

## **Annex 5: Conference Abstracts / Papers**

## LINKING AQUACULTURE/FISHERIES EDUCATION WITH ITS INDUSTRIES THROUGH INTERNSHIP PROGRAM

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Realizing the weak link between the University education and industry in the field of aquaculture and fisheries a project called "Aqua Internship" has been recently launched targeting post-graduate students with a view to providing more practical knowledge and problem solving skills. The three-year project, funded by EU under Asia Link program, aims to establish a system to support students of European and Asian institutions to work with Aquaculture/Fisheries industries in Asia. Two European, namely, University of Stirling, UK and University of Aveiro, Portugal and four Asian institutions, namely, Institute of Agriculture and Animal Science (Chitwan, Nepal), Royal University of Agriculture (Phnom Penh, Cambodia), Research Institute for Aquaculture No. 1 (Hanoi, Vietnam) and University of Agriculture and Forestry (HCM City, Vietnam) are working together coordinated by the Asian Institute of Technology (AIT) based near Bangkok, Thailand.

Under this program, Asian partner institutions in their respective countries/locations will work jointly with local host organizations i.e. private commercial farms, non-government organizations, and research and extension offices of the government. Upon completion of 1- year course work, their post-graduate students in their respective countries/locations will work for at least six months to assist their host organizations. The selected students and the Local coordinator in consultation with the students' advisors will choose host organizations and make necessary arrangements. During the internship program, students will identify problems of the real world while working with them, devise research plans for their thesis work and carry out thesis research to recommend the practical solutions.

Over the period of three years, at least 36 Asian students (3 students per institution/year) will be supported to work with the industry under this internship program. At least 20 instructors of the Asian partner institutions (5 per partner) and four European instructors will also be involved in the program. Four Asian instructors (1 per partner) will enroll for doctoral program and will be doing internship as a part of their dissertation. Other instructors will guide interns and monitor their work by visiting host organizations under internship program. At the same time, at least eight European students will be recruited by the European partners to work with Asian partner institutions and/or their host organizations which could be a part of their thesis work or credits for community work depending upon their University systems and requirements. The interns will give two public seminars. Instructors from AIT and European partners will serve as resource persons; attend seminars, and serve as committee for the evaluation of thesis or internship work.

The uniqueness of this 36-month project is that partners are committed to run the internship programs in the long-run on the basis of cost sharing among the parties involved such as students, institutions and host organizations. It should serve as a model for other institutions.

### Citation:

**Bhujel, R.C.** 2008. Linking Aquaculture/Fisheries Education with its Industries through Aqua-Internship Program, p. 67. Book of Abstracts, Annual Conference, World Aquaculture Society (WAS), Busan, Korea, May 19-23, 2008.

## IMPROVING AQUACULTURE AND FISHERIES EDUCATION IN THE MEKONG REGION

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Fish has been a key dietary staple for over a billion people contributing up to 75% of the animal protein intake. There is a need for balanced approach for sustainable management of fisheries and the promotion of aquaculture. There is always lack of skilled human resource for such increasingly important disciplines especially in developing countries such as ones in the Mekong region. Higher education plays a crucial role. There are several institutions in the Mekong region which offer under- and post-graduate degrees in aquaculture/fisheries; however, their curricula are either very traditional or very new and immature. In most of the cases, their graduates do not possess required knowledge, skills and experiences. Their graduates have difficulties in finding suitable jobs, they find jobs but in other areas and/or face problems while at work. Therefore, there is a need to make curricula and teaching/learning process more real field oriented and need-based.

Realizing this, AIT initiated a curriculum development program (Sep 2005 – Aug 2008) funded by EU under Asia-Link program with the purpose of improving post-graduate education. The AIT played a leading role in the development of common curricula and the course contents. Two EU partners (University of Stirling, UK and Universidade de Aveiro, Portugal) provided resource persons to ensure the quality of the course contents. The Asian partner (IAAS-Nepal, RUA-Cambodia, RIA-1-Hanoi and UAF-HCM City) course instructors were actively involved in the development of course materials and case studies specific to each institution/country. The main activity of the project was an extensive and participatory curriculum development exercise during which six core courses (theme groups) were revised/improved involving 20 instructors from Asian partner institutions.

More recently AIT started “Aqua-Internship” program using the same network of partners. This program will create linkages between the University education and industry in the field of aquaculture and fisheries and equip post-graduate students with practical experience and problem solving skills. Asian partner institutions will work closely with local host organizations e.g. private hatcheries/farms, NGOs, and research and extension offices of the government in their respective countries/locations. Upon completion of course work, students from respective institutions will be placed with those host organizations to work for up to six months. The selected students and the Local coordinators in consultation with the students’ advisors select the host organization, make necessary logistics. During this period, students are expected to identify researchable problems of their host organizations. While working closely with them, students should be able to develop research plans for their thesis and carry out field-based research to address real problems and recommend practical solutions. This program provides support to at least 36 Asian students (at least 3 students per institution/year). Four Asian instructors will enroll into a doctoral program. They will simultaneously carry out internship as part of their dissertation. At least eight European students will also be selected by the European partners to work with Asian partner institutions and/or their host organizations which could be a part of their thesis work or credits for community work depending upon their University systems and requirements. The interns will need to give public seminars of their work at the Asian partner institution, AIT and their own institution. They will also need to publish their work in magazines or newsletters. The uniqueness of this project is that partners are committed to run the internship programs in the long-run on the basis of cost sharing basis among the parties involved such as students, institutions and host organizations. It also offers other institutions and private organizations to join e.g. Ghent University has sent a student in RIA-1, Vietnam.

**Bhujel R.C. and Amrit N. Bart. 2008. Improving aquaculture and fisheries education in the Mekong region. International Symposium in Sustainable Fish Biodiversity, Fisheries and Aquaculture in the Mekong Basin. Sept 3-5, 2008. Ubonrachathani, Thailand.**

Abstract...

**Bhujel**, R.C. 2009. How can we sustain the partnerships; with or without external funding? Workshop under Europe and Asia Higher Education Program (EAHEP) organized by European University Association (UEA). Jakarta Jun 8-9, 2009.

## AQUA-INTERNSHIP: HELPING AQUACULTURE-FISHERIES GRADUATES IN FINDING JOBS

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Higher education plays important role in the development of aquaculture industry which is relatively new but growing very fast showing a potential to compensate declining capture fishery. There is always lack of skilled enough workforce for such an emerging industry. However, many of the aquaculture/fisheries curricula are either very old and traditional, or very new and immature. In most of the cases, they are incapable producing skillful graduates required by the industry. As a result, many graduates are either unemployed or they find jobs in other areas. Therefore, there is a need to bridge a gap between university education and the industry need. Realizing this, AARM-AIT has started “Aqua-Internship” program. This program aims to establish a network to support post-graduate students of European and Asian institutions to place in Aquaculture/Fisheries industries in Asia after completion of their course work. The project is funded by EU under Asia Link program and coordinated by the Asian Institute of Technology (AIT) based near Bangkok, Thailand. Under this program, AIT AARM works with two European Universities (University of Stirling, UK and University of Aveiro, Portugal) and four Asian institutions (Institute of Agriculture and Animal Sciences (Nepal), Royal University of Agriculture -Cambodia, Research Institute for Aquaculture 1 -Hanoi, Vietnam and University of Agriculture and Forestry -HCM City, Vietnam). This program attempts to create linkages between the University education and industry in the field of aquaculture and fisheries. More specifically, the project is called “Aqua-Internship” and aims to equip post-graduate students with practical experience and problem solving skills.

Asian partner institutions will work closely with local host organizations e.g. private hatcheries/farms, NGOs, and research and extension offices of the government in their respective countries/locations. After completion of course work, students from respective institutions will be placed with those host organizations to work for at least six months. The selected students and the Local coordinator in consultation with the students’ advisors select the host organization, make necessary logistical arrangements and provide mentoring. During this period, students are expected to identify researchable problems of their host organizations. While working closely with them, students should be able to develop research plans for their thesis and carry out field-based research to address real problems and recommend practical solutions.

This program provides support to at least 36 Asian students (at least 3 students per institution/year) to work with the industry under this internship program. Four Asian instructors (1 per partner) will enroll into a doctoral program. They will simultaneously carry out internship as part of their dissertation. Other instructors will guide interns and monitor their work by visiting host organizations for monitoring. At least eight European students will be recruited by the European partners to work with Asian partner institutions and/or their host organizations which could be a part of their thesis work or credits for community work depending upon their University systems and requirements. The interns will need to give public seminars of their work at the Asian partner institution, AIT and their own institution. They will also need to publish their work in magazines or newsletters.

The uniqueness of this project is that partners are committed to run the internship programs in the long-run on the basis of cost sharing basis among the parties involved such as students, institutions and host organizations. It also offers other institutions and private organizations to be a part of it.

**Bhujel, R. and A. Bart. 2008. Aqua-internship: helping aquaculture-fisheries graduates in finding jobs. Supplementary Session on Education and Research Activities, International Institute of Fisheries Economics and Trade (IIFET), Nha Trang, Vietnam, July 23, 2008.**

## AQUA-INTERNSHIP: A MEANS OF PROVIDING STUDENTS WITH PRACTICAL EXPERIENCE

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Post-graduate education plays a crucial role in the development of aquaculture which is relatively new but growing very fast showing a potential to compensate declining capture fishery. There is always lack of skilled workforce for such an emerging industry. However, most of the aquaculture/fisheries curricula are either traditional or immature. In most of the cases, they are not successful in producing skillful graduates demanded by the industry. As a result, many graduates find jobs in other areas. Therefore, there is a need to bridge a gap between university education and the industry need. Realizing this, AARM-AIT has started "Aqua-Internship" program which aims to establish a network to support post-graduate students of European and Asian institutions to place in Aquaculture/Fisheries industries in Asia after completion of their course work. The main objective is to equip post-graduate students with practical experience and problem solving skills. The project is funded by EU under Asia Link program and coordinated by the Asian Institute of Technology (AIT) based near Bangkok, Thailand. Under this program, AIT AARM works with two European Universities (University of Stirling, UK and University of Aveiro, Portugal) and four Asian institutions (Institute of Agriculture and Animal Sciences (Nepal), Royal University of Agriculture -Cambodia, Research Institute for Aquaculture 1 -Hanoi, Vietnam and University of Agriculture and Forestry -HCM City, Vietnam).

The project partners of Asia work closely with local host organizations e.g. private hatcheries/farms, NGOs, and research and extension offices of the government in their respective countries/locations. After completion of course work, students from respective institutions are placed in those host organizations to work for 3-6 months. The selected students and Local Coordinators in consultation with the students' advisors select the host organizations, make necessary logistical arrangements and provide mentoring. During this period, students are expected to identify researchable issues of their host organizations. While working closely with them, students should be able to develop research plans for their thesis and carry out field-based research to address real problems and recommend practical solutions.

This program provides support to at least 36 Asian students (3-5 students per institution/year) to work with the industry under this internship program. Four Asian instructors (1 per partner) have enrolled into a doctoral program. They will simultaneously carry out internship as part of their dissertation. Other instructors guide interns and monitor their work by visiting host organizations for monitoring. At least eight European students will be recruited by the European partners to work with Asian partner institutions and/or their host organizations which could be a part of their thesis work or credits for community work depending upon their University systems and requirements. Two have already completed so far and two are arriving in October 2008. The interns give public seminars of their work at the Asian partner institution, AIT and their own institution. They will also publish their work in magazines or newsletters as outputs.

The uniqueness of this project is that partners are committed to run the internship programs in the long-run on the basis of cost sharing basis among the parties involved such as students (e.g. food), institutions (airfare) and host organizations (e.g. accommodation). It also offers other institutions and private organizations to be a part of it.

**Bhujel, R. and A. Bart. 2008. Aqua-internship: a means of providing students with practical experience. Supplementary Session on Education and Research Activities, International Institute of Fisheries Economics and Trade (IIFET), Nha Trang, Vietnam, July 23, 2008.**

## AQUA-INTERNSHIP IN ASIA: OPPORTUNITIES FOR STUDENTS

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Post-graduate education plays a crucial role in the development of aquaculture which is relatively new but growing very fast showing a potential to compensate declining capture fishery. There is always lack of skilled workforce for such an emerging industry. However, most of the aquaculture/fisheries curricula are either traditional or immature. In most of the cases, they are not successful in producing skillful graduates as demanded by the industry. As a result, many graduates find jobs in other areas. Therefore, there is a need to bridge a gap between university education and the industry need. Realizing this, AARM-AIT has started "Aqua-Internship" program which aims to establish a network to support post-graduate students of European and Asian institutions to place in Aquaculture/Fisheries industries in Asia after completion of their course work. The main objective is to equip post-graduate students with practical experience and problem solving skills.

Partners in Asia work closely with local host organizations e.g. private hatcheries/farms, NGOs, and research and extension offices of the government in their respective countries/locations. After completion of course work, students from respective institutions are placed in those host organizations to work for 3-6 months. The selected students and Local Coordinators in consultation with the students' advisors select the host organizations, make necessary logistical arrangements and provide mentoring. During this period, students identify researchable issues while working for their host organizations. They should also be able to develop research plans for their thesis and carry out field-based research to address real problems and recommend practical solutions. Under the present project at least 36 Asian intern students (3-5 students per institution/year) will be supported to work with the industry. Two European students have already completed and other two are doing their work at AIT. The interns give public seminars of their work at their Asian partner institutions, AIT and their own institutions. They will also publish their work in magazines or newsletters as outputs.

The uniqueness of this project is that partners are committed to run the internship programs in the long-run on the basis of cost sharing basis among the parties involved such as students (e.g. food), institutions (airfare) and host organizations (e.g. accommodation). Present partners are University of Stirling, UK; University of Aveiro, Portugal; Institute of Agriculture and Animal Sciences, Nepal; Royal University of Agriculture, Cambodia; Research Institute for Aquaculture 1, Hanoi, Vietnam; and University of Agriculture and Forestry, HCM City, Vietnam. It also offers other institutions and private organizations to join to recruit students or serve as hosts.

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## **IMPROVING AQUACULTURE AND FISHERIES EDUCATION THROUGH CURRICULUM DEVELOPMENT AND AQUA-INTERNSHIP**

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Shortage of skilled human resource has hampered management of fisheries and the promotion of sustainable aquaculture, especially in developing countries. Higher education plays a crucial role in meeting such human resource needs. However, most post-graduate curricula in aquaculture/fisheries offered are either traditional or very new and immature. Most of their graduates possess limited knowledge and practical skills. This makes landing suitable jobs difficult. Those who do find jobs, face problems while at work. There is a need to make curricula and teaching/learning more applied to real field and industry conditions. Realizing it, we initiated a curriculum development program since September 2005 funded by EC under Asia-Link program with the purpose of improving post-graduate curricula. AIT played coordinating role while two EU partners (University of Stirling, UK and Universidade de Aveiro, Portugal) along with AIT instructors, provided expertise to make sure the quality of the curricula were high. Twenty instructors from four Asian partners (IAAS-Nepal, RUA-Cambodia, RIA-1-Hanoi and UAF-HCM City) were actively involved in developing curricula and case studies specific to their own institutions. Syllabi of six core courses, (Aquaculture Systems, Fish Nutrition, Fish Reproduction/Breeding, Fisheries Management, Water Quality Management, and Fish Health Management) were improved which are now being used by the instructors. Review of this program has been positive. Students and alumni found new curricula to be better than the older ones because they are well-organized, up to date and practical.

While testing the new curricula, we quickly realized that students still lack application skills. Building from this we designed and launched an 'Aqua-Internship Program' funded again by EC under Asia Link program working with the same partners. Under this program, Asian partner institutions explore and select potential host organizations e.g., community groups, private farms, NGOs, and research and extension offices of the government in their respective countries/locations. Upon completion of course work, selected students from respective institutions are placed in those host organizations for 2-6 months. The selected students and the Country Coordinators in consultation with the students' advisors select host organizations and make the necessary arrangements. Students serve as their staff on a day-to-day basis during the internship period. At the same time, they identify researchable problems, develop research plans for their thesis and carry-out field-based research to address real problems and recommend practical solutions. The program has arranged internships for 30 post-graduate students of Asian partners and five of European partners. The European students work either independently or together with Asian students. The internship is often a part of student thesis or credits for community work depending upon their University systems and requirements. All interns are required to give public seminars of their work at the Asian partner institutions, AIT and/or their own institutions. They are also encouraged to publish their work in local magazines or newsletters. The uniqueness of this project is that partners are committed to continue the internship programs in the long-run even after the project ends on the basis of cost sharing among the parties involved. For example, students would bare cost of food, host organizations offer accommodation for interns and either Universities or students shoulder the transportation cost. Efforts are underway to expand the network for internship.

Innovative and practical solutions to education of aquaculture such as this is needed to not only improve teaching at a modern graduate institution, but also to ensure that the graduates are employable after completion of their degree. The model developed through EU supported Asia-link could be replicated in more locations and in other agricultural sectors.

**Bhujel, R.C. and Bart, AN.** 2009. Improving aquaculture and fisheries education through curriculum development and aqua-internship. International Symposium on Aquaculture and Fisheries Education (ISAFE), Asian Fisheries Society, AIT and Shanghai Ocean University, November 27-29, 2009.

## AQUA-INTERNSHIP: A PRE-JOB TRAINING AS A PART OF ACADEMIC DEGREE

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Most aquaculture/fisheries curricula are traditional; teaching-learning is mainly classroom based. Post-graduate students of most universities have little exposure to the real field situation. As a result, thesis/dissertation research is hardly designed towards solving problems encountered by the industry. Producing skillful and entrepreneurial graduates as demanded by the industry has been a real challenge. This has led many private and public organizations in hiring non-aquaculture graduates to manage or promote aquaculture/fisheries development projects. This has hampered the pace of aquaculture development. Therefore, there is a need to reform university education from traditional classroom teaching to action or need based learning. Realizing this, AARM-AIT has launched “Aqua-Internship” program funded by EC and has established a network that supports post-graduate students of European and Asian institutions and provides opportunities of exposure to Aquaculture/Fisheries industries as a part of their degree programs.

Under the program, Asian partner institutions search, select and make arrangements with the potential local host organizations e.g. private hatcheries/farms, NGOs, and research and extension offices of the government in their respective countries/locations. After completion of course work, students are placed in those host organizations to work for 2-6 months.. The students identify researchable problems while working for their host organizations. They should also be able to develop research plans for their thesis and carry out field-based research to address real problems and recommend practical solutions. Under the provision of the present project about 20 Asian intern students (about 5 students per institution/year) have already been facilitated to work with the industry. In addition, five European students have completed their internship in Asia. The interns give public seminars of their work at their respective institutions and/or AIT. They will also publish their work in magazines or newsletters as outputs.

This project is very unique as the partners are committed to run the internship programs in the long-run on cost sharing basis among the parties involved such as students pay for food), institutions cover airfare/transportation and host organizations provide on-campus accommodation. Realizing the value, most of the partners including AARM-AIT have developed internship as a course with 2-3 credits. Although, University of Stirling, UK; University of Aveiro, Portugal; Institute of Agriculture and Animal Sciences, Nepal; Royal University of Agriculture, Cambodia; Research Institute for Aquaculture 1, Hanoi, Vietnam; and University of Agriculture and Forestry, HCM City, Vietnam are the present partners, few others e.g. Ghent University (Belgium) have joined the network. We also expect more academic institutions will join the network to send their students and also other public and private organizations will show their interest to serve as hosts for interns who can be of help without any cost.

**Bhujel, R. C.** 2009. Aqua-internship: a pre-job training as a part of academic degree. WAS Conference, Kuala Lumpur, Nov 4-6, 2009.

## ASIA-LINK INTERNSHIP: AN EFFORT TO ENHANCE AQUACULTURE AND FISHERIES EDUCATION

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University education is primarily classroom- or laboratory research-based with limited exposure to the real field situation. Research with relevant to the industry is a real challenge. Despite having adequate theoretical knowledge, our data show that very few graduates turn to be entrepreneurs mainly due to lack of practical skills. Realizing the need to augment the post-graduate education with practical skills and need-based learning, AARM-AIT together with its Asian and European partners launched “Aqua-Internship” program in 2007. The initial European partners were University of Stirling, UK and the University of Aveiro, Portugal. The Asian partners are Institute of Agriculture and Animal Sciences, Nepal; Bangladesh Agriculture University, Bangladesh; Research Institute for Aquaculture 1, Hanoi, Vietnam; and University of Agriculture and Forestry, HCM City, Vietnam. Based on the agreement, Asian partners arrange host organizations which include private hatcheries/farms, NGOs, and research and extension offices in their respective countries/locations. Students are placed in those host organizations to work for 2-6 months after completion of course work. While working for their host organizations and understanding the problems encountered by the industry, the students identify research topics. Most of them develop proposals and carry out field-based research directly addressing the real problems.

During the three year project period, over 70 Asian and European students have already completed internship with the partial supports by the project funded by EU. Internship was made open to any interested students. So far, 12 self-paying students joined without the project support covering all the costs by themselves. As a requirement, all the interns present their work at their respective institutions and/or at AIT to share updated knowledge from the real fields. Some of them also publish their work in magazines or newsletters as outputs. Realizing its importance, internship has been incorporated formally as 2-credit course into the curricula of Asian partners. More importantly, the internship program has established its name worldwide and is going to be continued in the long-run. Efforts are underway to link more universities / institutions as a part of the network for mutual benefits to all the parties involved. Many students from European countries, US and others have shown their interest in joining the programs in Asia. This indicates that there is a potential for the internship project to become a self-sustaining program. Various efforts have been made to disseminate the project outcome. A list of placements has been made available on-line at the project webpage: <http://www.aarm-asialink.info/Placements.html>. Prospective interns can choose the country and the placement. More and various types of internship placements will be added continuously.

*Keywords:* Aquaculture Education, Aqua Internship, Asia Link

**Bhujel, R. C.** 2011. Asia-Link internship: an effort to enhance aquaculture and fisheries education. April 22-23, 2011. Shanghai, PR China.

# Improving Fisheries/Aquaculture Curricula and Enhancing Employability of Graduates: AIT Experience

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## Abstract

*This paper describes the approaches and outputs of a program launched by the Asian Institute of Technology (AIT) which aimed at improving higher education in Aquaculture and Aquatic Resources Management in South and South East Asia. The program started in 2005 with the financial assistance from the European Commission under the Asia Link program. The process involved development of standard curricula, and development and incorporation of an internship program into the new curricula with a view to provide hands-on experience to the students. A total of 20 courses were improved and standardized involving over 20 Asian partner institutions and more than 10 resource persons. An internship program was established in Aquaculture and Fisheries discipline which provided more than 89 students with an opportunity of gaining exposure to the real field and developing hands-on skills within the project period of three years. The internship has continued to benefit many more even after the end of the project support because it has benefitted students, instructors and institutions as well as host organizations. In conclusion, it is clear that improving curricula to make more relevant to the local contexts and incorporation of internship program made the aquaculture and fisheries education robust. As a result, more students are attracted into aquaculture and fisheries programs. The most important point is that the robust education helped produce high caliber graduates with increased employability. It is hoped that these graduates will have tremendous positive impacts on the overall growth of aquaculture and sustainable management of aquatic resources in their respective areas/locations. This approach should serve as a model for other institutions and / or countries so that the shortage of highly qualified human resource for the industry can be solved through joint efforts.*

Bhujel. R.C. 2011. Improving Fisheries/Aquaculture Curricula and Enhancing Employability of Graduates: AIT Experience, *In Revitalizing Indian Fisheries and Aquaculture*. May 8-10, 2011.

# Aqua-Internship: A Model for Financially Sustainable Academic Collaboration

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**Bhujel, R.C.** 2010. Links that matter: Recurring themes in EU-Asian Higher Education Cooperation, Part III: Sustainability of EU-Asian academic collaboration: 8. Financial sustainability - Aqua-Internship: A Model for Financially Sustainable Academic Collaboration. NUFFIC, DAAD, UEA, EU.

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## Abstract

*Aqua-Internship is a program initiated by the Asian Institute of Technology (AIT) involving two European and four Asian partners. Under this program, post-graduate students are placed for 2-6 months in local host organizations in Asia such as fish farms, government institutions, community organizations and private companies. The students served as employees or interns to learn and gain practical experience. Upon completion, they share their knowledge and experience by giving seminars at their Universities. This program has been popular attracting more students even from institutions other than the collaborating partners. Therefore, the partners of the collaboration have incorporated the internship as a part of curricula and committed to continue to work together.*

## 1. Background

This article is based on an EC funded program called “Aqua-Internship” (AIT, 2009a; 2009b) under Asia Link programme for which Asian Institute of Technology (AIT) established collaborations with two European universities, namely; University of Stirling (UoS), UK and University of Aveiro (UoA), Portugal, and four Asian academic institutions, namely; Institute of Agriculture and Animal Sciences (IAAS), Nepal; Royal University of Agriculture (RUA), Cambodia; University of Agriculture and Forestry (UAF), Ho Chi Minh City, Vietnam and Research Institute for Aquaculture No. 1 (RIA1), Hanoi, Vietnam. The program was launched in September 2007 realizing the gap between the theoretical knowledge that students receive from university education and practical skills required by the industries in the real field situation.

Under this program, post-graduate students spend 2-6 months to assist host organizations after completion of course work. Students and the Local coordinators choose suitable host organizations and make necessary arrangements. During the internship program, students identify the problems of the real world while working with them, devise research plans for their thesis, and continue further to find and recommend the practical solutions. The main approach of this collaboration is to establish a mechanism to support students of European and Asian institutions to work closely with Aquaculture/Fisheries industries in Asia. As fish stock in the natural water bodies is declining, more research on the wise use and proper management of aquatic resources, often known as “Fisheries” is needed. At the same time, promotion of farming fish or aquatic animals, also known as “Aquaculture”, has been emphasized as a means to compensate the wild-catch decline.

## **2. Objectives**

The main objective of the collaboration is to provide students with hands-on skills to the post-graduate students in the field of aquaculture and aquatic resources management encouraging them to work closely with its industries through internship program. The broader goal of the collaboration is to help reduce poverty or improve livelihoods of the people in Asia through aquaculture and aquatic resources management. In addition, culture of some fish species has emerged as a business. Asia has huge resources and capacity to grow. European partners are therefore keen to collaborate as they see an opportunity of producing more seafood in Asia at cheap price and supplying to Europe.

Present collaboration is also to boost the profiles of Asian institutions. European universities are collaborating with the developing countries for marketing or visibility purposes as a large number of their students come from abroad. In fact, present collaboration was initiated by the leading institution from the feeling of responsibility of improving institutions of its command area. As a regional leader in post-graduate education, AIT, for example, has its mission of capacity building of institutions in the region. Aqua-Internship is a result of this feeling. Another purpose of developing collaboration is to maintain its leading status and visibility in the region.

The immediate objective of the collaboration was to improve post-graduate education of the Asian partner institutions thereby attract more and smarter students. In principle, there is possibility of developing a new collaboration among institutions with common purpose but a functional or real collaboration is possible only when individuals of the different institutions are closely associated with their background and previous working relationships. Many Universities in Europe tend to collaborate with the universities in Asia because of the efforts of their alumni. The main reason is that they have common understanding and some similarities in many aspects that make them work together.

## **3. Approaches and Strategies**

### **3.1 Project concept development**

Various ideas for collaboration were discussed during field visits and face-to-face meetings with partners organized under previous collaborations. As a follow-up action, a concept note was prepared by the Lead Partner and circulated to all the selected partners for their comments. After incorporating the suggestions of all the partners, the final proposal was developed and submitted to EU in response to a call for proposals. In the proposal for the collaboration, an organizational set-up was clearly defined such as a steering committee comprised off Project Coordinator and Project Manager from AIT, European key experts and Asian Country Coordinators. Their responsibilities were also clearly described in line with the collaboration's goal and objectives. Although basic framework was outlined, some of the methods were decided later based on the local conditions at the time of implementation.

### **3.2 Partner selection**

AIT and University of Stirling were promoting small-scale fish culture in the region with Asian partners. Therefore, there was already working relationships among them. University of Stirling (UoS) was selected because of its well established academic programs and laboratory facilities in this field. Another important reason was the past working relationship wherefrom some of the faculty members of AIT were graduated. UoS was selected because of its expertise in environmental and eco-toxicology programs and also because it was involved with a previous EC project. However, selection was due to a faculty member who is a UoS alumni and was well-known to other partners before.

Among the Asian partners, Vietnamese and Cambodian partners were selected because of the past collaborations through Aqua Outreach and their several faculty members were alumni of AIT, including the Country Coordinators for the project. RUA and UAF were particularly selected because of their needs

to upgrade academic programs and to produce qualified human resource for their country or locations. IAAS (Nepal) was selected because their post-graduate education was quite new and was in need of strengthening its program. In addition, there was a strong favour at the time of partner selection because the head of the department was AIT alumni who was well recognized and well trusted scientists.

In addition to the institutional partners, under this collaboration, partnership has been extended to private companies, fish farms, community-based organizations, and government and non-government organizations (NGOs). Asian partner institutions in their respective countries/locations explore and scrutinize these local organizations based on their needs to serve as hosts for interns. These organizations have been convinced that they benefit in many ways by engaging post-graduate students as employees without salary. For examples, it boosts image of the organizations. Interns can help in day-to-day work as their employees, conduct research to solve their problems, can publish articles as free advertisement and so on. After convincing them this way, many of them are happy to offer food and/or accommodation.

### **3.3 Implementation**

The project was launched from September 2007. An inception meeting was organized on the third month i.e. November at the Asian Institute of Technology, Thailand, the Lead Partner of the project. Selection and scheduling of activities were finalized during this meeting. Roles and responsibilities of partners, intern host organizations, interns and their supervisors were clearly defined. Potential risk factors were also discussed. Formal collaboration was established at the institutional level signing Memorandum of Understanding (MoU) by the Lead Partner with all the collaborating partners separately. A progress meeting of steering committee was organized during 8-9 January 2009 in Kathmandu. All the Country Coordinators presented their progresses. At the same time, plan of action for the year 2009 was discussed. Necessary changes in strategies were also made.

During the whole period of project implementation, if there were any good and bad news or of a partner, the message was passed on to all other partners. Therefore, all the partners were made aware of the situation. More importantly, provision was made to frequent visits to all the partners by the Project Team together with European experts involved and sometimes even with external evaluators. During the visits all beneficiaries have been met to discuss about the situation and understand the problems faced by them. At the same time, authorities of the partner institutions have been met with a view to provide feedback and possible improvement in their own systems. This has created direct linkages of Project Team with the beneficiaries at the ground level. This has helped in better understanding of the problems and reporting more realistically. More importantly, Project Team has met various intern host organizations in each country.

### **3.4 Results**

More than 30 internship organizations interested to host interns have been set-up making their details available on-line (<http://www.aarm-asialink.info/Placements.html>). Perspective interns can go through the list and select based on their interests.

Under internship program, over 30 Asian students have been supported so far; 10 in Nepal and 20 in Vietnam. For example, almost all interns in Nepal e.g. Nabin, Hare Ram, and Sadharam and Kamala worked with women's groups/cooperatives in Chitwan, Lamjung Nawalparasi and Nuwakot. Similarly, most RIA1 students e.g. Chien, Chung, Hoa, Thanh and Yen, worked for Government stations and conducted research to develop techniques of breeding and feeding of crab, clam and others which are economically high value species. Applying their techniques, poor farmers can get better returns from their limited resources. UAF students e.g. Binh, Thanh, Tu and Tam are tied with private companies such as Alltech, Bayer, Biomin and NOVUS Aqua. Most of these Asian interns (first batch) have already got new jobs while others those who joined the previous jobs have got promotion. Most of these interns are likely to serve the sector after their graduation.

Similarly, seven European students have completed internship in Asia. Ben Belton and Farah from UoS studied the technology transfer and causes of disease problem in tilapia in Thailand respectively. Two students from UoA (Sonia and Susana) from Portugal conducted research at AIT collecting samples from Nam Sai Farms Co. Ltd., to assess the residues of methyltestosterone (MT) hormone used for sex-reversal of tilapia fry. Few students from Universities other than the partners joined the internship on their own costs. For examples, Mikael, Chavelly from Montpellier, France conducted a trial to compare two strains of tilapia. Gladys from Ghent and Naomi from Menno Simons College in Winnipeg, Canada helped staff at RIA1. More attempts are on-going especially advertisement through emails and internet targeting students especially from western universities and presenting it during conferences have resulted in more than 25 inquiries in few months time.

More than 30 instructors from all partners involved in internship have also benefitted in terms of knowledge through field visits and seminars given by the interns after completion. Activities of the student during internship itself have increased involvement of academicians which in turn have helped better transfer of knowledge and technology to the community.

Realizing the scope for internship, all the Asian partners have incorporated internship into their curricula as 1 or 2 credit courses specifying the number of hours to be spent in the field. It will take time to show how the collaboration can help in achieving the broader goal of the project i.e. poverty reduction and improvement of people's livelihood through aquaculture development and aquatic resources management.

## **4. Challenges**

Establishing any collaboration means creating some challenges and prepared to face it. Greater challenges are encountered to make it sustainable if the collaborations are established with time-bound donor funding.

Formalization of partnership with private farms and community organizations has been a challenge as small companies and farms are not familiar with formal processes and documents. They worry about signing on any documents and going to legal processes. Therefore, signing MoU with them has been a problem although they accept interns mostly in an informal way.

During our implementation, we also encountered one of the partners not performing to the expected level. Therefore, we had to replace the partner. Many of the collaborations tend to be continued even in such situations considering that they have close friendships. But when it comes to the implementation, this type of thinking should not be allowed. If that is allowed, it reduces chances of future collaborations because other partners may not be keen to continue in one hand and on the other hand, donors may not be willing to support further.

More challenges are still there to continue this collaboration although there are indications that it can be continued. For example, internship has been incorporated in the existing curricula in Asian partner institutions agreeing that the cost of transportation for internship will be borne by the students and accommodations by their host organizations. However, these have created some feelings of burden to them. At the same time, as the collaboration was initiated with the donor's support, most beneficiaries and some of the people working closely with partners expect more supports rather than helping and sharing the costs. For examples, when we announced for intern positions clearly mentioning they were unpaid, many of those who apply expect stipends and living allowances to be covered by the project. This misconception has been one of the hurdles for sustainability. Similarly, there are still some doubts whether the partners will give their time and efforts to continue this collaboration in the future even though clear commitment has been made.

## **5. Sustainability**

The uniqueness of collaboration for aqua internship is that partners are committed to run the internship programs in the long-run on the basis of cost sharing among the parties involved such as students,

institutions and host organizations. This means the fund provided by EU is only for initiation of the process or establish the well-functioning collaboration. For internship program cost sharing idea has been adopted. For example, host organizations are happy to provide accommodation for interns as they work free for the hosts. Interns are happy to go out to work covering travel costs because they get good experience and exposure to the real industry. Travel cost for Asian interns is very little. For western interns it is a Asian tour they would like to have even if it is not the part of university program. Some of the universities even have some funds to support them. In such cases, interns get three-fold benefits at free of costs. Asian institutions which organize these also get direct benefits. For example, within a year from our collaboration, IAAS (Nepal) was able to attract more students for its M. Sc. Program from staggering 1 or 2 per batch up to 5, which is the maximum the institute has set as the target. A Vietnamese partner (UAF) is working with private companies to test their products. As a result, it was able to establish a good laboratory funded by NOVUS International. All of these have helped UAF increase its M. Sc. enrollment by 300% from 9 to 27 in 2009 compared to 2008 (AIT, 2009b). This has even created greater needs for collaboration as UAF has shortages of qualified lecturers, more research ideas, better facilities and other supports.

While visiting other institution for cooperation, several institutions have shown their interest to join. Attempts to link with other collaborations also have helped to continue as they also have the similar objectives and may have some resources to mobilize. For an example, Ghent University in Belgium immediately showed interest in joining when the Project Coordinator presented about the collaboration during a conference (Bhujel, 2008). They recruited a student in Vietnam (RIA1) and have also showed interest to send more. There are many more inquiries from other western universities and their students for joining the internship at their own costs.

Targeting western university students, an on-line application system has been developed within the project homepage i.e. <http://www.aarm-asialink.info/apply.html>. Any interested person can send inquiries and send application on-line. The Project Team has established a separate Aqua-Internship unit at AIT which charges a nominal fee (management fee) to the individuals for the service. With this service fee, a staff can be supported to facilitate internship so that it can run in the long run. Promotion of the internship has also been done during conferences and also via internet. It is hoped that more people will join. Depending upon the number of interns and income, more staff can be added later. Whereas for students of Asian partner institutions, internship has been developed as a course and incorporated in their curricula.

## **6. Lessons learned**

Collaborations can be long lasting if all the partners feel the need and if the new collaborative activities are incorporated into the existing system. The most important factor in sustainability is the benefits to the stakeholders that convince them to share the costs; however, they also need to feel that they are treated equally and their roles are well recognized.

Formally collaborations are at the institutional level; however they actually start from the like-minded individuals resulting from their good working relationships and trust among each others. In brief, collaborations are initiated and successfully run in the long run if the following points are addressed:

- Individuals involved in the collaborations expect either financial benefits or opportunities of upgrading their careers. Those who expect career upgrade are interested to be involved with the collaborations which focus on more research and publication.
- In addition to financial benefits, individuals also expect other direct benefits in terms of travel and exposure to the new country and places.
- Prior working relationship is key factor in selecting partners.
- In many cases individuals feel obligation e.g. alumni or former staff to assist their organizations or even their countries through collaborations. In such a case, neither career nor the financial benefits are very important. In such a case they may have stronger commitments with higher chances of success.

- Many institutions compete for the performance and presence in the region. Competition among the institutions for existence, growth as well as internationalization has become the norm nowadays.
- Many collaborations are established just to keep continuity of relationships or linkages but they may not be performing well to produce actual outcomes
- Most partners of collaborations expect to enhance the image of themselves or their institutions. This is true especially if they are newly established.
- Too rigid rules and regulations may not work especially in developing countries. Therefore, plans have to be flexible enough in terms of time and rules.

## 7. Recommendations

One of the most important notions to be established for any collaboration among the partners is that donor funding is only for the initiation of good collaboration, and not for long term supports. Indeed, those collaborations which can provide clear plan how to sustain even after the funding is ended. Partners of such collaborations have to clearly mention all possible ways for the continuation of activities. For this purpose, they have to have plans to justify the need of the collaboration to the stakeholders. Once stakeholders and authorities with resources realize they will incorporate such collaborative activities into their institutional annual programs. In such cases, authorities will have to make provision in the annual budget to support those activities.

The most important avenue in achieving long-term sustainability is to make provision for cost sharing among the stakeholders. Benefits should be clearly shown in order to convince stakeholders involved. In such a case, the relation of beneficiaries and donors do not exist. Although it seems difficult, it is achievable if it is carefully thought out while designing the collaboration.

Other methods of achieving sustainability are to mobilize local resources as described by Alexander (1996). Some of the collaborations may result in products and services. By marketing and selling them, collaborative activities could be continued e.g. books, reports, manuals, maps, videos, CDs, T-shirts and so on. Similarly, offering training programs and consultancy services based on the experiences gained from the collaborations can also generate income in many cases. Other strategies could be creating a group (e.g. alumni club) from the collaboration and collecting reasonable membership fees or donations on regular basis (monthly/annual) can generate income to continue collaborative activities. Raising funds regularly by organizing marathon, special dinner speeches, concerts, sports competitions, and so on can also be one of the ways of generating income locally to carry on the collaborative activities.

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