Curriculum Development for Sustainable Seafood and Nutrition Security (SSNS)

Deliverable 6.1 Dissemination, Exploitation and Sustainability plan

Report prepared by:

Asian Institute of Technology (AIT)

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Dissemination level		
Department / Faculty	x Local	x National
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Curriculum Development for Sustainable Seafood and Nutrition Security (SSNS)

Dissemination, Exploitation and Sustainability plan

I: Background

This document is the brief description of strategies for dissemination, exploitation and sustainability as an essential part of the project entitled, "Curriculum Development for Sustainable Seafood and Nutrition Security (SSNS)". It is a 3-year project developed and launched with a grant award of 999,556.10 Euros from EU Erasmus+ Programme. The main objective of the project is to enhance the capacity of the Asian partner universities, their lecturers (36) and produce students (90) with new and need-based skills by developing innovative teaching-learning methods, and explore new paradigm shifts in seafood production systems and its value chain to ensure long-term sustainability of seafood and nutrition security. The team plans to develop at least 20 MSc courses and 27 vocational training courses to make available online, develop 40 internship programs establishing nine seafood security centers in Indonesia, Thailand and Vietnam.

The project has a consortium of nine Asian partner institutions in Asia which include Khon Kaen University (Thailand), Maejo University (Thailand), University of Gadjah Mada (Indonesia), Bogor Agricultural University (Indonesia), Jakarta Fisheries University (Indonesia), Can Tho University (Vietnam), Nong Lam University, HCMC, (Vietnam) and Research Institute for Aquaculture No. 1, Hanoi (Vietnam), and four European partners; University of Stirling (UK), Norwegian University of Science and Technology, (Norway) University of Thessaly, Department of Ichthyology & Aquatic Environment (Greece), and EUROTraining (Greece).

The kick-off meeting or inception workshop was organized at AITCC in April 2018 (Fig 1). Currently, 3-4 lecturers from each partner institution are actively participating in the development of new MSc courses. With a view to understanding innovative teaching and sophisticated laboratory techniques, these lecturers joined one-week trip to NTNU (Norwegian University of Science and Technology) during November 5-9, 2018 (Fig. 2). They are also planning to visit Institute of Aquaculture, University of Stirling, Scotland, UK during February 10-15, 2019. Working closely with EU partners and building on earlier two EU Asia Link programs, they are implementing this ambitious initiative. Dr Ram C. Bhujel played a key role in developing the proposal and implementing it as Project Coordinator. He serves as Research Associate Professor in Aquaculture and Aquatic Resources Management (AARM) program of the Department of Food, Agriculture and Bio-resources within the School of Environment, Resources and Development (SERD).

Part II: Dissemination plan

Considering the fact that outcomes of the project (courses or new knowledge) need to be widely distributed and disseminated so that wider population can get benefits from the experience gained. Higher education is the one to steer the industry towards the right direction of sustainability. Sustainability of seafood and nutrition security is an issue pertaining to all the levels; local, national, regional and global levels. Therefore, outcomes of the projects have been planned to disseminate at various levels.

2.1 SSNS Logo

A logo for SSNS program has been designed with the help of professional designer. First draft was distributed to all the partners during the inception workshop in April 2018. After having comments and suggestions it has been improved. The final logo (Fig. 1) consists of slogan "SEAFOOD FOR ALL & FOREVER", a globe in the middle, and Co-funded by EU Erasmus+ and seafood pictures on outer ring.

In order to make the project to get maximize visibility, all the partners will use the logo in all project documents such as news articles, reports, presentations and so on either on the top or bottom depending upon the situation.

Fig. 1 Logo designed and used for all the documents and promotional materials.

2.2 SSNS Centre and door sticker / signboard

A signboard or a door sticker was designed, produced and distributed to each partner during the Kick-off meeting which will be used to stick on the wall or door of the SSNS Centre office or show on the front during any activities so that it is visible while taking photographs. For example Fig. 2 shows an example used by Khon Kaen University in Thailand (Partner #3).

Fig. 2. SSNS Door sticker for the SSNS Centre at Khon Kaen University in Thailand.

Maejo University, Faculty of Fisheries Technology and Aquatic Resources (FTAR) is going to establish a Center of Excellency. This Center received funds from both projects including SSNS and TUNASIA for a capacity building. Its functions would focus on offering training courses in aquaculture and related fields based on market and student demands, as well as providing services like environmental analyses, disease diagnosis and doing research. The MJU rules about for opening a center has been under study. MJU has hosted four exchange students from Can Tho University (another partner in the project) from Vietnam under MoU between two universities in order to strengthen students in fisheries and aquaculture area during December 3 – 30, 2018. This indicates some extra activities carried out by the Fisheries Faculty, which will happen more in the future.

2.3   Signature file and subject heading

The Country Coordinators, especially those of Asian partners, will carry the name of the project in their signature file or in subject heading while communicating through email to outsiders depending upon the situation the identifiers can be "Local Coordinator, SSNS Co-funded by EU Erasmus+".

2.4   Brochure

Brochure has been designed incorporating the comments and suggestions from all the partners. All partners will print at least 300 hard copies and distribute to visitors and interested persons/stakeholders. They will also use soft copy (PDF version) to send to their networks via email or social media which is available online at:

https://www.seafood-security.org/brochure

Faculty of Fisheries Technology and Aquatic Resources (FTAR), Maejo University plans to print 100 copies of the designed brochure (English Version; picture provided in Annex 2) for disseminating the SSNS project. This brochure will be delivered while academic meetings both domestic and International conferences.

RIA1 printed 200 copies and 5 posters (local language) and disseminate to the participants who attended the national aquaculture/fishery workshop, which organized at RIA1 in September 10-11, 2018. They also plan to print out about 500 copies (300 in English and 200 in Vietnamese) for 2019 and around 300 (150 in English and 150 in VN) copies of brochure in 2020.

Nong Lam University's Faculty of Fisheries (FoF) plans to print 500 copies of the designed brochure (English Version; picture provided) for disseminating the SSNS project. This brochure will be delivered while FoF meeting with its domestic and International partners at Nong Lam University.

2.5   Banner

A banner was designed, produced and distributed to each partner before the Kick-off meeting which will be used to show on the front during any activities so that it is visible while presenting to audience and also taking photographs. For example Fig. 3 shows an example used by a partner in Indonesia.

Fig. 3 Banner showing the logos of EU Erasmus+ and the project partners

2.6   Public notices

All project partners will use logos, banners, or the texts depending upon the situation while having project activities. Fig. 4 was prepared and displayed on the front of AIT Conference Centre a week before the Kick-off meeting was organized, where other public announcements of similar work shops and trainings are displayed.

Fig. 4 A Public notice at AIT for kick-off meeting.

2.7 Project webpage

The most common and important dissemination method practiced is creation of internet webpage dedicated to the project, which is up and running for this project at: https://www.seafood-security.org/ where all necessary activities, information and documents of public interest will be uploaded as soon as they are ready to do so. For example, brochure has already been produced in soft version (PDF) and made available online at (https://www.seafood-security.org/brochure)

2.8 Links to the project in the partners homepages

AIT's School of Environment, Resources and Development has a news about the project at which openly accessed by staff and students and also by outsiders:

http://serd.ait.ac.th/2019/01/07/aarm-continues-to-lead-curriculum-development-program-in-asia/

Maejo Univeristy (P2), Faculty of Fisheries Technology and Aquatic Resources (FTAR) has uploaded the information about International projects including SSNS and TUNASIA at: http://www.fishtech.mju.ac.th/WEB/main/index.php.

NTNU: SSNS project has been mentioned in the webpage at NTNU. The direct link is: https://www.ntnu.edu/ibt/research/food-safety/projects#Curriculum

Nong Lam University (NLU), Vietnam: *http://fof.hcmuaf.edu.vn/fof-32878-1/en/on-going-project-ssns-curriculum-development-for-sustainable-seafood-and-nutrition-security.html*

2.9 Social media

A social media group (Sustainable Seafood Net) dedicated to the project has been created in Facebook (https://web.facebook.com/groups/Sustainableseafood), which has 469 members, and will be added almost weekly. Every activity happening in partner or program countries will be posted and shared.

2.10 Conference presentations

The Project Team has made clear that the project should be promoted during internal or external meetings, seminars, workshops and conferences by all the partners. The Power point presentation slides should contain the logos of EU with Erasmus+ Programme and the also the SSNS logo. The templates are given in Annex 3.

Various partners have already done it or will do it over the period. More will be added, but the activities accomplished so far are given below:

Albalat A, Jakobsen AN, Lerfall J, Bhujel RC (2018) Development approach in the Erasmus+ project 'Curriculum Development for Sustainable Seafood and Nutrition Security, SSNS'. EURASTiP Capacity Building Foresight workshop, Montpillier, France 25.08.2018.

Polymeros K., Karapanagiotidis I.T, Boziaris I.S., Kessopoulou S., Bhujel R.C. 2018. Curriculum development in higher education for sustainable seafood and nutrition security. P. 643-644. In HydroMedit 2018. 3rd International Congress on Applied Ichthyology & Aquatic Environment. November 8-11, 2018, Volos, Greece. 843 pages (attended by 605 participants) http://hydromedit.gr/index.php/hydromedit-international-congress-is-expanding/ --- (Annex 4)

Bhujel, R.C. 2018 Curriculum Development for Sustainable Seafood and Nutrition Security (SSNS). Kasetsart University, November 21, 2018. Thailand organized by European Union, EACEA. (Audiences – 75 all EU project partners of Thailand)

Bhujel, R.C. 2018 Curriculum Development for Sustainable Seafood and Nutrition Security (SSNS). Asian Aquaculture Conference – Dec 4, 2018. AIT, Thailand (200 participants – aquaculture professionals from all over the world).

Moreover, each partner have/will have plans to present about the project during national or international conferences, meetings, workshops etc. Papers will be available through their websites or distributed hard copies to the participants. The followings are some examples:

RIA1, plans to present the project during National Aquaculture/Fishery Workshop to be held at RIA1 during September 10-11, 2019.

NTNU group is planning one or two abstracts from WP1 to an educational conference in Norway 6-7th of May 2019 (abstract deadline 14.12.2018).

University of Gadjah Mada - two Focus Group Discussions. The activities were already reported in the WP1 Report. We plan to present the project in the 3th International Seminar on Fisheries and Marine Science in the next 8-9 July in Yogyakarta.

Maejo University (P2): The Faculty of Fisheries Technology and Aquatic Resources co-partner with the Office of Agricultural Research and Extension, Maejo University organized the 11th National Fisheries Conference and 7th International Fisheries Conference at the Faculty of Fisheries Technology and Aquatic Resources (FTAR), Maejo University (MJU) during Dec 11 – 13, 2018. Faculty of Fisheries Technology and Aquatic Resources (FTAR) will be one of the academic partners to arrange the 6th International Conference on Fisheries and Aquaculture in Bangkok on August 22 – 23,

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2019 in Bangkok, Thailand (https://aquaconference.com/) to present about SSNS project.

Maejo University team plans to present results of the projects and research in some internal, national and/or international seminars, workshops, or even book chapters in 2019 (1-3 presentations). This is part of capacity building of academic staff, which is a part of dissemination plan.

Conference at Nong Lam University (NLU) - The Faculty of Fisheries (FoF), held a scientific conference at Nong Lam University campus in Ho Chi Minh City, on 12th January 2018, with participants from Nong Lam University, the Research Institute for Aquaculture No.2, the National University of Ho Chi Minh City, and the Department of Agricultural and Rural Development of Ho Chi Minh City. The aims of the conference were to present research works and results from students, staffs and other partners; and to develop research focus for 2017-2022. During this conference, the SSNS and TUNASIA projects had been informed to all participants, for them to look for collaboration opportunities.

Nong Lam University - Under the SSNS project, a seminar held at the Faculty of Fisheries, Nong Lam University-Ho Chi Minh City, on June 20 2018. The purpose of the seminar was to discuss the current MSc in Aquaculture program being offered by the Faculty of Fisheries, Nong Lam University- Ho Chi Minh City (FoF) and to propose strategies on how to re-structure and/or improve it to meet the needs of the employment market. This seminar was hosted by the FoF with participants from different sectors including: employers such as companies, research institutes, government offices; on-going MSc students at the FoF.

NLU team also plans to attend and present some results of the projects in some internal, national and/or international seminars, workshops, or even book chapters (maybe) in 2019 (1-3 presentations).

SSNS Conference: will be organized near the end of the project period i.e. October 2020, and a hard copy book of abstracts will be produced and distributed to all participants as well as soft copy to via email lists and social media group. We expect about 300 participants for the conference.

2.11 Dissemination strategy for the outcomes of Workpackages (WPs)

The Table 1 is a summary of outcomes and dissemination methods and target beneficiaries.

2.1.1   WP1 outcomes – Needs assessment reports

The project team has produced at least three reports from WP1.

1. Three reports on existing MSc curricula and gap/needs analysis in Asia i.e. Indonesia, Thailand and Vietnam

2. One report from European side covers information collection from internet search and various sources on existing curricula, and a survey on gap/needs analysis.

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3. Another report on existing vocational education training (VET) courses and highlights of the needs or gaps.

These reports will be published in either a booklet form or a magazine or journal articles depending upon the quality of outputs, which will be decided by the quality board or management board. Dissemination will be done by direct distribution to university teachers, libraries etc. or made online and estimated target beneficiaries are shown in Table 1.

2.1.2   WP2 outcomes: a list of courses & teachers guide

Under the WP2, the project team has a plan to produce a compiled document/brochure of course outlines of MSc curricula for each country / partner, a compiled list of VET Courses developed. These courses will be also available online through Project webpage or VLE (Virtual Learning Environment) system. At the same time, a general teachers guide (How to be an Effective University Professor?) will be produced in English by and translated versions into three local languages.

2.1.3   WP3 outcomes – Internship programs

During the activities for this Workpackage, teachers will be trained on-the-job at their respective universities and produce reports of the trainings. Project plans to develop an Internship program for each three Asian partner countries that includes host organizations for internship mostly private sector. These reports will be in the form of newsletter or magazine articles as soon as training occurred. These will be available online or circulated via group emails lists or online via social media and son on.

2.1.4   WP4 outcomes – news articles

The work package 4 is for accreditation of courses, delivery and evaluation/feedback. Each institution will have its own report on these which will be published in newsletters or magazines and also made available online via SSNS project webpage and social media groups.

2.1.5   WP5 outcomes – evaluation report

The main outcome of this Workpackage will be a project evaluation report to be produced by independent consultant covering the process and the impacts or sustainability. This outcome will be shared among the partners and submitted to EU.

2.1.6   WP6 outcomes – other materials

Khon Kaen University (P3) will distribute the SSNS advertising leaflets (300 copies in Thai language) during the Northeast Agricultural Fair during 25 Jan-2 Feb 2019

Project team also plans to write news or newsletter articles about the project, its activities and impacts and publish in university-wide or nation-wide newsletters/paper or media. They will be made available through SSNS project webpages and social media group.

Table 1 shows a summary of dissemination plan. It is still a tentative because it is difficult to predict the target number of beneficiaries. It will be updated as we go.

Table 1. Dissemination strategy and plan of SSNS Ref #585924

	Deliverables	Outputs	Dissemination method	Target beneficiaries	Target no. (approx.)
	WP1:				
D1.1	Existing curricula report- Asia	3 magazine articles	Email & direct post	Univ lecturers, libraries	90
D1.2	Existing curricula report- Europe	1 Journal article	Email & direct post	Univ lecturers, libraries	90
D1.3	VET coures report	1 report	Email & direct post	Univ lecturers, libraries	90
D1.4	WP1 Combined report	2 report	Email & direct post	Univ lecturers, libraries	90
	WP2:				
D2.2	Functional VLE System	VLE Guide	Email or through online	Univ lecturers, libraries	45
D2.3	MSc Course outlines	Compiled list of new courses	Email & direct post	Univ lecturers, libraries	45
D2.4	Teachers guide book	Hand book - local languages	Email & direct post	Univ lecturers, libraries	180
D2.5	Vet coures report	Compiled list new VET courses	Email & direct post	Univ lecturers, libraries	180
	WP3:				
D3.1	Training materials/modules	Compiled list	Email & direct post	Univ lecturers, libraries	90
D3.2	Teachers training by EU partners	Training report	Email & direct post	Univ lecturers, libraries	10
D3.3	Internship hosts	3 Reports - list of hosts	Email & direct post	Univ lecturers, libraries	90
	WP4:				
D4.1	Accreditation of curricula	9 Reports	Email & direct post	Univ lecturers, libraries	N/A
D4.2	Delivery of the curricula	9 Reports	Email & direct post	Univ lecturers, libraries	N/A
D4.3	Program evaluation/Feedback	9 Reports	Email & direct post	Univ lecturers, libraries	N/A
	WP5:				
D5.1	Quality Board & monitoring plan	1 report	Email & direct post		N/A
D5.2	External rvaluation	Impacts report	Email & direct post		N/A
	WP6				
D6.1	Dissemination materials	Brochure	Email & direct distribution	Visitors, participants etc.	2700
D6.2	SSNS Website/Social media	Website	Internet / email		5000
D6.3	SSNS Conference	A book of abstracts	Direct distribution	Participants, all stakeholder	300
	Other conferences	Paper about SSNS Project	Oral / post presentation	Participants	300
	News papers/letters	News articles	Soft/hard copies	Readers	300
D6.4	Sustainabilty	Plan - how to continue		No. of students/participant	N/A
	WP7				
D7.1	Technical coordination	Meeting minutes	Email, Skype or face to face		N/A
D7.2	Consortium agreements	12 MoA	Keep as internal docs		N/A
D7.3	Contingency plan		Keep as internal docs		N/A
D7.4	Commuinication plan		Keep as internal docs		N/A
	Total direct beneficiaries				**9600**

N/A – Not applicable

Part III: Exploitation, Impacts and Sustainability Plan

3.1 Needs assessment reports

Needs assessment reports will be very helpful for all the partner universities in Asia. Moreover they can be useful for other institutions including in Europe, and other continents while there is a need to develop new courses, which is a regular process. Usefulness and impacts will be regularly tracked wherever possible through various ways such as email, social media and so on.

3.2 MSc Curricula and Courses

The courses identified and developed during this project period will be offered by the Asian partners. Asian partners are very optimistic that the new courses or improvement in the existing courses will attract more students. At least 20 new or improved courses will be accredited and/or incorporated into the new curricula of SSNS program or existing related programs.

3.3 Internship hosts

The internship programs will developed creating a list of host organizations especially private sector. This creates a bond between universities and the industry. Internship will be offered to the students of SSNS at first., then they can be offered for the students of other associated programs. More importantly, these hosts can accommodate students from European universities. After the project period is ended, the internship program can still run from the bench fee charged to them. Agreements will be made between the host and universities so that clear roles of intern student, professor and supervisor at the host organization. Attempts will also be made to negotiate with the private companies/farms to provide accommodation, transport and/or food or any other incentives so that it will attract self-funded students.

3.4 Teachers guide

Teachers' guidebook to be produced will be useful for all the teachers of partners universities. In addition, attempts will be made to publish the guide book so that it can be sold at reasonable prices so that it can be continuously updated with new versions/editions with improvement along with the advancement in the new technologies and emerging new challenges.

3.5 VLE System

Initially, Virtual Learning Environment (VLE) system or Moodle system will be developed using a common domain for the project partners. All the participating lecturers will use the system for the courses they are going to develop and offer. The trial courses will create good environment for interaction between students and

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teachers, which will gradually expand to other courses, and in, turn in whole university. Then the universities, which have no VLE system/Moodle, will set up the system for all of their teachers.

3.6 Vocational Education Training courses

The courses developed during this project period will be added to the list of courses. These courses will be offered charging the fees to the participants or donors who supports them. Typical 1-wk program tuition fee may range from 10 Euro (e.g. Vietnam/Indonesia) to 1,000 Euro (e.g. AIT). Aqua-Centre of AIT has been organizing 5-20 training and study tour programs each year. Similarly, European and Asian partners have been encouraged to do the same.

3.7 SSNS Centre of Excellence

Nong Lam University plans to establish a Center of Excellence under the FoF supported by the SSNS and TUNASIA. Its functions would focus on offering training courses in aquaculture and related fields based on market demands, as well as providing services like environmental analyses, disease diagnosis and doing research. The opening ceremony of this Center is planned in the (First) Second Quarter 2019. Potential partners like relevant companies will be invited to attend the ceremony; different professional communicating sectors such as television, radio, and so on will be invited too. An informing message/advertising note will be posted on the Nong Lam website too.

Similarly, Jakarta Fisheries Universities (JFU) plans to establish a similar Centre at its own university campus, which will offer training courses to generate income and continue in the long run.

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Annexes

The contents of these annexes are annexed as examples of some of the dissemination efforts, which will serve as templates for our partners.

Annex 1 – News about the project.
Annex 2 – Brochure
Annex 3 – Power point presentation template
Annex 4 – Paper presented in HydroMedit (Greece)

Note: These are presented as an example. More will be included in the report as they are produced.

Annex 1 - News about the project

AARM continues to lead curriculum development program in Asia

Aquaculture and Aquatic Resources Management (AARM) program within the School of Environment, Resources and Development plays leading role in developing new curricula in the field of aquaculture and fisheries in Asia. A 3-year project entitled, "Curriculum development for Sustainable Seafood and Nutrition Security (SSNS)" has been developed and launched with a grant award 999,556.10 Euros from EU Erasmus+ Programme. The proposal was highly rated. The anonymous proposal evaluators mentioned that the project is rooted in and driven by the experiences of previous Asia-Link projects, activities are presented very well; they are coherent, logical in sequence, build from each other and clearly reflect the aims and objectives, the target groups are appropriately identified and for each a detailed presentation of impact follows, including a list of the deliverables that they will use or that will have most impact upon them.

More importantly, the proposal received a very positive feedback on "Relevance" from the consulted EU Delegation(s). They mentioned that the proposal has rightly identified the current issues and challenges that seafood industry is encountering globally, and proposes solutions through improvement in higher education which has direct impacts on development of skilled human resource, high quality research & development, efficient technology transfer, and practical planning and policy making.

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The project has a consortium of nine Asian partner institutions in Asia which include Khon Kaen University (Thailand), Maejo University (Thailand), University of Gadjah Mada (Indonesia), Bogor Agricultural University (Indonesia), Jakarta Fisheries University (Indonesia), Can Tho University (Vietnam), Nong Lam University, HCMC, (Vietnam) and Research Institute for Aquaculture No. 1, Hanoi (Vietnam), and four European partners; University of Stirling (UK), Norwegian University of Science and Technology, (Norway) University of Thessaly, Department of Ichthyology & Aquatic Environment (Greece), and EUROTraining (Greece).

The main objective of the project is to enhance the capacity of the Asian partner universities, their lecturers (36) and produce students (90) with new and need-based skills by developing innovative teaching-learning methods, and explore new paradigm shifts in seafood production systems and its value chain to ensure long-term sustainability of seafood and nutrition security. The team plans to develop at least 20 MSc courses and 27 vocational training courses to make available online, develop 40 internship programs establishing nine seafood security centers in Indonesia, Thailand and Vietnam.

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For more information, please write to: Bhujel@ait.asia or

Visit project website: www.seafood-security.org and

Join social media group: https://www.facebook.com/groups/Sustainableseafood/

Annex 2 - Brochure

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Curriculum Development:
Sustainable Seafood & Nutrition Security (SSNS)

Global consumption of seafood and the demand is rising dramatically due to increased population, health awareness and income. Supply has to be double by 2050.

Seafood has to be sufficient and safe. Production, processing and distribution practices have to be economically viable and socially acceptable.

Seafood comes from either fishing of wild stock or farming. Both of them are encountering sustainability issue which has global significance and cause of concern.

Asia Pacific region continues to be the world's largest producer and supplier of seafood. However, in most countries, capture fishery is declining. Aquaculture is booming but often get devastated due to diseases.

Aquaculture is growing fast but can't be without environmental damages. Some practices often face high risk of collapse. Therefore, growth needs to be optimized to ensure sustainability.

Europe is the largest importer of seafood. Safe seafood from sustainable sources is a big concern.

Sustainable Seafood and Nutrition Security) (SSNS) project co-funded by EU Erasmus+ Program is to address the challenges faced by the industry and ensure sustainability of seafood production, supply and consumption through building capacity of institutions & individuals.

Goal
To contribute to achieve sustainable seafood and nutrition security (SSNS)

Objectives
1. Capacity building of higher education institutions and the professionals
2. Establish Sustainable Seafood and Nutrition (SSNS) centres
3. Develop MSc and Vocational training courses
4. Develop and incorporate internship
5. Strengthen collaborations and linkages among institutions and individuals

Period: 36 month (Oct 2017-Sept 2020)
Budget: 999,556 Euros

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Project Approach

Project initiation: Inception meeting of stakeholders

Preparation: Identify existing courses to use, and assess the needs of new courses. Steps to be followed include:

Identify existing curricula and good practices → Identify academic and labor gaps and needs → Gather Data & Define Best Practices Needs → Prioritize Needs and innovative elements → Summarize Findings

Capacity-building and Curricula Development:

- Lecturers from Asia to visit to EU partner institutions, and from EU visit to Asia
- New or improved MSc curricula/courses will be developed incorporating internship and field visits linking with industries.
- New vocational training courses will be developed.
- Virtual eLearning environment (VLE) / Moodle system will be developed and used

Academic staff training and preparation for delivery: It includes a series of lesson plans, preparations and course delivery trainings and testing of new or improved courses.

Accreditation and delivery of the courses: Each partner university to accredit courses / programmes.

Quality plan – internal and external quality control processes/systems to be installed.

Dissemination and Exploitation: Outputs will be distributed to interested individuals and institutions. An SSNS international conference will be organized in October 2020.

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Project partners and contacts:

PN	Partners	Countries	Name	Emails
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2	Maejo University	Thailand	Chanagun	chanagun1@hotmail.com
3	Khon Kaen University	Thailand	Somsamorn	somsamorn@gmail.com
4	Bogor Agricultural University	Indonesia	Ruddy Suwandi	rsuwandi@apps.ipb.ac.id
5	Universitas Gadjah Mada	Indonesia	Alim Isnansetyo	isnansetyo@ugm.ac.id
6	University of Stirling	UK	Rachel Norman	rachel.norman@stir.ac.uk
7	NTNU	Norway	Jorgen Lertfal	Jorgen.lertfall@ntnu.no
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CURRICULUM DEVELOPMENT IN HIGHER EDUCATION FOR SUSTAINABLE SEAFOOD AND NUTRITION SECURITY

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Abstract
Considering that humanity has to inevitably explore new ways to feed the world's rapidly growing population, seafood seems to be one of the most promising sectors throughout the globe. Maintaining and further increasing the long-term production and supply of seafood, from both capture fisheries and aquaculture, is a significant and on-going challenge for local societies and global community. Seafood production has to be increased further in order to satisfy humanity's needs and has to be sufficient, safe and nutritious to meet immediate needs and preferences. It also has to be environmentally, socially and economically sustainable to provide for the long term. On this context, a project called "Curriculum Development for Sustainable Seafood and Nutrition Security (SSNS)" was proposed and approved under the Erasmus+ Programme "Higher Education – International Capacity Building" that aims to highlight the need of socially, environmentally, and economically sustainable seafood and nutrition security, through good education and building capacity in the fisheries and aquaculture sector.
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Today, the global community is challenged to meet the pressing food needs of a growing population by utilizing the finite natural resources sustainably and by conserving the natural environment. Seafood has always been considered as an important part of human diet and it has long been recognized as a health-promoting food for human nutrition. Seafood has a high protein content of high biological value, is a rich source of vitamins and minerals that are required in human nutrition and provides high amounts of omega-3 fatty acids that have beneficial effects on several human health disorders. Today, seafood represents a significant part of the daily diet for over three billion people worldwide (FAO 2016). The global per capita seafood consumption has reached about 20 Kg in 2015, having been doubled since 1960s due to the rise of human population mainly in developing countries, income increases and urbanization, improvements in processing, distribution, marketing and food technology as well as due to a shift towards a healthier diet amongst others. Seafood consumption is expected to continue rising due to an expected increased demand in all world regions.

The global seafood production from both capture fisheries and aquaculture production is around 170 million tons per year having been increased rapidly since 1950s' with an average annual rate of 3.2%. This seafood supply for human consumption, in fact, has outpaced human population growth (1.6%) for this period. Seafood production provides jobs for around 56 million people worldwide (FAO 2016) and support livelihoods for many people in low-income countries. The Asia-Pacific region continues to be by far the world's largest seafood producer of both capture and aquaculture origin. More than half of all seafood is internationally traded with net transfers from developing to developed countries. The EU is highly dependent on seafood imports to satisfy its domestic consumption, being by far the largest single market for seafood imports, valued at US$28 billion per year (FAO 2016). The global capture fisheries production has been relatively static since the late 1980s due to overfishing that causes reductions in most fish stocks with many of them being now collapsed. The implementation of an effective sustainable management of all fishing areas is needed urgently. On the other hand, aquaculture has an increasing role in the supply of seafood. The sector has been grown rapidly since 1980s and became the fastest growing agriculture sector, nowadays providing half of all fish for human consumption. However, the sustainability and further development of aquaculture is challenged by many concerns such as shortages of space and water, increased production costs, negative impacts on the aquatic ecosystem, disease outbreaks and seafood safety, shortages of fishmeals and fish oils for aquafeeds, lack of suitable technology and proper management practices and lack of favorable policies and investment amongst others. Specifically, the Asia-Pacific region, where most of the world farmed seafood is produced, has faced many fish and shrimp disease occurrences due to intensification of production in geographically restricted areas. These disease outbreaks has led to seafood industry collapses, world trade shocks and threatened the seafood security itself. Current EU policies for international trades between Asia and Europe concentrates on

issues of food safety and quality, while enhance the development of standards and labels that identify social and environmental parameters.

Seafood security is a complex and holistic issue of global significance. Maintaining and further increasing the long-term production and supply of seafood, from both capture fisheries and aquaculture, is a significant and on-going challenge for local societies and global community. Seafood production has to be increased further in order to satisfy humanity's needs and has to be sufficient, safe and nutritious to meet immediate needs and preferences. It also has to be environmentally, socially and economically sustainable to provide for the long term. Environmentally sustainable production is needed to maintain the productivity and diversity of the seafood resource and the ecosystems that support it and to ensure that the impacts of seafood production do not compromise other ecosystem services. Socially acceptable and economically sustainable production is needed to ensure the communities, industries and supply chains that generate seafood continue to function without compromising the welfare of organisms and the people involved. Thus, sustainable farming and fisheries principles and practices are crucial, and proper education and awareness are needed so as to have sustainable seafood production.

In Asia-Pacific, there are many programmes of higher education studies related to fisheries and aquaculture. However, there is a lack of appropriate Master's degree programmes focusing on sustainable seafood and nutrition security. On this context, a project called "Curriculum Development for Sustainable Seafood and Nutrition Security (SSNS)" was proposed and approved under the Erasmus+ Programme "Higher Education – International Capacity Building" with 13 participants from 6 countries, namely: Asian Institute of Technology (Thailand), University of Thessaly (Greece), Norwegian University for Science and Technology (Norway), University of Stirling (UK), Agricultural University of Bogor (Indonesia), Jakarta Fisheries University (Indonesia), University of Gadjah Mada (Indonesia), Can tho University (Vietnam), RIA1 (Vietnam), Nong Lam University (Vietnam), Maejo University (Thailand), Khon Kaen University (Thailand) and EUROTraining (Greece).

The wider and long-term objective of the SSNS project is to make a viable contribution towards achieving sustainable seafood nutrition security in the region of the Asian participant countries. More specifically, the SSNS project aims to have a long-term impact in securing the sufficient, safe, as well as environmentally, socially and economically sustainable production of seafood in three of the region's largest aquaculture and capture fisheries producing countries, namely Thailand, Vietnam and Indonesia. In addition, the project aims to improve the quality of host educational institutions (HEI) and enhance its relevance for labour market and society.

The specific objectives of the project are:

1. *To develop new specialized curricula and an innovative M.Sc. programme on sustainable seafood nutrition security, thus helping build the capacity of HEI of the partner countries, improve the level of competences and skills offered, and address the existing absence of a similar programme.*
2. *To promote cooperation, exchange of know-how and good practices in the subject area between EU and HEI of partner countries.*
3. *To establish viable synergies and links with the regional aquaculture and fisheries industry in order to address their needs in specialized personnel in the SSNS project, training needs and enhance the employability of postgraduates.*

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