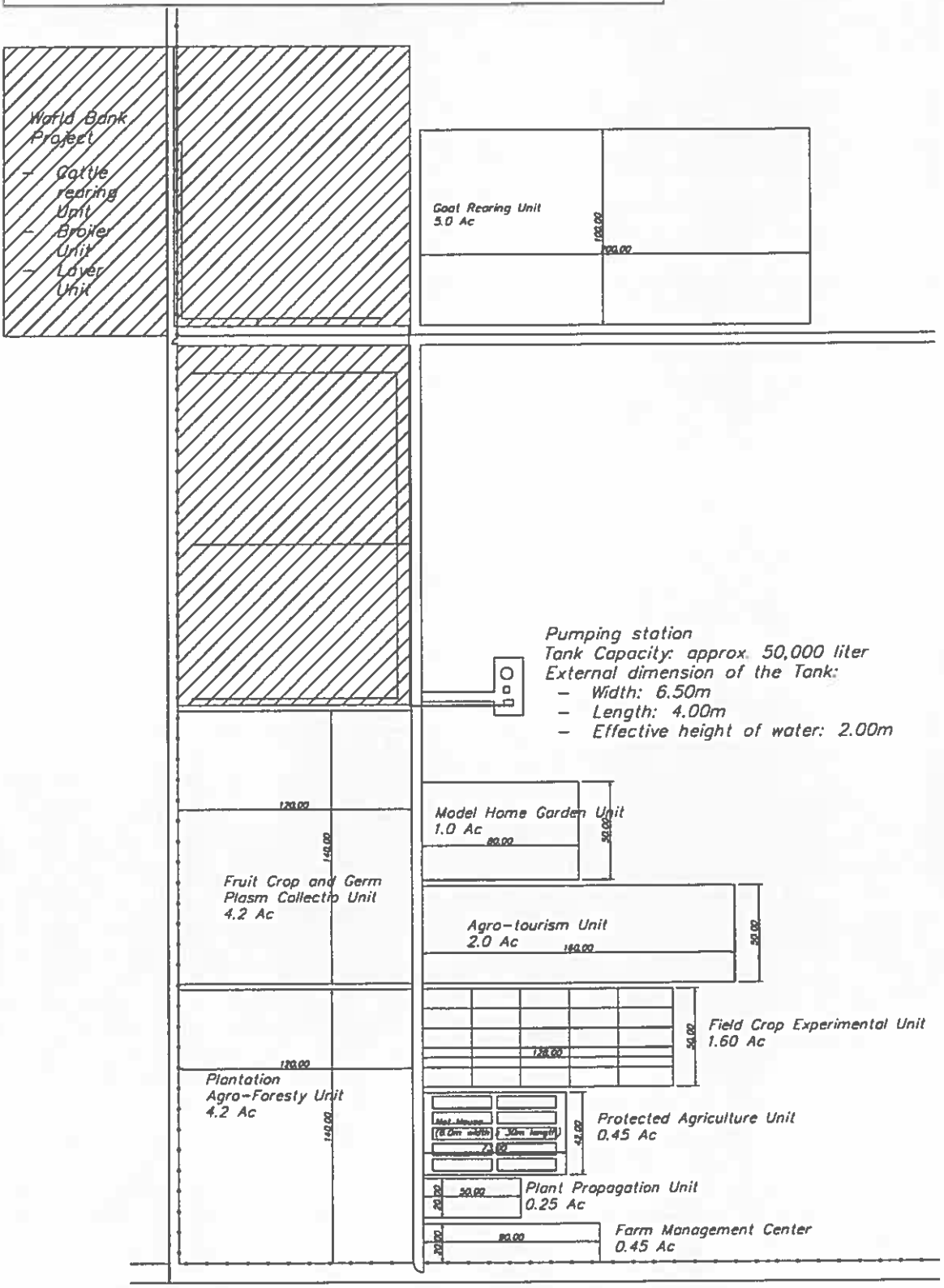
| Unit | Size in Ac | | Remarks |
|---|---|---|---|
| | Requested | Modified | |
| **Crop, Horticulture and Agroforestry Research and Training Farm** | | | |
| 1. Plant Propagation Unit | 10.00 | 0.25 | |
| 2. Protected Agriculture Unit | 5.00 | 0.45 | |
| 3. Fruit Crops Germ-Plasm Collection Unit | 9.00 | 4.20 | |
| 4. Field Crops Experimental Unit | 14.00 | 1.60 | |
| 5. Plantation and Agro-forestry Unit | 20.00 | 4.20 | |
| 6. Farm Management Center (~~Agr. Business Centre~~) | 3.00 | 0.45 | (i) Office<br>(ii) Crop post-harvest unit<br>(iii) Primary sample preparation unit<br>(iv) Farm Machinery storage<br>(v) Farm Machinery Workshop |
| 7. Model Home Garden Unit | 1.00 | 1.00 | |
| 8. Horticulture Unit | 15.00 | - | The unit is included to Field crops experimental unit |
| 9. Floriculture Unit | 9.00 | - | The unit is included to Protected agriculture unit. |
| 10. Agro-Tourism Unit | 4.00 | 2.00 | |
| Total | 90.00 | 14.15 | |
| **Integrated Livestock Research and Training Farm** | | | |
| 1. Goat-rearing Unit | 10.00 | 5.00 | Including Goat Shed |
| Total | 10.00 | 5.00 | |
| Grand Total | 100.00 | 19.30 | |

Appendix-5

## Scope or the Land Leveling Work for Farms

| Unit | Clearing | Plowing | Leveling |
|---|---|---|---|
| 1. Crop Research and Training Farm | | | |
| 1.1 Plant Propagation Unit | Yes | Yes | Yes |
| 1.2 Protected Agriculture Unit | Yes | No | Yes |
| 1.3 Fruit Crops Germ-Plasm Collection Unit | Yes | No | Yes |
| 1.4 Field Crops Experimental Unit | Yes | Yes | Yes |
| 1.5 Plantation and Agro-forestry Unit | Yes | Yes | Yes |
| 1.6 Farm Management Center | Yes | No | Yes |
| 1.7 Model Home Garden Unit | Yes | Yes | Yes |
| 1.8 Agro-Tourism Unit | Yes | Yes | Yes |
| 2. Livestock Research and Training Farm | | | |
| 2.1 Goat-rearing Unit | Yes | Yes | Yes |

## Appendix -6 Site Layout Plan of Research and Training Farms




Note:
(a) Geometries of units in the drawing will be adjusted based on the topo-survey result.
(b) Area of units will be adjusted (decrease) based on the availability of well-water.
(c) Drainage canal around the farm area which the farm canal access to shall be prepared by UoJ.
(d) ---
(e) ---

APPENDIX - 7

Schedule of Utilities per Room

■ Research and Training Complex

Revi.1 30.May.2015

| | Department | Floor | Floor Area m2 | Occupants (Persons) | Room Name | A/C Split type | Mechanical Ventilation | Ceiling Fan | Lighting Type | Lighting Lux | Socket Outlet 230V | Socket Outlet 400V | Telephone | LAN Outlet | Water | Drainage Waste | Drainage Chemical | LPG | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Agronomy | GF | | 21 | Crop Science Laboratory | O | III | - | A | 400 | O | O(If any) | O×1 | O×1 | O | - | O | - | |
| | | | | 2 | Preparation Room | - | III | O | B | 300 | O | - | - | - | O | - | O | - | |
| | | | | 2 | Technical Officer's Room | - | - | O | A | 300 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | - | Instruments Room | O | III | O | B | 300 | O | - | - | - | O | - | O | - | |
| | | | | 1 | Department Head Room | △ | - | O | A | 300 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | 1 x6 | Lecturer's Room-1,2,3,4,5,6 | △ | - | O | A | 300 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | 4 | Demonstrator's Room | △ | - | O | A | 300 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | - | Common area for Lecturers | - | - | O | A | 300 | O | - | O×1 | O×1 | O | O | - | - | One lavatory |
| | | | | - | Storage A | - | - | - | D | 100 | - | - | - | - | - | - | - | - | |
| | | | | - | Storage B | - | - | - | D | 100 | - | - | - | - | - | - | - | - | |
| | | | | - | Storage C | - | - | - | D | 100 | - | - | - | - | - | - | - | - | |
| 2 | Animal science | 1F | | 21 | Animal Nutrition Laboratory | O | III | - | A | 400 | O | O(If any) | O×1 | O×1 | O | - | O | - | |
| | | | | 2 | Weighing Room | O | III | - | B | 400 | O | O(If any) | - | - | - | - | - | - | |
| | | | | 2 | Microbial Analysis Room | O | III | - | A | 400 | O | O(If any) | O×1 | O×1 | O | - | O | - | |
| | | | | - | Sample Preparation Room | - | III | O | B | 300 | O | - | - | - | - | - | - | - | |
| | | | | - | Sample Storage | - | III | - | B | 100 | O | - | - | - | - | - | - | - | |
| | | | | 2 | Preparation Room | - | - | O | B | 300 | O | - | - | - | O | - | O | O | |
| | | | | 2 | Technical Officer's Room | - | - | O | A | 300 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | 1 | Department Head Room | △ | - | O | A | 300 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | 1 x6 | Lecturer's Room-1,2,3,4,5,6 | △ | - | O | A | 300 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | 4 | Demonstrator's Room | △ | - | O | A | 300 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | - | Common area for Lecturers | - | - | O | A | 300 | O | - | O×1 | O×1 | O | O | - | - | One lavatory |
| | | | | - | Storage | - | - | - | D | 100 | - | - | - | - | - | - | - | - | |
| | | GF | | 21 | Reproductive Physiology Laborator | O | III | - | A | 400 | O | O(If any) | O×1 | O×1 | O | - | O | - | Emergency shower |
| | | | | - | Semen Storage | O | III | - | D | 300 | O | O(If any) | - | - | - | - | - | - | |
| | | | | - | Semen Preparation Room | O | III | - | A | 400 | O | - | - | - | O | - | O | - | |
| | | | | 2 | Preparation Room | - | - | O | D | 300 | O | - | - | - | O | - | O | O | |
| | | | | 2 | Technical Officer's Room | - | - | O | A | 300 | O | - | O×1 | O×1 | - | - | - | - | |
| 3 | Agro-Chemistry | GF | | 21 | Soil testing & Bio-fertilizer Laboratory | O | III | - | A | 400 | O | O(If any) | O×1 | O×1 | O | - | O | - | Emergency shower |
| | | | | - | Glass Ware Room | - | - | - | D | 100 | O | - | - | - | - | - | - | - | |
| | | | | - | Chemical Room | - | - | - | D | 200 | O | - | - | - | - | - | - | - | |
| | | | | 2 | Atomic Absorb Spectrometer Room | O | III | - | A | 400 | O | - | O×1 | O×1 | O | - | O | - | |
| | | | | 2 | Kjeldahl Room | - | III | - | A | 400 | O | - | - | - | O | - | O | - | |
| | | | | 2 | Micro biology room | O | III | - | A | 400 | O | - | - | - | - | - | - | - | |
| | | | | 2 | Preparation Room | - | III | O | D | 300 | O | - | - | - | O | - | O | - | |
| | | | | 2 | Technical Officer's Room | - | - | O | A | 300 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | 1 | Department Head Room | △ | - | O | A | 300 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | 1 x6 | Lecturer's Room-1,2,3,4,5,6 | △ | - | O | A | 300 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | 4 | Demonstrator's Room | △ | - | O | A | 400 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | - | Common area for Lecturers | - | - | O | A | 300 | O | - | O×1 | O×1 | O | O | - | - | One lavatory |
| | | | | - | Storage A | - | - | - | D | 100 | - | - | - | - | - | - | - | - | |

| | Department | Floor | Floor Area m2 | Occupants (Persons) | Room Name | A/C Split type | Mechanical Ventilation | Ceiling Fan | Lighting Type | Lighting Lux | Socket Outlet 230V | Socket Outlet 400V | Telephone | LAN Outlet | Water | Drainage Waste | Drainage Chemical | LPG | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1F | | 21 | Food Analysis & Processing Laboratory | O | III | - | A | 400 | O | O(If any) | O×1 | O×1 | O | - | O | - | Emergency shower |
| | | | | 2 | Gas Chromatography Room | O | III | - | A | 400 | O | - | O×1 | O×1 | O | - | O | - | |
| | | | | 2 | Fiber Extractor Room | O | III | - | A | 400 | O | - | - | - | O | - | O | - | |
| | | | | 2 | Micro biology room | O | III | - | A | 400 | O | - | - | - | - | - | - | - | |
| | | | | - | Glass Ware Room | - | - | - | D | 100 | O | - | - | - | - | - | - | - | |
| | | | | - | Chemical Room | - | - | - | D | 100 | O | - | - | - | - | - | - | - | |
| | | | | 2 | Preparation Room | - | III | O | D | 300 | O | - | - | - | O | - | O | - | |
| | | | | 2 | Technical Officer's Room | - | - | O | A | 300 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | | | | | | | | | | | | | | | | |
| 4 | Agro-Biology | GF | | 21 | Plant Protection & Bio-control Lab. | O | III | - | A | 400 | O | O(If any) | O×1 | O×1 | O | - | O | - | Emergency shower |
| | | | | - | Inoculation Room | O | III | - | A | 400 | O | O(If any) | - | - | - | - | - | O | |
| | | | | - | Glass Ware Room | - | - | - | D | 300 | O | - | - | - | - | - | - | - | |
| | | | | - | Chemical Room | - | - | - | D | 300 | O | O | - | - | - | - | - | O | |
| | | | | 2 | Preparation Room | - | III | O | D | 300 | O | - | - | - | O | - | O | - | |
| | | | | 2 | Technical Officer's Room | - | - | O | A | 300 | O | - | O×1 | O×1 | - | - | - | - | |
| | | 1F | | 21 | Bio-technology & Tissue Culture Lab. | O | III | - | A | 400 | O | O(If any) | O×1 | O×1 | O | - | O | - | |
| | | | | - | Research Space | O | III | - | A | 400 | O | O(If any) | - | - | - | - | - | - | |
| | | | | 2 | Preparation Room | - | - | O | D | 300 | O | - | - | - | O | - | O | - | |
| | | | | - | Storage | - | - | - | D | 100 | - | - | - | - | - | - | - | - | |
| | | | | 1 | Staff room | - | - | O | A | 300 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | 1 | Preparation Area | - | III | O | A | 300 | O | - | - | - | O | - | O | - | |
| | | | | - | Transfer Room | O | III | - | A | 300 | O | - | - | - | - | - | - | - | |
| | | | | - | Grow Chamber Room | O | III | - | A | 300 | O | - | - | - | - | - | - | - | |
| | | | | 2 | Light Microscope Room | O | III | - | A | 400 | O | - | - | - | - | - | - | - | |
| | | | | | | | | | | | | | | | | | | | |
| 5 | Agro-Engineerin | GF | | 21 | Environment & Hydro Research Rm. | O | III | - | A | 400 | O | O(If any) | O×1 | O×1 | O | - | O | - | Emergency shower |
| | | | | - | Storage | - | - | - | D | 100 | O | - | - | - | - | - | - | - | |
| | | | | - | Chemical Room | - | - | - | D | 200 | O | - | - | - | - | - | - | - | |
| | | | | 2 | Preparation Room | - | III | O | D | 300 | O | - | - | - | - | - | - | - | |
| | | | | 2 | Technical Officer's Room | - | - | O | A | 300 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | 1 | Department Head Room | Δ | - | O | A | 300 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | 1 x6 | Lecturer's Room-1,2,3,4,5,6 | Δ | - | O | A | 300 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | 4 | Demonstrator's Room | Δ | - | O | A | 400 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | - | Common area for Lecturers | - | - | O | A | 300 | O | - | O×1 | O×1 | O | O | - | - | One lavatory |
| | | | | - | Storage A | - | - | - | D | 100 | - | - | - | - | - | - | - | - | |
| | | | | | | | | | | | | | | | | | | | |
| 6 | Agro-economics | GF | | 21 | Multi-purpose Training Room | Δ | I | O | B | 400 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | - | Storage for Chair | - | - | - | D | 100 | - | - | | | - | - | - | - | |
| | | | | - | Storage for Equipment | - | - | - | D | 100 | - | - | - | - | - | - | - | - | |
| | | 1F | | 26 | Econometrics Laboratory | O | III | O | A | 400 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | 2 | Preparation Room | - | III | O | D | 300 | O | - | - | - | - | - | - | - | |
| | | | | 2 | Technical Officer's Room | - | - | O | A | 300 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | 1 | Department Head Room | Δ | - | O | A | 300 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | 1 x6 | Lecturer's Room-1,2,3,4,5,6 | Δ | - | O | A | 300 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | 4 | Demonstrator's Room | Δ | - | O | A | 300 | O | - | O×1 | O×1 | - | - | - | - | |
| | | | | - | Common area for Lecturers | - | - | O | A | 300 | O | - | O×1 | O×1 | O | O | - | - | One lavatory |
| | | | | - | Storage | - | - | - | D | 100 | - | - | - | - | - | - | - | - | |
| | | | | | | | | | | | | | | | | | | | |

| | Department | Floor | Floor Area m2 | Occupants (Persons) | Room Name | A/C | Mechanical | Ceiling | Lighting | | Socket Outlet | | Telephone | LAN Outlet | Water | Drainage | | LPG | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Split type | Ventilation | Fan | Type | Lux | 230V | 400V | | | | Waste | Chemical | | |
| 7 | Common | | | | Toilet | – | Ⅲ | – | D | 150 | – | – | – | – | ○ | ○ | – | – | WC,Urinal, Lavatory |
| | | | | | Pantry | – | Ⅲ | – | D | 200 | ○ | – | – | – | ○ | ○ | – | – | |
| | | | | | Corridor | – | – | – | D | 100 | ○ | – | – | – | – | – | – | – | |
| | | | | | Entrance Hall | – | – | – | C,F | 200 | ○ | – | – | – | – | – | – | – | FAP, SW |
| | | | | | Electrical Room | – | Ⅰ | – | D | 100 | ○ | ○(If any) | – | – | – | – | – | – | |
| | | | | | Water Reservoir Room | – | Ⅰ | – | D | 100 | ○ | ○(If any) | – | – | ○ | ○ | – | – | |
| | | | | | | | | | | | | | | | | | | | |

■ Farm Management Center

| | Department | Floor | Floor Area m2 | Occupants (Persons) | Room Name | A/C | Mechanical | Ceiling | Lighting | | Socket Outlet | | Telephone | LAN Outlet | Water | Drainage | | LPG | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Split type | Ventilation | Fan | Type | Lux | 230V | 400V | | | | Waste | Chemical | | |
| | Training Farm | GF | | | Office | △ | Ⅲ | ○ | D | 300 | ○ | – | ○ | ○ | ○ | ○ | – | – | Lavatory |
| | | | | | Preliminary Sample Preparation Un | – | – | – | D | 200 | ○ | – | – | – | ○ | ○ | – | – | Utility sink |
| | | | | | Crop Post-harvest Unit | – | – | – | D | 200 | ○ | – | – | – | ○ | ○ | – | – | Utility sink |
| | | | | | Farm Lecture Room | △ | – | ○ | D | 200 | ○ | – | ○ | ○ | – | – | – | – | |
| | | | | | Toilet | – | – | – | D | 150 | – | – | – | – | ○ | ○ | – | – | WC,Urinal, Lavatory |
| | | | | | Room for Mechanics | △ | – | ○ | D | 300 | ○ | – | ○ | ○ | ○ | ○ | – | – | Lavatory |
| | | | | | Storage | – | – | – | D | 100 | – | – | – | – | – | – | – | – | |
| | | | | | Cylinder's Storage | – | – | – | D | 100 | – | – | – | – | – | – | – | – | |
| | | | | | Farm Machinery Workshop | – | – | – | D | 300 | ○ | ○(If any) | – | – | ○ | ○ | – | – | Lavatory |
| | | | | | Farm Machinery Storage | – | – | – | D | 200 | ○ | – | – | – | – | – | – | – | |
| | | | | | | | | | | | | | | | | | | | |

Abbreviation

Lighting Fixture
- A: Recessed Mount Type W/Louver FL or LED
- B: Recessed Mount Type FL or LED
- C: Down Light FL or LED
- D: Surface Mount V-Shaped Type FL or LED
- E: Surface Mount Type W/Reflector FL
- F: Wall Light FL or LED

Mechanical Ventilation
- Ⅰ:Supply & Exhaust Fan
- Ⅲ:Exhaust Fan

Air-conditioning system
- ○:Installed by the Project
- △:To be installed in future
- —:Not installed

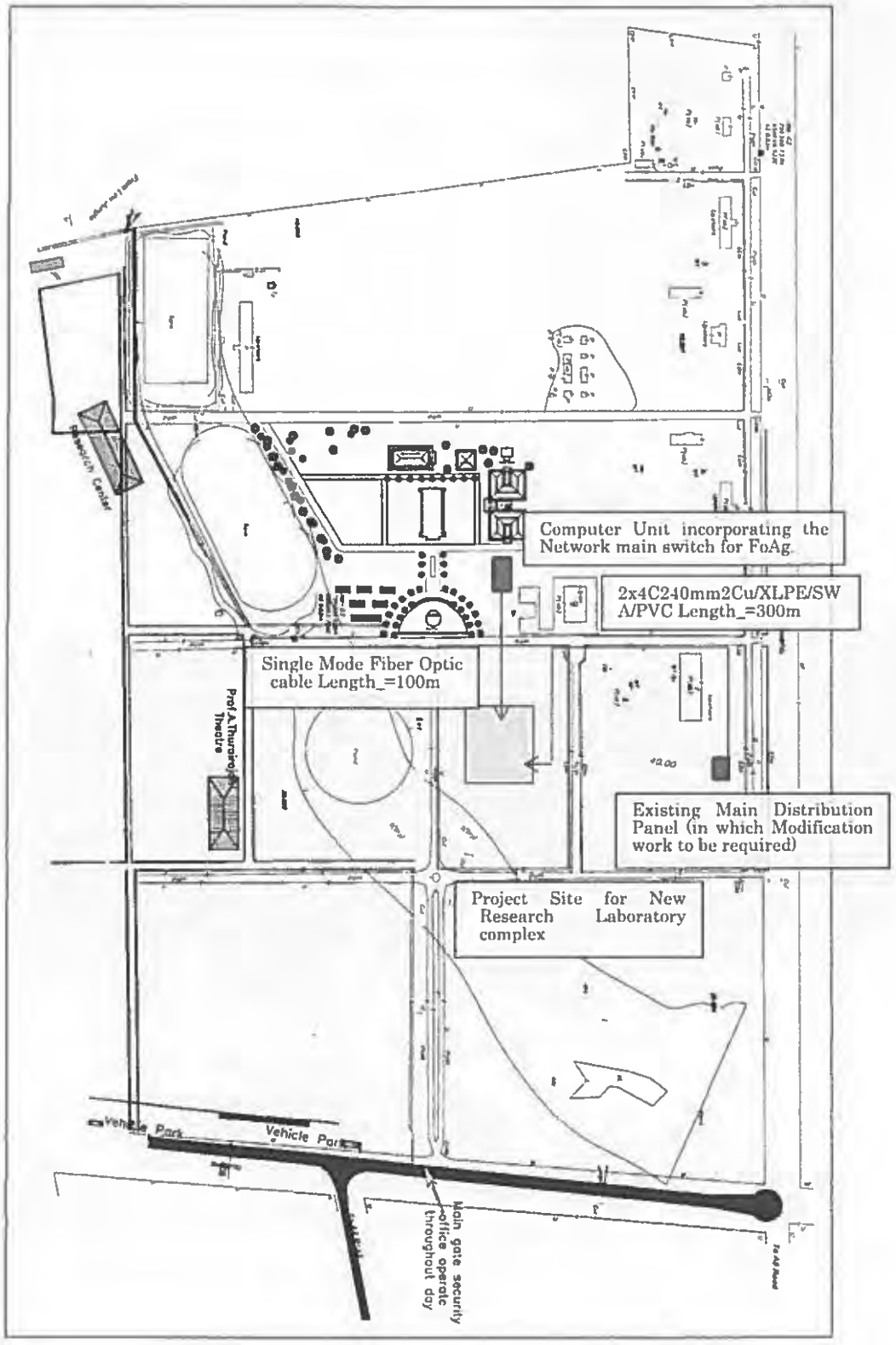
LAN System
- SW:Switching Hub
- ○:RJ45 LAN outlet

FAP:
Fire Alarm Control Panel

LPG
Liquid Petroleum Gas

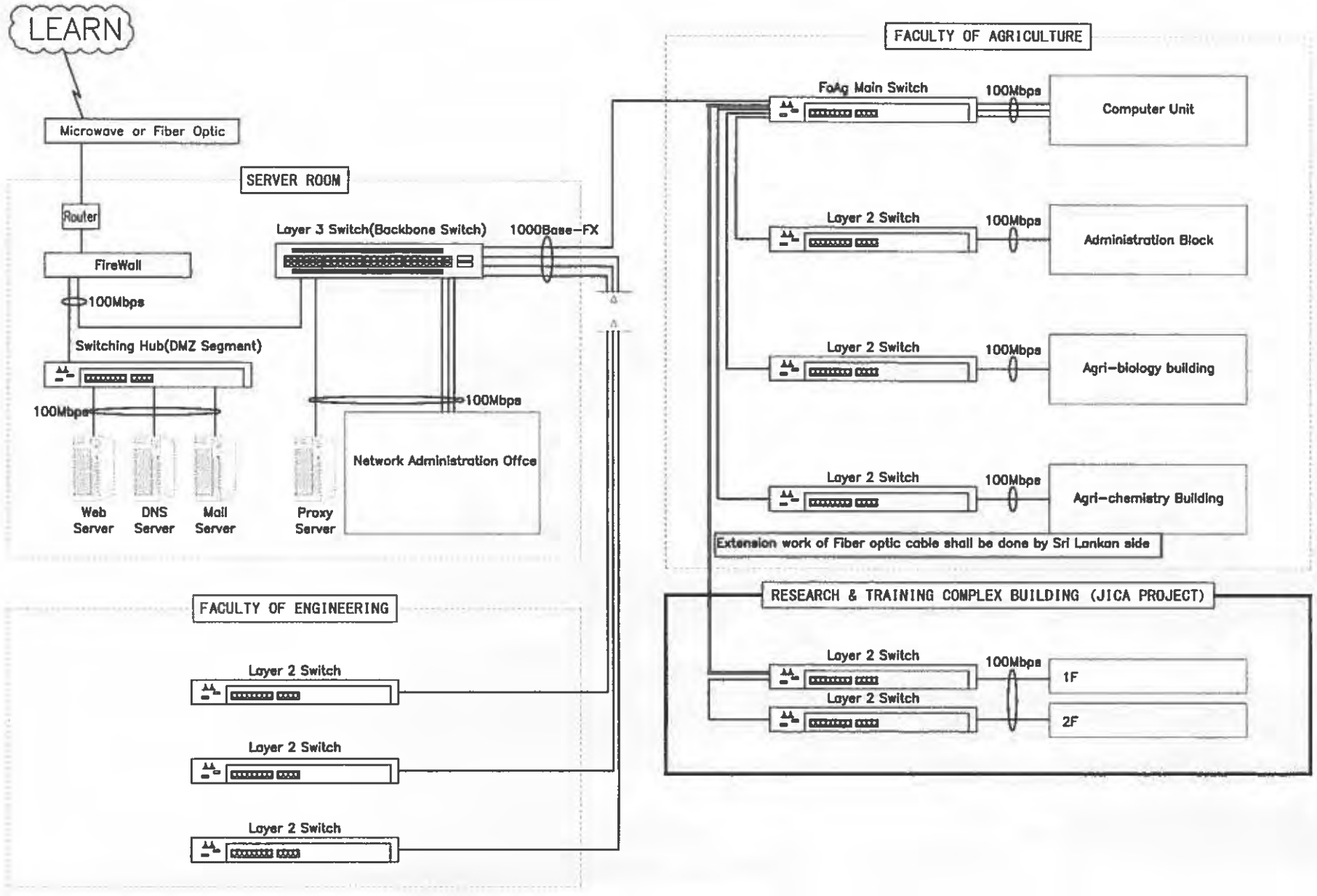
APPENDIX -8

**Power Supply Work and Network Extension Work to the JICA Project Done by Sri Lankan Side** 27/May, 2015 JICA Study Team



APPENDIX- 9

# NETWORK EXTENSION PLAN FOR RESEARCH AND TRAINING COMPLEX



**Appendix-10(1) List of Candidate Equipment**

**Department of Agronomy**

| No. | Equipment | Spec. |
|---|---|---|
| 1 | Mesuring tape | |
| 2 | Magnifier | with lamp |
| 3 | Stereo-microscope | |
| 4 | Dissection kit set | in box |
| 5 | Centrifugal seed dividers | |
| 6 | Labo. seed cleaner | |
| 7 | Labo. spiral seed separator | |
| 8 | Grain moisture meter | |
| 9 | Oven | |
| 10 | Electronic balance | |
| 11 | Weighing balance | |
| 12 | Seed germination incubator | |
| 13 | Refrigerators | |
| 14 | Grafting knife | |
| 15 | Budding knife | |
| 16 | Garden scissors | |
| 17 | Polyethylene sealer | plastic pot making |
| 18 | Packing machine | |
| 19 | Digital leaf area mete | portable |
| 20 | Green leaf area meter | table-top |
| 21 | Chlorophyll meter | |
| 22 | Lux meter | |
| 23 | Portable photosynthesis analyzer | Infrared gas analysis (IRGA), CO2:0 - 2000ppm, , H2O: 0-75 mbar, Leaf temp -5 - 50oC |
| 24 | pH meter | |
| 25 | EC meter | |
| 26 | Vaccum pump | for filtering sample |
| 27 | Thermometer | |
| 28 | Soil moisture meter | |
| 29 | CO2 dissolved sensor | |
| 30 | Root scanner | |
| 31 | Vanier caliber | |
| 32 | Clinometer | |
| 33 | Diameter tape | |
| 34 | Increment borer | |
| 35 | GPS | |
| 36 | Digital camera | |
| 37 | ArcView (ArcGIS) | software |
| 38 | WinRHIZO | software |
| 39 | Statistica | software |
| 40 | Minitab | software |
| 41 | SPSS | software |
| 42 | Real Time Landscaping Plus Review | software |
| 43 | Water stirilizer | |
| 44 | Water bath | |
| 45 | Magnetic stirrer | |
| 46 | Dispenser pipette | |

| | | |
|---|---|---|
| 47 | Autoclave | |
| 48 | Kjeldahl digestion and distillation unit | |
| 49 | Auto fiber analyzer | |
| 50 | Muffle furnace | |
| 51 | Membrane filter | |
| 52 | PCR | |
| 53 | Clean bench (laminar flow) | |
| 54 | Incubator (incubation room) | |
| 55 | Net green house | |
| 56 | Cheesecloth | |
| 57 | Hydroponic unit | |
| 58 | Plant incubator (growth chamber) | temp & humid control |
| 59 | 4W tractor | |
| 60 | Mould board plough (attachnent of 4W tractor) | |
| 61 | Disc plough (attachnent of 4W tractor) | |
| 62 | Harrow (attachnent of 4W tractor) | |
| 63 | Rotator cultivator (attachnent of 4W tractor) | |
| 64 | Intercultivator (attachnent of 4W tractor) | |
| 65 | Seed drill (attachnent of 4W tractor) | |
| 66 | Flower and leaf plucker (attachnent of 4W tractor) | |
| 67 | 2W tractor | |
| 68 | Attachnent of 2W tractor | rotator cultivator, trailer |
| 69 | Power sprayer | |
| 70 | Sprinkler unit | |
| 71 | Transplanter | |
| 72 | Combine harvester | |
| 73 | Maximum and minimum thermometer | |
| 74 | Wet & dry bulb thermometer | |
| 75 | Rain-gauge | tipping bucket |
| 76 | Barometer | |
| 77 | Wind anemometers | |
| 78 | Soil thermometer | |
| 79 | Open pan evaporimeter | |
| 80 | Sun shine recorder | |
| 81 | Hygrometer | |

**Appendix-10(2) List of Candidate Equipment**

**Department of Animal Science**

| No. | Equipment | Spec. |
|---|---|---|
| 1 | Animal models of cattle | |
| 2 | Animal models of poultry | |
| 3 | Animal models of rabbit | |
| 4 | Animal models of pig | |
| 5 | Animal models for monogastric (pig) | |
| 6 | Animal models for ruminants digestive system (cattle) | |
| 7 | Animal models for digestive system of poultry | |
| 8 | Reproductive system of male and female ruminant models | |
| 9 | Reproductive system of male and female pig models | |
| 10 | Reproductive system of male and female poultry models | |
| 11 | General animal models for nervous system | |
| 12 | General animal models for circulatory system | |
| 13 | General animal models for respiratory system | |
| 14 | Dissection set (for small animals) | |
| 15 | RBC counting chamber | |
| 16 | WBC counting chamber | |
| 17 | CMT kit | |
| 18 | Digestion chambers | cattle & goat |
| 19 | Respiration & metabolic chamber | cattle & goat |
| 20 | Animal fistula | |
| 21 | Cannula fit | |
| 22 | Grass sampler | |
| 23 | Vacuum bag for silage | |
| 24 | Air suction pump | |
| 25 | Electric pressurized washer | |
| 26 | Weigh bridge for cattle | |
| 27 | Animal weighing scale (small animals) | |
| 28 | Milking machine | |
| 29 | Binocular microscope (x400) | |
| 30 | Warm stage microscope - 100x | |
| 31 | Warm stage microscope - 400x | |
| 32 | Phase contrast microscope | |
| 33 | Florescent microscope | |
| 34 | Microtome | |
| 35 | Microtpme sample processer | |
| 36 | Electronic balance | 200g, 0.5mg |
| 37 | Electronic balance | 500g, 0.1g |
| 38 | Analytical balance | |
| 39 | Drying cabinet | |
| 40 | Autoclave | |
| 41 | Centrifuge | 3000 rpm |
| 42 | Centrifuge, refrigirated | |
| 43 | Micro centrifuge | refrigirated |
| 44 | Hematocrit centrifuge | |
| 45 | Gerber centrifuge | milk centrifuge |
| 46 | Water distillation unit | |
| 47 | pH meter | desk top |

| | | |
|---|---|---|
| 48 | Feed crushing mill | |
| 49 | Grinder | labo type |
| 50 | Mixer | labo type |
| 51 | Homogenizer | labo type |
| 52 | Oven | |
| 53 | Water bath with shaker | |
| 54 | Shaker | agitator |
| 55 | Voltex mixer, test tube | |
| 56 | Magnetic stirrer | |
| 57 | Dispenser | |
| 58 | Feed fiber analyzer | Fiber tec |
| 59 | Micro Kjeldhal apparatus | |
| 60 | Macro Kjeldhal apparatus | |
| 61 | Soxhlet apparatus | |
| 62 | Muffle Furnace | |
| 63 | Vaccume pump (Lab.) | for filtering |
| 64 | Fume hood | |
| 65 | Bomb calorimeter | |
| 66 | Milk fat tester | electronic |
| 67 | Fatty acid analyzer | |
| 68 | Ultrasonic milk analyzer | Lacto Scan |
| 69 | Alcohol gun | milk inspection |
| 70 | Refractometer | |
| 71 | Texture analyzing machine (meat & fish) | |
| 72 | Haemocytometer | |
| 73 | Bovine sperm photometer | |
| 74 | Sperm motility analyzer | |
| 75 | Flame photo meter | |
| 76 | Amino acid analyzer | |
| 77 | Incubator | general & biological |
| 78 | Low temperature incubator | |
| 79 | Laminar flow cabinet | |
| 80 | PCR | |
| 81 | Electrophoresis | Gel, horizontal |
| 82 | UV illuminator | |
| 83 | Colony counter | |
| 84 | ELISA kit | |
| 85 | ELISA reader | |
| 86 | AI kit for the field | for cattle & goat |
| 87 | Artificial vagina for cattle | |
| 88 | Artificial vagina for goat | |
| 89 | Artificial vagina for poultry | |
| 90 | Artificial vagina for pig | |
| 91 | Ultra sound pregnancy detector | for cattle & goat |
| 92 | Kamar Pressure-Sensitive Mount Detectors(Heat detection aids) | |
| 93 | Electronic Mount Detectors(Heat detection aids) | |
| 94 | Pedometer(Heat detection aids) | |
| 95 | Chin ball detector(Heat detection aids) | |
| 96 | Semen processor | |

| | | |
|---|---|---|
| 97 | Single straw filling and sealing machine | |
| 98 | Straw printer | |
| 99 | Diluter of semen | |
| 100 | Liquid nitrogen gas container (10 L) | |
| 101 | Thawing device for frozen semen | |
| 102 | Vaginal speculum for cow | |
| 103 | Flow cytometer machine | |
| 104 | Automatic irrigator for embryo flushing | |
| 105 | Catheter for removing vagina mucous | |
| 106 | Embryo collector 10 pcs./set | for cattle & goat |
| 107 | Dilating bougie for cow and heifer, sugie-type | |
| 108 | Program freezer | |
| 109 | Liquid Nitrogen gas container (30L) with square canister | |
| 110 | Thawing device for frozen tube | |
| 111 | Embryo transporter | for cattle & goat |
| 112 | Embryo transplanter | for cattle & goat |
| 113 | Cabinet type poultry incubator | |
| 114 | Electronic vernier (egg measurement) | |
| 115 | Egg candling light | |
| 116 | Chick brooder | |
| 117 | De-beaker (for poultry) | |
| 118 | Yolk color fan (checking egg color) | |
| 119 | Sphero meter (measuring egg, internal size) | |
| 120 | Fish model to illustrate the internal and external anatomy of fish | |
| 121 | Fish measuring board | |
| 122 | Sacchi dish (water transparency) | |
| 123 | Water sampler | different depth |
| 124 | Ekmnman grab sampler | bottom soil sampling |
| 125 | pH meter, portable | |
| 126 | EC meter, portable | |
| 127 | Thermometer, portable | |
| 128 | BOD meter, portable | |
| 129 | Salinity meter, portable | |
| 130 | Plankton nets | zoo plankton & phyto plankton |
| 131 | Homogenizer (for Yoghurt & ice cream) | |
| 132 | Incubator for Yoghurt making | |
| 133 | Butter churner (5 – 10 lit.) | electric |
| 134 | Cheese presser | |
| 135 | Cream separator | |
| 136 | Pasteurizing milk processer | |
| 137 | Sterilizing milk processer | |
| 138 | Flavored milking machine | |
| 139 | Ice cream maker | |
| 140 | Steam sterilizer | spices |
| 141 | Meat mincer | |
| 142 | Meat grinder | |
| 143 | Bowl chopper | |
| 144 | Linking machine | |
| 145 | Meat thermometer | |

| | | |
|---|---|---|
| 146 | Smoke chamber | |
| 147 | Meat stuffer | |
| 148 | Meat tumbler | |
| 149 | De boning and butchering knife | |
| 150 | Ham & bacon moulding cases | |
| 151 | Brine injector | |
| 152 | Steamer | |
| 153 | Ice flake machine | |
| 154 | Shear force test machine | meat quality inspection |
| 155 | Refrigerator | |
| 156 | Freezer | programmed & general |
| 157 | Deep freezer | |
| 158 | 4W tractors | |
| 159 | Grass cutters | Farm machnery attachment |
| 160 | Grass choppers | Farm machnery attachment |
| 161 | Broadcaster | Farm machnery attachment |
| 162 | Seeder | Farm machnery attachment |
| 163 | irrigation facilities (pipeline ) & sprinklers | |

## Appendix-10(3) List of Candidate Equipment

### Department of Agri. Chemistry

| No. | Equipment | Spec. |
|---|---|---|
| 1 | GPS | |
| 2 | Sampling equipment (Soil auger) | |
| 3 | Soil sieves | |
| 4 | Binocular microscope | x 1000, oil emersion lens |
| 5 | pH meter | |
| 6 | Electrical conductivity meter | |
| 7 | Soil texture analyzer | |
| 8 | Pressure plate apparatus | |
| 9 | Wet sieving equipment | wet aggregate stability study |
| 10 | Soil grinder | |
| 11 | Water still (double distilled water apparatus) | |
| 12 | Water deionizer | |
| 13 | Conventional free-swinging equal arm balance | |
| 14 | Top loading balance | 2kg, 10g |
| 15 | Electronic balance | |
| 16 | Analytical balance | |
| 17 | Autoclave | |
| 18 | Oven | |
| 19 | Centifuge | 3000 rpm |
| 20 | Mixer grinder | |
| 21 | High speed blender | |
| 22 | Magnetic stirrer | |
| 23 | Vortex stirrer | |
| 24 | Shaker | |
| 25 | Shaking water bath | |
| 26 | Water bath | |
| 27 | Hot plate | |
| 28 | Rotary Evaporator | |
| 29 | Fume hood (draft chamber) | |
| 30 | Macro kjeldal | |
| 31 | Micro kjeldal | |
| 32 | Soxhlet appratus | |
| 33 | Fibre anayzer | fibre tec |
| 34 | Muffle furnace | |
| 35 | Flame photometer | |
| 36 | Spectrophotometer | |
| 37 | High Performance Thin Layer Chromatography (HPTLC) | |
| 38 | Nitrogen & Carbon Analyser | |
| 39 | GC (Gas chromatography) | |
| 40 | AA spectrometer | |
| 41 | Colori meter | |
| 42 | Bomb calorimeter | |
| 43 | Water activity measuring meter | food material |
| 44 | Rapid visco analyzer | |
| 45 | Texture analyzer | food hardness |
| 46 | Fruit firmness tester (hardness meter) | |
| 47 | Salinometer | |

| | | |
|---|---|---|
| 48 | Ebulliometer | alcohol % measurement |
| 49 | Dial thermometer | measure temp. of cordial |
| 50 | Digital moisture meter | for food |
| 51 | Flourimeter | Vitamin B analysis |
| 52 | Food chronometer | |
| 53 | Refractometer | measure solids contents of fruits juice |
| 54 | Laminar flow cabinet | |
| 55 | Incubator | |
| 56 | Colony counter | |
| 57 | Haemocyto-meter | |
| 58 | Steam bath | |
| 59 | Cabinet drier | food |
| 60 | Fruits pulper | For mango, etc |
| 61 | Twin screw extruder | |
| 62 | Dough mixing machine | for wheat flour |
| 63 | Bakery oven | Lab scale |
| 64 | Freeze dryer | |
| 65 | Spray drier | |
| 66 | Bag sealing machine | |
| 67 | Vacuum packaging machine | |
| 68 | Modified atmosphere packaging equipment | N gas |
| 69 | Refrigerator | |
| 70 | Freezer | |
| 71 | Deep freezer | Temp. 0 to -10Co |
| 72 | GIS software (Arc view) | |
| 73 | Laptop computer | |
| 74 | Tractor | with land preparation attachment |
| 75 | Sprayer | |
| 76 | Net house | |
| 77 | Flame photometer | |
| 78 | Net house | |

**Appendix-10(4) List of Candidate Equipment**

**Department of Agri. Biology**

| No. | Equipment | Spec. |
|---|---|---|
| 1 | Ganong's photometer | transpiration measurement |
| 2 | Dissection microscopes | x 100 |
| 3 | Research binocular microscope | attachment |
| 4 | Stereo binocular micoscope | three dimention, x 100, with camera attachment |
| 5 | Stage microscopes | x 100 |
| 6 | Computers +printers & accessories to attached with microscope | |
| 7 | Microscope pointer | |
| 8 | Dissection kit | |
| 9 | Insect collection appliances | insect aspirator, etc. |
| 10 | Soil sample auger | |
| 11 | Nematodes sieve | for nematodes |
| 12 | Atomizer | spraying |
| 13 | ULV Sprayer | pesticide |
| 14 | Refrigerator | |
| 15 | Deep freezer | Temp.0 to -10 Co |
| 16 | Ultra deep freezer | |
| 17 | Liquid nitrogen container | with tube holding container |
| 18 | Water distiller | |
| 19 | Electronic balance | |
| 20 | Oven | |
| 21 | Autoclave | |
| 22 | Microwave oven | |
| 23 | pH meter | |
| 24 | Thermo-hygrometer | |
| 25 | Grinder | |
| 26 | Mortar and pestle | |
| 27 | Sample mixer | |
| 28 | Homogenizer | |
| 29 | Vortex mixture | |
| 30 | Magnetic stirrer | |
| 31 | Water bath | |
| 32 | Hot plate | |
| 33 | Orbital shaker | |
| 34 | Rotary evaporator | |
| 35 | Centrifuge, refrigirated | refrigerated, 10000rpm |
| 36 | Micropipette dispensor | |
| 37 | Spectrometer | |
| 38 | Gas chromatography | liquid (GLC) |
| 39 | Gel-electrophoresis | horizontal |
| 40 | Trans illuminator | UV |
| 41 | PCR (Tnermo-cycler) | |
| 42 | DNA sequencer | |
| 43 | Computer software | Micro Gene & Blast |

| | | |
|---|---|---|
| 44 | Laminar flow cabinet | double electrical socket, vacuum tab, gas tap with solenoid valve high level UV lamp, UV shield spare HEPA filter set, stand with casters |
| 45 | Inoculation needle | |
| 46 | Incubator | |
| 47 | Cooled incubator | Temp. -10 - 40 Co |
| 48 | Plant growth chamber | |
| 49 | Shelves with lighting | Incubation/culture room (Temp. 25 Co) |
| 50 | Net house | |

**Appendix-10(5) List of Candidate Equipment**

**Department of Agri. Engineering**

| No. | Equipment | Spec. |
|---|---|---|
| 1 | Drawing board A3 with T square | |
| 2 | Instrument box, set square 60o /30o | |
| 3 | Instrument box, set square 45 o | |
| 4 | Rainfall meters | |
| 5 | Current meter | |
| 6 | Staff for water elevation | |
| 7 | Sun shine recorder | |
| 8 | Anemometers | |
| 9 | Wet & dry bulb thermometer | |
| 10 | Engine cut models and spares | |
| 11 | 4 wheel tractor | |
| 12 | 2 wheel tractor | |
| 15 | Work shop tools and welding equipment | |
| 16 | Dip meter(sounding apparatus for water level measurement) | |
| 17 | Sieve set with shaker | |
| 18 | pump (open impeller, semi open impeller, close impeller) submersible pump | |
| 19 | Water sampler | |
| 20 | EC meter | |
| 21 | DO meter | |
| 22 | Spectrophotometer | |
| 23 | Dumpy level | |
| 24 | Theodolite | |
| 25 | Tri pod | |
| 26 | Plane table | |
| 27 | Alidade | |
| 28 | Compass | |
| 29 | Soil moisture measurement instrument (tensiometer, gypsum block, neutron probe) | |
| 30 | Auger | |
| 31 | Strainer pipe | |
| 32 | Pan evaporimeter | |
| 33 | Lysimeter | |
| 36 | Milling machines | |
| 37 | Penitrometer and Measuring tools | |
| 38 | Thermometers and humidifiers | |
| 39 | Evaporators and Heat exchangers | |
| 40 | Cyclone | |
| 41 | Calorimeter | |
| 42 | pH meter | |
| 43 | Gas chromatography | |
| 44 | Model for land fill | |
| 46 | Drip irrigation set | |
| 47 | Sprinkler irrigation set | |
| 48 | Primary tillage implement | |
| 49 | Second tillage implement | |
| 50 | Combine harvester | |

| | | |
|---|---|---|
| 51 | Knapsack sprayer | |
| 52 | Power sprayer | |
| 53 | Duster | |
| 54 | Reaper | |
| 55 | Thresher | |
| 56 | Seeder | |
| 57 | Planter | |
| 58 | Trickling filter | |
| 59 | Sewage plant design | |
| 60 | Bio mass burner | |
| 61 | Sedimentation tank | |
| 62 | Aerator | |
| 63 | Separation unit | |
| 64 | Gasifier | |
| 65 | Bio filter | |
| 66 | Activator | |
| 67 | Sludge chamber | |
| 68 | Single and multi-effect evaporators | |
| 69 | bomb calorimeter | |
| 70 | Electronic balance | |
| 71 | Freezer | |
| 72 | Ruttner Water sample collector | |
| 73 | Refrigerator | |
| 74 | Turbidity meter | |
| 75 | Sun drying | |
| 76 | Drier or Oven | |
| 77 | Oven | |
| 78 | Analytical balance (four digits) | |
| 79 | Potable colori meter(DR 2700) | |
| 80 | Incubator (26 – 50oC) and manifold filter with vacuum pump (eight filtering unit) | |
| 81 | BOD Incubator (0 – 20oC) | |
| 82 | Thermo stable Water bath 30 – 120 o C | |
| 83 | Re-circulatory soaking setup – Water pump and sprinkler head | |
| 84 | Auto clave (15 psi) | |
| 85 | Pressure cooker | |
| 86 | Steamer | |
| 87 | A laboratory-scale rice huller | |
| 88 | Polisher | |
| 89 | Rice Grader | Labo-type, Indent Cylinder |
| 90 | Cyclone cylinder (seed cleaning) | Labo-type |
| 91 | Seed paddy divider | Labo-type |
| 94 | Electrical Rice cooker | |
| 95 | Volumetric flask | |
| 96 | Electronic taste analyzer | |
| 97 | Gluco-meter kit | |
| 98 | Kjeldhar apparatus (Digestion, distillation and titration) | |
| 102 | Venire caliber | |
| 103 | Micro meter | |

| | | |
|---|---|---|
| 104 | Potable grain moisture meter | |
| 105 | Microwave oven | |
| 106 | Digital image analyzer | |
| 107 | Eureka bucket | |
| 108 | Fruit penetro meter (Digital) | |
| 109 | Colorimeter (Digital) | |
| 110 | Refractor meter (Digital) | |
| 111 | Digital instron cyclinder | |
| 112 | Fluidized bed drum dryer | |
| 114 | Centrifuge | |
| 115 | Magnetic stirrer | |
| 116 | Electrical conductivity meter | |
| 117 | Muffle furnace | |
| 118 | Grinders | |
| 119 | Scanning electron microscope | |
| 120 | FT-IR spectroscopy | |
| 122 | Chlorophyll meter | |
| 123 | Measuring cylinders | |
| 124 | Micro wave digester | |
| 126 | Membrane filter | |

(Note)

1. Many equipment is overlapped with other departments, as the department of Agri-engineering covers many inter-discipline subjects in its practical experiments & research

2. Need to include many equipment for hydrology instead of overlapped equipment with other department

**Appendix-10(6) List of Candidate Equipment**

**Department of Agri. Economics**

| No. | Equipment | Spec. |
|---|---|---|
| 1 | DSLR Camera:- 12 -15 mega pix | |
| 2 | Computer | Digital |
| 3 | Video camera HD digital | |
| 4 | Mini voice recorder | |
| 5 | Multimedia projector | |
| 6 | OHP | |
| 7 | Duplex photocopier | monochrome & color |
| 8 | Printer monochrome | rotary press system |
| 9 | Color printer | for photo printing |
| 10 | Scanner flatbed type | |
| 11 | Public addressing system (out-door) | speaker sets on field |
| 12 | Computers | i3 or i7 |
| 13 | Analytical software | GAUSS, RATS, STATA |

## Appendix-11 Major undertakings to be taken by both side

| | Portions by the Sri Lankan Side | |
|---|---|---|
| | **Items** | **Budget (Rough Estimation in Rs.)** |
| (1) Building Works<br>a) Structure works, finishing works<br>b) Parking lot<br>c) Accessroad whitning the site<br><br>(2) Farm Works<br>a) Land leveling works<br>b) Irrigation and drainage system<br>c) Farm road<br>d) Related structure works<br><br>(3) Electrical Works<br>a) Low voltage power supply system within the Project site including installation of distribution panels, cables, conduit pipes and outlets<br>b) Emergency power supply system providing a diesel engine generator<br>c) Lighting system within the Project site including installation of lighting fixures, cables, conduit pipes and switches<br>d) Local Area Network System within the Project site including installation of swiches, cables and LAN outlets<br>e) Telecommunications system applying VoIP within the Project site<br>f) Lightning Protection System<br>g) Manual Fire Alarm System<br><br>(4) Mechnical Works<br>a) Installation of a new Deep well<br>b) Water Supply system within the Project site including installation of Elevated tank, reserve | (1) Site Preparation<br>a) Pre-construction works<br>- Detection of landmines and UXO, and their clearance.<br>b) Ground-preparation works:<br>- Demolition of unnecessary existing buildings, utilities.<br>- Removal of unnecessary existing trees.<br>- Leveling and reclaiming the site for the building<br>c) Preparation of temporary stock yard for construction period<br>d) Temporary access road for the construction. Separate gate from students/staff access.<br><br>(2) External Works and Approach Roads<br>- Landscaping, planting, etc., within the Site<br>- Fencing around the site<br>- Permanent road works around the site<br><br>(3) Utilities and Facilities<br>a) Electrical Works<br>Cabling works from the existing low voltage distoribution panel to the distribution panel at the Research & Training Complex and Farm Managemet building provided by the Project<br>b) Network and Telecommunication Works<br>Installation work of Fiber optic cable from the existing main switch located in the Computer Unit to the switch provided by the Project<br>c) Storm drainage from outside | (1) Site Preparation<br>a) (include temporary access road)<br>b)<br>—<br>c)<br>d)<br><br>(2) External Works and Approach Roads<br>—<br>—<br><br>(3) Utilities and Facilities<br>a) Rs.14,000,000<br>b) Rs.150,000 |

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| | Portions by the Sri Lankan Side | |
|---|---|---|
| | **Items** | **Budget (Rough Estimation in Rs.)** |
| tank, pumps, piping and fixtures<br>c) Sewerage system including piping works within the Project site<br>d) Waste water treatment facility (Septic tanks and soaked pits)<br>e) Storm drainage piping to the existing open ditch inside the Project site<br>f) Fire extinguishing facility (Fire extinguishers)<br>g) Air conditioning system and Mechanical Ventilation system<br><br>(5) External Work for the Building<br>Road, path and parking lots within the site<br><br>(6) Equipment<br>Equipment for Research | (4) Others (before implementing project)<br>a) Commissions to the Japanese foreign exchange bank for its banking services based upon the Banking Arrangement (B/A) namely the advising commission of the Authorization to Pay (A/P) and payment commission<br>b) Smooth customs clearance, tax exemptions, and prompt internal transportation for the imported construction materials and equipment<br>c) Governmental works including the application and obtaining of governmental approvals and permissions | a) *Will be estimated based on the total project cost.*<br><br>b)<br><br>c) Rs. 169,630 for Planning Clearance (UDA)<br>Rs. 1,500 for Building Construction Application (Kilinochchi Pradesasava) |
| | (5) Tax exemptions and necessary preferential treatment for the construction staff from Japan or a third country | (5) |
| | (6) Smooth entry, re-entry, and departure of DRC for the Japanese technical members | (6) |
| | (7) All the expenses, other than those to be born by Japan's Grant Aid within the scope of the Project | (7) |
| | After the Constrtuction | |
| | (8) Management, operation and maintenance cost for the new building and facilities | (8) |

A-6-34

Appendix-12

O/C.

මගේ අංකය
எமது இல.
My Number

ඔබේ අංකය
உமது இல.
Your Number

තැ.පෙ.අංකය-57
තිරුනෙල්වේලි,
යාපනය

த.பெ. எண் - 57,
திருநெல்வேலி,
யாழ்ப்பாணம்.


දුරකථනය
தொலைபேசி 021 206 0175
Telephone :
Fax : 021 206 0175

යාපනය විශ්වවිද්‍යාලය - ශ්‍රී ලංකාව
யாழ்ப்பாணப் பல்கலைக்கழகம் - இலங்கை
UNIVERSITY OF JAFFNA - SRI LANKA
OFFICE OF THE DEAN
FACULTY OF AGRICULTURE
ARIVIYAL NAGAR, KILINOCHCHI

P.O. Box - 57,
Thirunelvely,
Jaffna.


25.05.2015

The District Secretary,
Kilinochchi,

Dear Sir,

**Request for Land Mine Clearance Certificate**

We.the Faculty of Agriculture applied for a JICA Grant for the development of our faculty. The JICA office asked to submit Land Mine Clearance Certificate as prerequisite for entire area belong to Faculty of Agriculture at Ariviyal Nagar to be consider the project proposal. Then we requested the then District Secretary/Kilinochchi and she issued the nontechnical survey report for the area which had been already submitted to JICA Sri Lanka office.

Unfortunately the same kind of certificate was issued by your office for a water project carried by JICA in KIlinochchi district, came across some UXO's while implementing the project. Therefore now they insist us to provide technical survey report for the entire area. We did land leveling and clearing using heavy machineries in the proposed areas with the help of Security Forces Head Quarters Kilinochchi. Anyway the military personalsare not authorized to issue the certificate.

Now the preliminary work for the project is completed and the minutes were finalized and singed and a copy is attached for your reference. In that minutes the provision of technical survey for land mine clearance is mentioned as a prerequisite and have to be submitted in very short period. Further, they requested to provide the Action Flow Chart if any case UXO found while executing the project.

I would be very much thankful to you if kindly make necessary arrangement to do technical survey for land mine clearing and issue the certificate by authorized persons at your earliest. Please indicate the time needed for the technical survey. The entire area will be around 125 ac.

In addition please provide the flow chart diagram mentioning the details of to whom have to inform, who will be responsible for removal of UXO, etc. if any UXO present during implementation period.

Thanking you.

Yours faithfully,

Dr.Mrs.S.Sivachandiran
(Dean/Agriculture)

Copy: JICA. Sri Lanka Office
Vice Chancellor/University of Jaffna

# Current Situation of Faculty of Agriculture, Jaffna University

## 1. Roles and challenges of the Faculty of Agriculture, Jaffna University

The Faculty of Agriculture (FoAg) of the University of Jaffna (UOJ) is the only higher education institute engaged in capacity building and research in the agricultural sector of the northern provinces of Sri Lanka. However, due to the civil war, which lasted for 25 years, the FoAg had to move from the campus in Killinochi District to the Jaffna campus. During the civil war, research and education was carried out in UOJ facilities in Jaffna and in private houses. In 2014, research and education activities were restarted at the Killinochi campus, but activities are restricted due to inadequate facilities and lack of equipment.

In Sri Lanka there are eight universities that are engaged in agricultural research and education in the area where they are located. Universities in Sri Lanka that grant degrees in agriculture-related subjects excluding food science are listed in Table 1. Because the UOJ is the only university located in the arid northern provinces, its faculty is expected to carry out research directed at development and capacity building. Most of the staff who work in government institutes and international organizations in Sri Lanka are graduates of the UOJ. The FoAg of the UOJ also provides training programs and post-graduate courses to staff who work in these governmental organizations.

Table 1. Agriculture-related universities in Sri Lanka and their enrollment capacities

| University | Degree | Enrolment capacity |
|---|---|---|
| University of Jaffna | Agriculture | 100 |
| University of Peradeniya | Agriculture Technology and Management | 200 |
| University of Ruhuna | Agricultural Resource Management and Technology | 150 |
| Sabaragamuwa University of Sri Lanka | Agriculture | 85 |
| Eastern University of Sri Lanka | Agriculture | 85 |
| Rajarata University of Sri Lanka | Agriculture | 155 |
| Wayamba University of Sri Lanka | Agriculture | 150 |
| Uva Wellassa University of Sri Lanka | Export Agriculture | 60 |
| | Animal Science | 60 |
| | Tea Technology and Value Addition | 60 |

Source: Admissions to the Undergraduate Courses of the Universities in Sri Lanka 2013/2014 (University Grant Commission, Sri Lanka)

Although the FoAg of UOJ is the only higher education institute in the arid northern provinces, the enrollment capacity is limited to 100 students. The enrollment capacity is planned to increase to 200 by 2025, but the current faculty size and the facilities are both inadequate.

The UOJ should contribute to regional capacity building and agricultural development. For example, the FoAg could contribute to improving the agricultural productivity of the region by improving processing techniques for palm products, or enhancing the preservation and utilization of jackfruit and mango, which are grown in Sri Lanka in only the northern provinces. However, because research at UOJ is difficult due to inadequate facilities and equipment, most of the research conducted by undergraduate and graduate students is currently carried out at the facilities of the Faculty of Medical Science of UOJ and at the University of Peradeniya. Even though UOJ FoAg has same teaching responsibilities as other universities in Sri Lanka, the practical classes that are very important in agricultural education are difficult to conduct in the current facilities at UOJ.

A comparison of faculty size between the University of Peradeniya, one of the leading universities in Sri Lanka, and UOJ is shown in Table 2. There are only 24 faculty at UOJ, an extremely low number compared to the 109 faculty at Peradeniya University. Also, the number of faculty members who hold a PhD was 98 at the University of Peradeniya compared with 9 at UOJ. To date, research and capacity building activities by the FoAg at UOJ have been limited due to insufficient facilities, even with restarting of the activities at the Killinochi campus. But eventually, the restoration of the campus should be done to improve research and education.

Table 2. Number of faculty members in the Faculty of Agriculture at the University of Peradeniya and the University of Jaffna

| Department | No. of faculty members (with PhD) | |
|---|---|---|
| | Univ. of Peradeniya | Univ. of Jaffna |
| Department of Crop Science | 22 (20) | 5 (1) |
| Department of Biology | 11 (7) | 4 (2) |
| Department of Agricultural Engineering | 13 (11) | 4 (2) |
| Department of Animal Science | 24 (16) | 4 (1) |
| Department of Food Science and Technology | 12 (8) | 3 (2) |
| Department of Soil Science | 9 (7) | |
| Department of Agricultural Economics and Business Management | 10 (5) | 4 (1) |
| Department of Agricultural Extension | 8 (4) | |
| Total | 109 (98) | 24 (9) |

Source: Webpage of the University of Peradeniya (accessed on 2015/10/01) and questionnaire by survey team

As mentioned above, the FoAg is expected to contribute to agricultural development in the northern regions of Sri Lanka. To meet this expectation, the FoAg aims to restart education and research at the Killinochi Campus and

emphasize practical education programs. From the survey, it was made clear that research and education is hindered by inadequate staffing, facilities, and equipment. Thus, development of the research and education environments by building a research complex, increasing the faculty size, and improving enrollment capacity is urgently needed to empower the research and education activities of the FoAg of UOJ.

## 2. Status of Education and Research

(1) Curriculum

Faculty of Agriculture at Jaffna University has 6 departments of educational /research areas, namely, Department of Agronomy, Animal Science, Agricultural Chemistry (Soil Science, Food Analysis/Processing), Agricultural Biology, Agricultural Engineering and Agricultural Economics. Students of Master's and Doctoral Courses belong to the University headquarters, while they conduct their study/research supervised by each department's member.

The curriculum at the Faculty consists of core courses, which are common among all its departments, specialized courses per department and, practices and common/auxiliary subjects as Table 3 indicates (For the detailed, see Annex 7-1)

Basically, students take 55 core courses by the first semester of the third year. From the second semester of the third year, they specialize in one of the six departments and take 6-14 subjects. The structure indicates that the Faculty at Jaffna University focuses on general knowledge of the agriculture, prioritizing core courses.

Table 3 Number of Core Courses, Specialized Courses and Auxiliary/Common Subjects of each Department

| Department | Core Courses (Inc. Experiments and Practices) | Specialized Courses (Inc. Experiments and Practices) | Auxiliary/Common Subjects |
|---|---|---|---|
| 1. Agronomy | 9 ( 9 ) | 9 ( 8 ) | 12 |
| 2. Animal Science | 9 ( 9 ) | 12 ( 10 ) | |
| 3. Agricultural Chemistry (Soil Science) | 8 ( 7 ) | 7 ( 6 ) | |
| 4. Agricultural Chemistry (Food Science) | 8 ( 7 ) | 7 ( 5 ) | |
| 5. Agricultural Biology | 7 ( 6 ) | 14 ( 9 ) | |
| 6. Agricultural Engineering | 6 ( 6 ) | 6 ( 5 ) | |
| 7. Agricultural Economics | 8 ( 6 ) | 8 ( 6 ) | |

Source: Faculty of Agriculture, Undergraduate Student Handbook

Students need to earn 128 credit in 4 years; 110 credits from core courses, 12 credits from specialized courses and 6 credits from research projects. As Table 4 shows, all students of the Faculty have to earn most of core courses, i.e., 110 credits out of 122 Core Courses. On the other hand, they need to take only 18 credits including 6 credits of research project, out of 130 specialized courses. The credit structure also

indicates that students are required to understand agriculture in a broad sense, rather than developing their specialization. Students under the curriculum can learn general knowledge of agriculture while they are not able to enhance their specialties.

Table 4 Number of Credits

| No | Department | Courses | 1st Year | | 2nd Year | | 3rd Year | | 4th Year | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1st | 2nd | 1st | 2nd | 1st | 2nd | 1st | 2nd | |
| 1 | Agronomy | Core | 3 | 3 | 4 | 4 | 5 | 2 | 0 | 0 | 21 |
| | | Specialized | 0 | 0 | 0 | 0 | 0 | 4 | 14 | 0 | 18 |
| | | Total | 3 | 3 | 4 | 4 | 5 | 6 | 14 | 0 | 39 |
| 2 | Animal Science | Core | 2 | 2 | 3 | 5 | 4 | 2 | 0 | 0 | 18 |
| | | Specialized | 0 | 0 | 0 | 0 | 0 | 4 | 20 | 0 | 24 |
| | | Total | 2 | 2 | 3 | 5 | 4 | 6 | 20 | 0 | 42 |
| 3 | Agricultural Chemistry | Core | 3 | 3 | 3 | 3 | 2 | 4 | 0 | 0 | 18 |
| | | Specialized | 0 | 0 | 0 | 0 | 0 | 6 | 20 | 0 | 26 |
| | | Total | 3 | 3 | 3 | 3 | 2 | 10 | 20 | 0 | 44 |
| 4 | Agricultural Biology | Core | 2 | 4 | 3 | 2 | 4 | 2 | 0 | 0 | 17 |
| | | Specialized | 0 | 0 | 0 | 0 | 0 | 4 | 26 | 0 | 30 |
| | | Total | 2 | 4 | 3 | 2 | 4 | 6 | 26 | 0 | 47 |
| 5 | Agricultural Engineering | Core | 2 | 3 | 3 | 3 | 3 | 2 | 0 | 0 | 16 |
| | | Specialized | 0 | 0 | 0 | 0 | 0 | 4 | 6 | 0 | 10 |
| | | Total | 2 | 3 | 3 | 3 | 3 | 6 | 6 | 0 | 26 |
| 6 | Agricultural Economics | Core | 3 | 2 | 2 | 3 | 4 | 2 | 0 | 0 | 16 |
| | | Specialized | 0 | 0 | 0 | 0 | 0 | 4 | 12 | 0 | 16 |
| | | Total | 3 | 2 | 2 | 3 | 4 | 6 | 12 | 0 | 32 |
| 7 | Common/Auxiliary Subjects | Core | 6 | 3 | 0 | 1 | 1 | 3 | 2 | 0 | 16 |
| | | Specialized | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 6 |
| | | Total | 6 | 3 | 0 | 1 | 1 | 3 | 2 | 6 | 22 |
| | **Total** | **Core** | **22** | **20** | **18** | **21** | **23** | **17** | **2** | **0** | **122** |
| | | **Specialized** | **0** | **0** | **0** | **0** | **0** | **26** | **98** | **6** | **130** |
| | | **Total** | **21** | **20** | **18** | **21** | **23** | **43** | **100** | **6** | **252** |

Source： Edited from URL of Jaffna University (Partly, updated through the JICA's Study)

The number of credits of specialized courses is significantly different in each department. Department of Agricultural Biology, Agricultural Chemistry and Animal Science offer more specialized courses than core courses. On the contrary, Department of Agricultural Engineering and Agricultural Economics have only 18 credits, smaller than the minimum required number. Students of these two departments, therefore, need to take specialized courses from other departments. Among all departments, only Department of Agronomy has more core courses than specialized courses. This may be because the department is expected to provide fundamental knowledge of agriculture to all departments.

Table 5 summarizes the content of subjects of each department (for the detailed content of subjects, see Annex 7-1). All curriculums for undergraduates are designed to start from the introductory courses and proceed to specialized courses year by year. However, analyzing the contents of each syllabus, there are a number of core courses that qualify as specialized course. Moreover, most syllabuses cover a broad range of specialized knowledge but lack the basic knowledge to support students' understanding of those specialized knowledge.

While this survey is limited to one Faculty, and noting that the curriculum is related to the educational policy of the University, it is premature to provide a comprehensive evaluation. However, this Faculty's curriculum and syllabus indicate that the University requires its undergraduate students to learn a broad range of courses in depth. That probably reflects the current highly developed technology of sciences including agriculture. Nevertheless, it might be difficult for an undergraduate student to learn such a broad range of subjects in depth (at the current level of specialization) within four years. For this reason, it is suggested that the Faculty restructure their curriculum to either general/broad range or specialized/in depth, and not both. Based on the choice of the direction of the Faculty, the curriculum of each department is able to narrow down and focus on key specialization while enhancing core courses of basic knowledge of agriculture, considering agricultural status quo. If necessary, the reorganization of departments would be considered.

Table 5 Summary of Subjects of Each Department

| No | Department | Subject Contents |
|---|---|---|
| 1 | Agronomy | Crop Production and Management (cereal crops, vegetables, fruits, floriculture, plantation crops), Crop Physiology, Weed Management, Seed Production & Nursery Management, Landscaping, Experimental Data Management |
| 2 | Animal Science | Livestock Breeding Management, Anatomy and Physiology of Livestock, Animal Nutrition, Animal Hygiene, Animal Reproductive Physiology, Animal Product Processing (Meat/Dairy Production) and By-product Utilization |
| 3 | Agricultural Chemistry | Soil Properties, Soil Chemistry, Plant Nutrition, Soil Microbiology, Soil Pollution Management, Food Nutrition, Food Processing, Food Chemistry, Food Microbiology, Laboratory Techniques |
| 4 | Agricultural Biology | Plant Physiology, Applied Entomology, Applied Microbiology, Plant Pest Management, Plant Breeding, Plant Biotechnology, Cell Biology, Environmental Biology |
| 5 | Agricultural Engineering | Hydrology, Water Resource Management, Irrigation, Farm Machinery, Postharvest Machinery, Food Processing Machinery, Environmental Engineering |
| 6 | Agricultural Economics | Agricultural Extension, Farm Management, Agricultural Economics, Agribusiness, Trade of Agricultural Products |
| 7 | Common/Auxiliary | Computer Literacy, Basic Mathematics, English, Industrial Training, Research Project |

| | Subjects | |
|---|---|---|

Source： Edited from URL of Jaffna University (Partly, updated through the JICA's Study)

As a reference, Table 6 compares the number of classes of department of agronomy at Tokyo University of Agriculture in Japan and that of Jaffna University. The Faculty of Agriculture at Jaffna University covers comprehensive and specialized subjects. The curriculum of Jaffna University offers three subjects of horticultural studies (consisting of vegetables, fruits, and floriculture), three subjects of crop conservation and only one subject for crop breeding.

Table 6 Comparison of Department of Agronomy with Tokyo University of Agriculture

| Subject | Dep. of Agriculture at Tokyo University of Agriculture | Dep. of Agronomy at Jaffna University | Subject | Dep. of Agriculture at Tokyo University of Agriculture | Dep. of Agronomy at Jaffna University |
|---|---|---|---|---|---|
| Crop Production Science | 2 | 3 | Theory of Bio-nursery | 1 | 3 |
| Food Crop Science | 2 | 2 | Crop Breeding | 3 | 1 |
| Horticultural Science | 9 | 3 | Agricultural Environmental Science | 7 | 4 |
| Industrial Crop Science | 1 | 1 | Crop Conservation | 9 | 3 |
| Meadow/Forage Science | 1 | 1 | Plant Physiology | 3 | 4 |
| Theory of Postharvest | 1 | 1 | Agricultural Economics and Management | 5 | 8 |

Source： Syllabus2015 of Tokyo University of Agriculture (in Japanese) and
Faculty of Agriculture, Undergraduate Student Handbook

(2) Experiments/Practices

Faculty of Agriculture at Jaffna University prioritizes practical education. As Table 3 indicates, the Faculty of Agriculture at Jaffna University provides a number of experiments/practices and most of the subjects combine theory and practice (Annex 7-1). Departments of all natural sciences excluding that of Agricultural Economics, provide 11-19 experiments/practices subjects. In addition, the curriculum includes Industrial Training and Experiential Training as compulsory subjects that employ field experiences.

The study interviewed faculty members regarding the syllabus of those experiments/practices. It was confirmed that some of the syllabus include high level of specialization for an undergraduate level, which requires strong commitment for both students and teachers to complete those programs with high standard

of quality. In reality, however, the syllabus is not covered completely; neither can the students participate in the program actively. There are two main factors that contribute to;

1) The number of experiment/practice classes and the number of teachers are disproportionate as the number of classes per teacher is too many.
2) Although the syllabus is written by full-time teachers, actual classes are taught by laboratory assistants who have only a bachelors' degree. The classes are not well supervised by full-time teachers with PhD degree.

Considering a future increase in the number of students, the syllabus of experiment/practice classes needs to be reorganized to enable all students to fully understand the contents and participate in the classes actively.

(3) Research Activities and Contents

Table 7 summarizes the researches and achievements of full-time members at the Department of Agronomy, Agricultural Biology, Agricultural Chemistry, and Agricultural Engineering between 2012 and 2014. Most achievements are conferences' abstracts of academic societies that do not require any review, and is lowly evaluated in the academic arena. Some papers are published only in domestic academic journals which are not well known in international academic societies. The academic level of faculty members needs to be enhanced to enable the Faculty to play a vital role as the agricultural research hub in the Northern state of Sri Lanka.

Table 7 Research Achievement of Four Departments between 2012 and 2014

| Department | Number of academic papers | Number of abstracts of academic societies | The number of academic publications |
|---|---|---|---|
| Agronomy | 3 | 11 | 0 |
| Agricultural Chemistry ( Soil Science) | 5 | 29 | 0 |
| Agricultural Chemistry (Food Science) | | | |
| Agricultural Biology | 11 | 22 | 3 |
| Agricultural Engineering | 6 | 23 | 0 |

Source: The Result of the JICA Study

The study also surveyed the 5-year research plan of each department and the experiment processes of these plans. Table 8 shows the summary (For the detailed research plan, see Annex 7-2).

Table 8 Summary of Research Plans of Each Departments

| No | Department | Research Topics |
|---|---|---|
| 1 | Agronomy | Field experiments of various crops (varieties, fertilizing, pest control, water management, etc.), hydroponics, micro-propagation, seed preservation, plant genetic resources evaluation, forestry resource evaluation, pollutant removal |

| | | |
|---|---|---|
| | | crops |
| 2 | Animal Science | Animal breeding (artificial insemination, embryo transfer, pathological diagnosis), viral disease control, Feed development, animal product development, aquaculture technology |
| 3 | Agricultural Chemistry | Packaging technology development, seaweed processing, citrus juice processing, soil microelement analysis, heavy metal pollution evaluation (soil, irrigation water), organic matters utilization (feed residue), soil microbe utilization |
| 4 | Agricultural Biology | Somatic hybridization, hybrid seed, fruit genet evaluation, mutation breeding, Genome sequencing, Bio-control agent development, rhizobium utilization, natural enemy utilization, residual agricultural chemicals |
| 5 | Agricultural Engineering | Water analysis, parboiled rice processing, physical properties analysis of banana, waste utilization from power generation facility (soil improvement materials) |
| 6 | Agricultural Economics | Marketing analysis of agricultural products, consumers analysis, economic growth of agricultural sector, agricultural insurance system, utilization of audiovisuals (agricultural extension) |

Sources: Source: The Result of the JICA Study

The above research/experiment topics contribute to the agricultural development in Northern Sri Lanka while some of them are rather frontline scientific topics.

In addition, as a response to popularity of current interdisciplinary topics, some of the above topics require a cross-departmental commitment. There are also some overlapping themes between departments. Cross-departmental approaches would be strategically employed, provided that each department's academic roles are clarified first and foremost prior to determining interdisciplinary topics (For more details, see Annex 7-2).

(4) Academic Background of Teaching Staff

Table 9 describes the academic background of the current teaching staffs. There are only nine staffs out of 24, with only one or two staffs per department have PhD. Two staffs are currently taking doctoral and master courses.

Table 9 Academic Background of Teaching Staffs(May, 2015)

| Department | PhD | MSc | BSc | Study |
|---|---|---|---|---|
| Agronomy | 1 | 1 | 3 | One for PhD overseas (Australia) |
| Animal Science | 1 | 0 | 3 | One for MSc in-country |
| Agricultural Chemistry | 2 | 0 | 1 | |
| Agricultural Biology | 2 | 0 | 2 | |
| Agricultural Engineering | 2 | 2 | 0 | |
| Agricultural Economics | 1 | 3 | 0 | |

| | | | | |
|---|---|---|---|---|
| Total | 9 | 6 | 9 | |

Source：Sources: Source: The Result of the JICA Study

In Sri Lanka, BSc holders can quality as an assistant lecturer but he/she needs to earn MSc or PhD within 7 years (paid study leave). On the other hand, MSc holders qualify as senior lecturers (with the option to avail paid study leave or not)

As mentioned above, currently BSc holders teach most of the classes that a chairman of each department designed. To improve the quality of lectures and experiments/practices, it is necessary to increase the number of faculty teaching staffs who meet proper requirements as well as MSc and PhD holders.

Current Situation of the Farm

(1) On-campus farm

As shown in Figure 2-5 and Table 10, a total of 14 training farms, covering a total area of 3.5 acres (14,200m$^2$) are temporarily established on the UOJ campus. The size ranges from around 10 to 20 acres, which are unsuitable for satisfactory training, practice and research.

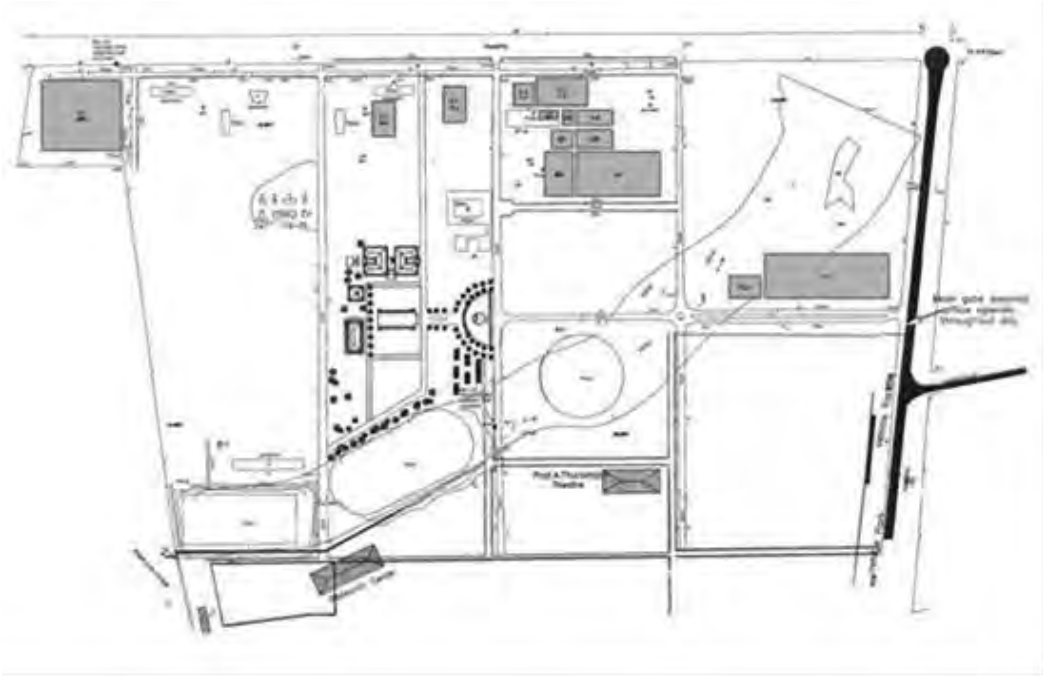

Figure 1 Training Farms on the Kilinochchi Campus, Faculty of Agriculture, University of Jaffna

Table 10 On-campus Training Farms

| Name of the Unit | Area (Ac) | Target Crops | Related Syllabus |
|---|---|---|---|
| 1. Plantation farm | 1.22 | Cashew, Mango | AGR 22022, AGR 32013, AGRS41042 |
| 2. Tissue culture farm | 0.04 | Banana | AGR22022, AGRS41042 |

| | | | |
|---|---|---|---|
| 3. Alley cropping system | 0.54 | Maize, sorghum and others | AGR12013, AGR22012, AGR32012, AGRS 32012 |
| 4. Student field plots | 0.26 | Pulses, cowpea and others | AGR 21012, AGR 22012 |
| 5. Crop training system | 0.24 | Grape and others | AGR 22022, AGRS41042 |
| 6. Student experiment unit | 0.03 | Tomato | AGR 20102, AGR4210 |
| 7. Orchard unit | 0.15 | Banana | AGR 22022, AGRS41042 |
| 8. Indoor plants unit | 0.04 | Fern, begonia and others | AGR 22022, AGRS41072 |
| 9. Student experimental unit | 0.01 | Brinjal (eggplant) | AGR 20102, AGR4210 |
| 10. Orchard varietal unit | 0.28 | Banana | AGR 22022, AGRS41042 |
| 11. Fodder grass unit | 0.06 | CO3, Napier | - |
| 12. Plantation farm | | | Included to unit 11 |
| 13. Student experimental unit | 0.01 | Paddy | - |
| 14. Home garden unit | 0.62 | Spice, vegetables and others | AGR 32012 |
| Total | 3.50 | | |

Water is provided to on-campus farms either via a water tap installed in their neighborhood or drawing from elevated tanks on the university premises into wheeled water tanks, which are then transported by UOJ owns. Since the farms are dispersed, water supply to farms via tractors is carried out almost all day long, from start to end time (8:00 - 16:00).

(2) Intake facilities for irrigation

Within the target farm development areas, irrigation intake facilities utilizing ground water and pipeline systems are improved per 5 acres of farm land and 5 acres of meadow to facilitate a research project of fourth-year students (Course Code CCC42016). Intake facilities are a 6m-diameter well, 2 volute pumps for underground pumping and an elevated tank holding approximately 50,000 liters and 21.5m in height. In UOJ, there are plans to fill the tank with water twice daily, which is then supplied to farms and the farms to be improved in this Project planned to utilize the same intake facilities. However, a water supply test revealed that after drawing water from the well, the well water did not recover to the pre-supply level. Accordingly, using the existing well to supply irrigation water to farms is deemed difficult, so a well of similar size to the existing one is installed in the Project.

Table 11 Intake Facility Specifications

| Intake facility | Specifications | Shape dimension |
|---|---|---|
| Well | Diameter: 6.0m<br>Ground water level: 5.65m from the top end and 5.20m from the pipe center |  |
| Pump | Type: Centrifugal volute pump (Model: DH200/3)<br>Pumping water: fresh water<br>Diameter: 2 inches (2 x 2)<br>Design flow rate: not available<br>Total pump head: up to 60m (200ft)<br>Output: 5.6 kW<br>Number of revolutions: 2,850 rpm<br>Manufacturer: JINASENA (Pvt) Limited |  |

| | | |
|---|---|---|
| Elevated tank | Tank: width 4.0 x length 6.5 x height 2.5m (outer frame measurement)<br>Slipway pipe installation height: 2.0m from the lower end<br>Effective water volume: 52,000 liters (4.0 x 6.5 x 2.0m)<br>Height: 21.5m (from the ground level to the top end of the tank) |  |