IPB partners with Wageningen University to conduct research on Jatropha curcas

The Research Center for Biological Resources and Biotechnology of Institut Pertanian Bogor (IPB) and the Research Centre of Wageningen University (WUR), The Netherlands conducted a research partnership on the “Growth, Development and Production of Jatropha curcas in Indonesia.” The research partnership studied the interaction of the genotype, environment and management of the productivity of Jatropha. The research team for the Jatropha research partnership is composed of Prof. Ken Giller, Dr. Raymond Jongscap and Dr. Maja Slingerland all from WUR, and Dr. Sony Suharsono from IPB.

Jatropha curcas is a deciduous shrub that grows in any type of soil, preferably well-drained, with good aeration. It is drought resistant and can withstand light frost. The oil extracted from the toxic Jatropha seed can be processed and refined into an alternative source of biofuel, which would greatly reduce dependency on coal or oil.

The project is part of the interdisciplinary umbrella research program “JATROPHA: The commoditization of an alternative biofuel crop in Indonesia,” funded by The Netherlands Organization for Scientific Research under the program “Agriculture Beyond Food.” This three-year study (from 2011 to 2013) will involve working with doctoral students from the WUR. To formulate the strategy and methodology of the study, Dr. Maja Slingerland and Ms. Juliana Tjew, a doctoral student from WUR met with Dr. Suharsono, Head of

Oil from the toxic Jatropha seed can be processed and refined into an alternative source of biofuel. The research is part of the interdisciplinary umbrella research program “JATROPHA: The commoditization of an alternative biofuel crop in Indonesia,” funded by the Netherlands Organization for Scientific Research (NWO) in the program “Agriculture beyond Food.”
The University of Queensland has once again proven itself as one of the world's leading research institutions. Results of a survey conducted on 28 February 2011 among the readers of The Scientist magazine showed that the University of Queensland made it to the top five of the world's best places for post-doctoral work. The UQ is also the only institution located outside the northern hemisphere to be included in the top 10 International Institutions list.

According to Professor Alan Lawson, UQ's Pro-Vice-Chancellor for Research and International, the survey reflected the increasing recognition that the UQ has been gaining as a reputable world-class institution.

The survey drew its results from 2881 web-based responses from readers who were asked to assess their work environment and experience by indicating their level of agreement with the 38 criteria in the following areas: Quality of Training and Mentoring, Career Development Opportunities and Networking, and lauds him for his devotion and dedication to the graduate school during his five-year term from 2006-2011. (AVLAlcala)

IPB welcomes Dr. Ir. Dahrul Syah as new dean of Graduate School

The officers and staff of Institut Pertanian Bogor (IPB) welcomed Dr. Ir. Dahrul Syah as the new dean of Graduate School. Dr. Syah's term of office will be from 2011 to 2015.

At the same time, the IPB Graduate School bade goodbye to its outgoing dean Prof. Dr. Ir. Khairil Anwar Notodiputro, and lauds him for his devotion and dedication to the graduate school during his five-year term from 2006-2011. (AVLAlcala)

UPM ranks sixth in UI Green Metric World University Rankings for 2010

The Universiti Putra Malaysia (UPM) placed sixth out of 95 universities in the 2010 Green Metric World University Rankings. UPM is the only university in Asia who managed to be part of the top 10 universities around the world in terms of implementing policies for sustainability through environmental conservation and green technology.

The Green Metric World University Ranking is an initiative of the Universitas Indonesia that was launched in 2010. It aims to give recognition to universities that put premium on sustainability in their campuses by reducing their carbon footprint. The ranking was determined by collecting data from thousands of participating universities around the world and processing it to arrive at a single score.

The ranking team asked them to provide numeric data on a number of criteria, which include the size of the university, location and amount of green space as well as information on energy use, transport, water use and recycling and waste treatment.

Information on the ranking of world universities and details on UI GreenMetric World University Rankings can be found on the website of http://greenmetric.ui.ac.id/id/page/ranking ratings.

Source: UPM News Page | 3 January 2011

See UQ among, p. 5

Source: UPM News Page | 3 January 2011

The University of Queensland has once again proven itself as one of the world's leading research institutions. Results of a survey conducted on 28 February 2011 among the readers of The Scientist magazine showed that the University of Queensland made it to the top five of the world's best places for post-doctoral work. The UQ is also the only institution located outside the northern hemisphere to be included in the top 10 International Institutions list.

According to Professor Alan Lawson, UQ's Pro-Vice-Chancellor for Research and International, the survey reflected the increasing recognition that the UQ has been gaining as a reputable world-class institution.

The survey drew its results from 2881 web-based responses from readers who were asked to assess their work environment and experience by indicating their level of agreement with the 38 criteria in the following areas: Quality of Training and Mentoring, Career Development Opportunities and Networking, and lauds him for his devotion and dedication to the graduate school during his five-year term from 2006-2011. (AVLAlcala)

IPB welcomes Dr. Ir. Dahrul Syah as new dean of Graduate School

The officers and staff of Institut Pertanian Bogor (IPB) welcomed Dr. Ir. Dahrul Syah as the new dean of Graduate School. Dr. Syah's term of office will be from 2011 to 2015.

At the same time, the IPB Graduate School bade goodbye to its outgoing dean Prof. Dr. Ir. Khairil Anwar Notodiputro, and lauds him for his devotion and dedication to the graduate school during his five-year term from 2006-2011. (AVLAlcala)

UPM ranks sixth in UI Green Metric World University Rankings for 2010

The Universiti Putra Malaysia (UPM) placed sixth out of 95 universities in the 2010 Green Metric World University Rankings. UPM is the only university in Asia who managed to be part of the top 10 universities around the world in terms of implementing policies for sustainability through environmental conservation and green technology.

The Green Metric World University Ranking is an initiative of the Universitas Indonesia that was launched in 2010. It aims to give recognition to universities that put premium on sustainability in their campuses by reducing their carbon footprint. The ranking was determined by collecting data from thousands of participating universities around the world and processing it to arrive at a single score.

The ranking team asked them to provide numeric data on a number of criteria, which include the size of the university, location and amount of green space as well as information on energy use, transport, water use and recycling and waste treatment.

Information on the ranking of world universities and details on UI GreenMetric World University Rankings can be found on the website of http://greenmetric.ui.ac.id/id/page/ranking ratings.

Source: UPM News Page | 3 January 2011

See UQ among, p. 5

Source: UPM News Page | 3 January 2011
UC Associate Member in focus: Tokyo University of Agriculture

Founded more than 100 years ago, the Tokyo University of Agriculture (TUA) is a private university in Japan that has been known to produce many fine graduates through education and research grounded in a practical science approach.

Currently, the University has two graduate schools, the Graduate School of Agriculture and Graduate School of Bioindustry.

The Graduate School of Agriculture consists of 12 departments including departments of Food and Nutritional Sciences, Fermentation Science and Technology and Landscape Architecture. Since its establishment the graduate school was able to successfully train 1,301 doctorate candidates (828 research doctors and 473 course work doctors).

On the other hand, the Graduate School of Bio-industry integrates the study of biological production, food science and technology, and industrial business management, particularly in the context of the Okhotsk Region, considered as one of the major food production bases in Japan.

The Graduate Schools of TUA have partnerships with the National Institute for Food, Agriculture and Environment Science and Technology. Under this partnership system with frontline research institutions nationwide, TUA engages actively in exchanging researchers, supervising doctoral dissertations, and undertaking educational and research guidance for graduate students.

In 2006, TUA became an associate member of the University Consortium (UC). Through the affiliation, TUA, SEARCA and UC implemented the three-year Dissertation Doctorate Program for Agriculture and Natural Resources which aims to contribute to the enhancement of agricultural research and development in Southeast Asia, and is open to all UC member universities.

Dr. Neal Menzies is UC Executive Officer of UQ

Dr. Neal Menzies, head of the School of Agriculture and Food Sciences and a professor in Soil and Environmental Science, is the new Executive Officer of the University of Queensland to the University Consortium.

Dr. Menzies finished his Ph.D. at the University of Queensland in 1992. His main research interests include phyto-toxicity of metals, and in particular aluminum, surface charge chemistry, and the management of nutrients in tropical farming systems.

After obtaining his Ph.D., Dr. Menzies worked at the International Institute of Tropical Agriculture in Cameroon, and then as an academic at the University of Newcastle upon Tyne in the UK, before returning to Australia to take a position at the University of Queensland. He is a ASSSI Certified Professional Soil Scientist (CPSS 3 Stage 3).

He also served in various key positions in international academic and scientific organizations. He became the Secretary, Vice President, and President of the Queensland Branch of the Australian Society of Soil Science Inc. (ASSSI), and Vice President and eventually, President of the Federal ASSSI Branch from 2004 to 2006. He was also a Program Leader in the Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC-CARE), Associate Editor of the Journal of Environmental Quality, and Vice Chair of the Organizing Committee (and Chair of the Scientific Committee) for the 19th World Congress of Soil Science (WCSS) held in Brisbane, Queensland, Australia in 2010.

(AVLAlcala)
The University of Queensland (UQ) received A$131 million of the 2011 Research Block Grants as funding for its research and training. The fund boost will certainly help reinforce the university’s status as a world-leading research organization. The University received the third-largest allocation of the 2011 research grants awarded to 41 Australian universities and received over 60 percent of the total amount allocated to Queensland universities.

Already recognized as one of the world’s best institutions in terms of post-doctoral work, UQ’s dedication to excellence in quality research enabled it to attract over $300 million in research income each year. The University employs 6300 staff and operates on a A$1.4 billion budget.

Prof. Max Lu, UQ’s Deputy Vice-Chancellor for Research, said that the funding will definitely help their research on the following vital areas: health, humanities, economics, agriculture, water and food security, climate, biofuels and space exploration technology.

UQ also received an increase in their Australian Postgraduate Award (APA) places. From 2010’s 267 APA places, it was increased to 296.

Prof. Zlatko Skrbis, dean of UQ’s Graduate School said that the increased allocation is aligned with the University’s goal to further build and strengthen its research higher degree activities.

He also said that as one of Australia’s highest-ranked and most comprehensive research organizations, UQ is strategically placed to educate further and support the next batch of Australian scholars.

Condensed from UQ News Page | 23 Feb 2011
IPB researchers discover high yielding type of Chili

Dr. M. Syukur and his team of researchers from the Agronomy and Horticulture Department of the Faculty of Agriculture, IPB successfully reproduced a high-yielding hybrid-seed chili plant known as IPB CH3. The IPB CH3 produces large fruit of about 14-17 cm in length, has a flowering period of less than three months and is able to produce one kilogram of chili per tree or 15 tons per hectare. The Ministry of Agriculture of Indonesia has already approved the distribution of this type of chili plant to the public since October 2010.

Indonesians are fond of eating fresh chilies, making it an important vegetable crop in the country with high economic value. Knowing this, Dr. Syukur and his four colleagues, Prof. Dr. Sriani Sujiprihati, Dr. Rahmi, Dr. Widodo, and Dr. Hendrastuti, have been studying chili plants since 2003 and have already discovered 11 types of “superior chili” plants. Four types of chili are currently awaiting approval from the Ministry of Agriculture.

The team is currently conducting research on a new non-hybrid type of chili so that farmers will only need to buy the seeds once and just produce more seeds from the chili trees they have grown. This will help reduce the cost of production for Indonesian farmers. With the expected rise in the population of Indonesia, the increasing need for fresh chilies, the success of Dr. Syukur’s research team will greatly benefit Indonesia’s chili production. (AVLAlcala)

Source: IPB News | 18 January 2011

---

IPB CH3 produces large fruit of about 14-17 cm in length, has a flowering period of less than three months and is able to produce one kilogram of chili per tree or 15 tons per hectare.

---

IPB partners, from p. 1

PPSHB IPB and the staff of PT Jedo in Darmaga Campus of IPB on 9 February 2011. PT Jedo is a Japanese private company that produces jatropha oil fuel.

The discussion was followed by the visit of WUR team together with Dr. Suharsono to one of the jatropha plantations managed by PT Jedo in Muarabuminangen, Pandeglang Regency, Banten Province. This site will be used as one of the experiment areas.

Apart from the cooperation on Jatropha, WUR also partners with IPB for the “Scientific Program Indonesia-The Netherlands,” or SPIN on the research topic “High Quality Solanaceous Vegetables by Exploration of Natural Biodiversity (IndoSol)” for the period of 2007-2012. (AVLAlcala)

---

UQ among, from p. 2

Quality of Communication, Value of the Post-doctoral Experience, Quality of Facilities and Infrastructure, Funding, Equity, Pay and Benefits, and Family and Personal Life.

Jef Akst, associate editor of The Scientist who oversees the Best Places survey for the publisher Faculty of 1000, said that the post-doctoral years are critical in any budding scientist’s career and that the survey showed the fine balance between independence and guidance. This, Ms. Akst says, is important to a successful postdoctoral experience. (AVLAlcala)

Source: UQ News Page | 1 March 2011

---

Prof. Ulrike, from p. 8

research in the University of Texas in Dallas, USA and upon returning, took up a position at the Universitätsklinikum Hamburg (University Medical Center Hamburg-Eppendorf). She completed her habilitation at the Hamburg University in 1990, where she was also appointed to a C3 professorship (university professor) status six years later. In 2001, she became the Director of the Institute for Biochemistry and Molecular Biology at the University Medical Center Hamburg-Eppendorf. It was also during this time when she was elevated to C4 professorship. She is also a holder of an honorary degree from the Swedish University of Umea and recipient of scientific awards and distinctions. (AVLAlcala)

Source: UG News | January 2011
SEARCA publishes two new discussion papers in January 2011

The first two issues of SEARCA’s Agriculture and Development Discussion Paper Series (DPS) for the 2010-2011 fiscal year are now available for free download at the SEARCA website. The papers are authored by SEARCA’s Seed Fund for Research and Training (SFRT) Awardees, as part of their final research reports.

DPS 2010-1 titled Impacts of Cyclone Nargis on Livelihood, Food Security, and the Agriculture Sector in Myanmar, was written by Dr. Khin Oo (principal researcher) and Dr. Theingi Myint (associate researcher) of Myanmar’s Yezin Agricultural University. The paper presented the results of a survey in Bogayalay, Ayeyarwady Division - the area worst affected by Nargis – conducted a year after the cyclone hit the country. The authors also provided policy recommendations for disaster recovery and relief, and disaster risk management.

On the other hand, DPS 2010-2 is a study on the Integration of GIS and AHP Techniques for Analyzing Land Use Suitability in Di Linh District, Upstream Dong Nai Watershed, Vietnam. The study by Dr. Nguyen Kim Loi and his associate researchers from Nong Lam University in Vietnam investigated the effectiveness of applying both the Geographic Information System (GIS) and analytical hierarchy process (AHP) approaches in analyzing the change in land use cover and land use suitability for three tree species: Pinus kesyana, Pinus merkusii, and Acacia auriculiformis. The study also gave recommendations for future land use studies and policy implications for natural resources management.

As part of its knowledge management initiatives towards the promotion of a learning culture, the Center publishes the DPS to disseminate information on current trends or researches and to inspire discussion between the author and other stakeholders.

Hard copies of DPS 2010-1, and past DPS issues are available at SEARCA’s Knowledge Resources Unit (KRU) – Knowledge Management Department (KMD).

Soft copies of the DPS series can be downloaded at the SEARCA website. (RJPEvangelista)

4 new buildings inaugurated at Institut Pertanian Bogor

Four new buildings were inaugurated at the Institut Pertanian Bogor (IPB) on 14 February 2011. These four buildings are the Faculty of Forestry, Agriculture Media Center, Public Electronic Agrimedia (Green TV) and Development Incubator Production.

Inauguration ceremonies took place at the Electronic Agrimedia (Green TV) building, which was built to serve as the development center for creativity in the production of information packages and also serve as a center for practical works of students. According to IPB Rector, Prof. Dr.Ir. Herry Suhardiyanto, MSc, “The establishment of Green TV is actually an effort to produce TV program on agricultural education, as well as to bring the University closer to the public at large.” (AVLAlcala)

Source: IPB News page | 7 March 2011
The University Consortium

The Southeast Asian University Consortium for Graduate Education in Agriculture and Natural Resources is a program launched on 19 September 1989 by SEARCA.

The idea of having such a program was formed in August 1988 when SEARCA, with convened a meeting of deans of five leading agricultural graduate schools in the region. The deans noted a rising demand for graduate education across all agricultural disciplines and related fields, strong agricultural and demographic pressures, and tremendous growth in education, and agreed to the idea of establishing a University Consortium.

The objectives of the Consortium are:

1. To provide highly trained personnel in agriculture and natural resources for national development of Southeast Asian countries.
2. To promote mutually beneficial cooperation among agricultural universities in the region.
3. To utilize more fully and efficiently the scarce resources and expertise available in each country in the region for top-quality graduate education and research.
4. To stimulate freer sharing and exchange of information, facilities, and expertise among agricultural universities in the region.

SEARCA has served as the Consortium’s Secretariat since 1989. Its founding members are Universitas Gadjah Mada (UGM) and Institut Pertanian Bogor (IPB), both in Indonesia; Universiti Putra Malaysia (UPM) in Malaysia; University of the Philippines Los Baños (UPLB) in the Philippines; University of British Columbia (UBC) in Canada; and Kasetsart University (KU) in Thailand. Four associate members have been admitted, namely: University of Queensland (UQ) in Australia, Georg-August University of Göttingen (GAUG) in Germany, and Tokyo University of Agriculture (TUA) in Japan.

“To be a leader in implementing collaborative strategies for excellent graduate education and cutting-edge research in agriculture, environment, and natural resources for the benefit of Southeast Asia” - this is the vision of the revitalized University Consortium.

The Consortium has five components, namely: student exchanges, faculty exchange and visit, research fellowships, professorial chairs, and thesis grants.

UC Contact Persons

UNIVERSITAS GADJAH MADA

Dr. Masyhuri
Director, Center for World Trade Studies
Office of International Affairs
Universitas Gadjah Mada
Jl. Flora, Bulaksumur 55281
Yogyakarta, Indonesia
Tel: 62-274-555676
Fax: 62-274-516656
E-mail: mmasyhuri@hotmail.com or dr_masyhuri@yahoo.com

UNIVERSITY OF THE PHILIPPINES LOS BAÑOS

Dr. Crisiteta N. Cuaresma
Secretary, Graduate School
University of the Philippines Los Baños
4031 College, Laguna, Philippines
Tel: (63-49) 536-3414, 536-2310
Fax: (63-49) 536-2310
Email: teta.cuaresma@gmail.com or mcncuaresma@uplb.edu.ph

INSTITUT PERTANIAN BOGOR

Dr. Rinekso Soekmadi
Director, Directorate of Collaboration and International Programs
Institut Pertanian Bogor
Gedung Rektorat, Lt. 2
Kampus IPB Dramaga
Bogor, Indonesia
Tel: (62-251) 622-638
Fax: (62-251) 622-638
E-mail: internas@indo.net.id

UNIVERSITY OF QUEENSLAND

Dr. Neal Menzies
Professor of Soil and Environmental Science
Head, School of Agriculture and Food Sciences
Dean of Agriculture
University of Queensland
Brisbane Queensland
4072, Australia
Tel: (61-7) 3365 2059
Fax: (61-7) 3365 1177
E-mail: n.menzies@uq.edu.au

KASETSART UNIVERSITY

Mr. Somsakdi Tabtimthong
Director, International Affairs Division
Kasetsart University

50 Phaholyothin Road
Chatuchak, Bangkok 10900, Thailand
Tel: (66-2) 942 8171
Fax: (66-2) 942 8170
E-mail: fro@montri.ku.ac.th
(Foreign Relations Office)

UNIVERSITY OF BRITISH COLUMBIA

Dr. Mahesh Upadhyaya
Associate Dean, Graduate Studies
Faculty of Land and Food Systems
University of British Columbia
270-2357 Main Mall
Vancouver, B. C. V6T 1Z2, Canada
Tel: (1-604) 822-6139
Fax: (1-604) 822-4400
E-mail: upadhy@interchange.ubc.ca

UNIVERSITI PUTRA MALAYSIA

Prof. Dr. Bujang Kim Huat
Deputy Dean, School of Graduate Studies
University Putra Malaysia
4th Floor, Administration Building
UPM 43400 Serdang, Selangor, Malaysia
Tel: (60-3) 89460643
Fax: (60-3) 89432509
Email: bujang_at_eng.upm.edu.my

GEORG-AUGUST UNIVERSITY OF GÖTTINGEN

Prof. Dr. Kerstin Wydra
Managing Director
Centre for Tropical and Subtropical Agriculture and Forestry (CeTSAF) - Tropenzentrum Georg-August University of Göttingen Buesgenweg 1
D-37077 Göttingen, Germany
Tel: +49 (0)551 / 39 - 3908/9
Fax: +49 (0)551 / 39 - 4556
E-mail: kwydra@uni-goettingen.de
URL: www.tropenzentrum.de

TOKYO UNIVERSITY OF AGRICULTURE

Dr. Akimi Fujimoto
Professor, Faculty of International Agriculture and Food Studies
and Director, International Programs
Tokyo University of Agriculture
1-1-1 Sakuragaoka, Setagaya-ku
Tokyo 156-8502, Japan
Tel.: (8-13) 5477 2377
Fax: (8-13) 5477 2646
E-mail: fujimoto@nodai.ac.jp

SEARCA

Dr. Gil C. Saguiquit, Jr.
Director, SEARCA
Los Baños 4031, Laguna, Philippines
Telefax: (63-49) 536-7097
E-mail: gc@agri.searca.org

Dr. Editha C. Cedicol
Manager, Graduate Scholarship Department
SEARCA, Los Baños 4031, Laguna, Philippines
Telefax: (63-49) 536-7164
E-mail: ecc@agri.searca.org

University Consortium is a newsletter of the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) for the Southeast Asian University Consortium for Graduate Education in Agriculture and Natural Resources (UC). It can be downloaded from the UC website at http://www.uc.searca.org

Editor and Layout Design:     Jesselle S. Laranas
Assistant Editor: Anne Victoria L. Alcala
Advisers: Gil C. Saguiquit, Jr. Editha C. Cedicol

University Consortium accepts contributed articles on activities related to the Consortium programs. Send contributions to: The Editor, University Consortium, SEARCA, College, Los Baños 4031 Laguna, Philippines; Telefax: (63-49) 536 7164; Email: jsl@agri.searca.org, gsd@agri.searca.org

April-June 2011
University Consortium Newsletter

Prof. Dr. Ulrike Beisiegel is new president of Georg-August-Universität Göttingen

Professor Dr. Ulrike Beisiegel, a biochemist formerly based in Hamburg, succeeded Professor Dr. Kurt Von Figura as the new president of the Georg-August-Universität Göttingen in Germany in ceremonies held on 10 January 2011. Dr. Beisiegel is the first ever woman to take the helm of the distinguished university. In her inaugural speech, she stressed that teaching in the University should be “rooted in the latest scientific findings and must be research-based”. She also envisions the University to provide the means to encourage creative endeavor through “a well-directed deceleration in the processes of science and scholarship” with the objective of raising the quality of research being carried out by the university. She also mentioned that she wants to explore partnerships with non-university research institutions on the Göttingen research campus during her term as University president.

Born in 1952, Prof. Dr. Beisiegel studied human biology in Marburg and subsequently got her doctoral degree from the Department of Medicine of the same institution. She conducted her post-doctoral

See Prof. Ulrike, p. 5

UGM graduate students conduct entrepreneurship training on Seaweed Cultivation

Seaweed cultivation and processing is considered an important home-based industry for people living near the sea, especially in countries like Indonesia, whose coastlines measure a total of 81,000 km. Villagers process seaweed into chips which can be sold to tourists and visitors. Aside from chips, seaweed can also be processed into pecel (traditional salad dressing) and sauce, emphasizing its potential to processed into other types of food.

In line with this, the Master of Management (MM) students of the Faculty of Economics and Business of the Universitas Gadjah Mada (UGM) conducted a mentoring and entrepreneurship training on seaweed cultivation business in Kemadang Village, Tanjungnarsari, Gunung Kudul regency in Indonesia.

Before conducting the entrepreneurship training, the students first conducted mapping and data collection activities on the number of farmers and SMEs of seaweed chips in Kukup, Krakal, and Sundak Beaches. Based from the information they have gathered, seaweed harvesting and utilization has not yet been optimally managed in Kemadang Village. Cultivation of seaweed still relies on natural processes. For example, the intake of seaweed has to be done until the tide ebbs on the beach.

Also, seaweed harvest still relies on weather, particularly the end of rainy season.

Aditya Budi Krisnanto (24), an MM UGM student, said that the technology employed by the villagers for seaweed utilization is still simple or basic. He further explained that the improvement of this process needs to be done through effective transfer of technology in order for seaweed to be produced in a sustainable manner and for the villagers to no longer rely on nature.

Aside from the economic aspect of seaweed cultivation, the villagers must also consider the environmental sustainability of the technology they will employ in cultivating seaweed.