

E.1. Why does the consortium wish to undertake this project?

Seafood security is a complex issue of global significance and understanding the role and contribution of seafood especially nutrition security is an emerging research area. Seafood products are provided by both aquaculture and capture fisheries and are the most nutritious and highly traded food products globally.

At the same time, global consumption of seafood and associated trade volumes have risen dramatically over the last decade due to rising population, growing affluence and changing eating habits. Today more than half of all seafood is internationally traded with net transfers from developing to developed countries. The EU is the largest single regional importer taking over 30% of all internationally traded seafood in 2008. The contribution of farmed seafood products to this market has grown steadily; currently around half of global seafood production is of farmed origin. The rate of growth and levels of intensification of some of these systems in geographically restricted areas is unprecedented, leading to serious sustainability concerns. Current EU policy supporting international trade between Asia and Europe concentrates on issues of food safety as measures of quality, whilst market-forces drive development of standards and labels that identify social and environmental parameters.

Maintaining the long-term production and supply of such food, from both fisheries and aquaculture, is a significant and on-going challenge for society. Production has to be sufficient, safe and nutritious to meet immediate needs and preferences, but 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 food resource and the ecosystems that support it and to ensure that the impacts of food 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 food continue to function without compromising the welfare of organisms and the people involved.

The Asia-Pacific region continues to be the world's largest producer of fish. The capture production of the Asia-Pacific region has exceeded 50 per cent of world production since 2006. In most countries, capture fishery is either declining or remaining constant, but demand is increasing due to which farming of fish has grown rapidly becoming the fastest growing food production sector. However, recently aquaculture has suffered a lot e.g. shrimp farming due to frequent occurring of various diseases and lack of proper management practices. It has threatened the whole industry and thereby food security. Thailand was world's #1 exporter of shrimp for over two decades, but the industry collapsed in mid- 1990s. It took about 5 years to revive but again collapsed after a decade, and still in coma. Diseases are occurring one after another. Vietnam produces nearly 1 million mt of *Pangasius* catfish and supplies white fillet (popularly known as basa, dory etc.) all over the world. Farmers use excessively high density, and intensive farming method, it may also face disease and other problems. Sustainable farming principles and practices are crucial, and proper education and awareness are needed so as to avoid such failures. Indonesia is now in a race to compete with Thailand and Vietnam for aquaculture. Aquaculture is growing rapidly as it has been highly emphasized recently. Fast growing industry has highest environmental damages, and also high risk of collapse. Therefore, growth is needed to be optimized to make it sustainable.

Despite the prominence of fisheries and marine related academic programmes in the region's HEIs in the last few years, there seems to be a lack of appropriate master's degree programmes especially focusing on Fisheries and Aquaculture for Food and Nutrition Security addressing the emerging problems of the real world, which the proposed project aims to fill.

The proposed MSc programme will be a holistic and integrated approach to quality education and lifelong learning on sustainable seafood nutrition security, covering aspects from production to processing and promotion of seafood. The SSNS MSc could introduce among others the global issues affecting seafood production and trading and will promote an understanding of the key factors affecting aquatic food production, post-harvest protocols, post-mortem metabolic events, chemical and especially microbial processes / that are key factors for food quality and safety. Quality assessment including sensory evaluation and shelf-life extension technologies will also be covered. The course could also cover key issues in seafood marketing such as the globally modern consumer concerns, trends wants and preferences, traceability

systems, certifications, as well as the impact of governance and legislation on the global seafood sector. One of the main aims of the courses will be to comprehensively follow the food chain from production through to consumer nutritional security health and welfare.

By developing these curricula and simultaneously building up cooperation with the regional aquaculture and fisheries industry this project aims to have a long-term impact in addressing the key issue of seafood nutrition security which is one of the EU's top development priorities (source: http://ec.europa.eu/europeaid/sectors/food-and-agriculture/food-and-nutrition-security_en). The project is also in line with the national priorities and development strategies of Vietnam, Indonesia and Thailand as defined in cooperation with FAO. More specifically, all three countries have as their FAO priorities: food security, safety, quality and nutrition as well sustainable management of fisheries (in the case of ID) (source: <http://www.fao.org/countryprofiles/index/en/?iso3=IDN=THA=VNM>).

Project Proposal Preparation

The project capitalises on previous experiences from other projects most notably from two Asia-Link projects which were also headed by AIT:

- 1) Improving Master's Degree level education in Aquaculture and Aquatic Resources Management in Cambodia, Nepal and Vietnam.
- 2) Linking the post-graduate education in aquaculture and aquatic resources management with its industries through internship program.

Brief descriptions of the two projects are provided below.

SSNS aims to take the outcomes of these projects a further step, by developing more specialized curricula on seafood security – a critical issue for all the participant partner countries – creating additional synergies with the aquaculture and fisheries industry and expanding its reach to relevant HEIs of one of the biggest fish producers of the region: Indonesia. Some of the partners on these projects like AIT and Stirling University, have worked together before with great results, and have greatly evolved their academic base and activities since then, two facts that will be very beneficial for the proposed project.

E.2. Rationale for the setting-up of the consortium

AIT – the Lead Applicant of the proposed project has rich experience of designing, coordinating and managing two relevant projects as mentioned above under the Asia Link programme. AIT aquaculture Faculty has over 30 years of experience in designing and running academic degree programs, training and outreach programs in Indo-China and in other countries in Asia and Africa. Over 500 university lecturers, government officials and private sector executives in the field of aquaculture have graduated from AIT. It is also centrally located among Asian partners.

The Institute of Aquaculture (IoA) at the University of Stirling is the leading international centre in its field, and the largest of its kind in the world. The IoA has been closely associated with the global expansion of aquaculture initially through developing and improving the existing production systems and the development of new farmed species. The IoA brings together over 350 highly skilled staff and students to meet the wide range of challenges faced as aquaculture grows to meet global demands.

NTNU is the largest HEI in Norway and the leading technology related institution. It currently operates a master program in Aquatic Food Production - Safety and Quality (AQFood). AQFood is a unique education for the aquatic food sector linking advanced aquatic food production, processing and distribution with issues of importance for tomorrow's consumers, industry and society.

The Department of Ichthyology and Aquatic Environment (DIAE) of UTH has shown competence in research with many national and international research projects already completed amount to more than 3.0 M €. The DIAE Laboratory has experience in both teaching and research in the areas of aquaculture technology, fish nutrition, processing, quality assurance and marketing of seafood.

EUROTraining is a leading Greek VET organisation that is active in the areas of agriculture and aquaculture. In addition, it has rich experience in developing innovative e-learning platforms for educational purposes for EU projects. Its know-how will be tapped in to support the development of the SSNS VET courses and the SSNS VLE.

The three partners in Vietnam have been selected to cover three different regions located in major commercial centres i.e. Hanoi, Ho Chi Minh and Can Tho. In addition to the BSc and MSc programmes it operated since 1994, RIA 1 has conducted more than 100 national and international research projects, combining basic and applied researches in order to have quick approach to production.

The two other HEIs in TH, Khon Kaen University and Maejo University have been selected because they are located in relatively poorer regions of Thailand; therefore, they have scope to play a greater role towards achieving food and nutrition security of the people in their respective regions. In addition, SSNS will help them operate a niche MSc programme thus upgrading their Fisheries faculties.

IPB has a postgraduate program in aquatic product technology and aquaculture since 2000s. The postgraduate program alumnus distributed in government sectors, universities or fishery industries. Therefore, IPB is capable and ready to implement the MSc program for sustainable seafood and nutrition security. In addition, the centre of excellence (Sustainable seafood centre) is urgently required to be initiated. JFU is a center of excellence for applied science in marine and fisheries. It aims to provide education with knowledge, skills and practice based on stakeholder needs, develop vocational training on marine and fisheries affairs to improve social welfare, and strengthen its collaboration with other institutions on education. In the field of fisheries and aquaculture, UGM has contributed in the development of aquaculture technology, food development and processing based on the utilization of aquatic resources, and aquatic resources management for sustainable fisheries.

E.3. European added value

This project gives the chance to three top European HEIs, in their subject area, to support their Asian peers in VN, ID and TH built their capacity, by developing specialised curricula on seafood security and nutrition. As already argued, this is an area, both in academic terms as well as in terms of regulations and policy, where there is a lot of room for innovation and improvement in ID, VN and TH. European added value stems from the fact that the EU is the top importer of seafood from the three countries and has a stake in improving the security and safety of the imported seafood in the long term, which is one of SSNS key objectives. Thus, European HEIs have to cooperate closely among them and together with their Asian counterparts towards achieving this long-term target, by building lasting cooperation research structures.

In addition, SSNS will allow European partners to have better exposure to Asian seafood industry, interaction with Asian experts while developing MSc courses, training courses and internship placements. Better understanding of seafood industry value chain would help shape their curricula and also help make appropriate policies in their respective countries as well as for EU.