Socialist Republic of Viet Nam

Preparatory Survey on the Project for Strengthening Can Tho University in Viet Nam to be an Excellent Institution of Education, Science Research and Technology Transfer

Final Report

September 2014

JAPAN INTERNATIONAL COOPERATION AGENCY

Ernst & Young Sustainability Co., Ltd.
PADECO Co., Ltd.
NIHON SEKKEI, INC.

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Abbreviations

ABET	Accreditation Board for Engineering and Technology
ADB	Asian Development Bank
ASEAN	Association of South-East Asian Nations
AUN	ASEAN University Network
AUNQA	AUN Quality Assurance
BiRDI	Biotechnology Research Development Institute
CAAB	College of Agriculture and Applied Biology
CAF	College of Aquaculture and Fisheries
CENRes	College of Environment and Natural Resources
CEOC	Common Equipment Operation Center
CICT	College of Information & Communication Technology
CoET	College of Engineering Technology
CoNS	College of Natural Science
CRD	College of Rural Development
CTU	Can Tho University
DOST	Department of Science Technology
EFQM	European Forum of Quality Management
FDI	Foreign Direct Investment
FIRST	Fostering Innovation through Research, Science and Technology
GIS	Geographic Information System(s)
HRDMP	Human Resource Development Master Plan
HRDS	Human Resource Development Strategy
IETC	International Education Training Center
JICA	Japan International Cooperation Agency
JIRCAS	Japan International Research Center for Agricultural Sciences
LRC	Learning Resource Center
MDGs	Millennium Development Goals
MDI	Mekong Delta Development Research Institute
MDR	Mekong Delta Region
MHO	(Name of Project in Dutch)
MOET	Ministry of Education and Training
MONRE	Ministry of Natural Resources and Environment
NEDO	The New Energy and Industrial Technology Development Organisation
ODA	Official Development Assistance

PCR	Polymerase chain reaction
QA	Quality Assurance
QATC	Department of Quality Assurance and Testing Center
SEBA	School of Economics & Business Administration
SEDP	Socio-Economic Development Plan
SEDS	Socio-Economic Development Strategy
SoE	School of Education
SoL	School of Law
SoPS	School of Political Science
SoPU	School of Pre-University
SSSH	School of Social Science & Humanity
UNDP	United Nations Development Programme
UNSECO	United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development
UV-VIS	Ultraviolet･Visible Absorption Spectroscopy
ViFiNET	Viet Nam Fisheries and Aquaculture Institution Network
VIIP	Viet Nam Inclusive Innovation Project
VLIR-ICU	(Name of project in Flemish)

Executive Summary

1. Background of the Survey

Becoming an industrialized country by 2020 and maintaining economic growth are national goals of the Government of Viet Nam (hereinafter referred to as "the Government"). To achieve the goal, the Government has set policies for industrialization and prioritized industries, and focused on development of industrial human resources and enhancement of scientific research capacity.

To deal with such challenges within the education sector, the Government developed the concept of 'development of new model universities' which was initiated in 2006. Ministry of Education and Training (MOET) selected four (4) large universities from different regions to provide them extensive financial and educational support through the state budget and donors. This enables the universities to develop as internationally acknowledged universities and function as archetypes for other standard universities after 2020.

To realise this concept, the Government requested the Japanese Government support in upgrading Can Tho University (CTU), one of the four model universities, to become an excellent and internationally recognized universities, focusing on three fields, agriculture, fisheries and aquaculture and environment. In response, the Japanese Government decided to conduct this Preparatory Survey on the Project for Strengthening Can Tho University in Viet Nam to be an Excellent Institution of Education and Research and Technology Transfer (hereinafter referred to as "the Survey") in October 2013.

The Survey aims to examine items necessary for appraisal of the JICA loan project (hereinafter referred to as "the Project"). They include objectives, outlines, and costs estimation of the Project, Project implementation schedule, Project implementation methods (procurement/ construction), Project management and implementation arrangements, operation and maintenance system, social and environmental considerations, and proposed capacity development necessary for realizing effects of the Project. In addition, the Survey will examine contents of a technical cooperation project to effectively and efficiently implement the proposed Project.

The survey was conducted from the middle of March 2014 till the end of September 2014.

2. Necessity and Justification of the Project

Country context. Viet Nam's socio-economic development and planning framework is composed of the Socio-Economic Development Strategy 2011–2020 (SEDS) and Socio-Economic Development Plan 2011–2015 (SEDP). Becoming an industrialized country by 2020 is a national goal and one of the main focuses is on rapid development of high quality human resources through quality enhancement of education and training and development of scientific, technological and intellectual economy.

With regard to education and training, it focuses on the needs of restructuring and reforming the education and training system. Pertaining to the development of scientific, technological and intellectual economy, the SESDP identifies challenges: (i) investment in science-technology and, basic research in natural science and practical research, (ii) enhancement of scientific level and position of Viet Nam in sectors the country is strong in, (iii) enhancement of research capacity, (iv) strengthening of technological application and renovation in industry, and (vi) development of skills of choosing industrial and service sectors with high level of technology.

The Human Resources Development Strategies 2011-2020 (HRDS) and Human Resource Development Master Plan 2011-2020 (HRDMP) give specific targets for human resources development. The HRDS plans to increase the percentage of trained labourers to total labour forces in the agriculture, forestry and fisheries sector to 50% in 2020 from 15% as of 2010. The HRDMP emphasizes higher education and vocational training above the intermediate level because they directly contribute to socio-economic development and sets targets in teachers' quality which affects quality of education and requests more teachers in higher education to get higher academic degrees.

Regional context. CTU is located in Mekong River Delta (MRD), south of Viet Nam, and the area is full of agriculture and fishery industries. The MRD has 27.2% of the nation's agricultural land areas, and produces 53.4% of the nation's rice and 90% of rice exports. It occupies 70% of the nation's inland water areas for aquaculture, responsible for 58.7% of the nation's production of aquaculture and fisheries and 80% of shrimp export. Considering these roles of Mekong River Delta in national economy, it has potential for development of agricultural machinery and food processing in agriculture and fisheries which are two of the prioritized areas underlined in the Government's industrialization strategies.

However, as the National Strategy for Climate Change mentions, the MRD is assessed as one of the most vulnerable river deltas in the world together with the Nile River Delta in Egypt and the Gages Delta in Bangladesh. It actually has faced some serious issues such as water pollution and rise in sea level affected by clime change, which directly relates to agriculture and aquaculture productions.

Despite the Government's efforts, the MRD continues to be poor and many of the social development indicators are far from satisfactory. To reduce the poverty in the region, the Government has developed 'the Master Plan on Socio-Economic Development of the Mekong River Delta through 2020'[1] which presents various policy targets to be achieved by 2020. The Master Plan also sheds light on the insufficient number of higher education institutes and presents a long term direction which designates the CTU as the regional center university to help improve the average quality of the education institutes in the MRD.

Sector context. The Government developed the concept of 'development of new model universities' which was initiated in 2006.[2] MOET selected four (4) large universities from different regions to provide them extensive financial and educational support both through the state budgets and donors. This enables the universities to develop as internationally acknowledged universities and function as archetypes for other standard universities after 2020.

While there are some distinctive differences among the 4 model universities, MOET issued the guiding principles for implementation of the New Model University concept in 2011 by establishing the steering committee.[3] The first model university project was started in 2010 in HCMC supported by the Government of Germany and the WB[4] and the second model

[1] Socialist Republic of Viet Nam. 2012. Prime Minister's Decision No. 939/QD-TTg of 19 July 2012 approving the Master Plan on the Socio-Economic Development of the Mekong River Delta through 2020. Hanoi.
[2] Socialist Republic of Viet Nam. 2006. Prime Minister's Decision No.145/2006/QD-TTg on Major Guidelines and Orientation on Establishing Viet Nam's University of International Standards approved on 20 June 2006. Hanoi.
[3] Socialist Republic of Viet Nam. 2011. Prime Minister's Decision No.891/2011/QD-TTg on Establishment and Regulations on functions, responsibilities, authorities and organizational structure of the Steering Committee for Establishing Universities of Excellence approved on 8June 2011. Hanoi.
[4] World Bank. 2010. Program Document for A Proposed Credit to the Socialist Republic of Viet Nam for A Model University Project. Washington D.C.

university project in 2011, supported by the Government of France and ADB.[5] In accordance with this recent development, CTU is also preparing to receive support from Japan.

Alignment with Japan's ODA policy. The Project is closely linked with two priority areas of Japan's ODA policy: (i) promotion of growth and strengthening of competitiveness and (ii) mitigation measures against vulnerability. Under the area of promotion of growth and strengthening of competitiveness, a market-oriented economic system is strengthened and industry and industrial human resources are developed to achieve sustainable development through strengthened international competitiveness. On the other hand, mitigation measures against vulnerability deals with environmental issues associated with rapid urbanization and industrialization along with threats caused by disasters and climate change.

3. Overall Project Scope

3.1 Project Objectives

The long-term objective is to strengthen CTU as an excellent, internationally recognized institution in agriculture, aquaculture and environment and other interrelated fields, which will also contribute to the socio-economic development of the MRD and the country as a whole.

The short-term objective is to strengthen CTU's capacity to deliver high quality academic and research works in three fields (agriculture, fisheries/aquaculture and environment) and interdisciplinary fields, which will result in contributing to climate change issues and adding value to agriculture and aquaculture of the MRD.

3.2 Overall Project Scope and ODA Schemes

To achieve the project objectives, an overall project scope is developed and appropriate ODA schemes are examined. To effectively and efficiently implement the Project (JICA loan project), the JICA study team has also proposed a technical cooperation project. The overall project scope and demarcation of the JICA loan project and the technical cooperation project are shown in Table 1.

[5] ADB. 2010. Report and Recommendations of the President to the Board of Directors: Proposed Loan to the Socialist Republic of Viet Nam for the University of Technology and Science Hanoi (New Model University) Development Project. Manila.

Table 1: Overall Project Scope and Appropriate ODA Schemes

Project Scope	Japan's ODA Schemes		Remarks
	Technical Cooperation	ODA Loan	
1. Human Resource Development in Research Activities			
1-1 Scientific Training in Japan		✔	
1-2 Overseas Short-term Research Training		✔	
1-3 Joint Research Studies with Japanese Partner Universities	✔	✔	The technical cooperation project is responsible for research capacity development of CTU in the three fields while the Project is responsible for providing research project budget and supporting CTU in managing research activities.
2. Improvement in Graduate Programs			
2-1 Establishment of Graduate Programs	✔		
2-2 Provision of Model Lectures in Graduate Programs	✔		
2-3Obtaining Accreditation of Graduate Programs	✔		
3. Strengthened University Governance and Management			
3-1 Strengthened Private-Public-Academia Collaboration including patent management	✔		
3-2 Strengthened Research Policy and Management	✔		Incorporated into 1-3 above of the technical cooperation project.
3-3 Quality Assurance Expansion	✔		Included in 2-3 above.
3-4 Establishment of Graduate Programs	✔		Including in 2-1 above.
3-5 Supporting Unit staff Capacity Development in areas of 3-1 to 3-4	✔	✔	The technical cooperation project covers most of the training while the Project is responsible for master's degree training.
4. Improvement in Academic and Research Environment			
4-1 Construction of Buildings for Practice, Research Studies, Lectures, International Conferences		✔	
4-2 Provision of Practice and Research Equipment	✔	✔	CTU procures research equipment through the Project while the technical cooperation project provides minimum equipment for its implementation.
4-3 Overseas Short-term Training for O&M of Practice and Research Equipment	✔		
5. Strengthened Capacity of Project Implementation Unit for Effective and Good Quality Project Implementation and M&E			
5-1 Establishment of Project Implementation unit, Preparation of Project implementation plan and Monitoring and Evaluation (M&E) plan		✔	
5-2 Short-term training on Project Implementation and M&E	✔		Country Specific Training Courses on Project Management of JICA Loan Projects will be launched, getting PMU members of all new JICA loan projects in Viet Nam.

Source: JICA Study Team

1. Introduction

1.1 Study Background

The Government of Viet Nam (hereinafter referred to as "the Government") has set a goal as a long term national policy to become an industrialized country by 2020 and maintain economic growth by introducing the Social-Economic Development Strategy (2011–2020). By breaking away from the economic model based on cheap labor forces, and transiting from primary to secondary, and secondary to tertiary industry, the government has focused on developing industrial human resources to cater to the skills required in these new industries by increasing both quality and quantity of higher educational institutions and reinforcing research capability of universities. Given the situation, the Government planned "Framework of establishing International Model University" in 2006 to establish four model universities of international standards to serve as role models of better education and research in Viet Nam. Can Tho University (CTU) has been chosen as one of the four candidates of international model universities and the request for assistance was submitted to the Japanese government.

CTU is located in Mekong Delta Region (MDR), south of Viet Nam, and the area is active with agriculture and fishery industries which account for 25% of GDP in Viet Nam. The region has people who work for the primary industry; however, there are some serious issues, such as water pollution due to climate change and rise in sea level, which directly affect agricultural production. MDR has potential to develop food processing and agricultural machinery - two of the six prioritized fields in the industrialization strategy which is part of the industrial policy promoted by the Government. CTU is expected to realize the educational and research achievements by conducting researches which address such issues in Mekong delta, aiming to reinforce international competitiveness to gain recognition as a research based university and improve education, research, and management capability.

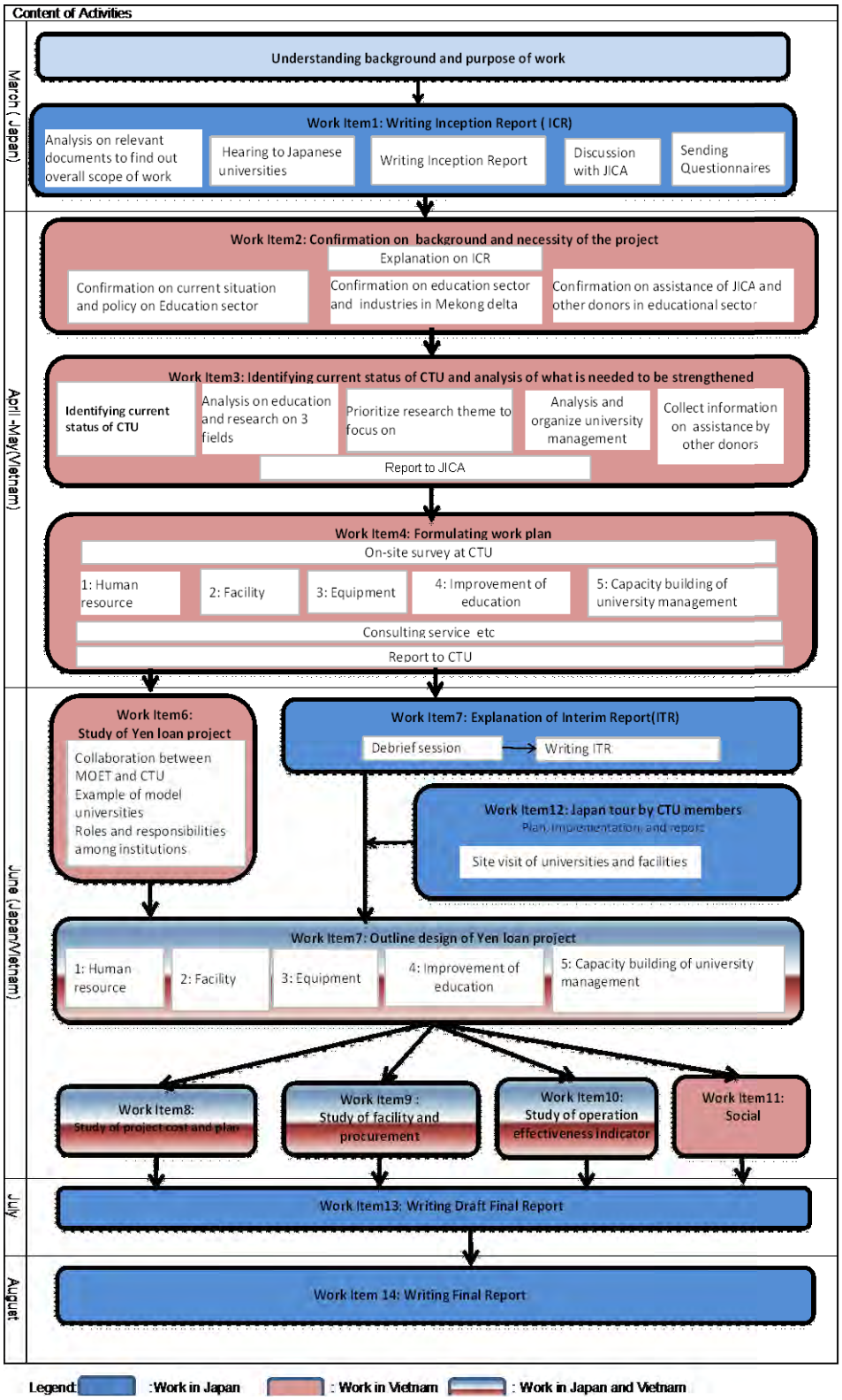
1.2 Study Description

1.2.1 Purpose of the Study

The Project Preparatory Survey on Strengthening Can Tho University to be an Excellent Institution of Education, Scientific Research and Technology Transfer (hereinafter referred to as "the Study") sets a goal to strengthen education and capability in CTU by training industrial human resources and researchers, upgrading industry in agriculture, fishery and aquaculture, and addressing environmental issues in MDR. In order to realize this goal, the Study examines 1) Capacity building of education, research, technology transfer/ regional and social contributions in each field of agriculture, fishery and aquaculture, and environment, 2) improvement of governance management, and 3) consistency of policy and plan of educational/research institution, and equipment and its maintenance. The Study evaluates the purpose of the upcoming Yen loan project, "Strengthening Can Tho University to be an Excellent Institution of Education, Scientific Research and Technology Transfer" by conducting survey on the project outline, the budget, the implementation schedule, implementation methodology on procurement and construction, the implementation structure, the operation and maintenance structure, and the consideration of environment and social impact. The Study also aims to examine the effective Yen loan proposal and the screening system to be approved.

1.2.2 The Study Flow

Figure 1-1 shows the Study Flow during the study period.



Source: The JICA Study Team

Figure 1-1: Study Flow

1.2.3 Reports

The JICA study team prepared reports and addressed the concerns shown in Table 1-1.

1.2.3 Reports

The JICA study team prepared reports and addressed the concerns shown in Table 1-1.

Table 1-1: Reports and Time of Submission

Report/Consultation Meeting	Contents/Agenda	Time of Submission
Inception Report	Discussions on ICR (English/Japanese) including i) study outlines, ii) major study items and methodology, iii) table of contents of study reports (initial version), iv) JICA consultant team's request for support from MPI and MOET	End of March 2014
Interim Report	Interim Report (English/Japanese) including survey items ii)–iv) of the first field survey	Beginning of June, 2014
Draft Final Report	Draft Final Report (English/Japanese) including draft of all findings, proposals and recommendations	End of July, 2014
Final Report	Final Report (Vietnamese/English/Japanese) including all findings, proposals and recommendations, reflecting comments from Vietnamese and Japanese sides	September 5th, 2014

Source: The JICA Study Team

1.2.4 Team Members

The Study was conducted by 13 international consultants and 5 national staff and coordinators. Name and position title of the members are shown in Table 1-2.

Table 1-2: Team Members

Name	Position
Hiroyuki Kanzaki	Team Leader/Project Planning for Higher Education
Hiromi Takagi	University Management/ Governance/ Evaluation
Masako Kishimoto	Human Resource Development
Kojiro Yoshioka	Assistant to Human Resource Development
Kyoko Nakano	Education and Research (Agriculture)
Junko Toyoshima	Education and Research (Aquaculture)
Noriko Kono	Education and Research (Environment)
Ryoji Harada	Equipment Plan/O&M
Yo Takahashi	Equipment Procurement/ Cost Estimates
Satoshi Okamoto	Facility Planning/O&M / Cost Estimates
Seichi Nakamura	Facility Planning/M&E Planning / Environment Consideration/ O&M
Ryoki Nishimoto	Facility Planning/ Construction Planning
Ryo Saito	Study Tour in Japan/Coordinator
Nguyen Thi Le Huong	University Policy/Management
Nguyen Thi Hong Yen	Monitoring and Evaluation / Financial Management
Nguyen Ba Can	Procurement/Cost Estimates for University Equipment
Nguyen Duy Phuc	Facility Coordinator
Le Viet Dung	Environment Coordinator

Source: The JICA Study Team

1.3 Site-Survey Program in Japan

During this preparatory survey project, there was a site-survey program; seven members from CTU were invited to Japan for a week to survey four universities (Kyushu University, Nagasaki University, Tokyo University of Marine Science and Technology, and Tokyo University of Agriculture and Technology) and one equipment factory (SHIMADZU).

The list of invited members from CTU is attached in Appendix 1-1 along with the detailed schedule for the site-survey program. The purpose of the visit is to reflect the plan and component of Yen loan project by observing laboratories in three fields, advanced equipment, university management, roles of supporting unit, and industry-academic collaboration in Japanese universities and equipment facility. At the end of each site visit, there were wrap-up and Q&A sessions, and CTU members had a chance to discuss issues such as how to take initiative to become an internationalized university in terms of management, education, and research view points, management of research team, operations and framework of maintaining research equipment and its budget, fund acquisition, introduction of IT and so on.

Each university was well-prepared and made proper arrangements to welcome the CTU members. Since there was limited time, some of the sites were not visited; however CTU members asked many questions and tried their best to learn from the experience.

On the last day of the site-survey program, CTU members presented the result of the site-survey to JICA and the advisory group in the viewpoint of the university management and three academic fields.

1.4 Report Composition

After the introduction, the report gives a big picture of the current status of industrialization and human resources in Viet Nam, and narrows it down to project needs by providing national policy and the current situation in higher education in Viet Nam. Based on the site surveys, the report deals with the current situation and issues in CTU such as priority of research theme in each field, university management, CTU's cooperation with other aid donors, facilities, and equipments.

2. Project Context and Necessity

2.1 Current Situation and Issues in Nation's Development Strategies and Plan and Higher Education Sector

2.1.1 Viet Nam's Development Strategies and Plan

Viet Nam's socio-economic development and planning framework is composed of the Socio-Economic Development Strategy 2011–2020 (SEDS) and Socio-Economic Development Plan 2011–2015 (SEDP). The SEDS is approved by the Communist Party and presents a vision (overall objectives) along with the main objectives and directions to achieve the vision. To implement its strategies, the SEDP is prepared by the Government of Viet Nam, which is more action-oriented.

The SEDS, approved by the Communist Party in January 2011, acknowledges the need to move beyond the current economic model, which is based on low labor costs and intensive capital investment, and move towards higher efficiency, productivity, and competitiveness as the core of growth.

The SEDS envisions that the country will become a modern industrialized nation and sets "Education and training, and science and technology are to meet the requirements of the country's industrialization and modernization" as one of the main objectives. The SEDS also specifies economic and social development indicators to be achieved by 2020 with the economic performance indicators, such as an average annual Gross Domestic Product (GDP) growth and the percentage of trained workforce over total labor force.

To achieve the objectives, the SEDS provides directions to promote development, renovation of growth model, and economic restructuring and selects three key course of actions: (i) improvement of the socialist oriented market economy institution, (ii) a rapid development of high quality human resources, and (iii) development of a synchronous and modern infrastructure system.

The SEDP approved by the Government in 2011, sets key targets of socio-economic development and environment over the span of five years up to 2015 and provides detailed guidance to implement the three orientations which the SEDS provides. For rapid development of high quality human resources, the SEDP emphasizes the enhancement of quality of education and training and the development of scientific, technological and intellectual economy. With regard to education and training, it focuses on the needs of restructuring and reforming the education and training system. Pertaining to the development of scientific, technological and intellectual economy, it illustrates several challenges: (i) to enhance investment in science-technology to raise labor productivity, (ii) to continue to invest in basic research in natural science and practical research, (iii) to increase scientific level and position of Viet Nam in sectors the country is strong in, (iv) to enhance research capacity, (v) to strengthen technological application and renovation in industry, and (vi) to develop skills of choosing industrial and service sectors with high level of technology. The SEDP also mentions that the Human Resource Development Strategies 2011–2022 (HRDS) and Human Resources Development Master Plan 2011–2022 (HRDMP) should be efficiently implemented to rapidly produce high quality human resources.

The HRDS was approved in April 2011 by the Prime Minister. It is to make Vietnamese human resources the foundation and the most advantageous factor for sustainable development of the country, international integration, and social stability and to raise the competitiveness of Vietnamese human resources to the level similar to that in advanced countries. In this context,

the HRDS identifies the challenges and bottlenecks in HRD, and proposes remedial actions to tackle these constraints along with more detailed qualitative and quantitative targets for HRD to be achieved.

The HRDS sets nine time-bound targets up to 2015 and 2020: six targets under "Raising of intellectual power and working skills" and three targets under "Raising of physical strength of human resources" as shown in Table 2-1.

Table 2-1: Specific Targets in the Human Resources Development Strategy 2011–2020

Targets	2010	2015	2020
I. Raising of intellectual power and working skills			
1. Rate of trained laborers (%)	40.0	55.0	70.0
2. Rate of vocationally trained laborers (%)	25.0	40.0	55.0
3. Number of university and college students per 10,000 people (number of students)	200	300	400
4. Number of international-standard vocational schools (number of schools)	-	5	More than 10
5. Number of international-standard excellent universities (number of universities)	-	-	More than 4
6. Highly qualified human resources in breakthrough fields (number of persons)			
• State management, policy making and international law	15,000	18,000	20,000
• University and college lecturers	77,500	100,000	160,000
• Science-technology	40,000	60,000	100,000
• Medicine, health care	60,000	70,000	80,000
• Finance-banking	70,000	100,000	120,000
• Information technology	180,000	350,000	550,000
II. Raising of physical strength of human resources			
1. Average life expectancy (years)	73	74	75
2. Young people's average height (m)	More than 1.61	More than 1.63	More than 1.65
3. Malnutrition rate among under 5 children (%)	17.5	Less than 10.0	Less than 5.0

Source: Strategy on Development of Vietnamese Human Resources During 2011–2020 (Decision No.579/QD-TTg, April 19, 2011), Hanoi

The HRDMP includes (i) statistics on the number of laborers by each economic sector in 2011 and the percentage of those trained in their respective field, (ii) estimated requirements of laborers in each sector by 2015 and 2020, (iii) percentage targets of individuals to be trained for each sector by 2015 and 2020, and (iv) estimated investment in human resource development by 2015 and 2020.

According to Table 2-2, the HRDMP plans to increase the percentage of trained laborers to total labor forces in the agriculture, forestry and fisheries sector to 50% in 2020 from 15% as of 2010. It is realistic to assume that support from aid donors is essential in addition to fully utilizing existing resources to achieve targets.

Table 2-2: Percentage of Trained Laborers to Total Labor Forces by Economic Sector in 2010, 2015 and 2020

Economic Sector	2010	2015	2020
Whole Economic Sector	40%	55%	70%
Agriculture, Forestry and Fishery Sector	15.5%	28%	50%
Industry Sector	78%	82%	92%
Construction Sector	41%	60%	65%
Service Sector	67%	80%	88%

Note: Figures in 2015 and 2020 are estimates in the HRDMP.
Source: Master Plan on Development of Viet Nam's Human Resources During 2011–2020 (Decision No.1212/QD-TTG, dated July 22, 2011) Hanoi, except for shares of whole economic sector which comes from Human Resources Development Strategy 2011–2020

The HRDMP emphasizes higher education after upper secondary education and vocational training above the intermediate level in human resources development because they directly contribute to socio-economic development. In this context, it sets targets in teachers' quality which affects quality of education and requests more teachers in higher education to get higher academic degrees as shown in Tables 2-3.

Table 2-3: Number of and Percentage of Teachers and Percentage of Holding Higher Degree by Education Level in 2015 and 2020

	2015		2020	
Education Level	Number of teachers (person)	Percentage of holding higher degrees (%)	Number of teachers (person)	Percentage of holding higher degrees (%)
Professional Secondary Schools	38,000	30	48,000	38.5
Colleges	33,500	6	44,200	8.0
Universities	62,100	23	75,800	30.0

Note: "Higher Degree" means master's degree and higher degrees in teachers at professional secondary schools and doctoral degree in teachers at colleges and universities.
Source: Master Plan on Development of Viet Nam's Human Resources During 2011–2020 (Decision No.1212/QD-TTG, dated July 22, 2011), Hanoi

2.1.2 Current Situation and Challenges in the Higher Education Sector in Viet Nam

Under the planned economy, the major function of the higher education institutes in Viet Nam was to produce enough human resources necessary to work for the central and local government agencies after graduation. In connection to this, many state universities, in particular the ones located in the provinces, were founded as provincial colleges which originated from the provincial Teacher Training Schools and/or the Agricultural Institutes. In accordance with the expansion of primary and secondary education, even in the rural areas, much more than secondary school graduates now hope to continue to study in the post-secondary education institutes and so, provincial colleges have gradually expanded to general universities including graduate schools/research centers. In addition to the country's socialistic political system where the social services, including education, are considered as a priority investment option, the Confucianism deeply rooted in the Vietnamese culture help the Vietnamese people believe in the value of education and as a result, the average public education expenditure per student in Viet Nam is considerably higher than that in the other developing countries at a similar level of the GDP per capita. Especially, the primary and lower secondary education are already comparable to the universal level.[6] One of the most important policy targets in the education

[6] Socialist Republic of Viet Nam. 2011. *Education Sector Strategic Development 2011–2020*. Hanoi.

sector in Viet Nam is universalization of upper secondary education and enhancing of both quality and access of higher education.

For higher education in Viet Nam, in alliance with the Education Sector Strategic Development (ESSD) 2011–2020[7], the Ministry of Education and Training (MOET) has developed 'Higher Education Sector Master Plan 2002–2010' in assistance with the World Bank (WB).[8] Unlike the Secondary Education Sector Master Plan supported by the Asian Development Bank (ADB)[9] which has been updated by ADB every 5 years, the progress and achievements under the Higher Education Sector Master Plan was not updated or reviewed in 2005 in form of interim review. Instead, MOET developed the first Higher Education Law again in assistance with WB. This is the first regulatory framework for higher education which had not had any specialized law for a long time and now functions as the basis for planning and management for the sector. Another base policy for higher education is the Comprehensive Education Renovations approved by the National Assembly in November 2013.[10] The direction and targets set out in the section of higher education under this Comprehensive Education Renovations are the priority areas for the investment in higher education.

According to the annual statistics for 2012 of the General Statistics Office of Viet Nam,[11] currently the total number of higher education institutes in Viet Nam is about 750 and the enrollments are about 2,180,000. In the past, access to higher education was limited to a small number of advantaged groups and university graduates considered as the very elite class of the society having a promising future. However now, private universities have drastically increased and the net enrollment rate for higher education has already reached 24.6%. This means, higher education in Viet Nam is now in the transitional period from the European-style of higher education where the purpose of higher education is to serve the public through high-level research and education to the American-style of higher education where university graduates are produced in mass. On the other hand, many of the universities in Viet Nam have not been accredited by the external accreditation organization such as the ASEAN University Network (AUN). Also, majority of newly established private universities are often pointed out for their weak financial foundation and poor quality of education. Also, according to the 2014 Annual Education Statistics issued by the United Nations Educational, Scientific and Cultural Organization Institute of Statistics[12], it is observed that many high school graduates like to major in law and business in universities, rather than engineering and agriculture which directly contributes to the industrialization of the country. The Government considers that it is necessary to develop a strategy for high-level human resources development for industry and agriculture sectors. Higher education institutes are also expected to meet the local needs in their respective areas and address the socio-economic challenges such as poverty in the rural agricultural/fishery areas and global issues such as the environment and climate change issues. However, in the school year of 2014, only 24.0% of the total university students are majoring in engineering and 6.2% of the students are studying agriculture; expansion of the program of these core fields of study and improvement of the quality of education programs of engineering and agriculture are urgently needed.

[7] *ibid.*
[8] Ministry of Education and Training 2002. *Higher Education Sector Master Plan 2002–2010*. Hanoi.
[9] Ministry of Education and Training. 2012. *Secondary Education Sector Master Plan 2011–2015*. Hanoi.
[10] Socialist Republic of Viet Nam. 2013. *Comprehensive Education Renovations*. Hanoi.
[11] General Statistics of Viet Nam. http://www.gso.gov.vn/default_en.aspx?tabid=474&idmid=3&ItemID=14018
[12] United Nations Educational, Scientific and Cultural Organization Institute for Statistics. 2014. http://www.unis.unesco.org/Pages/default.aspx. Montreal.

One of the potential solutions for these issues is the concept of 'development of new model universities' started in 2006.[13] This is a priority project in the higher education sector. MOET selects 4 large universities from different regions and gives intensive financial and educational support both from the state budgets and donors to help them to develop as internationally acknowledged universities and to function as the ideal model for other standard universities after 2020. According to the Prime Minister's Decision in 2006, four criteria of 'new model universities' are specified as follows:

- The universities lead higher institutions, providing training at undergraduate, post-graduate and doctoral levels, conducting science and technology research with high quality and reaching advanced levels within the region and the world.
- The universities are average in size and concentrate on developing focal and leading industries that directly contribute to the enhancement of the economy's competitiveness.
- The universities shall test new models of universities, apply modern methodologies, ideologies and methods in educational activities and research, in organization, management and human resource of the universities based on competitive principles for the assessment of development per society and the not-for-profit principle. The universities are granted high autonomy and accountability in the management, training, science research, personnel organization and financial issues.
- The universities have close relationships with and make full use of the aggregated strength of facilities, leading science staff as well as management staff of higher institutions, research institutions, key laboratories, and firms in and outside the country. The universities are the destination to attract Vietnamese living overseas, foreign professors and researchers to come to work.
- The universities have training and research links with leading higher institutions in the world, and the training curriculum of these universities can be linked with international standard universities. These universities participate in the accreditation and qualification peer-recognizing system with international standard universities.

The Decision also shows two options to establish "new model universities": setting up absolutely new institutions or utilizing established institutions as basis.

In the beginning, the concept did not fully work due to the financial constraint of the Government. However, since MOET identified the selected key donor partners which have professional expertise in the development of higher education to support these 4 universities one on one, the 4 model university projects have started. While there are some differences and specific features among 4 model universities, MOET issued the guiding principles for implementation of the New Model University concept in 2011 by establishing the steering committee[14]. The members of the committee consist of the Vice Prime Minister, Minister of MOET, and Vice ministers or representatives from relevant organizations which aims of assisting the Prime Minister in steering the establishment of 'universities of excellence'. The first model university project was started in 2010 in HCMC supported by the Government of Germany and the WB[15] and the second model university project in 2011, supported by the

[13] Socialist Republic of Viet Nam. 2006. Prime Minister's Decision No.145/2006/QD-TTg on Major Guidelines and Orientation on Establishing Viet Nam's University of International Standards approved on 20 June 2006. Hanoi.
[14] Socialist Republic of Viet Nam. 2011. Prime Minister's Decision No.891/2011/QD-TTg on Establishment and Regulations on functions, responsibilities, authorities and organizational structure of the Steering Committee for Establishing Universities of Excellence approved on 8 June 2011. Hanoi.
[15] World Bank. 2010. Program Document for A Proposed Credit to the Socialist Republic of Viet Nam for A Model University Project. Washington D.C.

Government of France and ADB.[16] In accordance with this recent development, CTU is also preparing to receive support from Japan.

2.2 Current Situation of Viet Nam's Higher Education and Industrial Structure in Mekong River Delta

2.2.1 Current Situation and Prospects in Human Resources Development in Mekong River Delta

Mekong River Delta has a population of 17.4 million[17] which makes the area one of the largest labor markets in Viet Nam. However, it lacks socioeconomic development in terms of human resources due to the following reasons:

(i) Labor forces are occupied with lower skilled laborers who engage in primary industries such as rice product, aquaculture and fisheries
(ii) Population of ethnic minorities who are behind socio-economic development is relatively large.
(iii) Private sector development which utilizes high quality of education and vocational training lags behind.

In this regard, the Government of Viet Nam has considered the region as one of the prioritized areas for support and investment. The Government provides a framework in human resources development in the region through the HRDMP mentioned in section 2.1.1. As shown in Table 2-4, it aims to increase trained labors in agriculture, forestry and fisheries to 2.5 million in 2020 from 1 million in 2015 and increase those in industry and construction to 2 million in 2020 from 1 million in 2015.

Table 2-4: Forecasted Demands of Trained Labor Forces of Economic Sectors by Region in 2015 and 2020

	Agriculture, Forestry, Fisheries		Industry and Construction		Services	
Regions	**2015**	**2020**	**2015**	**2020**	**2015**	**2020**
Northern Midland and Mountainous	1,200,000	1,900,000	850,00	1,400,000	1,100,000	1,200,000
Red river Delta	2,000,000	3,800,000	3,600,000	4,700,000	3,700,000	4,500,000
Northern and Coastal Central	2,000,000	3,000,000	2,000,000	3,000,000	2,000,000	2,500,000
Central Highlands	580,000	780,000	340,000	520,000	390,000	452,000
Eastern South Viet Nam	500,000	1,000,000	3,200,000	4,500,000	3,100,000	4,300,000
Mekong River Delta	1,000,000	2,500,000	1,000,000	2,000,000	2,000,000	2,000,000
Total	7,280,000	12,980,000	10,990,000	16,120,000	12,290,000	14,952,000

Source: Master Plan on Development of Viet Nam's Human Resources During 2011–2020 (Decision No.1212/QD-TTG, dated July 22, 2011) Hanoi

Based on the HRDMP, the Government requests each People's Committee and line agency to prepare human resource development plan for each region and sector. For Mekong Delta River, the Development of Education, Training and Vocational Training in the Mekong River Delta

[16] ADB. 2010. Report and Recommendations of the President to the Board of Directors: Proposed Loan to the Socialist Republic of Viet Nam for the University of Science and Technology Hanoi (New Model University) Development Project. Manila.
[17] General Statistics Office of Viet Nam. http://www.gso.gov.vn/default_en.aspx?tabid=474&idmid=3&ItemID=1401

during 2011–2015[18] was approved in June 2011 which shows goals of human resource development in the region. It specifies the prioritized solutions in higher education as follows:

(i) To enhance physical foundations and equipment to improve higher education in the region as a whole
(ii) To strengthen university networks by establishing universities and colleges
(iii) To consider CTU as a leading university and support it to modernize physical foundations and develop lecturers and academic programs up to the level of developed countries
(iv) To build dormitories to accommodate students including ethnic people
(v) To support linguistics programs at Nha Trang University and Tra Vinh University to preserve ethnic language and culture

The Master Plan on Socio-Economic Development of the Mekong River Delta through 2020[19] mentions strategies to supply human resources in the sections of human resource solutions and scientific and technological solutions to meet demands presented in the Development of Education, Training and Vocational Training in the Mekong River Delta during 2011–2015. In principle, it aims to enhance the quality of human resources in the region by intensifying investment in education and vocational training. In addition, it presents necessities of attracting capable human resources outside the region by improving life conditions and research and education environments. Furthermore, it emphasizes strengthened scientific research capacity, development of scientific technology to enhance productivities in agriculture and other local industries, and efficiencies in business and public sectors, and promote scientific research activities for environment protection and sustainable development.

2.2.2 Viet Nam's Strategies for Industrialization

Supported by the Government of Japan, the Government of Viet Nam has been developing its industrialization strategies under which it aims to become an industrialized country by 2020. Up to now, it selected (i) Electric/Electronics, (ii) Shipbuilding, (iii) Agricultural Machinery, (iv) Food Processing in Agriculture and Fisheries, (v) Automobile, and (vi) Environment/ Energy Saving as prioritized industries. It is preparing action plans to develop these industries by 2020.

Mekong River Delta is one of the important areas for agriculture in Viet Nam, having 27.2% of the nation's agricultural land areas, and producing 53.4% of the nation's rice and 90% of rice exports. It also plays an important role in aquaculture and fisheries. It occupies 70% of the nation's inland water areas for aquaculture, responsible for 58.7% of the nation's production of aquaculture and fisheries and 80% of shrimp export.

Considering these roles of Mekong River Delta in national economy, it has potential for development of agricultural machinery and food processing in agriculture and fisheries in relation to the industrialization strategies mentioned above. Through the development of these industries, qualitative and quantitative impacts are expected as shown in Table 2-5.

[18] Government of Viet Nam. 2011. The Prime Minister's Decision No.1033/QD-TTg approved on 30 June 2011 on Development of Education, Training and Vocational Training in the Mekong River Delta During 2011–2015. Hanoi.
[19] Government of Viet Nam. 2012. The Prime Minister's Decision No.939/QD-TTg approved on 19 July 2012 Approving Master Plan on Socio-Economic Development of the Mekong River Delta Through 2020. Hanoi.

Table 2-5: Qualitative and Quantitative Impacts of Development of Agricultural Machinery and Food Processing in Agriculture and Fisheries

Name of Prioritized Industries	Qualitative and Quantitative Development Impacts
Agricultural Machinery	• Agricultural machinery as industry does not have much impact quantitatively; however, if agricultural machineries are widely diffused to the farmers, who make up 70% of the total population, it will greatly contribute to the improvement of agricultural productivity. • If agricultural productivity is increased, more workers are expected to shift from agriculture to industrial areas.
Food Processing in Agriculture and Fisheries	• One of the top shares of industrial products is foods and drinks. Main export products are fishery products and rice. • Taking particular note of affluent agricultural and fishery products, food processing, and exporting have increased. It is also expected that there will be increased value added products for domestic market.

Source: JICA

2.2.3 Private-Academic and Public-Private-Academic Partnerships in the Mekong River Delta

There is a relatively small number of the higher education institutes in the Mekong River Delta and CTU is pretty much the only university known for its quality education. As explained more in detail in the later Chapter of this report, the CTU is composed of 15 Colleges, 88 educational programs and the total number of students of over 31,000 which is the largest resource university in the region. Many CTU graduates have worked for the provincial/district governments, public agencies, and the major private firms in the Mekong River Delta.

The Public-Private Partnership and Public-Private-Academic Partnership have increasingly become popular in Japan, particularly in the private sector, local governments and the engineering colleges of the local universities. The partnerships are expected to develop a win-win relationship among stakeholders – the partnerships may give rise to innovative solutions for the various issues that the local governments and private firms have faced and the proposed mitigation measures can address the immediate needs in the local context while the universities can apply their knowledge to the actual and practical issues in the society while improving access to research grants and job opportunities for students provided by the local governments and firms.

Such a win-win partnership is also considered to be applicable to CTU and Mekong River Delta and some trials have already been carried out. For instance, Yammer Holdings Co. has opened its office in the 2nd CTU Campus and plans to open a demonstration site in the 4th Campus, which will be the platform to display the firm's agricultural machinery and products. Honda Motors Co. Ltd. has also established an office in CTU and prepares to provide practical technical training programs to the students. In addition to these firms, some other Japanese firms including Hitachi, Ltd., KOBELCO, and some liquor companies are interested in future partnership with CTU[20]. Appendix 2-1 presents some of the existing partnership between CTU and private institutions.

2.2.4 Human Resources Needs for the Direct Japanese Investors in Viet Nam

Viet Nam is a young country where more than 50% of the total population is below the age of 33. Viet Nam is one of the attractive labor markets in the world due to the following reasons: it is rich in cheap labor, politically Viet Nam is very stable, the people are sympathetic to the

[20] Interview with CTU

Japanese culture, and the people are in general hard-working. Foreign Direct Investments (FDI) from Japanese firms have increased since Viet Nam introduced the Doimoi ("Renewal") Policy since mid-1990.

According to the analysis[21] done by a Japanese research company based on the 2014 National Annual Statistics by the General Statistics Office of Viet Nam, FDI from Japanese firms in 2013 is summarized as follows: the amount of investment was about USD 142 million; the amount of additional investment on top of the existing FDI was about USD 73 million and in total, USD 216 million was increased by 54.5% compared to 2012. On the other hand, the actual amount of investments was USD 115 million compared to 2012 which was increased by 9.9%. The number of new investments was 208 for 2011, 317 for 2012 and 291 for 2013. According to the chambers and commerce of the Japanese firms in Viet Nam, the total number of Japanese firms which operate in Viet Nam reached about 1,200 as of December 2013, which follows Thailand in rank.

Among the recipient provinces, Thai Nguyen province ranked 1st receiving USD 34 million and Thanh Hoa province ranked 2nd receiving USD 29 million followed by Hai Phoung City receiving USD 26 million. In the Mekong River Delta, the number of the Japanese investors has gradually increased and a few firms have already started operations in Long Anh and Bac Leiu provinces where the industrial zone was developed. In April 2014, the Economic Committee of the Mekong River Delta, under the Chambers and Commerce of Japan and Tokyo, sent the delegation to Viet Nam and assessed the Mekong River Delta as one of the most resourceful areas for food security in Asia[22]. While the Mekong River Delta is rich in natural resources and adjacent to HCMC, the area is socio-economically behind partially due to the delay in human resource development. The central and local governments in the Mekong River Delta hope to attract more Japanese investors by developing skilled, high-level laborers. The proposed project will meet the needs of the Japanese firms through (1) development of the agricultural and fishery products with additional values and reliability in natural disasters; and (2) development of human resources that have professional and technical knowledge and managerial skills, who are currently lacking in the region.

2.3 Donor Partners' Support in Viet Nam's Higher Education Sector

2.3.1 Japan's ODA Policy for Viet Nam and Past and On-going Projects in Higher Education in Viet Nam

The current Japanese Country Assistance Policy for Viet Nam was prepared in December 2012.[23]. It aims to support Viet Nam in achieving its goals of becoming an industrialized country by 2020. Under this principle, it specifies three priority areas for Japanese ODA support: (i) promotion of growth and strengthening of competitiveness; (ii) mitigation measures against vulnerability and (iii) strengthening of governance.

The requested project aims to strengthen education and research capacity of the CTU in agriculture, aquaculture, fisheries, environment and other interdisciplinary fields through development/improvement of human resources, academic programs, university, governance and management and academic and research environments. The realization of the aim leads to the resolution of issues Mekong River Delta has faced/will face such as environmental issues and threats by climate change.

[21] Vina BiZ. http://www.vina-finance.com/jpsp/

[22] The Japan- Mekong Business Cooperation Committee, Mekong Delta Environment Investment Site Survey Mission Briefing Report, May 8th, 2014

[23] http://www.mofa.go.jp/mofaj/gaiko/oda/seisaku/houshin/pdfs/Viet Nam-1.pdf

Considering the project objective, the requested project is in line with Japan's ODA policy. In fact, the project is closely linked with two priority areas of Japan's ODA policy mentioned above: (i) promotion of growth and strengthening of competitiveness and (ii) mitigation measures against vulnerability.

In the area of promotion of growth and strengthening of competitiveness, the Government of Japan supports to strengthen a market-oriented economic system and develop industry and industrial human resources to achieve sustainable development through strengthened international competitiveness. On the other hand, mitigation measures against vulnerability deals with environmental issues associated with rapid urbanization and industrialization along with threats caused by disasters and climate change. Table 2-6 shows major projects of Japan's ODA in the higher education sector in Viet Nam.

Table 2-6: Major Projects of Japan's ODA in Higher Education Sector in Viet Nam

Project Names	ODA Schemes	Project Period
The Project for the Improvement of the Facilities and Equipment of the Faculty of Agriculture, Can Tho University	Grant Aid	1993
Improvement of Environmental Education in Agricultural Sciences	Technical Cooperation Project	1999-2002
Higher Education Development Support Project on ICT	ODA Loan Project	2006–On-going
Capacity Building of Ho Chi Minh City University of Technology to Strengthen University-Community Linkage (Phase 1)	Technical Cooperation Project	2006–2009
Capacity Building of Ho Chi Minh City University of Technology to Strengthen University-Community Linkage (Phase 2)	Technical Cooperation Project	2009–2012
Strengthening the Capacity of ITSS Education at Hanoi University of Technology (Phase 1)	Technical Cooperation Project	2006–2008
Strengthening the Capacity of ITSS Education at Hanoi University of Technology (Phase 2)	Technical Cooperation Project	2009–2012

Source: JICA Study Team

2.3.2 Supports from Donor Partners

The Government of Viet Nam has given high priority to human resource development through education as one of three drivers of the country's development in the Socio-Economic Development Strategy. In particular, higher education is considered important as it directly contributes to economic growth. In terms of donor support, however, higher education is not receiving a larger scale of ODA compared to other subsectors in education such as primary education or technical and vocational education and training. The reasons for limited donor support for higher education includes the following reasons: (1) higher education is not included in the Millennium Development Goals (MDGs) unlike primary education to which the donor support is massively allocated; (2) higher education is technically very sophisticated and needs professional expertise in designing and monitoring, so that only selected donors which can have rich experiences and resources are able to support; (3) target universities should have the capacity for coordination and collaboration with the MOET and other governmental agencies; and (4) to ensure quality control and sustainability, long-term commitment is needed, both from the donors and the Government.

Currently the leading donor for the higher education sector is the WB. WB started its first loan in 1998[24]. Since then, WB has provided a wide range of support to higher education including development of the Higher Education Law, development of the national higher education accreditation system, provision of the research grants, capacity development of the MOET and the selected universities and research institutes, and the computerization of the universities. WB has funded a total of 4 projects whose total estimated cost sums up to USD 473 million, including the ongoing projects. WB-funded projects are summarized in the table below:

Table 2-7: World Bank Support in Higher Education Sector in Viet Nam

No	Project Names	Approved year	Project Budget (USD Million)
1	Higher Education Project	1998	83.3
2	Second Higher Education Project	2007	59.4
3	Higher Education Development Policy Reform(1)	2009	50.0
	Higher Education Development Policy Reform(2)	2010	50.0
	Higher Education Development Policy Reform (3)	2013	50.0
4	New Model University Project	2010	180.4
		Total	473.1

Source: JICA Study Team

Apart from WB, ADB also supports one of the model university projects together with the Government of France whose beneficiary is the University of Science and Technology Hanoi. Yet, this is the only university project in Viet Nam for ADB and all other ADB-funded education projects are targeting sub-sectors other than higher education. Other key donors active in higher education other than WB and ADB are mainly bilateral donors. Apart from 2 countries which help the model university projects with WB and ADB – Germany and France, United States Agency for International Development (USAID) supports the networking of some engineering universities of the country and the Government of Australia and the Government of Belgium have provided scholarships to the Vietnamese students who study in universities in their own countries. As for the donor coordination framework, the Education Sector Group (ESG) which is chaired by UNSECO Viet Nam Office, calls donor meetings intermittently, but there is no official donor coordination framework for higher education where the donors can share the lessons learned from their projects and coordinate support of the donors for higher education. To share other donor experiences in the model university project, it is necessary to meet respective donors intensively for information sharing.

[24] World Bank. 1998. Program Document for A Proposed Credit to the Socialist Republic of Viet Nam for A Modal University Project. Washington D.C.

3. Current Situation of Mekong River Delta and Roles and Issues of CTU

3.1 Needs and Issues of Mekong River Delta

3.1.1 Geographical Conditions

The Mekong River Delta is one of the administrative regions in Viet Nam and as of April 2014, it comprises 12 provinces and the Can Tho City. 12 provinces include the following: Long An, Dong Thap, An Giang, Tien Giang, Vinh Long, Ben Tre, Kien Giang, Hau Giang. Tra Vinh, Soc trang, Bac Lieu, and Cau Mau. According to the 2012 national statistics book[25], the Mekong River Delta has a population of 17.4 million people, accounting for 22% of the national population. The total land area of the Mekong River Delta is about 40,553.1 km^2 with a population density of 429.0 (person/kms). The Mekong River Delta is known as one of the most fertile river deltas in the world and the biggest rice production area in the country[26]. However, agricultural productivity is relatively low partly due to the severe natural and climatic conditions including the annual floods which often make about 2 million hectares of the region inundated from August to December every year. Climate changes and poor living conditions promote urbanization in the areas and large-scale domestic migrants from the Mekong River Delta to Ho Chi Minh City have deteriorated the annual population growth rate of the Mekong River Delta to only 0.8%, which is lower than the national average of 1.04%. The coastal areas of Southeast Asia, including the Mekong River Delta are often rich in biodiversity. However, it is clearly observed that the damages caused by natural disasters have been more serious in recent years due to climate change[27] and such environmental issues in the region are considered to be a serious threat to the lives and assets of the people in the region. Natural disasters, which include flooding, increased salinity rates, decreased water quality / water supply, ecological hazard, and heavy annual rainfall which can reach 1,520–1,580 mm, are one of the challenges that needs to be addressed most urgently.

3.1.2 Socio-Economic Conditions

The Mekong River Delta is considered as one of the most disadvantaged regions in Viet Nam in addition to the Northern Mountainous Region and the Central Highland. Resultantly, the Government and donor partners have granted a priority area for support and investment to these regions. As the Mekong River Delta is close to the border with Cambodia, there are many different ethnic minority groups including the Khmer and Cham groups. About 8% of the region's population is made up of ethnic minority groups. Mekong River Delta is abundant in natural resources including oil, natural gas, limestone, and peat and it is expected to explore and utilize them for economic development of the region in the future. However, inadequate human resources make it difficult to link rich natural resources to income generation and employment opportunities. As a result, the poverty rate remains at 11.6% according to the national statistics of 2012, considerably higher than that in urban areas.

Despite the Government's efforts, the Mekong River Delta continues to be poor and many of the social development indicators are far from satisfactory. To reduce the poverty in the region, the Government has developed 'the Master Plan on Socio-Economic Development of the

[25] General Statistics Office of Viet Nam. http://www.gso.gov.vn/default_en.aspx?tabid=474&idmid=3&ItemID=14018

[26] In 2012, rice production in MDR was 24.3 million tons which contributed 55.6% to the total rice production in Viet Nam (43.7 million tons). The second biggest contributor is Red River Delta, producing 6.9 million tons according to General Statistics Office in Viet Nam.

[27] According to the National Strategy for Climate Change (Decision No.2139/QD-TTg on 5 December 2011), the Mekong River Delta is assessed as one of the most vulnerable river deltas in the world together the Nile River Delta in Egypt and the Ganges Delta in Bangladesh.

Mekong River Delta through 2020'[28] which presents various policy targets to be achieved by 2020. They include (1) reduced malnutrition rate among 5-year-old children to less than 12%, (2) reduced infant mortality rate to less than 0.75 %, (3) increased primary education enrollment rate to 99%, (4) increased lower secondary enrollment rate to 85%, (5) increased upper secondary enrollment rate to 60%, (7) reduced unemployment rate to less than 3%–5%, and (8) increased ratio of trained labor to total workforce to 50%–55%. The Master Plan also sheds light on the insufficient number of higher education institutes and presents a long term direction which designates the CTU as the regional center university to help improve the average quality of the education institutes in the Mekong River Delta.

3.1.3 Industrial Conditions

Agriculture, fisheries and aquaculture are the major industries in the Mekong River Delta. The Mekong River Delta has a labor force of 10,000 thousand people, accounting for 19.7% of the national labor force, of which about 66% of the labor force are engaged in agriculture, which is considerably higher than the national average of 52.6%. The Mekong River Delta produces rice at 23,269.5 thousand tons in 2011, accounting for 55% of the nation's production. The total catch of fish was about 3,169,715 tons in 2011, accounting for 59% of the nation's production and about half of fish processing factories in the country are located in the region. Fisheries and marine products are major exports of the country. For instance, frozen fish fillets of catfish are exported mainly to Europe and the United States while vannamei is mainly exported to Japan. Aquaculture production in the Mekong River Delta reached 2,128,956 tons in 2011, accounting for 73% of the national aquaculture production of Viet Nam. As mentioned above, the Mekong River Delta plays a significant role in the primary industry of Viet Nam. However, the ratio of trained labor to total labor force was 8.6% in 2012, considerably lower than the national average of 15.4%. This indicates that the quality of labor force needs to be improved. The Government is shifting the industrial structure from agriculture to industrial and service sectors in the long run. However, in reality it is not easy to create new employment opportunities due to the immature private sector. The Government aims to add value to the current agriculture and aquaculture and fisheries sectors while resolving environmental issues. Currently, one of the main goals of the regional development plan is to establish high value-added sectors of fisheries and aquaculture and agriculture. At the same time, it is requested to urgently solve environmental problems which pose a threat to the economy and industries of the region.

3.2 Current Situation and Needs of CTU

3.2.1 CTU's Profile

CTU was originally named Can Tho Institute and was established in 1966 with four faculties, Sciences, Law and Social Sciences, Literature and Vietnamese Linguistics, and Education[29]. At that time, the number of students was around 4,000. CTU was restructured in 1994 and 1995, increasing the scope of education with the founding of larger schools and colleges as seen presently.

In 2004, CTU was approved as one of the 14 key universities[30] by the Prime Minister (No: 1269/CP-KG) (Appendix 3-1). CTU is expected to support other universities in the region as the key university and to improve its education and training, research activities, and human resource development. CTU is the largest and the only multi-disciplinary international university in the MDR, serving the needs of nearly 20 million inhabitants in the region.

[28] Socialist Republic of Viet Nam. 2012. Prime Minister's Decision No. 939/QD-TTg of 19 July 2012 approving the Master Plan on the Socio-Economic Development of the Mekong River Delta through 2020. Hanoi.
[29] CAN THO INSTITUTE (1966–1975) , CTU Website, http://www.ctu.edu.vn/en/intro_det.php?mn=2&id=35
[30] The key universities increased one in 2008, and another in 2011; currently Viet Nam has 16 key universities.

Reviewing the recent statistical data of CTU, the number of students at CTU increased over 30,000 in 2013, which is 7 times more than the starting period. The fields of study (school/college) also increased to 15 disciplines. CTU offers 88 Bachelor's, 31 Master's, and 13 Doctorate programs as of 2014. The strength of CTU is as follows.

Table 3-1: The Number of CTU Students by Discipline and by Level of Study (as of December 31, 2013)

	Training unit	Under-graduate	Master	Doctor	Total
1)	College of Agriculture and Applied Biology	2,960	434	77	3,471
2)	College of Aquaculture and Fisheries	1,449	185	39	1,673
3)	College of Environment and Natural Resources	1,116	235	37	1,388
4)	College of Engineering and Technology	4,692	9	-	4,701
5)	College of Information & Communication Technology	1,557	97	-	1,654
6)	College of Rural Development	1,933	-	-	1,933
7)	College of Natural Sciences	1,305	341	-	1,646
8)	School of Economics and Business Administration	4,498	895	36	5,429
9)	School of Political Science	384	-	-	384
10)	School of Social Sciences and Humanities	2,135	31	-	2,166
11)	School of Law	1,285	133	-	1,418
12)	School of Education	3,744	360	-	4,104
13)	Department of Physical Education	327	-	-	327
14)	Biotechnology Research and Development Institute	687	98	32	817
15)	Mekong Delta Development Research Institute	54	140	5	199
	Total	28,126	2,958	226	31,310

Source: CTU Statistics

The organization of CTU is divided into two large groups, one is the academic unit and the other is the supporting unit. Basically, the academic units have some students and provide education/ research activities, while the supporting unit mainly performs administrative functions for CTU. As of December 2013, the number of CTU staff is 2,024 in total, out of which 874 are female staff (43.1% of the total). 1,197 or around 60% of the staff are teaching staff. The ratio of Ph.D. holders among the teaching staff is 264, around 22%, and that of Master's holders is 55% as of December, 2013. The staff information of each unit is seen in Appendix 3-2. Some administrative staff are assigned in each school/ college who work for the supporting unit. The structure is shown as Appendix 3-3.

CTU currently consists of 3 campuses in Can Tho City (Campus-1, -2 and -3), Hoa An Campus (which is located 30 km southwest of Can Tho City, in Haugiang Province) and other 3 auxiliary campuses. Table 3-2 shows the outline of each campus.

College of Information & Communication Technology (CICT), which is located at Campus-3, will be relocated to the existing Administration Building in Campus-2 after the Administration department is moved to a new Headquarter building (which will be operating from the end-2014).

Table 3-2: Outline of CTU's Current Campuses

Campus	Location	Site Area (Ha)	Building Area (m^2) / Floor Area (m^2)	No. of Students / No. of Staff	Major Function & Roles
Campus 1 An Phu	Street 30/4 Can Tho	6.23	14,611 20,042	- -	Department of Publishing House, Center of Foreign Languages,Public House & Guest House
Campus 2 Xuan Khanh	Street 3/2 Can Tho	80.95	82,522 158,270	24,731 1,524	Main Campus: CAAB, CAF,COET, CENRes, CONS, SEBA, SOE, Graduate School, SoL, SoPU, SSSH, BiRDI & other institutes
Campus 3 Hung Loi	Ly Tu Trong Street Can Tho	0.55	2,163 3,970	1,700 80	College of Information & Communication Technology (CICT) & Software Center
Hoa An	Phung Hiep District, Haugiang	111.29	7,198 7,770	2,320 69	College of Rural Development. For field training and biodiversity experiment scientific research & National Defense Education
Vinh Chau	Vinh Phuoc, Vinh Chau, Soc Trang	17.11	237 237	- -	Artemia experimental farm and aquaculture
Cai Rang	Tan Phu, Cai Rang District, Can Tho	2.37	60 60	- -	Experimental farm and aquaculture
An Binh	An Binh, Can Tho	0.03	100 100	- -	Community House of CENRes

Source: Department of Facility Management, CTU

3.2.2 Summary of the Strategic Plan for Development of CTU 2007–2020

CTU published its Strategic Plan for Development of CTU 2007–2020, and MOET approved it on September 21, 2007. According to the plan, by 2020 CTU will become a vital multi-disciplinary university within the country; the aim is to not only become the best university in Viet Nam, but to be recognized throughout Asia-Pacific as one of the leaders in education, research and development. Its concrete targets are explained in CTU documents as follows.

By 2020, CTU aims to reach the following goals[31]:

- 50%–60% of faculties will obtain Ph.D. and be fluent in a foreign language, preferably English;
- Approximately 20% of students will be taking graduate programs (both master's and Ph.D.s);
- International students (both degree and non-degree seeking) account for 10% of total students;
- 30%–40% of teaching staff will publish papers on international peer review journals;
- Be in the top 250 universities of the Asia-Pacific region.

Some parts of the Strategic Plan for Development of CTU 2007–2020 has been revised as of April 2014, and will be submitted to MOET for approval, as the Strategic Plan for Development of CTU 2014–2022. CTU's goals (target indicators) are mentioned previously. However, these concrete targets do not match those of the official document. For example, the ratio of teachers with Ph.D. in 2020 was revised from 45% to 56.4%, and the ratio of Master's degree holding teachers in 2020 was revised from 50% to 39.7%. The number of undergraduate students was 25,000 and graduate students was 5,000 in the Strategic Plan for Development of CTU (2007–2020), which was revised to 38,852 undergraduate students, and 4,965 graduate students. Those two target numbers are not exactly the same as mentioned above. The target numbers for other three indicators, also, are not found in both Strategic Plans. It seems that CTU has changed the target numbers accordingly. The indicators for the Strategic Plan for CTU (2007–2020) and that of (2014–2022) are given in Appendix 3-4. In the Strategic Plan for Development of CTU 2014–2022, some other information are added, such as CTU organizational model, training programs, scientific research, international training, instructors and instructor-assistants

[31] Those target goals are mentioned in the CTU presentation, and also seen in the CTU website. http://ctu.edu.vn/en/intro_det.php?mn=2&id=13&p=13

planning, and funding sources, based on the government and MOET regulation, and CTU's condition.

Through the ODA project CTU aims to become an internationally recognized university. According to the Minutes of Meetings between CTU and JICA, on April 25, 2014, CTU defines "internationally recognized institution" as follows, and set up goals to be achieved by 2020.

- 18 programs are accredited by external organizations, such as AUN and ABET
- CTU is ranked within top 200 in Asia and Oceania
- International students' ratio goes up to 10%.
- 500 international journals are published; 30% are International peer reviewed.
- Number of patent application reaches 40

The target ranking of 200 in Asia Oceania is higher than 250 mentioned earlier. In addition, the new indicators are added for this project purpose, such as the number of accredited programs, international journal publications along with international peer reviewed ratio, and the number of patent applications.

The status, as of April 2014, for those target goals are as follows:

- Ph.D. ratio of faculties is 22.1%, according to the CTU statistics, December 2013.
- Graduate student ratio is 10.1%, according to the CTU statistics, December 2013.
- International students' ratio is not yet counted by CTU officially, since each college/ school deals with international students, and those are mostly short-short term training students.
- The number of teaching staff who publish papers is not identified yet and needs to be determined before the project starts.
- In 2013, CTU ranked 413 in Asia-Pacific and 39 in South East Asia according to Webometrics[32].
- Two undergraduate programs of CTU were externally assessed by AUN, out of which one was accredited by AUN.
- International journal publication and proceedings are 197 as of 2013. The data for international peer reviewed journals is not compiled, and needs to be determined before the project starts.
- CTU had applied for two patents as of April 2014.

3.3 Needs of Mekong River Delta and Related Programs at CTU

3.3.1 Agriculture

CTU, a university located in MDR, has particular advantages in agricultural education and research from several viewpoints. CTU's strength among four strong agricultural universities of Viet Nam, namely Hanoi University of Agriculture, Hue University of Agriculture and Forestry, Nong Lam University, and CTU, also relates to its geographical and socioeconomic circumstances. Yet innovations in agriculture, such as production management that introduce information and communication technologies (ICT) and quality improvements of agricultural products through application of molecular biology, are anticipated. Details are as described below.

[32] Webometrics website (2013) http://www.webometrics.info/en/Asia_Pacifico/South%20East%20Asia

(1) Rice Production

Viet Nam is the world's second largest rice exporter[33], exporting 7.7 million tons of rice in 2012[34]. In 2012, rice production in MDR was 24.3 million tons and contributed 55.6% to the total rice production in Viet Nam, which was 43.7 million tons[35]. MDR is also known for exporting paddies. It is estimated that MDR has accounted for approximately 90% of the total rice exports in recent years[36].

Demographically, MDR embraces an employed population of 10.5 million, which makes up 19.7% of the total employed population of Viet Nam. Among 10.5 million, 52% work in the agriculture, forestry, and fishing sectors as of 2012[37]. These data show that rice production is also significant from the viewpoint of labor force absorption in MDR.

Meanwhile, from the viewpoint of global food security, dearth of food is predicted[38] to be more serious in the near future, not only as a result of rising human population but also due to the increase of food consumption that recent economic growth begets and the negative impacts of climate change. Issues of rice production in MDR that contributes 20% to the world rice exports[39] may affect global food security and should therefore be understood from global viewpoints.

Agriculture is, in brief, the most important industry in MDR, with a focus on rice production, and, hence, should be strengthened in terms of both quality and quantity, considering the global food security and impacts to MDR's socioeconomic development.

(2) Adaptation to Climate Change in MDR

It is well known that climate change, such as warmer air temperatures, increased rainfall, and rise in sea level, gravely impacts agricultural production[40]. Materializing adaptations to climate change is hence one of the urgent issues in MDR where agricultural production is highly vulnerable to climate changes. Saline soil is one of the problems that is induced due to rise in sea level and related hydrological conditions in MDR. Emerging diseases and increasing stressors of local plants and animals are also partly due to warmer air temperatures. Genetic studies for improved crop varieties with higher salinity tolerances, plant protection, and production system improvement, including soil remediation, help adapt to such climate changes.

(3) National Policy for Agriculture Field

Agriculture Development Program of Hi-tech Application of the National Program of Hi-tech Development through 2020 (hereinafter referred to as Agriculture Development Program), approved by the Prime Minister on December 17, 2012, aims at establishing comprehensively-developed agriculture through the application of high quality technologies. During the period of

[33] Viet Nam Trade Promotion Agency (http://www.vietrade.gov.vn/en/index.php?option=com_content&id=2027:vietnams-rice-export-for-the-first-6-months-of-2013&Itemid=232), IRRI (http://irri.org/our-work/locations/Viet Nam)
[34] Viet Nam Food Association (http://vietfood.org.vn/en/default.aspx?c=108)
[35] *Statistical Yearbook of Viet Nam 2012*, 2013, General Statistics Office of Viet Nam, pp. 380–385
[36] Ramsar Convention (http://www.ramsar.org/pdf/cop11/Pre%20COP11%20Asia%20Reg%20mtg%20PDFs/Presentations/48-%20Mekong%20Delta%20Wetlands_Huynh%20Tien%20Dzung%20_WWF%20Vietnam.pdf), Katie Padilla, 2011, "The Inventory of Conflict and Environment (ICE) case studies No.265: The Impacts of Climate Change on the Mekong Delta," American University (http://www1.american.edu/ted/ICE/mekong-migration.html)
[37] *Report on Labour Force Survey, First 9 months of 2012*, 2012, General Statistical Office of Viet Nam, p. 8
[38] FAO, 2012, *The State of Food and Agriculture*, PP. 99-106
[39] USDA, 2014, *World Production, Markets and Trade Reports*, p. 14
[40] E.g. Mackay, P. et al., 2011, "ADB Technical Consultant's Final Report: Climate Change Impact and Adaptation Study in the Mekong Delta (Project Number 43295)," Asian Development Bank, p. xxi

2016 to 2020, two (2) to three (3) new varieties of each crop and animal, which have high yields, good quality, and outstanding resistance to diseases are expected to be developed.

Hi-tech applications unique to MDR are expected to materialize adaptation to climate change and contribute to sustainable socio-economic development of MDR.

In this context, it must be recognized that MDR's contribution to the total industrial output in 2011 was 9.8%[41]. Considering that Agriculture Development Program eventually anticipates 200 hi-tech applied agricultural enterprises, innovation of agricultural production technologies is yet pursued in MDR, especially at CTU. Developing value adding technologies and obtaining intellectual property rights are challenging tasks of CTU, taking into consideration the industrialization strategy of Viet Nam.

(4) Resources for High Technologies

Universities are expected to provide resources for hi-tech solutions to problems in MDR and for the development of human resources that introduce high technologies for this purpose. In this context, among 4 (four) state universities that have strengths in agricultural education and research in Viet Nam, CTU is the only institution that explicitly recognizes contribution to the socio-economic development of MDR as one of the major missions. It is likely that each university has its unique mission depending on geographical and/or historical backgrounds. In terms of development of new varieties, CTU could focus more on improving the quality of rice as export goods and increasing tolerance to saline or acidic soil.

(5) Technology Transfer to Communities

Gene banks are indispensable not only for improved plant varieties but also for good farming systems. It is CTU's advantage that Mekong Delta Development Research Institute of CTU (hereinafter referred to as MDI) has a gene bank and conserves more than 2,000 kinds of rice germplasm, including those collected before 1975. This collection is particularly diversified, compared to the one that Mekong Delta Rice Research Institute of Ministry of Agriculture and Development (hereinafter referred to as MARD) possesses. MDI reproduces rice seeds every five (5) years at original lands of each germplasm in cooperation with Rice Seed Center of each province in MDR.

CTU also contributes to improved farming performances, by providing local industries, such as biopesticide and biofertilizer companies, with manpower and technologies.

Close relationships with local farming communities and industries is another advantage that CTU has established.

3.3.2 Fisheries and Aquaculture

(1) Fisheries and Aquaculture in MDR

Mekong Delta serves as a center of aquaculture production in Viet Nam, supporting both food production and economy of the whole country. This is due to its geographical setting which provides vast inland water area suitable for aquaculture fields. Aquaculture of freshwater fishes has been developed in inland area, while aquaculture of marine and brackish water species, such as shrimps and eels, has been developed in the coastal area. Today, in MDR alone, 30% of fishery products and 70% of aquaculture products are produced each year.

[41] *Statistical Yearbook of Viet Nam 2012*, 2013, General Statistics Office of Viet Nam, pp. 486-488

In parallel with development of fisheries and aquaculture, the aquatic food processing industry has also been developed. At present, around 50% of aquatic food processing factories in Viet Nam is concentrated in the MDR. These aquatic food products are commercially important and are major export items for the country. For example, frozen catfish fillet is exported mainly to Europe and US, and shrimp is mainly exported to Japan. Table 3-3 summarizes global ranking of Viet Nam in terms of aquatic food production.

Table 3-3: Global Position of Viet Nam in Aquatic Food Production 2011

Items	Ranking
Farmed *Pangasius* catfish	1st
Farmed shrimp	3rd
Aquaculture production	3rd
Seafood export value	5th
Total seafood production	7th

Source: Dr. TN Hai, CAF

However, aquaculture industry in MDR has already reached its peak with little available land for expansion. Therefore, it is necessary to develop more efficient and profitable aquaculture techniques, or convert to more sustainable aquaculture techniques to reduce environmental impacts. Another challenge is adaptation to the effects of global climate change such as elevated water temperature and increased frequency of natural disasters. Since MDR is situated in the area with high biodiversity[42], the research on conservation and wise use of biological resources is also needed. Lastly, research on marine fishery is relatively underdeveloped and issues such as marine resource management and prevention of overfishing need to be addressed.

(2) National Policy for Fisheries and Aquaculture

The Vietnamese national strategy for development of fisheries and aquaculture (Decision No. 1690/QD-TTg and Decision No. 332/QD-TTg) is to industrialize and modernize the fisheries sector and comprehensively and sustainably continue developing it into a large commodity production industry with rational structures and forms of production, high productivity, quality, efficiency, prestigious brands, and competitiveness while steadily integrating into the world economy. It is a national target for the fisheries economy to make up 30%–35% of GDP and seafood export turnover to reach USD 8–9 billion. The total fisheries output is expected to reach 6.5–7 million tons out of which aquaculture accounts for 65%–70%. The following species are specifically chosen to be economically important; Asian catfish, brackish water shrimp, mollusks, marine fish, seaweed, and blue-legged prawn.

To work towards the abovementioned goal, the following tasks are set forth by the national policy, to which CTU can contribute through education and research.

1. Development of production of breeds: To improve the system for research, production and supply of aquatic animal breeds from the central to local levels. By 2015, to supply 100% of aquatic animal breeds to aquaculture farms; 70% of supplied breeds of major cultured aquatic species (common tiger prawn, while-legged green prawn, Tra catfish, blue-legged prawn, tilapia and mollusks) will be disease-free.

2. Development of aquaculture: To expand areas for intensive aquaculture with high yield and to apply clean and environmentally friendly technologies. To raise yield and output of existing zones for extensive aquaculture on the basis of upgrading the irrigation system and widely

[42] MDR is a part of Indo-Burma Biodiversity Hotpot. (http://www.conservation.org/where/priority_areas/hotspots/asia-pacific/Indo-Burma/Pages/default.aspx)

applying advanced technologies. To develop and widely apply technologies to rear aquatic animals in cages and rafts suitable to environmental and socio-economic conditions of coastal areas, islands and reservoirs.

3. Production of feed, biological preparations, supplies and equipment for aquaculture: To rapidly develop the industry producing feed, biological preparations, supplies and equipment for aquaculture combined with building zones for rearing aquatic animals for use as processing materials, and at the same time assure high quality and reasonable prices of products.

4. Reorganization of production: To properly implement the master plan on aquaculture in compliance with regulations on requirements on production and assurance of food hygiene and safety, and at the same time create a close link between aquaculture and processing and sales.

(3) CTU's College of Aquaculture and Fishery-CAF

College of Aquaculture and Fishery (CAF) of CTU was first established in 1979, and since then it has supported local fishery and aquaculture industries through education and research. Its mission is to contribute directly to the development of MDR by developing and transferring fishery and aquaculture knowledge and technologies to the local communities. It has strong cooperative relationships with around 100 local companies and industrial groups. On the other hand, CAF is also active in strengthening academic collaboration with international institutions. Research on marine aquaculture and fishery is a relatively new area for CAF and needs to be strengthened further.

Nationally, CTU is a proactive participant of a network of universities called Viet Nam Fisheries and Aquaculture Institution Network (ViFiNET, see Appendix 3-5). Among the participating institutions, Hanoi National University, Hue University and Nha Trang University mainly work on fishery and aquaculture in Northern and Central Viet Nam. Non Lam University in Ho Chi Min is responsible for Northern MDR, while CTU serves as a center of education and research in fishery and aquaculture of Southern MDR.

3.3.3 Environment

(1) Local Environmental Problems concerning MDR

One distinct geographical trait of CTU in terms of the environment field is that it is situated in the MDR and CTU needs to find the solutions for the issues. Looking at the environmental issues locally, flooding, salinity, degradation of water quality/water supply, and ecosystem endangerment are the main issues associated with the regional environmental problems. Intensive agriculture and aquaculture, and land use cause soil degradation, water pollution, and upstream-downstream water resource competition. Rapid change in land use leads to reduced bio-diversification, loss of species, and increased invasive species. Industrialization and urbanization increases land and water demands, resulting in more pollution (water, soil, air, etc). Over exploitation of ground water (especially along coastal area) creates ground water depletion and saline intruded.

(2) Regional and Global Environmental Problems concerning MDR

Focusing on wider areas of environmental problems, trans-boundary issues and future threats affect the livelihood of the MDR and surrounding population as well as the area's agriculture, aquaculture, and ecosystem. For example, upstream development (hydropower dams, upstream irrigation projects) changes water resources of the Mekong Delta (both quantitative and qualitative). Climate change alters rainfall pattern and temperature across seasons. Accumulation affect of sea level rise + climate change + upstream development reduce inflow,

increase saline intrusion (dry season) and flood (rainy season), increase river bank erosion and reduce sedimentation.

Regarding climate change, Ministry of Natural Resources and Environment (MONRE) of Viet Nam Government envisages (Table 3-4) that the MDR will be affected widely in these scenarios, as the rise in temperature, change in rainfall patterns, and rise in sea levels are expected to have a huge impact on the physical conditions of Mekong Delta[43]. In fact, Mekong Delta ranks among the top 5 deltas in the world that tends to be severely affected by climate change.[44]

Table 3-4: Characteristics of Climate Change Scenarios in Viet Nam

	Moderate Scenarios		Higher Scenarios	
	2050	**2100**	**2050**	**2100**
Increase in wet season flow	No change	10%	0%–10%	20%–50%
Increase in wet season rainfall	0%–5%	5%–10%	10%–20%	10%–30%
Dry season flow	+/− 5% (higher or lower)	5% higher or 15% lower	10%–30% lower	30%–60% lower
Decrease in dry season rainfall	0%–10% less	5%–15% less	10%–20 % less	20%–40% less
Increase in salinity intrusion	Slight	Moderate	Moderate	Dramatic
Sea level rise	20–40 cm	57–73 cm	40–60 cm	78–95 cm

Source: MONRE 2012

(3) National Policy for Environmental Field

In 2011, Prime Minister announced: *The national strategy for climate change* (promulgated together with the Prime Minister's Decision No. 2139/QD-TTg) as one of the most important environmental policy of the country. The strategy warns the country's vulnerability to climate change. In addition, the aim for a modernity-oriented industrial country by 2020, strongly increases energy production and consumption activities, and it will accelerate the increase in GHG emissions to the atmosphere.

On the other hand, GHG emission reduction policies are taking place globally and it will create new trading barrier and Viet Nam is aware that it also needs to harmonize these world trends. The government came up with these strategic objectives.

i. To bring into play national capacity; carry out simultaneous measures of climate change adaptation and GHG emission reduction to assure safety of people and properties for sustainable development goals.
ii. To strengthen human and natural system resilience to climate change, develop a low-carbon economy to protect and enhance quality of life, ensure national security and sustainable development in the context of global climate change, and actively join the international community to protect the earth's climate system.

The strategy defines the following three specific objectives: 1) To assure food security, energy security, water source security, hunger eradication and poverty reduction, gender equality, social security, community health, improve living standards and protect natural resources in the context of climate change. 2) To enhance low-carbon economy and green growth as well as GHG emission reduction and absorbability 3) To raise climate change awareness to the public

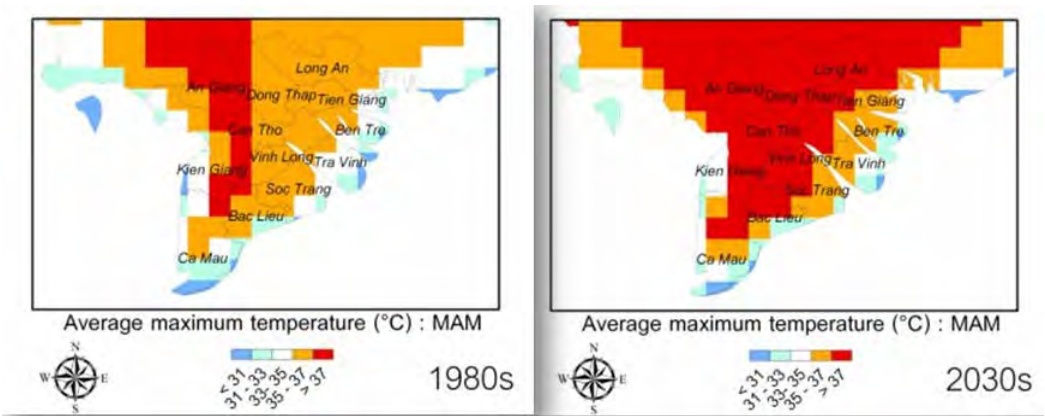
[43] Partners of Water. 2013. Mekong Delta Plan
[44] Stewart, M. A; Coclanis, P. A, 2011

and to develop human resource quality in the field; and 4) To actively join international communities in responding to climate change.

(4) CTU's College of Environment – CENRes

CTU needs to research both regional and global environmental challenges. In fact, CTU has always paid good attention to these issues and these actions play important roles in CTU, not only in the field of environment but also agriculture, aquaculture, engineering and social science.

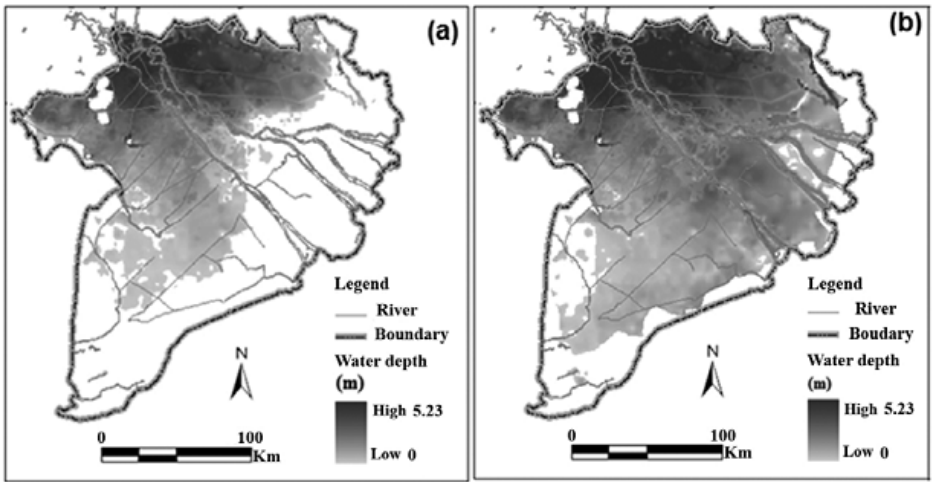
College of Environment and Natural resources – CENRes is in charge of environment field forecasts and Figure 3-1 indicates the temperature change by climate change in MD. In the 1980s, cool climate is relatively observed to be prevalent in coastal areas, and the average maximum temperature of above 37 °C is recorded only the inland part of the western location. However, in the 2030s, most of the inland shows the average maximum temperature of and above 37 °C, which can be taken as significant temperature rise.



Source: Van Pham Dang Tri 2014

Figure 3-1: Climate Change in MDR March–May Temperature (1980 and 2030)

In CENRes, the status of flood in usual scenario and drastically changed scenario are studied as shown in Figure 3-2 respectively. As it can be clearly seen in figure b, expansion in the area affected by flood is predicted.



Source: Van Pham Dang Tri, Ngyen Hieu Trung, and Vo Quoc Thanh 2012

Figure 3-2: MDR Area Peak Flood Time as (a) Usual Scenario and (b) the Most Affected Scenario

Consequently, research activities of climate change in MDR at CENRes CTU have become one of the most important adaptation guidelines of these phenomena.

In CENRes, simultaneously, on top of the international research mentioned above, continuous social contribution to local farmers/fishermen and poor communities, are pursued through student activities[45]. On the other hand, it is difficult for CTU to collaborate with private sectors, as the Vietnamese companies' interests are usually not in line with the protection of environment or minimum impact to surrounding habitat[46].

With regard to Vietnamese universities prominent in environmental fields other than CTU, there are three universities: University of Natural Resources and Environment, HCMC, Nong Lam University HCMC, and University of Technology HCMC. Comparing CTU with these universities, CTU CENRes has advantage in terms of proximity to MDR, as one of the best fields to study both regional and global environmental challenges and weaknesses in providing engineering solutions such as introduction of new technology and scientific countermeasures to pollution[47].

3.4 Detailed Analysis of Related Programs at CTU

3.4.1 Outline of Related Program and Positioning at CTU

The following institutions are relevant to the 3 fields of study that are targets of the project.

- CAAB (Agriculture)
- CAF (Fisheries and Aquaculture)
- CENRes (Environment)
- BiRDI (Agriculture)
- MDI (Agriculture and Environment)

The details of activities of each institution are described in the sections below. Among these institutions, CAAB, CAF, and CENRes are the main actors of this project.

The Tables 3-5 and 3-6 show amount of research fund acquired and number of research projects by the 3 colleges. CAAB has the biggest share in terms of funding and number of research projects.

Table 3-5: CTU Research Fund Acquisition by Year and by 3 Main Colleges

Unit: thousand VND

Colleges	2008	2009	2010	2011	2012	2013
CAAB	6,008,468	7,631,976	6,025,625	10,470,080	6,393,191	7,051,116
CAF	2,783,300	2,327,822	6,904,183	3,171,488	5,441,763	3,886,632
CENRes	−	1,507,000	1,188,003	1,692,230	1,257,474	3,998,347
others	5,538,400	4,916,638	14,038,848	21,752,145	20,627,487	11,556,442
Total	**14,330,168**	**16,383,436**	**28,156,659**	**37,085,943**	**33,719,915**	**26,492,537**

Source: Data from Department of Research Affairs

[45] Interview with CENRes, April 2014
[46] *ibid.*
[47] *ibid.*, consultants in other fields, April 2014

Table 3-6: The Number of CTU Research Project by Year and by 3 Main Colleges

	2008	2009	2010	2011	2012	2013
CAAB	36	41	47	46	70	58
CAF	15	15	40	25	21	20
CENRes	-	9	9	14	15	20
others	43	128	78	109	104	139
Total	**94**	**193**	**174**	**194**	**210**	**237**

Source: Data from Department of Research Affairs

Tables 3-7 and 3-8 show number of journal publications by 3 colleges accepted by national and international scientific journals.

Table 3-7: CTU International Journal Publication and Proceedings by Year and by 3 Main Colleges

	2008	2009	2010	2011	2012	2013*
CAAB	-	-	-	27	30	13/24
CAF	-	-	-	20	24	13/20
CENRes	-	-	-	2	15	12/15
others	-	-	-	53	75	105/138
Total	**146**	**155**	**56**	**102**	**144**	143/**197**

* The number of 2013 shows “the number of first author journal”/ “total number”
** The number is not categorized by College 2008-2010.
Source: Data from Department of Research Affairs

Table 3-8: CTU National Journal Publication and Proceedings by Year and by 3 Main Colleges

	2008	2009	2010	2011	2012	2013*
CAAB	-	-	-	148	151	87/94
CAF	-	-	-	37	41	27/27
CENRes	-	-	-	38	13	19/21
others	-	-	-	237	188	130/206
Total	**85**	**192**	**562**	**460**	**393**	263/**348**

* The number of 2013 shows “the number of first author journal”/ “total number”
** The number is not categorized by College 2008-2010.
Source: Data from Department of Research Affairs

Table 3-9 shows amount of research fund acquired and number of research projects carried out by the 3 colleges. CAAB has the biggest share in terms of funding and number of research projects.

Table 3-9: CTU Number of Degree Programs by 3 Main Colleges

	Bachelor	Master	Doctor
CAAB	12[*1]	7	4
CAF	5	2	1
CENRes	4[*2]	3	1
Total	**21**	**12**	**6**

Note *1: Five (5) programs provide "on-service" lectures to some students at remote sites. All practical education is given at the CAAB laboratories.
*2: There will be one another program made during 2014 and it will become five eventually.
Source: JICA Study Team

The current number of students in each College is shown in Table 3-1. The number of teaching staff and their educational background is shown in Appendix 3-2.

3.4.2 Agriculture

(1) Undergraduate and Postgraduate Education

Postgraduate education of CTU in the field of agriculture possesses high potential and advantages. However there are several agendas that CTU has to handle in order to become an internationally recognized research university. The most urgent issue is to increase the number of Ph.D. holders among young teaching staff members in order to update education contents. Improving research facilities and equipment should be comprehensive with this human resources development. Details are as described below.

1) Programs and Education

The College of Agriculture and Applied Biology (hereinafter referred to as CAAB) currently offers seven (7) master's programs (Soil Science, Crop Science, Plant Protection, Animal Science, Veterinary Medicine, Food and Beverage Technology, and Post-harvest Technology) and four (4) doctoral programs (Soil Science, Crop Science, Plant Protection, and Animal Science), covering most fields of agriculture, including basic genetics, veterinary sciences, and food technologies[48]. As one of the units that conduct education and research in agricultural fields, Biotechnology Research and Development Institute (hereinafter referred to as BiRDI) focuses more on molecular biology and offers a master's program in biotechnology and a doctoral program in microbiology besides the three (3) bachelor programs[49]. MDI also offers integrated graduate programs in agriculture-related fields: a master's program that integrates rural development and farming system studies of undergraduate programs and a doctoral program that introduces policy studies for solving existing issues such as climate change.

Many alumni of postgraduate programs of CTU work for higher education institutes and enterprises in MDR.

While CTU offers considerable number and kinds of agricultural education programs, no bachelor's program, except the agricultural economics of School of Economics and Business Administration, has received AUN-QA or other international quality assurance certificates. Considering that CAAB aims to contribute to the development of MDR by nurturing human resources for high quality research and to ensure that majority of the master's students of CAAB graduate from bachelor's programs of the same college, insufficient quality assurance of undergraduate education, in terms of equipping students with basic knowledge and scientific thinking methods, is a disadvantage for postgraduate programs of CAAB.

2) Teaching Staff and Learning Resources

CAAB has four (4) professors, 25 associate professors, and a total number of 61 Ph.D. holders[50] (as of Dec. 2013, Appendix 3-6); 50.4% of 121 teaching staff members[51] of CAAB hold Ph.D. degrees, which is a little lower than College of Aquaculture and Fisheries but still distinguishable at CTU. It is also an advantage that 51 among 61 Ph.D. holders of CAAB have obtained degrees at universities abroad, including 11 Japanese universities. BiRDI has 11 Ph.D. holders including one (1) professor and seven (7) associate professors, among 22 teaching staff

[48] Department of Food Technology of CAAB is to be moved to BiRDI in the near future.
[49] BiRDI offers an advanced bachelor program in biotechnology, which was supported by the MHO project of the Netherlands. BiRDI is preparing for AUN-QA.
[50] Researchers paid by own funds of CAAB projects are excluded from these numbers.
[51] The total number of professors, associate professors, and lecturers of CAAB is 121 as of December 2013.

members. At MDI, eleven (11) among 16 teaching staff members are Ph.D. holders, including three (3) associate professors. These data suggest that the teaching staff of CTU has good potential.

However, nearly half or more Ph.D. holders of CAAB are in their fifties as shown in Table 3-10 and will retire in the near future. This is especially serious in the field of crop science and veterinary science. Supporting doctoral studies of young teaching staff is a priority issue.

Table 3-10: Number of Ph.D. Holders of CAAB by Age (April 2014)

	Ph.D. Holders by Age				
Department	**30–40**	**41–50**	**51–60**	**>60**	**Total**
Soil Science	3	4	3	0	10
Agricultural Genetics and Breeding	2	1	2	0	5
Crop Science	1	0	4	1	6
Physiology and Biochemistry	1	1	4	0	6
Plant Protection	2	1	3	1	7
Animal Production	3	2	8	1	14
Veterinary medicine	1	1	5	0	7
Food Technology	3	3	3	0	9
Total	**16**	**13**	**32**	**3**	**64**

Source: CAAB

Access to international academic journals from Learning Resource Center is limited; Scopus and papers published in the Elsevier journals are not accessible to students. This situation is a serious disadvantage for postgraduate students and teaching staff in terms of quality of education, since research outputs of international levels cannot be produced without learning from advanced research. CTU should recognize this situation and allocate appropriate budget that enables access to international journals, provided that CTU intends to contribute to the development of MDR by producing quality research outputs.

3) Curricula and Research Based Education[52]

CAAB does not offer part-time programs at postgraduate levels. All postgraduate students stay on campus and are allowed to participate in his/her supervisor's research projects from the second semester of the master's program. The cost associated with the research is financed through research funds acquired by supervisors. Furthermore, nearly 50% of the new master's students are fresh graduates of the undergraduate programs[53] in recent years.

Students, who are to proceed to the master's program right after graduation, conduct graduation thesis work, in most cases, under the supervision of a teaching staff member who is expected to be his/her supervisor at graduate school. This situation is advantageous for master's thesis work. Appendix 3-7 shows a sample of courses that a student may take, assuming he/she immediately proceeds to a master's program. Annual intakes of new master's students vary from 150 to 180[54], while approximately 30 students are newly enrolled in doctoral programs. It is not usual that graduates of CAAB's master's programs start doctoral studies straightaway.

[52] Research Based Education aims at equipping postgraduate students, especially master's students, with research capabilities. Research Based Education therefore requires teaching staff, namely supervisors of master's students, to establish a research team that includes master's students and give clear assignments to each master's student. The hierarchical structure of a research team helps postgraduate students conduct research smoothly and produce quality research outputs as research team members.

[53] Based on the information obtained through interviews to CAAB faculty members.

[54] The intake depends on the MOET's policy of the year.

CAAB requires master's students to obtain 50 or more credits, among which ten (10) credits are for master's thesis work. Though the number of credits that should be acquired by lab work is relatively small compared to those obtained by classroom work, as long as the master's students are involved in a research project that his/her supervisor manages as research members, research based education can be introduced. In this regard, it is CAAB's advantage that the master's students join a research team from the second semester and co-author academic papers as part of their master's work.

The structure of curricula is similar at most graduate schools. However, in Japan and some other countries, master's students are involved in research activities with his/her supervisors' research team members throughout the study program. Standardization of curricula and lectures is pursued at postgraduate schools in Japan; yet stories about advanced research outputs and future perspectives enthusiastically told by the teaching staff always make classes attractive and vibrant. Weaknesses of the postgraduate education of CAAB may come from syllabi and/or lecture contents that do not measure up to research activities of international levels.

(2) Research

Agricultural research has advantages owing to geographical and socio-economic circumstances as stated in 3.3.1. In terms of research capabilities in the field of agriculture, disadvantages such as inadequacy in international journal publications should be offset by strengthening human resources and facilities. Enhancing global and interdisciplinary research scopes and responding to geographical and socioeconomic situations of MDR will upgrade research performances and contribute to innovations. CTU should actively introduce interdisciplinary research themes as a part of its efforts to become an internationally recognized research university and take an important role in MDR. Raising awareness and skills on the management of intellectual property rights is anticipated from the viewpoint of expanding joint research and industrial cooperation. Details are as given below.

1) Research Team and Human Resources for Research

Research at CAAB, BiRDI, and MDI is conducted by research teams, which consist of teaching staff members, researchers, and postgraduate students. Different from Japanese universities where research teams make organizational units of the school[55], research teams are established based on research projects or financial resources. Laboratories, which are physical spaces for experiments and research work, are usually managed by the teaching staff who leads research teams in the relevant field; postgraduate students use their supervisors' laboratories for research work in most cases. For example, departments, laboratories, and research field of research teams are structured as shown in Table 3-11 and are expected to be reorganized for more research-oriented activities.

[55] Structural arrangements differ by faculty/school and department. What is often called "the course-based system" (Koza-sei) is not always introduced, while merits of this system is reappraised from the viewpoint of efficiency of research team work.

Table 3-11: Structure of Departments and Laboratories at CAAB

Existing Laboratory (CAAB)	Future Laboratory Plan	Field of Research Teams
Dep. Soil Science		
Soil Chemistry Lab	(A) Soil Chemistry Lab	Sustainable Production of Tropical Plants and Animals
Soil Physics Lab	(A) Soil Physics Lab	Sustainable Production of Tropical Plants and Animals
Soil Microbiology Lab	(A) Soil Microbiology Lab	Sustainable Production of Tropical Plants and Animals
(New)	(A) Soil Classification and Micromorphology Lab	Sustainable Production of Tropical Plants and Animals
Dep. Agricultural Genetics & Breeding		
Plant Genetics Lab	(A) Plant Molecular Genetics Lab	Genetics and Breeding for Plants
Electrophoresis Lab	(A)	
Plant Breeding Research Lab	(A) Plant Breeding	Genetics and Breeding for Plants
(New)	(A) Seed Technology	Genetics and Breeding for Plants
Dep. Crop Science		
Crop Science Lab	(C) Horticulture Science Lab	Sustainable Production of Tropical Plants
(New)	(A) Rice Research Lab	Sustainable Production of Tropical Plants
(New)	(A) Edible and Pharmaceutical Mushroom Lab	Sustainable Production of Tropical Plants
Dep. Plant Physiology & Biochemistry		
Plant Physiology Lab	(C) Plant Physiology Lab	Genetics and Breeding for Plants
Biochemistry Lab	(C) Plant and Animal Biochemistry Lab	Genetics and Breeding for Plants and Animals
Tissue Culture Lab	(A) Cell Biotechnology Lab	Genetics and Breeding for Plants and Animals
(New)	(A) Applied Biological Science Lab	Genetics and Breeding for Plants and Animals
Dep. Plant Protection		
Plant Pathology Lab	(C) Plant Pathology Lab	Sustainable Production of Tropical Plants
Entomology Lab	(C) Entomology Lab	Sustainable Production of Tropical Plants
Biological Control Lab	(C) Biological Control Lab	Sustainable Production of Tropical Plants
(New)	(A) Biological and Chemical Technology in Plant Protection Lab	Sustainable Production of Tropical Plants
Dep. Animal Sciences		
Anatomy Lab	(C) Animal Anatomy and Physiology Lab	Genetics and Breeding for Animals
Animal Physiology Lab		
Genetics & Animal Breeding Lab	(C) Animal Nutrition and Feed Technology Lab	Genetics and Breeding for Animals
Animal Feed Lab		
Animal Nutrition Lab		
Apiculture Lab	(C) Non-ruminant Animal Production Techniques Lab	Genetics and Breeding for Animals
Dep. Veterinary Medicine		
Obstetrics & Artificial Insemination Lab	(C) Veterinary Bacteriology and Mycology Lab	Sustainable Production of Tropical Animals
Microbiology & Immunology Lab		
Animal Pathology Lab		

Existing Laboratory (CAAB)	Future Laboratory Plan	Field of Research Teams
Parasitic Disease Lab	(C) Parasitology Lab	Sustainable Production of Tropical Animals
Infection & Parasitic Disease Lab		
Clinical Diagnostic Lab	(A) Animal Clinic and Virology Lab	Sustainable Production of Tropical Animals
Dep. Food Technology		
Food Technology Lab	(B) Food Technology Lab	Food Technology and Post-harvest Technology
Postharvest Technology Lab	(B) Postharvest Technology Lab	Food Technology and Post-harvest Technology
Food Process Engineering Lab	(B) Food Process Engineering Lab	Food Technology and Post-harvest Technology
Food Biotechnology Lab	(B) Food Biotechnology Lab	Food Technology and Post-harvest Technology
(New)	(B) Food Nutrition Lab	Food Technology and Post-harvest Technology
(New)	(B) Food Chemistry Lab	Food Technology and Post-harvest Technology

Source: CAAB, edited by JICA Study Team

As already described in 3.4.2 (1) 3), master's students participate in their supervisors' research team from the second semester of the program, after looking for a supervisor/research team that caters to his/her research concern. This situation is advantageous in terms of structural research management and research based education for postgraduate students.

Research teams are led by Ph.D. holders and need qualified research members. If the research capacity of team leaders is not good enough to conduct research at international levels, CTU would not be able to offer postgraduate education that could be internationally recognized nor produce research outputs of international levels. It is yet anticipated that young teaching staff members nurture capacities to plan and carry out innovative research by obtaining Ph.D. degrees at universities in Japan. It is also indispensable for this purpose that CTU keeps motivating young research team leaders to make more innovations after coming back to CTU; For example, CTU should provide young Ph.D. holders with a system for sharing research outputs and creative research culture with other researchers and postgraduate students at CTU, simultaneously developing a research environment that enables further expansion of their research at CTU.

2) Research Funds and Facility

Securing financial resources of research activities is one of the fundamentals for high quality research. CAAB received research funds of VND 7,051,116,200 in 2013 from central governments, CTU[56], private companies, and majorly from local governments. This amount is about 27% of CTU's total external research funds and suggests CAAB's relative strength in research. More than 50% of local authorities' research funds are given to CAAB, which also implies CAAB's prominent contributions to local communities. CAAB has also participated in 33 international projects in the last five years, among which few provide CAAB with research grants[57].

Lab equipment is currently shared by undergraduate students, postgraduate students, and teaching staff. Practical activities of bachelor students are given more priority over research

[56] CTU offers internal competitive research grants to 110 research teams. The amount of each grant is about USD 2,500.

[57] According to the information obtained through interviews, most of international projects support cooperation among universities and/or methods of strengthening education programs such as curriculum development.

activities of teaching staff members and postgraduate students at CAAB, BiRDI, and MDI; this situation is extremely disadvantageous in terms of research performances of international levels.

3) Research Themes

Research team based activities are widespread in the agricultural fields of CTU; however, research themes that encompass two or more research concerns are yet to be pursued. For instance, BiRDI has published considerable number of papers regarding functions of bacteria living in MDR and firmly underlies potential interdisciplinary research activities, while applications of new methodologies such as live imaging could be considered. Research on stem cell applications should be linked to veterinary science teams of CAAB. Application-oriented research themes of food technologies could be made innovative through the introduction of ICT.

One direction, in a practical sense, is to fully utilize research resources of CTU's agricultural fields; for example, research teams of BiRDI may take part in a molecular biological aspect of research in crop and animal sciences. The other is to introduce new disciplines such as computational simulations of engineering fields and environmental digital data collections that are available at CTU. Collaborative work for innovative problem solutions, especially for climate changes in MDR through interactive information exchanges with environment and aquaculture research teams is anticipated. Interdisciplinary research collaboration may provide researchers with more opportunities for international journal publications.

4) Dissemination of Research Output

The number of paper publications of each department of CAAB and BiRDI in the last five years is given in Table 3-12, which suggests that CAAB's paper publication in international journals is not improving. Considering the number of Ph.D. holders, paper publication in genetics and breeding is more prevalent.

Table 3-12: Number of International Journal Publications of CAAB and BiRDI

Department of CAAB/Institute	2009	2010	2011	2012	2013
Soil Science	1	2	3	1	0
Agricultural Genetics and Breeding	10	12	10	8	8
Crop Science	3	1	3	1	2
Physiology and Biochemistry	0	0	2	2	2
Plant Protection	0	3	3	3	1
Animal Production	21	10	8	7	11
Veterinary medicine	1	6	4	7	8
Food Technology	1	1	0	0	5
BiRDI	2	6	3	5	4

Note: The data indicate the numbers of academic papers, to which one or more teaching staff members of each department have contributed either as the first author or as one of co-authors, and include duplicated numbers[58].
Source: CAAB and BiRDI

CTU gives incentives to teaching staff members who have published international journal papers; one international journal paper is equivalent to 80 hours of teaching hours[59]. Increased number of international journal papers is one of the priority targets of CAAB.

There are a number of papers published at international conferences, especially those given at CTU. CTU also publishes a domestic journal and supports teaching staff members' publication

[58] Method of counting the number of papers that an institution (department) is involved in follows Monbukagakusho –Kakenhi's policy (http://www.mext.go.jp/b_menu/shingi/gijyutu/gijyutu4/030/gijiroku/1334396.htm)
[59] In the case where there are two or more authors, the hours are shared by co-authors.

fees. This arrangement somehow discourages international journal publications, while providing postgraduate students and teaching staff members with opportunities to be eligible for Ph.D. degrees at CTU and research funds that CTU receives.

However, in order to achieve the increased number of international journal papers, it is essential that the teaching staff of CTU conducts novelty research learning from advanced research, and keeps producing research outputs of international levels and that CTU invests more in such activities of researchers.

5) Technology Transfer and Intellectual Property Rights Management

CTU's Technology transfer to local communities has been highly active in the field of agricultural. Dissemination of production technologies and improved seeds is an established technology transfer skill at CTU. Workshops are given at CAAB, while practical technology transfer is mainly provided by College of Rural Development[60] at the Hoa An Campus. Improved seeds that the gene bank of MDI develops/preserves are disseminated to farmers in cooperation with rice seed centers of provinces in MDR.

As for collaboration with private industries, one of the largest agricultural companies of Viet Nam, An Giang Plant Protection Joint Stock Company (AGPPS) benefits from biocontrol technology of CTU. Former teaching staff of CTU is leading research at AGPPS; most of his technical staff is from CAAB and BiRDI. DASCO, a subsidiary company of Don Thap Trading Joint Stock Company, has commercialized CTU's biofertilizer technology; one of DASCO's directorate board members has a master's degree in agronomy of CTU.

In this context, CTU, as a prospective research university, is expected to be more aware of the necessity of intellectual property managements[61]. CTU should also understand that offering technologies to local communities would not be hindered by patent applications and recognize that Viet Nam is a TRIPS[62] member country.

3.4.3 Fisheries and Aquaculture

(1) Undergraduate and Postgraduate Education

CAF currently encompasses 6 academic departments, 113 teaching staff, 1449 undergraduate students, 185 master's students, and 39 doctorate students.

1) Programs and Education

As of spring 2014, the following academic programs are being offered.

- **Bsc. Programs (5)**
  - Aquaculture (Aquaculture; Marine aquaculture and aquatic resources conservation; Advanced program in aquaculture Transferred program in Aquaculture)
  - Aquatic animal pathology

[60] According to the interview, a person in charge of a certain field who develops technology, the same person disseminates the technology transfer, while there are personnel have been assigned for technology transfer in College of Rural Development.

[61] Patent application based on research outputs financed by government research funds is conducted at Ho Chin Minh City University of Technology (HCMUT). HCMUT has applied for more than 60 patents (invention). Application processes take a few months. Request of registration can be made within 42 months after the application with the National Office of Intellectual Property (NOIP) in Ho Chi Minh City. Examinations for registration take a year or more. Patents must be applied for before publishing papers; balancing patent applications and paper publications is needed.

[62] Agreement on Trade-Related Aspects of Intellectual Property Rights. Viet Nam has been a member of this agreement since 2006.

- Fisheries product processing technology (Transferred program in fisheries product processing technology)
- Fisheries economics
- Aquatic resources management

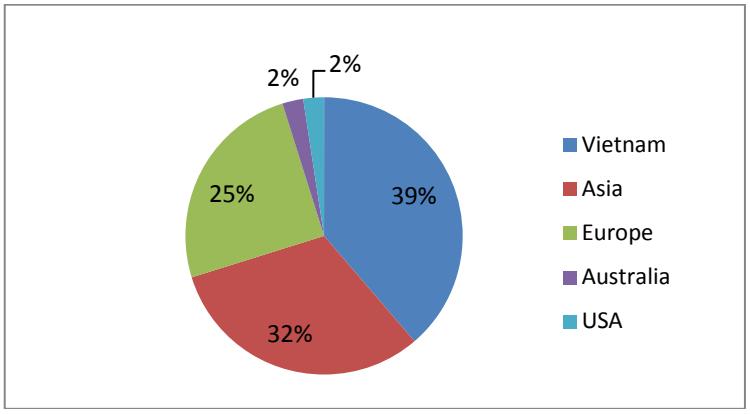
- **Msc. Programs (2)**
  - Aquaculture
  - Aquatic Resources Management
- **Ph.D. Program (1)**
  - Aquaculture

The number of graduate programs is limited compared to undergraduate courses, so the opportunity for undergraduate students to continue their research at graduate level may be limited.

Typical career paths for the graduates of CAF with master's or doctorate degrees are to work for academic institutions, local government, or private fishery and aquaculture companies in MDR. Few graduates work for NGOs/NPOs. In any case, most of the alumni stay in Mekong Delta and contribute to regional development of fisheries and aquaculture.

2) Teaching Staff and Learning Resources

As mentioned above, CAF has 113 staff members. Approximately 31% of them are Ph.D. holders and 34% are M.Sc holders. Sixty percent of the staff has obtained their postgraduate degrees abroad (Figure 3-3). Among the countries from where they obtained their postgraduate degrees, Belgium is the most popular destination, followed by Thailand, Malaysia, and Japan. Many of the teaching staff received undergraduate education at CTU and then went abroad for higher degrees. Alternatively, some staff members are studying and working as supporting staff or lecturers at CAF at the same time. The average age of CAF staff is around 40.



Source: CAF

Figure 3-3: CAF Staff Members Graduated MSc or Ph.D. Degrees from Different Regions

3) Curricula and Research Based Education

Curricula of undergraduate and graduate degree programs are attached in Appendix 3-8. Advanced program in aquaculture is a unique undergraduate program which is offered in collaboration with Auburn University in the United States. The lectures are taught in English (some of the lectures are taught by visiting professors from Auburn University), and students are required to write their theses in English.

Opportunities for research-based education are provided as Bachelor's and Master's Thesis research and Doctoral Dissertation research. The number of research credits is the same as other Colleges. The students can select their supervisor according to their academic interest.

(2) Research

1) Research Team and Human Resources for Research

Each research project is conducted by a research team, which comprise of one team leader (who is an academic staff of CAF) and 2–8 team members (including researchers from outside). Graduate students are not counted as members of research teams, but can conduct research under the supervisors and publish papers in academic journals under their name. Graduate students may receive financial support depending on the conditions of funding source.

At present, the following laboratories belong to CAF. These laboratories are used for multiple purposes including undergraduate practical courses, postgraduate research, and research by teaching staff members.

- Zoo-Physiology Laboratory
- Aquatic Pathology Laboratory
- Water and sediment analysis Laboratory
- Laboratory for live food and invertebrate biodiversity
- Fisheries Resources Laboratory
- Food Safety Laboratory
- Genetic Laboratory
- Freshwater Hatchery
- Brackish Water Hatchery and Wet Labs

Table 3-13 shows the lab and department relationship in CAF.

Table 3-13: Structure of Departments and Laboratories in CAF

Existing Laboratory	Future Laboratory Plan	Education Program	Research Program
Department: Aquatic Nutrition and Products Processing			
Fish Nutrition Basic Lab	Fish Nutrition Basic Lab	BSc in Aquaculture, Aquatic product processing, Aquatic animal pathology	Theme I, II, IV
Fish Physiology Basic Lab	Fish Physiology Basic Lab	BSc in Aquaculture, Aquatic animal pathology	Theme I, II, IV
Microbiology Basic Lab	Microbiology Basic Lab	BSc in Aquatic product processing; MSc and PhD in Aquaculture	Theme IV
Food Safety Basic Lab	Food Safety Basic Lab	BSc in Aquatic product processing	Theme IV
Aquatic Product Processing Basic Techniques (CAF Area)	Aquatic Product Processing Basic Techniques (CAF Area)	Same as above	Theme IV
(New)	Fish Nutrition Research Lab	MSs and PhD in Aquaculture, Aquatic product processing	Theme I, II, IV
(New)	Fish Physiology Research Lab	Same as above	Theme I, II, IV

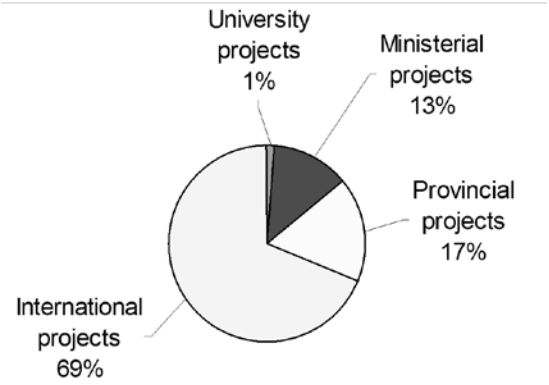
Existing Laboratory	Future Laboratory Plan	Education Program	Research Program
(New)	Microbiology Research Lab	Same as above	Theme IV
(New)	Food Safety Research Lab	Same as above	Theme IV
(New)	Aquatic Product Processing Techniques Research Lab (CAF Area)	Same as above	Theme IV
Department: Aquatic Pathology			
Bacteriology Lab	Bacteriology Lab	BSc in Aquaculture, Aquatic animal pathology; Fisheries management; MSc, PhD in Aquaculture, Fisheries management	Themes I, II, IV
Histology Lab	Histology Lab	Same as above	Themes I, II, IV
Mycology Lab	Parasitology and Mycology Lab	Same as above	Themes I, II, IV
Virology Lab	PCR and Virology Lab	Same as above	Themes I, II, IV
Biotecnology Lab			
(New)	Immunology and Tissue Culture Lab	Same as above	Themes I, II, IV
(New)	Basis Lab	Same as above	Themes I, II, IV
Department: Applied Hydrobiology			
Plankton and Invertebrate Lab	Algae Toxins & Plankton/ Periphyton Biodiversity Lab	BSc in Aquaculture, Aquatic animal pathology, Fisheries management; MSc and PhD in Aquaculture; Fisheries management	Themes I, II, V, VII
Live Food Study Lab	Live Food Study Lab	BSc in Aquaculture, Aquatic animal pathology; MSc and PhD in Aquaculture	Themes I, II, V
Probiotics Study Lab	Probiotics Study Lab	Same as above	Themes I, II, V
Marine Biology Lab	Marine Biodiversity & Bioactive Products Lab	BSc in Aquaculture, Aquatic animal pathology, Fisheries management; MSc and PhD in Aquaculture; Fisheries management	Themes I, II, III, VI
Shrimp/Fish Taxonomy Lab			
Water Quality Study Lab	Water Quality/Aquatic Invertebrate/Fish Taxonomy Basic Lab	Same as above	Themes I, II, III, V
(New)	Aquaculture Ponds Water/ Sediment Lab	Same as above	Themes I, II, V, VII
Department: Fisheries Management and Economics			
Fish Collection Room	Fish Collection Room	BSc in Fisheries resources management; Aquaculture; MSc and PhD in Fisheries resources management; Aquaculture	Themes I, II, III, VII
(New)	Fish Biology Lab	Same as above	Themes I, II, III, VII

Existing Laboratory	Future Laboratory Plan	Education Program	Research Program
(New)	Fish Distribution and Migration Lab (Fisheries Resources Lab)	Same as above	Themes I, II, III, VII
(New)	Fish Stock Assessment and Management Lab (Fishing Technology and Management Lab)	Same as above	Themes I, II, III, VII
(New)	Fish Population Dynamics Lab	Same as above	Themes I, II, III, VII
Department of Coastal Aquaculture and Department of Freshwater Aquaculture			
Brackish Water Wetlabs (Hatcheries)	Brackish Water Wetlabs (Hatcheries)	BSc in aquaculture, fisheries resources management, aquatic animal pathology, fisheries economics; MSc and PhD in aquaculture, fisheries resources management, aquatic animal pathology	Themes I, II, III, VII
Freshwater Wetlabs (Hatcheries)	Freshwater Wetlabs (Hatcheries)	Same as above	Themes I, II, III, VII
(New)	Other Research and Practice Wetlabs	Same as above	Themes I, II, III, VII
College of Natural Sciences			
Department: Biology			
(New)	Advanced Equipments Lab	MSc and PhD in aquaculture, fisheries resources management, seafood processing	Themes, IV, VI
(New)	Bioassay Lab	Same as above	Themes, IV, VI
(New)	Natural Products Chemistry Lab	Same as above	Themes, IV, VI

Source: CAF, edited by JICA Study Team

2) Research Fund and Facility

CAF acquires research funding from different sources on project basis. Main funding sources are ministerial (MOET and other central ministries), provincial, international, and internal research funds of CTU itself. CAF acquired research funds of USD 3.48 million in total from 2010 to 2013. As shown in the Figure 3-4 below, 'international projects' is the largest category in terms of the amount, making up 69% of all research funds. CTU's internal research fund makes only 1% of the total research fund at CAF.



Source: CAF

Figure 3-4: CAF Research Fund by Funding Sources

3) Research Themes

Majority of the research themes in CAF is directly linked to development and improvement of aquaculture techniques in MDR. The main target species are commercially important species such as crustaceans (e.g. shrimps and crabs) and fishes (e.g. snakehead fish and eel). Some examples of international collaboration projects are on biodiversity and its wise use of aquatic species in MDR in collaboration with Nagao Foundation, on culture techniques of *Artemia spp.* supported by Belgium, and Interdisciplinary Project on Climate change in Tropical Aquaculture supported by Denmark. Most of the research at CAF is applied, and relatively few basic or theoretical researches have been done. Interdisciplinary research, such as socio-economics of fishery and aquaculture is also conducted at CAF.

4) Dissemination of Research Output

The output of research is published in national and international journals as well as presented at international conferences. The number of articles published in national and international journals in the period of 2007–2012 is shown in the table below. A full list of publications is attached in Appendix 3-9.

Table 3-14: The Number of CAF Articles Published in National and International Journals in the Period of 2007–2012

Year	National journals	International journals
2007	5	14
2008	39	10
2009	35	18
2010	77	32
2011	91	17
2012	115	24
Total	**362**	**115**

Source: CAF

CAF researchers also actively participate in numerous national and international academic conferences where they present their research outcomes to the scientific community. For example, CAF hosted International Fisheries Symposium in 2012, in 8 universities belonging to ASEAN countries participated in order to strengthen collaboration in education, research and information exchange in aquaculture and fisheries.

5) Technology Transfer and Intellectual Property Rights Management

Technical development may be discussed at seminars and trainings for local communities. CTU regards technology transfer as the most important mission of the University, so seminars and trainings are organized very often. For years 2010–2014, CAF hosted a total of 59 national training courses in which 2,968 trainees participated, and 15 international training courses in which 42 trainees participated. Most of these trainings are held in classrooms and wetlabs of CAF building. Some technical transfers are also carried out at Vinh Chau Research Station which is located about 100km south of the main campus. Five of international training courses were held overseas.

As the purpose of their research is to contribute to the development of local industry by disseminating their knowledge, their research outcomes are rarely protected by patents.

3.4.4 Environment

(1) Undergraduate and Postgraduate Education

1) Programs and Education

Postgraduate education of environment in CTU is mainly pursued at College of Environment and Natural Resources – CENRes. It was founded in 2008, originated from a combination of Department of Environmental Engineering and Water Resources (College of Technology) and Department of Environment and Natural Resources Management (College of Agriculture and Applied Biology).

In 2010, a new department, Department of Land Resources, branched out from a unit of the Department of Soil Science (College of Agriculture and Applied Biology). CENRes contains 4 departments:

- Department of Environmental Sciences
- Department of Environmental and Natural Resources Management
- Department of Environmental Engineering
- Department of Land Administration

Presently, the CENRes possesses a building with an area of 4,200 m^2 comprising 9 laboratories which are:

- Environmental Toxicology Laboratory
- Environmental Biology
- Chemical Environmental Engineering Laboratory
- Biological Environmental Engineering Laboratory
- Environmental Quality Laboratory
- Wastewater Treatment Laboratory
- Solid wastes Treatment Laboratory
- GIS and Remote sensing Laboratory
- Hydraulic Laboratory

In terms of connectivity to undergraduate study, CENRes questionnaires show that about 10-20 % of the undergraduates at CTU will proceed to the masters program (Table 3-15). The reason for decrease in this number from 2012 is the growing number of students from other universities. More connectivity of undergraduate and graduate programs at CTU CENRes can be pursued by increase of internal undergraduates.

Table 3-15: Percentage of Undergraduate Finishers Going to Graduate School of CTU CENRes

Department/ Year	2013	2012
Env. Management	8	24
Env. Sciences	15	32

Source: CENRes 2014

2) Teaching Staff and Learning Resources

Currently CENRes has 61 staff, including 1 Professor, 8 Associate Professors, 33 lecturers, 15 Ph.D. pursuers and 8 others. The staff education level is: 19 Ph.D. holders, 34 master's holders, 6 bachelor's holders, and 2 others (below bachelor's level). Ph.D. ratio of the teaching staff is 33.3 %. Research Institute for Climate Change known as Dragon Institute, which closely works with CENRes, has one staff with a master's degree.

One crucial issue at CENRes is the shortage of human resources. The table below shows the current age distribution of CENRes teaching staff. According to CENRes representatives, the core lecturers are in their fifties and reaching their retirement age but the next generation of human resources is yet to be developed.

Table 3-16: Teaching Staff's Current Age Distribution of CENRes

Gender/Age	26-30	31-40	41-50	51-60
Male	1	21	7	9
Female	3	10	7	4

Source: CENRes 2014

3) Curricula and Research Based Education

Curriculum for CENRes is shown in Appendix 3-10. The courses are categorized into two parts: R: Required course credits; and S: Selective course credits. The two categories also need specific hours which are T: Theory hours; P: Practice hours and F: Fieldtrip hours. There is a requirement for Pr: Prerequisite course. For example, to get a degree of Master of Science: Curriculum_Env. Management_English_CENRes needs 32 required course credits; and S: 22 Selective course credits. The CENRes syllabus is supposed to be under review every two years in order to get new insight from the real world.

Several departments using laboratories are seen to work on their research in form of teams. For example, laboratories like GIS & Remote Sensing Laboratory and Hydraulic Laboratory engage in research of analyzing data, and these laboratories possess full-time researchers who engage in laboratory management and some research work. These arrangements are efficient in organizing research teams. On the other hand, laboratories like Environmental Toxicology Laboratory, Environmental Biology, and Chemical Environmental Engineering Laboratory are used for graduate and undergraduate experiments for both research and education. Therefore, these laboratories are not thought as research teams but as the places for experiments.

(2) Research

Like the agriculture and aquaculture fields, environmental related researches have advantages due to geographical and socio-economic circumstances as stated previously. Concerning research capabilities in the fields of environment, shortage in human resources and inadequacy of international journal publications is conspicuous, partly because it is a relatively newer field compared to the other two. It can be offset by providing research experiences and strengthening facilities and equipment with a long-term vision, and it is indispensable to plan human resources

and facilities to be developed as a research oriented university. Environmental fields have been intensively engaged in global and interdisciplinary research, responding to geographical and socioeconomic situations of MDR, and more and more mutual engagement should be enhanced with related fields, such as agriculture, aquaculture and fishery, engineering and economics. Details are as given below.

1) Research Team and Human Resource for Research

Most of the core researchers are getting old and there exist some concern of lack of human resources. There are issues of shortage of PhD degree holders. PhD is a qualification of indicator of an appropriate researcher. The PhD holders of CENRes occupy 33.3% and it is lower than the other two: CAAB: 50.4% and CAF 56.1%. However, compared to the level of PhD holders' ratio of the whole universities being 21.7%, CENRes level is relatively high.

Table 3-17 shows 9 existing laboratories and 7 new laboratories as along with their assigned department and division. The table also shows the present use of education and research at different levels of education (undergraduate, master, and doctorate). Some laboratories can be referred as being research teams but others, which are used for both education and research purposes, can only be referred to as places for experiments. It is needed to have clear demarcation between education and research when creating new laboratories.

Table 3-17: Structure of Departments and Laboratories in CENRes

UG-undergraduate, M=master, and D=doctorate

Department name	Division name	Names of "Laboratories" as space New Lab *	Education (Present)	Education (Future)
CENREs				
Environmental Sciences	Environmental Quality	Soil and Water Environment	UG, M, D	UG, M, D
		Environmental Toxicology	UG, M, D	UG, M, D
	Environmental Ecology	Environmental Biology	UG, M, D	UG, M, D
		*Advanced Techniques	-	Special arrangement *1
Environmental Engineering	Water supply and waste water treatment	Wastewater Treatment	UG, M, D	UG, M, D
		Chemical Environmental Engineering	UG, M, D	UG, M, D
		Solid Waste Treatment	UG, M, D	UG, M, D
		*Air pollution control		UG, M, D
		*Center for demonstration pilot technologies		This center will be in Hoa An (51m^2 office and opened space
Land Resources (Administration)	Natural Resource Conservation	GIS and Remote Sensing	UG, M	UG, M, D
		Land Resource	UG, M	UG, M, D
Environmental and Natural Resources Management	Environmental Management	Hydraulics	UG, M	UG, M, D
		* Environmental modeling	-	UG, M, D
	Natural Resource Management	* Climate change and Environmental Observation	-	UG, M, D
College of Engineering and Technology- CoET				
Department of Automation Technology		* Automation in Agriculture and Environment	-	UG, M

Department name	Division name	Names of "Laboratories" as space New Lab *	Education (Present)	Education (Future)
Department of Electrical Engineering		* Renewable and green energy	-	UG, M
School of Economic - Business Administration - SEBA)*2				
Department of Natural Resource and Environmental Economics		* Lab of Environment and Behavioral Economics	-	M, D

Note *1 It is used for more profound research purpose because of only high tech equipment here. This lab will be operated as common used lab like what C/P have learnt from Japan training. Online booking for using equipment will be developed. Consultancy with Japanese Universities is needed.
Note *2 Department of Agricultural Economics also involves in this lab.
Source: CENRes 2014

1) Research Team and Human resources

Shown in previous table of the age distributions of CENRes teaching staff, core researchers are reaching their retirement age. Low rate of Ph.D. holders is also an issue. As a researcher, a Ph.D. degree serves as a means of determining if a person can pursue sound researches. The rate of CENRes Ph.D. holders is 33.3%, and compared to the teaching staff of the other two fields, 50.4% in agriculture and 56.1% in aquaculture, the level is comparatively low. However, as the rate of Ph.D. holders in the total teaching staff is 21.7%, CENRes's rate is higher than the average.

2) Research Fund and Facility

According to CENRes representative, some supervisors will support students who want to participate in their supervisor's project activities. Generally students need to personally cover the costs of projects they are interested in (students may get funds from their office).

In 2013, the fund acquisition of CENRes was VND 3,998,347. As seen in 3.5.1, the amount of CENRes research fund has been inconsistent over the years. Funding from international organization accounted for 67.6%, CTU funding 5.4% and MOET 27%. It is hard to get private sector funds from Vietnamese enterprises as their interest in environmental conservation is low.

3) Research Themes

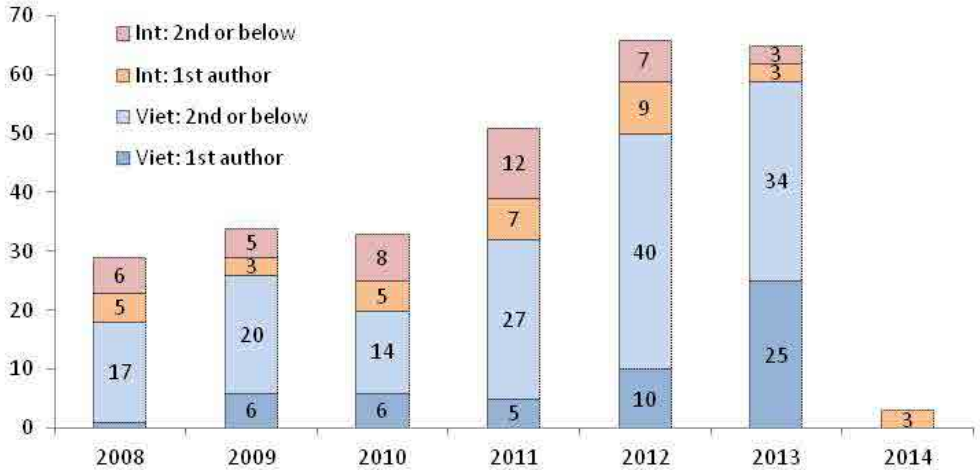
Research Themes of CENRes are deeply rooted in MDR activities as previously mentioned and they are also linked to trans-boundary issues of surrounding areas. These issues pave way for urgency, potential for future development, direct beneficiary for MDR, contributions to global environmental challenges, high possibility for interdisciplinary research, collaboration potentials with Japanese university, and sustainability.

4) Dissemination of Research Output

Figure 3-5 shows publications made by CENRes during 2008–2014. Though international papers are smaller in number, it has been successful in publishing more and more Vietnamese language papers.

Representative of CENRes CTU raised a point that some staff as prospective Ph.D. holders tend to produce a lot of international papers through their process of writing dissertation, but they stop doing that after their completion of Ph.D. This is because they do not find time to pursue research due to daily tasks as educators and administrators at CTU.

In order to conquer this issue, some incentives to writing international journals are made. Researchers, who have published an international paper, can decrease their teaching hours, depending on the level of involvement (first author, second and other author)[63]. Regardless of these incentives, it is still very hard for them to produce international papers due to daily tasks as educators and administrators. Some drastic policies to promote international research should be taken to increase the number. For instance, long-term sabbatical leaves given according to the served years and opportunities for researching abroad can be the options.



Source: CENRes 2014

Figure 3-5: Publication of CENRes

5) Technology Transfer and Intellectual Property Right Management

With regard to technology transfer in the field of environmental education, there is involvement of Hoa An campus. Hoa An was used as a place of demonstration for biodiversity related research. Dragon Institute presently has interaction with Hoa An campus through bio-gas and irrigation method adapted to climate change (Alternative Wet / Dry System).

Soil of Hoa an campus is acidic and the location is ideal to study acidic soil. Also it is considered to be a good place to study fruit production for CAAB. However Hoa an campus is physically quite far from campus III. If the area close to Campus III could provide similar facilities, it would be a good place for technology transfer. The intellectual property management is not yet an issues in the environmental field, but it is necessary to continue managing them precedent of agriculture and aquaculture.

3.4.5 Hoa An Technology Transfer Center

CTU has played an important role in technology transfer and tremendously contributed to the development of technology in agricultural production in Mekong Delta River. To strengthen the function, the Hoa An Technology Transfer Center was established in 2011, located 40 kilometers from Can Tho City because installing new animal and field test facilities is difficult in the city center due to environmental issues.

In addition to offering academic programs, the Center is used mainly for CAAB, CAF, CENRes, and College of Rural Development (CRD) to conduct testing of research findings in the field conditions, demonstrations, and, training and transfer of new technologies to extension workers, farmers and local government officers.

[63] Interview with CENRes, April 2014

The Center has offered 7–8 undergraduate programs since 2011. At present it does not offer any graduate programs, however a number of graduate students are using the Center's facilities for studying, practicing, and preparing thesis. Two master's programs in Agriculture Extension and Agriculture Business will be offered in 2017 and 2020 respectively.

In order to improve qualifications and knowledge of officers and farmers in Mekong Delta River, short training courses have been organized by the CRD itself or cooperation with other colleges at the Center. The list of training courses the CRD directly organized are showed in Table 3-18.

Table 3-18: List of Training Courses Organized by the CRD from 2011–2013 in Mekong Delta River

Name of Training Courses	Location/ Local authorities	Year	Training Period (days)
Upgrade knowledge and skills in Agricultural extension	Hau Giang	2011	5
New Rural Village model development	Soc Trang	2011	3
Rice Breeding	Vinh Long	2012	60
Enhancing knowledge & skills for implementing New Rural Village model	Can Tho City	2012	84
Participatory Technology Development (PTD)	Hau Giang	2012	3
Participatory Technology Development (PTD)	Dong Thap	2012	3
Methodology for Enhancing agricultural production and farmer incomes	Can Tho City	2013	42
Planning & method for New Rural Village model development	Tien Giang	2013	10
Research proposal and data analysis	Ben Tre	2013	7
TOT- Household Economic Management	Tra Vinh	2013	7
TOT- Household Economic Management	Ben Tre	2013	7
TOT- Household Economic Management	Tien Giang	2013	7
Assessment of livelihood vulnerability	An Giang	2013	3
Impact pathway analysis for CLUES technologies in An Giang	An Giang	2014	3

Source: CRD

The Center has also provided services for consultancy and technology transfer for local authorities through research findings. The research projects and technology transfer organized by the CRD are shown in Table 3-19.

Table 3-19: List of Research Projects and Technology Transfer that Organized by the CRD from 2007 to 2013 in Mekong Delta River

Research and Technology transfer	Location/ Local authorities	Year	Value (USD)
Planning for New Rural Village model development (5 villages)	Tien Giang	2013	39,750
Study on urban agriculture models at Soc Trang City, Soc Trang Province	Sóc Trăng	2012–2015	31,905
Master plan for socio-economic development of Mang Thit district, Vinh Long province towards 2020	Vinh Long	2010–2012	17,750
Building up the linkage of production and consumption for high quality rice towards GAP standard in Dong Thap	Đồng Tháp	2010–2012	41,515
Study on "New Rural Village" model for Khmer ethnic at Long My, Hau Giang	Hậu Giang	2010–2012	15,000
Investigation, selection, and identification of source of trees and techniques for increasing yield and quality of "Dau Ha Chau"	Cần Thơ	2009–2011	30,000
Trial artificial production *Cirrhinus jullieni*	An Giang	2009–2011	21,106
Purification and demonstration and multiplication of specially rice variety of Nep Than, Nanh Chon, Tau Huong		2007–2011	19,700
Vulnerability assessment of livelihoods in Lower Mekong Basin: Adaptation options for enhancing capacity of people living in the most vulnerable flood-prone areas in Cambodia and Viet Nam	SUMERNET – Sweden	2011–2012	50,000
Investigation of organization forms for rice production and agricultural mechanization in Mekong Delta	IDE, JETRO, Japan	2011	10,000
Participatory Agricultural Extension in Southern Viet Nam (PAEX)	VVOB – Belgium	2008–2012	120,000
Study on sustainable agricultural production models in fresh water zone Go Cong	Tien Giang	2009	15,000
Study on the local community institutions to cope with flood situation in the Mekong region	SUMERNET – Sweden	2008	50,000
Livelihoods and resources use strategies in the Mekong Delta	SUMERNET – Sweden	2007	10,000
Mekong Delta Agricultural Extension Project (MDAEP)	VVOB – Belgium	2001–2007	140,000

Source: CRD

3.5 Priority of Research Programs in CTU's Agriculture, Aquaculture, and Environment Faculties

3.5.1 Agriculture

16 research sub-programs under three (3) research programs that should be strengthened are shown in Table 3-20. (Appendix 3-11: Detailed list of themes and descriptions). The selection of the research themes are done based on the consultation of the JICA Study Team and advisory group meetings held in April 2014. The key concepts for selection are: beneficiaries to MDR and response to climate change.

In the process of scoring each theme, priorities are given from the viewpoints of advantages and potentials of CTU as a resource university in the MDR, urgencies such as adaptations to climate change, feasibilities in terms of producing international publications, and sustainability at CTU as well as consistency with government policies and potential contributions to MDR; A is prioritized over B. In terms of value adding technology development, introducing more

engineering knowledge such as sensors for non-destructive evaluation of agricultural products is strongly recommended.

Interdisciplinary research activities are also anticipated at CTU in order to become an internationally recognized university. In this regard, all themes in the agricultural research field respond to climate changes and hence introduce collaborative analysis, simulation, and evaluation with environmental researchers.

Table 3-20: List of Research Themes and Priority in Agriculture

Program 1: Plant and Animal Genetics and Breeding	
Plant genetics and breeding	
A	Plant resources collection, evaluation and development (rice, other crops, animal forages, etc.)
A	Application of genetic, breeding and cell culture technologies for new varieties of rice and other crops with improved quality and adaptability to climate changes and other environmental stresses
Animal genetics and breeding	
B	Collection, evaluation and development of native animal breeds
A	Application of genetic and breeding technologies for new livestock varieties with improved quality and adaptability to climate changes and other environmental stresses
Program 2: Sustainable Production of Tropical Plants and Animals	
Crop production	
B	Developing integrated crop management (ICP) for improvement of product quality and adaptation to climate changes
Plant protection	
A	Studies on insect pests and diseases and development of alternative plant protection technologies
Soil management	
A	Studies on bio-remediation of MDR problem soil under impacts of climate change
B	Studies on sustainable soil uses
Animal production	
A	Improve animal production systems for higher quality and safety of products
Animal health management	
A	Molecular studies for detection and identification of animal diseases in MDR
A	Microbial and pharmaceutical studies for animal disease treatment
Agricultural modelling	
A	Simulation of metal-organic frameworks (MOFs)
A	Agricultural machineries
Program 3: Food Technology and Post-harvest Technology	
Post-harvest and Logistics	
A	Studies and development of post-harvest technologies for rice, plant and crop based-food products in MDR
Food Processing	
A	Development of value added food products from agricultural products and by-products in MDR
Food Safety and Quality Management	
A	Studies on food pathogens and antibiotics resistant bacteria

Note: A is prioritized over B.
Source: CAAB, edited by JICA Study Team

Additionally, relationships of each research theme to MDR are explained as below.

Table 3-21: Research Themes in Agriculture Field and Relation to MDR

Research Themes		Relation to MDR
1. Plant and Animal Genetics and Breeding		
1.1	Plant resources collection, evaluation and development (rice, other crops, animal forages, etc.)	New varieties of plants are expected by MARD. This research theme pays special attention to climate-change-induced problems in MDR and aims at contributing to enhancement of food security by diversifying plant genetic resources in MDR.
1.2	Application of genetic, breeding and cell culture technologies for new varieties of rice and other crops with improved quality and adaptability to climate changes and other environmental stresses	This research theme aims at developing new varieties that are adaptable to problems caused by climate change in MDR. Adaptation to increased salinity of soil is one of the most urgent issues in MDR in terms of sustainable crop production. This research also aims to increase values of agricultural products according to MARD's development program.
1.3	Collection, evaluation and development of native animal breeds	This research theme contributes to improved animal production through diversification of animal breeds in MDR. Breeding technologies such as applying animal cell technology to sperm studies are to be introduced.
1.4	Application of genetic and breeding technologies for new livestock varieties with improved quality and adaptability to climate changes and other environmental stresses	This research develops reproduction technologies that enable adaptation to climate change and hence contributes to sustainable agricultural productions in MDR. High quality dairy cows and beef cattle production is one of the high-technology applications that MARD's development program anticipates.
2. Sustainable Production of Tropical Plants and Animals		
2.1	Developing integrated crop management (ICP) for improvement of product quality and adaptation to climate changes	This research theme aims to enhance climate-change-adaptability of rice production and other crop production such as fruit, vegetables, and pharmaceutical plants. This research also studies alternative strategies for rice and crop production to avoid serious impacts of climate change in MDR.
2.2	Studies on insect pests and diseases and development of alternative plant protection technologies	Biological impacts of climate change in MDR are gravely serious. This research theme develops biopesticides and other new compounds for crop protection in MDR. The research also studies newly emerging insect pests, prediction and forecast of the outbreak of important plant diseases in MDR.
2.3	Studies on bio-remediation of MDR problem soil under impacts of climate change	High salinity and acidity are serious problems of the MDR soil, partly due to climate change. This research theme includes development of microbial environmental management and application of microbial enzymes for soil remediation.
2.4	Studies on sustainable soil uses	This research pursues morphological studies and classification of the MDR soil for sustainable soil uses in MDR. This research theme also develops organic and bio-fertilizers based on the characteristics of the MDR soil.
2.5	Improve animal production systems for higher quality and safety of products	Enabling adaptation to the environmental stresses is indispensable for animal production in MDR. This research theme includes improvement of animal feed and production systems for better production performance and environmental safety. High-tech applications to livestock are also anticipated by MARD.
2.6	Molecular studies for detection and identification of animal diseases in MDR	This research theme studies emerging diseases, which are induced by climate change in MDR and/or unique to MDR. One of the expected outputs of this research theme is a database of pathogens in MDR.

Research Themes		Relation to MDR
2.7	Microbial and pharmaceutical studies for animal disease treatment	Based on the molecular studies on animal diseases in MDR, this research studies host-pathogen interactions that are vulnerable to climate change and/or other environmental stresses in MDR. The research also conducts screening of indigenous microbial extracts and plant materials for treating animal diseases in MDR.
2.8	Simulation of metal-organic frameworks (MOFs)	Simulation of climate change is intensively conducted at CENRes; joint work is anticipated. This research theme aims at developing agricultural models that relate to CO_2 adsorption and hence contributes to solving environmental problems in MDR.
2.9	Agricultural machineries	This research is jointly conducted with researchers of College of Engineering Technology and produces basic farm machineries for agricultural production in MDR. Machine designs depend on physical conditions such as hydraulics and land levels that are unique to MDR.
3. Food Technology and Post-harvest Technology		
3.1	Studies and development of post-harvest technologies for rice, plant and crop based-food products in MDR	This research theme includes kinetic modeling of food quality attributes for agricultural products of MDR. Simulation of 3D product temperature distribution aims to improve post-harvest technologies for the MDR food.
3.2	Development of value added food products from agricultural products and by-products in MDR	Agricultural products and by-products are vulnerable to environmental stresses including those caused by climate change. This research theme therefore aims to identify nutritional effects and functional components of agricultural products and applies genetics and biochemistry of useful microbes in MDR.
3.3	Studies on food pathogens and antibiotics resistant bacteria	This research aims at identifying pathogens and antibiotic-resistant bacteria, which could be impacted by climate change in MDR. Research outputs should actualize and sustain the quality management of food in MDR.

Source: JICA Study Team

3.5.2 Aquaculture

The following 8 research themes were identified as priority in CTU's CAF. The selection of the research themes are done based on the consultation of the JICA Study Team and advisory group meetings held in April 2014. The key concepts for selection are: beneficiaries to MDR and response to climate change.

In accordance with Meeting Minutes between JICA Advisory Mission and CTU, the priorities were given based on factors such as the degree of urgency, contribution to economic and social development of MDR, and response to global environmental issues. As a result, Theme 1 was agreed to be the most prioritized. The following list is in order of priority.

In terms of consideration for interdisciplinary research, the selected research themes included numerous interdisciplinary themes such as adaptation to climate change, environmental monitoring, engineering and information technology, and socioeconomics (See table below). The detailed description of each theme and expected output is attached in Appendix 3-12.

Table 3-22: List of Research Themes in Fisheries and Aquaculture

I	Climate change: Impacts and adaptation in aquaculture and Fisheries
	1. Impacts of environmental changes on aquatic animal life history, biology, physiology, nutritional value, and health
	2. Adaptation measures to climate changes through selective breeding, environmental manipulation, nutrition and feed improvement, and health management
II	Green technology innovation for aquaculture
	1. Green technology innovation for seed production and farming systems of marine aquaculture
	2. Green technology for seed production and farming systems of for sustainable inland aquaculture
III	Fisheries Resources management and Conservation
	1. Ecophysiology of endangered and stressed species and conservation
	2. Monitoring biodiversity in Mekong Delta and Phu Quoc Island
	3. Sustainable capture fisheries management
IV	Quality improvement of fisheries/aquaculture products
	1. Establishment of evaluation systems for aquatic products safety
	2. Quality improvement of aquatic products in cold chain transportation system
	3. Applied biology in aquatic product processing
	4. Quality improvement of aquatic products by supplementation of natural antioxidants
V	Environmental monitoring for aquaculture and fisheries
	1. Monitoring and management of water and sediment quality (physical-chemical-biological factors) for inland aquaculture in Mekong Delta
	2. Monitoring and management of water quality (physical-chemical-biological factors) for marine aquaculture
VI	Biochemistry and pharmaceutical science in aquaculture and fisheries
	1. Development of eco-friendly supplements to reduce drugs and chemicals used for aquaculture
	2. Development of natural bioactive products as functional food for human and for aquaculture
VII	Engineering and information technology development and application in aquaculture and fisheries
	1. Development and application of engineering equipments and materials for aquaculture and fisheries
	2. Development and application of IT (software, data base and networks) for aquaculture and fisheries
VIII	Fisheries socioeconomics and management
	1. Impacts of environmental changes on socioeconomics of aquaculture activities in Mekong Delta region
	2. Evaluation on the impacts and roles of policies on sustainable development of aquaculture and fisheries
	3. Value chain in aquaculture and fisheries

Source: CAF

Additionally, the relationship with MDR with each research theme is explained below.

Table 3-23: Research Themes in Fisheries and Aquaculture Field and Relation to MDR

Research Themes	Relation to MDR
I. Climate change: Impacts and adaptation in aquaculture and Fisheries	
1 Impacts of environmental changes on aquatic animal life history, biology, physiology, nutritional value, and health	The overall objectives of the research are to enhance capacity of understanding and adaptation solutions to climate change for sustainable development of aquaculture and fisheries in MDR. The research themes address a global environmental issue while promoting adaptation to climate change at a local level. It also takes an interdisciplinary approach.
2 Adaptation measures to climate changes through selective breeding, environmental manipulation, nutrition and feed improvement	
II. Green technology innovation for aquaculture	
1 Green technology innovation for seed production and farming systems of marine aquaculture	The overall objectives of the research are to develop and apply advanced and environmental friendly technology for seed production and farming in order to contribute to innovation and sustainable development of aquaculture in MDR. It will also contribute to environmental protection in MDR.
2 Green technology for seed production and farming systems of for sustainable inland aquaculture	
III. Fisheries Resources management and Conservation	
1 Ecophysiology of endangered and stressed species and conservation	The objective is to assess and better understand ecophysiology of endangered and stressed species for conservation. It will contribute to biodiversity conservation in MDR.
2 Monitoring biodiversity in Mekong Delta and Phu Quoc Island	The objective is to evaluate and monitor biodiversity and gene pools of aquatic species in MDR and marine protected area (including Phu Quoc)
3 Sustainable capture fisheries management	The objective is to evaluate and recommend solutions for sustainable capture fisheries management in MDR. Capture fisheries is still under development in MDR, so the necessity of the research is high.
IV. Quality improvement of fisheries/aquaculture products	
1 Establishment of evaluation systems for aquatic products safety	The overall objectives of the research themes are to strengthen the fisheries products processing sector and enhance food safety management to support the sustainable growth of this important industry in MDR.
2 Quality improvement of aquatic products in cold chain transportation system	
3 Applied biology in aquatic product processing	
4 Quality improvement of aquatic products through provision of natural antioxidants	
V. Environmental monitoring for aquaculture and fisheries	
1 Monitoring and management of water and sediment quality (physical-chemical-biological factors) for inland aquaculture in Mekong Delta	The objective is to assess and improve monitoring and management of water and sediment quality (physical-chemical-biological factors, including disease pathogens) for inland aquaculture in MDR. It will enhance capacity in monitoring and managing the aquatic environment in order to ensure sustainable development of aquaculture in the MDR.
2 Monitoring and management of water quality (physical-chemical-biological factors) for marine aquaculture	The objective is to assess and improve monitoring and management of water and sediment quality (physical-chemical-biological factors, including disease pathogens) for marine aquaculture in MDR. It will enhance capacity in monitoring and managing the aquatic environment in order to ensure sustainable development of aquaculture in the MDR.

Research Themes		Relation to MDR
VI. Biochemistry and pharmaceutical science in aquaculture and fisheries		
1	Development of eco-friendly supplements to reduce drugs and chemicals used for aquaculture	The research objective is to develop and apply eco-friendly supplements to reduce drugs and chemicals used for aquaculture. It will contribute in promoting effective and sustainable development of aquaculture and fisheries in MDR.
2	Development of natural bioactive products as functional food for human and for aquaculture	The research objective is to develop and apply natural bioactive products as functional food for human and for aquaculture. It will contribute in promoting effective and sustainable development of aquaculture and fisheries in MDR.
VII. Engineering and information technology development and application in aquaculture and fisheries		
1	Development and application of engineering equipments and materials for aquaculture and fisheries	The objective is to study, develop and apply engineering technology, automatic equipments and advanced materials for aquaculture and fisheries. It is an interdisciplinary study with engineering. It will help mechanize and modernize aquaculture and fisheries in MDR.
2	Development and application of IT (software, data base and networks) for aquaculture and fisheries	The objective is to study, develop and apply IT (software, database, monitoring and warning systems, GIS and remote sensing and communicate networks) for aquaculture and fisheries management. It is an interdisciplinary study with information technology. It will help mechanize and modernize aquaculture and fisheries in MDR.
VIII. Fisheries socioeconomics and management		
1	Impacts of environmental changes on socioeconomics of aquaculture activities in Mekong Delta region	The overall research objectives are to assess the existing socio-economic status of aquaculture and fisheries; roles of aquaculture and fisheries; impacts of environmental changes such as climate change on aquaculture and fisheries socio-economic and to recommend establishing strategies and solutions for sustainable fisheries sector development in the MDR.
2	Evaluation on the impacts and roles of policies on sustainable development of aquaculture and fisheries	
3	Value chain in aquaculture and fisheries	

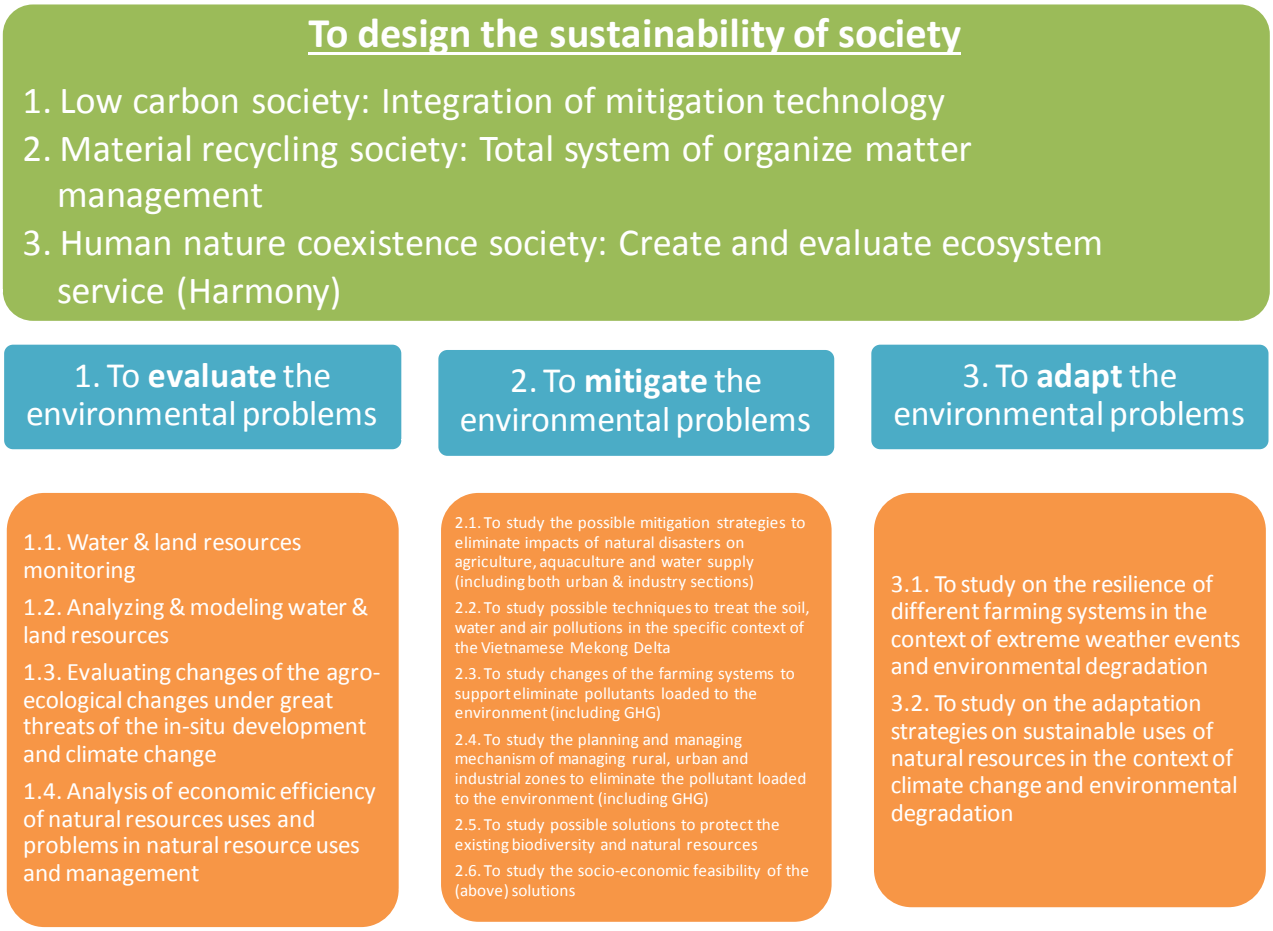
Source: JICA Study Team

3.5.3 Environment

The Environment field of CTU has selected the following 12 research themes. The selection of the research themes are done based on the consultation of the JICA Study Team and advisory group meetings held in April 2014. The key concepts for selection are: beneficiaries to MDR and response to climate change. First they set an overall goal of the environment field of CTU. Then they developed 12 concrete research themes, also categorized under the three large categories (Figure 3-6).

In terms of consideration for interdisciplinary research, the environment fields can play a center role in bridging not only the other two fields in question, but also other related fields such as engineering, environmental economics and social science.

For example, the Environment field suggests the overall goal as overarching research goals which can be applied for even the other two fields (Figure below). Considering the promotion of interdisciplinary research is one of the most important concerns for the study, these themes should be taken as focal issues of research collaboration among the three fields.



Source: CENRes 2014

Figure 3-6: Research Theme of Environment Field of CTU

Table 3-24 shows outline and priority submitted by the CENRes of CTU. Some of the themes have already produced publications while others are yet to produce papers. Appendix 3-13 shows more details on the conditions of each theme.

These priorities are given from the viewpoints of advantages, potentials, and sustainability at CTU as well as consistency with government policies and potential contributions to MDR.

Table 3-24: Research Themes and Priority of Environment Field of CTU

Research Themes		Priority
1. To recognize current problems, evaluate impacts and project trends of changes in the field environment and natural resources in the Vietnamese Mekong Delta		
1.1	Water & land resources monitoring	10
1.2	Analyzing & modelling water & land resources	10
1.3	Evaluating changes of the agro-ecological changes under great threats of the in-situ development and climate change	9
1.4	Analysis of economic efficiency of natural resource uses and problems in natural resource uses and management	8
2. To study the mitigation of environmental impact		
2.1	To study potential mitigation strategies to eliminate impacts of natural disasters on agriculture, aquaculture and water supply (including both urban & industry sections)	8
2.2	To study possible techniques to treat soil, water and air pollution in the specific context of the Vietnamese Mekong Delta	10
2.3	To study changes of the farming systems to support elimination of pollutants added to the environment (including GHG)	10
2.4	To study the planning and managing mechanism of rural, urban and industrial zones to eliminate the pollutant added to the environment (including GHG)	9
2.5	To study possible solutions to protect the existing biodiversity and natural resources	8
2.6	To study the socio-economic feasibility of the (above) solutions	8
3. To study the resilience and adaptive capacity of local residents in the context of environmental changes		
3.1	To study the resilience of different farming systems in the context of extreme weather events and environmental degradation	8
3.2	To study the adaptation strategies on sustainable uses of natural resources in the context of climate change and environmental degradation	9

Source: CENRes, edited by JICA Study Team

Additionally, the relationship with MDR with each research theme is explained below.

Table 3-25: Research Themes in Environment Field and Relation to MDR

Research Themes		Relation to MDR
1. To recognize current problems, evaluate impacts and project trends of changes in the field environment and natural resources in the Vietnamese Mekong Delta		
1.1	Water & land resources monitoring	The research theme uses remote sensing technologies and it monitors MDR from the viewpoints of numerous regional and global environmental problems in soil, water, air and so on. Therefore, it is of great benefit to MDR. CTU has ample experience in this theme and the joint research with Japanese university is beneficial to MDR as CTU can use better data.
1.2	Analyzing & modeling water & land resources	The research theme uses the data from 1.1 and it analyzes and models the water and soil resources. It is of great benefit to MDR as it can propose the base for the solutions to MDR's environmental issues. It has interdisciplinary traits among the other two fields in question. CTU CENRes has ample experience in this theme and joint research with Japanese universities is beneficial.
1.3	Evaluating changes of the agro-ecological changes under great threats of the in-situ development and climate change	The research theme evaluates the agro-ecological changes affecting the crop conditions caused by global environmental challenges. It includes interdisciplinary research with agriculture field. It mostly uses MDR for field studies, which are expected to be of great benefit to MDR.

Research Themes		Relation to MDR
1.4	Analysis of economic efficiency of natural resource uses and problems in natural resource uses and management	The research theme focuses on economic efficiency of natural resources and its use/management. It contains interdisciplinary research with agriculture, aquaculture/fishery, economics, and soil fields. For pursuing this theme, here MDR is used for ideal field studies, as MDR is full of various natural resources.
2. To study on the mitigation of environmental impact		
2.1	To study potential mitigation strategies to eliminate impacts of natural disasters on agriculture, aquaculture and water supply (including both urban & industry sections)	The research theme aims to eliminate impacts of natural disasters such as record heats, droughts, storms, floods, and fires etc., occurring in the fields of agriculture, aquaculture/fishery, and water resources in MDR, and it is beneficial in catering to these issues. It is an interdisciplinary research among agriculture, aquaculture/fishery, and environment. The theme targets the urban areas, a newer field to be enhanced for the college.
2.2	To study possible techniques to treat soil, water and air pollution in MDR	The research theme is to study the technologies to upgrade environmental conditions in MDR. MDR possesses a great variety of natural resources and the theme is important for the enhancement of the engineering field. CTU CENRes's achievements in this field in the past are larger than other themes.
2.3	To study changes of the farming systems to support elimination of pollutants added to the environment (including GHG)	The research theme aims the environmental-friendly farming systems and it shows an ideal collaboration of environment and agriculture fields. The theme is highly important for local environmental issues and MDR as well as global environmental challenges.
2.4	To study the planning and managing mechanism of rural, urban and industrial zones to eliminate the pollutant added to the environment (including GHG)	The research theme aims to mitigate GHG emissions and environmental pollutants in MDR. As it tries to reduce GHG emissions and the environmental pollutants in the area, the benefits to MDR are sought. Collaboration with the agriculture field is needed and is beneficial for global environmental issues.
2.5	To study possible solutions to protect the existing biodiversity and natural resources	The research theme focuses on solutions for protecting biodiversity and natural resources. MDR needs to face various environmental challenges such as record heats, droughts, storms, floods, and fires etc. Therefore the theme is important in terms of MDR beneficiaries, and interdisciplinary research possibilities. CENRes's experiences in this theme in the past are relatively small. The theme in the past dealt with an invasive plant.
2.6	To study the socio-economic feasibility of the (above) solutions	This research theme focuses on the socio-economic feasibility of the solutions mentioned in 2.5. CENRes and other environmental fields in CTU have no achievement so far on this theme. Collaboration with the field of economics is about to begin.
3. To study the resilience and adaptive capacity of local residents in the context of environmental changes		
3.1	To study on the resilience of different farming systems in the context of extreme weather events and environmental degradation	The research theme deals with the resilience of agriculture in the context of adaptation issues applied to MDR. It anticipates collaboration with the agriculture (and some aquaculture/fishery) fields and it is highly important as it responds to the changes in food production, land use, and other socio-economic aspects and it contributes to the further development of MDR.

Research Themes	Relation to MDR
3.2 To study on the adaptation strategies on sustainable uses of natural resources in the context of climate change and environmental degradation	The research theme looks at the sustainable uses of natural resources and it answers the adaptation issues applied to the MDR. It shows large contributions to adaptation issues such as changes in food production/land use, and other socio-economic related issues and it contributes to the further development of MDR. The collaborations with Japanese universities are useful in terms of data sharing.

Source: CENRes 2014

3.6 University Management

3.6.1 University Management

In Viet Nam, there seems to be a trend of decentralization in the higher education sector, as a form of university autonomy. MOET is also promoting university autonomy to all universities under MOET. CTU also requested MOET to expand their autonomy (Appendix 3-14). University autonomy is in-process by degrees at CTU as well, as most decisions regarding university management are made by the Rectorate Board. MOET's authority in the past is transferring to the Rectorate Board. As of April 2014, CTU management is mainly functioning by the Rectorate Board, composed of a Rector and five Vice Rectors of CTU. In addition, CTU set up the Academic and Science Board as Advisory Committees. The Academic and Science Board (Advisory Committees) advise Rector Board for their decisions. The Board consists of 25 members; some are members of CTU, others are outside CTU, such as the representatives from industries and community (see Appendix 3-15).

According to the Strategic Plan for Development (2007–2020), University Council for CTU will be established, and the decision making function will be transferred from the Rectorate Board to the University Council in the future.

According to the interviews with Graduate School, some items listed below are time consuming since they cannot decide only by the CTU Rectorate Board and Advisory Committee. MOET's approvals are necessary to decide such issues.

- Establishing new programs
- Increase tuition and salary standards

Establishing new programs requires a large amount of time in general; however, CTU had some experience in establishing new programs including advanced program in the past. On the other hand, CTU has no experience in changing the university financial base, such as tuition and salary standards. This type of revision, fundamental change in university financial base, might be considered in the future to implement CTU's education and research activities at international levels.

For revenue of the current CTU, around 50% is own income such as tuitions and others, and around 50% is subsidized from MOET. Research funds gained from outside are not included in the CTU revenue account. External research funding was approximately 10%–17% of CTU's own income in 2009–2012, but was equivalent to about 7% in 2013. Approximately 30% of the current CTU expenditure is made up of labor costs. The breakdown of CTU expenditure other than labor cost is as follows: about 30% is ordinary expenses, 10%–20% is construction costs, equipment costs make up 5%–8%, and about 2% is expenditures for operation and maintenance cost.

To be an internationally recognized university, CTU is striving to enhance education/ training and research capacity. During the survey term, the university management and governance team highlighted the following three items; quality assurance, research management and technology transfer, and education program development management. In addition, supporting staff has less opportunity to join training and study abroad; they consider that the supporting staff capacity needs to be improved.

3.6.2 Human Resources Management and Development

(1) CTU's Strategy and Vision for Human Resource Development

Based on the "CTU Overall Strategic Development Plan 2007–2020", approved by MOET, CTU created the "Human Resource Development Plan 2008–2015", aiming to develop global standard human resources to extend the scale and improve the quality of the education of CTU. Furthermore, on that basis, each college and school created their own development plans. In 2013, CTU started creating the 2014–2022 version by making small adjustments to the "CTU Overall Strategic Development Plan 2007–2020" to conform to the actual situations; however, CTU has not submitted it to MOET yet.

CTU aims to improve the quality of its staff members, by increasing the proportion of teaching staff with graduate degrees (doctorate degrees, in particular), and improving foreign language skills, especially English. It aims to increase the proportion of teaching staff with graduate degrees up to at least 97% by 2022 from the current level of 77.5%. In particular, the percentage of teaching staff with doctorate degrees is aimed to increase to 62% by 2022 from the current level of 22%.

CTU plans to achieve the goals by sending its teaching staff abroad to acquire graduate degrees, in addition to promoting acquisition of degrees in Viet Nam. In particular, CTU plans to send 546 teaching staff members abroad to acquire graduate degrees from 2014 to 2022 (428 teaching staff members for Ph.D. study). Total cost for sending these members abroad is estimated to be 409,080 million VND. The main resource for sending staff abroad other than this JICA ODA loan project is Program 911 which is a Vietnamese Government scholarship program, targeting university lecturers. However, the scholarship is open for the whole country and quotas cannot always be allocated and guaranteed to CTU. Destinations to study abroad under Program 911 are not fixed to just Japan, but many countries in Europe, North America and Asia.

Furthermore, CTU aims to increase the number of staff members to 2,174 by 2022 from the current level of 1,673 (as of December 2013).

As recent progress of these development plans, for example, 42 teaching staff members acquired graduate degrees in 2013, and its rate increased by 3.8%. However, in order to achieve CTU's objective by 2022, 775 more teaching staff members, which are approximately four times higher than the current number of Ph.D. holders at CTU, need to acquire Ph.D. degrees by 2022. This means that every year approximately 86 teaching staff members have to acquire Ph.D. degrees, and its pace is two times faster than that of 2013. It is difficult to achieve the objectives with only CTU's resources, and thus support from abroad is needed.

(2) Personnel System

In accordance with the "Advanced Promotion Procedure of CTU Lecturers," a code of the CTU based on the Vietnamese Government's decision (Decision No.58/2010/QD-TTg), teaching staff of CTU are required to acquire master's degrees starting from 2014, and furthermore, teaching staff under 41 years of age are required to acquire doctorate degrees (5870/QĐ-ĐHCT).

In addition, it requires sufficient English skills and information skills to meet the qualification standards of teaching staff. The Vietnamese Government also sets requirements for supporting staff at universities on the same decision. According to a requirement, the respective head of four departments at the supporting unit, namely, Academic Affairs, International Relations, Scientific Research Management and Personnel, are required to be a lecturer with at least 5 years working experiences. To be a lecturer, it is required to hold a Master's degree as mentioned above. Therefore, CTU needs to train potential human resources in the departments by promoting acquisition of Master's degree. The Vietnamese Government requires universities to lay out recruitment and training plans for their supporting staff to meet the above-mentioned requirements. Training of supporting staff is also a pressing need for CTU.

CTU guarantees minimum wage depending on the positions in accordance with the CTU's code, the "Internal Expenditure Regulation of CTU" (Decision 6294/QĐ-ĐHCT dated 31/12/2013), however, the wage for associate professors is, for example, still about 520 USD on a monthly basis. While the retention rate of staff members is high, because of low wage, some members quit to join the private sector after obtaining doctorate degrees, especially in the engineering field. The salary of teaching staff is determined based on the standards of MOET, and it cannot be changed at the discretion of CTU. However, CTU is considering increasing the salary together with the tuition fees in the future.

The term of employment contract for a new teaching staff member will be extended in incremental steps, starting from the probationary period, which lasts for 3 months, and the period of contract becomes longer, from one year, three years to permanent. When a non-permanently employed staff member goes abroad to study, an employment contract with a longer period than the period of study will be made before studying abroad. After returning to Viet Nam, the staff member is required to stay at CTU at least three times the period that he/she stayed abroad to study according to the regulations of the Vietnamese Government.

The interval between personnel changes is relatively long, and it is not so uncommon to work at the same section for 10 years. The term of the rector is five years. The current Rector Toan took office in 2012 so his term of office is until 2017.

There are some cases in which teaching staff members are transferred to the Supporting Unit as managers. In such cases, a portion of teaching is decreased, yet they are still required to handle both teaching/research and administrative work. Managers originally from faculties and currently in charge of administration are not always specialized in governance and management of university, therefore, they are striving to manage administrative and management works in their own ways.

(3) English Proficiency

The result of the field survey showed that English proficiency of staff members in the 3 targeted faculties were relatively high as nearly half of them had IELTS score of 6.0 or equivalent which are the minimum requirements for Ph.D study in Japan.

(4) Study Abroad Experiences

Belgium has been the most popular destination among CTU staff members studying abroad according to statistics collected by CTU since 2001 (Table 3-26). Many staff members studied and earned a Ph.D. degree in the country while a project was undertaken by the country and CTU from 1998 to 2008. Belgium was the most popular destination in the field of agriculture and aquaculture, while Thailand hosted the largest number of staffs members for environment related studies (Table 3-27). Japan hosted the second largest number (12 people) of staffs in agriculture after Belgium. Overall, a majority of CTU staffs studied in European countries such

as Belgium and Netherlands and Asian and Oceanian countries such as Thailand, Australia, and Japan.

Table 3-26: Top 10 Popular Destinations among CTU Staff Members Studying Abroad (Statistics since 2001)

		Already acquired			On going			
Rank	**Country**	**Ph.D.**	**MSc**	**Total**	**Ph.D.**	**MSc**	**Total**	**Total**
1	Belgium	22	29	51	27	2	29	80
2	Australia	7	34	41	21	6	27	68
2	Thailand	7	47	54	8	6	14	68
3	Netherlands	26	31	57	9	0	9	66
4	France	20	19	39	15	3	18	57
5	Japan	17	15	32	10	6	16	48
6	Taiwan	6	14	20	7	16	23	43
7	Korea	9	12	21	11	4	15	36
8	Germany	10	8	18	7	2	9	27
9	U.S.A	4	11	15	9	0	9	24
10	Malaysia	6	7	13	0	1	1	14

Source: CTU Statistics

Table 3-27: Top 3 Popular Destinations among CTU Staff Members Studying Abroad in the Three Fields

Rank	**CAAB**		**CAF**		**CENRes**	
1	Belgium	25	Belgium	20	Thailand	15
2	Japan	12	Thailand	17	Netherlands	14
3	Germany/Sweden	7	Malaysia	10	Denmark/Germany	8

Source: CAAB, CAF, CENRes

(5) Available Scholarship Programs

As shown in Table 3-28, many scholarship programs are available at CTU. The highest number of staff members have been sent out so far by a scholarship program “Program 911” offered by the Vietnamese Government, followed by the second popular program offered by Australia, Australia Development Scholarship “ADS.” In addition to regular scholarship programs, CTU utilizes the scholarship programs associated with some projects with foreign countries. Through such programs, some staff members have studied in Belgium and Netherlands in the past. MHO, a project co-sponsored with Netherlands, has already completed in 2004. The next phase of “VLIR” a project co-sponsored with Belgium, is planned to focus on the establishment of international programs of Master’s and Doctoral levels in the fields of Fisheries and Food technology, and studying abroad is not included in the project activities. Any of the scholarship programs listed in Table 3-28 is highly competitive, and it is expected to be difficult to achieve the goal of the CTU Overall Development Plan 2014–2022, which is to increase the percentage of teaching staff with doctorate degrees to 62% by 2022, based only on these programs.

Table 3-28: Available Scholarship Programs at CTU

Name	Provider	Dispatch destination	Field of study	Degree	Project Period
Project 911	VN government	All countries	All fields	Doctors	2010–2020
ADS Scholarship	Australian Government	A11 Australian universities	All fields	Doctors, Masters	Quotas every year
Fulbright Scholarship	US government	All American universities	Economics, Chemistry, Pharmacy	Doctors, Masters	Quotas every year
Lotus	Europe	Belgian, Dutch, German, British, French, Portuguese universities	All fields	Doctors, Masters	Quotas every year
MEXT Scholarship	Japanese Government	All Japanese universities	All fields	Doctors, Masters	Quotas every year
JDS	JICA	8 Japanese universities	7 fields	Masters	2013–2016
Scholarship of two government agreement	Hungary	Hungary	All fields	Doctors, Masters	Quotas every year
Scholarship of two government agreement	Romania	Romania	All fields	Doctors, Masters	Quotas every year
NZAID scholarship	New Zealand Government	New Zealand	All fields	Doctors, Masters	Quotas every year
NUFFIC Scholarship	Dutch Government	Dutch	Economics, English, Education	Doctors, Masters	Quotas every year

Source: CTU Department of Personnel

(6) Internal Training Programs in CTU

CTU provides its own internal training programs for human resource development. For instance, it offers English training for those who want to get a graduate degree, and management training for newly promoted managers. For English training, outstanding young CTU staff members are selected to take free English lessons in the Center for Foreign Language on campus for three months.

3.6.3 Quality Assurance

Quality Assurance (QA) is one of the target processes for CTU to be recognized as an institution which offers programs of international standards. CTU established Quality Assurance and Testing Center (QATC) in 2006, to work on EFQM (European Forum of Quality Management) and other international standards. Originally, internal assessment was conducted based on MOET-QA; CTU started internal assessment in 2008. Then, CTU introduced AUN-QA system in 2009. Since 2010, CTU has focused on ASEAN University Network Quality Assurance (AUN-QA); it is assumed that CTU presently targets the level of standard of Asia. The standard of AUN-QA and MOET-QA can be seen in Appendix 3-16. All the internal assessments till 2013 are of undergraduate level. CTU is planning to conduct internal assessment for graduate level programs in 2014.

Table 3-29: CTU Internal Assessment for QA

Academic Years Program	2008	2009	2010	2011	2012	2013
MOET QA	15	15 (*)	0	0	0	0
AUN QA	0	12	16	11	12 (**)	13

Source: PPT by QATC

(*)15 programs were externally assessed by Vietnamese experts, and accredited with MOET Standards.

(**) 2 programs with good results were externally assessed by AUN-QA

In 2012, CTU conducted external assessment for two programs as seen in the following list. The programs assessed by external members were those with good scores in the CTU internal assessment. The programs receiving a score of 4.0 or more by external members meet the standards of accreditation. Agricultural Economics Program met the standard, but the Electrical Engineering Program has not yet. The number of accredited programs at CTU is just one as of 30 April 2014; moreover, AUN accredited only three universities in Viet Nam, VNU-Hanoi, VNU-HoChiMinh, and CTU.

Table 3-30: CTU External Assessment Results by AUN QA

Name of Program	Providing School/ College at CTU	Result of external assessment of AUN
Bachelor of Science, Electrical Engineering Program	College of Engineering Technology	3.9/7.0 (Not yet accredited)
Bachelor of Science, Agricultural Economics Program	School of Economics & business administration	4.0/7.0 (Accredited)

Source: interview with QATC

CTU is planning to conduct an external assessment in 2014 of the following two programs.

1) Advanced Aquaculture Programme (BSc)
2) Advanced Biological Programme (BSc)

As the future plan in the presentation document from QATC, CTU will conduct internal assessment for 10 programs per year, and 2 out of the 10 programs will be externally assessed each year. In addition, CTU targets 18 programs to be accredited by external organizations such as AUN and ABET by 2020[64].

3.6.4 Scientific Research Management and Technology Transfer

Scientific research should be the core activity of CTU in order to become a research university. It is expected to increase the number of research activities, as well as journal publications, especially at international levels. In addition, it is ideal that the outputs of the research be utilized in technology transfer. The current condition at CTU is as follows:

(1) Competitive Research Fund at CTU

CTU has acquired research funds from external sources, the amount of which has increased along with the number of the researches compared to 5 years ago. Reviewing the research fund of the last 6 years, the major source is local government, which accounts for around 50-80% of the total amount of external research fund.

CTU receives competitive research funds from government, MOET, DOST from Mekong regional provinces mainly, and companies. Based on Tables 3-20, 3-21, and 3-22, the facts are as follows.

- Last year (2013), the external fund was VND20,589,640,200 or USD 980,459
- The highest amount between 2008–2013 was VND32,028,643,000 or USD 1,525,173.48 (2011), and the lowest VND14,042,068,000 or USD 668,669.90 (2008)
- The average amount gained last 6 years (2008–2013) was VND22,564,982,533 or USD 1,074,522.98

[64] Minutes of Meetings between CTU and JICA, April 25, 2014, p.2

- Around half of the research fund depends on 3 main colleges, CAAB, CAF, and CENRes.

In addition to external funds, CTU allocates some budget for CTU research activities (Appendix 3-17).

Table 3-31: CTU Research Fund by Year and by Source

Unit: thousand VND

		2008	2009	2010	2011	2012	2013
External	National Fund	-	2,570,000	4,203,000	3,333,000	4,480,000	500,000
	Ministries	2,119,000	6,053,660	8,438,595	16,343,070	9,914,860	6,251,549
	Local Government	11,629,400	8,355,572	17,866,314	15,685,573	16,867,129	13,918,912
	Company	293,668	466,164	132,750	-	634,500	419,179
External Fund Total		**14,042,068**	**14,875,396**	**26,437,659**	**32,028,643**	**27,416,489**	**20,589,640**
CTU Research Fund		288,100	1,508,040	1,719,000	5,057,300	6,303,426	5,902,897
Total Research Fund		**14,330,168**	**16,383,436**	**28,156,659**	**37,085,943**	**33,719,915**	**26,492,537**

Source: Data from Department of Research Affairs

(2) Journal Publication

To become a research university, CTU has increased the number of international journal publications. Reviewing the last three years' journal publication information, the number[65] of international journal publications and proceedings increased, while, that of national decreased.

In 2013, the first author journals by CTU staff are around 72.5% (143 out of 197) for international, and 75.5% (263 out of 348) for national journals and proceedings.

As for the number of three main colleges, CAAB, CAF, and CENRes[66], the number of international journal publications has been almost the same from 2011-2013, while, that of national has decreased. The three main colleges make up around 50% of the annual total number of journals at CTU, in both national and international journals.

(3) Patent

As of April 2014, CTU has 13 copyrights, and most of them are software. CTU has no patent registration. CTU applied for two patents for items related to the field of agricultural as mentioned below and is waiting for the results;

1) Sugar processing from juice of palm flower;
2) Multi-nutrient cake for animal feeding (cow and buffalo).

According to CTU Department of Research Affairs, CTU did not think of acquiring patents, since it is costly and time consuming. CTU has several license agreement contracts with companies for the invention of CTU, and would like to further continue to do so. CTU would like to continue as it is, serving local people, while, CTU's Research Affairs Department needs the patent numbers, as it is important in being recognized as a research university. The Department will work for patent application for the future.

[65] The number is the journals and proceedings qualified the standards of CTU, counted by Department of Research Affairs; some numbers maybe different from that of from School/ College.
[66] CENRes: 2 international journals in 2011, but 15 journals in year 2012 and 2013.

(4) Technology Transfer

The function of Department of Technology Transfer used to be a part of the Department of Research Affairs. In 2012, CTU established the Department of Technology Transfer, focusing on the services and training for those not enrolled at CTU. The Department is a part of the university's income generating functions, along with the Publishing House. In the future, the Department may work to promote university products. The current main task of this Department is to summarize financial records based on all activities at CTU, and report to CTU. All the units have to report their financials to the Department of Technology Transfer at the end of the fiscal year. The net income by technology transfer and training is allocated to university (60%) and the offering department[67] in school (40%). University counts the amount as university income. The department can use the fund for their own purpose, such as maintenance, salary for contract staff, equipment and so on. The total net income in 2010–2013 was around USD 700,000 (VND12–13 billion); around USD 420,000 was included as university income. (Detail is given in Appendix 3-18).

The people outside CTU can contact and request activities either through their school/college or Department of Technology Transfer of CTU. Promotional activities are also supposed to be conducted by the Department of Technology Transfer, but CTU does not yet promote their inventions systematically.

Hoa An Center for Technology Transfer requesting assistant from JICA will function in a way similar to the Department of Technology Transfer. According to the interview at CTU, however, Hoa An Center for Technology Transfer work for both research activity and technology transfer, and the targeted fields are agriculture, aquaculture and environment, and the activity of interdisciplinary field, which is also the target of establishing College of Rural Development. On the other hand, Department of Technology Transfer will handle all other fields, focusing on technology transfer, training, and services. Therefore, CTU stated that the function of Hoa An Center will not overlap with others.

3.6.5 Education Program Development and Management

The Education Program needs to be developed to meet the requirements of being an international level, research focused university. CTU is planning to improve graduate programs. At the same time, CTU is also considering upgrading undergraduate programs from the point of view of laying the foundation for graduate level studies.

Graduate School at CTU takes care of graduate level education programs, while Department of Academic Affairs at CTU takes care of undergraduate education programs. Common facts in education programs in both graduate and undergraduate levels are as follows:

- Revise curriculum every 3–5 years; minor revisions, such as change of subject name, lecturers, and credit hours, can be revised every year.
- Utilize credit system
- Introduce some compulsory subjects[68] to abide by MOET regulation
- Assign each academic department in preparing contents and syllabus, which is then modified by the department

[67] The all net income for Department of Technology Transfer is transferred to CTU, since their main activities are considered for CTU.

[68] Compulsory subjects required by MOET for undergraduate programs are 1) military training, 2) physical education, 3) foreign language, 4) basic science and 5) political science (philosophy: Marxism-Leninism 1 & 2, Ho Chi Minh thoughts, Revolutionized way of Vietnamese Communist Party). Political science (philosophy) is also the requirement for graduate programs.

Establishing a new program (at graduate and undergraduate levels) takes around 1–2 years from the preparation stage till approval is obtained from MOET. CTU has some experience in setting up new programs in the past, including advanced programs and foreign degree programs in Viet Nam. (The short summary is seen Appendix 3-19)

3.6.6 Strengths and Weaknesses of CTU

Based on the Previous Section, the JICA team the strengths and weaknesses of CTU.

(1) Strengths

1) Quick and strong decision making process

Quick and strong top-down decision making process is also an advantage for efficient decisions. The Rectorate Board adequately manages the CTU staff of around 2,000 members. More things are decided and managed at university level; autonomy is not affected within the current organization structure.

2) Research fund allocation

CTU is preparing and implementing some actions in order to become a research university. Reviewing CTU's status of research fund acquisition, university research fund allocation by internal fund, and staff evaluation policy (Appendix 3-20) based on output of research and education activities, it is clearly seen that CTU is planning and moving towards becoming a research university.

3) Basis for implementation of human resources development program.

CTU has the following advantages in implementing a human resources development program. It means that CTU has a basis for smoothly carrying out the program.

1. CTU has actively tried to promote internationalization of university as relatively many teaching staff members have obtained a Master's or Ph.D. degree abroad.
2. Based on networks of personal contacts, CTU has strengthened the networks and cooperation with foreign universities including ones in Japan.
3. Some teaching staff members have experience of studying abroad in Japan including the Vice Rector Dung.
4. A number of study abroad programs are available, and CTU has actively worked with other donors.
5. CTU is active in sending teaching staff members abroad as well as accepting foreign experts through its cooperation with other donors.

(2) Weaknesses

Reviewing the CTU policies and information, CTU is clearly moving towards a research university; however, some activities have just started and not much output can be seen at this moment, such as patent application and other IPR and technology transfer, educational quality assurance, and staff quality in administration.

1) Patent and other IPR management and technology transfer

Patent application has not been an item of focus as yet. Department of Research Affairs recognizes its importance, and set up the goal to acquire 40 patents (assuming from the number of applications) by 2020, but the steps towards achieving the target number have not been taken.

2) AUN-QA

Preparing AUN quality assurance activities has just started recently; so far, only one program was externally accredit by AUN in 2014. CTU will work actively from now on to prepare documents for several basic inquiries related to education and research activities.

In AUN-QA standards, some viewpoints are evaluating supporting units, such as supporting staff quality, library facility, student assessment, and stakeholders' satisfaction.

3) Standards for Admin Staff

Compared to the teaching staff, the administrative staff has no standards for evaluation of their work load. The teaching staff has standardized scale to demonstrate their workload and/ or output in education and research activities.

4) Lack of human resource

1. The proportion of teaching staff members currently holding a Ph.D. degree is inadequate to achieve CTU's strategic development plan 2014–2022.
2. There is a small middle age group among faculty members with disparate age composition.
3. There is a small number of highly professional supporting staff members who specialize in the field of public administration or management.
4. Faculty members are sometimes assigned administrative tasks in addition to teaching, as a result, they spend less time in research and publication work.

3.7 Facilities – Current Situations and Issues

3.7.1 Outline of CTU's Current Campuses

CTU currently consists of 3 campuses in Can Tho City (Campus-1, -2 and -3), Hoa An Campus (which is located 30 km southwest of Can Tho City, in Haugiang Province) and other 3 auxiliary campuses. The following section describes the current situations of Campus-2 and Hoa An Campus, which will be improved by the Project.

3.7.2 Current Situation of Campus-2

(1) Number of Students and Academic Staff Members

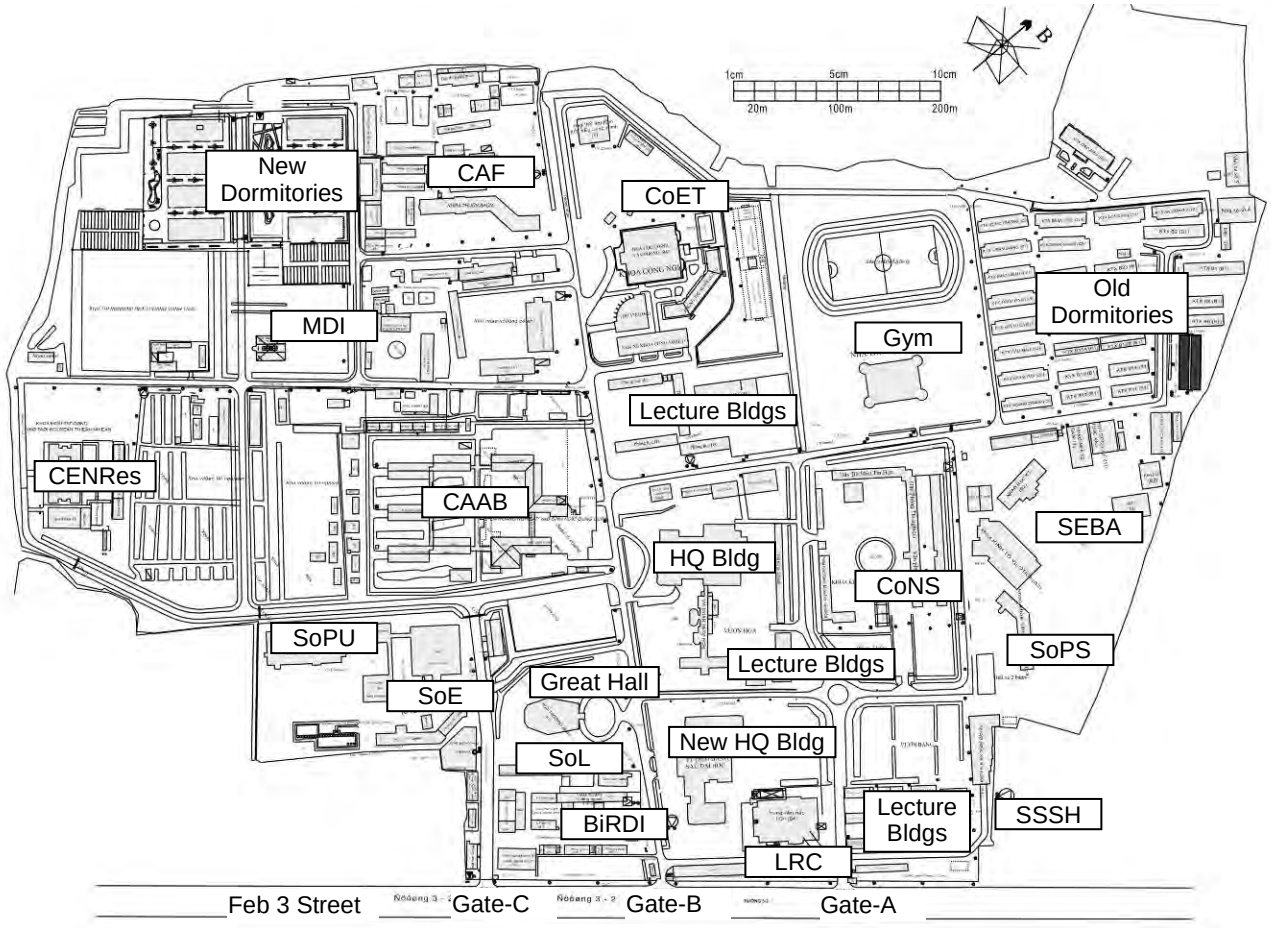
Table 3-32: Number of Students and Academic Staff of Each Faculty

		No. of Students			No.of Academic/ Administration Staff	Total
	Faculty/School	Under-graduate	Master	Doctor		
College	Agriculture & Applied Biology (CAAB)	2,960	434	77	162	3,633
	Aquaculture & Fisheries (CAF)	1,449	185	39	68	1,741
	Environmental & Natural Resources (CENRes)	1,116	235	37	61	1,449
	Engineering & Technology (CoET)	4,692	9	0	194	4,895
	Natural Sciences (CoNS)	1,305	341	0	122	1,768
School	Education (SoE)	3,744	360	0	207	4,311
	Law (SoL)	1,285	133	0	67	1,485
	Political Science (SoPS)	384	0	0	37	421
	Social Science & Humanities (SSSH)	2,135	31	0	97	2,263
	Economics & Business Administration (SEBA)	4,498	895	36	131	5,560
	Pre-university (SoPU)	95	0	0	14	109
	Graduate	0	0	0	10	10
Department	Physical Education	327	-	-	22	349
Institute	Biotechnology Research & Development (BiRDI)	687	98	32	30	847
	Mekong Delta Development Research	54	140	5	19	218
Others	Administration Staff	-	-	-	283	283
Total		24,731	2,861	226	1,524	29,342

Source: CTU

(2) Existing Facilities

Figure 3-7 shows major existing buildings and Table 3-33 shows their outlines. New Headquarters (Administration Building) funded by MOET is now under construction and is scheduled for operation from the end of 2014.



Source: JICA Study Team

Figure 3-7: Existing Facility Layout, Campus-2

Table 3-33: Major Buildings of Each Faculty, Campus-2

Faculty/School	Floor Area (m^2)	No. of Floors	Construction Year	Faculty/School	Floor Area (m^2)	No. of Floors	Construction Year
CAAB	13,107	1F, 2F, 3F	1996 - 2010	BiRDI	3,870	1F, 2F, 3F	1975 - 2003
CAF	10,309	1F, 2F, 4F ,5F	1978 - 2010	MDI	3,841	1F, 2F, 3F	1986 - 2011
CENRes	4,983	1F, 3F	2006 - 2011	LRC	7,560	4F	2,005
CoET	19,836	1F, 2F, 3F, 4F	1978 - 2012	CSTT	1,756	1F, 3F	1998 - 2011
CoNS	9,649	1F, 2F, 3F	1997 - 2010	Lecture Bldg	15,308		
SoE	6,257	3F	2003, 2006	Headquarter	5,771	2F	1,992
SoL	1,200	2F	2000	Great Hall	2,200	2F	1,989
SoPS	3,011	3F	2006	Gymnasiums	4,965	1F, 2F	1991, 2012
SSSH	2,331	3F	2011	Old Dormoitories	13,531		
SEBA	5,551	1F, 2F	1996 - 2000	New Dormitories	14,004		1999 - 2003
SoPU	3,086	3F	2013	Others	4,571		
Graduate School	1,574	2F	2001				Total 158,270

Source: CTU

(3) Current Situations of the Infrastructure

Electricity

- Can Tho City's electric company's overhead power lines (22 kV, 50 Hz) are installed in the campus. The high-voltage power is transformed to low-voltage power at 13 transformers located within the campus, and distributed to each building.
- The high-voltage power lines and transformers are owned by the electric company, and secondary (low-voltage) power lines are owned and managed by CTU.
- Only the Main Auditorium, Headquarters Building (IT department) and Learning Resource Center (LRC) have emergency generators.

Telephone

- The telephone company's overhead lines are installed in the campus, and telephone and LAN lines are provided only to necessary buildings from those overhead lines.

Water Supply

- There are 6 tapping points from the city water main along the main street, and 2 along the northeast road. Supply water quality is managed by the Can Tho City water authority. The water supply is sometimes suspended by damage of underground supply pipes within the campus.
- Each building has its own reservoir tanks, pumps and elevated tanks.
- There are exterior fire hydrants within the campus, and they are directly connected to the water supply main. Relatively new buildings have fire hydrant systems, and LRC has sprinkler systems. There is no central hot-water supply system in the campus.

Drainage

- Wastewater, along with rain water, is discharged to open ditches after being treated at each septic tank. The open ditches are connected to the city drainage main pipe and Zang Xang Canal.
- Water in the open ditch is stagnant, and some portions are covered with aquatic plants.
- Laboratory wastewater is discharged after neutralization treatment at each building. The CAAB's treatment plant is out of order. Primary waste is collected by a specialized company.

Air-conditioning

- Only limited rooms have air-conditioning systems, and most of the lecture rooms have ceiling fans. Air-cooled air-conditioning systems are commonly used, and there is no centralized cool water supply system.

Waste Disposal

- General waste is collected by private companies at each collecting point every day, and there is no incinerator inside the campus.
- Laboratory waste is regularly collected by Sao Viet Co. (in Ho Chi Minh City).

(4) Current Situation of the Relevant Faculty

College of Agriculture & Applied Biology (CAAB)

- Number of Students and Academic Staff Members

Founded in 1968, CAAB is the oldest faculty in CTU. CAAB consists of 8 departments and accepts approximately 700 undergraduates and 180 post-graduate students per year. Table 3-34 shows the current number of undergraduate and post-graduate students of each course.

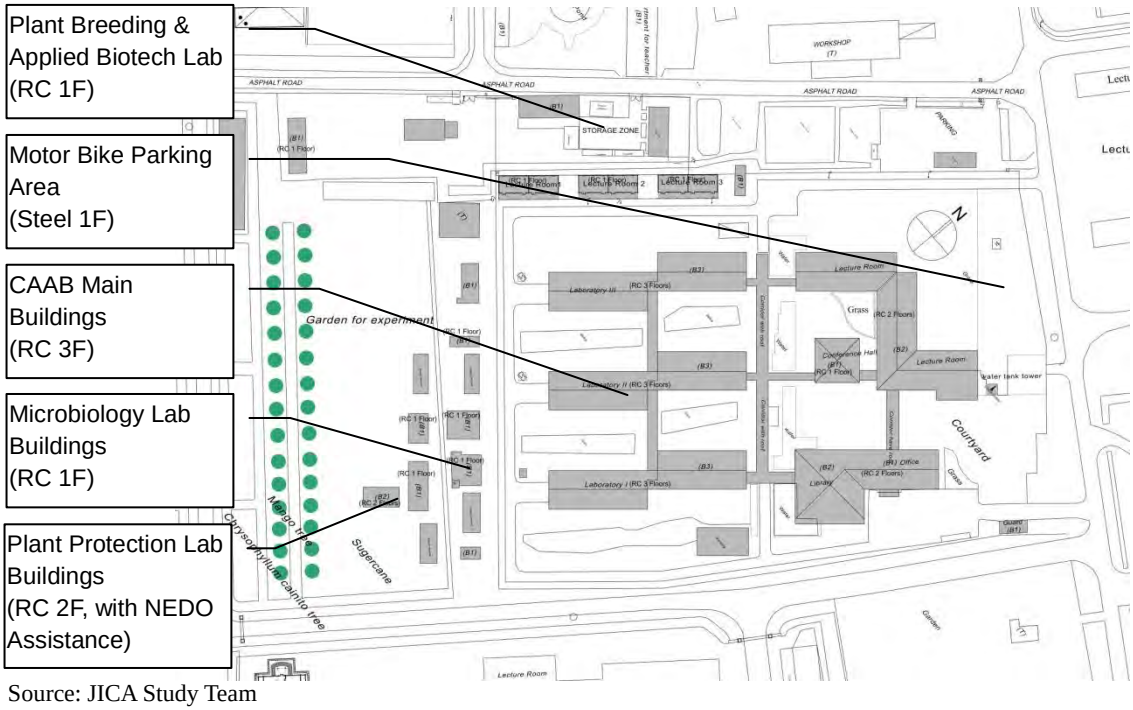
Table 3-34: Number of Students and Academic Staff, CAAB

College	Course/Research Field	Number of Students 2013 (Current)		
		Enrollment per Year	Length of Course	Total
CAAB	Undergraduate Program			2,820
	1 Animal Science	80	4 Years	320
	2 Animal Breeding Technology	40	4 Years	160
	3 Food Technology	50	4 Years	200
	4 Crop Science	30	4 Years	120
	5 Plant Breeding Technology	40	4 Years	160
	6 Organic Agriculture	50	4 Years	200
	7 Horticulture and Landscape Architecture	40	4 Years	160
	8 Agronomy	100	4 Years	400
	9 Plant Protection	50	4 Years	200
	10 Soil Science	60	4 Years	240
	11 Veterinary Medicine	100	5 Years	500
	12 Veterinary Pharmacology	40	4 Years	160
	Graduate Program			278
	1 Crop Science	36	2 Years	72
	2 Animal Science	20	2 Years	40
	3 Soil Science	9	2 Years	18
	4 Veterinary Medicine	27	2 Years	54
	5 Plant Protection	23	2 Years	46
	6 Food Technology	19	2 Years	38
	7 Post-harvest Technology	5	2 Years	10
	PhD Program			105
	1 Animal Science	5	3 Years	15
	2 Plant Protection	5	3 Years	15
	3 Soil Science	5	3 Years	15
	4 Crop Science	10	3 Years	30
	5 Food Technology	5	3 Years	15
	6 Pathology and Therapeutics for Animals	5	3 Years	15

Source: CTU

- Existing Facilities

CAAB mainly uses 3-story buildings (approximately 11,000 m^2), which were constructed under a Japanese Grant Aid in 1996. There are some smaller buildings, greenhouses and net houses constructed by MOET and other donor funds (including NEDO in Japan).



Source: JICA Study Team

Figure 3-8: Existing Facilities, CAAB

- Current Situation of Grant Aid Building

Buildings constructed under the Japanese Grant Aid in 1996 are generally maintained and operated well despite almost 20 years passing since their completion.

A single-corridor layout with deep eaves and pitched roof maintains natural ventilation, and CTU highly evaluates the layout.

However, the size of the buildings (total floor area: 11,000 m^2) are physically insufficient to accommodate more than 4,500 students (total of undergraduates and post-graduates). Most departments conduct student practice and research activities at the same laboratory; furthermore, there are no researchers' and post-graduates' research offices, which results in difficulties in carrying out appropriate research activities.

College of Aquaculture & Fisheries (CAF)

- Number of Students and Academic Staff Members

Founded in 1979, CAF consists of 7 departments and accepts approximately 500 undergraduates and 70 post-graduate students per year. Table 3-35 shows the current number of undergraduate and post-graduate students of each course.

Table 3-35: Number of Students and Academic Staff, CAF

College	Course/Research Field	Number of Students		
		2013 (Current)		
		Enrollment per Year	Length of Course	Total
CAF	Undergraduate Program			2,080
	1 Aquaculture	80	4 Years	320
	2 Marine Aquaculture Technology	40	4 Years	160
	3 Aquaculture Environmental Management	40	4 Years	160
	4 Advanced Program in Aquaculture	20	4 Years	80
	5 Transferred Program in Aquaculture	40	4 Years	160
	8 Aquatic Animal Pathology	60	4 Years	240
	9 Fisheries Management	50	4 Years	200
	10 Fisheries Management & Economics	60	4 Years	240
	11 Aquatic Products Processing	100	4 Years	400
	12 Transferred Program in Aquatic Product Processing	30	4 Years	120
	Graduate Program			118
	1 Aquaculture	45	2 Years	90
	2 Fisheries Management	14	2 Years	28
	PhD Program			30
	1 Aquaculture	10	3 Years	30

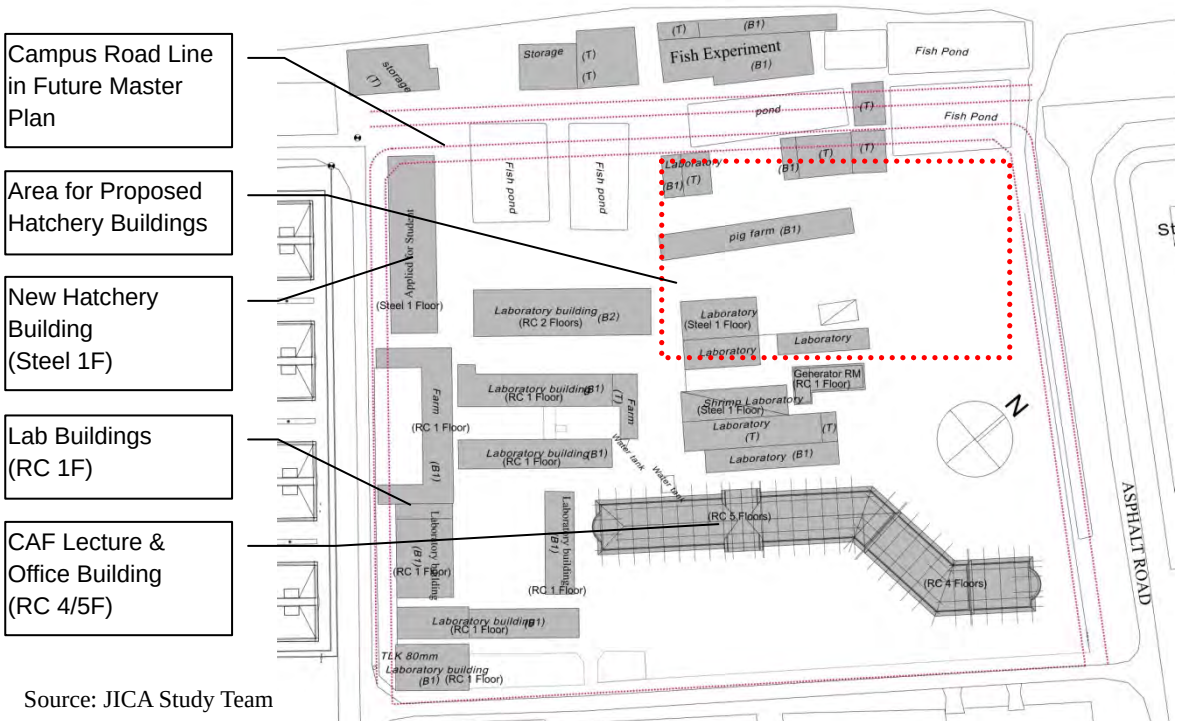
Source: CTU

- Existing Facilities

Except for a 4/5-story lecture/administration building, which was constructed in 2009, most of the existing buildings of CAF are old and deteriorated. In particular, most laboratories are located at old, single-story buildings and do not meet CAF's research activities requirements.

A new hatchery facility (single-story steel structure with 1,000 m^2) was constructed in 2012, north of the block.

The area where the existing old hatchery facilities are located will be used for the newly proposed hatchery facilities, in case the project includes those facilities.



Source: JICA Study Team

Figure 3-9: Existing Facilities, CAF

College of Environment & Natural Resources (CENRes)

- Number of Students and Academic Staff Members

Founded in 2008, CENRes consists of 4 departments and accepts approximately 400 undergraduates and 100 postgraduate students per year. Table 3-36 shows the current number of undergraduate and post-graduate students of each course.

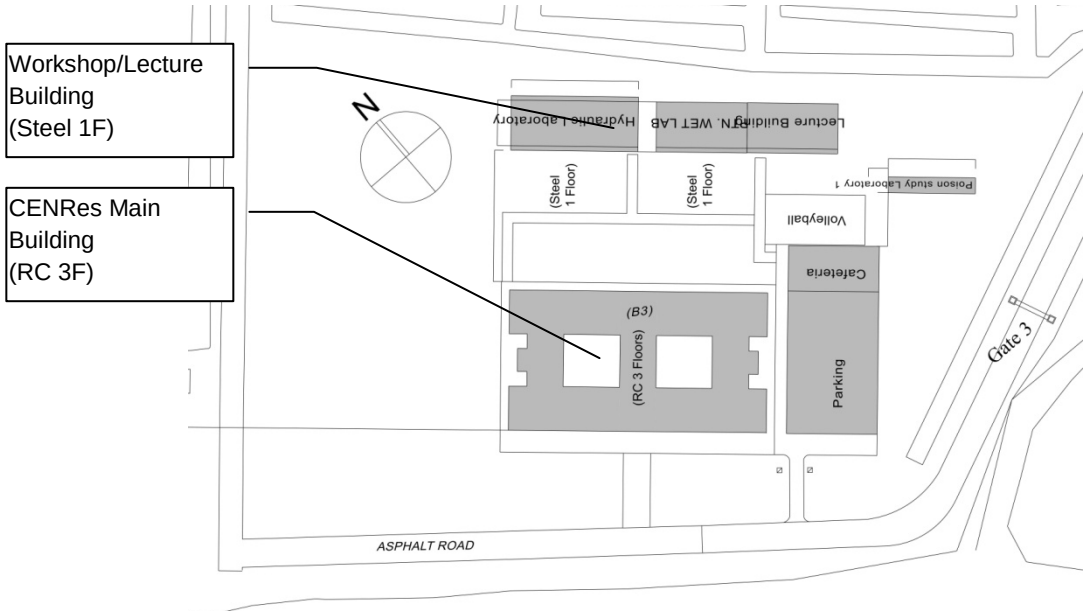
Table 3-36: Number of Students and Academic Staff, CENRes

College	Course/Research Field	Number of Students 2013 (Current)		
		Enrollment per Year	Length of Course	Total
CENRes	Undergraduate Program			1,440
	1 Environmental Science	80	4 Years	320
	2 Environmental Engineering	80	4 Years	320
	3 Environmental & Natural Resources Management	80	4 Years	320
	4 Land Resource Management	80	4 Years	320
	5 Forestry	40	4 Years	160
	Graduate Program			226
	1 Environmental Sciences	44	2 Years	88
	2 Natural Resources and Environmental Management	27	2 Years	54
	3 Land Management	42	2 Years	84
	PhD Program			30
	1 Soil & Water Environment	5	3 Years	15
	2 Land Management	5	3 Years	15

Source: CTU

- Existing Facilities

CENRes mainly uses a 3-story building (approximately 4,000 m^2), which was constructed in 2008. Besides this building, there is a workshop/lecture building and a field experiment facilities in the block.



Source: JICA Study Team

Figure 3-10: Existing Facilities, CENRes

Biotechnology Research & Development Institute (BiRDI)

- Number of Students and Academic Staff Members

Founded in 1995, BiRDI consists of 2 departments and accepts approximately 200 undergraduates and 50 postgraduate students per year. Table 3-37 shows the current number of undergraduate and post-graduate students of each course.

Table 3-37: Number of Students and Academic Staff, BiRDI

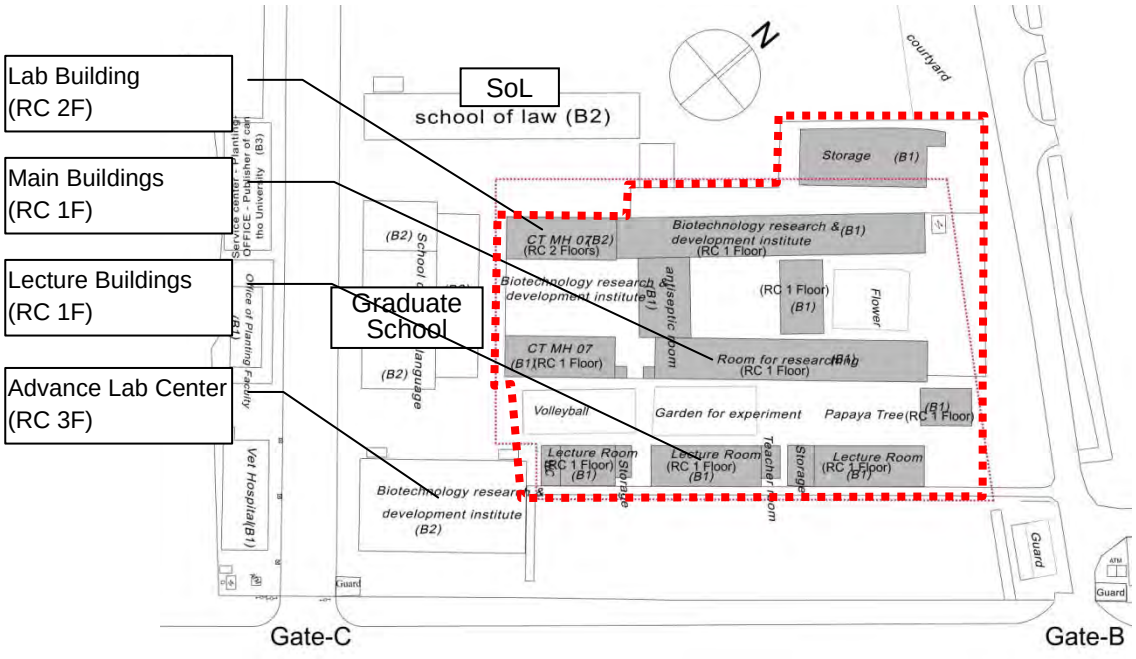
College	Course/Research Field	Number of Students 2013 (Current)		
		Enrollment per Year	Length of Course	Total
BiRDI	Undergraduate Program			963
	1 Microbiology	68	4 Years	272
	2 Regular Biotechnology	124	4 Years	496
	3 Advanced Biotechnology (Taught in English)	39	5 Years	195
	Graduate Program			90
	1 Biotechnology	45	2 Years	90
	PhD Program			30
	1 Microbiology	5	3 Years	15
	2 Biotechnology	5	3 Years	15

Source: CTU

- Existing Facilities

BiRDI mainly uses the former Medical College's buildings, which were left after the Medical College was separated from CTU in 2000. Most of the existing buildings are old and run down, and do not meet BiRDI's research activity requirements.

BiRDI uses the right-half portion of the Advance Laboratory Center (3-story) to fulfil a shortage of lecture rooms and laboratories.



Source: JICA Study Team

Figure 3-11: Existing Facilities, BiRDI

Great Hall (Turtle Hall)

The Great Hall is called "Turtle Hall" because of the unique shape of its outline, and is popular among students and alumni. The building construction was started in 1970, and competed in 1980 after periodical suspensions during the Viet Nam War.

Total floor area is approximately 2,200 m^2 (2 story), and the total number of seats is about 1,400 (950 on the ground floor and 450 on the second floor).

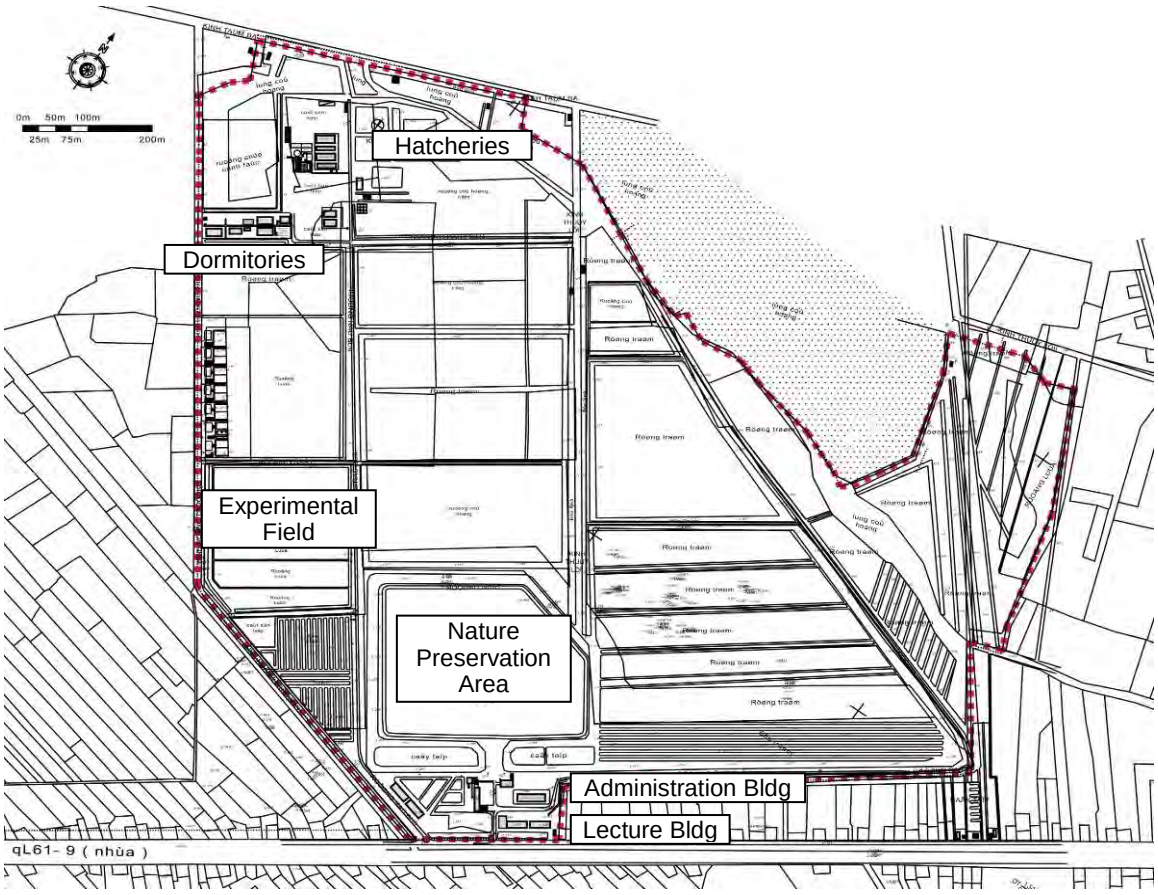
Most of the interior walls are finished with wood materials, and there is no smoke/fire detector system or sprinkler system in the building. It is necessary to refurbish those fire-protection systems if CTU plans to use this building for a substantial period of time in the future.

8 outdoor-unit-embedded air-conditioning units are installed on the exterior walls to provide cooled air to the hall. Noise from the outdoor units penetrates into the hall, and spoils the acoustic environment of the hall.

3.7.3 Current Situation of Hoa An Campus

Hoa An Campus is located 40 km southwest of Can Tho City, in the Phung Hieop District in Haugiang Province.

(1) Existing Facilities and Layout



Source: JICA Study Team

Figure 3-12: Existing Facility Layout, Hoa An Campus

Hoa An Campus has approximately 111 ha land area, and most of it was used as a natural preservation area and experimental paddy fields. Administration office and lecture buildings are located at a block near the entrance gate, and animal nursery/hatchery facilities and dormitories are located north of the campus.

(2) Current Situations of the Infrastructure

Electricity

Haugiang Province's electricity company's overhead power line is connected at the Administration Building, located at the south, and other line is connected at the livestock facilities, located north of the site, respectively. An electricity meter is also installed separately.

Telephone

An overhead telephone line is connected at the Administration Building, located south of the site.

Water Supply

- There are 3 tapping points from the city water main along the main street. The amount of water from the city water main is not sufficient to cover the demand; therefore the campus uses well water and canal water after proper treatment.
- The Dormitory buildings have their own reservoir tanks to fulfill demand changes.
- There are exterior fire hydrants within the campus, and they are directly connected to the water supply main.

Drainage

- There is no public sewerage line.
- Wastewater, along with rain water, is discharged to open ditches after being treated at each septic tank. The open ditches are connected to the canal.
- Rainwater penetrates into the soil.

Air-conditioning

- Only limited rooms have air-conditioning systems, and most of the lecture rooms have ceiling fans. Air-cooled air-conditioning systems are commonly used, and there is no centralized cool water supply system.

Waste Disposal

- Each building has garbage packets to collect waste separately (blue: garbage, yellow: other general waste).
- Haugiang District Company collects waste two times a week.

3.7.4 Review of the Issues the Existing Facilities Face

The Study team reviews challenges and issues that CTU's existing facilities have based on the survey results. Table 3-38 shows the results.

Table 3-38: Challenges and Issues the Existing Facilities Face

Component	Item	Challenges/Issues
Faculty Facilities	Shortage of Research Labs	• Sharing student practice lab and research lab in the same room prevents continuous researches. • Sharing different research fields in one lab causes lack of proper research space.
	Insufficient Quality of Research Labs	• Some institutions' labs were converted from office or lecture rooms, and their layout and utility systems do not match the required lab functions. • Some institutions' labs have significantly low construction quality, such as a partially collapsed floor (CENRes) and deteriorated conditions of the lab (CAF). • Most lab wastewater is not properly treated. The CAAB's treatment plant has been left out of order. • Most lab exhaust is not properly treated. Even CAAB has no scrubber unit to treat exhaust from the fume hood.
	Shortage of Research Office Space	• Existing labs have no adjacent documentation area, which is adversely affecting report making. • Existing faculty buildings have no research offices for researchers and postgraduate students, and fewer rooms for academic staff. These situations prevent effective research activities.
Campus Infrastructure	Inappropriate Drainage System	• Wastewater, along with rain water, is discharged into open ditches in the campus after being treated at each block's septic tank. Most wastewater is stagnant within the campus and not discharged outside properly.

Source: JICA Study Team

In general, floor area per student of CTU's existing facilities is approx. 4.0 m^2/ student (Japan's MEXT University Establishment Standard defines approx. 17.0 m^2/ student). CTU faces significant shortage of facility space.

3.8 Equipment – Current Situation and Issues

3.8.1 Current Situation of Existing Equipment

Since existing equipment is qualitatively and quantitatively deficient, sufficient practical training for undergraduates and research works cannot be carried out.

The constraints concerning the existing equipment currently faced in each field is described hereunder:

(1) CAAB

Present status and problems:

- Since many items of equipment are not functioning, undergraduates and researchers cannot perform advanced experiments and research works.
- Since the laboratory has a restriction for equipment use, researchers cannot carry out practical training.
- Since undergraduates utilize most of the equipment, the time left for researchers to study is quite limited.

(2) CAF

Present status and problems:

- Many items of existing equipment are not updated and thus the reliability of data is low.

- The undergraduates of the facility and the master's course students use most of the equipment for practical training, therefore, research time is quite limited.
- There exists shortage of human resources who can maintain experimental equipment, and insufficiency of funds to cover the operation and maintenance expenses, which lead difficulty to replace the obsolete equipment with the new ones. Therefore, many items of equipment are not in working condition, and fixing them is probably not possible.
- As for the hatchery, the present laboratory is narrow, obsolete and scattered, and the place is not wide enough to carry out research works and experiments sufficiently.

(3) CENREs

Present status and problems:

- There is a laboratory that many items of equipment are not repairable,
- Data precision of many equipment such as the titration unites, is low and their quantity is also limited, and
- Equipment is mainly used by undergraduates of the faculty for training and education and by students of master's course to conduct practical training.
- It is difficult for researchers to perform practical training as the number of undergraduates' increases.

(4) Supporting Fields (CoET, CoNS, and CoICT)

Engineering field for CAAB and Aqua-cultural engineering

Present status and problems:

- Though many items of existing equipment have been obsolete, including items which were manufactured during 70's and 80's, they have not been updated yet.
- Existing equipment is used mainly for the training of undergraduate students, and thus is not applicable to research works.
- With old models of equipment, it is difficult to undertake research works adapting to the surrounding conditions and environment which are consistently changing.

(5) IT Management

Present status and problems:

- In most of the CTU faculties, since they do not have a common database for other activities, research works of the faculty personnel are performed on each PC.
- Due to restriction of hardware and software, it is not possible to accommodate simultaneous users.
- Almost all the equipment including a server and network equipment is superannuated, and thus the present system cannot meet the present demands or that of future education, management, and research works.

Remarks: Please refer to Appendix 3-21 for more detailed explanation for the current status of the existing equipment.

3.8.2 Operation and Maintenance System and Current Financial Status

(1) Operation and Maintenance System

The Department of Facility Management is responsible for asset management of the whole CTU.

The functions of the department are described as follows:

- To submit CTU asset management report annually to MOF and MOET, and
- To procure, inspect, maintain and dispose of equipment and maintain building and facility.

The headquarters of the department, which is located at the existing administration building, has six personnel, that is, a chief, a deputy chief, a mechanical engineer, an IT engineer, an accountant and a clerk.

The functions and activities of the department are described hereunder:

The facility management department is located at the headquarters which is located at the ground floor of the administration building. The headquarters has 5 personnel, namely, a chief, an IT engineer, a mechanical engineer, an accountant, and a clerk.

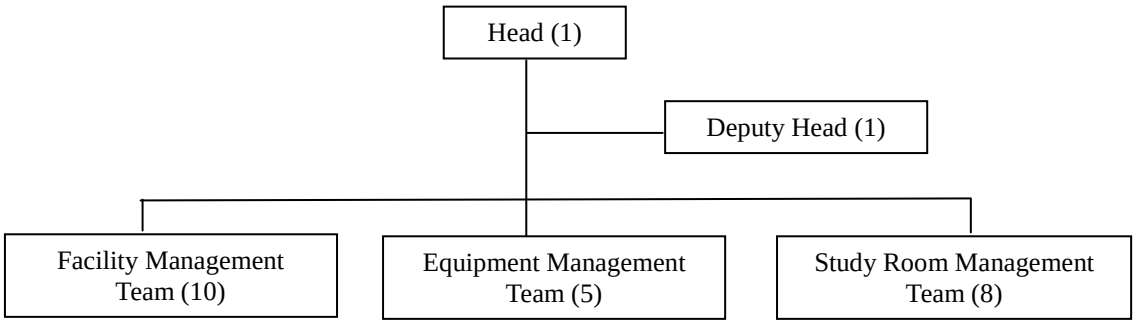
The functions and the activities of the department are described hereunder:

i) Asset database: It is introduced to simplify a complicated annual report for MOET and is released by the web of CTU. The department has been renting some extra items of equipment to other public universities without charging.

ii) Inspection of purchased equipment: The staff members stand for inspection of newly purchased equipment together with personnel of the recipient faculty.

iii) Dealing with equipment failure: In case of serious equipment failure the mechanical engineer of the facility management department will inspect the equipment failure and judge whether to call for services from equipment agents or other private workshop. CTU does not have a workshop with full-time maintenance engineers and technicians, which would otherwise cost personnel expenses. Instead of such a system, the chief of laboratory or the lecturer is responsible for daily equipment management as front-line maintenance; only in case of serious equipment failure, will the service be outsourced.

As the organizational structure shown in Figure 3-13 below, the department has 3 management teams of facility, equipment and study room. The teams work for both procurement and maintenance in their fields to cover all the colleges/schools/institutes of CTU.



Note: ( ) indicates numbers of staff members.
Source: CTU

Figure 3-13: Organization Chart of Facility Management Department

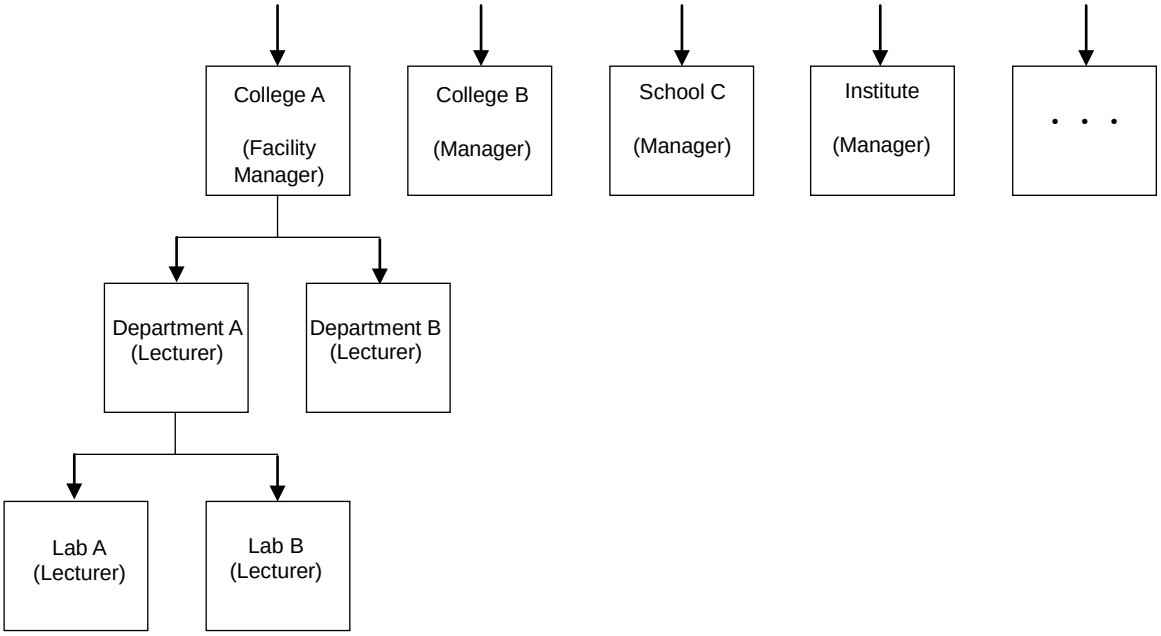
The functions of each management team are described as follows:

Table 3-39: Functions of Maintenance Management Teams

Name of Teams	Functions
Facility Management Team	Implementing the management – development – use – maintenance – protection and repair for facilities.
Equipment Management Team	Implementing the management – development – use –maintenance – protection, shopping – shopping advice and repairs – repairs counseling for equipment
Study Room Management Team	The team is responsible for managing study rooms about preservation and cleaning.

Source: Department of Facility Management, CTU

Each college/school/institute has assigned one facility manager for equipment and material procurement at college level and one manager/lecturer at department level, and one lecturer/head at laboratory level. The lecturer/laboratory head is responsible for management of laboratory equipment and its daily maintenance.



Source: CTU facility management department

Figure 3-14: Procurement and Management System of College/School/Institute

(2) Current Status of Balance between Budget and Expenditures

CTU budget has been increasing relatively firmly these 5 years. The main sources of revenue are subsidy of MOET and tuition fee. In recent years, the subsidy of MOET increased by about 40%, and there is increase in income from tuition due to increase in the number of students. However, simultaneously, there is also an increase in expenditure on CTU personnel, experimental material, and so on.

As for the operation and maintenance expense of CTU against operation expenditure (= overhead expense + equipment purchase-expenses + other expenses) of fiscal year 2011 is 4.4%; 4.0% for l year 2012 and 3.7% for fiscal year 2013. Thus, the operation and maintenance expense has been very stable at 4% in general, with little variation every fiscal year.

3.8.3 Equipment Operation and Maintenance Related Issues

According to the facility management department, there have not been so many serious cases of equipment failure in the past since lecturers are responsible for taking care of laboratory equipment and conducting operation check before and after its operation in CTU. For some precision equipment, engineers from equipment agents sometimes visit CTU to check the delivered equipment. In case of failure or when mechanical engineers of the facility management department cannot fix the issue, each college/institute calls for an equipment agent and determines the price quotation for repair service. The college has some budget for maintenance and the dean makes judgment regarding the acceptance of the repair service. In case the estimated cost is higher than the budgeted amount, the CTU rector board will make the final judgment whether to budget for the service based on the report prepared by the college/institute. If the board judges that the service is not cost effective there happened that the repair service has not been done in such a case of the LC-MS/MS of CAF.

It is hard to mention that the capability is enough to carry out maintenance management for the most advanced equipment appropriately under the present circumstances. Taking advantage of the said lessons, with emphasis on preventing serious troubles, operation and maintenance system for this project should be strengthened so that preventive service may be performed periodically. For especially advanced research equipment, it is essential to carry out the maintenance management service regularly by the specialist engineer of a local equipment agent. Also in this project, securing research expense is essential when the labs are formulating annual research plans. It is desirable to accumulate research expenses, such as experimental materials, chemicals, reagents and to have enough operation and maintenance budget for the next fiscal year.

3.9 CTU's Cooperation with Other Aid Donors and Universities/ Institutions in Other Countries

3.9.1 Influential Donors' Assistance in the Past

In the past, CTU conducted three big grant projects supported by other countries/ donors. The main influential projects are as follows:

Table 3-40: Influential Donor's Assistance in the Past

Netherlands	MHO[69]	1995–2000 (I) 2000–2004 (II)	EUR 15, 882,070 (USD 21.6 million[70])	Governance, Curriculum, Teaching methods, staff training (38 Ph.D., 211 master's, 382 short term, 300 invitation to VN) establish new department (Natural Science)
World Bank	1)Quick Quality Improvement Grant (QIG)[71] 2)Training Research Improvement Grant (TRIG)[72]	1) 2000–2007 2) 2008–2012	1) USD4.8 million 2) USD 3.8 million	1) enhance research and teaching in Biotech, ICT, Aquaculture 2) Governance, research and education, staff training (15 Ph.D.[73], 20 master's, more than 100 short term training)
Belgium	VLIR-IUC	1998–2003 (I) 2003–2008 (II)	EUR 6,778,863 (USD 9.5 million[74])	Distance Education, Curriculum, Research activity in aquaculture, biotech, soil dynamic and aquatic environment, Staff training (12 Ph.D., 46 master's, 71 short term training, 120 staff exchange)

Source: summarized by JICA Study Team

Common characteristics of influential projects are 1) long-term project of 2 phases of around 5-year project term[75], 2) sending of staff for Ph.D. and Master's degrees, 3) equipment including research activities, and 4) assistance to improve education. In addition, the same framework of the governance and university management section in the JICA proposal was used in MHO and World Bank projects.

During the interview with CTU members, the JICA team often heard about those three projects. The projects were apparently influential in raising CTU to the current status. The MHO project first introduced an IT network to CTU and established the Natural Science Department. In addition, introducing EFQM made it possible for CTU to work according to international standards. The World Bank produced current Deans and Vice Deans in several academic schools/ colleges of CTU. The budget only allowed 15 staff to go abroad for studies; however, 3 additional teaching staff received Doctoral degrees with the support of partner universities during the project. This indicates positive project impact as well as strong ties with partner universities. In addition, CTU learned the procedure of procurement, proposal writing, and project implementation by themselves with the World Bank projects. The VLIR-ICU[76] project indicates Mekong Delta's potential and CTU's role in its development. Their report states that a "win-win situation is always established during project implementation based on the needs and interests of both parties." The assistance was also fruitful to Belgium partners. The new phase of

[69] Name of the project in Dutch

[70] Rate as of 31 Dec. 2004 by OANDA http://www.oanda.com/lang/ja/currency/converter/ 1 Euro = 1.364 US dollar: EUR 15, 882,070 = USD 21,663,100

[71] Under "Higher Education Project", USD 103.7 million (including WB USD 83.3 million loan) (1999–2007).

[72] Under "Second Higher Education Project," USD 70.5 million (including WB USD 59.4 loan, and PHRD co-finance 4.8m of Japanese Grant) (2007–2012)

[73] Additional 3 Ph.D. degree holders were produced by partner universities' support.

[74] Rate as of 31 Dec, 2008 by OANDA http://www.oanda.com/lang/ja/currency/converter/ 1 Euro=1.409 US dollar: EUR 6,778,863=USD 9,555,010

[75] Asian Development Bank (ADB) has projects more than 10 years, but the activities were mainly for School of Education. The 3 ADB projects are as follows: 1) Upper Secondary Education Development (2002–2008): USD 32,500, 2) Second Upper Secondary Education Development Project (2012–2019): USD 500,000, 3) Upper Secondary and Professional Teacher Development Project (2007–2013): USD 1,000,000.

[76] The abbreviation means Flemish inter-university council.

VLIR, "VLIR Network University Cooperation[77]" started in 2013. Phase I (2013–2019) is for biosciences for food, and CTU is expecting phase II (2019–2025). In Phase II, CTU expects to organize the doctoral school and MSc program in English on specialization of aquaculture and food technology, and double and joint decree/diploma will be granted with Flemish universities in Belgium.

3.9.2 On-going International Projects

The ongoing international projects as of April 2014, rated by the budget size of the country, are listed below. The biggest budget in terms of total project amount is Australia, followed by Denmark. The budget sizes are almost the same, and those two are the top donor countries at CTU presently. Japan is the third largest collaborating country in 8 countries, majority of them are European countries. Most of the projects are related to Mekong Delta and Climate Change. CAF is conducting a research project on the effects of climate change on physiology of fish in cooperation with Denmark, which may be related to the prioritized research theme for this project. As of April 2014, there are 14 official ongoing projects. Some projects are not in the list, such as NAGAO project in aquaculture field, and phase I of VLIR Network University Cooperation, since they cannot provide official documents such as Project Outline, Project Proposal, Financial Plan, Management System, Implementation Schedule or budget information. MOET instructed CTU to treat such projects as internal (unofficial) projects.

Japan should show long-term commitment to work with CTU, not only with ODA, but also with private companies and/or universities, by setting branch offices or sending staff regularly at CTU. That will lead to positive impact of Japanese assistance. Currently, CTU does not have any ongoing JICA projects, however, JIRCAS (Japan International Research Center for Agricultural Science) and Yammer (private company) are working with the university staff and students, which demonstrate Japanese presence.

The details of 33 recent projects are attached in the Appendix 3-22, including those projects which ended in 2013 or early 2014. The list does not include two Word Bank projects, since CTU is still considering applying for them, VIIP (Viet Nam Inclusive Innovation Project), and FIRST (Fostering Innovation through Research, Science and Technology).

Table 3-41: Summary of On-going International Projects by Country (as of April 30, 2014)

	Country/ Donor	Total budget in USD [78]	No. of project	Fields of activity
1.	Australia	1,457,455 (AUSD 1,557,311)	4	Mekong Delta related topics (environment, livelihoods, agriculture), Climate change
2.	Denmark	1,454,600 (DKK 7,929,677)	3	Aquaculture fishery, Business, Environment
3.	Japan	443,507	2	Environment
4.	Belgium	136,723 (Euro 99,850)	1	Aquaculture under VLIR
5.	Netherlands	53,607 (Euro 39,150)	1	Climate Change
6.	Philippines	30,000	1	Environment
7.	Sweden	12,000	1	Environment
8.	Canada	11,044.3 (CAD 12,000)	1	Water management

Source: summarized by JICA Study Team

[77] While VLIR-IUC targeted only CTU, VLIR-Network University Cooperation is targeted several Vietnamese Universities including CTU.

[78] Exchange rate by 19 May 2014, OANDA, http://www.oanda.com/lang/ja/currency/converter/

3.10 Analysis of the Major Constraints of the CTU and Proposed Solutions

In this section, the major issues in the fields of Agriculture, Fisheries and Aquaculture, and Environment faced by CTU and the approaches on how to address these issues are discussed. The analysis is summarized in Table 3-42. The following Chapter 4 proposes the basic project design which will help resolve the challenges categorized and discussed here.

Table 3-42: Issues of the Programs of Agriculture, Fishery and Aquaculture, and Environment of the CTU and the Proposed Solutions

Issues	Proposed Solutions
I. Limited Quality and Number of the Human Resources in the Research Activities	
• There is an urgent need to satisfy the requirement set out by MOET that CTU should increase the number of professors with Ph.D. degree from the current 22% to 62% by 2022. The target seems difficult to achieve as many of the professors with Ph.D. degrees are in their mid-fifties and close to retirement. Hence, it is necessary to help young professors with Master's degrees obtain Ph.D. degrees. • Since there are limited opportunities of joint-research studies and professional training with overseas universities and academic institutes, many professors in CTU are not very familiar with the international trends and methodologies in their fields of study. • Due to limited opportunities of information sharing and exchange with different academic fields and scarce financial resources for research activities, it is rather difficult for the researchers in CTU to propose and conduct the inter-disciplinary academic programs. • Since the budget for accessing the database of international research studies and the support for drafting research papers are very limited, CTU has not fully developed the academic environment where the researchers are able to produce numerous research papers which meet the international quality standards.	• To address the current key concern of lack of good quality human resources to lead research activities due to the expected retirement of many professors in their fifties. Through internationally reputable Ph.D. programs offered by selected Japanese universities, it is expected that the scholars will obtain in-depth knowledge regarding the approaches and methodologies for research studies and foster working ethics and code of conduct as professional researchers. The degree programs and participation in the academic associations will help the scholars develop professional networks with famous foreign scholars in their respective fields, relevant universities and institutes, and the private sector. • Targeting mid-level instructors with Ph.D. degrees, the short-term overseas research training programs will be offered which aim to give them the opportunity to be exposed to the hottest international academic research studies which would help them understand the methodologies and approaches. • To conduct joint-research with selected Japanese universities and to implement and monitor the research activities which will help the University broaden the boundary of their research topics and push them towards other inter-disciplinary fields. Joint research studies with Japanese universities will also strengthen the capacity of the University in developing good quality academic reports and presenting them in academic journals and conferences.
II. Limited Graduate Education Programs Meeting the International Standards	
• Majority of the graduate education programs are offered in the Vietnamese language in CTU. As a result, it is difficult for the University to arrange exchange programs with overseas universities and institutes and accept international students. • The Environmental Study Programs have recently been getting popular and the number of applicants has drastically increased. To meet the demand and the expectation, new education programs urgently need to be established and developed. • Compared to the under-graduate programs, the graduate programs are limited in	• To establish the new graduate programs in the fields of Agriculture, Fishery/Aquaculture and Environment which will help the University be recognized as an internationally reputable research university in the future. To provide technical support to CTU to help develop suitable curriculum and syllabus of the newly established programs.

Issues	Proposed Solutions
number and fields. Many students hope to continue the graduate study in CTU, but because of the limited variety of the education programs available in CTU, they often have to move to other universities which offer them the programs which are more appealing.	
• The teaching style of the graduate courses (both the Master's and the Ph.D. degree programs) is often not appealing enough to the students and fails to stimulate their academic interests. • The capacity of senior fellows of CTU in leading and guiding the research study teams tends to be limited which results in the weak capacity of graduate students participating in the team.	• To provide model lectures with the help of Japanese university professors which can improve CTU professors' quality of teaching. Later joint-lectures will be provided to the students by the Japanese and CTU professors which will explain more clearly about the progress and achievements of their ongoing researches.
• There have been no education programs in the fields of the Agriculture, Fisheries/Aquaculture, and Environment accredited by the international quality control organization for higher education such as the ASEAN University.	• With a wide range of advisory support from the Japanese professors who have experience in university program accreditation by external quality control organization for higher education, the selected graduate programs in CTU in the 3 fields will be accredited.
III. Limited Capacity in Management and Governance of the University	
• There is a limited number of supporting unit staff who can effectively and efficiently help the academic unit and their researches. • Adequate management and implementation framework for the supporting unit, which can ensure the motives of the supporting unit staff including the standard performance evaluation criteria, regular training opportunities, and the action plan showing the mission statement and long-term direction of the supporting unit of CTU, have not been developed yet. • There is not enough supporting unit staff who are familiar with the necessary procedures and requirements of acquiring the certificate of accreditation of the education programs by the external quality control organizations for higher education institutes. • There are not many researchers who are active in acquiring patents which results in low external acknowledgement and recognition of the academic achievements of CTU.	• To provide the supporting unit staff short- and long-term university administration and governance training programs on planning, implementation and monitoring of university management which are essential for CTU's sustainable development as an international level university. • To provide a specialized training program to the supporting unit staff who are expected to effectively help the academic unit get the selected education programs to be accredited by the AUN. • To provide a specialized legal training program to the supporting unit staff who are expected to effectively help the researchers who are active in acquiring patents.
IV. Poor Academic and Research Environment	
• The same laboratories have to be shared and used for both educational experiments conducted by undergraduate students and the research experiments carried out by professors/graduate students. Further, some departments share the same laboratories even if their research themes are different. In result they cannot secure sufficient	• To build new facilities for the experiments and research with enough space and function in order to support the professors' research and teaching activities.

Issues	Proposed Solutions
space for laboratory experiments. Also occasionally some departments utilize the spaces in the buildings made for non-laboratory use (such as for lecture rooms, offices, etc.) as laboratories. Therefore they do not fulfill the functions of the research laboratories. • Teachers' offices and research space for graduate schools are insufficient. There is no paper-writing space where the researchers and graduate students can write the research papers based on the experiments in the laboratory. • The education facilities in CTU are outmoded and the drainage and air circulation of the laboratories are not properly managed. • There is not enough space where international conferences can be organized leading to limited opportunities of presentation of research achievements and networking within CTU. • The lecture halls and classrooms are limited in number.	
• After primary treatment at the processing tanks in the block, sewage from each undergraduate facility, is drained with stormwater in open ditch drainage in the campus, and it stays in the drainage ditch. • Infrastructure for equipment, including electricity, air circulation and gas, are not safely provided and it does not secure the safety of the researchers and the conditions for safe use of the equipment.	• To improve the drainage system in the campus as necessary
• The researchers encounter difficulty in carrying out research activities as intended due to limited number and quality of experimental equipment. It is also observed that the equipment is not managed through ICT. • Research plans are often limited by the quality, grade and number of available research equipment. Some equipment is already outmoded and cannot function properly.	• To provide research and experimental equipment and facility at appropriate level as needed.
• Administration and management of facilities and equipment and regular repair of articles of research laboratory, classroom, electricity, water, and education are carried out. However, as opportunities to receive specialist training on such activities is small and the response to problems is delayed, the process is resultantly inefficient.	• To provide short-term training program on operations and maintenance of the equipment to the academic and supporting unit staff in charge of the Research Management. The training programs aim to help develop the participants' capacity in better and appropriate usage of the equipment procured by the Project. Also it will give the participants a learning opportunity to understand how to jointly manage such sophisticated equipment for high-level research studies.

Source: JICA Study Team

Appendices

Appendix 1-1

Site Survey Program

MEMBERS OF CAN THO UNIVERSITY DELEGATION TO JAPAN FROM JUNE 22ND TO JUNE 28TH, 2014

1. A/Prof. Le Viet Dung, Vice Rector for International Relations and Scienctific Research
2. A/Prof. Tran Trung Tinh, Vice Rector for Facilities Management
3. Dr. Nguyen Van Be, Director, Department of International Relations
4. A/Prof. Ly Nguyen Binh, Vice Dean, College of Agriculture and Applied Biology
5. A/Prof. Tran Ngoc Hai, Vice Dean, College of Aquaculture and Fisheries
6. A/Prof. Nguyen Van Cong, Vice Dean, College of Environment and Natural Resources
7. Mr. Duong Thanh Long, Director, Department of Administration and Planning

Site-Survey Program in Japan
2014/6/22-2014/6/28

Date	date	Start	End	Site	Item	Person	Language	Address	Transportaion	Accomodation
2014/6/21										
2014/6/22	Sun	7:30			Transport by Train				Airport to Hanata	Toyoko-INN Hakata-guchi ekimae2 092-437-1045
		18:00			Welcome Party by Kyushu University					
2014/6/23	Mon	8:30	9:00		Transport by bus	N/A	N/A			Toyoko-INN Nagasaki ekimae 095-825-1045
		9:00	10:00	Kyushu University (Hakozaki Campus)	**Courtesy visit to Director**	N/A	English	6-10-1 Hakozaki Higashi-ku Fukuoka 812-8581		
					Intro to Faculty of Agriculture	Dr. Nakamura	English			
					Intro to Kyushu University	Dr. Hiramatsu	English			
					Intro to Agriculture research	Dr. Ogata	English			
					Basic plan of relocation	Dr. Yoshimura	English			
		10:00	10:45		**Center for Advanced Instrumental and Educational Supports**	Dr.Sakai	English			
		10:45	11:45		Transport by Bus	N/A	N/A		Chartered bus	
		12:00	13:00		Lunch	N/A	N/A			
		13:00	14:00	Kyushu University (Ito Campus)	**Visiting lecture hall Courtesy visit to Vice President**	Dr. Hiramatsu	English	744 Motooka Nishi-ku Fukuoka 819-0395		
		14:00	14:30		**Central Analysis Center**	Dr. Ogata	English			
		14:30	15:00		**AgriBio**	Dr. Nakamura	English			
		15:00	16:00		Transport by bus	N/A	N/A		Chartered bus	
		16:00	18:30		Transport by Train	N/A	N/A		Hakata to Nagasaki Kamome 33	
		19:00			Welcome Party by Nagasaki University	N/A	N/A			
2014/6/24	Tue	8:30	9:00		Transport by Bus	N/A	N/A			Sunsine City Price Hotel 3-1-5 Higashi Ikebukuro Toshima, Tokyo
		9:00	11:00	Nagasaki University (Hakozaki Campus)	**Intro to Nagasaki University**	Dr. Kato	English	1-14 Bunkyo-machi Nagasaki City,		
					Research activities on aqua culture	Dr. Hagiwara	English			
					Research activities on environment	Dr. Miyanishi	English			
					IT utilization on academic management		Japanese			
		11:00	11:30		**Multidisciplinary educational research center**	Dr. Hagiwara	English			
		11:30	12:45		Lunch	N/A	N/A			
		13:00	13:30		**Courtesy visit to President (with Vietnamese ambassador)**		English			
		13:30	14:00		**Presentation by JICA**					
		14:00	15:00		**Library ICT center**		Japanese			
					Faculty of Environment	Dr. Miyanishi	English			
		15:00	15:30		Transport by bus	N/A	N/A		Chartered bus	
		15:30	17:00	Nagasaki University (Research Center)	**Facility site visit**	Dr. Ishimatsu	English	1551-7 Taira Nagasaki City		
					Cost of research activity	Dr. Ishimatsu	English			
					Student body (Japanese and International)	Dr. Ishimatsu	English			
					Frame work of centralization of research center	Dr. Ishimatsu	English			
		17:00	17:30		**Kakuyoumaru ship visit**	Dr. Ishimatsu	English			
		17:30	17:55		Transport by ship	N/A	N/A		Togitsu to Airport	
		19:00	20:40		Transport by Airplane	N/A	N/A		ANA:HN670	
		21:00			Transport by Bus	N/A	N/A		Haneda to Ikebukuro	
2014/6/25	Wed	9:30	10:00	Tokyo University of Marine Science and Technology	Transport by Train	N/A	N/A	4-5-7,Konan,Minato-ku,Tokyo	Ikebukuro to Shinagawa	Sunsine City Price Hotel 3-1-5 Higashi Ikebukuro Toshima, Tokyo
		10:30	10:50		**Introduction**		E/J			
		10:50	11:50		**Facility site visit (dormitory, library)**		Japanese			
		11:50	13:00		Lunch	N/A	N/A			
		13:00	15:20		**Facility site visit (Research center, industry collaboration)**		E/J	4-5-7,Konan,Minato-ku,Tokyo		
		15:20	16:20		**Exchange opinions with faculty head**		Japanese			
		16:30	17:10		**Courtesy visit to President**		Japanese			
		17:30	19:30		Welcome Party by TUMSAT		Japanese			
		19:30			Transport by train	N/A	N/A		Sshinagawa to Ikebukuro	
2014/6/26	Thu		9:50	Tokyo University of Agriculture and Technology	Transport by Train	N/A	N/A	3-5-8 Saiwaicho Fuchu, Tokyo	Ikebukuro to Fuchu	Sunsine City Price Hotel 3-1-5 Higashi Ikebukuro Toshima, Tokyo
		10:00	11:00		**Environment research facility and equipment site visit**	Dr. Okayama				
		11:00	11:30		**Gene testing site visit**	Dr. Sasaki				
		11:40	12:15		**Lunch**	N/A	N/A			
		12:30	15:00		**Agriculture research site visit**	Dr. Kanekatsu		3-5-8 Saiwaicho Fuchu, Tokyo		
		15:10	15:30		**Information center and shared equipment facility site visit**	Dr. Arie				
		15:40	16:00		**Global Information office**					
		16:30	17:30		**Q & A session**					
		17:30	19:00		Welcome Party by TUAT	N/A	N/A			
		19:00			Transport by Train	N/A	N/A		Fuchu to Ikebukuro	
2014/6/27	Fri	7:22	9:00	Equipment training Center (Shimazu)	Transport by Train			380-1 Hadano, Kanagawa	Ikebukuro to Shibusawa	Sunsine City Price Hotel 3-1-5 Higashi Ikebukuro Toshima, Tokyo
		9:00	10:30							
		10:30	12:00		Transport by Train				Shibusawa to Kojimachi	
		12:00	13:00		Lunch					
		13:00	15:00	JICA	**Meeting with CTU**		English	5-25 Nibancho Chiyoda, Tokyo		
		15:00			**Back up time**		English			
					Transport by Train	N/A	N/A		Kojimachi to Ikebukuro	
		18:00			Welcome Party by Consultant	N/A	N/A	To be determined	Ikebukuro	
2014/6/28	Sat		7:30		Transport by Bus	N/A	N/A		Ikebukuro to Narita Airport 6:15 departure	
		9:30	14:00		Transport by Airplane	N/A	N/A			

Appendix 2-1

List of On-going Collaboration with Private Sector in Three Fields

List of Some of Ongoing Collaboration with Private Sector in Three Fields

Name of Company	Technology Transfer and Research Collaboration	Status	Belongings
Dong Thap Company Limited One member Agricultural Development Services (DASCO)	Microorganism fertilizer Stimulating growth for rice	On-going	Biotechnology Research and Development Institute
Asia Veterinary Medicine Company Limited	Medicine for pigs	On-going	CAAB
An Phu Nong Kien Giang Joint Stock Company for Investment and Development	Organic Fertilizer	Contract Signed. A plant is under construction.	Advance Laboratory of CTU
Ca Mau Nitrogen Plant	Processing Nitrogen Fertilizer	On-Going	CTU involving many colleges and staffs
Thuan Hung Company – Hau Giang province	Transferring modern farming system of catfish (VIDATEC)	On-going	CAF
CASEAMEX – Can Tho city	Transferring technology of farming system of catfish (SUPA)	On-going	CAF
Long Phu Company- Hau Giang Province	Transferring technology of farming system of catfish (SUPA)	On-going	CAF
AFIEX Company- An Giang	Transferring Feeding technology for snake-head fish	On-going	CAF
Hoang Long Company– Dong Thap	Transferring Feeding technology for snake head fish	On-going	CAF
Uni President Company	Transferring Feeding technology for snake head fish	On-going	CAF
Hung Duong Company	Transferring technology of seed production of Catfish	Finished 2014	CAF
Truc Anh Company	Transferring technology of super-intensive shrimp farming	Under discussions	CAF
TEXCHEM Company - Malaysia	Transferring technology of Mud crab seed production and culture	Under discussions	CAF
ENOVIK Company	Trials on Feeding of white leg shrimps and catfish	On-going	CAF
DASCO	Microorganic fertilizer (DASVILA)	On-going	BiRDI
Province Seed centers (13 provinces in Mekong delta)	Rice cultivars	On-going	MDI
Bui Van Ngo (VITALIS)	Bought and distribution of rice product	Under-discussion	Prof. Vo Cong Thanh, Department of Agricultural Genetics & Breeding, CAAB
Long An Department of Science & Technology	Rice (aromatic, acid sulphate soil, saline tolerance)	On-going (doing research)	Prof. Vo Cong Thanh, Department of Agricultural Genetics & Breeding, CAAB

Name of Company	Technology Transfer and Research Collaboration	Status	Belongings
GREENFEED Animal Feed Company	Feed, animal breed, product quality and performance	On-going	Department of Animal Science, CAAB
CARGILL Animal Feed company	Feed, animal breed, product quality and performance	On-going	Department of Animal Science, CAAB
DE HEUS Animal Feed company	Feed, animal breed, product quality and performance	On-going	Department of Animal Science, CAAB
EMIVEST Animal Feed company	Feed, animal breed, product quality and performance	On-going	Department of Animal Science, CAAB
CP Group Animal Feed company	Feed, animal breed, product quality and performance	On-going	Department of Animal Science, CAAB
Hau Giang Department of Science and Technology	Selection of some local chicken breeds (Tau Vang, Sao) with good growth and high meat quality	On-going	Department of Animal Science, CAAB
Bac Lieu Department of Science and Technology	Modeling of livestock farms	Under discussions	Department of Animal Science, CAAB
Ca Mau Department of Science and Technology	Genetic resources conservation of local chickens and dogs	On-going	Department of Animal Science, CAAB
Dong Thap Department of Science and Technology	Cooperation in Agriculture development	Under discussions	Department of Animal Science, CAAB
Soc Trang Department of Science and Technology	Modeling of dairy farm system	On-going	Department of Animal Science, CAAB
Vinh Long Department of Science and Technology	Modeling of beef cattle production	Under discussions	Department of Animal Science, CAAB
An Giang Department of Science and Technology	Modeling of beef cattle production	Under discussions	Department of Animal Science, CAAB
Ben Tre Department of Science and Technology	Cooperation in agriculture development	Under discussions	Department of Animal Science, CAAB
Kien Giang Foodstuff Canning Joint Stock Company	+ Heat penetration test. + Temperature distribution in retort.. + Calculation processing tine for current products. + Processing time determination for new products. + Energy saving and improve quality of canned products.	On-going	Prof. Vo Tan Thanh – Department of Food Technology, CAAB
Huong Giang Co., Ltd (Kien Giang province)	+ Heat penetration test. + Temperature distribution in retort. + Calculation processing tine for current products.	On-going	Prof. Vo Tan Thanh – Department of Food Technology

Name of Company	Technology Transfer and Research Collaboration	Status	Belongings
	+ Processing time determination for new products. + Energy saving and improve quality of canned products.		
Khanh Hoa Canned Food Co., Ltd	+ Heat penetration test. + Temperature distribution in retort.. + Processing time .determination for new products. + Energy saving and improve quality of canned products.	On-going	Prof. Vo Tan Thanh – Department of Food Technology
Tin Thinh Co., Ltd (Khanh Hoa province)	+ Heat penetration test. + Temperature distribution in retort.. + Calculation processing tine for current products. + Processing time determination for new products. + Energy saving and improve quality of canned products.	On-going	Prof. Vo Tan Thanh – Department of Food Technology
Special Aquatic Products Joint-Stock Company SEASPIMEX VIETNAM (Ho Chi Minh city)	+ Heat penetration test. + Temperature distribution in retort. + Calculation processing tine for current products. + Processing time .determination for new products. + Energy saving and improve quality of canned products.	On-going	Prof. Vo Tan Thanh – Department of Food Technology
West Food Company (Can Tho city)	+ Heat penetration test. + Temperature distribution in retort. + Calculation processing tine for current products. + Processing time .determination for new products. + Training course on BPCS (*Better Processing Control School*) for technical persons	On-going	Prof. Vo Tan Thanh – Department of Food Technology
Vivian Company Ltd.(Vinh Long province)	+ Heat penetration test. + Temperature distribution in retort. + Calculation processing tine for current products. + Processing time .determination for new products.	On-going	Prof. Vo Tan Thanh – Department of Food Technology

Name of Company	Technology Transfer and Research Collaboration	Status	Belongings
Cuu Long Seaproducts Company (Tra Vinh province)	+ 3D airspace and product temperature distribution in frozen storage room. + Determination the well mixed zone in 3D space of storage room. + Modeling to determination air flow pattern in 3D space of frozen storage room. + Air space and product temperature distribution in IQF. + Temperature distribution during steaming of shrimp.	On-going	Prof. Vo Tan Thanh – Department of Food Technology
To Chau Joint Stock Company (Dong Thap province)	+ 3D airspace and product temperature distribution in frozen storage room. + Determination the well mixed zone in 3D space of storage room. + Modeling to determination air flow pattern in 3D space of frozen storage room. + Air space and product temperature distribution in IQF.	On-going	Prof. Vo Tan Thanh – Department of Food Technology
SEAPRIMEXCO Vietnam (Ca Mau province)	+ 3D airspace and product temperature distribution in frozen storage room + Determination the well mixed zone in 3D space of storage room + Modeling to determination air flow pattern in 3D space of frozen storage room + Temperature distribution during steaming of shrimp	On-going	Prof. Vo Tan Thanh – Department of Food Technology
Rang Dong Company	+ High-Tech cultivation using artificial lighting systems	On-going	Department of Plant Physiology & BioChemistry
DOMESCO	Herb production: + Seeding + Planting technology + Storing technology	On-going	Departments of CAAB
An Giang Plant Protection Joint Stock Company (AGPPS)	Trico-DHCT (Bio-fertilizers)	On-going	Department of Plant Protection

Note 1 : YANMAR CO., LTD. is collaborating with College of Technology in CTU.
Note 2: COBELCO collaborated with College of Agriculture and Applied Biology from 2012 to 2014.

Appendix 3-1

Completing the Network of Universities and Colleges (Decision No. 1269/ CP-KG of Viet Nam's Prime Minister, September 6, 2004)

CHÍNH PHỦ ************	**CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM** **Độc lập - Tự do - Hạnh phúc** ************

Số: 1269/CP-KG
V/v tiếp tục hoàn thiện mạng lưới các trường đại học, cao đẳng

Hà Nội, ngày 06 tháng 9 năm 2004

Kính gửi:
- Bộ Giáo dục và Đào tạo,
- Bộ Kế hoạch và Đầu tư,
- Bộ Nội vụ,
- Bộ Tài chính,

Xét đề nghị của Bộ Giáo dục và Đào tạo tại tờ trình số 2293/KHTC ngày 25/3/2004 về kế hoạch triển khai Quyết định số 47/2001/QĐ-TTg ngày 04/4/2001 về quy hoạch mạng lưới các trường đại học và cao đẳng Việt Nam giai đoạn 2001 - 2010, Thủ tướng Chính phủ có ý kiến như sau:

1. Đồng ý xây dựng một số cơ sở đại học trọng điểm như sau:

- Đại học Quốc gia Hà Nội,

- Đại học Quốc gia thành phố Hồ Chí Minh,

- Đại học Thái nguyên,

- Đại học Huế,

- Đại học Đà Nẵng.

- Trường Đại học Sư phạm Hà Nội,

- Trường Đại học Sư phạm thành phố Hồ Chí Minh,

- Trường Đại học Bách khoa Hà Nội,

- Trường Đại học Nông nghiệp I Hà Nội,

- Trường Đại học Kinh tế quốc dân Hà Nội,

- Trường Đại học Y Hà Nội,

- Trường Đại học Kinh tế thành phố Hồ Chí Minh,

- Trường Đại học Y thành phố Hồ Chí Minh,

- Trường Đại học Cần Thơ.

2. Bộ Giáo dục và Đào tạo

a. Chỉ đạo xây dựng đề án đổi mới giáo dục đại học, trong đó quy định các tiêu chí cụ thể của các trường đại học trọng điểm, khoa, ngành trọng điểm; có kế hoạch chỉ đạo triển khai cụ thể.

b. Chỉ đạo, hướng dẫn các trường đại học, cao đẳng, chọn lọc đưa vào thí điểm đào tạo một số chương trình và giáo trình tiên tiến, hiện đại thuộc các ngành khoa học tự nhiên, kỹ thuật - công nghệ và quản lý kinh tế đang được giảng dạy ở các trường đại học nước ngoài phù hợp với yêu cầu phát triển của Việt Nam.

c. Chủ trì, phối hợp với Bộ Kế hoạch và Đầu tư xây dựng và triển khai thực hiện đề án "Đổi mới phương pháp giao chỉ tiêu tuyển sinh đại học, cao đẳng hàng năm" gắn với điều kiện bảo đảm chất lượng đào tạo của trường, khả năng đáp ứng của ngân sách nhà nước, nhu cầu sử dụng nhân lực và yêu cầu học tập của xã hội.

3. Về mạng lưới trường đại học, cao đẳng:

a. Về đại học:

- Thành lập một số trường đại học thuộc một số lĩnh vực (đặc biệt trong lĩnh vực xã hội) đang có nhu cầu cấp bách về cán bộ nhưng chưa có trường đào tạo.

- Thành lập một số trường đại học dân lập ở một số tỉnh đã có điều kiện phát triển, có nhu cầu đào tạo nhưng chưa có hoặc có ít trường đại học, cao đẳng.

- Khuyến khích các trường liên kết đào tạo với các cơ sở đào tạo có chất lượng cao của nước ngoài trong lĩnh vực khoa học - công nghệ.

- Thí điểm thành lập một số trường đại học tư thục.

- Đối với một số tỉnh ở các vùng theo quy hoạch về lâu dài cần có trường đại học như trước mắt còn khó khăn, Bộ Giáo dục và Đào tạo nghiên cứu giao cho một số trường đại học mạnh, dựa vào các cơ sở đào tạo sẵn có ở địa phương, chuẩn bị các điều kiện làm cơ sở để phát triển thành trường đại học vào giai đoạn 2006 - 2010.

b. Về cao đẳng:

- Đồng ý thành lập mới một số trường cao đẳng ở các địa phương, đặc biệt là những địa phương khó khăn. Tiến hành tổng kết mô hình trường cao đẳng cộng đồng để có thể nhân rộng mô hình này.

- Đồng ý thí điểm thành lập một số trường cao đẳng tư thục.

4. Bộ trưởng Bộ Giáo dục và Đào tạo chỉ đạo triển khai các công việc nói trên theo quy định hiện hành và thường xuyên báo cáo Thủ tướng chính phủ kết quả thực hiện.

KT. THỦ TƯỚNG CHÍNH PHỦ
PHÓ THỦ TƯỚNG

Phạm Gia Khiêm

(Translation)

PRIME MINISTER
****

SOCIALIST REPUBLIC OF VIETNAM

Independence – Freedom – Happiness
****

No: 1269/CP-KG
V/v completing the network of universities and colleges

Hanoi, September 06th 2004

To: - MOET;
- MPI;
- Ministry of Finance;
- Ministry of Home Office,

Considering the Proposal of the Ministry of Education and Training at the Statement No.2293/KHTC dated 25/3/2004 on implementation plan of Decision No.47/2001/QĐ-TTg dated 04/4/2001 on planning the network of universities and colleges period 2001 - 2010, Prime Minister has the following comments:

1. Agree to build some major universities as below:

- Vietnam National University – Hanoi,
- Vietnam National University – Ho Chi Minh City,
- Thai Nguyen University,
- Hue University,
- Da Nang University.
- Hanoi University of Education,
- Ho Chi Minh City University of Education,
- Hanoi University of Science & Technology,
- Hanoi University of Agriculture I,
- Hanoi National Economics University,
- Hanoi Medical University,
- University of Economics, Ho Chi Minh City,
- Ho Chi Minh City Medical University,
- Can Tho University.

2. MOET

a. To direct the project formulation of the innovation of higher education, in which stipulates the specific criteria of the major universities, faculties, fileds; have plans to direct a specific implementation.

b. To direct, guide the universities, colleges, select to implement the pilot training of some advanced and modern programs and curriculums in the fields of natural science, technology - technical and business management being taught in a foreign university in accordance with the requirements of development of Vietnam.

c. To chair and coordinate with the Ministry of Planning and Investment in the establishment and implementation of the project "Renewal methods of annual enrollment allotment of universities, colleges" associated with conditions that ensure the training quality of schools ability to meet the state budget, needs of human resources use and learning requirements of society.

3. Network of universities, colleges:

a. For universities:

- Establish some universities in fields (particularly in social sectors) are in urgent need of staff but have not yet the training schools.

- Establish some private universities in several provinces have developed conditions, training needs but they have not got or got few universities and colleges.

- Encourage the joint training with high-quality training institutions of foreign countries in the scientific - technology field.

- Pilot establishment of several private universities.

- For some provinces in the region under long-term planning needed university but still got some difficulties, the Ministry of Education and Training assigned the strong universities, based on the available institution in the localities, to prepare conditions as the basis for university development in the period 2006 – 2010.

b. For colleges:

- Agree the new establishment of colleges in some localities, especially the disadvantaged areas. Conduct a model of community college to be able to replicate this mode.

- Agree the pilot establishment of private colleges.

4. Ministry of Education and Training directs the implementation of the above works under the current regulations and regularly reports to the Prime Minister about the results.

P/P PRIME MINISTER
DEPUTY PRIME MINISTER

Phạm Gia Khiêm

Appendix 3-2

CTU Staff Strength (As of December 31, 2013)

CTU Staff Strength

<Units with students>

No	Unit	All Staff Total by Degree	Doctor	Master	BSc & College	Other	Teaching Staff Total by Title	(Prof.)	(A/Prof.)	(Senior Lecturer)	(Lecturer)	Ph.D ratio of teaching Staff (%)
1	College of Agriculture and Applied Biology	162	61	61	9	31	121	4	24	20	73	50.4
2	College of Aquaculture and Fisheries	68	32	24	7	5	57	1	12	11	33	56.1
3	College of Environment and Natural Resources	61	19	34	6	2	57	1	8	5	43	33.3
4	College of Engineering and Technology	194	20	91	65	18	161		1	21	139	12.4
5	College of Information & Communication Technology	78	14	32	28	4	60		2	10	48	23.3
6	College of Rural Development	48	3	14	21	10	31		2		29	9.7
7	College of Natural Sciences	122	18	59	27	18	93		2	22	69	19.4
8	School of Economics and Business Administration	131	19	73	37	2	124		5	9	110	15.3
9	School of Political Science	37	5	21	9	2	31			9	22	16.1
10	School of Social Sciences and Humanities	97	7	60	29	1	94			21	73	7.4
11	School of law	67	5	22	39	1	60			2	58	8.3
12	School of Education	207	26	124	50	7	184		6	51	127	14.1
13	Department of Physical Education	22	1	15	4	2	18			4	14	5.6
14	Biotechnology Research and Development Institute	30	11	9	7	3	22	1	7		14	50.0
15	Mekong Delta Development Research Institute	19	10	5	2	2	16		3	2	11	62.5
16	National Defense Education Center	21			20	1	19				19	0.0
17	School of Pre-University	14		10	1	3	9			2	7	0.0
	Units with Students Total	1378	251	654	361	112	1157	7	72	189	889	21.7
	<Units without students>											
18	Research Institute for Climate Change	1		1			0					-
19	Graduate School	10	2	3	4	1	4		1		3	50.0
20	Center for Foreign Language	11	1	9	1		9			4	5	11.1
21	Cooperative Training Center	4		1	3		0					-
22	Software Center	2		2			2			1	1	0.0
23	Learning Resource Center	41		7	22	12	1				1	0.0
24	Quality Assurance and Testing Center	9	1	3	5		3				3	33.3
25	Information and Network Management	14		3	11		1				1	0.0
25	Center for Services &Technology Transfer	3	1		2		1			1		100.0
26	CTU Publishing House	6	1		2	3	1		1			100.0
28	Administration and Planning Department	36		1	5	30	0					-
29	Personnel Department	29		2	10	17	2			1	1	0.0
30	Finance Department	16		3	7	6	1			1		0.0
31	Facility Management Department	24		1	7	16	1				1	0.0
32	Academic Affairs Department	11	1	2	7	1	2		1	1		50.0
33	Research Affairs Department	8	3	2	3		4		2		2	75.0
34	International Relations Department	11	3		8		3		1	1	1	100.0
35	Student Assistance Department.	18	1	2	12	3	0					-
36	Political Affairs Department	8		1	4	3	0					-
37	Legality Department	4			4		1				1	0.0
38	Construction Management Office	6		2	4		2			2		0.0
39	High School Teacher Practice	12		8	2	2	0					-
40	Communist Party, unions and Associations Office	10		1	9		2				2	0.0
41	Office of Institutional Council for Professor Title & Emulation and Reward	1		1			0					-
	Unit without Students Total	295	14	55	132	94	40	0	6	12	22	
	Total	1673	265	709	493	206	1197	7	78	201	911	22.1

Contract staff paid by the units: 351

Note:

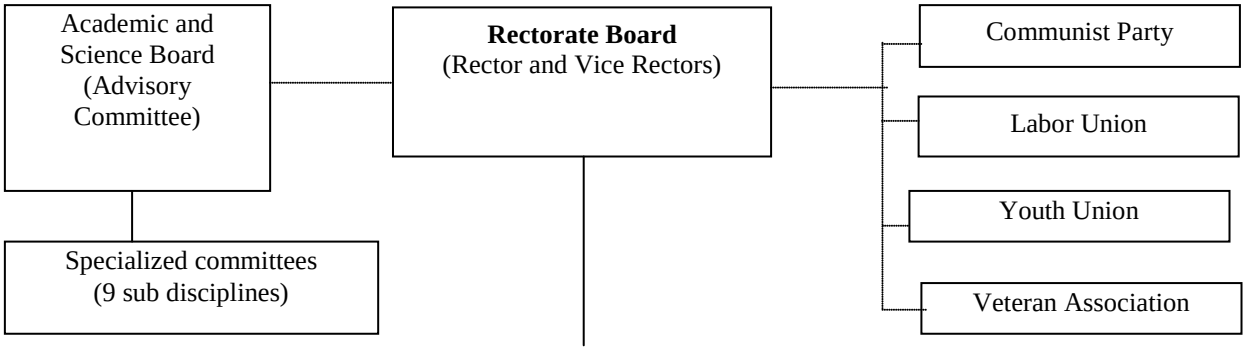
- The number of teaching staff (with PhD holders) is including Prof. and A. Prof. (O is including K and L).

- There are 267 PhD holders including 264 teaching staff and 1 admin. staff (Student Assistance Department) and 2 researchers (one person works in College of Agriculture and Applied Biology and one person works in Software Center. Both of them receive salary from their College and Center so they were not counted in this file. 1673 staff in this file receive salary from CTU)

Appendix 3-3

Organization Structure of CTU

STRUCTURE OF CAN THO UNIVERSITY IN 2013



COLLEGES/SCHOOLS	INSTITUTES/ CENTERS	DEPARTMENTS/ OFFICES
College of Agriculture & Applied Biology	Biotechnology Research and Development Institute	International Relations Department
College of Aquaculture & Fisheries	Mekong Delta Development Research Institute	Administration and Planning Department.
College of Engineering Technology	Research Institute for Climate Change	Academic Affairs Department
College of Environment & Natural Resources	Cooperative Training Center	Facility Management Department
College of Natural Sciences	CTU Lab School	Finance Department
School of Economics & Business Administration	Information and Network Management	Legality Department
Graduate School	Learning Resource Center	Personnel Department
School of Education	Quality Assurance and Testing Center	Political Affairs Department
School of Law	Center for Services and Technology Transfer	Research Affairs Department
School of Political Science		Student Assistance Department.
School of Pre-University		Construction Management Office
School of Social Sciences & Humanities		Office of Institutional Council for Professor Title & Emulation and Reward
Department of Physical Education		
College of Information & Communication Technology	Software Center	
College of Rural Development	Center for Foreign Language	CTU Publishing House

Campus 3

Hoa An (Campus 4)

Campus 1

RECTORATE BOARD
Assoc. Prof. Dr. Ha Thanh Toan, Rector
Assoc. Prof. Dr. Tran Thi Thanh Hien, Vice Rector
Assoc. Prof. Dr. Le Viet Dung, Vice Rector
Assoc. Prof. Dr. Do Van Xe, Vice Rector
Prof. Dr. Nguyen Thanh Phuong, Vice Rector
Assoc. Prof. Dr. Tran Trung Tinh, Vice Rector

UNIONS
Mr. Nguyen Van Linh, Head of Labor Union
Mr. Le Thanh Son, Head of Youth Union
Assoc. Prof. Bui Van Trinh, Head of Veteran

ACADEMIC UNITS
College of Agriculture and Applied Biology: The college offers education programs.
Assoc. Prof. Dr. Le Van Hoa, Dean
Assoc. Prof. Dr. Ly Nguyen Binh, Vice Dean
Assoc. Prof. Dr. Nguyen Minh Thuy, Vice Dean
Dr. Nguyen Van Hon, Vice Dean

College of Aquaculture and Fisheries: The college offers education programs.
Assoc. Prof. Dr. Truong Quoc Phu, Dean
Assoc. Prof. Dr. Tran Ngoc Hai, Vice Dean
Assoc. Prof. Dr. Vu Ngoc Ut, Vice Dean
Dr. Nguyen Thanh Long, Vice Dean

College of Engineering Technology: The college offers education programs.
Dr. Nguyen Chi Ngon, Dean
Dr. Truong Chi Thanh, Vice Dean
Dr. Nguyen Van Cuong, Vice Dean
Dr. Tran Thanh Hung, Vice Dean

College of Environment and Natural Resources: The college offers education programs.
Assoc. Prof. Dr. Nguyen Hieu Trung, Dean
Assoc. Prof. Dr. Nguyen Van Cong, Vice Dean
Dr. Nguyen Xuan Hoang, Vice Dean
Mr. Le Hoang Viet, Vice Dean

College of Information & Communication Technology: The college offers education programs.
Assoc. Prof. Dr. Tran Cao De, Dean
Assoc. Prof. Dr. Huynh Xuan Hiep, Vice Dean
Dr. Ngo Ba Hung, Vice Dean
Mr. Doan Hoa Minh, Vice Dean

College of Natural Sciences: The college offers education programs.
Assoc. Prof. Dr. Bui Thi Buu Hue, Dean
Dr. Nguyen Thanh Tien, Vice Dean
Dr. Ngo Thanh Phong, Vice Dean
Dr. Nguyen Huu Hoa, Vice Dean

College of Rural Development: The college offers education programs.
Assoc. Prof. Dr. Nguyen Duy Can, Dean
Assoc. Prof. Dr. Nguyen Ngoc De, Vice Dean
Dr. Cao Quoc Nam, Vice Dean

School of Economics and Business Administration: The school offers education programs.
Assoc. Prof. Dr. Vo Thanh Danh, Dean
Assoc. Prof. Dr. Le Khuong Ninh, Vice Dean
Assoc. Prof. Dr. Luu Thanh Duc Hai, Vice Dean
Assoc. Prof. Dr. Truong Dong Loc, Vice Dean

School of Education: The school offers education programs.
Dr. Trinh Quoc Lap, Dean
Assoc. Prof. Dr. Nguyen Van No, Vice Dean
Dr. Tran Van Lua, Vice Dean
Dr. Nguyen Thi Thu Thuy, Vice Dean
Mr. Nguyen Thanh Binh, Vice Dean

School of Graduate : In charge of administrative work for graduate programs
Assoc. Prof. Dr. Mai Van Nam, Dean
Mr. Nguyen Vinh An, Vice Dean
Dr. Dang Thi Ngoc Lan, Vice Dean

School of Law: The school offers education programs
Dr. Le Thi Nguyet Chau, Dean
Mr. Diep Thanh Nguyen, Vice Dean
Dr. Phan Trung Hien, Vice Dean

School of Political Science : The school offers education programs. It has its own students. In additional it teaches courses realted to political sciences for all education programs at CTU.
Dr. Le Duy Son, Dean
Dr. Tran Van Hieu, Vice Dean
Dr. Le Ngoc Triet, Vice Dean

School of Social Sciences and Humanities: The school offers education programs.
Dr. Thai Cong Dan, Dean
Dr. Dao Ngoc Canh, Vice Dean
Dr. Diep Kien Vu, Vice Dean
Dr. Nguyen Kim Chau, Vice Dean

School of Pre-University: In charge of training for pre- university courses, and candidates in disadvantage areas to prepare basic knowledge to meet requirements to enter university.
Mr. Dang Van Thuan, Dean
Mr. Son Chanh Da, Vice Dean

Department of Physical Education: The department offers physical education program. It has its own students. In additional it teaches courses realted to physical education for all education programs at CTU.
Mr. Nguyen Van Hoa, Director
Ms. Tran Thi Xoan, Deputy Director
Mr. Nguyen Van Thai, Deputy Director

Biotechnology Research and Development Institute: It is research institute. However, it also offer education programs in Biotechnology, Microbiology. It has its own students.
Assoc. Prof. Dr. Tran Nhan Dung, Director
Assoc. Prof. Dr. Nguyen Van Thanh, Deputy Director
Assoc. Prof. Dr. Ngo Thi Phuong Dung, Deputy Director

Mekong Delta Development Research Institute: It is research institute only. However, it also offer education programs in Rural Development. Its has its own students.
Assoc. Prof. Dr. Nguyen Van Sanh, Director
Dr. Vu Anh Phap, Deputy Director
Dr. Dang Kieu Nhan, Deputy Director

Research Institute for Climate Change: It is research institute only. It does not have its own students.
Prof. Dr. Le Quang Tri, Director
Dr. Le Anh Tuan, Deputy Director

Center of Foreign Languages: The center offers languages courses (English and French) with certificates for CTU students and others.
Dr. Luu Nguyen Quoc Hung, Director
Mr. Nguyen Buu Huan, Deputy Director
Mr. Tran Quoc Hung, Deputy Director

Center of National Defense Education: The center offers courses on National Defense Education to all CTU students.
Assoc. Prof. Dr. Ha Thanh Toan, Director
Mr. Nguyen Vinh Ninh, Deputy Director
Mr. Cao Ngo Bau, Deputy Director

Cooperative Training Center: In charge of administrative work for informal (in service) undergraduate programs, including distant education programs.
Mr. Pham Phuong Tam, Director
Ms. Pham Thi Ngoc Suong, Deputy Director
Mr. Trinh Trung Hung, Deputy Director

Learning Resource Center: In charge library, university learning resource
Mr. Nguyen Hoang Vinh Vuong, Director
Ms. Nguyen Thi Tuyet Trinh, Deputy Director

SUPPORTIVE UNITS
Construction Management Board: *Website: http://websrv2.ctu.edu.vn/dept/dcm*
Functions and tasks: To advise the Rectorate Board in management of all new construction works towards overall development planning cases. Test the quality of materials, building components, installed equipments as required by the design and the approved standards.
Dr. Tran Trung Tinh, Director
Mr. Tran Van Phan, Deputy Director

Department of Academic Affairs: *Website: http://websrv2.ctu.edu.vn/dept/daa*
Functions and tasks: To help the Rector in orientating, developing of training programs, training plans, managing of regular bachelor programs about teaching and learning, curriculum work; to advise the Rector in solving problems arising in the process of training.
Mr. Nguyen Minh Tri, Director
Ms. Vo Thi Ngoc My, Deputy Director

Department of Administration and Planning: *Website: http://websrv2.ctu.edu.vn/dept/dap*
Functions and tasks: to help the Rector and the Rectorate Board in organizing and operating all administrative and clerical activities. To advise the Rectorate Board in planning, monitoring of the performance of plans of the university.
Mr. Duong Thanh Long, Director
Mr. Trinh Ngoc Hoa, Deputy Director
Mr. Nguyen Trong Hieu, Deputy Director

Department of Facility Management: Website: http://websrv2.ctu.edu.vn/dept/dfm
Functions and tasks: to advise the Rectorate Board in planning, management the use of University facilities. Manage and supervise the regularly repairing of houses – structural objects, electric - water - phone systems; monitor, manage the asset procurement and disposal in the University.
Mr. Le Phi Hung, Director
Mr. Le Thanh Phieu, Deputy Director

Department of Financial Affairs: *Website: http://websrv2.ctu.edu.vn/dept/dfa*
Functions and tasks: to advise the Rector on orientations and measures of financial management regulations, take the financial decision of the Rector. Implement the procedures for financial transactions with organizations and individuals inside and outside of University; inspect and control the implementation of the financial management regulations.
Mr. Nguyen Van Duyet, Director
Mr. Vu Xuan Nam, Deputy Director

Department of International Relations: *Website: http://websrv2.ctu.edu.vn/dept/dir*
Functions and tasks: To advise the Rector and the Rectorate Board in the management, implementation of the work of international cooperation of the University. Support professional knowledge and provide information for the University's units to draw up plans, projects and to manage the projects which are being done.
Dr. Nguyen Van Be, Director
Mr. Pham Xuan Binh, Director

Department of Legality: *Website; http://websrv2.ctu.edu.vn/dept/dl*
Functions and tasks: To advise and assist the Rector in implementing the State's inspection authority within the University to promote effective management, ensure and improve the quality of education and training of the University. To ensure that the University will operates under the laws and follow the rule of legislation.
Mr. Vo Xuan Thang, Director
Mr. Tran Van Phuoc, Deputy Director
Mr. Le Van Lam, Deputy Director

Department of Personnel: *Website: http://websrv2.ctu.edu.edu.vn/dept/dp*
Functions and tasks: To help the Rector in the management, planning, training and retraining of staffs, officers and consolidating the organizing of the apparatus; ensure correctly and timely in implementing of the policies of the State for staffs and officers; effectuate the security and order in the University campus.
Mr. Nguyen Van Tri, Director
Ms. Nguyen Thi Kim Loan, Deputy Director

Department of Political Affairs: *Website: websrv2.ctu.edu.vn/dept/dpa*
Functions and tasks: understand the political and ideological situation of the staffs and students, recommend to the Rector guidelines and measures for this work. Organize students and staffs for learning current political issues and news. Coordinate with other units to build a healthy educational environment.
Mr. Tran Thien Binh, Deputy Director
Mr. Vo The Nam, Deputy Director

Department of Research Affairs: *Web: http://websrv2.ctu.edu.vn/dept/dra*
Functions and tasks: To help the Rector and the Rectorate Board in managing the scientific and technological activities of the University. Develop plans, orient in developing of scientific research work and plans of scientific and technological activities of the University. Manage the transfer of scientific advance and enforcement of intellectual property rights.
Assoc. Prof. Dr. Le Van Khoa, Director
Dr. Le Nguyen Doan Khoi, Deputy Director

Information and Network Management Center: *Website: http;//inac.ctu.edu.vn/*
Functions and tasks: To advise the Retorate Board in the building, management and development of the infrastructure of the computer system, services and applications on the network and the Website of the University. Publish scientific journal of the University. Manage and develop the Network Operation Center of Mekong Delta Region (NOC-CT) on the Vietnam Research and Education Network (VINAREN-TEIN2).
Mr. Luu Trung Duong, Director
Mr. Tran Thanh Dien, Deputy Director

Department of Student Affairs: *Website: http://websrv2.ctu.edu.vn/dept/dfa*
Functions and tasks: To advise the Rectorate Board in the management of students, implement the policies of the State, the rules of the University to students. To advise the Board in management all aspects of activities of students' lives.
Dr. Nguyen Thanh Tuong, Director
Mr. Pham Van Hien, Deputy Director
Mr. Phan Quang Vinh, Deputy Director

Quality Assurance and Testing Center : In charge of quality assurance application, several types of university evaluation activities, including by students, staff, and companies
Dr. Phan Huy Hung, Director
Mr. Nguyen Khanh Son, Deputy Director

Center for Services and Technology Transfer : In charge of education service and technology transfer and related finance Dr. Le Thanh Phong, Director
Mr. Dang Van Bach, Deputy Director
Mr. Le Trung Hieu, Deputy Director

Software Center: In charge of developing software for selling or for CTU
Mr. Nguyen Hoang Viet, Director
Mr. Nguyen Phu Truong, Deputy Director
Mr. Le Hoang Thao, Deputy Director

Can Tho University Publishing House: In charge of printing, editing books/ journals for selling
Assoc. Prof. Bui Van Trinh, Director
Mr. La Huu Chau, Deputy Director

Office of Institutional Council for Professor Title & Emulation and Reward: Functions and tasks: to track, manage, organize and advise and assist the Rector in the work related to consideration of the title Professor, Associate Professor of the University. Track, manage, organize and advise and assist to the Rector in the work related to emulation and generally in the University.
Mr. Truong Chi Hai, Director

Appendix 3-4

Some Target Indicators in CTU Strategic Plan 2007–2020, CTU Strategic Plan 2014–2022

(Unofficial Translation)

MINISTRY OF EDUCATION AND TRAINING **SOCIALIST REPUBLIC OF VIETNAM**

No.: 6004/QD-BGDDT **Independence – Freedom – Happiness**

Ha Noi, September 21st, 2007

DECISION
Approving "Overall developing Can Tho University Plan toward 2020" Project

MINISTER OF EDUCATION AND TRAINING

Pursuant to Decree No. 86/2002/ND-CP on November 5th, 2002 of Central Government stipulating the function, responsibility and authority of Ministry, Ministerial agency and Governmental agency;

Pursuant to Decree No. 85/2003/ND-CP on July 18th, 2003 of Central Government stipulating the function, responsibility and authority and structure of Ministry of Education and Training;

Pursuant to Decision No. 121/2007/QD-TTg on July 27th, 2007 of the Prime Minister about approving the planning of university and college network period 2006 – 2020;

Pursuant to Resolution of Central Government No. 14/2005/NQ-CP on November 12th, 2005 about renewing basically and completely the university education of Vietnam period 2006 – 2020;

Pursuant to Decision No. 20/2006/QD-TTg on January 20th, 2006 of the Prime Minister about Education, training and vocational development in the Mekong Delta region toward 2010 and orientation toward 2020;

Considering the recommendation of Director General of Planning-Finance Department,

DECISION:

Article 1: Approving "Overall developing Can Tho University Plan toward 2020" with the main contents as following:

1. General objectives:

Improving Can Tho University toward 2020 to be a major university of interdisciplinary and multisector; centre for education, scientific and technology transfer of the Mekong Delta region; a high prestige name among industrial sector and entrepreneurs.

2.4. Facilities

The overall plan of the University toward 2020 includes 190 ha, in which 128 ha is used for education and research purposes; 51 ha is the public area and 11 ha is used for building of dormitory for teachers and university officials, divided as:

- Operation center: main functions are: management, training, development research (Rectorate building, conference halls, lecture halls, classrooms, education department, laboratories, electronic library, graduate school, etc.);
- Research zone and technology transfer (including institutes, research and technology transfer centers)
- Workshops, stations, experimental farms;
- Sport center, culture center, military training center;
- Dormitory

2.5. Budget

The total budget for implementing the plan until 2020 is 5,900 billion VND, which is divided as following:

- State budget: 3,100 billion VND, accounting for 52.5%;
- Generating from education, research and technology transfer activities: 1,800 billion VND, accounting for 8.5%
- From other sources: 500 billion VND, accounting for 8.5%

3. Implementation:

The following actions have to carry out in order to accomplish the mentioned above objectives and implement Resolution No. 14 of Central Government about renewing basically and completely the university education of Vietnam toward 2020:

3.1. The university should focus in improving the capacity and number of lecturers, management officials and scientific research; recruiting excellent students to improve the quality of lecturers; encouraging for higher education of officials and lecturers by grants from different sources; improving policy to attract more national and international experts to participating in teaching at the university.

- The university should pay more attention in capacity building for the lecturers, officials and researchers.

4. Phases of the Project:

4.1 Period 2007 – 2010:

- Completing land planning, maintaining and upgrading existing structures and buildings; constructing new lecture halls, classrooms, offices, library of colleges, established research institutes; prompting the planning and completing project of new areas; paying special attention on biotechnology, post harvest technology, environment and natural resource management, etc.

- Starting construction of new structures such as working place of College of Aquaculture and Fisheries; Center for Graduate education; Building 1 – College of Economics and Business Administration; Biotechnology Research and Development Institute; School of Pre-University; College of Information and Communication Technology; Building 2 – working place of Department of Marx – Lenin; 3 dormitories and canteens.

- Investing and completing existing laboratories.

- Adjusting budget for capacity building of lecturers which would be 70% of lecturers holding graduate degree (PhD – 25%, Msc – 45%) in 2010. Every year, 100 lecturers and researchers would be appointed for higher education nationally and internationally (in which 20% would study by different grants).

4.2 Period 2011- 2015:

- Maintaining and constructing other classrooms, offices, library and laboratory of each college; constructing Mekong Delta Development Research Institute, School of

Social Sciences and Humanities, School of Economics and Business Administration, School of Natural Sciences, School of Aquaculture and Fisheries and College of Engineering Technology, Sport center and swimming pool, 5 dormitories and 3 canteens.

- Constructing new offices so each professor, associate professor and doctor having individual work place in the university.

- Investing in facilities for laboratories.

- Adjusting budget so that 85% of lecturers holding graduate degree (PhD – 40%, Msc – 45%) in 2015.

3. Department of Personnel is responsible for monitoring the implementation of development of lecturers and officials from 2007 to 2020 at Can Tho University; assessing and guiding the implementation the enhancement of Can Tho University lecturers and officials.

4. Department of University and Graduate Education is responsible for monitoring the implementation of advance courses of Can Tho Universtiy, building up advance teaching methodology; guiding the university in preparation for developing to a excellence university belonging to the top 10 Universities of Asia in 2020.

5. Department of Science and Technology is responsible for monitoring and helping in the implementation of research in application new technology into teaching, especially in Biotechnology, Material technology; giving priority for scientific research in term of budget.

6. Department of International Relation is responsible for monitoring and creating favorable conditions for the University to develop the cooperation in education and research with other prestige universities in the region and on the world; cooperating with the 322 project for capacity building of lecturers and official through higher education in other advanced countries; cooperating with the University and related Departments for policy making in order to attract scientists to come for teaching and research at the Can Tho University.

Article 3: Chiefs of Offices and Head of related Department named in the Article 2, Ministerial Departments and Rector of Can Tho University are **responsible** for implementing this Decision./.

Recipients:
- As Article 3;
- Prime Minister, Deputy Prime Ministers;
- Office of the Government;
- Southwest Steering Committee;
- Ministry of Planning & Investment;
- Ministry of Finance;
- Ministry of Internal Affairs;
- People's Committee of Can Tho City;
- People's Committee of Mekong Delta Provinces;
- Deputy Ministers

On behalf of The Minister

Permanent Deputy Minister

(Signed)

Banh Tien Long

Some Indicators from CAN THO UNIVERSITY – DEVELOPMENT PLAN TO 2020

Table 1: Undergraduate education plan to 2010, 2015 và 2020

	2006	2007	2008	2009	**2010**	**2015**	**2020**
Undergraduate	17,590	19,780	21,490	23,180	**24,560**	**26,674**	**25,000**
Increase rate (%)		12.5	8.6	7.9	**6.0**	**0.993**	**0.987**
Master	1,250	1,434	1,631	1,928	**2,087**	**3,326**	**5,000**
Increase rate (%)		14.7	13.7	18.2	**8.2**	**7.9**	**6.8**
Total	**18,840**	**21,214**	**23,121**	**25,108**	**26,647**	**30,000**	**30,000**

Table 2: Recruiment and total students in different levels and education types

Education levels and types	Year 2010		Year 2015		Year 2020	
	Recruitment	Total students	Recruitment	Total students	Recruitment	Total students
Undergraduate	6,230	24,560	6,184	26,674	5,654	25,000
Master	698	2,087	1,180	3,326	1,744	5,000
Total (Full time)	**6,928**	**26,647**	**7,364**	**30,000**	**7,398**	**30,000**
Per-request	180	180	280	280	280	280
Pre-University	160	160	260	260	260	260
Second Diploma	200	800	200	800	200	800
Tranferred Programs	400	1,000	400	1,200	400	1,200
Working-study part time	4,500	15,200	5,000	19,400	5,000	20,000
Distance Learning	300	600	650	2,650	900	3,950

Table 3: Education scales by colleges

College	Year 2010		Year 2015		Year 2020	
	Undergr	Grad.	Undergr	Grad.	Undergr	Grad.
+ School of Education	3,320	282	3,490	412	3,060	494
+ College of Engineering Technology	3,810	60	4,570	266	4,689	758
+ School of Economics and BA	3,600	180	3,289	194	2,590	253
+ College of Agriculture & Applied Biology	3,380	487	4,060	721	3,650	896
+ College of Natural Sciences	840	435	1,030	437	760	738
+ College of Aquaculture & Fisheries	1,840	120	1,600	204	1,400	285
+ College of ICT	1,220	60	1,250	214	1,250	265
+ School of Law	1,000	54	1,100	96	800	120
+ School of Political Science	360	0	850	54	1.200	120
+ College of Information technology	1090	0	1070	18	1194	120
+ College of social-science and humanities	1420	100	2020	262	2307	342
+ College of Environment & Natural Resource	1090	180	1055	294	1100	355
+ College of Physical Education	200	0	200	0	200	0
Other Units						
+ Mekong Delta Development Research Institute	390	62	400	68	280	94
+ Learning Resource Center	300	0	290	18	240	60
+ Biotechnology Research & Development Inst	400	67	400	68	280	100
Sub-total	**24,260**	**2,087**	**26,674**	**3,326**	**25,000**	**5,000**
Total in CTU	**26,347**		**30,000**		**30,000**	
+ School of Pre-University	340		540		540	

b) Research scales

TT	Types of research projects	2006-2010	2011-2015	2016-2020
		# projects	# projects	# projects
01	Bilateral government collaboration	6	10	15
02	Strengthening scientific research	2	4	15
03	National	2	6	10
04	Ministerially focused	15	25	30
05	Misnisterial	150	200	250
06	Trial production	4	6	10
07	Provincial	100	120	200
08	Technology incubator park	6	10	15
	Total:	**285**	**381**	**545**

b) International training:

Unit: foreigner participants

TT	Types of training	2007	2010	2015	2020
1	Short training	150	300	600	1000
2	Long-term training	10	50	300	500
Total:		**160**	**350**	**900**	**1500**

Table 4: Requirement of staff number to 2020

Year	Total number of students	Staff groups			
		Instructors	Instructor Assistant	Adminis. staff	Total
2007	20,914	952	232	232	1,417
2008	22,821	1,001	254	254	1,508
2009	24,808	1,051	276	276	1,602
2010	**26,347**	**1,100**	**293**	**293**	**1,685**
2011	27,639	1,168	307	307	1,782
2012	28,659	1,236	318	318	1,873
2013	29,466	1,304	327	327	1,959
2014	29,852	1,372	332	332	2,035
2015	**30,000**	**1,440**	**333**	**333**	**2,106**
2016	29,964	1,472	333	333	2,138
2017	29,964	1,503	333	333	2,169
2018	29,964	1,535	333	333	2,201
2019	30,000	1,566	333	333	2,233
2020	**30,000**	**1,598**	**333**	**333**	**2,265**

Table 5: Post-graduate training plan to 2020 for instructors

Year	# Instructors	Lecturers at posgradute degrees					
		Ratio (%)	Number	Ph.D		Master	
				Ratio (%)	Number	Ratio (%)	Number
2006	*902*	*54,4*	*491*	*13,6*	*123*	*40,8*	*368*
2007	952	58	552	16	152	42	400
2008	1,001	62	621	19	190	43	430
2009	1,051	66	693	22	231	44	462
2010	**1,100**	**70**	**770**	**25**	**275**	**45**	**495**
2011	1,168	73	853	27	315	46	537
2012	1,236	76	939	29	358	47	581
2013	1,304	79	1030	31	404	48	626
2014	1,372	82	1125	33	453	49	672
2015	**1,440**	**85**	**1224**	**35**	**504**	**50**	**720**
2016	1,472	87	1280	37	544	50	736
2017	1,503	89	1338	39	586	50	752
2018	1,535	91	1397	41	629	50	767
2019	1,566	93	1457	43	674	50	783
2020	**1,598**	**95**	**1518**	**45**	**719**	**50**	**799**

Table 6: Development plan for instructors (Inst.) and instructor-assistants (Inst. Ass.) in colleges

Colleges/Schools	Year 2010		Year 2015		Year 2020	
	Inst.	Inst. Ass.	Inst.	Inst. Ass.	Inst.	Inst. Ass.
+ School of Education	168	13	219	15	229	15
+ College of Engineering Technology	124	74	177	94	227	94
+ College of ICT	49	22	56	22	64	22
+ College of Agriculture & Applied Biology	131	59	185	74	196	74
+ College of Aquaculture & Fisheries	65	29	69	29	73	29
+ College of Natural Sciences	157	24	204	24	233	24
+ School of Economics and BA	95	4	105	2	93	2
+ School of Law	38	2	51	2	47	2
+ School of Political Science	64	3	99	3	123	3
+ College of Information technology	35	21	39	21	54	21
+ School of Social Sciences and Humanities	39	2	71	3	88	3
+ College of Environment & Natural Resource	43	19	50	20	51	20
+ College of Physical Education	31	2	40	3	44	3
Other units						
+ Biotechnology Research & Development Institute	16	7	18	7	17	7
+ Mekong Delta Development Research Institute	15	7	18	7	17	7
+ Learning Resource Center	7	3	10	4	10	4
+ Can Tho Center of National Defense Education	23	2	29	3	32	3
Sub-total	**1,100**	**293**	**1,440**	**333**	**1,598**	**333**
Total:	**1,393**		**1,773**		**1,931**	

Table 7: Total number of students and staff members in CTU

YEAR	Undergraduates	Graduate students	Staff members			
			Instructor	Inst. Ass.	Admin. staff	Total
2010	**24,260**	**2,087**	**1,100**	**293**	**293**	**1,686**
2015	**26,674**	**3,326**	**1,440**	**333**	**333**	**2,106**
2020	**25,000**	**5,000**	**1,598**	**333**	**333**	**2,264**

a) Income funding sources *(Million VND)***:**

Funding sources	Total 2006 - 2010	Total 2011 - 2015	Total 2016 - 2020	Total 2006 - 20	Ratio (%)
1. State budget	**773,574**	**1,204,042**	**1,126,643**	**3,104,258**	**52.57**
1.1 For undergraduate education	313,215	393,815	389,000	**1,096,030**	
1.2 For post-graduate education	33,140	58,032	88,484	**179,655**	
1.3 For staff training	51,327	61,784	20,790	**133,901**	
1.4 For scientific research	36,000	85,000	178,500	**299,500**	
1.5 For infrastructure	280,932	542,916	338,984	**1,162,833**	
1.6 For targer programs	58,959	62,496	110,885	**232,339**	
2. Education activities	**321,657**	**651,959**	**799,521**	**1,773,136**	**30.03**
2.1 Tution fees from full time programs	155,983	325,661	428,517	**910,161**	
2.1.1 Fulltime undergraduate	139,424	268,426	330,183	**738,033**	
2.1.2 Postgraduate	16,559	57,235	98,334	**172,128**	
2.2 Tution fees from part time programs	135,120	274,800	298,800	**708,720**	
2.3 Collaborative research with provinces	20,000	40,000	60,000	**120,000**	
2.4 Research and production services	10,554	11,499	12,204	**34,256**	
3. Sponsor fundings	**180,320**	**196,120**	**146,560**	**523,000**	**8.86**
4. Other sources	**143,403**	**258,861**	**102,383**	**504,647**	**8.55**
4.1 For infrastructure	106,041	194,716	86,260	**387,018**	
4.2 For targer programs	37,361	64,144	16,123	**117,629**	
Total	**1,418,953**	**2,310,982**	**2,175,107**	**5,905,042**	**100.00**

b) Budget required *(Million VND)*:

Expense	Fungding source	Total 2006-10	Total 2011 - 15	Total 2016-20	Total
1. Full time undergraduate education	State budget	310,215	388,815	384,000	**1,083,030**
	Education activities	104,568	201,319	247,637	**553,524**
	Sub-total	*414,783*	*590,134*	*631,637*	***1,636,554***
2. Post graduate education	State budget	33,415	57,984	88,052	**179,450**
	Education activities	12,419	42,926	73,751	**129,096**
	Sub-total	*45,834*	*100,910*	*161,802*	***308,546***
3. Working-study part time	Education activities	*135,120*	*274,800*	*298,800*	***708,720***
4. Training staff	State budget	51,327	61,784	20,790	**133,901**
	Education activities	22,000	25,000	12,191	**59,191**
	Sub-total	*73,327*	*86,784*	*32,981*	***193,092***
5. Research	State budget	36,000	85,000	178,500	**299,500**
	Education activities	20,000	40,000	60,000	**120,000**
	Sub-total	*56,000*	*125,000*	*238,500*	***419,500***
6. Infracstructure	State budget	280,932	542,916	338,984	**1,162,833**
	Education activities	14,587	37,962	59,019	**111,568**
	Other funding sources	106,041	194,716	86,260	**387,018**
	Sub-total	*401,560*	*775,595*	*484,263*	***1,661,419***
7. Equipment and facilities	State budget	58,959	*62,496*	*110,885*	**232,339**
	Education activities	8,087	*30,000*	*48,555*	**86,642**
	Other funding sources	37,361	*64,144*	*16,123*	**117,629**
	Sub-total	*104,408*	*156,640*	*175,563*	***436,611***
8. Library	State budget	3,000	5,000	5,000	**13,000**
	Education activities	4,600	0	0	**4,600**
	Sub-total	*7,600*	*5,000*	*5,000*	***17,600***
10. Sponsor funding	Staff training	101,760	108,960	46,560	**257,280**
	Equiqment and research activities	78,560	87,160	100,000	**265,720**
	Sub-total	*180,320*	*196,120*	*146,560*	***523,000***
Total budget	State budget	**773,849**	**1,203,994**	**1,126,211**	**3,104,053**
	Education activities	**298,707**	**584,045**	**692,379**	**1,575,131**
	Sponsor funding	**180,320**	**196,120**	**146,560**	**523,000**
	Other sources	**143,403**	**258,861**	**102,383**	**504,647**
	Total	***1,418,953***	***2,310,982***	***2,175,107***	***5,905,042***

Some Indicators from "Proposal on Overall Development Plan for Can Tho University by 2022" (Information As of April 2014)

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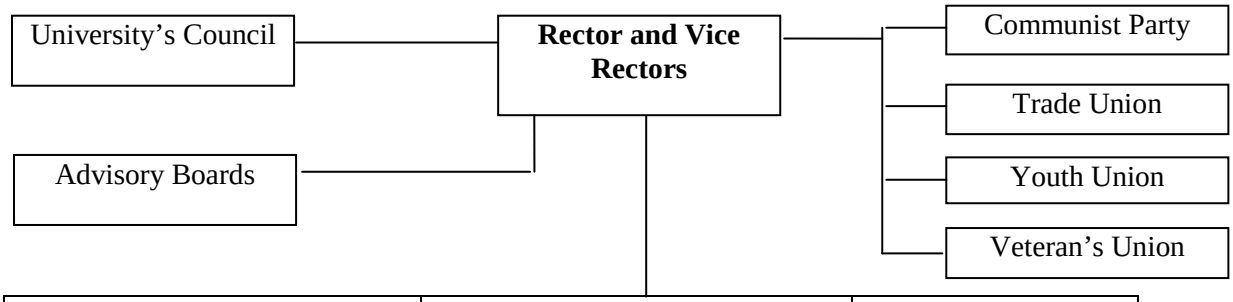
ORGANIZATIONAL STRUCTURE OF CTU BY 2017



Colleges/Schools	Institutes & Centers	Supporting Units
College of Agriculture & Applied Biology	Biotechnology Research & Development Institute	Department of Administration and Planning
College of ICT	Mekong Delta Development Research Institute	Department of Academic Affairs
School of Political Science	Research Institute for Climate Change	Department of Finance
School of Economics and Business Administration	Center of Foreign Languages	Department of International Relations
College of Natural Sciences	Center for Scientific Information and Technology	Department of Personnel
School of Technology (Construction Consultancy and Testing Center + Center for Services and Technology Transfer + Electricity and Electronics Center)	Center for Services and Technology Transfer	Department of Legality
College of Education (Center for Teaching Training)	Center for National Defense Education	Department of Facility Management
College of Aquaculture & Fisheries (Center for Technology Application and Transfer in Fisheries)	Quality Assurance and Testing Center	Department of Student Affairs
School of Law	Learning Resources Center	Department of Political Affairs
College of Social-Science and Humanities	**Center for Chemical Analysis of Environment and Foods**	Department of Scientific Research Affairs
College of Environment & Natural Resource	Cooperative Training Center	Office of Construction Management
School of Pre-University	**Center for Research and Technology Transfer**	Publishing House
College of Rural Development	Software Center	
Graduate School	**Center for Student Assistance**	
Department of Physical Education	**Center for Student Consultancy**	
School of Foreign Languages	**Center for Training, Research and Development of Marine Economics of Mekong Delta**	
	Center for Foreign Language Educational Testing	
	Hoa An Center	
	High School for Teaching Practice	

*** New school/ center/ school are in bold letters**

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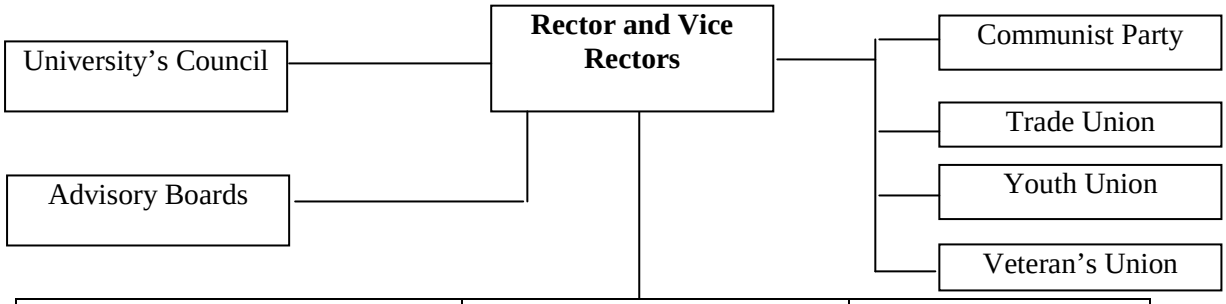
ORGANIZATIONAL STRUCTURE OF CTU BY 2022



Colleges/Schools	Institutes & Centers	Supporting Units
College of Agriculture & Applied Biology	Biotechnology Research & Development Institute	Department of Administration and Planning
College of ICT	Mekong Delta Development Research Institute	Department of Academic Affairs
School of Political Science	Research Institute for Climate Change	Department of Finance
School of Economics and Business Administration	Center of Foreign Languages	Department of International Relations
College of Natural Sciences	Center for Scientific Information and Technology	Department of Personnel
School of Technology	Center for Services and Technology Transfer	Department of Legality
College of Education	Center for National Defense Education	Department of Facility Management
College of Aquaculture & Fisheries	Quality Assurance and Testing Center	Department of Student Affairs
School of Law	Learning Resources Center	Department of Political Affairs
College of Social-Science and Humanities	Center for Chemical Analysis of Environment and Foods	Department of Scientific Research Affairs
College of Environment & Natural Resource	Cooperative Training Center	Office of Construction Management
School of Pre-University	Center for Research and Technology Transfer	Publishing House
College of Rural Development	Software Center	
Graduate School	Center for Student Assistance	
School of Physical Education	Center for Student Consultancy	
School of Foreign Languages	Center for Training, Research and Development of Marine Economics of Mekong Delta	
	Center for Foreign Language Educational Testing	
	Hoa An Center	
	High School for Teaching Practice	

*** New school/ center/ school are in bold letters**

Table 1: Undergraduate education plan by 2010, 2015 and 2020

	2007	2008	2009	**2010**	**2015**	**2020**
College					**204**	
Undergraduate (*all forms of training*)	19,780	21,490	23,180	**24,560**	**41,691**	**54,772**
Undergraduate (*enrollment through the national entrance exam*)	19,780	21,490	23,180	**24,560**	**33,322**	**38,852**
Undergraduate (*excluding students of 2nd diploma and the unconditionally admitted)*	19,780	21,490	23,180	**24,560**	**36,541**	**44,522**
Undergraduate (*excluding students of 2nd diploma)*	19,780	21,490	23,180	**24,560**	**37,791**	**50,272**
Postgraduate	1,434	1,631	1,928	**2,087**	**2,629**	**4,965**
Total number of students of university and college training (excluding students of 2nd diploma) and postgraduate training	**21,214**	**23,121**	**25,108**	**26,647**	**41,790**	**55,343**

Note: 2nd diploma means part time program (not formal program).

Table 2: Enrollment and education plan by different levels of training

Levels and forms of training	2010		2015		2020	
	Enrollment	Total students	Enrollment	Total students	Enrollment	Total students
Undergraduate (*enrollment through the national entrance exam)*	6,230	24,560	8,230	33,322	9,310	38,852
Postgraduate	698	2,087	1,393	2,629	2,357	4,965
2nd diploma	200	800	600	1,500	1,000	2,900
Transferred Programs (From College training to University Training)	400	1,000	150	250	300	550
Nomination	180	180	200	609	300	1150
Pre-university	160	160	250	860	400	1400
Working and studying	4,500	15,200	6,300	19,100	7,800	27,550
Distance Learning	1,859	1,859	5,600	15,900	7,100	20,400

Table 3: Education plan by colleges / schools

No	College / School	2010		2015		2020	
		Under graduate	Post graduate	Under graduate	Post graduate	Under graduate	Post graduate
1	College of Engineering Technology	3,810	5,722	1060	6,680	39040	5,722
2	College of ICT	1,220	1,951	10910	2,000	22029	1,951
3	College of Natural Sciences	840	1,561	2480	1,510	43330	1,561
4	School of Political Science	360	652	00	960	200	652
5	College of Social-Science and Humanities	1,420	100	2,180	600	2,800	2150
6	School of Economics and Business Administration	3,600	180	4,707	440119	4,920	760220
7	College of Aquaculture & Fisheries	1,840	120	1,787	17544	2,240	30079
8	School of Law	1,000	54	1,387	700	2,580	1600
9	College of Environment & Natural Resource	1,090	180	1,654	19439	2,240	26449
10	College of Agriculture & Applied Biology	3,380	487	4,139	360126	4,512	500209
11	College of Education	3,320	282	3,605	28815	3,120	48072
12	College of Rural Development			2,331	00	2,800	600
13	Department of Physical Education	200	0	364	00	600	0
14	Mekong Delta Development Research Institute	390	62	345	10015	320	18020
15	Biotechnology Research & Development Institute	400	67	937	7041	1,240	16040
	Total	**24,260**	**2,087**	**33,322**	(2,220409) **2,629**	**38,852**	(4,177788) **4,965**
	Total number of students	**26,347**		**36,167**		**35,951**	

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b) Scope of human resource is identified based on Decision No 711/QD-TTg dated 13th June 2012 of the Government; Decision No 795/QD-BGDDT dated 27th February 2010, Circular No 57/2011/TT-BGDDT dated 2nd December 2011 of Ministry of Education and Training guiding the calculation of number of student per number of lecturers and the decrease in number of student per number of lecturers for some fields of study, specifically:

No	Fields of study at CTU	2013	2015	2017	2020	2022
1	Engineering, technology, agriculture, forestry, fisheries, water resources, natural sciences, transport, construction	≤ 25	≤ 24	≤ 23	≤ 21	≤ 20
2	Economics, finance, banking, culture, tourism, journalism, library, social-science and humanities, legal affairs, administration	≤ 25	≤ 25	≤ 25	≤ 25	≤ 25
3	Pedagogy, physical education	≤ 25	≤ 24	≤ 23	≤ 21	≤ 20

The percentage of Teaching Assistants / Supporters and Administrative staff is decreased gradually from 40% per current total number of lecturers (in which Teaching Assistants / Supporters account for 23% and Administrative staff account for 17%) so that by 2022 the percentage of Teaching Assistants / Supporters and Administrative staff per total number of lecturers is 30% at maximum (in which Teaching Assistants / Supporters account for 17.5% and Administrative staff account for 12.5%)

c) Scope of human resources development

Table 5: The postgraduate training plan for lecturers by 2022

Year	No of lecturers	Lecturers having postgraduate degree					
		Percentage (%)	Number	PhD		Master	
				Percentage (%)	Number	Percentage (%)	Number
Sept 2012	1,185	73.9	876	18.8	223	55.1	653
Dec 2012	1,203	73.7	886	19.4	233	54.3	653
Sept 2013	1,214	76.0	923	20.6	250	55.4	673
Dec 2013	1,197	77.5	928	22.4	268	55.5	665
2014	1,341	82.6	1,108	25.8	346	56.8	762
2015	1,410	88.4	1,246	29.4	415	59.0	831
2016	1,440	92.4	1,330	31.5	453	60.9	877
2017	1,499	94.2	1,412	36.8	551	57.4	861
2018	1,540	94.5	1,455	42.8	659	51.7	796
2019	1,566	95.0	1,488	49.1	769	45.9	719
2020	1,609	96.1	1,546	56.4	908	39.7	638
2021	1,639	96.3	1,578	60.2	986	36.1	592
2022	1,672	96.9	1,621	62.3	1,043	34.6	578

Table 6: The development plan in number of lecturers in colleges / Schools

Colleges/Schools	Dec 2013	2015	2017	2020	2022
College of Engineering Technology	169	196	204	197	197
College of ICT (from Software Center)	64	78	87	88	87
College of Natural Sciences	94	123	132	144	156
College of Environment & Natural Resource	59	56	59	69	69
College of Agriculture & Applied Biology	125	127	136	144	143
College of Education	202	208	208	208	225
College of Aquaculture & Fisheries	57	55	58	74	75
College of Social-Science and Humanities	103	124	123	138	142
School of Economics and Business Administration	130	141	157	173	188
School of Law	64	72	84	100	108
School of Political Science	32	46	55	62	63

Colleges/Schools	Dec 2013	2015	2017	2020	2022
Department of Physical Education	18	22	27	32	36
College of Rural Development	23	45	44	48	48
School of Foreign Languages (from the College of Education, College of Social-Science and Humanities, Center of Foreign Languages)					
Mekong Delta Development Research Institute	16	18	22	25	24
Biotechnology Research & Development Institute	22	27	31	32	33
Total:	**1,134**	**1,338**	**1,427**	**1,534**	**1,594**

Note:

- From 2013 to 2017 the School of Foreign Languages will be established.
- The percentage of teaching for other units is calculated as follows:

+ The field of study in which lecturers of School of Political Science teach students of other colleges/schools: 30% of the School of Political Science, 70% of the colleges/schools managing that field of study.

+ For National Defense Education: 30% of the Center of National Defense Education, 70% of the colleges/schools managing that field of study.

+ English language (not specialized English): 50% of the teaching colleges/schools (mainly the College of Social-Science and Humanities, and 50% of the colleges/schools managing that field of study.

+ Basic informatics: 50% % of the teaching colleges/schools (mainly the College of Natural Sciences) and 50% of the colleges/schools managing that field of study.

- In College of Rural Development, for the components/fields of study established by the College but managed by other specialized College, then the number of students is added for the specialized College to calculate number of lecturers.
- Number of lecturers and students of the Software Center is added to the number of the College of ICT.

Table 7: Total number of students, officers and lecturers of CTU

Year	Undergraduate	Master	PhD	Officers and Lecturers			
				Lecturers	Supporting staff	Administrative staff	Total
Sept 2013	**28,238**	**2,763**	**162**	**1,214**	**279**	**200**	**1,693**
Dec 2013	**32,679**	**2,763**	**162**	**1,197**	**275**	**201**	**1,673**
2014	32,992	1,939	319	1,341	280	203	1,824
2015	**33,526**	**2,220**	**409**	**1,410**	**282**	**204**	**1,896**
2016	34,760	2,719	520	1,440	283	205	1,928
2017	**35,598**	**3,120**	**624**	**1,499**	**284**	**206**	**1,989**
2018	36,915	3,472	692	1,540	286	207	2,033
2019	37,937	3,853	746	1,566	288	208	2,062
2020	38,522	4,177	788	1,609	289	209	2,108
2021	38,852	4,327	813	1,640	290	210	2,144
2022	**39,062**	**4,352**	**821**	**1,642**	**291**	**211**	**2,174**

Note:

- Administrative staff have personnel classification scale from technician, official and accountant.
- Number of undergraduate is the number of enrollment from the national entrance exam. Number of students at college degree is converted into number of students at university degree, in which 01 student at college degree is equivalent to 0.8 student at university degree.

Appendix 3-5

ViFiNET (Vietnam Fisheries and Aquaculture Institution Network)

ViFINET International Aquaculture Workshop
December 5-8, 2008
Can Tho University, Vietnam

ViFINET
(Vietnam Fisheries and Aquacultute Institution Network
http://www.vifinet.vn/

I. Introduction:

ViFINET is founded 2 April 2005 to promote among Viet Nam Fisheries and Aquaculture Institution Network in oder to research and develop fisheries and aquaculture sustainability in Viet Nam.

2. ViFINET courterpart: 8 members

1. Can Tho University
2. Nha Trang University
3. Nong Lam University
4. Hue University of Agriculture and Forestry
5. Research Institute For Marine Fisheries
6. Research Institute Aquaculture 1
7. Research Institute Aquaculture 2
8. Research Institute Aquaculture 3
9. More,….

3. ViFINET activities:

- Collaboration on training and research;
- Sharing humman capacity;
- Sustainable development;
- Fund to share network`s members.

4. Responsibilities and Benefits of the Network's members:

a. Responsibilities
   - Execute annual action plan approved by the Network. For each term, each members appoint one person to join the Secretariat Board and one joint The Steering Committee.
   - Share operational cost of the Network. All eight members of the Network contribute VND 10 million, plus VND 2 million annually. New members will contribute the same amount as for the founders when joining the Network. The Steering Committee will decide how to use this budget.
   - Facilitate and support training and/or research activities of other members by sharing available resourses where possible.
   - Keep other Network's members informed about on-going or tentative training and research programs at the host insitution .

b. Benefits
   - Access to relevant information and activities of the Network.
   - Receive supports from the Network for training and research activities at the host institution.

- Participate in training or research programs, both national and international, developed by the Network.

5. ViFINET activities:

a. VIFINET hosts Asian-Pacific Aquaculture meeting in Hanoi (2007)

VIFINET, the Vietnamese Fisheries and Aquaculture Institutes Network hosted the Asian-Pacific Aquaculture 2007 meeting in Hanoi, August 2007 The Asian-Pacific Chapter of the World Aquaculture Society partnered with the Ministry of Fisheries, Vietnam to host the event. Dr Le Thanh Luu (RIA No 1) and Professor Patrick Sorgeloos (Ghent University, Belgium) were the Co-Chairs for the Conference Steering Committee and Dr Nguyen Van Hao (RIA No 2) and Dr Graham Mair (Flinders University, Australia) were the Program Committee Co-Chairs.

The conference and trade show were held at the Melia Hanoi Hotel and over 1100 delegates attended, approximately 30% from Vietnam and the rest from over 40 different countries throughout the world. Delegates included farmers, researchers, equipment and service suppliers to the industry, government officers and representatives of all other sectors of the aquaculture industry. The conference included a very comprehensive technical program covering all major aquaculture industries in Vietnam. There were 27 individual sessions with 290 oral presentations and 140 poster presentations. The trade show held 83 booths with representatives from major industry suppliers.

b. ViFINET International Aquaculture Workshop, 5 - 8 December, 2008, Can Tho City, Vietnam

c. Workshop on evaluating and exchanging expreriences (22 July 2011 at CTU)

1.Purpose of workshop

(1) Review activities of the project
(2) Exchange experiences between ViFINET members on the new teaching and training methods via the LMS
(3) Lessons learned and directions

2.Tentative time

The workshop scheduled on 22 July 2011 at CTU

3.Participants

(1) Representative of BTC
(2) Representative of International Cooperation Department, MoET
(3) Leaders, technical staff and teaching staff from ViFiNET members (See **Appendix 2**: Participants of ViFiNET members).
(4) CTU leaders, staff involved project.(5) Guests from CTU (teaching staff and students).

d. E-learning system for ViFINET at CTU 2010

6. Aquaculture organisations & Networks

Acquacoltura
Italian site dedicated to aquaculture

American Fisheries Society (AFS)
A professional society representing fisheries scientists

Aqua
New England aquaculture educators network

Aqua Biotechnology (AquaBio)
Focusing on recirculation in aquaculture

Aqua Farm
Commercial website directory for fish farming, seafood and aquatic species

Aqua.cl
Portal to Aquaculture in Chile (content in Spanish)

Aquaculture Association of Canada (AAC)
The goal of the Aquaculture Association of Canada is to foster an aquaculture industry in Canada, to promote the study of aquaculture and related science in Canada, to gather and disseminate information relating to aquaculture, and to create public awareness and understanding of aquaculture.

Aquaculture Development Program, (ADP)
Department of Agriculture, State of Hawaii

Aquaculture Engineering Society (AES)
... provides a means by which its members can come together to discuss engineering problems related to aquaculture.

Aquaculture Institute for South Africa (AISA)
A coordinating body for Aquaculture in South Africa to promote the integrated development of a sustainable and equitable Aquaculture sector for all South Africans

Aquaculture online
A service providing current information to the worldwide aquaculture community

Aquaculture.com
Links aquaculture professionals by providing content, a supportive community and commerce opportunities

Aquafeed.Com
Uniting feed manufacturers with science, academia, aquaculture farmers and the supply trade

Aquaflow
European Network for the dissemination of Aquaculture RTD information

AquaGuide
Italian site focused on aquaculture and aquarium topics

Aqualog
Books, news...(in french)

Aquamedia
Delivers accurate and up-to-date information about aquaculture in 13 European languages.Aquamedia is being developed by the Federation of European Aquaculture Producers (FEAP) and is also supported by important businesses that operate in the aquaculture sector.

AquaNet
Canada's research network in Aquaculture aims to foster a sustainable aquaculture sector in Canada through high quality research and education.

AquaNIC
The Aquaculture Network Information Center is a gateway to the world's electronic resources for aquaculture

AquaSearch
A targeted search engine related to aquaculture, seafood and fisheries industries

AquaStore
Online store for aquatic productsfeaturing books, software, videos, equipment, supplies, seafood and more

Aquatext
Aquaculture dictionary

Aquatic Network
Information Service for the Aquatic World. Subject areas covered include aquaculture, conservation, fisheries, marine science and oceanography, maritime heritage, ocean engineering, and seafood

AquaTT
The European Aquaculture Training and Technology Transfer Network

Arizona Aquaculture
Information on aquaculture in Arizona

Ascot International Fish Database (Aquafind)

Asian Fisheries Society (AFS)
The Asian Fisheries Society is a scientific society organized in 1984 for fishery professionals in Asia to communicate, share information and cooperate with each other.

Biofilter.Com
BioFilter.Com is an index of aquatic and aquaculture information found on the Internet. We review each article/site submitted to us for relevance, place it into an appropriate category, provide you with the opening paragraph of the document and its active hyperlink. We manually sort the sites because people understand aquaculture much better than search engines do! The information stored here is based upon all of our collective knowledge.

Brazilian Association of Shrimp Producers
In Portuguese

Canadian Aquaculture Industry Alliance (CAIA)
A national organization, a federation of regional and sectoral associations working with and for individuals, business and associations whose work is related to aquaculture

Canarian Association of Fish Farmers (CAFF)

Coastal guide
The largest European website on coastal issues

CONSENSUS
A Multi-Stakeholder Platform for Sustainable Aquaculture in Europe, wishes to ensure that sustainability becomes normal practice in the aquaculture industry in terms of the environment, social contribution and economic success into the future. Another major role of CONSENSUS is to demonstrate to consumers the health benefits of eating fish and shellfish grown in sustainable conditions.

EastFish
Project that supports the development and modernization of the aquaculture and fish processing sectors in Central and Eastern Europe

European Aquaculture Society (EAS)
An international, non-profit association offering services in all fields related to aquaculture

European Association of Fish Pathologists (EAFP)

European Centre for Information on Marine Science and Technology (EurOcean)
Eurocean is an internal portal for sharing information and creating synergy in Europe. It contains a database of the Marine Science and Technology Projects Funded under FP6.

European Fish Ageing Network (EFAN)
Aims to develop, conduct and co-ordinate collaborative research and training, and thereby ensure that age determination becomes a reliable element of the assessments underlying the scientific management advice on fisheries and environmental resources.

European Union for Coastal Conservation (EUCC)
The largest European coastal network

Federation of European Aquaculture Producers (FEAP)
Contains information on European aquaculture production and a variety of linked topics concerning this important sector, and includes data on number of projects developed by the FEAP to assist the progression of European aquaculture.

Fish Info Service (FIS-net)
Provides information from around the world on topics related to fishing Industry, Aquaculture and Seafood

Fish Link Central
A website for aquarium hobbyists with a lot of links to websites about aquariums, aquaculture, all kinds of fish, ...

Fisheries Society of the British Isles (FSBI)
Catering for the interests of professional fish biologists and fisheries managers

Fishfarms.com
Huge list of links to aquaculture sites, classified per species

Fishing for information
Contains links to Internet resources in aquatic science with particular emphasis on aquaculture and fisheries, including fish farming, the culture of shrimp, other crustacea, shellfish and seaweed, capture fisheries, aquariums, angling, marine science, freshwater studies, aquatic environments, toxicology, earth science, water resources and links to relevant business and commercial services

Fishjobs
The seafood industry jobs network

Fishlink
This commercial European service has succeeded to gather a quite extensive number of names and addresses of institutes, companies and organisations in the field of aquaculture and fisheries.

Food and Agriculture Organisation - Fisheries (FAO - Fisheries)
Food and Agriculture Organisation - Fisheries Department

Fundacion Chile

Global Aquaculture Alliance (GAAlliance)
GAA is a nonprofit trade association dedicated to advancing responsible aquaculture. Its FREE NEWSLETTER and Codes of Practice promote environmental sustainability, social responsibility and food safety.

Global Program of Action (GPA)
Global Program of Action for the Protection of the Marine Environment from Land-based Activities

INFOFISH
Intergovernmental organization for marketing information and technical advisory services for fishery products in the Asian and Pacific region

International Aquaculture Webring
Is a webring that has been set up to link as many high quality, aquaculture related websites as possible from around the world.

International Council for the Exploration of the Sea (ICES)
The international science organization studying and helping to safeguard North Atlantic marine ecosystems and the living resources they sustain

International Fishmeal and Oil Manufacturers Association (IFOMA)
International Fishmeal and Oil Manufacturers Association

International Foundation for Science (IFS)
"Is an NGO providing research grants for young scientists from developing countries to perform research in the field of ""Aquatic Resources"""

International Society for Salt Lake Research (ISSLR)
ISSLR was founded to establish effective liaison between persons interested in any aspect of inland saline waters, to encourage these interests, and to educate the public in the scientific use, management,and conservation of salt lakes

International Veterinary Information Service (IVIS)
A not-for-profit organization established to provide information to veterinarians, veterinary students and animal health professionals world wide.

Japanese International Food and Aquaculture Society (Jifas)

Marine Aquarium Council (MAC)
Is an international, not-for-profit organization that brings marine aquarium animal collectors, exporters, importers and retailers together with aquarium keepers, public aquariums, conservation organizations and government agencies

Monitoring and Regulation of Marine Aquaculture (MARAQUA)
This project reviews existing information and the establishment of agreed guidelines for the monitoring and regulation of marine aquaculture

National Shellfisheries Association (NSA)
An international organization of scientists, management officials and members of industry, all deeply concerned with the biology, ecology, production, economics and management of shellfish resources

National Shellfisheries Association (NSA)

Network of Aquaculture Centres in the Asia-Pacific (Naca)
An intergovernmental organization that promotes rural development through sustainable aquaculture. NACA seeks to improve rural income, increase food production and foreign exchange earnings and to diversify farm production. The ultimate beneficiaries of NACA activities are farmers and rural communities.

Northern Aquaculture
Is a monthly publication about cold water aquaculture in North-America, but offers also a lot of other

internet services

Norwegian Herring Oil and Meal Industry Research Institute (SSF)

OneFish
Internet portal providing access to information on fisheries and aquatic research and development

Permanent Advisory Network for Diseases in Aquaculture (PANDA)
Development of a permanent network of experts on infectious diseases of aquaculture species for providing scientific advice on EU policy

PiscesTT
the European forum for Aquaculture Education and Training

Salmon Growing BC
British Columbia salmon farmers association (Canada)

Salt Institute
Source of authoritative information about salt and its uses

Sea-Mart
A website with links to other aquaculture related websites and an aquaculture company database

Southern Regional Aquaculture Center (SRAC)
Is one of five regional aquaculture centers established by Congress

The Aquaculture Knowledge Environment Government Documents Library (Aqua KE)
an information and communication resource designed to help advance knowledge and balanced information sharing on the science, policy, and practice of aquaculture.

The International Foundation for the Conservation of Natural Resources (IFCNR)
A range of individuals, academic institutions, corporations, associations, industries, cultures, non-governmental organizations and government agencies bound together by the desire to promote responsible, sustainable, environmentally compatible, and socially just use and conservation of the Earth's natural resources

The Tropical Fishfarming Site

U.S. Department of Agriculture - Aquaculture Production (LDP-AQS)
Examines the U.S. aquaculture industry, including production, inventory, sales, prices, inputs, and trade of catfish, trout, tilapia, salmon, mollusks, crawfish, shrimp, ornamental fish and new species.

UK Sea Fish Industry Authority (SeaFish)
Promotes the efficiency of the sea fish industry and serves the interests of that industry and the consumers of sea fish and sea fish products

US Trout Farmers Association (USTFA)

VESO Vikan Akvavet
Norwegian centre for veterinary contract research and commercial servicesdistribution of vaccines, research for fish diseases

Washington Fish Growers Association (WFGA)
(USA) the major trends worldwide affecting the production and consumption of seafood

Western European Fish Technologists Association (WEFTA)
Provides technical assistance to those part of the fish industries that handled, processed and marketed fish and fishery products.

World Aquaculture
Dynamic database of information pertaining to aquaculture

World Aquaculture Society (WAS)
The World Aquaculture Society

World Fish Net
Linking to the most important fish related sites and databases around the world.

Appendix 3-6

Staff Members of CAAB in 2014

See Appendix 3-2 for Staff of CAAB as of 2013.

Staff Members of CAAB in 2014

Department Organization	Number of Academic Staff Members in 2014					
	Professor/ Assoc. Professor	Lecturer	Researcher	Others	Administ-rative Staff	**Total**
Administration Office				16	5	21
Agri. Genetics & Breeding	1	7	3	5		16
Animal Sciences	6	11	5	4		26
Crop Science	3	8	7	1		19
Food Technology	4	21	9	2		36
Plant Biochemistry & Physiology	3	10	5	7		25
Plant Protection	2	12	13	7		34
Soil Science	3	10	20	4		37
Veterinary Medicine	6	14	4	3		27
Experimental Unit	1			11		12
Total	29	93	66	60	5	**253**

Source: CAAB

Appendix 3-7

Example of Undergraduate Study in Food Technology of CAAB (for the case of continuing postgraduate study in Food Technology)

Example of Undergraduate Study in Food Technology of CAAB

(For students who are to continue to the master's program in Food Technology of CAAB)

* Compulsory Subject

(*) Virtual Compulsory Subjects (Optional subjects but no other options for these credits)

Subject		Credit
Basic Subjects		
Military Science	*	8
Basic Information Technology	*	1
Practice of Basic Information	*	2
Marxism-Leninism 1	*	2
Marxism-Leninism 2	*	2
Ho Chi Minh Thought	*	2
Revolutionary Way of Vietnamese Communist Party	*	3
Basic Law	*	2
Basic Calculus	*	4
Fundamental Thermomechanics	*	2
Fundamental Thermomechanics Practice	*	1
General Chemistry	*	3
General Chemistry Practice	*	1
Analytical Chemistry	*	3
Analytical Chemistry Practice	*	1
Biochemistry	*	2
Production Management	*	2
Engineering Drawing	*	2
Fluid Mechanics	*	2
Mass and Heat Transfer	*	2
Thermodynamics	*	2
Engineering Electricity	*	2
Fundamental Microbiology	*	2
Food Physiochemistry	*	3
Mass & Heat Balance	*	2
Laboratory of Fundamental Food Engineering	*	2
Physical Training 1	(*)	3
Basic English 1	(*)	4
Basic English 2	(*)	3
Basic English 3	(*)	3
Basic Sociology (or other social science)		2
Basic Knowledge		
Statistics	*	2
Industrial Practice of Food Engineering	*	2

Subject		Credit
Human Nutrition	*	2
Methods of Scientific Research in Food Science and Technology	*	2
Food Chemistry Practice	*	1
Food Microbiology	*	2
Food Microbiology Practice	*	1
Food Quality Management & Legislation	*	2
Principles of Food Preservation and Processing	*	2
Food Processing Technology Essay	*	2
Food Chemistry	*	3
Food Evaluation	*	2
Laboratory of Food Evaluation	*	1
Industrial Food Technology Practice	*	3
Food Machinery	Note 1	2
Bioprocessing Engineering		2
Security and Pollution in Food Production		2
Food Specialized English		2
Specific Subjects		
Food Thermal Processing	*	2
Food Cooling and Freezing	*	2
Postharvest Engineering of Fruit, Vegetables and Cereals	*	3
Fermentation Engineering	*	2
Laboratory of Food Engineering	*	2
Laboratory of Food Technology	*	2
Technology of Vietnamese Traditional Food	Note 2	2
Technology of Milk and Dairy products		2
Technology of Animal Products		2
Functional Food		2
Thesis	*	10
Total Credit		141

Note 1: Other optional subjects

Measuring Tools for Food Technology, Industrial Supply and Waste Water Treatment, Computer Application for Food Technology, Food Physical Properties, Food Additives, Food Packaging, Food Specialized French

Note 2: Other optional subjects

Technology of Sugar, Confectionary and Bakery, Technology of Fishery Products, Technology of Rice and Rice Products, Technology of Edible Oil and Fat Products, Technology of Tea, Coffee and Cocoa, New Food Product Development

Source: Prepared by JICA Study Team from the curriculum table of the Food Technology Program in 2014

Appendix 3-8

Curricula for Undergraduate and Graduate Degree Programs of CAF

Curriculum
Advance Aquaculture Program (BSc)

Study field: Aquaculture **Chuyên ngành: Advance Aquaculture program**

No	Code	Name of courses	Cre-dits	Obl.	Opt.	Lecture	Practice	Requiste	Term
Khối kiến thức Giáo dục đại cương *(General courses)*									
	QP001	Giáo dục quốc phòng *(Millitary training) (*)*	6	6		115	50	Do trường bố trí	
	TC000	Giáo dục thể chất 1 *(Physical fitness training) (*)*	1		1		45		I, II, H
	TC013	Bơi lội *(Physical fitness training)* (*)	1	1			30		I, II
	AQ100	Anh văn tăng cường *(English bridging program)*	12 (+8)	12		180			I, II
	TN051	Hóa đại cương I *(Fundamental of chemistry I – inorganic)*	2	2		30			I, II
	TN052	TT Hóa đại cương I *(Fundamental of chemistry Lab I – inorganic)*	1	1			30		I, II
	TN053	Hóa đại cương II *(Fundamental of chemistry II – organic)*	2	2		30			I, II
	TN054	TT Hóa đại cương II *(Fundamental of chemistry Lab II – organic)*	1	1			30		I, II
	TN055	Hoá phân tích *(Analytical chemistry)*	2	2		30			I, II
	TN056	TT Hoá phân tích *(Analytical chemistry Lab)*	1	1			30		I, II
	TN057	Sinh học đại cương *(Principles of biology)*	2	2		30			I, II
	TN058	TT Sinh học đại cương *(Principles of biology Lab)*	1	1			30		I, II, H
	TN059	Toán cao cấp *(Calculus)*	3	3		45			I, II
	ML009	Những nguyên lý cơ bản của chủ nghĩa Mác-Lênin 1 *(Basic Principles of Marxism – Leninism 1)*	2	2		30			I, II, H
	ML010	Những nguyên lý cơ bản của chủ nghĩa Mác-Lênin 2 *(Basic Principles of Marxism – Leninism 2)*	3	3		45			I, II, H
	ML006	Tư tưởng Hồ Chí Minh *(Ho Chi Minh's ideas)*	2	2		30			I, II, H
	ML011	Đường lối cách mạng của Đảng CS Việt Nam *(Revolution line of Vietnam Communist Party)*	3	3		45			I, II, H
	KT101	Kinh tế đại cương *(Principles of Economics)*	2	2		30			I, II, H
Cộng: 47 TC									
Khối kiến thức Cơ sở ngành *(Aquaculture fundamental)*									
	AQ201	Tiếng Anh nâng cao I *(Advanced English I)*	3	3		45			I, II
	AQ202	Tiếng Anh nâng cao II *(Advanced English II)*	3	3		45			I, II
	AQ203	Tiếng Anh Nuôi trồng thủy sản I *(English for Aquaculture I)*	3	3		45			I, II
	AQ204	Tiếng Anh Nuôi trồng thủy sản II *(English for Aquaculture II)*	3	3		45			I, II
	AQ205	Vi sinh *(Microbiology)*	3	3		30	30		I, II
	AQ206	Nhập môn Khoa học nghề cá *(Introduction to fish science)*	3	3		30	30		I, II
	AQ207	Khoa học môi trường nước *(Water science)*	3	3		45			I, II
	AQ208C	Phân loại học đại cương *(General ichthyology)*	4	4		45	30		I, II
	AQ209C	Ao hồ học *(Limnology)*	4	4		45	30		I, II
	AQ210	Sinh thái học đại cương *(Principles of ecology)*	2	2		30			I, II

No	Code	Name of courses	Cre-dits	Obl.	Opt.	Lecture	Practice	Requiste	Term
	AQ211C	Sinh lý động vật thủy sản *(Aquatic animal physiology)*	4	4		45	30		I, II
	AQ212C	Dinh dưỡng động vật thủy sản *(Aquatic Animal nutrition)*	4	4		45	30		I, II
	AQ213	Nguyên lý nuôi trồng thủy sản *(Principles of Aquaculture)*	3	3		45			I, II
	AQ214	Thống kê và phép thí nghiệm *(Statistics and experimental design)*	3	3		30	30		I, II
	AQ215	Nghệ thuật giao tiếp *(Public Speaking)*	2	2		30			I, II
	AQ216	Phương pháp nghiên cứu khoa học *(Scientific Research Methodology)*	2	2		30			I, II
Cộng: 49 TC									
Khối kiến thức Chuyên ngành *(Aquaculture courses)*									
	AQ301	Kỹ thuật nuôi thủy sản *(Aquaculture production)*	4	4		60			I, II
	AQ302	Quản lý trại giống cá *(Finfish hatchery operation and management)*	4	4		30	60		I, II
	AQ303C	Kỹ thuật nuôi giáp xác và nhuyễn thể *(Shellfish aquaculture)*	4	4		60			I, II
	AQ304	QL trại giống giáp xác và nhuyễn thể *(Shell hatchery operation and management)*	4	4		30	60		I, II
	AQ305	Đại cương về bệnh thủy sản và phương pháp chẩn đoán *(Introduction to fish health and clinical fish disease diagnosis)*	3	3		30	30		I, II
	AQ306	Bệnh Thủy sản *(Fish and shell fish diseases)*	4	4		45	30		I, II
	AQ307	Cải tiến di truyền và quản lý nguồn lợi *(Fish Genetic Enhancement and Resources Management)*	3	3		45			I, II
	AQ308	Sinh học và quản lý nguồn lợi Thủy sản *(Fisheries Biology and Management)*	3	3		30	30		I, II
	AQ309	Thiết bị và công trình thủy sản *(Facilities for Aquaculture)*	3	3		45			I, II
	AQ310	Sản xuất thức ăn tươi sống *(Live food production)*	2	2		30			I, II
	AQ311	Qui hoạch phát triển thủy sản *(Aquaculture planning and management)*	2	2		30			I, II
	AQ312C	Kinh tế thủy sản *(Aquaculture economic)*	3	3		45			I, II
	AQ313	Luật thủy sản *(Fisheries law)*	2	2		30			I, II
	AQ314	Khuyến nông *(Agriculture extension)*	2	2		30			I, II
	AQ315	Thuyết trình *(Seminar/sepcial topics)*	1	1			30		I, II
	AQ401	Luận văn tốt nghiệp *(Graduation thesis)*	10	10			300		I, II
Cộng: 54TC									
Tổng cộng- 150 TC (+8 TC Bridge English)									

Ngày tháng năm 2009

Phê duyệt của Ban Giám hiệu
P.HIỆU TRƯỞNG

Đỗ Văn Xê

Phê duyệt của HĐ.KHĐT
CHỦ TỊCH

Lê Quang Trí

Thủ trưởng đơn vị

Nguyễn Thanh Phương

CURRICULUM FOR MASTER'S DEGREE PROGRAM IN
FISHERIES RESOURCE MANAGEMENT
Code: 60620305

No	Course Code	Course Title	Credits	Core	Elective	Semester
Prerequisite courses			**3**	**3**		
1	ML605	Philosophy	3	3		I, II
2		English				
Fundamental courses			**10**	**6**	**4**	
3	TS624	Scientific Research Methodology	3	3		I
4	TS625	Ichthyology	3	3		I
5	TS605	Aquatic ecology	2		2	I
6	TS626	Marine biology	2		2	I
7	TS628	Water quality management in aquaculture ponds	2		2	I
8	TS645	Water environment biomonitoring	2		2	I
Major courses			**30**	**20**	**10**	
9	TS629	Surveys of Fisheries resources	2	2		I
10	TS630	Fisheries resources Biodiversity and Conservation	3	3		II
11	TS631	Aquatic resource assessment	3	3		II
12	TS632	Aquatic resource management	2	2		II
13	TS633	Fisheries planning and management	2	2		II
14	TS634	Fisheries legislation and policy analysis	2	2		II
15	TS635	Fisheries economics	2	2		I
16	TS637	Fisheries resource management practices	4	4		I
17	TS638	Fish Genetic and Enhancement Resources Management	2		2	I
18	TS636	Seminar/special topics	2		2	
19	TS639	English for Fisheries resource management	2		2	I
20	TS640	Preparation and appraisal of fishery projects	2		2	I
21	TS641	Coastal aquaculture	2		2	II
22	TS642	Freshwater aquaculture	2		2	II
23	TS643	Fishing Technology	2		2	II
24	TS602	Aquatic animal physiology	2		2	I, II
27	TS647	Aquatic seed production	2		2	II
25	TS648	Aquaculture Trade	2		2	II
26	TS649	Application of GIS for fisheries resource management	2		2	II
Graduation course			**10**	**10**		
28	TS900	MSc Thesis	10	10		II
		Total	**53**	**39**	**14**	

CURRICULUM FOR MASTER'S DEGREE PROGRAM IN
Aquaculture
Code: 60620301

No	Course Code	Course Title	Credits	Core	Elective	Semester
Prerequisite courses			**3**	**3**		
1	ML605	Philosophy	3	3		I, II
2		English				
Fundamental courses			**13**	**9**	**4**	
3	TS601	Principles of aquaculture	2	2		I
4	TS602	Aquatic animal physiology	2	2		I
5	TS603	Aquatic animal nutrition and feed technology	3	3		I
6	TS604	Experimental design and scientific writing	2	2		I
7	TS605	Aquatic ecology	2		2	I
8	TS606	Anatomy and population genetics	2		2	I
9	TS607	Eco-toxicology	2		2	I
10	TS645	Water environment biomonitoring	2		2	I
Major courses			**28**	**18**	**10**	
11	TS608	Water quality management in aquaculture ponds	2	2		II
12	TS609	Aquaculture genetics	2	2		II
13	TS610	Brackish water aquaculture production systems	3	3		II
14	TS611	Freshwater aquaculture production systems	3	3		II
15	TS612	Aquatic animal health management	3	3		I
16	TS614	Aquaculture economics	2	2		I
17	TS615	Aquaculture practices	3	3		I
18	TS616	Aquatic resource assessment and management	2		2	II
19	TS613	Aquaculture Planning and Management	2		2	I
20	TS617	English for aquaculture	2		2	II
21	TS618	Water recirculation in aquaculture	2		2	I
22	TS619	Aqua-food safety	2		2	I
23	TS620	Molecular epidemiology	2		2	I
24	TS621	Advances in immunology	2		2	I
25	TS644	Advances in Eco-toxicology	2		2	I
26	TS646	Application of probiotics for Water quality management	2		2	I
27	TS648	Aquaculture Trade	2		2	I
Graduation course			**10**	**10**		
28	TS900	MSc Thesis	10	10		II
		Total	**54**	**40**	**14**	

DOCTORAL PROGRAM IN AQUACULTURE
Code: 62 62 03 01

Applicants need to prepare a research proposal. The research topic must be relevant to a research domain in the list of research orientations provided by the University of Cantho.

Part 1: Coursework

1.1 Courses for holders of a BSc degree in:

- Aquaculture, Aquatic Pathobiology, Aquatic Resources Management, Agronomy, Fishing Technology *(required 30 credits, in which 26 Core credits + 4 Elective credits)*
- Animal Science, Biology education, Bachelor of sciences in biology, Biological and Agricultural Engineering, Environmental Sciences *(required 36 credits, in which 26 Core credits + 10 Elective credits).*

No	Course Code	Course Title	Credits	Core	Elective
1.	ML605	Philosophy	3	x	
2.	TS601	Principles of aquaculture	2	x	
3.	TS602	Aquatic animal physiology	2	x	
4.	TS603	Aquatic animal nutrition and feed technology	3	x	
5.	TS604	Experimental design and scientific writing	2	x	
6.	TS605	Aquatic ecology	2		x
7.	TS606	Anatomy and population genetics	2		x
8.	TS607	Eco-toxicology	2		x
9.	TS608	Water quality management in aquaculture ponds	2	x	
10.	TS611	Freshwater aquaculture production systems	3	x	
11.	TS612	Aquatic animal health management	3	x	
12.	TS615	Aquaculture practices	3	x	
13.	TS610	Brackish water aquaculture production systems	3	x	
14.	TS609	Aquaculture genetics	2		x
15.	TS613	Aquaculture Planning and Management	2		x
16.	TS614	Aquaculture economics	2		x
17.	TS616	Aquatic resource assessment and management	2		x
18.	TS617	English for aquaculture	2		x
19.	TS618	Water recirculation in aquaculture	2		x
20.	TS619	Aqua-food safety	2		x
21.	TS620	Molecular epidemiology	2		x
	Total		**30-36**	**26**	**4-10**

1.2 Courses for holders of an MSc degree in Agricultural Systems, Environmental Sciences, Environmental Management, Ecology, Veterinary Medicine, Biotechnology and holders of MSc degrees in related fields who graduated more than 10 years ago. These students are required to achieved 10 credits from the following list of courses

No	Course Code	Course Title	Credits	Core	Elective
1	TS601	Principles of aquaculture	2		x
2	TS602	Aquatic animal physiology	2		x
3	TS603	Aquatic animal nutrition and feed technology	3		x
4	TS608	Water quality management in aquaculture ponds	2		x
5	TS610	Brackish water aquaculture production systems	3		x
6	TS611	Freshwater aquaculture production systems	3		x
7	TS612	Aquatic animal health management	3		x
8	TS613	Aquaculture Planning and Management	2		x

Part 2. PhD courses, PhD research projects and a literature review

2.1. PhD courses *(8 credits)*

No	Course Code	Course Title	Credits	Core	Elective
1.	TS901	Aquatic animal endocrinology	2	x	
2.	TS902	Application of biotechnology in aquaculture	2	x	
3.	TS903	Cell culture technique	2		x
4.	TS904	Immunology	2		x
5.	TS905	Water quality biomonitoring	2		x
6.	TS906	Freshwater biodiversity and conservation	2		x
7.	TS908	Integrated management of Coastal zone	2		x
8.	TS909	Advances in methodology for socio-economic study in fisheries	2		x
9.	TS910	Appraisal of fishery projects	2		x
	Total		**8**	**4**	**4**

2.2. PhD research projects

- Number of PhD research projects: 2 (6 credits)
- Implementation time period:
  + 1st PhD research project: Second year
  + 2nd PhD research project: Second year

2.3. Literature review

- Implementation time period: Second year

Part 3: Scientific research and Doctoral dissertation

1. Scientific research: Third year or Fourth year
2. Doctoral dissertation: Third year or Fourth year

Appendix 3-9

List of Publication: CAF 2005–2014

LIST OF PAPERS PUBLISHED BY

COLLEGE OF AQUACULTURE AND FISHERIES

CAN THO UNIVERSITY 2005-2014

1. Nguyen Thanh Phuong and **Truong Hoang Minh** (2005). An overview of aquculture sector in Vietnam. Publication online on NACA. pp. 1-14.
2. **Van, M.V**., Abol-Munafi, A.B., Effendy, A.W.M., Asmanelli. (2005). Development of Trypsin and Chymotrypsin During Early Larvae Stage of Marble Goby (*Oxyeleotris marmoratus*). Proceeding of the Kustem 4th Annual Seminar on Sustainability Science and Management on 2-5 May, 2005. At the Primula Beach Resort, Kuala Terengganu, Terengganu, Malaysia. 302-306.
3. **Van, M.V.,** Abol-Munafi, A.B., Effendy, A.W.M., and Liem, P.T. (2005). Development of the Digestive System of Marble Goby (*Oxyeleotris marmoratus*) Larvae. Proceeding of the Kustem 4th Annual Seminar on Sustainability Science and Management on 2-5 May, 2005. At the Primula Beach Resort, Kuala Terengganu, Terengganu, Malaysia. p.79.
4. Hai, T. N and A. Yakupitiyage (2005).The effects of the decomposition of mangrove leaf litter on water quality, growth and survival of black tiger shrimp (Penaeus monodon Fabricius, 1798). Aquaculture, 250 (3-4) 700-712.
5. Phu, T.Q., Yang Yi (2005).The effects of catfish cage-culture on water quality in Hongngu District, Dongthap Province. Scientific Journal of Can Tho University 2005:3 247-258. (Full paper in Vietnamese).
6. Tran Thi Thanh Hien, Tran Ngoc Hai, Nguyen Thanh Phuong, Hiroshi Y. Ogata and Marcy N. Wilder (2005). The effects of dietary lipid sources and lecithin on the production of giant freshwater prawn Macrobrachium rosenbergii larvae in the Mekong Delta region of Vietnam. Fisheries Science 2005; 71 : 279–286.
7. Tran TT Hoa, Richard AJ Hodgson, Dang TH Oanh, Nguyen T Phuong, Nigel J Preston and Peter J Walker (2005). Genotypic Variations in Tandem Repeat DNA Segments between Ribonucleotide Reductase Subunit Genes of White Spot Syndrome Virus (WSSV) Isolates from Vietnam. Diseases in Asian Aquaculture V, 2005, pp. 339-351.
8. Vu Nam Son, Yang Yi & Nguyen Thanh Phuong (2005). River pen culture of giant freshwater prawn Macrobrachium rosenbergii (De Man) in southern Vietnam. Aquaculture Research, Volume 36 Issue 3 Page 284-291, February 2005.
9. Van, M.V, A.B. Abol-Munafi, A.W.M. Effendy, M. Awang Soh (2005). The effect of different diets on proteolytic enzymes activity of early marble goby (oxyeleotris marmoratus) larvae. Journal of Animal Veterinary Advances 4(10): 835-838, 2005.
10. Truong Hoang Minh. (2006). Rotation farming of rice and shrimp in the Mekong Delta, Vietnam. Publication online on CIB. pp. 1-20
11. Phu, T.M., T.L.C. Tu, and T.T.T. Hien (2006). Trials on intensive culture system of Climbing perch (*Anabas testudineus*) using different protein pellets. Scientific Journal of Can Tho University, Specific Issue on Aquaculture and Fisheries 2006(2): 104-109. (Full paper in Vietnamese).
12. Sinh, L.X., D.M. Chung, P.T.N. Khuyen and T.T. Truyen (2006). Social impacts of coastal aquaculture in the Mekong Delta. Scientific Journal of Can Tho University, Specific Issue on Aquaculture and Fisheries 2006(2): 220-234. (Full paper in Vietnamese).
13. Son, T.H.P., L.T.T. Ha, L.L. Huong, Pascal Raux, Jacque Popolus and Eve Auda (2006). Some of the tools for integrated management of aquaculture in the Mekong Delta. Scientific Journal of Can Tho University, Specific Issue on Aquaculture and Fisheries 2006(2): 235-246. (Full paper in Vietnamese).
14. Toan, N.T. (2006). Marketing research of the aquatic products in Ca Mau Province. Scientific Journal of Can Tho University, Specific Issue on Aquaculture and Fisheries 2006(2): 247-258. (Full paper in Vietnamese).
15. Phuong, N.T, T.N Hai, T.T.T Hien, T.V. Bui, D.T.T. Huong, V.N. Son, Y. Morooka, Y. Fukuda and M.N. Wilder. 2006. Current status of freshwater prawn culture in Viet Nam and the development

and transfer of seed production technology (Review article). Fisheries Science. 72:1–12.

16. Lam My Lan, Jean-Claude Micha, Duong Nhut Long and Pham Truong Yen (2006). Effect of densities and culture systems on growth, survival, yield and economic return of freshwater prawn, Macrobrachium rosenbergii, farming in the rice field in the Mekong Delta, Vietnam. Journal of Applied Aquaculture, Volume 18, Number 1, 2006, Pages 43-62.
17. Lam My Lan, Duong Nhut Long and Jean-Claude Micha (2006). The effects of densities and feed types on the production of Macrobrachium rosenbergii (de Man) in the rotational rice - prawn system. Aquaculture Research, Volume 37, Issue 13, September, 2006, Pages 1297-1304.
18. Duong Nhut Long, Lam My Lan, Nguyen Anh Tuan & Jean-Claude Micha (2006). Artifical propagation and culture of climbing perch (Anabas testudineus Bloch, 1792) in the Mekong Delta. Meded. Zitt. K. Acad. Overzeese Wet. Bull. Séanc. Acad. R. Sci. Outre-Mer 52 (3) 2006, papes 279-302.
19. Lam My Lan, Long Duong Nhut, Pham Yen Truong & Jean-Claude Micha (2006). Comparison of Freshwater Prawn (Macrobrachium rosenbergii) Production in Integrated and Rotational Rice Prawn Systems in the Mekong Delta of Vietnam. International Conference Hubs, Harbours and Deltas in Southeast Asia: Multidisciplinary and Intercultural Perspectives. Royal Academy of Overseas Sciences, Phnom Penh, 6-8 February, 2006 pages 439-452.
20. Thao T.T. Ngo, Sang-Gyun Kang, Do-Hyung Kang, Patrick Sorgeloos and Kwang-Sik Choi (2006). Effect of culture depth on the proximate composition and reproduction of the Pacific oyster, Crassostrea gigas from Gosung Bay, Korea. Aquaculture, Volume 253, Issues 1-4, 31 March 2006, Pages 712-720.
21. Kyung-Il Park, Thao T.T. Ngo, Sang-Duk Choi, Moonjae Cho and Kwang-Sik Choi (2006). Occurrence of Perkinsus olseni in the Venus clam Protothaca jedoensis in Korean waters. Journal of Invertebrate Pathology Volume 93, Issue 2, October 2006, Pages 81-87.
22. Viet, T.V. (2006). Impacts of the investment and management on shrimp culture in Soc Trang province. Scientific Journal of Can Tho University, Specific Issue on Aquaculture and Fisheries 2006(2): 259-267. (Full paper in Vietnamese).
23. Viet, L.Q., N.A. Tuan (2006). Status of farming giant freshwater prawn (Macrobrachium rosenbergii) in pond in Vinh Long provice. Scientific Journal of Can Tho University, Specific Issue on Aquaculture and Fisheries 2006(2): 280-290. (Full paper in Vietnamese).
24. Sinh, L.X., D.M. Chung, H.V. Hien, T.V. Bui (2006). Technical-economic efficiency in the hatchery of giant freshwater prawn (Macrobrachium rosenbergii) in the Mekong delta. Scientific Journal of Can Tho University, Specific Issue on Aquaculture and Fisheries 2006(2): 268-279. (Full paper in Vietnamese).
25. Isabel Beasley, L.X. Sinh, Amanda Hodgson (2006). Investigating the occurrence of Mekong Irrawaddy dolphins (Orcaella brevirostris) in Vietnam. Scientific Journal of Can Tho University, Specific Issue on Aquaculture and Fisheries 2006(2): 291-300. (Full paper in Vietnamese).
26. **Van, M.V**., Abol-Munafi, A.B., Effendy, A.W.M., Mamat Awang Soh, 2007. Histochemical development of digestive enzymes in marble goby *(Oxyeleotris marmoratus)* larvae. Proceeding of the Asian-Pacific Aquaculture on 5-8 August, 2007. At the Melia Hotel, Hanoi, Vietnam.
27. Phuong, N.T., Sinh, L.X., Thinh, N.Q., Chau, H.H., Anh, C.T. and Hau, N.M. (2007). Economics of aquaculture feeding practices: Viet Nam. In M.R. Hasan (ed.). Economics of aquaculture feeding practices in selected Asian countries. FAO Fisheries Technical Paper. No. 505. Rome, FAO. 2007. pp. 183–205.
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29. Duyen, T.T.M., T.T.T. Hoa (2007). Application of PCR-genotyping for epidemiological study of white spot syndrome virus (WSSV) pathogens. Proceedings of the National Youth Science and Technology Conference of Agriculture-Forestry-Fishery Universities and Colleges, the third time, 2007: 721-7227. (Full paper in Vietnamese).
30. Van, M.V. (2007). Status of the trawl net fishery in SocTrang province. Cantho University, Proceeding of Scientific Conference. 2007:218-225.

31. Dinh, T.D., M.A. Ambak, A. Hassan, N.T. Phuong Biology and population Dynamics of the Goby, Pseudapocryptes elongatus in the Coastal Mud Flat Areas of the Mekong Delta, Vietnam. Pakistan Journal of Biological Science 10(19):3284-3294, 2007.
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35. Viet, T.V., H.V. Hien, D.M. Chung (2007). Economic effect of Black Tiger Shrimp culture (Peneaus monodon) on semi-intensive and intensive systems in Soc Trang province. In: Proceedings of Scientific workshop about sustainable development of the Mekong region after Vietnam participated on World Trade Organization (WTO) at Can Tho University, Oct 10th 2007. Pages 226-234. (Full paper in Vietnamese)
36. Viet, T.V., T.X. Loi (2007). The Status of Inshore Fishing and Its Impact on Aquatic Resources of the Coastal Area of the Mekong Vietnam. In: Proceedings of the 11 th International Symposium on the Efficient Application and Preservation of Marine Biological Resources at Nha Trang University, Nov, 1st- 2nd , 2007, pages 174 -178
37. Toan,V.T., Chheng Phen and Eric Baran (2007). Research on character of water parameters and occurrence of shrimp and fish nature species in Baclieu province. Scientific Journal of Can Tho University 2007:8 139-148. (Full paper in Vietnamese).
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39. Vu Ngoc Ut, Lewis LeVay,Truong Trong Nghia & Tran Thi Hong Hanh (2007). Development of nursery culture techniques for themud crab Scylla paramamosain (Estampador). Aquaculture Research, 2007, 38, 1563-1568.
40. Vu Ngoc Ut, Lewis LeVay,Truong Trong Nghia & MarkWalton (2007). Comparative performance of hatchery-reared and wild Scylla paramamosain (Estampador, 1949) in pond culture. Aquaculture Research, 2007, 38, 1593-1599.
41. Giang, H.T., V.N. Ut, N.T. Phuong (2008). Study on water quality of intensive catfish culture (Pangasianodon hypophthalmus) ponds in An Giang province. Scientific Journal of Can Tho University, Specific Issue on Aquaculture and Fisheries 2008(1): 1-9. (Full paper in Vietnamese).
42. Ut, V.N., T.V. Phuong (2008). Water quality in Artemia culture area of Vinh Chau district, Soc Trang province. Scientific Journal of Can Tho University, Specific Issue on Aquaculture and Fisheries 2008(1): 10-22. (Full paper in Vietnamese).
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44. Ngan, P.T., T.C. Tam, T.Q. Phu (2008). Effects of vegetable oil supplementation on the diversity of bacteria in bio-filter system. Scientific Journal of Can Tho University, Specific Issue on Aquaculture and Fisheries 2008(1): 33-43. (Full paper in Vietnamese).
45. Long, N.T., V.T. Toan (2008). Study on the accumulation of nitrogen and phosphorus in intensive shrimp (Penaeus monodon) ponds. Scientific Journal of Can Tho University, Specific Issue on Aquaculture and Fisheries 2008(1): 44-52. (Full paper in Vietnamese).
46. Luong, V.C. (2008). Ecopath modeling for natural food web management in cove aquaculture. Scientific Journal of Can Tho University, Specific Issue on Aquaculture and Fisheries 2008(1): 53-60. (Full paper in Vietnamese).
47. Dung, D.T., N.C. Thuan, N.T.C. Thien (2008)Using zobenthos assembalge structure for waterbody

zoning. Scientific Journal of Can Tho University, Specific Issue on Aquaculture and Fisheries 2008(1): 61-66. (Full paper in Vietnamese).

48. Lien, N.T.K., T.T. huy, N.T. Phuong (2008). Culture of rotifer (Brachionus rotundiformis) (super small type) using Chlorella and Baker's yeast as feeding diets. Scientific Journal of Can Tho University, Specific Issue on Aquaculture and Fisheries 2008(1): 67-74. (Full paper in Vietnamese).
49. Dinh, T.D., N.T. Phuong, Mohd Azmi Ambak & Anuar Hassan (2008). Population dynamics of the goby (Pseudapocryptes elongatus) in coastal areas of Soc Trang and Ca Mau. Scientific Journal of Can Tho University, Specific Issue on Aquaculture and Fisheries 2008(1): 75-80. (Full paper in Vietnamese).
50. Thuong, N.V. (2008). Classification of the Pangasianodon hypophthalmus in the Mekong River. Scientific Journal of Can Tho University, Specific Issue on Aquaculture and Fisheries 2008(1): 84-89. (Full paper in Vietnamese).
51. Huong, D.T.T., Marcy N. Wilder (2008). The Na+/K+ ATPase activities and osmoregulation in adult whiteleg shrimp (Litopenaeus vannamei) exposed to low salinities. Scientific Journal of Can Tho University, Specific Issue on Aquaculture and Fisheries 2008(1): 90-99. (Full paper in Vietnamese).
52. Khanh, L.V., P.T.T. Van, N.H. Thuy, D.T.T. Huong (2008). Study on feeding habit and reproductive biology of rice eel (Monopterus albus). Scientific Journal of Can Tho University, Specific Issue on Aquaculture and Fisheries 2008(1): 100-111. (Full paper in Vietnamese).
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54. Hoa, N.P., Yang Yi, L.T. Hung (2008). Searching cues and digestion of marble goby fingerlings (Oxyeleotris marmorata) to different prey types. Scientific Journal of Can Tho University, Specific Issue on Aquaculture and Fisheries 2008(1): 112-118. (Full paper in Vietnamese).
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56. Van, N.T.H., H.T. Toi, L.V. Thong, N.V. Hoa (2008). Effect of nutritional qualities in Artemia biomass on culturing tiger shrimp juveniles (Penaeus monodon). Scientific Journal of Can Tho University, Specific Issue on Aquaculture and Fisheries 2008(1): 127-133. (Full paper in Vietnamese).
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58. Hoa, T.T.T., T.T. Tuan, N.T. Phuong (2008). Application of PCR-genotyping (ORF94) to study white spot syndrome virus (WSSV) infection in shrimp (Penaeus monodon). Scientific Journal of Can Tho University, Specific Issue on Aquaculture and Fisheries 2008(1): 163-169. (Full paper in Vietnamese).
59. Thuy, L.T.M. (2008). Study on the mixture of chitosan and gelatin to produce film for packaging tuna (Thunnus sp.) fillet. Scientific Journal of Can Tho University, Specific Issue on Aquaculture and Fisheries 2008(1): 147-153. (Full paper in Vietnamese).
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Total: 237 papers (tong ket đợt trước)

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Total 316 papers

Appendix 3-10

Curriculum of CENRes (Master of Environment and Natural Resources Management)

MASTER PROGRAM Field of Study: Environment and Natural Resources Management
Code: 60 85 01 01

No.	Course Code	Course Title	Credits	R	E	T	P	F	Pr	Semester
Conditional Courses			**4**	**4**	**0**					
1	ML601	Philosophy	4	x						I
2		English (B1 level according to the Can Tho University regulation)								I
Basic Courses			**12**	**8**	**4**					
3	MT 614	Environmental Scientific Research Methodology	2	x		20	20			I
4	MT615	Statistics and Experimental Design in Environmental Science	3	x		30	30			I
5	NNN736	GIS and Remote Sensing	3	x		30	30			I
6	MT616	Environmental Modelling	2		x	20	20			I
7	KT607	Natural Resources and Environmental Economics	2		x	20	20			I
8	MT617	Environmental Sociology	2		x	20		40		I
9	MT618	Special English for Natural Resources and Environment Management	2		x	30				I
Specialized Courses			**28**	**20**	**8**					
10	M619	Environmental Planning	2	x		20		40		II
11	MT620	Soil and Water Management	3	x		30		30		II
12	MT621	Ecology and Wetlands Management	2	x		20		40		II
13	MT622	Institutional Arrangement and Policies for Environmental Management	2	x		20		40		II
14	MT606	Environmental impact Assessment	2	x		20		40		II
15	MT623	Environmental Management for Agriculture and Rural Areas	2	x		20		40		II
16	MT611	Climate Change and Adaptation	2	x		20		40		II
17	MT625	Environmental Monitoring	3	x		30	30			II
18	MT626	Field-trips and Seminar	2	x				120		I
19	MT627	Environmental Management for Industrial Zones	2		x			40		I
20	MT628	Water Supply and Drainage	2		x	20		40		I
21	MT629	Integrated Coastal Resources Management	2		x	20		40		I
22	MT630	Socio-economic Analysis for Intergrated Coastal Resources Management	2		x	20		40		I
23	MT361	Community-Based for Coastal Resources Management	2		x	20		40		I
24	MT632	Flood Management and Mitigation	2		x	20		40		I
Master Thesis/courses			**10**	**0**	**10**					
25	MT900	Thesis	10		x					I,II
26	MT898	Assignment no. 1	5		x					I,II
27	MT899	Assignment no. 2	5		x					I,II
Total			**54**	**32**	**22**					

Notes: R: Required course; S: Selective course; T: Theory hours; P: Practice hours; F: Fieldtrip hours; and. Pr: Prerequisite course

Appendix 3-11

Research Themes in Agriculture Field

Program 1: Plant and Animal Genetics and Breeding

		Research Theme	Laboratory (Research Team)
1.1		**Plant genetics and breeding**	
1.1.1		**Plant resources collection, evaluation and development (rice, other crops, animal forages, etc.) (A)**	
	1	Collecting plant resources for evaluation and development (rice, other crops, animal forages, etc.)	Seed Technology, Molecular Biology, Gene bank, Animal Biotechnology and Molecular Biology
1.1.2		**Application of genetic, breeding and cell culture technologies for new varieties of rice and other crops with improved quality and adaptability to climate changes and other environmental stresses (A)**	
	2	Genetics and breeding of major crops adapted to climate change and other environmental stresses	Plant Molecular Genetics, Molecular Biology, Cell Biotechnology
	3	Application of new technologies to enhance nutrient values of seeds and seed quality planted in problem soils	Plant Breeding, Seed Technology, Plant Physiology, Plant and Animal Biochemistry
	4	Bioinformatics applications to plant genetics and breeding	Plant Molecular Genetics, Molecular Biology
	5	Development of plant cell culture technologies for MD	Cell Biotechnology
	6	Studies on plant responses and adaptation to environmental stresses in MD	Molecular Biology, Plant and Animal Biochemistry, Applied Biological Sciences, Plant Pathology, Entomology, Biological Control
	7	Studies on natural biological active compounds and proteins/enzymes in agricultural production, pharmaceutical, and medical applications	Protein Technology & Natural Products, Stem Cell, Plant and Animal Biochemistry, Applied Biological Sciences, Biological and Chemical Technology in Plant Protection
1.2		**Animal genetics and breeding**	
1.2.1		**Collection, evaluation and development of native animal breeds (B)**	
	8	Collecting animal resources for evaluation and development of native animal breeds	Experimental Animal Farm, Animal Biotechnology and Molecular Biology
1.2.2		**Application of genetic and breeding technologies for new live stock varieties with improved quality and adaptibility to climate changes and other environmental stresses (A)**	
	9	Genetics and breeding of animals for improving growth and reproduction performance, product quality, and disease resistance	Experimental Animal Farm, Animal Biotechnology and Molecular Biology, Advance Testing, Histology and Molecular Pathology
	10	Applications of stem cells in breeding and conservation of animal resources	Stem cell, Experimental Animal Farm
	11	Bioinformatics applications to animal genetics and breeding	Experimental Animal Farm, Animal Biotechnology and Molecular Biology, Molecular Biology

Program 2: Sustainable Production of Tropical Plants and Animals

		Research Theme	Laboratory (Research Team)
2.1		**Crop production**	
2.1.1		**Developing integrated crop management (ICP) for improvement of product quality and adaptation to climate changes (B)**	
	12	Developing integrated management systems to improve rice productivity and quality	Plant Breeding, Molecular Biology, Plant and Animal Biochemistry, Plant Physiology, Plant Pathology, Entomology, Biological Control, Rice Research
	13	Developing integrated management systems to improve the productivity and quality of fruit trees, vegetables, pharmaceutical plants and industrial trees	Horticulture Science, Edible Pharmaceutical Mushroom, Veterinary Pharmacology
	14	Studies on alternative strategies for production of rice and other crop plants under climate change impacts in MD	Molecular Biology, Plant and Animal Biochemistry, Plant Physiology, Plant Pathology, Entomology, Biological Control, Horticulture science, Edible Pharmaceutical Mushroom, Rice Research

Research Theme			Laboratory (Research Team)
2.2		**Plant protection**	
2.2.1		**Studies on insect pests and diseases and development of alternative plant protection technologies (A)**	
	15	Development of plant protection technologies; biopesticides and newly synthesized compounds for crop protection	Plant and Animal Biochemistry, Molecular Biology, Plant and Animal Biochemistry, Plant Pathology, Entomology, Biological Control
	16	Studies on interaction changes among insect pests, crops and beneficial organisms under climate change impacts	Entomology, Biological Control, Biological and Chemical Technology in Plant Protection
	17	Studies on newly emerging insect pests, prediction and forecast of the outbreak of important plant diseases	Plant Pathology, Entomology, Biological and Chemical Technology in Plant Protection
	18	Studies on induced resistance in plants against insect pests and diseases	Molecular Biology, Biological and Chemical Technology in Plant Protection
	19	Identification and application of insect semiochemicals, pathogenic inhibitors and plant-origin pesticidal compounds for plant protection	Biological and Chemical Technology in Plant Protection
	20	Application of molecular techniques in detection/identification of pathogens, insect pests, and beneficial organisms on plants	Molecular Biology, Biological and Chemical Technology in Plant Protection
2.3		**Soil management**	
2.3.1		**Studies on bio-remediation of MD problem soil under impacts of climate change (A)**	
	21	Developing microbiological environmental management technologies for soil nutrition and soil remediation for crop production in MD	Soil Classification and Micromorphology, Soil Microbiology, Soil Chemistry, Soil Physics
	22	Identification of impacts of climate change on soil properties, greenhouse gas emission and soil use in MD toward new cropping systems	Soil Microbiology, Soil Chemistry, Soil classification & micromorphology, Plant Breeding
	23	Identification and application of enzyme activities of microorganisms in the MD soil toward soil pollution remediation	Soil Microbiology, Soil Chemistry, Molecular Biology, Protein Technology, Natural Products
	24	Studies on interaction between soil micro-organisms and plants on soil nutrition enhancement and plant growth stimulation	Soil Microbiology, Soil Microbiology
2.3.2		**Studies on sustainable soil uses (B)**	
	25	Morphological studies and classification of MD soil for sustainable soil uses	Soil Classification and Micromorphology, Soil Physics and Soil chemistry
	26	Development and application of high performance organic and bio-fertilizers	Soil Microbiology, Soil Microbiology, Soil Physics, Molecular Biology
2.4		**Animal production**	
2.4.1		**Improving animal production systems for higher quality and safety of products (A)**	
	27	Enhancement of nutrient values of animal feeds and efficiency of feed conversion for improving quality of animal products	Experimental Animal Farm, Non-ruminant Animal Production Techniques, Animal Nutrition and Feed Technology, Advance Testing
	28	Improvement of animal production systems towards biosafety and environmental challenges	Experimental Animal Farm, Non-ruminant Animal Production Techniques, Advance Testing
	29	Physiological studies on characteristics of animals under different feeding conditions and environmental stresses	Experimental Animal Farm, Animal Anatomy and Physiology
	30	Studies on ruminant animal production systems for Improving production performance and reducing greenhouse gas emission and environmental pollution	Experimental Animal Farm, Ruminant Animal Production Techniques, Advance Testing
2.5		**Animal health management**	
2.5.1		**Molecular studies for detection and identification of animal diseases in MD (A)**	
	31	Studies on disease control systems for improving animal health: all types of pathogenic agents including bacteria, viruses, parasites and fungi	Veterinary Bacteriology and Mycology, Parasitology, Animal Clinic and Virology, Food of Animal Origin Hygiene and Safety, Histology and molecular pathology, Immunology and Epidemiology, Veterinary Pharmacology, Experimental Animal Farm

		Research Theme	Laboratory (Research Team)
	32	Application of molecular techniques in detection/identification of pathogens and beneficial micro-organisms on animals	Molecular Biology, Veterinary Bacteriology and Mycology, Animal Clinic and Virology, Experimental Animal Farm, Histology and Molecular Pathology, Food of Animal Origin Hygiene and Safety, Experimental Animal Farm
	33	Studies on animal tissues for disease diagnosis by histological analysis and molecular techniques (developing a database for diagnosis)	Histology and Molecular Pathology, Food of Animal Origin Hygiene and Safety, Experimental Animal Farm
2.5.2		**Microbial and pharmaceutical studies for animal disease treatment (A)**	
	34	Pharmacological screening of microbial extracts (including *escherechia.coli*) and plant materials for treating animal diseases	Veterinary Pharmacology, Experimental Animal Farm
	35	Studies on antibiotic residues in food-producing animals and antimicrobial resistance in the context of a food chain	Food of Animal Origin Hygiene and Safety, Experimental Animal Farm
	36	Epidemiology, immunobiology and diagnostic aspects of animal viral, bacterial and parasitic infections and principles of host-pathogen interactions	Immunology and Epidemiology, Experimental Animal Farm
2.6		**Agricultural modelling**	
2.6.1		**Simulation of metal-organic frameworks (MOFs) (A)**	
	37	Simulation, modelling and calculation on environmental chemistry, MOFs based materials for storage and adsorption of CO2 and materials for hydrogen energy	Materials and Molecular Modelling
2.6.2		**Agricultural Machineries (A)**	
	38	Mechanical designing and manufacturing for farm machineries	Agricultural Automatic Machinery, Hear Treatment and Material Technology

Program 3: Food Technology and Post-harvest Technology

		Research Theme	Laboratory (Research Team)
3.1		**Post-harvest and Logistics**	
3.1.1		**Studies and development of post-harvest technologies for rice, plant and crop based-food products in MD (A)**	
	39	Studies and modelling of kinetic changes of quality attributes of food	Postharvest Technology, Food Nutrition, Food Technology, Food Chemistry, Food Engineering
3.2		**Food Processing**	
3.2.1		**Development of value added food products from agricultural products and by-products in MD (A)**	
	40	Studies and modelling of kinetic changes of quality attributes of food	Food Technology, Food engineering, Food Tech Food Microbiology, Food Nutrition
	41	Value added products from by-products of food processing	Food Technology, Food Chemistry
	42	Modelling to control 3D product temperature distribution in process room (heating, cooling....)	Food Engineering, Postharvest
	43	Identifying nutritional effects and developing functional food	Food Nutrition, Food Chemistry, Food Tech, Human Nutrition
	44	Identification of functional peptide	Food Biotechnology
	45	Purification and application of enzyme for food processing	Food Biotechnology
	46	Studies on physiology, genetics, biochemistry, and behavior of useful microorganisms in food products of MD	Food Microbiology, Food Biotechnology, Molecular Biology
	47	Studies on probiotics and prebiotics in food products	Food Microbiology, Protein Technology & Natural Products
3.3		**Food Safety and Quality Management**	
3.3.1		**Studies on food pathogens and antibiotics resistant bacteria ()**	
	48	Identification and treatment of food pathogens: pathogens and antibiotic resistant bacteria	Food Microbiology, Molecular Biology

Appendix 3-12

Research Themes in Aquaculture and Fisheries Field

PROGRAM 1	**Climate change: Impacts and adaptation in aquaculture and Fisheries**
1 OVERALL OBJECTIVES	The overall objectives of the program are to enhance capacity of understanding and adaptation solutions to climate change for sustainable development of aquaculture and fisheries
2. SPECIFICIC OBJECTIVES	- To evaluate the impacts of environmental changes on aquatic animal life history, biology, physiology, nutritional value, genetics and health - To find out adaptation measures to climate changes through selective breeding, environmental manipulation, nutrition and feed improvement , health management
3. EXPECTED OUTPUTS	- Scientific data and information about the impacts of environment changes on aquatic animal life history, biology, physiology, nutritional value, genetics and health - At least 5 scientific and technical solutions to adapt to climate changes to through selective breeding, environmental manipulation, nutrition and feed improvement , health management - Workshops, training and technique transfer for 500 persons organized. - 50 scientific paper and 3 books published (30% internationally) - 15 MSc and 3 PhD students involved/graduated (national and international students) - 5 national and international workshops, conferences organized
4. ACTIVITIES	*Joint activities with Japanese experts and students in:* - Conducting in-depth studies on the effects of different environment factors (temperature, salinity…) aquatic animal life history, biology, physiology, nutritional value, and health - Conduct experiments and trials on the feasibility of different technical methods (selective breeding, environmental manipulation, nutrition and feed improvement , health management) for improving aquaculture and fisheries production under environmental changes. - Supervising students doing thesis researches - Organizing workshops, training courses of developed technologies to local people - Publishing scientific papers and books
5. DURATION	8 years (2015-2023)
6. ESTIMATED BUDGET	400,000 USD

PROGRAM 2	**Green technology innovation for aquaculture**
1 OVERALL OBJECTIVES	The overall objectives are to develop and apply advanced and environmental friendly technology for seed production and farming in order to contribute to innovation and sustainable development of aquaculture in Mekong Delta region.
2. SPECIFICIC OBJECTIVES	The specific objectives are: - To develop and apply successfully green technology for seed production (broodstock management and domesticaion, larval rearing technology) and farming systems (recirculating systems, modern marine cage culture, integrated mariculture, sea ranching) of marine and brackish water species (such as marine fish, mollusks, crustacean) in order to contribute to inovation of marine aquaculture – a new and very potential area in the Mekong Delta - To develop and apply successfully green technology for seed production (broodstock management and domesticaion, larval rearing technology) and farming systems (integrated farming systems, recirculating systems, water–reuse aquaculture, bioflocs…) of freshwater water species for sustainable development of inland aquaculture.
3. EXPECTED OUTPUTS	- Successfully breeding 5 new indigenous species, especially marine fish, mollusc, crustacean. - Broodstock management and domestication strategies for 5 species. - Successfully developing and applying 5 modern aquaculture systems such as pond intensive culture, super-intensive recirculating tank culture, bioflocs

	aquaculture systems, integrated aquaculture systems and marine cage culture of important species (freshwater and marine). - Successfully developing and applying 5 farming systems for newly bred species. - Organizing national and international workshops, training and culture technique promotion to 500 people. - Publishing of 40 journals (30% internationally) - Publishing of 3 major books. - Applying 1 patern - Advising to 30 master and Ph.D. thesis, national and international
4. ACTIVITIES	*Joint activities with Japanese experts and students in:* - Studying on artificial seed production of new species, especially marine species. - Studying and developing different modern and environmental friendly aquaculture systems for important cultured species and new species - Applying for effective practice culture (demonstration). - Training and technique promotion. - Publishing to references. - Applying for patern - Advising to student graduate thesis.
5. DURATION	7 years (from 2015 to 2023)
6. ESTIMATED BUDGET	400,000 USD

PROGRAM 3	**Fisheries Resources Management and Conservation**
1 OVERALL OBJECTIVES	The overal objectives are to have better understanding about freshwater and marine aquatic resources, fishing technology and management in order to contribute to development of strategies for sustainability uses, management and conservation of fisheries resources in the Mekong Delta.
2. SPECIFICIC OBJECTIVES	The specific objectives are - To assess and understand on ecophysiology of endangered and stressed species and conservation - To evaluate and monitor on biodiversity and genes pools of aquatic species in Mekong Delta and marine protected area (Phu Quoc,…) - To evaluate and recommend solutions for sustainable capture fisheries management in the Mekong Delta
3. EXPECTED OUTPUTS	- Database on biodiversity, distribution and population dynamics of aquatic species, especially endangered species and marine species. - Status of capture fishing technology and management - Recommendations for sustainable use, management and conservation of aquatic and fisheries resources - 5 training courses for fish stock assessment, fishing techniques and fisheries management for about 200 persons. - Organizing 3 workshops, conferences - 30 scientific papers (30% internationally) - 2 specialist books - 20 post-graduate students
4. ACTIVITIES	*Joint activities with Japanese experts and students in:* - Study on biodiversity and population dynamics of aquatic species - Study on status of capture fisheries technology, socio-economic and management - Workshop and training on fisheries resources management. - Scientific publication - Guide students to carry out research on fish stock assessment and fisheries management
5. DURATION	7 year, 2015-2023

6. ESTIMATED BUDGET	350,000 USD

PROGRAM 4	**Quality improvement of fisheries/aquaculture products**
1 OVERALL OBJECTIVES	The overall objectives of this program are to strengthen the fisheries products processing sector and enhance food safety management to support the sustainable growth of this important industry in the Mekong Delta
2. SPECIFICIC OBJECTIVES	The specific objectives of the program are - To evaluate and recommend for improvement of the evaluation systems for aquatic products safety - To evaluate and recommend for quality improvement of aquatic products in cold chain transportation system - To apply biotechnology in aquatic product processing - To improve the quality of aquatic food products.
3. EXPECTED OUTPUTS	The expected achievements of the program are: - Database on current status of evaluation systems for aquatic products safety and recommendation for improvement of the systems - Database on current status of cold chain transportation system of aquatic products and recommendation for further improvement. - Two (at least) processing protocols (high-tech) of selected aquatic products. - Recommended procedures for evaluation systems for aquatic products safety and cold chain transportation system of aquatic products - Supply of certain natural antioxidant to farmed fish and shrimps to prevent postharvest quality deteriorations, - 50 student thesis involved/graduated; - 30 scientific papers and 1 book published (30% internationally) - 3 workshops, conferences
4. ACTIVITIES	*Joint activities with Japanese experts and students in:* - Study on the status of evaluation systems for aquatic products safety and recommendation for improvement of the systems - Study on the current status of cold chain transportation system of aquatic products and recommendation for further improvement. - Study on application of biotechnology in processing of added of selected aquatic products - Supervision of student thesis researches; transfer of developed processing technologies and analysis protocol to end-users; and publication of scientific papers and book. - Study on the application of natural antioxidants for controlling oxidative deterioration in aquatic food products
5. DURATION	7 years (2015-2023)
6. ESTIMATED BUDGET	300,000 USD

PROGRAM 5	**Environmental monitoring for aquaculture and fisheries**
1 OVERALL OBJECTIVES	The overall objectives are to enhance capacity in monitoring and managing the aquatic environment in order to ensure sustainable development of aquaculture in the Mekong Delta
2. SPECIFICIC OBJECTIVES	The specific objectives are to - To assess and improve monitoring and management of water and sediment quality (physical-chemical-biological factors, including disease pathogens) for inland aquaculture in Mekong Delta - To assess and improve monitoring and management of water quality (physical-chemical-biological factors including disease pathogens) for marine aquaculture

3. EXPECTED OUTPUTS	- Database on aquatic environment (water, sediment and biotic components) of inland and marine aquaculture areas in the Mekong Delta - Procedures for monitoring of aquatic environments for aquaculture areas. - Warning and recommended measures for sustainable management of aquatic environments for aquaculture - 40 papers published (30% internationally) - 2 books on aquatic environment monitoring and management in the Mekong Delta 20 MSc and PhD students participating in graduation theses - Workshop and training for 400 peoples
4. ACTIVITIES	*Joint activities with Japanese experts and students in:* - Studying, monitoring and building database water, sediment and biotic components in inland and marine aquaculture areas of the Mekong Delta - Warning and recommendation on aquatic environment for aquaculture - Conducting training and technology transfer in environmental monitoring and management - Publish papers and books
5. DURATION	7 years, 2015-2023
6. ESTIMATED BUDGET	300,000 USD

PROGRAM 6	**Biochemistry and pharmaceutical science in aquaculture and fisheries**
1 OVERALL OBJECTIVES	The overall objectives are to develop and apply of biochemistry-pharmaceutical science and technologies to promote effective and sustainable development of aquaculture and fisheries in the Mekong Delta.
2. SPECIFICIC OBJECTIVES	The specific objectives are - To develop and apply eco-friendly supplements to reduce drugs and chemicals used for aquaculture - To develop and apply natural bioactive products as functional food for human and for aquaculture
3. EXPECTED OUTPUTS	- 5 products and 5 effective technology processes of extraction and formulation of nutraceuticals, cosmaceuticals and pharmaceuticals, fine chemicals from aquaculture sources for human. - 5 products and 5 effective production technologies of natural derived pharmaceuticals for different sources for aquaculture. - Publishing 30 papers (30% internationally) - 2 books in the field of biochemistry-pharmaceutical technologies for sustainable aquaculture (especially with Japanese partners) - 50 students take part in researches (30% from oversea, especially from Japan). - Applying 1 patern - 5 conferences and training in biochemistry-pharmaceutical technologies for sustainable aquaculture.
4. ACTIVITIES	*Joint activities with Japanese experts and students in:* - To research and develop technological processes for the production of bioproducts from aquaculture sources for human. - To research and develop technological processes for the production of natural derived products for aquaculture. - Technology transfer. - To supervise graduate and undergraduate students doing graduation researches - Publishing research results - Conference attending and organization
5. DURATION	7 years (2015–2023)
6. ESTIMATED BUDGET	200,000 USD

PROGRAM 7	**Engineering and information technology development and application in aquaculture and fisheries**
1. OVERALL OBJECTIVES	The overall objectives are to develop and apply engineering and information technologies to mechanize and modernize aquaculture and fisheries in the Mekong Delta
2. SPECIFICIC OBJECTIVES	The specific objectives are - To study, develop and apply of engineering technology, automatic equipments and advanced materials for aquaculture and fisheries - To study, develop and apply IT (software, database, monitoring and warning systems, GIS and remote sensing and communicate networks) for aquaculture and fisheries management
3. EXPECTED OUTPUTS	- 10 new products produced and 10 technological protocols of production which are applied effectively to aquaculture and fisheries. - Publish 20 papers (30% internationally) - Publish 4 books in technology for aquaculture. - Supervise 100 undergraduate students, postgraduate students for their thesis. - 2 paterns - Workshop, trainining for 400 people
4. ACTIVITIES	*Joint activities with Japanese experts and students in:* - Study on development of engineering technology and information technology in aquaculture - Producing products - Application to aquaculture and fisheries - Organizing training, workshop - Publishing papers and book - Application for patern - Supervise graduate/undergraduate students
5. DURATION	7 years, 2015–2023
6. ESTIMATED BUDGET	200,000 USD

PROGRAM 8	**Fisheries socioeconomics and management**
1 OVERALL OBJECTIVES	The overall objectives are to assess the existing status socio-economic of aquaculture and fisheries; roles of aquaculture and fisheries; impacts of environmental changes on aquaculture and fisheries socio-economic and to recommends for building up strategies and solutions for sustainable fisheries sector development in the Mekong Delta
2. SPECIFICIC OBJECTIVES	The specific objectives are - To evaluate status and roles of aquaculture and fisheries in socio-economics - To evaluate the impacts of environmental changes on socio-economics of aquaculture activities in Mekong Delta region - To evaluate the impacts and roles of policies on sustainable development of aquaculture and fisheries - To evaluate and improve the value chain in aquaculture and fisheries
3. EXPECTED OUTPUTS	- Reports on evaluation of status and roles of aquaculture and fisheries in socio-economic and recommendation for improvement - Reports on evaluation of the impacts of environmental changes on socio-economics of aquaculture activities in Mekong Delta region and recommendation for improvement - Reports of roles of policies on development of aquaculture and fisheries and recommendation for improvement - Reports on value chains and recommendation for improvement - 10 workshops, training courses, sharing information a among stakeholders (producers, traders, managers and scientists) - 20 scientific papers on the above aspects - 03 books of socio-economics and management in fisheries - 50 theses of Bachelor, Master and PhD students

4. ACTIVITIES	*Joint activities with Japanese experts and students in:* - Investigating on the current status and trends of aquaculture and capture fishery development - Providing useful information and recommending for aquaculture and fisheries socio-economic management and development - Publishing papers and books - Organizing training courses, workshops and conferences - Supervising under graduate and graduate students to conduct their researches
5. DURATION	7 years, 2015–2025
6. ESTIMATED BUDGET	USD 100,000

Appendix 3-13

Research Themes in Environment Field

LIST OF PROJECTS IN ENVIRONMENT-RELATED FIELDS CATEGORIZED BY 12 RESEARCH THEMES (SINCE 2008)

1USD=21.000 VND

No.	Related to research topics(*)	Project title	Period (start-end)	Budget (USD)	Sponsor	Partners
1. To recognize current problems, evaluate impacts and project trends of changes in the field environment and natural resources in the Vietnamese Mekong Delta (VMD) 1.1. Water & land resources monitoring						
	Dept.					
1	***Environment and Natural Resources (CENRes)***	Community-based environmental monitoring using social media for the Mekong Delta – a salinity monitoring prototype	2011 - 2014			USAID, USGS, IUCN
2		To investigate sediment flux through the Song Hau mouth and adjacent tidal channels	2012 - 2013			Washington University, The United States
3		Community-based climate change adaptation in the Ca Mau province	2012			World Vision Vietnam
4		Flood dynamics and damages of the flood in the study area of the Mekong Delta in 2011	03 - 09/2012			Jircas, Japan
5		Current situation on dyke systems in Dong Thap and An Giang provinces	07 - 12/2012			Jircas, Japan
6		Multi-level adaptation to floods and the governance of risk in the Mekong Delta, Vietnam	2007- 2008			M-POWER
7	***Environmental Sciences (CENRes)***	Assessing the impacts of flood control systems to soil fertile, loading capacity of water sources and community health for sustainable agricultural development	2013-2015	61.640	Department of Natural Resources and Environment of An Giang province	
8		Assessing the residues of organophosphate, carbamate and pyrethroid in main rivers and canals in HauGiang province	2012-2015	29.871	Department of Science and Technology of Hau Giang province	
9		Assessing the Arsenic (As) pollution in the Mekong delta	2012-2015	4.599	Vietnamese Ministry of Education and Training	
10	***Land Resources (CENRes)***	Application of GIS in database management for socioeconomic & environmental resources in HauGiang				
11		Climate change and rice monitoring for enhancing food security: A case study from Mekong Delta, Vietnam				
12		The Remote sensing-based Information and Insurance for Crops in Emerging economies				
1. To recognize current problems, evaluate impacts and project trends of changes in the field environment and natural resources in the Vietnamese Mekong Delta (VMD) 1.2. Analyzing & modelling water & land resources						
13	***Environment and Natural Resources (CENRes)***	Climate change affecting land use in the Mekong Delta: Adaptation of rice-based cropping systems	2011 - 2014			ACIAR, IRRI

No.	Related to research topics(*)	Project title	Period (start-end)	Budget (USD)	Sponsor	Partners
	Repeated	To investigate sediment flux through the Song Hau mouth and adjacent tidal channels	2012 - 2013			Washington University, The United States
1. To recognize current problems, evaluate impacts and project trends of changes in the field environment and natural resources in the Vietnamese Mekong Delta (VMD) 1.3. Evaluating changes of the agro-ecological changes under great threats of the in-situ development and climate change						
14	***Environment and Natural Resources (CENRes)***	Adaptation to climate change: Land-use innovative models applied to environmental management	2012 - 2014			Peers, France
15		Climate change affecting land use in the Mekong Delta: Adaptation of rice-based cropping systems	2011 - 2014			ACIAR, IRRI
16		To develop climate change adaptation strategies in the coastal areas of the Vietnamese Mekong Delta: The case study of the TràVinh province	2012 - 2013			HSF
17	***Land Resources (CENRes)***	Climate change and rice monitoring for enhancing food security: A case study from Mekong Delta, Vietnam				
1. To recognize current problems, evaluate impacts and project trends of changes in the field environment and natural resources in the Vietnamese Mekong Delta (VMD) 1.4. Analysis of economic efficiency of natural resources uses and problems in natural resource uses and management						
18	***Environment and Natural Resources (CENRes)***	Assessing economic and welfare values of fish in the Lower Mekong Basin: To establish a coordinated monitoring of fish resources through a network of universities	2012 - 2015			Worldfish, ICLARM
19	***Land Resources (CENRes)***	Wise use of tropical peatlands: focus on Southest Asia				
20		Study on the current status and potential for exploitation of clay resource in the Mekong delta (University study)				
2. To study on the mitigation of environmental impact 2.1. To study the possible mitigation strategies to eliminate impacts of natural disasters on agriculture, aquaculture and water supply (including both urban & industry sections)						
21	***Environment and Natural Resources (CENRes)***	Rainwater harvesting in the Can Tho City, Vietnamese Mekong Delta	02 - 12/2013			CtC and CCCO
22		An integrated approach for risk assessment in the coastal agro-ecological zone of the Bến Tre province				
23		Project 1: Climate adaptation through sustainable urban development with the case study on urban water systems in Can Tho, Vietnam	2010 - 2012			CSIRO, Australia
24	***Natural Sciences College***	A Study towards the Effect of Antioxidants on Vietnamese Catfish Fat Biodiesel. Researcher: Nguyen Van Dat	Jan. 15, 2010 –Mar. 15, 2010	Invited by New Energy Foundation (NEF), Japan	New Energy Foundation (NEF) Japan	National Institute of Advanced Industrial Science and Technology (AIST)

No.	Related to research topics(*)	Project title	Period (start-end)	Budget (USD)	Sponsor	Partners
25		Potential of Utilizing Some Biomass Sources as a Feedstock for Biodiesel and Oxidation Stability of Biodiesel-Diesel Blends (The collaborative research activities with National Institute of Advanced Industrial Science and Technology under the Asia Biomass Energy Researchers Invitation Program 2010). Researcher: Nguyen Van Dat	Sep. 13. 2010 –Dec. 12. 2010	Invited by New Energy Foundation (NEF), Japan	New Energy Foundation (NEF) Japan	National Institute of Advanced Industrial Science and Technology (AIST)
26		Studies on the Oxidation Stability of Coconut Based Biodiesel And Coconut – Jatropha Biodiesel Blends (The collaborative research activities with National Institute of Advanced Industrial Science and Technology under the Asia Biomass Energy Researchers Invitation Program 2010). Researcher: Dr. Bui ThiBuu Hue	Dec. 1, 2010 –Feb. 25, 2011	Invited by New Energy Foundation (NEF), Japan	New Energy Foundation (NEF) Japan	National Institute of Advanced Industrial Science and Technology (AIST)
27		Biofuel Research Principal Investigator: Bui ThiBuu Hue	Dec. 1, 2013 – ongoing research	28,000	Yanmar Japan	Yanmar Agriculture Research Institute in Cantho
28	***Land Resources (CENRes)***	Application of GIS technology to track and predict the migration of pest presence of rice in Mekong Delta				
29		The Remote sensing-based Information and Insurance for Crops in Emerging economies				
30		Climate change and rice monitoring for enhancing food security: A case study from MD, VN				
2. To study on the mitigation of environmental impact 2.2. To study possible techniques to treat the soil, water and air pollutions in the specific context of the Vietnamese Mekong Delta						
31	***EnviEng (CENREs)***	Promotion of biogas appliation in the Mekong Delta of Vietnam	2009 - 2012	50.000	TRIG project - Vietnamese Ministry of Education & Training	Technical University of Braunschweig - German
32		Design and implementation of biogas lighting	2010 - 2011	5.000	JIRCAS - Japan	JIRCAS
33		Design and implement the Arsenic removal unit for groundwater at TraVinh province	2009 - 2010	5.000	Provincial budget	
34		INVENT: Integrated Waste Management modules for different courses of graduate studies	2007 - 2009		Funded by Asia-Link project	Bremen University, Dresden University - German, King Mong Kut Uni - Thailand, National University of Laos, Royal University of Agriculture - Cambodia

No.	Related to research topics(*)	Project title	Period (start-end)	Budget (USD)	Sponsor	Partners
35		SANSED: Closing nutrient cycles in decentralised water treatment systems	2003 - 2008		Funded by BMBF	Bonn University, Bochum University - German
36		Wastewater treatment by wetland system	2003 - 2008		Funded by VLIR-A21	Catholic University of Leuven - Belgium
37	***ChemEng (CoET)***	Research and development of polymer composite materials based on natural fibre	2007-2009		MOST – Vietnam and BelSpo - Belgium	MTM – KULeuven, Polymer Center – Hanoi University of Technology
38		Improvement of the processing of natural fibres for composites and development of natural fibre composite applications	2009-2011	70.000	MOST – Vietnam and BelSpo	MTM – KULeuven, Polymer Center – Hanoi University of Technology
39		Completing the extraction technology, perform technology from coconut fibers and applications for composite	2014 -2016	175.000	MOST – Vietnam and BelSpo	MTM – KULeuven, Polymer Center – Hanoi University of Technology
40		Research and development of composite reinforced with coconut fibres	2010	1.500	Can Tho University	
41	***EnviSci (CENRes)***	Technical effects of Chlorella sp. and Spirulina sp. biomass in catfish ponds	2011-2012	2.142	Cantho University	
42		Study of using bazan soil to remove phosphorous in the seafood processing wastewater	2011-2011	2.797	Cantho University	
43		Using the wastewater from catfish ponds to grow Spirulina sp. for fish fingerlings	2013-2015	1.422	Cantho University	
44		Using Ozone to treat Arsenic in groundwater	2009-2010	711	Cantho University	
45		Effects of man-made materials to treat nitrogen and phosphoros in wastewater from food processing factories	2009-2012	4.619	Vietnamese Ministry of Education and Training	
46		Water resources management for long-term sustainability in climate change context: Treatment and reuse aquaculture water by eco-technology in the coastal zones of the Mekong Delta, Vietnam	2012-2014	10.920	IFS (Sweden)	Aquaculture College (CTU), Aarhus University (Denmark)
47		Integrated constructed wetlands in recirculation aquaculture system in the Mekong Delta	2010-2011	4.000	PhysCAM Project (DANIDA)	Aquaculture College (CTU), Aarhus University (Denmark)
48	***Land Resources (CENRes)***	Evaluate potential fertility and the limiting factor on rice paddy and fruit garden in HauGiang				

No.	Related to research topics(*)	Project title	Period (start-end)	Budget (USD)	Sponsor	Partners
49		Development of new technologies and their practice for sustainable farming systems in the Mekong delta				
50		Improving quality and productivity of pineapple in Go Quao, KienGiang				
51		Study on New alkaline fertilizer for acid soil reclamation in the MD				
2. To study on the mitigation of environmental impact 2.3. To study changes of the farming systems to support eliminate pollutants loaded to the environment (including GHG)						
	Environment and Natural Resources (CENRes)	Adaptation to climate change: Land-use innovative models applied to environmental management	2012 - 2014			Peers, France
2. To study on the mitigation of environmental impact 2.4. To study the planning and managing mechanism of managing rural, urban and industrial zones to eliminate the pollutant loaded to the environment (including GHG)						
52	***Environment and Natural Resources (CENRes)***	Rainwater harvesting in the Can Tho City, Vietnamese Mekong Delta	02 - 12/2013			CtC and CCCO
53	***Environmental Sciences (CENRes)***	Assessing the status of managing sewage sludge in Cantho city	2008-2009	711	Cantho University	
54		Study of using sewage sludge to produced organic fertilizers in Cantho city	2012-2014	23.233	Department of Science and Technology of Hau Giang province	
55		Flood and urban erosion management based on community in Cantho city	2013-2014	31.165	ISET-Rockefeller (USA)	
56		Sustainable biogas production from waste rice straw	2012-2016	443.834	DANIDA-Denmark	
57		Study of feasibility of rural development projects based on cleaner development mechanisms in the Mekong delta	2008-2016	365.373 (2008-2013)	JICA-Japan	
2. To study on the mitigation of environmental impact 2.5. To study possible solutions to protect the existing biodiversity and natural resources						
58	***Environmental Sciences (CENRes)***	Study of solutions to control Mimosa pigra	2008-2010	1.422	Vietnamese Ministry of Education and Training	
2. To study on the mitigation of environmental impact 2.6. To study the socio-economic feasibility of the (above) solutions						
3. To study on the resilience and adaptive capacity of local residents in the context of environmental changes 3.1. To study on the resilience of different farming systems in the context of extreme weather events and environmental degradation						
59	***Environment and Natural Resources (CENRes)***	Adaptation to climate change: Land-use innovative models applied to environmental management	2012 - 2014			Peers, France

No.	Related to research topics(*)	Project title	Period (start-end)	Budget (USD)	Sponsor	Partners
60		Water governance and gender in the context of climate change in the coastal area of Mekong Delta, Viet Nam	01 - 12/2013			MPOWER
61		An integrated approach for risk assessment in the coastal agro-ecological zone of the Bến Tre province				
3. To study on the resilience and adaptive capacity of local residents in the context of environmental changes 3.2. To study on the adaptation strategies on sustainable uses of natural resources in the context of climate change and environmental degradation						
62	***Environment and Natural Resources (CENRes)***	Rainwater harvesting in the Can Tho City, Vietnamese Mekong Delta	02 - 12/2013			CtC and CCCO
63	***Environmental Sciences (CENRes)***	Using cholinesterase to assess contaminated water by agro-chemicals and effects of these chemicals to snakehead fish (Channastriata)	2010-2013		Department of Science and Technology of Hau Giang province	
64	***Land Resources (CENRes)***	Using multispectral and multispatial remote sensing images to monitor shifting of aquaculture system on coastal wetlands in the MD				

Note: *Classification of research topics have to be cited in uniform manner as number below

1. To recognize current problems, evaluate impacts and project trends of changes in the field environemt and natural resources in the Vietnamese Mekong Delta (VMD)

1.1. Water & land resources monitoring
1.2. Analyzing & modelling water & land resources
1.3. Evaluating changes of the agro-ecological changes under great threats of the in-situ development and climate change
1.4. Analysis of economic efficiency of natural resources uses and problems in natural resource uses and management

2. To study on the mitigation of environmental impact

2.1. To study the possible mitigation strategies to eliminate impacts of natural disasters on agriculture, aquaculture and water supply (including both urban & industry sections)
2.2. To study possible techniques to treat the soil, water and air pollutions in the specific context of the Vietnamese Mekong Delta
2.3. To study changes of the farming systems to support eliminate pollutants loaded to the environment (including GHG)
2.4. To study the planning and managing mechanism of managing rural, urban and industrial zones to eliminate the pollutant loaded to the environment (including GHG)
2.5. To study possible solutions to protect the existing biodiversity and natural resources
2.6. To study the socio-economic feasibility of the (above) solutions

3. To study on the resilience and adaptive capacity of local residents in the context of environmental changes

3.1. To study on the resilience of different farming systems in the context of extreme weather events and environmental degradation
3.2.To study on the adaptation strategies on sustainable uses of natural resources in the context of climate change and environmental degradation

Appendix 3-14

Proposal of Autonomy Transfer to Can Tho University (No. 627/ ĐHCT-KHTH CTU Rector, April 17, 2013)

(Unofficial Translation)

MINISTRY OF EDUCATION AND TRAINING
SOCIALIST REPUBLIC OF VIETNAM

CAN THO UNIVERSITY **Independence – Freedom – Happiness**

N^0: 627/ ĐHCT-KHTH *Can Tho, April 17, 2013*

Ref: Proposal of autonomy transfer to Can Tho University

To: **Ministry of Education and Training**

On March 20, 2013, the Prime Minister and the delegation of Ministries and Agencies paid a visit to Can Tho University (CTU). At the meeting, on behalf of the Ministry of Education and Training (MoET), Vice Minister Bui Van Ga, upon the recommendations and suggestions from CTU, confirmed the strong support on CTU institutional autonomy and self responsibility. Therefore, CTU has to take initiative on detailed planning and submit it to MoET.

After that working session, the Government Office has publicized an announcement Ref. 146/TB-VPCP dated on April 1st, 2013 of the Prime Minister's conclusion upon the official visit to Can Tho University. In this official dispatch (clause 3 term a), the Prime Minister approved CTU to be a nationally leading university on focus, and to have the autonomy and self-responsibility; assigning MoET to consider, solve specific proposals on autonomy.

According to the announcement from the Government Office and the policy from MoET on strengthening the autonomy and self-responsibility; following the guidance of Prime Minister and Deputy Minister, CTU respectfully requests the consideration of MoET:

1. Supporting and allowing CTU to self-print undergraduate, graduate degrees based on the degree samples that have been issued by MoET.
2. Permitting CTU to approve of cooperative training projects implemented with domestic and international partners towards undergraduate and graduate degrees.
3. Consenting on the appraisal and decision on offering new undergraduate and graduate training programs that require ensuring the regulations and terms of new training programs from MoET.

CTU respectfully requests the review and approval of MoET.

Sincerely,

RECTOR

(signed)

Ha Thanh Toan

Appendix 3-15

Member List of Academic and Scientific Committee, and 9 Sub-Committees, CTU

Academic and Scientific Board (Advisory Committee), Can Tho University
(2012–2017 term)

1. Assoc. Prof. Dr. Ha Thanh Toan, Rector
2. Assoc. Prof. Dr. Tran Thi Thanh Hien, Vice Rector
3. Assoc. Prof. Dr. Le Viet Dung, Vice Rector
4. Assoc. Prof. Dr. Do Van Xe, Vice Rector
5. Prof. Dr. Nguyen Thanh Phuong, Vice Rector
6. Assoc. Prof. Dr. Vo Thanh Danh, Dean, School of Economics and Business Administration.
7. Assoc. Prof. Dr. Tran Cao De, Dean, College of Information and Communication Technology
8. Dr. Le Thi Nguyet Chau, Dean, School of Law
9. Assoc. Prof. Dr. Bui Thi Buu Hue, Dean, College of Natural Sciences
10. Assoc. Prof. Dr. Truong Quoc Phu, Dean, College of Aquaculture and Fisheries
11. Dr. Nguyen Chi Ngon, Dean, College of Technology
12. Dr. Le Duy Son, Dean, Scholl of Political Sciences
13. Dr. Trinh Quoc Lap, Dean, School of Education
14. Assoc. Prof. Dr. Tran Nhan Dung, Director, Biotechnology Research and Development Institute
15. Assoc. Prof. Dr. Le Van Hoa, Dean, College of Agriculture and Applied Biology
16. Dr. Thai Cong Dan, Dean, School of Social Science and Humanities
17. Assoc. Prof. Dr. Nguyen Hieu Trung, Dean, College of Environment and Natural Resources
18. Prof. Dr. Le Quang Tri, Director, Research Institute for Climate Change
19. Assoc. Prof. Dr. Ly Nguyen Binh, Vice- Dean, College of Agriculture and Applied Biology
20. Mr. Nguyen Thanh Son, Chairman, People's Committee of Can Tho City
21. Dr. Nguyen Duc Nghia, Vice President, National University Ho Chi Minh City.
22. Dr. Le Van Banh, Director, Cuu Long Rice Research Institute.
23. Dr. Nguyen Van Hoa, Deputy- Director, Southern Horticultural Research Institute.
24. Mr. Tran Trong Khiem, Director, Department of Education and Training of Can Tho City.
25. Assoc. Prof. Dr. Vo Van Son, Director, Center for Research and Product Development, VEMEDIM.

II. PERMANENT ACADEMIC AND SCIENTIFIC BOARD

1. Assoc. Prof. Dr. Le Viet Dung, Chairman
2. Prof. Dr. Le Quang Tri, Permanent Vice-Chairman
3. Assoc. Prof. Dr. Do Van Xe, Vice-Chairman
4. Prof. Dr. Nguyen Thanh Phuong, Vice-Chairman
5. Assoc. Prof. Dr. Ha Thanh Toan, Member
6. Assoc. Prof. Dr. Vo Thanh Danh, Member
7. Dr. Nguyen Chi Ngon, Secretary

III. SECRETARIATE

1. Mr. Nguyen Minh Tri, Head
2. Assoc. Prof. Dr. Le Van Khoa, Vice- Head
3. Assoc. Prof. Dr. Mai Văn Nam, Member
4. Dr. Trinh Quoc Lap, Member
5. Assoc. Prof. Dr. Vo Thanh Danh, Member
6. Dr. Nguyen Chi Ngon, Member
7. Assoc. Prof. Dr. Ly Nguyen Binh, Member.

IV. SPECIALIZED COMMITTEE

Natural Sciences Sub- Committee

1. Assoc. Prof. Dr. Bui Thi Buu Hue, Chairman
2. Dr. Ngo Thanh Phong, Vice- Chairman
3. Dr. Nguyen Thanh Tien, Secretary
4. Dr. Nguyen Thi Thu Thuy, Member (School of Education).
5. Dr. Ho Quoc Phong, Member (College of Engineering Technology)
6. Dr. Nguyen Huu Khanh, Member (College of Natural Sciences)
7. Dr. Vo Van Tai, Member (College of Natural Sciences)

Engineering Technology Sub- Committee

1. Dr. Nguyen Chi Ngon, Chairman
2. Assoc. Prof. Dr. Tran Cao De, Vice- Chairman
3. TS. Truong Chi Thanh, Secretary
4. Assoc. Prof. Dr. Tran Trung Tnh, Member
5. Dr. Ngo Ba Hung, Member (College of Information &Communication Technology)
6. Assoc. Prof. Dr. Huynh Xuan Hiep, Member (College of Information &Communication Technology)
7. Dr. Nguyen Van Cuong, Member (College of Engineering Technology)

Environment and Natural Resources Sub- Committee

1. Assoc. Prof. Dr. Nguyen Hieu Trung, Chairman
2. Assoc. Prof. Dr. Nguyen Van Cong, Vice- chairman
3. Dr. Nguyen Xuan Hoang, Member
4. Prof. Dr. Le Quang Tri, Member (Research Institute for Climate Change)
5. Assoc. Prof. Dr. Le Anh Tuan, Member (Research Institute for Climate Change)
6. Assoc. Prof. Dr. Nguyen Huu Chiem, Member (College of Environment and Natural Resources)
7. Dr. Van Pham Dang Tri, Member (College of Environment and Natural Resources)

Agriculture and Biotechnology Sub- Committee

1. Assoc. Prof. Dr. Le Van Hoa, Chairman
2. Assoc. Prof. Dr. Tran Nhan Dung, Vice- chairman
3. Assoc. Prof. Dr. Nguyen Minh Thuy, Secretary
4. Assoc. Prof. Dr. Ha Thanh Toan, Member
5. Assoc. Prof. Dr. Ngo Thi Phuong Dung, Member (Biotechnology Research and Development Institute)
6. Assoc. Prof. Dr. Ly Nguyen Binh, Member (College of Agriculture and Applied Biology)
7. Assoc. Prof. Dr. Do Vo Anh Khoa, Member (College of Agriculture and Applied Biology)
8. Assoc. Prof. Dr. Nguyen Duy Can, Member (College of Rural Development)
9. Dr. Dang Kieu Nhan, Member (Mekong Delta Development Research Institute)

Aquaculture and Fisheries Sub- Committee

1. Assoc. Prof. Dr. Truong Quoc Phu, Chairman
2. Assoc. Prof. Dr. Tran Ngoc Hai, Vice- Chairman
3. TS. Pham Thanh Liem, Secretary
4. Prof. Dr. Nguyen Thanh Phuong, Member
5. Assoc. Prof. Dr. Tran Thi Thanh Hien, Member
6. Assoc. Prof. Dr. Vu Ngoc Ut, Member (Aquaculture and Fisheries)
7. Assoc. Prof. Dr. Dang Thi Hoang Oanh, Member (College Aquaculture and Fisheries)
8. Assoc. Prof. Dr. Nguyen Van Thanh, Member ((Biotechnology Research and Development Institute)

9. Assoc. Prof. Dr. Nguyen Van Cong, Member (College of Environment and Natural Resources)

Education Science Sub- Committee

1. Dr. Trinh Quoc Lap, Vice- Chairman
2. Dr. Tran Van Lua, Vice- Chairman
3. Assoc. Prof. Dr. Lam Quoc Anh, Secretary
4. Assoc. Prof. Dr. Nguyen Van No, Member (School of Education)
5. Assoc. Prof. Dr. Nguyen Thi Hong Nam, Member (School of Education)
6. Assoc. Prof. Dr. Tran Thanh Ai, Member (School of Education)
7. Dr. Bui Phuong Thanh Huan, Member (School of Education)
8. Assoc. Prof. Dr. Duong Hieu Dau, Member (College of Natural Sciences)
9. Dr. Tran Van Nam, Member (School of Social Science and Humanities)

Social Science and Humanities Sub- Committee

1. Dr. Thai Cong Dan, Chairman
2. Dr. Dao Ngoc Canh, Vice- Chairman
3. Dr. Tran Thi Phung Ha, Secretary
4. Assoc. Prof. Dr. Le Viet Dung, Member
5. Dr. Nguyen Kim Chau, Member (Scholl of Social Science and Humanities)
6. Dr. Diep Kien Vu, Member (Scholl of Social Science and Humanities)
7. Dr. Phan Huy Hung, Member (Quality Assurance and Testing Center)

Economics Sub- Committee

1. Assoc. Prof. Dr.Vo Thanh Danh, Chairman
2. Assoc. Prof. Dr. Nguyen Van Sanh, Vice- Chairman
3. Assoc. Prof. Dr. Truong Dong Loc, Secretary
4. Assoc. Prof. Dr. Do Van Xe, Member
5. Assoc. Prof. Dr. Le Khuong Ninh, Member (School of Economics and Business Administration.);
6. Assoc. Prof. Dr. Luu Thanh Duc Hi, Member (School of Economics and Business Administration.);
7. Assoc. Prof. Dr.Vo Thi Thanh Loc, Member (Mekong Delta Development Research Institute)

Political Science and Law Sub- Committee

1. Dr. Le Thi Nguyet Chau, Chairman
2. Dr. Le Ngoc Triet, Vice- Chairman
3. Dr. Pham Van Beo, Secretary
4. Dr. Le Duy Son, Member (School of Political Science)
5. Dr. Tran Van Hieu, Member (School of Political Science)
6. Dr. Pham Van Bua, Member (School of Political Science)
7. Dr. Phan Trung Hien, Member (School of Law).

Appendix 3-16

Quality Assurance

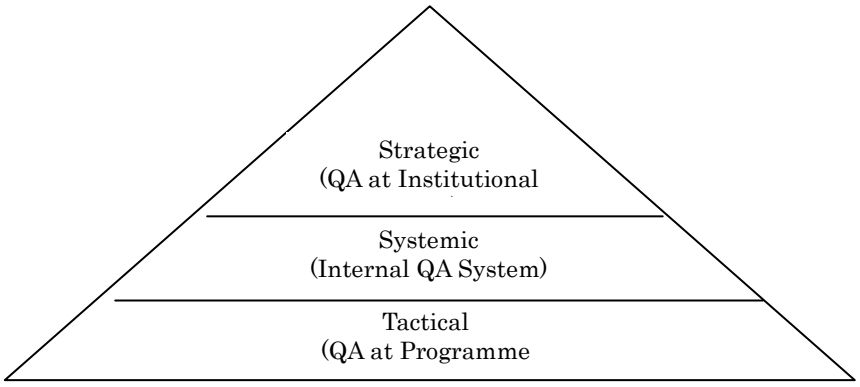
Quality Assurance

<1> MOET'10 quality standards for Accreditation at Institution level. (2nd edition, 2007-2008)

1. Mission and goals of the University: (2 criteria)
2. Organization and Management: (7 criteria)
3. Curriculum (Training programs): (6 criteria)
4. Instructional /training activities (7 criteria)
5. Teaching and managing staff (8 criteria)
6. Students (9 criteria)
7. Research and Technology Development: (7 criteria)
8. International co-operation (3 criteria)
9. Library and Facilities and infrastructure (9 criteria)
10. Finance & Financial Management (3 criteria)

<2> AUN Model

According to ASEAN University Network Quality Assurance (AUN-QA) model, it has the 3 levels of stages as shown in the chart below: 1) Tactical: programme level, 2) Systemic: internal QA system, and 3) Strategic: institutional level.



Source: Guide to AUN Actual Quality Assessment at Programme Level

Figure AUN-QA Models for Higher Education

<3> AUN Model for Programme Level

The AUN-QA Model for Programme level focuses on teaching and learning with regard to the following dimensions.

- Quality of input
- Quality of process
- Quality of output

AUN Standards

1. Expected learning outcome:

1) The curriculum is developed to promote learning, learning how to learn and to install in students a commitment of lifelong learning (e.g. commitment to critical inquiry, development of study and information-processing skills, a willingness to experiment with new ideas and practices.)

2) The curriculum offers to graduates the ability to do advanced studies, to competent in their field of study. The graduates should also have transferable skills, leadership skills, and should be oriented to the job market and be able to develop their careers.

3) The curriculum has clearly formulated learning outcomes, reflecting the relevant

demands and needs of all stakeholders.

<Check list>
1.1 The expected learning outcomes have been clearly formulated and translated into the programe
1.2 The programme promotes life-long learning
1.3 The expected learning outcomes cover both generic and specialized skills and knowledge
1.4 The expected learning outcomes clearly reflect the requirements of the stakeholders

<Source of Evidence>
- Programme and module specification
- Course brochure and prospectus or bulletin
- Skills matrix
- Stakeholders' input
- University and faculty website
- Communication media and plans to stakeholders
- Curriculum review minutes and documents
- Accreditation and benchmarking report

2. <u>Programme specification:</u>

1) Universities are recommended to publish, for each programme they offer, a programme specification which identifies potential stopping off points and gives the intended outcomes of the programme in terms of: - The knowledge and understanding that the students will have upon completion, - key skills: communication, numeracy, the use of information technology and learning how to learn, - cognitive skills, such as an understanding of methodologies or ability in critical analysis, -subject specific skills, such as laboratory skills, clinical skills, etc.

2) Programme specification is a concise description of the intended outcomes of learning from a higher education programme, and the means by which these outcomes can be achieved and demonstrated.

3) Programme specification makes explicit the intended outcomes in terms of knowledge, skills and attitudes. They should help students to understand the assessment method that enable achievement to be demonstrated; and the relationship of the programme and its study elements to the qualification frameworks in each member country and to any subsequent professional qualification or career path.

<Check list>
2.1 The university uses programme specification
2.2 The programme specification shows the expected learning outcomes and how these can be achieved
2.3 The programme specification is informative, communicated and made available to the stakeholders
<Source of Evidence>
- (same as above mentioned)

3. <u>Programme structure and content:</u>

1) The curriculum shows a balance between specialized contents, general knowledge and skills. The curriculum is designed to meet the needs of the stakeholders.

2) The curriculum takes into account and reflects the vision, mission, aims and objectives

of the institution. The vision, mission, aims and objectives are explicit and are known to staff and students.

3) The curriculum shows the expected competence of the graduate. Each course should clearly be designed to show the expected outcomes of the course competencies. To obtain this, a curriculum map should be constructed.

4) The curriculum is designed so that the subject matter is integrated and strengthens other courses in the curriculum.

5) The curriculum is structured to show range, depth, coherence and organization of the course.

6) The curriculum structure shows clearly the basic courses, the intermediate courses, the specialized courses and the final project, thesis or dissertation.

<Check list>
3.1 The programme content shows a good balance between generic and specialized skills and knowledge
3.2 the programme reflects the vision and mission of the university
3.3 the contribution made by each course to achieving the learning outcomes is clear
3.4 the programme is coherent and all subjects and courses have been integrated
3.5 The programme shows breadth and depth
3.6 The programme clearly shows the basic courses, intermediate courses, specialized courses and the final project, thesis or dissertation
3.7 the programme content is up-to-date

<Source of Evidence>
- (same as above mentioned)

4. <u>Teaching and learning strategy:</u>

1) Staff are encouraged to employ action learning. Action learning is a continuous process of learning and reflection, supported by peers, with the intention of achieving quality student learning. Through action learning, university teachers learn with and from each other by working on real problems and reflecting on their own experiences. A programme of facilitated action learning is aimed at the improvement of student learning and environment in which it occurs.

2) Quality learning is understood as involving the active construction of meaning by the students, and not just something that is imparted by the teacher. It is a deep approach of learning that seeks to make meaning and achieve understanding. Hence, the conception of teaching is the facilitation of learning.

3) It is the students who achieve the aims of higher education. Quality learning is largely dependent on the approach that the learner takes when learning. This in trun is dependent on the concepts that the learner holds of learning, what he or she knows about his or her own learning, and the strategies she or he chooses to use.

4) Quality learning embraces the principles of adult learning. Adult learning best in a relaxed, supportive, cooperative and informal learning environment. Deep learning is likely to take place in environments which foster collaborative learning. 5) In promoting responsibility in learning, teachers should:
a. create a teaching-learning environment that enables individuals to participate

responsibly in the learning process,
b. provide curricula that are flexible and enable learners to make meaningful choices in terms of subject content, programme routes, approaches to assessment and modes and duration of study.

6) In engaging with feelings and values as well as intellectual development, teachers provide learning opportunities and encounters which involve the whole person, feelings as well as intellect.

<Check list>
4.1 The faculty of department has a clear teaching and learning strategy
4.2 The teaching and learning strategy enables students to acquire and use knowledge academically
4.3 The teaching and learning strategy is student oriented and stimulates quality learning
4.4 The teaching and learning strategy stimulates action learning and facilitates learning to learn

<Source of Evidence>
- Teaching and learning strategy
- Evidence of action learning such as project, practical training, assignment, industrial attachment, etc.
- Student feedback
- Online learning portal
- Module specification

5. <u>Student assessment:</u>
1) Assessment covers:
- New student enhance by means of input competency,
- Student's study progress by means of matrix/ map/portfolio of the competency and outcome-based curriculum,
- final /exit test of the graduates by means of Graduate Competency Checklist or comprehensive and integrated assessment,

2) In line with principle of adult learning, adults prefer to be assessed by criterion-referenced methods and by a combination of peer, self- and teacher assessment.

3) In fostering open, flexible, reflective and outcome-based assessment, the teachers should provide a variety of assessment where the criteria are made explicit following negotiation with the course members. The assessment strategies adopted should be congruent with clearly defined learning outcomes.

4) Assessment methods correspond to all the aims and aspects of the curriculum as taught.

5) A range of assessment method is used in a planned manner to serve diagnostic, formative and summative purposes.

6) The scope and weighting of assessment schemes are clear and known to all concerned.

7) Standards applied in assessment schemes are explicit and consistent across the curriculum.

8) Procedures are regularly applied to ensure that, as far as possible, assessment schemes are valid, reliable and fairly administered.

9) Students have ready access to reasonable appeal procedures.

10) The reliability and validity of assessment methods should be documented and regularly evaluated and new assessment methods are developed and tested.

<Check list>
5.1 Student assessment covers student entrance, student progress and exit tests
5.2 The assessment is criterion-referenced
5.3 Student assessment uses a variety of methods
5.4 Student assessment reflects the expected learning outcomes and the content of the programme
5.5 The criteria for assessment are explicit and well-known
5.6 The assessment methods cover the objectives of the curriculum
5.7 The standards applied in the assessment are explicit and consistent
<Source of Evidence>

- Sample of in-course assessment, project work, final examination, etc.
- Marking scheme
- Moderation process
- Appeal procedure
- Programme and module specification
- Examination regulations

6. <u>Academic staff quality</u>:
1) Competent university teaching staff are able to
- design and deliver a coherent teaching and learning programme,
- apply a range of teaching and learning methods and select methods most appropriate to desired learning outcomes
- develop and use a variety of instructional media,
- employ a range of techniques to assess students' work and match these to intended learning outcomes,
- monitor and evaluate their own teaching performance and evaluate programmes they deliver,
- reflect upon their own teaching practices,
-identify needs and develop plans for continual development,

2) The teaching staff establishment or staffing is sufficient to deliver the curriculum and suitable in terms of the mix of qualifications , experience, aptitudes, age, etc.

3) Recruitment and promotion of academic staff are based on merit system, which includes teaching, research and service.

4) Roles and relationship of staff members are well defined and understood.

5) Duties allocated area appropriate to qualifications, experience, and aptitude.

6) Time management and incentive system are directed to support quality of teaching and learning.

7) All staff is accountable to the Owner of the University (e.g. the Government Board of Trustees, or the Foundation) through the Rector, President or Vice-Chancellor and to the stakeholders, taking into account their academic freedom and professional ethics.

8) There are provisions for review, consultation, and redeployment,

9) Termination, retirement and social benefits are planned and well implemented. 10) There is a well-planned staff appraisal based on fair and objective measures in the sprit of enhancement which are carried out regularly.

<Check list>
6.1 The staff are competent for their tasks
6.2 The staff are sufficient to deliver the curriculum adequately
6.3 Recruitment and promotion are based on academic merits
6.4 The roles and relationship of staff members are well defined and understood
6.5 Duties allocated are appropriate to qualifications, experience and skills
6.6 Staff workload and incentive systems are designated to support the quality of teaching and learning
6.7 Accountability of the staff members is well regulated
6.8 There are provisions for review, consultation and redeployment
6.9 Termination and retirement are planned and well implemented
6.10 There is an efficient appraisal system

<Source of Evidence>
- Recruitment criteria
- Staff qualification
- Training needs and plan
- Peer review and appraisal system
- Career plan
- Student feedback
- Award and recognition system
- Staff workload
- Allocation of roles and duties
- Termination, re-employment and retirement scheme

7. <u>Support staff quality</u>: There is adequate support in term of staffing at the libraries, laboratories, administration and student services.

<Check list>
7.1 Library staff are competent and adequate in providing a satisfactory level of service
7.2 Laboratory staff are competent and adequate in providing a satisfactory level of service
7.3 The computer facility staff are competent and adequate in providing a satisfactory level of service
7.4 The student service staff are competent and adequate in providing a satisfactory level of service

<Source of Evidence>
- Recruitment criteria
- Staff qualification
- Job description
- Training needs and plan
- Peer review and appraisal system
- Career plan
- Student/faculty feedback
- Award and recognition system
- Staff workload

- Allocation of roles and duties
- Termination, re-employment and retirement scheme

8. <u>Student quality</u>: There is a clear student intake policy and the admission criteria to the programme are formulated and reviewed periodically.

<Check list>
8.1 There is clear student intake policy
8.2 The student admission process is adequate
8.3 The actual study load is in line with the prescribed load
<Source of Evidence>

- Student selection process and criteria
- Trend of student intake
- Credit system
- Student workload
- Student performance reports
- Participation in academic and non-academic activities, extracurricular activities, competition, etc.

9. <u>Student advice and support</u>:

1) Student progress is systematically recorded and monitored feedback to students and corrective actions are made where necessary.

2) In establishing a learning environment to support the achievement of quality student learning, teachers do all in their power to provide not only a physical and material environment which is supportive of learning and which is appropriate for the activities involved, but also a social or psychological one.

<Check list>
9.1 There is an adequate student progress monitoring system
9.2 Student get adequate academic advice, support and feedback on their performance
9.3 Monitoring for student is adequate
9.4 The physical, social and psychological environment for the student is satisfactory

<Source of Evidence>

- Mechanism to report and feedback on student progress
- Provision of student support services at university and faculty level
- Coaching, mentoring and counseling schemes
- Student feedback

10. <u>Facilities and infrastructure</u>:

1) The physical resource to deliver the curriculum, including equipment, materials and information technology are sufficient.

2) Equipment is up-to-date, readily available and effectively deployed.

3) Learning resources are selected, filtered, and synchronized with the objectives of the study programme.

4) A digital library is set up in keeping with progress in information and communication technology.
5) Information technology system are set up or upgraded.

6) University compute centers provide continuously a highly accessible computer and network infrastructure that enables the campus community to fully exploit information technology for teaching, research and development, services and administration.

7) Environmental Health and Safety Standards meet the local requirements in all aspects.

<Check list>
10.1 The lecture facilities (lecture hall, small course rooms) are adequate
10.2 The library is adequate and up-to-date
10.3 The laboratories are adequate and up-to-date
10.4 The computer facilities are adequate and up-to-date
10.5 Environmental health and safety standards meet requirements in all aspects

<Source of Evidence>
- List of facilities, equipment, computer hardware and software,etc.
- Facilities booking, utilization rates, downtime/uptime, operating hours
- Maintenance plan
- New facilities and upgrading plans
- Safety , health and environmental policy
- Emergency plan
- Student and staff feedback

11. <u>Quality assurance of teaching and learning process</u>:
1) The curriculum is developed as a group to ensure the representation from the faculty Quality Committee, the faculty Teaching and Learning Committee, the programme team, students and stakeholders from industry, government and professional organizations.

2) The curriculum is periodically reviewed and evaluated as to its effectiveness. Adjustments are made after reasonable time periods.

3) A prime condition for constantly improving teaching and learning is a planned and regular process of evaluation. In this regard, teachers should foster a climate which values student involvement in the evaluation of teaching and the assessment of learning outcomes.

<Check list>
11.1 The curriculum is developed by al teaching staff members
11.2 The curriculum development involves students
11.3 The curriculum development involves the labour market
11.4 The curriculum is regularly evaluated at reasonable time period
11.5 Courses and curriculum are subject to structured student evaluation
11.6 Feedback from various stakeholders is used for improvement
11.7 The teaching and learning processes, assessment schemes, the assessment methods and the assessment itself are always subject to quality assurance and continuous improvement

<Source of Evidence>
- Curriculum design, review and approval process and minutes
- Stakeholders input
- QA of assessment and examination
- External examiners
- Local and international benchmarking
- Results of programme and module feedback

- Uses of feedback for improvement
- Percentage of students providing feedback
- Sample of feedback questionnaire

12. <u>Staff development activities</u>:
1) Training and development needs for academic and support staff are systematically identified, in relation to individual aspirations, the curriculum and institutional requirements.

2) Academic and support staff undertake appropriate staff development programmes related to the identified needs

<Check list>
12.1 There is a clear plan on the needs for training and development of both academic and support staff
12.2 The training and development activities for both academic and support staff are adequate to the identified needs

<Source of Evidence>
- Education, training and development policy and plan
- Training places and hours
- Scholarships
- Job rotation and development scheme

13. <u>Stakeholders feedback</u>: Universities are encouraged to have a built-in regular curriculum evaluation and course appraisal, involving all stakeholders (decision makers, employers, students, alumni, etc)
<Check list>
13.1 There is adequate structured feedback from the labour market
13.2 There is adequate structured feedback from the students and alumni
13.3 There is adequate structured feedback from the staff
<Source of Evidence>
- Regular and ad-hoc formal and informal survey and feedback mechanism
- Response rates
- Uses of feedback for improvement

14. <u>Output</u>: The quality of graduates should achieve the expected learning outcomes and the needs of the stakeholders. Research activities carried out by academic staff and students should meet the requirement of the stakeholders.

<Check list>
14.1 The pass rate is satisfactory and dropout rate is of acceptable level
14.2 Average time to graduate is satisfactory
14.3 Employability of graduates is satisfactory
14.4 The level of research activities by academic staff and students is satisfactory

<Source of Evidence>
- Graduates and employment surveys
- Employment statistics
- Entry level salary
- Employers feedback
- Press report

15. <u>Stakeholders satisfaction:</u> Stakeholders are satisfied with the programme and the quality of the graduates.

<Check list>
15.1 The feedback from stakeholders is satisfactory

<Source of Evidence>
- Process and indicators for measuring stakeholders satisfaction
- Stakeholders satisfaction trends
- Graduates, alumni and employers surveys
- Press reports

<4> Process

Process and schedule of AUN assessment for past 2 programmes at CTU

	Time line	**Activity**
Internal Assessment at CTU	May 2010	Part1: Workshop/Meeting of rectors of universities of Network in Uni.of Potsdam, Berlin, Germany
	Oct 2010	Part2: Workshop in Bangkok, Thailand Main contents: 1) About DIES, AUN, DAAD….and activities, 2) training QA for courses, programme, on AUN 18 Criteria (old version) and all 15 Criteria (new version), and on guide to how to write SAR.
	Dec 2011& Jan 2012	To make Decision and to set up Project Action Plan (PAP) for project; Sub self-assessment Plan for writing Self Assessment Report (1) - Workshops training on 15 criteria and on guide to write SAR and to use sub plan/survey….. - Workshops training on consultancy - Workshops training on internal auditing SAR,… - To translate SAR into English
	Feb 2012	- Submitted SAR1 via email >Feedback of experts: Good comments via e-mail - > College of Engineering Technology (CET) and School of Economics and Business Administration (SEBA) adjust (*) SAR with consultancies (twice). - > To continue to survey and to add information into SAR (or close gaps).
	March 2012	Part 3: Workshop in Potsdam, Berlin Main contents (cont): - To discuss directly on SARs > comments (peer review). - To continue to explain clearer 15 criteria and How to write a good SAR. - To analyse in order to learn some examples of SARs for different universities are externally assessed by AUN. - To visit some strong universities in adequate criteria (Criteria 1, 3, 6, 15….) - Good comments with some proposals to adjust
	July 2012	Good comments/ Submitted SAR2 Main contents (cont): - > CET and SEBA adjust (*) SAR with consultancies (> a lot of meetings of QAC and SEBA& CET). > To continue to survey and to add information into SAR (or close gaps)/ (a lot of meetings of QAC and SEBA & CET).
	Oct 2012	Part 4: Workshop at VNU/HCM City Main contents (cont): - To discuss directly on SARs > comments (peer review/pilot). - To continue to explain clearer 15 criteria and How to write a good SAR. - To analyse in order to learn some examples of SARs for different

		universities are externally assessed by AUN. - To visit some strong universities in adequate criteria - Guides to prepare site visit and practice.
	Feb 2013	Submitted SAR 3 Feedback: Good comments Adjust: (see (*)) In parallel, CTU prepares its site visit in SABA and in CET
	March & May 2013	Submitted Final SAR 4&5 and preparation for Site visit in SABA and in CET
	Dec. 2013	Part 5. Workshop in Bangkok, Thailand - Closing ASEAN-DIES Project. - Evaluation Proposals for extending project: 1) The consultancy visit of 2 programmes (2-4/6/14 at Can Tho University), 2) for proposal of DIES Partnership 2015-2018, 3) Train QA Course Background and Objectives 2015-2016 with 5 Parts/Workshops (**) and 5 Modules: **Module 1**: Effective QA and Change Management **Module 2**: Tools and Procedures of QA **Module 3**: Curriculum Design and Revision **Module 4**: Date-Based information Management **Module 5**: QA and its linkages to Higher Education Management
External Assessment at CTU	11-13 April, 2013	AUN team came to CTU for Site Visit for Electrical Engineering Programme of CoET, CTU
	13-15 June, 2013	AUN team came to CTU for Site Visit for Agricultural Economics Programme of SEBA, CTU
	March 2014	CTU Received Certificate for Agricultural Economics Programme of SEBA

(**) in 2 in Germany, 3 in southeast Asia
Source: summarized from Power point presentation from CTU TACT

<5> Reference from Self Assessment Report

SWOT Analysis for Electrical Engineering Program

	Strengths (Internal)	**Weaknesses (Internal)**
Opportunities (External)	Strengths / Opportunities: 1. Having good communication to stakeholder, especially labor markets. The program will get more useful feedback to upgrade the program, and rate of graduate employability with higher satisfaction. 2. Staff are being well-trained from many countries. So the Electrical Department will get a variety of experiences in education, and will have innovative applied products. 3. A good education system is being built by AUN criteria. The graduate will satisfy to labor markets in ASEAN area.	Weaknesses / Opportunities**:** 1. There are many staff having not been trained for the PhD. However, they will be trained for the PhD abroad according to training plan period 2008 – 2012 thanks to international relationships of CTU. 2. The system of evaluation of educational quality and outcomes has not been sufficient. Therefore, it is the opportunity to improve the curriculum, updating models in domestic as well as overseas.
Threats (External)	Strengths / Threats: 1. There are many students studying at Can Tho University. The EE is the first program with the most experience in Mekong Delta; therefore, the subjective is inevitable. In addition, the EE Department may not realize rivals in education field. 2. The EE program has initial charisma about human resources. Moreover, the Mekong Delta needs a large number of Electrical Engineers.	Weaknesses / Threats**:** 1. There are many staff who are studying postgraduate, a circumstance which burdens of training pressure may affect the education quality in a short period. 2. The EE program has not appealed to high-qualified students in the university entrance examination yet. The result of this is that there will be difficulties in training and developing job passion for

	As a result, there is going to be training pressure affecting training quality.	students, affecting training quality. 3. The scientific research activities of staff as well as students are limited. The EE Department has not had creative products in the research field, a situation that hurts the program's education and training reputation.

<6> Comment from External Assessors

External Assessors' comment for Bachelor of Agricultural Economics:

Criteria	Areas for improvement
1. Expected learning outcome	Implement the ELOs. From : Formulation > Show ELO for each module > Show ELO for entire program > Who measures the ELOs (qualitatively from staff and students; quantitatively from course assessment results) Outcome-based ELOs; input from alumni/industry
2. Programme specification	To evaluate how well the ELOs meet the program specifications Communicate program specifications and ELOs to stakeholders (students, academic staff, alumni, employers)
3. Programme structure and content	How are the ELOs achieved?
4. Teaching and learning strategy	Further broaden the above (more project work, group-based projects, external (industry) practicums, student-chosen projects. Move towards outcome-based learning. Further move towards e-learning [Difficulty with language skills]
5. Student assessment	Need to ensure equity in exam marking by different lecturers Move [more] towards group-based assessment? Moderation after all exam marks are submitted
6. Academic staff quality	The department should give more support for them to get scholarship for further study and higher degree Training on educational pedagogy is required to give young lecturers better understanding on how they can improve their teaching skills
7. Support staff quality	Increasing the number of support staff may be required in order to provide better service to the students and lecturers
8. Student quality	Better marketing should attract more qualified students to apply to the Agricultural Economic study program
9. Student advice and support	Additional support staff would be good to improve the quality of support to students
10. Facilities and infrastructure	Working space for lecturers is required to be improved in order to support their academic activities
11. Quality assurance of teaching and learning process	Continuously take ELOs into account. To be described verbally, shown in course handbook, publish, regularly communicate to lecturers, students, stakeholders. Further encourage lecturers to follow ELOs.
12. Staff development activities	To further increase participation rate in order to fully meet expectations. Support staff to be recruited from the beginning with adequate skills in order to avoid additional expensive training before they meet job requirement
13. Stakeholders feedback	The structure of getting feedback from alumni and employers to be improved (e.g., have an alumni/employer association or an alumni manager from SEBA)
14. Output	SEBA may consider how to increase the number of research proposals and publications in reviewed journals as well as how to encourage more involvement of students in research activities
15. Stakeholder satisfaction	SEBA to consider to increase student satisfaction with regards to student services, learning material, teachings aids, and library Alumni and employer feedback that English language is increasingly important

Appendix 3-17

Research Fund

Research fund at CTU

The CTU research fund is also competitive fund, and selects by proposals. The amount increased from VND 288,100,000 or US$13,719.05 in 2008 to VND 5,902,897,000 or US$281,090.33 in 2013. One research project received around US$2,500 for year 2013. The graduate students are also qualified to apply for this CTU research fund. CTU research fund for graduate students is around 1,500 USD, less than faculty members. Around one third of the CTU research activities are by CTU graduate students. CTU research fund's prioritized points are as follows:

- Rectorate board's request and ordering,
- Basic researches,
- Staff who are studying MSc or PhD programme,
- PhD holders who graduated within 2 years considered at the time of selection.
- High feasible and necessary research proposals.

The intention is to practice and train for applying external funds, especially for the young researchers. The CTU 9 sub-committees[1] involve the selection of proposals; they put the proposal in prioritized order. This internal budget allocation for research fund and providing research opportunities for young staff shows the CTU's intention to be a research university.

Competitive Research Project and Fund Information

	Research fund for one project (approximate amount)	**Project Term**	**Application deadline**	**Time to wait for notice of the result**
Central government	2 billion VND (around 100,000 USD)	3-4 years	TBA	1 month
Ministry	600-700 million VND (around 30,000 USD)	2 years	Feb	5 months
University (CTU)	50 million VND (around 2,500 USD)	1 year	Dec	3 months
DOST	600-700 thousand VND (around 30,000 USD)	2-3 years	TBA	3 months
Company	600-700 thousand VND (around 30,000 USD)	2-3 years	TBA	soon

Source: interview with Department of Research Affairs

[1] See details in Appendix 3-15

Appendix 3-18

Revenue and Expenditure
Technology Transfer and Services

REVENUE AND EXPENDITURE OF PRODUCTION ACTIVITIES AND SERVICES IN 2013

Unit:VND

No	Unit Name	Revenue	Expenditure	Income	Tax	Net Income
(1)	(2)	(3)	(4)	(5) = (3) - (4)	(6)	(7) = (5) - (6)
1	Can Tho University Software Center	20,088,961,464	13,467,064,073	6,621,897,391	336,470,791	6,285,426,600
2	Center for Services and Technology Transfer	19,280,786,070	15,837,819,821	3,442,966,249	860,891,993	2,582,074,256
3	Center for Foreign Languages	12,268,192,440	8,997,441,050	3,270,751,390	817,687,847	2,453,063,543
4	Center of Technology Research and Application	4,838,147,327	4,285,289,574	552,857,753	151,332,591	401,525,162
5	Can Tho University Publishing House	2,523,503,707	2,577,241,813	(53,738,106)		(53,738,106)
6	Center for Contruction Assessment & Consulting	4,694,533,526	4,481,775,130	212,758,396	53,189,599	159,568,797
7	Center for Electronics and Informatics	66,871,376,726	66,541,396,575	329,980,151	111,272,986	218,707,165
8	Center for Agricultural Science Services	5,729,103,643	5,666,343,764	62,759,879	15,689,969	47,069,910
9	Research and Development Biotechnology Institute	370,093,000	355,424,313	14,668,687	7,321,000	7,347,687
10	Electrical & Electronic Center	2,059,076,823	1,859,949,340	199,127,483	3,498,810	195,628,673
11	Center for Training and Consulting in Economics	1,396,134,513	1,016,571,067	379,563,446	7,387,499	372,175,947
12	Center for Professional Development in Education	3,047,271,417	1,745,137,952	1,302,133,465	325,533,366	976,600,099
13	Center for Graduate Services & Training	1,251,877,350	998,496,944	253,380,406		253,380,406
	Total	**144,419,058,006**	**127,829,951,416**	**16,589,106,590**	**2,690,276,451**	**13,898,830,139**

Appendix 3-19

Education Program at CTU

- **Information about English and Foreign Program at CTU (As of April 2014)**

	Name of Program	School/ College at CTU	Degree/ collaborating university	Starting year
1	Master of Science, Data Mining	College of Information Communication Technology	- Mantes University, France, and CTU lecturers teach in English/French at CTU. - Provides French degree	Officially approved by MOET in 2014 (2007- as internal program)
2	Bachelor of Science, Advanced Biotechnology	Institute of Biotechnology Research and Development	- Michigan State University (MSU) and Can Tho University (CTU) lectures teach in English/ Vietnamese at CTU. - Provides VN degree, and MSU certificate.	Officially approved by MOET and offered in 2006
3	Bachelor of Science, Advanced Aquaculture*	College of Aquaculture and Fisheries (CAF)	- Auburn university (AU) and CTU lectures teach in English/ Vietnamese at CTU. - Provides VN degree, and AU certificate.	Officially approved by MOET and offered in 2008

(Unofficial Translation)

MINISTRY OF EDUCATION AND TRAINING
CAN THO UNIVERSITY

SOCIALIST REPUBLIC OF VIETNAM
Independence – Freedom – Happiness
----------***----------

Can Tho, date month year 2014

PROCEDURE ON ASSESSMENT AND APPROVAL OF PROPOSAL FOR OPENING NEW COURSE

Pursuant to Article 36, Chapter VIII of "Charter of Universities" promulgated together with Decision No. 58/2010/QĐ-TTg, dated September 22, 2010 of Prime Minister on stipulating power and responsibility of rectors' universities.

Pursuant to Article 5 of Circular No. 38/2010/TT-BGDĐT, dated December 22, 2010 providing the conditions, dossiers and process for permitting training, suspending enrolment or revoking decisions permitting the training of disciplines of master or doctorate degree;

Can Tho University stipulate procedure on assessment and approval of proposal for opening undergraduate course as follows:

I. Assessment of opening course conditions

1) Undergraduate training unit (generally called to be training unit, abbreviated to be TU) based on regulations of opening course conditions (Circular No. 38/2010/TT-BGDĐT dated December 22, 2010) (see on the Website of Graduate School) makes document on proposal for opening new course together with interpretation of satisfied conditions for opening course in order to submit Graduate School (GS).

2) GS will check up conditions, if such conditions are met with requirements, GS will submit document to Standing Council of Science and Training (a copy will be sent to TU) to be approved for opening course.

3) TU will appoint representative to present/ interpret to Standing Council of Science and Training on proposal for opening new course together with representative of Graduate School (TU will archive minutes of meeting which approves conditions for opening course made by Secretariat, Standing Council of Science and Training)

II. Compilation of proposal for opening course

1) When obtaining agreed minutes for opening new course, TU will compile proposal according to stipulated form of Ministry of Education and Training (see instructions of content and format regulations of proposal on the Website of Graduate School)

2) Submit proposal to Graduate School to read and make suggestions.

III. Assessment of proposal dossier

1) When proposal has been prepared in accordance with regulations of Ministry of Education and Training, Graduate School will make and submit document on forming Assessment Council for proposal dossier to Managing board (MB).

2) After MB agrees, TU will send expected list of members in the council (chairman, 2 opponents, member, and secretary), Graduate School will make decision on forming Assessment Council for proposal dossier based on the expected list and submit MB to approve.

3) After receiving decision on forming Assessment Council, Council's secretary will contact and send document to members (including 1 proposal draft volume, a dossier approving card and decision).

4) When Council makes meeting, draft committee will present main contents of proposal; members will give their ideas and chairman will make conclusion; secretary will record minutes and member's ideas in Council, collect dossier approving cards (5 cards).

5) TU will adjust the proposal according to Council's suggestions.

6) Secretary will check up the adjusted proposal and make presentation minutes of adjusted proposal as Council' suggestions, with signature of Chairman and secretary

7) Secretary submits the adjusted proposal and minutes (suggestion minutes of Council, adjusted presentation minutes, 5 dossier approving cards) to TU.

8) TU completes the adjusted proposal and relevant minutes, binds volume and submits to Graduate School (03 volumes to Department of Education and Training and 01 volume to Graduate School).

IV. Capacity assessment of training facility

1) Graduate Scholl will compile and submit MB to sign document on proposing Department of Education and Training to form Assessment Council of capacity assessment of training facility.

2) Graduate School gathers dossier (including 03 proposal volumes and document) to Department of Education and Training.

3) TU prepares necessary dossiers so that Department of Education and Training assesses (wages sheet of lecturers in list of opening course…)

4) After receiving replying document from Department of Education and Training, TU will adjust according to suggestions of Department of Education and Training, then print out and resent 01 volume to Department of Education and Training.

V. Assessment of training programs

1) Graduate Scholl will compile and submit to MB and Ministry of Education and Training on appointing assessment unit for training programs (implementing at the same time with proposal to Department of Education and Training).

2) After getting document on appointing assessment unit for training programs from Ministry of Education and Training, TU will contact with the assessment unit to preparation the form of Council.

3) After obtaining decision on forming Council, TU will contact with Council's secretary to send documents (including 05 proposal draft volumes, dossier approving cards and decision) to members of Council.

4) When Council makes meeting, secretary will record minutes and specific ideas from members in Council, collect dossier approving cards (5 cards).

5) TU will adjust the proposal according to Council's suggestions.

6) Secretary will check up the adjusted proposal and make presentation minutes of adjusted proposal as Council' suggestions, with signature of Chairman and secretary

7) Secretary submits the adjusted proposal and minutes (suggestion minutes of Council, adjusted presentation minutes, 5 dossier approving cards) to TU.

VI. Submission of proposal to Ministry of Education and Training

1) Graduate School compile Proposal to submit Ministry based on contents supplied by TU.

2) For proposal for opening Master course: TU will submit 06 proposal volumes to Graduate School to be approved by Ministry, permitting to open training course (03 volumes to Ministry,

01 volume to Ministry's specialists, 01 volume to Department of Education and Training and 01 volume archived at Graduate School).

3) For proposal for opening Doctoral course: TU will submit 06 proposal volumes to Graduate School to be approved by Ministry, permitting to open training course (04 volumes to Ministry, 01 volume to Ministry's specialists, 01 volume to Department of Education and Training and 01 volume archived at Graduate School)

RECTOR

Appendix 3-20

Work Load Management for Teaching Staff

(Unofficial Translation)

Extracts from No.: **6288**/QĐ-ĐHCT, *Cần Thơ, date 31 month 12 year 2013*

DECISION: Promulgating Regulations of professional work management with Lecturers of Can Tho University

Article 2. Definitions

1. **Personal obligation hour** (unit: H) is the regulated professional workload which each lecturer has to complete in the year, including teaching duty and scientific research accroding to teaching title and salary rank or academic title at the time of planning.

2. **Department obligation hour** (unit: H) is the sum of all obligation hour of all lecturers in the Department or equivalent organization, determined and approved prior to implementation, to be adjected as synthetic for progress assessment.

3. **Exceeded hour** (unit: H) is the regulated professional workload which lecturers and faculty are responsible to fulfill aside from obligation hours.

Article 3. Personal obligation hour determined by title, qualification and cofficient of salary as followed:

No.	**Title, qualification of Lecturer**	**Teaching obligation hour** (H)	**Research obligation hour** (H)	**Total obligation hour** (H)
1	Professor	340	170	510
2	Associate professor	320	140	460
3	Senior lecturer with coefficient of salary ≥ 5.76	310	130	440
4	Senior lecturer with coefficient of salary from 4.40 to 5.42 and PhD degree holding lecturer	300	120	420
5	Lecturer with coefficient of salary ≥ 4.32	280	100	380
6	Lecturer with coefficient of salary from 3.33 to 3.99 and Master degree holding lecturer	250	80	330
7	Lecturer with coefficient of salary form 2.34 to 3.00	220	60	280
8	Trainee (received 85% of basic salary)	50	10	60
9.	Assistant lecturer	Based on Regulation of University (currently, Document No. 1852/ĐHCT-TCCB dated 03/12/2010)		

The personal obligation hour for lecturers of Physical Education is determined according to title, qualification and coefficient of salary as followed:

No.	**Title, qualification of Lecturer of Physical Education**	**Teaching obligation hour** (H)	**Research obligation hour** (H)	**Total obligation hour** (H)
1	Professor, superior lecturer	480	170	650
2	Associate professor	460	140	600
3	Senior lecturer with coefficient of salary ≥ 5.76	450	130	580
4	Senior lecturer with coefficient of salary from 4.40 to 5.42 and PhD degree holding lecturer	440	120	560
5	Lecturer with coefficient of salary ≥ 4.32	420	100	520
6	Lecturer with coefficient of salary from 3.33 to 3.99 and Master degree holding lecturer	390	80	470
7	Lecturer with coefficient of salary from 2.34 to 3.00	350	60	410

No.	**Title, qualification of Lecturer of Physical Education**	**Teaching obligation hour** (H)	**Research obligation hour** (H)	**Total obligation hour** (H)
8	Trainee (Received 85% of basic salary)	180	10	190
9	Assistant lecturer	Based on Regulation of University (currently, Document No. 1852/ĐHCT-TCCB dated 03/12/2010)		

Article 4. Professional work, working time and place

1. The professional work of lecturers include preparing lectures and curriculum, teaching and evaluation, scientific research, composing curriculum, participating in capacity building and performing other activities which are planned and assigned by Head of Department.

2. Weekly working hours are 40 hours. Morning teaching hour is from 7:00 to 11:30 and 13:30 to 17:00 for afternoon hour, from Monday to Saturday. Teaching hours which is not in the regulated working hour are considered as overtime and is paid based on Regulation of internal expenditure.

3. Lecturers have to work at assigned place when teaching in lecture halls, instructing exercises-practices, meetings, learning resolutions, participating in seminars-workshop-conference … and assigned tasks by Head of Department. For other works, lecturer shall choose the appropriate working place but must ensure the accomplishment of professional workload assigned by the Department.

Article 5. Workload planning

1. Planning for the next year is carried out in October annually. Based on the work plan and assignment of Head of Department, lecturers are responsible for preparing and listing his/her workload ensuring the implementation of teaching duty and research and submit to Head of Department for approval. Head of Department is responsible for adjusting, revising and summarizing the professional workload of the Department and submits to the Dean for approval before submitting to Department of Administration and Planning no later than November 30th of each year to submit for approval of Rector prior to implementation.

Head of Department is responsible for ensuring the equitable distribution of working hours so that exceeded hours (if any) must correspond with personal obligation hours and the rate of individuals' exceeded hours must correspond with Department's exceeded hours; the difference of teaching hour between person with the highest number and the one with the lowest number must not exceed 500 hours/year (not including trainees and assistant lecturers).

2. The regulated workload of lecturers is cumulative from January 1st to December 31st every year for assessment of task completion and quality of work of individuals and units.

3. The University allocates and ensures financial resource for the approved plan implementation.

Article 6. Regulation of professional work

1. All of professional works of lecturers are regulated as followed:

Category	**No**	**Specific work**	**Standard (H)**
TEACHING Applies to all education system managed by the University of educational contract	1	1 period of theoretical teaching for university and collefe **(student ratio:** ≥ 65 = 1,1; ≥ 75 = 1,2; ≥ 90 = 1,4; ≥ 115 = 1,6; ≥ 135 = 1,8; ≥ 155 = 2; ≥ 175 = 2,2; ≥ 195 = 2,4; ≥ 250 = 3; ≥ 300 = 3,5; ≥ 400 = 4,5) Multiply by 1.4 if teaching in English or French (excluding foreign language module)	1,1

Category	No	Specific work	Standard (H)
(excluding distance education)	2	1 period of practical - experiment /group (20 - 40 students): + 20 - 23 St: 0,5 H/group + 24 - 27 St: 0,6 H/group + 28 - 31 St: 0,7 H/group + 32 - 35 St: 0,8 H/group + 36 - 39 St: 0,9 H/group + ≥ 40 St: 1,0 H/group (Group with less than 20 students is considered as a 20 student group) Assistance to practical – experimental teaching (for those laboratory without staff) is calculated 0.15 of above mentioned norm	0,5 – 1,0
	3	1 day of field trip, practical training of university, college/group	2
		1 day of field trip, practical training of graduate education/group	2,8
	4	1 period of graduate teaching **(student ratio:** ≥ 65 = 1,1; ≥ 75 = 1,2; ≥ 90 = 1,4; ≥ 115 = 1,6; ≥ 135 = 1,8; ≥ 155 = 2; ≥ 175 = 2,2; ≥ 195 = 2,.4; ≥ 250 = 3; ≥ 300 = 3,5; ≥ 400 = 4,5***)*** 1 period of teaching to research student Multiply by 1.4 if teaching in English or French (excluding foreign language module)	1,4 1,8
	5	Evaluation including: preparing exam questions, answers, invigilating, examining, inputting score, notifying (university and college)	1H/5 students
		Evaluation including: preparing exam questions, answers, invigilating, examining, inputting score, notifying (graduate modules)	1,4 H/5 Students
	6	PhD thesis supervision (main/co)/PhD candidate	100 (70/30)
	7	PhD subject instruction/subject	20
		Master thesis supervision/thesis	30
	8	Master essay instruction/essay; University thesis – project supervision/thesis - project; Scientific research supervision/research	15
	9	University graduation essay supervision/essay	6
		Annual research -project-special subject instruction/ Annual research - project-special subject	3
	10	Preparing lectures and trial of trainee/credit	30
	11	Head of Department secretary (double position)/year Department < 12 lecturers: 50H, 12 to25 lecturers: 65H; ≥ 26 lecturers: 75H	
		Academic adviser/specialized class, delayed class/year (class ≤ 30 students: 30H; 31-40 students: 40H; 41-50 students: 50H; 51-60 students: 60H; 61-70 students: 70H; 71-80 students: 80*H*; 81-90 students: 90H) In charge of graduate module is calculated as academic adviser and multiply by 1,4	
	12	University graduation examination council (2 members/council/essay; 2H/member)	4
		University thesis defense council (3 members/council/thesis-project; 2H/member)	6
		Master thesis outline defense council (5 members/council/thesis; 1H/member)	5
		Master thesis defense council (5 members/council/thesis): Chairman: 4H, Secretary: 4H, 3 members (including opponent): 3H/member; writing opponent: 3H/opponent	23
		Midterm assessment council (PhD) (5 members/council/researcher; 2H/member)	10
		PhD topic examination subcommittee /topic (3 members/topic; 2H/member)	6

Category	No	Specific work	Standard (H)
		PhD article examination council /article (3 members/article; 2H/member)	6
		PhD dissertation outline defense council /outline (5 members/council/outline; 4H/member)	20
		PhD dissertation requirement assessment council (5 members/council/researcher; 2H/member)	10
		Department PhD dissertation defense council (7 members/council/dissertation); Chairman: 15H; secretary: 15H; 5 members (including opponent): 10H/member; writing opponent: 10H/opponent.	100
		University PhD dissertation defense council, quality evaluation council on PhD dissertation (7 members/council/dissertation): Chairman: 15H; secretary: 15H; 5 members (including opponent): 10H/member; writing opponent: 10H/opponent.	110
		Evaluation council on curriculum and book (7 members): Chairman: 4H, secretary: 3H, 5 members including 2 opponents): 2H/member; beside, 2 opponents will have 5H/credit/curriculum and 10H/book.	≥ 37
SCIENTIFIC RESEARCH - Applies to all types of scientific research which the University is responsible for management or implementation, including international topics and projects - Especially, female lecturers will have an addition of 10% of the time conversion for each specific work	13	Scientific research outline (after approved): + National level or valued ≥ 1 billion VND + Ministerial–provincial-city level or valued ≥ 400 million VND + Ministerial–provincial-city level or valued < 400 million VND + University or faculty level	120 80 60 40
	14	Leader (accepted): + National level or valued ≥ 1 billion VND + Ministerial–provincial-city level or valued ≥ 400 million VND + Ministerial–provincial-city level or valued < 400 million VND + University or faculty level	200 120 80 60
	15	University Science & Education council (permanent member/commissioner/secretary) Subcommittee of University Science & Education council (member – not permanent member/commissioner/secretary of University Science & Education council) Science council (Chairman/commissioner/secretary) Professor title council (H/candidate) as: commissioner: 1.0, permanent member: 1.5, opponent: 4.0	60/40/60 30 30/20/30 1
	16	Reference books, monographs, translated books (approved by University Evaluation council for publishing as reference for teaching purpose)	100
	17	Editor-in-chief/Deputy editor of University Science Journal, University Publish house	60/40
	18	Syllabus (accepted/credit); if composed in foreign language (English, French, Russian, German, Chinese) will multiply by 1.4 (except those for foreign language module).	80
	19	Scientific article: + International scientific journal (having ISSN code**);** book chapter (having ISBN code) + National scientific journal recognized by State Professor Title Council; + National scientific journal (having ISSN code); + Conference summary record /international proceedings + Conference summary record /national proceedings and university (having publish house); + Seminar from department level and above (In which author is received 50%, co-authors will share the rest 50%)	100 50 30 40 30 20
	20	Scientific products granted intellectual property right (Equally divided if there are more than 1 author)	100

2. Lecturer doubles as assistant at faculty office, institute, center and department is calculated accordingly to Regulation promulgated together with Decision No. 1052/QĐ-ĐHCT dated 25/03/2013 by Rector of Can Tho University, professional workload is regulated as:

Workload = Coefficient of personnel X total personal obligation hours

Article 7. Remission of personal obligation hour

1. Lecturers who are appointed leadership or responsible for management of Party or Unions are considered for remission as following:

No.	Subject for remission	Ratio (%/year)
1	Rector/Vice Rector	85/80
2	Head/Deputy Head of Department, Committee, Center (not educational unit)	75/70
3	Head/Deputy Head/Chief of Office – institutes – center – department (educational units): < 40 lecturers or < 250 students ≥ 40 lecturers or ≥ 250 students ≥ 80 lecturers or ≥ 1.000 students ≥ 120 lecturers or ≥ 5.000 students ≥ 150 lecturers or ≥ 10.000 students	 25/20/15 30/25/20 35/30/25 40/35/30 45/40/35
4	Head/Deputy Head of Departments: < 20 lecturers ≥ 20 lecturers ≥ 40 lecturers	 15/10 20/15 25/20
5	Specialized Head, technical Head, laboratory management	10
6	Party Secretary, Chairman of University Labour Union	50
7	Deputy Secretary and permanent members of Party Committee, Vice Chairman of Labour Union, Chairman of Veteran's organization, Chief of People Inspection Committee, Chief of Domestic economic Committee, permanent member of Labour Union at University level	40
	Party Executive Committee member, Labour Union Executive Committee member at University level	30
8	Secretary of Party Committee and Party Cell at University level, Chairman of Labour Union – Leader of Labour Union branch /Vice Secretary of Party Committee and Party Cell at University level, Vice Chairman of Labour Union – Vice Leader of Labour Union branch /commissioner of Permanent Party Committee at University / commissioner of Party Committee and Party Cell Committee at University, commissioner of Labour Union Committee at faculty – institute – center - department (educational units): < 40 lecturers or < 250 students ≥ 40 lecturers or ≥ 250 students ≥ 80 lecturers or ≥ 1.000 students ≥ 120 lecturers or ≥ 5.000 students ≥ 150 lecturers or ≥ 10.000 students	 20/15/10/05 25/20/15/10 30/25/20/15 35/30/25/20 40/35/30/25
9	Party Cell Secretary, Leader of Labour Union /Party Cell Deputy Secretary, Vice leader of Labour Union /member of Party Cell Committee: < 20 lecturers ≥ 20 lecturers ≥ 40 lecturers	 10/05/03 15/10/05 20/15/10
10	Secretary/Deputy Secretary of Youth Union, Chairman of University Student Association Vice Chairman of University Student Association; Permanent member of Youth Union at University level	70/60 50 10

No.	Subject for remission	Ratio (%/year)
	Secretary and Deputy Secretary of Youth Union of officials, permanent member of University Youth Union Executive committee, Faculty Youth Union and equivalent level.	
11	Secretary/Deputy Secretary/Permanent member of Faculty Youth Union and equivalent level: ≤ 80 lecturers or ≤ 1.000 students > 80 lecturers or > 1.000 students	 35/30/25 40/35/30

2. Lecturers who are nominated to attend advance course, professional development course, assignment or temporary off work are considered for remission as following:

a) Lecturers who are in assignment, full-time study and advance training of more than 30 days for each period have the remission of 10% of annual obligation hour for every 30 days but not exceeding 100%. If the lecturer is appointed to attend of several long training courses, then the remission is cumulative; if the last days of more than 15 are rounded to 30 days.

b) Lecturers who are appointed for part-time study and training have the total remission equivalent to remission of corresponding full-time course. Exceptionally, those who are appointed for Master or PhD study have the remission based on the Decision for appointment.

c) Lecturers who hold university degree have the remission of 100% or obligation hour in the first 3 years since the started day for profession enhancement.

d) Lecturers who are temporary off work with social insurance due to illness, maternity or by decision of University of more than 15 days per period have the remission of 5% of annual obligation hour for every 15 days but not exceeding 100%. If lecturer has more continuous off work then the remission is cumulative and the last days of more than 7 days are rounded to 15 days.

đ) If lecturers having the remission of obligation hour regulated in this Article are responsible for management, then the remission due to management responsibility is calculated on the remaining obligation hour.

3. Lecturers who do not hold leadership or management position mobilized to non-educational units or administrative units of departments of the University and engaging in professional activity at one of educational unit and ensuring the rights of lecturers with the 30% of personal obligation hour.

4. Other special cases of remission shall be considered and decided by Rector.

Article 8. Principle for calculation of obligation hour and remuneration on exceeded hour

1. Changes in scale - rank – salary coefficient, degree, title happened from June 30th and before would be used as foundation for determining the annual rights and obligations; changes happened from July 1st onward would be used for planning next year activities. Particularly, the changes on remission of obligation hour regulated in Article 7 and newly employed lecturers, scale changing or appointing for assistant task are calculated based on actual arising in the year.

2. When the department accomplishes the obligation hours, lecturers with exceeded hours and those regulated in provision 7 of Article 3 in this Decision exceeding 30% of personal obligation hour will receive the remuneration of exceeded hours. Unit price and liquidity ratio for exceeded hours is regulated in Regulation on internal expenditure of the University.

Appendix 3-21

Current Status of Existing Equipment and Summary of Activities in Each Field

1. Agricultural Field

The current situation of the faculty is described hereunder introducing a Plant genetics laboratory and a Biochemistry laboratory as typical example.

(1) Plant genetics laboratory
It has basic equipment for practical training and researching. However, the laboratory was set up in 1996 and contained equipment such as 1 PCR machine, 1 centrifuge, 1 water-bath, 1 ice-maker, -20 C freezers and so on, of which some items are still working but some items are not working. Therefore, students and researchers cannot carry out the advanced experiments and they also endure wait time to use the limited facility in the laboratory. Sometimes they are forced to wait until midnight to use the facility when they cannot use it during day time. Currently, this laboratory offers 4 PhD degrees in Agriculture and Biotechnology area. Due to the limitation of laboratory space and equipment, the researchers are facing difficulty efficiently carrying out practical training for some courses related to molecular biology and genetic engineering courses. Due to the limitation of the laboratory facility, the researchers cannot achieve the project objective scope in keeping with the trends of applied biotechnology around the world. The equipment therefore should be upgraded to meet with the expansion of the facility's capacity as well as strengthening of research functions.

(2) Biochemistry laboratory
The biochemistry laboratory has some simple equipment for practical training for undergraduate and master's degree students such as a UV-VIS spectrophotometer, a centrifuge, a Kjeldahl system, a vacuum rotary evaporator, a fat Soxhlet extractor, and a fiber extractor. Some of them have been repaired many times. However, in day time most of equipment is utilized for undergraduate and master's degree students for practice and therefore time for researchers is very limited. Researchers are therefore sometimes forced to work even at night and holidays. Besides, the equipment has also been used for research works led by other laboratories in the faculty. Other laboratories are also in the same situation, thus the situation has become an urgent issue that should be settled with highest priority.

2. Aquaculture & Fisheries Field

The current situation of the faculty is described hereunder introducing fish pathology, fish biology laboratories and the fish hatchery as typical example.

(1) Fish pathology
The existing laboratories for research and student practice on fish pathology are old and small. Bachelor, master and PhD students are also using these labs to conduct their thesis lab works. The equipment used for bacteriological analysis is overloaded and some items have been used for more than 10 years. Systems used for histological analysis have the same status and several items were out of date. Equipment for PCR analysis (such as PCR machines, centrifuges, gel documentation, spectrophotometer, etc.) have been intensively used and regularly maintained that led to a delay in teaching and research activities. Some other existing equipment has not been working properly and is not repairable such as microscopes, autoclaves, digital balances, ice machines and micro plate readers. The same laboratories which were used for teaching have also been used for doing research. Therefore, the existing equipment are mainly used to do basic analysis in the field of aquatic pathology such as surgery of diseased specimens, observation via light microscope, preparation of simple histological slides, isolation and identification of bacteria and fungus by conventional methods. In addition, many items among the existing equipment have not been updated and thus data generated from them are not so reliable. The lacking of advanced equipment has led to limited publications in international journals as well as in-depth studies which are mainly based on appropriate number of samples to be analyzed.

The laboratories often encounter the problem of being overcrowded. Currently, there are 6 PhD students, 13 master's students and more than 20 undergraduate students that undertake their thesis work in the labs. Most of the equipment is used by undergraduate and master's degree students for training/practice and therefore the research time is very limited for researchers and many are forced to work at night, weekends and even holidays.

(2) Fish biology
There are four fish biology laboratories. They are old and small, around 100m^2 in total area. These labs have been serviced for practice courses, bachelor, master and PhD students for their thesis lab work. The equipment used for proximate composition analysis of fish and feed were being overused for nearly 20 years. Systems used for monitoring the respiratory regulations of fish and shrimp in terms of physiological responses were out of date. Equipment for analysis of bio-physiology e.g. hematology analysis tools, centrifugation, incubation, UV spectrometry have been intensively used and maintained regularly, which led to delay in teaching and research. Some other existing equipment has not been working and is not repairable such as microscopes, digital balances and micro plate readers.

(3) Fish hatchery
CAF has very old fish hatchery, over 30 years old; shrimp hatchery; and some temporary wet-labs. These wet-labs are small, old, and scattered in many places. There is not enough space for students and staff to carry out research and experiments. There are about 400 undergraduate students and 50 graduate students that practice and research experiments each year. The existing equipment is simple such as a plastic tank system, an air blow supply system, and a simple biological filter. At the moment, the space is too small to meet with the increasing numbers of students and for researchers to carry out research experiments, thus the hatcheries (Wet-Labs) have to set up enough places for student practice and research work.

3. Environmental Field

The current situation of the faculty is described hereunder introducing GIS and Remote Sensing laboratory and Land Resources Laboratory.

(1) GIS and Remote Sensing laboratory
Of existing 17 items, 10 items are not working and not repairable such as A0 printer, GPS, and desktop computers. It is considered difficult for lecturers to carry out practical training efficiently for increasing numbers of the said students.

(2) Land Resources Laboratory
This laboratory provides practical training for undergraduate and master's degree students and has equipment such as stable temp furnaces, four odd electronic scales, the PH and EC meter, titration instruments, Soil Auger 2m, and Soil Munsel color chart. Of such items, titration instruments are inaccurate in data and need to be replenished in numbers. As such, all the equipment existing in the Laboratory of Land Resources are very limited and used mainly for the teaching purposes. Most of equipment is occupied by the said students for training and practice in the day time, and thus researchers cannot secure enough research time. Under the circumstances, many researchers are forced to work even in night time. In addition, they have to utilize other laboratory to continue their research works due to limited numbers of experimental instruments.

4. Supporting Departments (CoET, CoIT, and CoNS)

(1) Engineering Field

Lab1, Agricultural and Aqua-cultural Engineering Lab: this laboratory provides practical

training for undergraduate students and has equipment such as tractor, combine harvester, drying machine, and so on. All of this equipment is self-produced, Russian-made and manufactured in between the 1970s to 1980s, except for a few Japanese-made items which have recently been procured through Japanese a technical assistance scheme. It is only used for student practice and cannot be used for research purposes. The Vietnamese government launched a policy of mechanization and automation in agriculture and, up to now, the large model farms have been encouraging reform for agricultural structure in Mekong Delta.

With the existing equipment, it is very hard to tackle research works which can help farmers adapt themselves technically to the changing circumstances and environment of MD.

5. IT and Management & Governance

For IT network of CTU, The summary of current IT system is described as follows:

i) The email system is hosted on Google mail for all the professors (more than 2,000) and students (more than 50,000),

ii) Syllabuses are available on the university website, and

iii) The system has internet connection with 90 Mbps for international link and 150 Mbps for national link.

In addition, each faculty is also allocated by an INAC database to store web contents. Moreover, CTU also has an e-learning system for lecturers to develop online courses. Furthermore, the CTU library also has a system to store the digitalized materials for students and staff members.

Most of the faculties of CTU do not have a common database for other activity yet. Most of the research and study of faculty staff is done on personal computers. As estimation, the total volume of data for 3 faculties is about 3195GB. This estimation is based on the number of staff members of the faculties and the interview of some staff members of these faculties. For future IT infrastructure, it is expected that CTU IT infrastructure have a system that can allocate to the faculty and staff on demand. Therefore, this system should have high capacity storage as well as high computing power.

For personal computers, CTU currently has around 4000 computers for both students and staff. As estimated, in the future we will need around 5000-6000 desktop computers. Among of them, 3000-4000 computers are for students to practice and do research. The majority of personal computer labs were purchased about 10 years ago. Therefore, they need to be replaced in the near future.

In order to make the management tasks more efficient, an information system for CTU should be developed. This information system allows the staff and students to conduct most of the tasks online. The main problem with the information system is that it cannot respond to a large number of concurrent users because of the limitation of hardware and software.

Currently, CTU has the IT infrastructure for the whole of CTU. However, most of the equipment's (including servers, and network devices) are old and cannot meet the requirements for current and future education, management, and research. Although the data-center is centrally managed by INAC, each faculty also needs the high performance computers for specific applications.

Appendix 3-22

List of International Projects

ON-GOING PROJECTS SUMMARY

NO.	Code	Title of project	Starting time	Ending time	Total of grant	Content of project	Department	Grant organization	Grant nation
1		Climate Change affecting Land Use in the Mekong Delta: Adaptation of Rice-based Cropping Systems (CLUES)	2011/3/1	2015/2/12	1,240,521 AUD	Creating a new model for community-led science learning and environmental action for families; developing a training program to build educational leadership within the CBOs; empowering CBO-based educators to direct the focus and content of science programming; and supporting ongoing collaboration among families, community-based education leaders, and museums	Climate Change Research Institute	Australian Center for International Agricultural Research (ACIAR) and International Rice Research Institute (IRRI)	Australia
2	**EUDEN00113TSNC**	Interdisciplinary Project on Climate Change in Tropical Aquaculture (iAQUA)	2013/1/1	2017/1/12	4,151,168 DKK	To understand how global warming will affect tropical aquaculture, they will study how a temperature rise from the current value of 27-32 C to 32-37 C will affect physiological performance, food conversion efficiency and growth in air-breathing fish. Particular emphasis will be placed on the role of the cardio-respiratory and digestive systems to address the prevailing hypothesis that compromised oxygen transport capacity determines temperature tolerance of aquatic ectothermic vertebrates	College of Aquaculture & Fisheries	DANIDA	Denmark
3	**EUBELG160609NCUU**	Improving management practices and food safety related to the use of chemicals for a sustainable freshwater aquaculture in the Mekong delta	2009/1/6	2014/1/6	184,211 EUR	Reducing the impact of using chemical in aquaculture, food safety and environment by developing and applying management methods and analytic technique	College of Aquaculture & Fisheries	VLIR	Belgium
4		Education Programme about reality of environment in Asia and Africa for managers	2010/1/1	2014/1/1	1,450,000 YEN	Training and enhancing abilities in protecting environment in Asia and Africa	College of Environment and Natural Resources		Japan

NO.	Code	Title of project	Starting time	Ending time	Total of grant	Content of project	Department	Grant organization	Grant nation
5	**EUBEL 01112C TUDT**	Pre-Partner Programme (2012) - "NETWORK University Cooperation" (VLIR)	2012/5/25	2013/3/31	45,000 EUR	Construct and consolidate the university's network between Vietnam and Belgium; Construct the balanced and capable project teams including coordinator and partner leader and hub; Establishing the concept note and final proposal of the project; Establishing a strategy for curriculum development of master programmes; Establishing a strategy for the development of a joined Doctoral School; Construct the appropriate management systems to operate and manage the programme	Can Tho University	VLIR	Belgium
6	**ASMA L01512 MTNC**	Assessment state and economic - social value of fish source in lower basin of Mekong Delta	2012/1/1	2015/12/31	36,689 AUD	Quantifying the multiple values of fish resources, interpret findings, analyse implications, and convey high levels results and implications to national decision-makers, development agencies and local actors, for sustainable and improved rural livelihoods	College of Environment and Natural Resources	ACIAR	Australia
7	**EUBEL 00412T STH**	Strengthening the impact of the ASEM Aquaculture platform - the bridge between Asian and European aquaculture	2009/1/12	2013/1/11	48,054 EUR	Develop a strong "Community of Practice" to reconcile ecosystem and economic system demands to promote and consolidate sustainability in aquaculture development in both regions	College of Aquaculture & Fisheries	VLIR	Belgium
8		Mitigation of pesticide pollution in the Mekong Delta	2010/1/4	2014/3/31	99,907.50 EUR	Characterizing the present situation regarding pesticide use in the Delta and the behaviour and occurrence of pesticide	College of Agriculture and Applied Biology	VLIR	Belgium
9		The Remote sensing-based information and Insurance for Crops in Emerging (RIICE-IRRI)	2012/1/6	2015/1/1	30,000 USD	Reducing vulnerability of smallholders in rice production through better and cheaper information systems on crop growth which will in turn lead to applications such as micro-insurance schemes	College of Environment and Natural Resources	IRRI	Philippines

NO.	Code	Title of project	Starting time	Ending time	Total of grant	Content of project	Department	Grant organization	Grant nation
10		LOTUS	2010/1/1	2014/1/1	20,000 EUR	Supplying the scholarships for Vietnam (include CTU) to study in Europe	Internation Relations Department	European Commission	Ghent Universit y
11	**GLUN DP0101 2KL**	Micro-Capital Grant Agreement For Non-Credit Related Activities	2011/2/1	2013/3/31	1,813,180,175 VND	Educating law knowledge for foreign students come to CTU for law studying	School of Law	UNDP	UNDP
12	**EUVLI R00111 NNTH**	Enrichment of fermented dairy products with selected tropical fruits from the Mekong Delta region in Vietnam	2011/1/8	2014/1/8	98,710.50 EUR	Producing fruits jam products with high-quality, nutrition and safety from the tropical fruits chosen in the Mekong Delta	College of Agriculture and Applied Biology	VLIR	Belgium
13	**AUAUS 00213V KHNC**	Improving the sustainability of rice-shrimp farming systems in the Mekong Delta, Vietnam	2013/1/6	2017/5/31	130,101 AUD	The project is to understand the mechanisms, processes and functionality of rice-shrimp farming systems through rigorous scientific investigations in order to achieve sustainable production	Climate Change Research Institute	University of New South Wales (UNSW)	Australia
14	**EUBEL 01312T SNC**	Advanced studies in pond culture - keys to success for sustainable artemia farming	2012/1/7	2016/1/9	99,850 EUR	Understanding nutrient dynamics in Artemia ponds with the aim to minimize input (e.g. fertilizer, supplementary food) but maximize out-put (biomass/cyst production) and to ensure environmental protection	College of Aquaculture and Fisheries	VLIR	Belgium
15		Decision-support Research for Environ-mental Applications and Models (DREAM) JEAI-DREAM, New IRD partner teams program	2011/1/1	2013/1/1	40,000 EUR	Research and choose the suitable models for environment in the Mekong Delta	College of Information and Communicatio n Technology	IRD	France
16		Enhancement awareness of local people to protect bats and Khmer culture in the Mekong Delta of Vietnam	2013/1/7	2014/1/2	8,950 USD	The project aims at enhancement awareness of local people, students and tourists around Bat Pagoda and visitors, and study situations about bats in the local	Mekong Delta Development Reasearch Insitute	The Rufford Small Grants Foundation	Britain

NO.	Code	Title of project	Starting time	Ending time	Total of grant	Content of project	Department	Grant organization	Grant nation
17	**EUBELG19709NCUU**	Study on rice breeding for brown plant hopper resistance	2009/1/4	2013/3/31	99,975.17 EUR	Assessing hereditary resource of rice variety to choose one has brown plant hopper resistance	Biotechnology Research and Development Institute	VLIR	Belgium
18		Research plan to investigate sediment flux through the Hau River mouth and adjacent tidal channels	2012/10/4	2013/3/31	30,000 USD	Understanding tidal and sediment dynamics at the mouth of the Hau River during high flow of the river	Climate Change Research Institute	Agency of the State of Washington, Office of Naval Research Global	America
19	**EU00001NCUU**	Sustaining Ethical Aquaculture Trade (SEAT)	2009/1/8	2013/7/30	230,687 EUR	Improving sustainment and quality of aquaculture producer	College of Aquaculture and Fisheries	European Commission and The University of Stirling, Scotland	Britain
20		Development of Agricultural Technologies in the Mekong Delta to respond to climate change (JIRCAS - Phase 2)	2011/1/4	2016/1/3	91,065 USD	Building a sustainable rural society to sustain natural resources and environment through establing a sustainable agricultural production in developing places	College of Environment and Natural Resources		Japan
21	**EUNET00812VKHNC**	Developing Agriculture, Aquaculture and Environment based climate change adaptation strategies for the Mekong Delta Plan of Vietnam	2011/5/18	2013/9/30	142,400 EUR	This project is designed to ensure a tailor-made and feasible development of an integrated climate change adaptation strategy across the agriculture, aquaculture and nature sectors in which (regional and national) policy makers, researchers and practitioners will be brought together using a relevant casus or hotspot approach. The project will deliver capacity building for setting up a science based policy process, and stimulate knowledge sharing with a strong orientation towards implementation of adaptation policies.	Climate Change Research Institute	Wageningen University and Research Center (WUR)	Netherlands

NO.	Code	Title of project	Starting time	Ending time	Total of grant	Content of project	Department	Grant organization	Grant nation
						This will create necessary support to bridge the gap between national planning and actual implementation of adaptation strategies.			
22	**EUDEN 00512K TTH**	Agricultural Growth and Poverty Pockets	2011/1/11	2014/12/31	1,381,801 DKK	Providing a better understanding of the processes that create and shape geographically concentrated areas ('pockets') of poverty in regions marked by agricultural growth and diversification	School of Economics and Business Administratio n	DANIDA	Denmark
23	**EUNET 00211T SNC**	Waste Management for Pangesius culture in the Mekong Delta of Vietnam (SuPa)	2011/1/1	2013/1/12	41,149 EUR	The project aims to contribute to improving the sustainability of Pangasius production methods by Vietnamese producers in the Mekong delta, sothat farms can comply with certification standards such as those of the Aquaculture Stewardship Council	College of Aquaculture and Fisheries	Wageningen University	Netherlan ds
24	**EUDEN 00612M TNC**	Sustainable Production of Biogas from Waste Rice Straw	2012/1/4	2016/1/12	2,396,708 DKK	Demonstrate that biogas production can be significantly enhanced by the RSTM process in farm-scale digesters in Vietnam by using RS and WH as feedstocks	College of Environment and Natural Resources	DANIDA	Denmark
25	**ASJAP 01212C TUNC**	New alkaline fertilizer for soils in Vietnam (Sumitomo)	2012/1/6	2016/1/2	352,442 USD	Testing the ability of steel lag fertilizer in improving the soil pH, soil fertility, and the side effects of fertilizer on soil chemistry/physics, product quality and environment	Can Tho University	Sumitomo Company Group	Japan
26	**ASPHI L00711 ĐBNC**	Strengthening Farmer-Agricultural Reasearch and Extension System Partnership in Participatory Plant Breeding and On-farm Agrobiodiversity Conservation in Vietnam (FARES)	2011/1/1	2013/12/31	80,350 USD	Strengthening agricultural research and extension system in Vietnam though the adoption of participatory technology development processes, and inclusion of biodiversity based agriculture production system for food security and climate change adaptation.	Mekong Delta Development Reasearch Insitute	SEARICE	Philippin es

NO.	Code	Title of project	Starting time	Ending time	Total of grant	Content of project	Department	Grant organization	Grant nation
27		Training Programme for Developing Capacity of Academic Library Staff in the Mekong Delta of Vietnam	2013/1/3	2013/1/9	16,054 AUD	Developing an effective training program for improving the capacity of academic library staff in Mekong Delta region so that they can effectively enhance the libraries' performance contributing to the advancement of the education in the Mekong Delta, which is essential to the regional sustainable development	Learning Resource Center	Australia Government	Australia
28		Adaptation to Climate Change: Lan-use innovative models applied to environmental management - ACCLIMATE (PEERS)	2012/1/1	2014/1/1	32,000 EUR	Discover the technology of creative model to improve environment and to make a decision for tracing out and using land	College of Environment and Natural Resources	IRD	France
29	**AUAUS 00712V KHNC**	Climate Adaptation through Sustainable Urban Development with the sase study on Urban Water Systems in Can Tho, Vietnam (CSIRO 1)	2010/10/8	2014/10/3	150,000 AUD	Supporting decision making for water and wastewater infrastructure investment in coastal and delta cities that reflects and respond to the anticipated impacts of climate change	Climate Change Research Institute	CSIRO	Australia
30	**AUAUS 00912V KHNC**	The Future of the Mekong Delta (Vietnam/CSIRO 2-MF)	2010/1/7	2014/1/3	177,000 AUD	Joint development of fieldwork instrumentation to collect primary household data; joint design of an assistance with partner participation in the local alternative futures workshops	Climate Change Research Institute	CSIRO	Australia
31	**EUSW E00313 MTNC**	Mangrove ecosystem services valuation-A combined approach of remote sensing and household survey analyses	2013/11/1	2014/11/1	12,000 USD	This project presents the results of ecosystem service valuation for a mangrove ecosystem tested site in Ca Mau province, MD, Vietnam They use remote sensing analyses for mapping percentage of mangroves and socio-economic analyses by using semi-structural questionnaire on household basis	College of Environment and Natural Resources	IFS (International Foundation for Science)	Sweden

NO.	Code	Title of project	Starting time	Ending time	Total of grant	Content of project	Department	Grant organization	Grant nation
32		Water management through the lens of gender, class and ethnicity: a comparative case study between an upstream and downstream of Mekong Delta's Vietnam	2014/02/01	2014/07/01	12,000 CAD	The study will explore the arena of water management, focusing on roles and responsibilities of men and women in two communes, one located in an upstream area and the other located in a downstream area of Vietnam's Mekong Delta	Mekong Delta Development Reasearch Insitute	The program of ASEAN-Canada Junior Fellowship 2013/2014	Canada
33	**EUNET 00114V KHNC**	Climate change and water supply in the Mekong Delta, Vietnam	2013/01/04	2017/01/04	39,150 EUR	The objective of this project is build the plans to adapt climate change for water supply companies, through this they can ensure the sustainable water supply for Mekong Delta	Climate Change Research Institute	Vitens Evides International	Netherlands