

**Annex 8:**  
Report of the Independent Evaluator

# **Evaluation of Aqua-Internship Project through Visits to Four Partner Institutions in Bangladesh, Nepal and North and South Vietnam**

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## **Overview**

Aquaculture is developing rapidly in Asia though university degree programmes are not able to provide adequately trained human resources for the industry. Degree programmes are still largely traditional as they are dominated by theory with relatively little exposure to real world aquaculture. Graduates thus lack the practical and especially entrepreneurial skills required by the industry. The internship programme was designed to provide M.Sc. students at partner institutes in Bangladesh, Nepal and Vietnam with the opportunity to work off-campus in a real world aquaculture setting.

The project has been very successful as it has met or considerably exceeded the expected outcomes in the Log Framework. This evaluation report follows the ToR (Appendix 1) with visits (Section 1) to each of the four partner institutions and face-to-face interaction with partner institution's higher authorities, local project coordinator, instructors involved, students, alumni and other relevant stakeholders, identification of areas of strengths and weaknesses for each institution in effective utilization of project generated inputs (Section 3), identification of strengths and weaknesses of the project goal/objectives and lessons for future such initiatives (Section 4) and inputs on how the project could have been delivered better (administratively and programmatically) and recommend improvements for future such endeavors (Section 5).

## **Section 1 - Itinerary**

### **1.1 Vietnam**

October 27 - Bangkok to HCM City; Programme review at Nong Lam University  
October 28 - Continue programme review at Nong Lam University  
October 29 - HCM City to Hanoi  
October 30 – Programme review at RIA No.1; Hanoi to Bangkok

### **1.2 Nepal**

November 1 - Bangkok to Kathmandu and Bharatpur  
November 2 - Programme review at IAAS  
November 3 - Field visit to potential intern site in Chitwan  
November 4 - Field visit to intern site in Lamjung  
November 5 - Kathmandu to Bangkok

### **1.3 Bangladesh**

November 25 - Bangkok to Dhaka and Dinajpur  
November 26 - Field visit in Dinajpur  
November 27 - Travel to BAU, Mymensingh  
November 28 - Programme review at BAU

November 29 – Mymensingh to Dhaka and Bangkok

## **Section 2 - Visits to the four partner institutions**

### **2.1 Department of Aquaculture, Nong Lam University, HCM City, Vietnam**

#### **2.1.1 Interns**

Six interns were interviewed in total from the three batches; Batches 1 and 2 had already graduated. Three students from Batch 3 made PowerPoint presentations of their internship topics. All were very satisfied with their internships as they learned practical working skills and the internship provided an idea for as well as an opportunity to plan a better design for their M.Sc. thesis topic.

To select topics for the internship, the faculty first asked the students what they would like to work on. Two students reported that they wanted to work with striped catfish as this is the major species in the country. One specifically mentioned discussing with BioMin Company about aflatoxin in feed and they provided support as they were interested in the topic.

Five of the six internships said that they preferred to work in a company rather than for the government as it would be more useful for the development of the country as well as paying more. Only one of the six, who used to work in a provincial agricultural department of Dong Nai province where aquaculture is poorly developed, expressed an interest to work for a provincial extension service and the main reason she gave was that it is close to her home. However, she chose to do an internship on a striped catfish farm although there are none now in her home province, Dong Nai, because the province is now planning for aquaculture development and she believes that striped catfish will be farmed all over Vietnam in the future.

Several of the students reported that the internship helped them to get a job as they had been employed by either the same company at which they did their internship or at another company. Companies now realize that there is a potential pool of future employees and that they can use the internship to evaluate prospective employees before they hire them. The internship students can also provide companies with up to date knowledge so there is a two-way interaction between theory and practice.

An issue raised is a problem of security for women students in remote areas.

Suggestions were there should be more interaction between internships so that they could better share ideas and experiences; and that the programme should be expanded to benefit more students from poorly developed provinces.

#### **2.1.2 Higher authority – Dr. Nguyen Ngoc Tuan, Head of Post Graduate Office**

Dr Tuan is responsible for M.Sc. and Ph.D degree programmes in the university. He was aware of the internship programme as he had been invited to be a member of the internship selection committee. Only aquaculture has introduced an internship course into the M.Sc. degree curriculum but in future other departments will do so.

A major issue is funding the internship as the university resources are very limited. Companies could help as they benefit also. As well as project support for the Asia-Link aquaculture internship, a French company finances an internship in animal production but as the M.Sc. thesis rather than as a separate course. The internship could be advertised locally so that companies could pick up students as free workers. However, it could be more difficult for provincial aquaculture departments although they should support their extension officers for an internship.

Perhaps students could pay towards their internship as they do for 3 the day field trip in the Aquaculture Systems course to the Mekong Delta in which the students pay for food and lodging.

Foreign intern students would need to work either in the university or in international companies rather than in provincial governments because of the language problem. Furthermore, the farming community is very suspicious of outsiders.

### **2.1.3 Local coordinator – Dr Le Thanh Hung**

Dr Hung is very satisfied with the internship programme. Eleven students joined the programme, four in Batch 1, four in Batch 2 and three in Batch 3. Three foreign students joined the internship, two from the University of Stirling and one from the University of Ghent, with possibly two more joining from Ghent. They were in Vietnam for 2 months and paid all their expenses except for laboratory materials and supplies.

The internship is to be continued as a 2 credit course within the M.Sc. degree programme.

The students are asked to suggest topics although the final decision is taken by a selection committee. It may be better to offer the internship after thesis defense. It is not easy to find locations for all 20 M.Sc. students each year. It will be easier to secure internships through companies. Both Biomin and Novus have indicated that they will continue to accept internships. However, there is a need to explore internships through provincial extension.

### **2.1.4 Faculty**

Eight faculty were interviewed: Nguyen Van Tu, Nguyen Huu Thinh, Nguyen Minh Duc, Tran Van Trai, Nguyen Phu Hoa, Le Thanh Hung, Vu Cam Luong and Nguyen Nhu Tri.

Although there are 33 faculty members in the Faculty of Fisheries, including those studying abroad, only 3 have been involved as either an adviser or a member of the selection committee. This limited number is because contacts are required with the aquaculture industry, mainly in feed and health.

The main rationale for the internship is to help students to gain field experience by taking them off campus as previously M.Sc. research was mainly only on-campus. Applications for an internship are competitive and are selected by an internship selection committee. The students have to submit an internship report.

The process of selection of internship topics is driven by the students' job aspirations. Most wish to work in commercial aquaculture and aquaculture industry rather than aquaculture for rural development. It may be possible to target provincial extension for internships but there are few students from provincial extension offices and most are weak students with a low GPA. The internship is useful for the students as it provides real world practical experience. It leads to a better selection of thesis topic and better topic design.

The internship is useful for the faculty as it gives them an opportunity to get out of the ivory tower and visit the field as well as learn through the students what is happening in the dynamic field of aquaculture. Increased contacts with the industry, farmers and companies through internships leads to more relevant teaching and research as well as better dissemination of research results. Internships also lead to the establishment of networks with farms, companies, provincial extension departments and national R&D centres such as the RIAs. The internship programme helps to improve the reputation of the university through being more relevant to the needs of the industry as well as attracting more students and financial support for its programmes.

More foreign students are now seeking to spend time at the university through the internship programme. Many are motivated to help developing countries and later seek employment through international and developed country development agencies and NGOs. However, foreign students cannot work in the field without major supervision and logistic support so they need to work on the on-campus farm or in laboratories.

The first phase of the Asia-Link project did not provide funds for research. The second internship phase has been designed to provide such support and is thus attractive to students.

There was confusion of the internship with the thesis in the first batch of internships in the university as the internship was viewed as part of the M.Sc. thesis. As the project intended for them to be separate, this was done with the second batch of students onwards.

There has been a problem with scheduling the internship as it is difficult for the students to do it when taking other courses unless the internship is carried out in a company or on a farm in or around HCM City. It is impossible if the internship site is a remote farm. This is the reason why one of the current internships is being conducted after completion of the thesis. It takes up to 1 year after the thesis defense before the official degree certificate is issued although a temporary certificate is issued immediately after completion of the requirements for the degree. Although there are advantages to do the internship before the thesis as discussed above, if done after completion of the thesis it still increases the value of the degree and therefore job opportunities.

Students only have 1.5 months after finishing course work before they start their thesis which is insufficient time to carry out an internship. There are no time gaps in the M.Sc. degree programme. One student is taking courses from Monday to Thursday and doing the internship from Friday to Sunday each week on a farm located near the university. However, it is recommended that the internship be carried out after completion of the thesis.

## **2.2 Research Institute for Aquaculture No.1 (RIA.1), North Vietnam**

### **2.2.1 Interns**

Sixteen interns (5 females) completed the internship programme: Batch 1 (2008), 5 interns; Batch 2 (2009), 5 interns; and Batch 3 (2010), 6 interns (Appendix 2). Interns were conducted at RIA.1 Departments and its Sub-Institute in Nghe An and Centers in Hai Duong and Cat Ba island and on farms (hatcheries and grow-out) and at companies in Thai Binh, Ninh Binh, Thanh Hoa, Nghe An, Hai Phong and Bac Giang provinces.

There were 5 foreign interns (2 PhD, 1 M.Sc. and 2 B.Sc.): Mrs. Gladys, a MSc. student at the University of Gent, Belgium did a 5 weeks internship (July-August 2008); Ms. Naomi Happychuk, with a B.Sc. degree in Environmental Science in Canada did a 2.5 months internship (April-June, 2009); Ms. Sandhya and Ms. Sajina, PhD students from the Central Institute of Fisheries Education, Mumbai, India did a 2 weeks internship (April, 2010); and Mr. Jason Choy Min Sheng, a B.Sc. student at the University Malaysia Terengganu did a 2 month internship (April-June, 2010). The following foreign interns will arrive in the future: Mr. Alex Kent from England, a marine biology graduate currently applying for a M.Sc. in aquaculture will start a 6 months internship programme at RIA.1 from 7 January, 2011; Mr. Flavien Dekoninck, B.Sc. degree from Savoie University Chambéry, France, plan for a 4.5 month internship from April to August, 2011; the Fisheries College and Research Institute, Tamilnadu Veterinary and Animal Sciences University, India, has proposed to send final year students for a 1 -2 months internship; and some students from France and Germany have sent an application for an internship to the RIA.1 Sub-Institution in Nghe An province.

Twelve out of the total of 16 interns were interviewed, 3 each from Batches 1 and 2 and 6 from Batch 3. In addition the 6 students in Batch 3 made PowerPoint presentations of their internships and handed out printed copies which were graded by the reviewers and the faculty.

All interns thought that the internship programme was very useful as they gained new knowledge, new practical skills and could now write a report or a proposal as well as present it in PowerPoint. All the interns selected their own topic as they understood its relevance. Only one student, who was working far away from RIA 1, had a problem with their internship clashing with regular courses. Although the interns were able to successfully carry out the task, they thought that the money was hardly sufficient. Several other students were also able to carry out an internship and without project support. Without project support the students thought that RIA 1 could provide seed money; many projects have activities suitable for internships; and as the intern would provide free labour, private farms and companies could be convinced of the value of the internship to them. Interns could make suggestions how their operation could be improved and provide new knowledge. The interns benefitted from interaction with foreign interns through improving their English and learning to be more flexible when dealing with people from other cultures.

In analyzing the internships very few were directly related to working with poor farmers, perhaps only one internship on a commune. The vast majority involved the development of technology on government research stations or hatcheries, or on large-scale private hatcheries or grow-out farms. Most of the internship topics, 12 out of 16 were directly related to the subsequent type of employment, possibly because many were carried out through their previous place of employment at which they continued to work following graduation although they said that it broadened their knowledge and skills as they often worked on a different topic.. This would explain the reason for the students being able to select their own internship topics and sites. However, many of the topics for the M.Sc. thesis carried out after

the internship were different e.g. 5 out of 6 in Batch 3. This was explained by the students as wanting to broaden their knowledge. The 6<sup>th</sup> student continued with the same topic for his M.Sc. thesis which thus provided a basis but in an expanded way. Fifteen of the 16 interns were subsequently employed in aquaculture with one waiting for an answer for a job application in aquaculture. The majority, 11 were employed by national or provincial government, 3 as university faculty and 2 in the private sector; and mostly as discussed above with the same organization or company prior to their M.Sc. degree.

### **2.2.2 Higher authority – Dr Le Thanh Luu, Director of RIA 1**

The internship programme has been very useful for the students and the institute. After the end of EU project support RIA 1 will carry on with the programme. RIA 1 has several international projects through which students could do an internship. AIT helped to establish a B.Sc. degree programme with project support for only 4 batches but 13 batches have been enrolled. NORAD helped to set up a M.Sc. degree programme with funding for 3 batches but 11 batches have been enrolled. After termination of successful international programmes the Government provides some support to continue.

### **2.2.3/2.2.4 Local Coordinator and Faculty**

The local coordinator, Dr Pham Anh Tuan and two faculty members, Tran Dinh Luan and Linh, were interviewed together. All were very pleased with the internship programme. They did not work as official supervisors but formed a committee, explained the internship programme to the M.Sc. students, asked them to submit ideas for an internship topic, commented on their choices and selected interns. Nineteen M.Sc. students from the last batch requested to do an internship but only six were selected. The internship was attractive to the students as it provides work experience; they have to write a report and make a presentation but there is no need to memorize for an exam.

The students benefitted from gaining new knowledge and practical working skills as well as learning how to write a report and make a presentation. Industry also benefitted through the students bringing in new knowledge so there is a two-way beneficial interaction between students and industry. The teachers benefitted from gaining new knowledge from the interns and the institute through a new educational initiative to improve the relevance of the M.Sc. degree. The local interns benefitted through the foreign interns through improved English, better understanding of other cultures and the development of links or networks. Prior to the internship programme, RIA 1 never had a link with India and Malaysia.

The foreign students were charged \$100/month for accommodation and they paid for their air tickets and food. They carried out their internships through field projects at no cost to them.

Although there are no other departments in RIA 1, the internship programme was explained to Hanoi Agricultural University as they approve the M.Sc. degree.

In the last batch of interns only one out of six was directly concerned with poverty.

The internship is now sustainable as from Batch 3 onwards it is a 2 credit course within the M.Sc. degree programme. Furthermore, some of the students not selected to do an internship through the EU-funded project were able to carry out an internship through self financing, project or company sponsorship.

## **2.3 Department of Aquaculture, Institute of Agriculture and Animal Science, Chitwan, Nepal**

### **2.3.1 Interns**

Seven interns were interviewed: Dilip Kumar Jha, a faculty member of IAAS who is currently enrolled for a Ph.D at AIT through the Asia-Link Project; and three students from each of three batches of internships, the completed batches of 2007-2009 and 2008-2010 and the on-going batch of 2009-2011.

Mr Jha made a presentation of his doctoral thesis research currently in progress on 'Fish seed health and management in Nepal and potential role of probiotics'.

The interns were interviewed together. Only Mr Jha made a presentation and no handouts were provided by the interns. In the first batch, Nabin Khanal self financed a visit to Bangladesh and Thailand to learn about tilapia breeding as his family intends to set up a fish farming business. Currently the family is a major poultry producer in Nepal. Hare Ram Devkota did his internship through the AwF project i.e. directly on rural poverty and has since been hired as project manager in the Mid Hills. The third intern interviewed in the first batch, Gopi Raj Chalise, works for the government in aquaculture development and did his internship on fish breeding at a private hatchery. The three other first batch interns not interviewed also work for the government. The three students interviewed in the second batch did their internships on farmer cage fish culture in the Pokhara Valley, decentralized seed production, and survey of farm production of small indigenous species (chhadi). All previously had government jobs to which they returned. The three third batch interns interviewed all had jobs with the government. One would like to work with a fish farm cooperative for his internship, another with his extension agency Danida funded project with 50 new small-scale farmer ponds, and the third still had no idea about a topic.

The interns were positive about the benefits of the internship. The internship helped with the logistics of their subsequent thesis as it helped them to identify the topic and the location and the farmers to work with. Their thesis was often extended research in the same topic e.g. one student did a survey of farmer stocking density and production of SIS and subsequently did on-farm experiments with various stocking densities. The knowledge and skills learned during the internship help them in their continuing employment in government research and extension.

The following suggestions were made:

1. there be an orientation for internships.
2. as aquaculture is underdeveloped in Nepal more internships be awarded as trained manpower is limited in the country.
3. the internship should be improved through provision of increased funds.
4. Nepal should have a chance to do an internship abroad where aquaculture development is more advanced and farmers are more entrepreneurial.
5. on the allocation of resources to each intern, students should not all receive an equal amount of funding; more money should be given to promising students identified through competition through writing a budgeted proposal; students who have just graduated with a

B.Sc. should receive more financial support than those working for government or a company as the latter could receive support from their place of employment

6. students should carry out their internship near home where they could stay so that the internship would be cheaper or they could use more money for the work

7. farms and companies should be encouraged to support internships.

### **2.3.2 Higher authorities**

The Dean was not available but discussions were held with three Vice Deans and the Campus Chief. They were familiar with the internship programme as it has now been approved as a formal course. Similar programmes occur in the agriculture and veterinary science departments in the B.Sc. degree in which students do a 1-2 month work experience off-campus.

The major problem is the poor economic situation in Nepal in which many land areas remain idle, food prices are rising and there is increasing urbanization. About 50% of IAAS graduates leave the country. There is a need to make Nepal more attractive.

There is a critical financial situation. There is now huge student demand with 100 students in 20 departments compared to 17 students in only 3 departments initially but there are few fee paying students. The priority of the university is undergraduates. The university only gets funding for faculty salaries so it would be difficult to sustain an internship programme even though it provides better opportunities for research as the campus facilities are poor. Currently education is mainly lectures and laboratories with limited real world exposure which the internship programme provides. Students still seek poorly paying but secure government jobs first rather than working in the private sector or becoming entrepreneurs.

Although IAAS has a campus farm, Tribhuvan University to which the institute currently belongs, takes any money earned through sale of produce so there is no incentive as in Land Grant universities in the USA which can farm their land to benefit their programmes. The officials recognize the need to foster entrepreneurship

A resolution has recently been passed to convert IAAS into the University of Agriculture and Forestry separate from Tribhuvan University. A committee has already been formed to develop a modus operandi. Once the new university is independent it should be able to set up a policy giving official support for income-generating activities, including the establishment of a campus fish farm in the Department of Aquaculture through which the internship programme could receive financial support.

### **2.3.3 Local coordinator**

Dr Madhav Shresther reported that the internship programme has been so successful that for the third batch of students it will be a 2 credit course and will be recorded on the graduates transcript. Other departments are aware of the internship programme because to seek institute approval it had to be presented before the Subject Committee comprising three faculty members per department. There is a two-way benefit of the internship programme for students and farmers as indicated by students and faculty. Dr MC Nandeeshya sent three students from Tamil Nadu, India to Nepal for 8 days. The Indians paid for their own airtickets

and IAAS supported lodging and local visits. Students and faculty benefit from exchange of ideas and experience.

While the university has approved the inclusion of the internship in the M.Sc. curriculum, funding is an issue without supporting project funds. However, if students appreciate the value of an internship they may be able to find ways to fund it. Ways should be explored for farms and companies to provide at least some support as they benefit also. IAAS started a Ph.D programme in 2010 with considerable student interest indicated by a queue for enrollment. However, financial support is a constraint as students have to pay Rupees 200,000 (\$3,000) fees plus board and lodging.

#### **2.3.4 Faculty**

Three faculty were interviewed, Dilip Kumar Jha and Dr Sunila Rai as well as Dr Shresta. All were very satisfied with the internship programme. All the internships were concerned with farmers and mostly small-scale farmers. The internship provided an opportunity for students, especially those newly graduated with a B.Sc. to learn about farmers. Furthermore, the faculty benefitted by learning about recent developments in aquaculture in Nepal such as farming SIS or chhadi. The project also improved the links with organizations hosting the interns such as the National Agricultural research Council (NARC), the Directorate of Fisheries Development (DOFD) which employs national aquaculture extension specialists.

One faculty member benefitted especially, Dilip Kumar Jha, as it enabled him to do a doctorate through AIT as one such scholarship was provided for each partner institute through the project except for BAU which joined the project late. One of the stipulations was that following course work at AIT, the doctoral student should do research in their own country. The project also provided some equipment and supplies to upgrade the laboratory facilities without which the research would not have been able to be carried out.

Other faculty also benefitted through logistic support to the Aquaculture Department. Installation of internet provided better communication. Materials could be downloaded for preparation of PowerPoints for teaching. An air conditioner made it possible to work in the office during the heat of the day which otherwise would not have been possible with the tin roofed building.

#### **2.3.5 Internship sites**

A Visit was made to a potential intern site, Pancha Mool, an 8 ha farm constructed in old brick borrow pits in the lowland Terai in Chitwan District. The owner Kapil Babu Khanal is a major poultry producer who intends to promote the culture of striped catfish (210,000 seed imported from Namsai Farm in Thailand), Nile tilapia (GIFT obtained from IAAS) and African catfish. He imported a small-scale pelleting machine from India. His relative did an internship travelling to Bangladesh and Thailand to study tilapia seed production.

A visit was also made to an AwF project site in Lamjung District in the mid hills where Hare Ram Devkota carried out his internship and for which he wrote a training manual in Nepali. He has now been hired as project field manager for the 'Women in aquaculture Nepal mid hills project'. As well as visiting small-scale ponds, the opening ceremony for the second phase of the project was attended.

## **2.4 Faculty of Fisheries, Bangladesh Agricultural University, Mymensingh, Bangladesh**

### **2.4.1 Interns**

The eleven interns of Batch 2 made impressive presentations of their topics in English to an audience of faculty, including the Dean of the Faculty of Fisheries and the Director of BAU Research and Education System, lead farmers as well as the review team at 'Intern's Day'. The interns handed out well-illustrated hard copies of their projects in English to the review team. The interns were questioned by the audience and were graded for their presentation and response to questioning by the faculty and the review team.

The names of the interns, their topics, M.Sc. supervisors, field supervisors and sites of internship are presented in Appendix 3.

Students from Batches two and three of the internship programme were interviewed. Batch one students had already graduated.

Benefits for the students:

1. Most of the knowledge provided in courses is only theoretical and some is dated so there is a gap between theory and practice. Most teachers are Western trained and use foreign books. The internship provides practical knowledge as well as the opportunity to identify problems of local farming practice
2. Most of the internship students would at least be able to operate a hatchery and would be able to at least start up their own hatchery.
3. Interns are now able to interact with local people and communicate with farmers which was difficult at first.

Benefits for farmers:

1. Most hatchery owners and managers are not fishery graduates and have limited theoretical knowledge about technical issues such as genetics, indigenous fish, broodstock quality and adverse effects of various drugs and chemicals. Students could provide the latest scientific knowledge on these topics. Most hatcheries only focus on the production of seed of common species but interns could help them to breed indigenous species. Fifty four native species are endangered in Bangladesh and should be explored for feasibility of commercial production.

The second batch of 11 interns reported that only one teacher went into the field. However, the third batch thought that some of their supervisors would go into the field as they were interested in the internship topics and it would give them an opportunity to upgrade their knowledge. The interns pointed out that it is important for their supervisors to go into the field with their individual internship students and not on a single field trip with all the interns in a given batch of interns. They proposed an opening ceremony with each student and supervisor at the internship site at the start of the internship with the supervisor providing on-site guidance.

Six out of the 11 interns in the second batch selected their own internship topic.

Problems experienced by the interns:

1. The time, 3 months is too short, and 6 months would be better and enable fish bred during the internship to be followed through grow-out
2. Fish breeding is a seasonal activity and an internship in a hatchery needs to be carried out during this period
3. Overlapping time between the internship and classes. As there is no break within the academic year and only one month between academic years, it was proposed that the internship be carried out after graduation although this would be problematic regarding assigning credit for the internship towards the degree
4. Transportation was not an issue with internship sites in Mymensingh but would be at distant sites such as in coastal areas in the south
5. Women interns staying away from home or campus is an issue
6. Farms may not have accommodation for interns who would then have to return to campus
7. Funds were adequate as sites were in Mymensingh where transportation was available although vehicles sometimes had to be changed several times. Use of taxis would be more convenient as it is direct but too expensive.

None of the 11 interns in the second batch had a job yet as they would only graduate in 2011. None thought that they would be hired by the aqua-industries at which they did their internships in the Mymensingh area due to the relatively small scale of the farms but it was thought that some shrimp farms in the south would possibly be able to hire BAU graduates. The student who worked on climate change for his internship would like to continue as a researcher in this field. In reply to a question about the feasibility of setting up their own aquaculture farm following graduation, the interns responded that it would not be possible although they reported that some previous graduates who had been hired as upazilla fishery officers later tried to set up their own farm after gaining more experience as it was financially better than a government salary.

According to the interviewed students in Batches 2 and 3, some of the 11 Batch one interns got jobs in the sector: 3-4 as upazilla fisheries officers, 1 at BFRI and 1 as a university teacher in Sylhet. Some of the others got jobs in other sectors such as banking and finance. This albeit incomplete reporting does not seem to agree with the comments of the Batch 1 interns interviewed while still at BAU in July 2010 during a monitoring visit which reported that 'almost all of them have already made arrangements either to establish their own farms or have been requested to assist by the companies/farms at which they were hosted...they showed no worry for the government job'.

The interns said it would be useful for students to visit aquaculturally advanced countries such as Thailand and Vietnam.

#### **2.4.2 Higher authority - Dr. M. Ali Akbar, Director of Bangladesh Agricultural University Research and Education System**

The University has already had an internship programme since 2002 in Animal Husbandry and Veterinary Science although for the B.Sc. and not the M.Sc. degree programme. Until last year the internship programme was outside the degree requirements but now it has been incorporated into the curriculum in the two departments.

It is good for a technical university to get practical experience through an internship programme. There are several advantages to having an internship programme:

1. It strengthens the students' knowledge about the field which can be applied in their future jobs
2. Farm-level practical work improves students' skills
3. Students' may be selected for a job upon graduation by the company through which they did their internship
4. An internship certificate improves the students' job application
5. And it is also good for the Faculty.

In previous years when students were assigned an internship site by the faculty, they lost interest soon after being seconded to a farm. However, this was much less of a problem once students were asked to select a farm to work on, indicating the benefit of active student participation in intern site selection.

### **2.4.3 Local coordinator - Professor Wahab, Dean of the Faculty of Fisheries**

Sixty M.Sc. students applied to do the internship but only the best 11 were selected.

Students are selected by an Internship Selection Committee comprising the heads of the four departments (Departments of Aquaculture, Fisheries Biology and Genetics, Fisheries Management and Fisheries Technology) and the Dean of the Faculty of Fisheries who is the Chair.

There is a visible difference between those students who did the internship and the others as the former are more confident and appreciative of farmers. According to Professor Wahab, at least 10 of interns will make their own aquaculture business although the interns did not confirm this.

Through the internship project BAU now has started wonderful cooperation with six aquaculture industry companies, most of which were represented at the presentation by the interns.

The Faculty of Fisheries is trying to incorporate an internship programme into the B.Sc. degree programme although not into the M.Sc. degree programme as it will make the graduates more marketable as well as useful. The Faculty agreed that it would be useful to have an internship programme and it is expect to be able to do so in 2011. However, it has been a struggle to reorganize the courses, many of which were repetitive. The Faculty comprises 55 teachers, mostly with Ph.Ds from all over the world who hold various viewpoints, not all of which would lead to increased efficiency.

An internship programme would be a model for other universities in Bangladesh.

A major issue is how to continue the internship programme with external project funding?

### **2.4.4 Faculty**

The three faculty interviewed agreed that the internship programme is useful and about 20 of the total of 55 faculty are involved in at least one batch of students, some in both batches. BAU is the lead university in fisheries in the country so having an internship programme would contribute towards the university remaining so as well as providing a model for other

universities with fisheries degree programmes to follow. There is a need to invest the time in establishing an internship programme to make their degree more relevant.

Aquaculture is expanding rapidly in Bangladesh. There is potential for an internship programme in all 10 universities in Bangladesh with fisheries programmes as well as in newly emerging universities.

Although the project internship is through the M.Sc. degree programme, it is being proposed that the internship be part of the B.Sc. degree programme. The addition of an internship programme in either the final 8<sup>th</sup> semester or as an additional 9<sup>th</sup> semester was suggested for the 4 year B.Sc. Honours degree programme. Reasons given were:

1. there is a precedent through the Faculties of Animal Husbandry and Veterinary Science. Faculty of Fisheries would be in line with these two other faculties in the university. The concept on internship came originally from medical schools which have a 1 year internship to provide the necessary practical experience as it is inconceivable for medics to practice medicine with only a theoretical education.
2. not all students do an M.Sc. degree and there is need for an internship for all B.Sc. students to make the degree course more practical
3. a B.Sc. internship would help to identify good candidates for the M.Sc. degree programme with the best performing internship students selected to continue for an M.Sc. degree.
4. although B.Sc. students normally do not read the scientific literature, those doing an internship would be encouraged to do so which would also lead to the students to designing a better M.Sc. thesis.
5. there is already a research component in the M.Sc. degree
6. internship could still be an elective for the M.Sc. which in Bangladesh is an 18 months programme with courses and a thesis (3 semesters with the first semester only courses, the second semester courses and thesis preparation and the third semester only thesis research), although there would still be a time clash with course scheduling.

Japan has a 4 year B.Sc. degree programme in which the last year is an internship i.e. students complete all course work in the first 3 years and do the internship in the final 4<sup>th</sup> year. In BAU perhaps all the courses could be done also in 3 years or 3.5 years. If courses are still given in the 4<sup>th</sup> year, the first part of the final year could include a 2 credit course on a literature review and internship preparation, with the final 6 months devoted entirely to the internship.

The teachers benefitted from visiting their internship students in the field. In future all 55 faculty should be involved with at least one internship student which would partially overcome the limited funds for faculty research and field work.

The faculty were unanimous on the value of the internship programme and that it should continue but both the type of internship and its funding remain unsure. The main problem is funding. It was suggested that the University Grants Commission of Bangladesh could be a possible source of funding.

### **Section 3 - Areas of strengths and weaknesses of each institution in effective utilization of project generated inputs**

### **3.1 Official recognition**

The internship is to be continued as a 2 credit course within the M.Sc. degree programme in Nong Lam University. The internship is now sustainable at RIA No.1 as from Batch 3 onwards it is a 2 credit course also within the M.Sc. While IAAS, Nepal has approved the inclusion of the internship in the M.Sc. curriculum, funding is an issue without supporting project funds. The Faculty of Fisheries of BAU is trying to incorporate an internship programme into the B.Sc. degree programme, not into the M.Sc. degree programme. Reasons given were there is a precedent through the Faculties of Animal Husbandry and Veterinary Science so the Faculty of Fisheries would be in line with the two other faculties in the university; not all students do an M.Sc. degree and there is need for an internship for all B.Sc. students to make the degree course more practical; a B.Sc. internship would help to identify good candidates for the M.Sc. degree programme with the best performing internship students selected to continue for an M.Sc. degree; although B.Sc. students normally do not read the scientific literature, those doing an internship would be encouraged to do so which would also lead to the students to design a better M.Sc. thesis; there is already a research component in the M.Sc. degree; the internship could still be an elective for the M.Sc. Japan has a 4 year B.Sc. degree programme in which the last year is an internship i.e. students complete all course work in the first 3 years and do the internship in the final 4<sup>th</sup> year and it was suggested that perhaps BAU could introduce the same type of internship.

### **3.2 Internship topic selection**

Faculty in all institutions asked potential students for their ideas about topics which generated ownership although the final decision is taken by a selection committee. In previous years when students were assigned an internship site by the faculty at BAU, they lost interest soon after being seconded to a farm. However, this was much less of a problem once students were asked to select a farm to work on, indicating the benefit of active student participation in intern site selection.

At Nong Lam University it would not be easy to find locations for all 20 M.Sc. students each year although easier to secure internships through companies than through provincial extension.

### **3.3 Student job aspirations**

Students in Nepal still seek poorly paying but secure government jobs first rather than working in the private sector or becoming entrepreneurs. It did not appear to be an issue in Bangladesh and N.Vietnam and certainly was not so in S.Vietnam where students sought to work with the private sector. This was also an issue in Thailand 30 years ago before the development of a vibrant commercial aquaculture sector.

### **3.4 Faculty involvement**

Only 3 of the 33 faculty members in the Faculty of Fisheries in Nong Lam University have been involved as either an adviser or a member of the selection committee because contacts are required with the aquaculture industry, mainly in feed and health. More faculty were involved with internships in the other partnership institutions.

### **3.5 Transportation**

Transportation was not an issue with internship sites close to the universities because of the need to take classes during the same time period but would be at distant sites.

### **3.6 Accommodation**

Farms may not have accommodation for interns who would then have to return to campus.

### **3.7 Security for women**

An issue raised is a problem of security for women interns staying away from home or campus, especially in remote areas.

## **Section 4 - Strengths and weaknesses of the project goal/objectives and lessons for future initiatives**

### **4.1 Benefits for interns**

All were very satisfied with their internships: it provides real world practical experience; they learned practical working skills; and how to interact with local people and communicate with farmers which was difficult at first; it leads to a better selection of thesis topic and better topic design; it helped them to identify the location and the farmers to work with as well as the topic; they could now write a report or a proposal as well as present it in PowerPoint; it helped them either to get a new job or to continue with their previous job if they had been employed by either the same company at which they did their internship. The internship provided an opportunity for students, especially those newly graduated with a B.Sc., to learn about farmers.

If their M.Sc. thesis was research in the same topic as the internship, then it was in more detail or expanded in scope e.g. one student in Nepal did a survey of farmer stocking density and production of SIS in his internship and subsequently did on-farm experiments with various stocking densities for his M.Sc. thesis.

In Bangladesh the interns reported that most of the knowledge provided in courses is theoretical and some is dated so there is a gap between theory and practice. The internship provides practical knowledge as well as the opportunity to identify problems of local farming practice. Most of teachers are Western trained and use foreign books. Most of the internship students said that they would at least be able to operate a hatchery and would be able to at least start up their own hatchery.

Four Doctoral scholarships were provided through the project, one each to Cambodia and Nepal through AIT and two to Vietnam through the University of Stirling. Two doctoral internship students were interviewed during the review, Dilip Kumar Jha, a faculty member of IAAS and Tai, Head of the RIA No.1 Department of Environmental Monitoring. Both thought that the internship was very useful for them as their thesis research had to be carried out in-country and the topics are directly related to their employment which will be continued following graduation. The project also provided some equipment and supplies to upgrade the

laboratory facilities without which the research would not have been able to have been carried out.

#### **4.2 Benefits for faculty**

The internship is useful for the faculty: an opportunity to get out of the ivory tower and visit the field; learn through the students what is happening in the dynamic field of aquaculture; more relevant teaching and research; better dissemination of research results. Other faculty also benefitted through logistic support to the Aquaculture Department in Nepal. Installation of internet provided better communication. Materials could be downloaded for preparation of PowerPoints for teaching. An air conditioner made it possible to work in the office during the heat of the day in Nepal which otherwise would not have been possible with the tin roofed building.

#### **4.3 Institutional benefits**

The establishment of networks with farms, companies, provincial extension departments and national R&D centres through increased contacts through internships; a new educational initiative to improve the relevance of the M.Sc. degree; improvement of the reputation of the university through being more relevant to the needs of the industry and thereby attracting more students and financial support for its programmes. BAU is the lead university in fisheries in Bangladesh so having an internship programme would contribute towards the university remaining so as well as providing a model for other universities with fisheries degree programmes to follow.

The project also improved the links with organizations hosting the interns e.g. in Nepal such as the National Agricultural research Council (NARC), the Directorate of Fisheries Development (DOFD) which employs national aquaculture extension specialists.

Prior to the internship programme, RIA 1 never had links with India and Malaysia which were forged through foreign interns. India sent three students from Tamil Nadu to Nepal and both students and faculty benefit from exchange of ideas and experience.

#### **4.4 Benefits for farmers**

Most hatchery owners and managers, and even less grow-out farmers, are not fishery graduates and have limited theoretical knowledge about genetics, indigenous fish, broodstock quality and adverse effects of various drugs and chemicals. Interns could provide the latest scientific knowledge on these topics. Most hatcheries only focus on the production of seed of common species but interns could help them to breed indigenous species.

#### **4.5 Benefits for companies**

Companies now realize that there is a potential pool of future employees; they can use the internship to evaluate prospective employees before they hire them; and internship students can also provide companies with up to date knowledge so there is a two-way interaction between theory and practice.

#### **4.6 Availability of jobs for graduates**

This varied widely among the interns from the partner institutes. Many if not most of the M.Sc. interns from Vietnam with a dynamic aquaculture industry and Nepal with much poorer developed aquaculture but with far fewer graduates already had a job before they enrolled for the M.Sc. degree and most would return to the same place of employment although sometimes in a higher position. In contrast, most of the interns in Bangladesh had enrolled directly in the M.Sc. degree programme immediately after graduating with a B.Sc. None of the 11 interns in the second batch had a job as they would only graduate in 2011. None thought that they would be hired by the aqua-industries at which they did their internships in the Mymensingh area due to the relatively small scale of the farms but it was thought that some shrimp farms in the south would possibly be able to hire them. A student who worked on climate change for his internship would like to continue as a researcher in this field. In reply to a question on setting up their own aquaculture farm following graduation, the interns replied that they would not be able to do so although some previous graduates who had been hired as upazilla fishery officers later set up their own farm after gaining more experience as it was financially better than a government salary. Some other BAU graduates have set up their own farms e.g. Reliance Aqua Farms was set up by a BAU graduate but he received support and financial help from Md. Sazzad Hossain of Sushama Feed who earlier himself had not been able to obtain a bank loan to start his aquaculture business.

According to the interviewed students in Batches 2 and 3, some of the 11 Batch one interns got jobs in the sector: 3-4 as upazilla fisheries officers, 1 at BFRI and 1 as a university teacher in Sylhet. However, others got jobs in other sectors such as banking and finance. This albeit incomplete reporting does not seem to agree with the comments of the Batch 1 interns interviewed while still at BAU in July 2010 during a monitoring visit which reported that 'almost all of them have already made arrangements either to establish their own farms or have been requested to assist by the companies/farms at which they were hosted...they showed no worry for the government job'. Professor Wahab also stated during the review that at least 10 of interns would 'make their own aquaculture business' although the interns did not confirm this.

#### **4.7 Poverty versus commercial aquaculture**

Few internships were directly related to working with poor farmers in Vietnam, especially in S.Vietnam; the vast majority involved the development of technology on government research stations or hatcheries or large-scale private hatcheries or grow-out farms. Most of the internship topics in RIA 1 were carried out through their previous place of employment at which they worked following graduation with a B.Sc. although they said that it broadened their knowledge and skills as mostly they selected new topics for their internship.

The process of selection of internship topics is driven by the students' job aspirations and almost all interns in S.Vietnam preferred to work in a company rather than for government provincial extension services as they believed it would be more useful for the development of the country as well as paying them more. Most wish to work in commercial aquaculture and aquaculture industry rather than aquaculture for rural development. It has now been recognized that the poor may benefit more in general from employment in large-scale commercial aquaculture and in input supply, processing and marketing i.e. along the whole value chain, than being farmers on their own small-scale farms. Nevertheless, there is a need to explore internships through provincial extension. It may be possible to target provincial

extension for internships but there are few students from provincial extension offices and most are weak students with a low GPA.

In contrast in Nepal all the internships were concerned with farmers and mostly small-scale farmers as large-scale aquaculture is only now starting to develop. Most of the interns in Nepal previously worked for the government to which they will return on graduation and their topics were directly related to small-scale farming e.g. farmer cage fish culture in the Pokhara Valley, decentralized seed production, and survey of farm production of small indigenous species (chhadi). All previously had government jobs following their B.Sc. to which they returned on graduating with an M.Sc. A large-scale farm was visited in the Terai in Nepal which has already started to culture striped catfish and GIFT tilapia intensively whose owner intends to host interns in the future so not all Nepali interns in future will be directly involved with poor farmers.

#### **4.8 Foreign interns**

More foreign students are now seeking to spend time abroad through the internship programme as they are motivated to help developing countries and later seek employment through international and developed country development agencies and NGOs. They may also be able to help faculty to prepare and edit English language reports, papers and brochures.

The interns benefitted from interaction with foreign interns through improving their English; learning to be more flexible when dealing with people from other cultures; and the development of links or networks.

Foreign students cannot work in the field at Nong Lam University without major supervision and logistic support so need to work on the on-campus farm or in laboratories of international companies rather than in provincial governments because of the language problem. Furthermore, the farming community is very suspicious of outsiders. In contrast, RIA 1 has several projects through which interns can be conveniently accommodated.

Foreign interns paid all their own expenses except for laboratory materials and supplies.

#### **4.9 Scheduling**

There has been a problem with scheduling the internship as it is difficult for the students to do it when taking other courses unless the internship is carried out in a company or on a farm near the university. It is impossible if the internship site is a remote farm. Although there are advantages to do the internship before the thesis as outlined above, if done after completion of the thesis before the award of the degree it still increases the value of the degree and therefore job opportunities. At Nong Lam University it was suggested that it may be better to offer the internship after thesis defense.

### **Section 5 - How the project could have been delivered better (administratively and programmatically) and recommend improvements for future endeavors**

#### **5.1 Internship course versus M.Sc. thesis**

There was confusion of the internship with the thesis in the first batch of internships in Nong Lam University university as the internship was viewed as part of the M.Sc. thesis. As the project intended for them to be separate, this was done with the second batch of students onwards.

## **5.2 Suggestions from interns**

The following suggestions were made by interns on how to improve the internship: there be a more formal orientation for internships; there should be an opening ceremony with the student and supervisor at the internship site at the start of the internship with the supervisor providing on-site guidance as most faculty did not visit their interns in the field; the interns pointed out that it is important for their supervisors to go into the field with their individual internship students and not on a single field trip with all the interns in a given batch of interns; there should be more interaction between interns so that they could better share ideas and experiences; the programme should be expanded to benefit more students from poorly developed provinces and areas; as aquaculture is underdeveloped in Nepal more internships should be awarded as trained manpower is limited in the country; the internship should be improved through provision of increased funds; students from Bangladesh and Nepal where aquaculture is less developed should have a chance to do an internship abroad where aquaculture development is more advanced and farmers are more entrepreneurial; on the allocation of resources to each intern, students should not all receive an equal amount of funding as more money should be given to promising students identified through competition through writing a budgeted proposal as well as students who have just graduated with a B.Sc. who should receive more financial support than those working for government or a company as the latter could receive support from their place of employment; students should carry out their internship near home if feasible where they could stay so that the internship would be cheaper or they could use more money for the work; farms and companies should be encouraged to support internships. The time, 3 months is too short, and 6 months would be better and enable fish bred during the internship to be followed through grow-out; fish breeding is a seasonal activity and an internship in a hatchery needs to be carried out during this period.

## **5.3 Funding for future internships**

A major issue in all four partner institutes is how to continue their internship programmes in future without external project funding although the severity of the problem varies.

In BAU, IAAS and Nong Lam University resources were reported to be very limited. Although interns thought that the money was hardly sufficient, they were able to successfully complete them. Furthermore, some of the students not selected to do an internship at RIA 1 through the EU-funded project were able to carry out an internship through self financing, project or company sponsorship.

Suggestions for funding without project support were: each institute could provide some seed money; perhaps students could pay towards their internship as they do for 3 the day field trip in the Aquaculture Systems course to the Mekong Delta in which the students pay for food and lodging; many projects have activities suitable for internships; private farms and companies could be convinced of the value of the internship to them as the intern would provide free labour as well as make suggestions how their operation could be improved and provide new knowledge; the internship could be advertised locally so that companies could

pick up students as free workers although this would be more difficult for provincial aquaculture departments although they should support their extension officers for an internship.

It would be easier for an institute to provide internships if it had on-going projects. RIA 1 has several nationally and internationally funded projects through which students could do an internship.

It was suggested that the University Grants Commission of Bangladesh could be a possible source of funding for continuing the internship at BAU.

#### **5.4 Funds for equipment and research**

The first phase of the Asia-Link project did not provide funds for research unlike the second internship phase and was thus more attractive to students.

#### **5.5 Poverty targeting**

It may be possible to target provincial extension for internships to increase the direct impact of aquaculture on poor and small-scale farmers. However, in S. Vietnam although there are few students from provincial extension offices and most are weak students with a low GPA.

#### **5.6 Fostering entrepreneurship on university campuses**

Clearly there is a need for the university to foster entrepreneurship through its own operations as well as through student internships. Although IAAS, Nepal has a campus farm, Tribhuvan University to which the institute currently belongs, takes any money earned through sale of produce so there is no incentive as in Land Grant universities in the USA which can farm their land to benefit their programmes. A resolution has recently been passed to convert IAAS into the University of Agriculture and Forestry separate from Tribhuvan University so that it should be able to set up a policy giving official support for income-generating activities, including the establishment of a campus fish farm in the Department of Aquaculture through which the internship programme could receive financial support. Government research institutes in Vietnam are now expected to be entrepreneurial and generate most of their funding rather than relying on the government as in the past.

#### **5.7 Expanding aquaculture**

Aquaculture is expanding rapidly in Asia so there is potential for internship programmes in other universities besides the four in the EU-funded internship project. It was suggested that there is potential for an internship programme in all 10 universities in Bangladesh with fisheries programmes as well as in newly emerging universities. The same surely applies to other countries in the region.

### **Appendix 1 - ToR**

The main purpose of this evaluation is to assess short and long-term project impacts. Specifically, the consultant will:

- Visit each of the four partner institutions on mutually agreed/arranged dates

- Interact face-to-face with partner institution's higher authorities, local project coordinator, instructors involved, students, alumni and other relevant stakeholders
- Use instruments to identify areas of strengths and weaknesses for each institution in effective utilization of project generated inputs
- Identify strengths and weaknesses of the project goal/objectives and lessons for future such initiatives
- Provide input on how the project could have been delivered better (administratively and programmatically) and recommend improvements for future such endeavors.

## Appendix 2. List of RIA No. 1 interships

No.	Name of student	Research title	Time	Working address
<b>Batch 1</b>				
1.	Mr. Ngo Van Chien	Study for improving production efficiency in mono-sex Tilapia in spring time in Northern Vietnam” at Genetics and Selection Department, RIA.1.	Feb.-May, 2008	Manager of Private Tilapia farm in Tay Ninh province (in the South of Vietnam)
2.	Ms. Nguyen Thi Hoa	Effect of protein levels content in feed to breeding capacity of Nile tilapia broodstock ( <i>Oreochromis Niloticus</i> ) – NOVIT 4 strain” at Department of Applied Biology, RIA.1.	Feb.-Nov., 2008	<ul style="list-style-type: none"> <li>- Depart. of Applied Biology in Aqua., RIA.1. Team leader for tilapia seed production &amp; selection to supply for domestic market; working for several projects.</li> <li>- Transferring technology on mono sex tilapia seed production to two provinces during 2009-2010.</li> <li>- Participation on TOT training for extensionists on tilapia</li> <li>- Running a private farm on tilapia seed production with her family.</li> </ul>
3.	Ms. Pham Thi Yen	Research for external parasites and its harmful effect on Cobia in young fish stage” at RIA.1; Aquaculture Research Sub-Institute for North Central in Nghe An and Quy Kim Experimental Farm in Hai Phong.	March-Nov.,2008	<ul style="list-style-type: none"> <li>- Deputy of Disease and Environment Department at Sub-Institute of Aquaculture Research in North Central Coast. RIA.1.</li> <li>- Technical consultants, training for farmers in Nghe An and nearby provinces</li> </ul>
4.	Ms. Dang Thi Thanh	Research effects of temperature, salinity on survival and growth rate of <i>Metrix lyrata</i> ) from larval stage to bottom dweller in hatcheries in Tien Hai district, Thai Binh province.	Feb.- Oct., 2008	Deputy of Scientific and Technology Transferring Center - Aqua. Extension Center in Hai Phong province
5.	Mr.Hoang Hong Chung	Surveying some technological solution in order to contribute to increase the survival rate in artificial breeding production of Blue Crab ( <i>Scylla serrata</i> )” at Hai Yen Hatchery, Hoang Phu commune, Hoang Hoa district, Thanh Hoa province	April-Oct., 2008	<ul style="list-style-type: none"> <li>- Head of Aqua.Extension Division, Agr.&amp; Aqua. Extension Center in Thanh Hoa province.</li> <li>- Member of Joint Stock Company on Aquatic Seed Production</li> </ul>

				- Technical consultants for farmers in Thanh Hoa as well as nearby provinces.
<b>Batch 2</b>				
6.	Vu Xuan Tich	“Study solution of feed and shelter on rearing mud crab ( <i>Scylla paramamosain</i> ) from crablet stage to seed stage” at Minh Tam hatchery, Dong Minh commune - Tien Hai district – Thai Binh province”	April-Sep., 2009	Head of Aquaculture Group, Sales and Marketing Department. Vietnam Veterinary Products Joint Stock Company (VINA VETCO). Ha Noi.
7.	Chu Chi Thiet	“Study on using probiotic for biomass culture of rotifer for feeding larvae stage of marine finfish” at Aquaculture Research Sub-Institute for North Central, Nghi Hai commune, Cua Lo district, Nghe An province.	July-Aug., 2009	Director of Sub-institute for Aquaculture in Northern Central Coast, Nghe An province. (RIA.1).
8.	Tran Thi Kim Anh	“Study on the effect of different feeding regime and feeding rate on growth and survival rate of clam larvae ( <i>Meretrix lyrata</i> ) from D-veliger to spat stage in artificial production condition at Aquaculture Research Sub-Institute for North Central, Nghi Hai commune, Cua Lo district, Nghe An province and Hai Tuan private farm, Kim Son district, Ninh Binh province	July-Aug., 2009	Lecturer at Aquaculture Division, Agriculture and Forestry Department, Agriculture and Forestry University. Responsible for the subjects “Technique of breeding and culture mollusc” and “Technique of breeding and culture marine fish”
9.	Nguyen Anh Hieu	“Artificial reproduction of Track eel ( <i>Mastacembelus favus</i> Hora, 1924) at National Broodstock Center, Phu Tao Ward, Hai Duong province”	April-Dec., 2009.	Genetic and Selection Department, RIA.1
10.	Le Van Thanh	“Intensive cage culture of some high-valued marine fishes in the Nghi Son Gulf, Thanh Hoa province and possible solutions to increase productivity and economic efficiency”	June-Nov., 2009	Lecturer at Agriculture, Forestry and Aquaculture Department - Hong Duc University, Thanh Hoa province Responsible for the subjects “ Technique of breeding and culture marine fish”; Feed and Feeding in Aquaculture”

Batch 3				
11.	Nguyen Quang Dat	“Monitoring changes of water environment factors in shrimp ponds” at Kim Trung fishery cooperative, Kim Trung commune, Kim Son district, Ninh Binh province	March-June, 2010	Director of Freshwater Aquatic Seed Center in Ninh Binh province
12.	Nguyen Thi La	“The changes in species components and the density of toxic algae in concentrated mollusc culture area in Ban Sen commune – Van Don district– Quang Ninh province”	April-July 2010	Centre for Environment and Disease Monitoring in Aquaculture. RIA.1
13.	Bui Van Dien	“Understanding and experiment some technologies to improve seed production of mud crab” at Bang La hatchery of fisheries, Do Son district, Hai phong province.	June-July, 2010	Deputy Director – Brackish-water Aquaculture Research Centre in Quy Kim, Hai Phong city (belong to RIA.1)
14.	Duong Van Luong	“Social and technical assessment of fish grow-out culture practice in the frame of cooperative in Tan Yen district, Bac Giang province”	Feb.-Aug., 2010	<i>Submit application to work for Agriculture and Rural Development in Bac Giang province (where he did internship)</i>
15.	Truong Tien Hai	“Artificial production of <i>Penaeus monodon</i> ( <i>Penaeus monodon fabriciut</i> 1798) at Quynh Lien Aquatic Seed Center- Quynh Luu district- Nghệ An province”	March-July, 2010	Lecturer at Agriculture, Forestry and Aquaculture Department - Hong Duc University in Thanh Hoa province. Responsible for subject “Techniques on breeding and culture crustacean”
16.	Le Duc Thuan	Study the process of hatching larvae shrimp seed ( <i>P. monodon</i> ) and evaluate the effects of biological products PC-1 Super Probiotic Pure to environment of artificial hatching larvae shrimp seed ( <i>P. monodon</i> ) in Hai Yen <i>P. monodon</i> seed production unit - Hoang Phu commune - Hoang Hoa district - Thanh Hoa province	June-July, 2010	Head of Applied Farm – Aquatic Breeding Center. Thanh Hoa province.

Note: interns of batch 1 and 2 have been completed their MSc programme at RIA.1; Interns of batch 3 will be graduated in April, 2011.

### Appendix 3. List of BAU internships

Appendix 3. Details of BAU internships, second batch.

<b>Intern</b>	<b>Title</b>	<b>M.Sc. Supervisor</b>	<b>Field Supervisor</b>	<b>Aqua-industry</b>
Md. Adibul Islam	Effect of temperature on monosex tilapia egg production	Professor Md. Abdul Wahab	A.B.M. Shamsul Alam	Agro 3 Fish Hatchery and Culture Farm
Lipi Rani Bhowmik	Factors influencing tilapia fry mortality during transportation	Dr. Harunur Rashid	A.B.M. Shamsul Alam	Agro 3 Fish Hatchery and Culture Farm
Kanij Rukshana Sumi	Effect of different protein levels of fry feed on tilapia fry quality	Dr. Monoranjan Das	A.B.M. Shamsul Alam	Agro 3 Fish Hatchery and Culture Farm
Md. Waheduzzaman	Induced breeding technique of Indian major carps and Thai koi	Professor Mostafa Ali Reza Hossain	A. K.M. Nurul Haque	Brahmaputra Fish Seed Complex
Md. Rajib Sharker	Seed production techniques of indigenous magur and shing	Professor Md. Mukhlesur Rahman Khan	A. K.M. Nurul Haque	Brahmaputra Fish Seed Complex
Zannatul Ferdous	Optimization of dose of methyl testosterone for tilapia	Professor Md. Mohsin Ali	Ritish Pandit	Reliance Aqua Farms
Rayahana Yeasmin	Utilization of organic sediments from an intensive aquaculture pond	Professor S.M. Rahmatullah	Ritish Pandit	Reliance Aqua Farms
Md. Sultan Mahmud	Overview of a fish feed industry and its operation	Dr. Md. Kamal	Md. Sazzad Hossain	Shushama Feed
Shekh Md. Arshad Bin Shahid	Report on maintenance of nutritional quality of fish	Dr. Md. Nurul Absar Khan	Md. Sazzad Hossain	Shushama Feed

	feed			
A.H.M. Mohsinul Reza	Current breeding practices of six fish species and overall hatchery operation	Dr. Zakir Hossain	Md. Abdul Kadir Tarafder	Shushama Feed
Md. Tarikul Islam	Environmental impacts of climate change in aquaculture in Bangladesh	Dr. Nesar Ahmed	Md. Abdul Kadir Tarafder	Shushama Feed