

**Aquaculture without Frontiers Volunteer Assignment**

**Tabasco, Mexico**

**Assignment Report**



**Submitted by:**

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## Volunteer Assignment Description

**Beneficiary Organization:**

Lacadon Village farmers' cooperative

**Location of Project:**

Villahermosa, Mexico (workshops) and Tacotalpa, Mexico (farm visit)

**Description of Assignment:**

Provide training on integrated aquaculture/agriculture systems through the presentation of a multi-day workshop and farm visit.

**Dates of Assignment:**

August 12-19, 2010

**Brief Background on Beneficiary Organization:**

A village of Lacadon farmers purchased tanks for fish culture, but have no training on how to integrate the fish culture into the irrigation of their vegetable, bean and corn farming.

**Proposed Objectives of the Assignment:**

The primary objective of this assignment will be to help the farmers design and build the plumbing and irrigation system that will allow them to grow fish and vegetables. The training will also include instruction on the basics of nutrient cycles and how sustainable farming will allow the farmers to get certification in Best Management Practices so that they can get better prices for fish in local and international markets.

**Tasks to be carried out:**

1. Review sustainable aquaculture methods and certification programs with farmers.
2. Contribute to supervision and actual construction of an integrated fish and vegetable system.
3. Describe to farmers how the certification programs operate and how they might benefit by getting products certified.
4. Discuss the nutrient cycles and water quality issues of integrated farming system and how fish effluents will benefit vegetable and tree crops.

**Expected Number of Persons to be Trained (m/f):**

20 M / 10 F

**Required expertise of Volunteer:**

Sustainable practices and certifications, tilapia, vegetable production

## Planned Agenda



### Universidad Juárez Autónoma de Tabasco

División Académica de Ciencias Biológicas

Laboratorio de Acuicultura Tropical

#### Workshop on Integrated Aquaculture Agriculture Systems

#### Registration 9-10 AM

<b>Jueves 12</b>		
<b>Time</b>	<b>Topic</b>	<b>Instructor</b>
10:00-12:30	Introduction Concepts of Integrated Aquaculture Agriculture Systems (IAAS) Practical activity	PhD. Candidate Rafael Martínez García
<b>12:30-13:00</b>	<b>Break</b>	
13:00-14:00	Historical perspective IAA projects on development	
<b>Viernes 13</b>		
9:00- 12:00	Principal objectives of the IAAS Function and development of IAAS Implementation of IAAS	Dr. Dennis McIntosh/ Dr. Kevin Fitzsimmons
<b>12:00-13:00</b>	<b>Break</b>	
13:00-15:00	Actual status of IAAS projects around the World * Special participation Dr. Kevin	
<b>Sábado 14</b>		
9:00- 14:00	Tentative field trip	
<b>Lunes 16</b>		
9:00-11:00	Organic cycles involved in IAAS	Dr. Dennis McIntosh
11:00-12:00	IAAS Project engineering	
<b>12:00-13:00</b>	<b>Break</b>	
13:00-14:00	Presentation of practical activity	
<b>Martes 17</b>		
9:00-12:00	Development process of IAAS	Dr. Dennis McIntosh
<b>12:00-13:00</b>	<b>Break</b>	
13:00-14:00	Future perspectives of IAAS	
14:00	Closing	

The practical activity will consist on a team project, where participants will form multidisciplinary work teams and will design a IAAS project on a rural community with all the phases (selecting fish, crops, ponds etc., etc.). This project will be presented by groups on Monday afternoon.

## Summary of Volunteer Activities by Day

### Thursday August 12, 2010

Volunteer Dennis McIntosh travels to Villahermosa, Mexico from his home in Clayton, Delaware, meeting up the Kevin Fitzsimons en-route. Fitzsimons and McIntosh are met at the airport by Rafael Martinez and Pablo Gonzales, and escorted to the hotel in Villahermosa.

### Friday August 13, 2010

Drs. McIntosh and Fitzsimons present an overview of integrated agriculture aquaculture systems (IAAS) at the Universidad Juárez Autónoma de Tabasco to 34 participants. A list of the workshop participants is included below. Dennis' initial presentation was entitled 'The Rationale Behind Integrated Aquaculture Agriculture Systems,' which provided an opportunity to introduce himself to the audience and set the stage for why integration of these two disparate production systems makes sense. Dr. Fitzsimons' presentation provided a more global overview of the current status of IAAS.

### Saturday August 14, 2010

On Saturday we visited the Lacadon village in Tacolapla (Fig. 1). Here we met members of the farmers' cooperative and saw their aquaculture production facility (Fig. 2). The farmers have identified a suitable location (Fig. 3) where they would like to produce vegetables, though currently do not have the knowledge to set-up an integrated agriculture aquaculture system (IAAS). Their intent is to produce a variety of crops both for their own use, but also as a means of generating income. The proposed site will need to be selectively cleared to make planting space for the IAAS, however, many of the larger trees will be retained.



Figure 1. Lacadon village in the Mexican state of Tabasco.

After evaluating the water supply, aquaculture system, proposed site and listening to the farmers' expectations, volunteer McIntosh offered suggestions on how the integration could best be realized. The proposed system will utilize a series of flood irrigated raised growing beds.



Figure 2. Aquaculture tanks in use by the farmers' cooperative to grow tilapia.

One of the issues with the overall layout of the village's site is the need to convey 'waste water' from the aquaculture production tanks across the stream to the planting location. While this presents a hurdle, it does not appear to be a

significant one, and a solution was easily identified. The second, and perhaps larger, issue that is present is the ability to manage water outflows from the aquaculture production tanks independently of crop irrigation needs. This is germane, given that one of cooperative's goals in establishing an IAAS is to minimize their impact on the local stream. Plans for an IAAC therefore must account for times when discharges from the aquaculture tanks are mandated but plants do not require additional water. The suggested solution to this problem is the use of a variety of plant production beds that are each irrigated from a common supply. If designed accordingly, the common supply could also act as a settling basin, providing a simple means of filtering their aquaculture effluent prior to its discharge back into the stream even if no water is needed for plant irrigation.



Figure 3. The proposed planting location for the Lacadon village farmers' cooperative IAAS.

The use of a common water supply system and the resultant ability to control the water supply to each bed individually will ensure that: 1) minimal filtration is provided to all water leaving the aquaculture production tanks, 2) adequate water is supplied to each crop to suite its needs, eliminating over or under watering, 3) the settling basin could also serve as an area where plants could be grown hydroponically, and 4) solids wastes from the aquaculture production tanks can be concentrated and utilized independently of the discharged water.

### **Sunday August 15, 2010**

McIntosh and Fitzsimmons were invited to the home of Dr. Wilfredo Contreras to relax and socialize with members of the faculty and staff of the Universidad Juárez Autónoma de Tabasco.

### **Monday August 16, 2010**

Fitzsimmons departs to Oaxaca for other business. McIntosh continues the workshop started the previous week at the Universidad Juárez Autónoma de Tabasco. He presents two additional presentations, entitled 'Understanding Water Quality & Water Quality Management' and 'Design Aspects of Aquaculture Systems.'

**Tuesday August 17, 2010**

On the final day of the workshop, McIntosh presents two final presentations, entitled 'Design Aspects of Plant Systems' and 'Wrapping It All Up.' In addition, workshop attendee groups presented their IAAS concepts. All of the presentations were well done, and many incorporated ideas and information from the workshop presentations, providing evidence of information incorporation.

**Wednesday August 18, 2010**

On the final day in Mexico, McIntosh visits the Mayan ruins at Palenque, to learn about the history and culture of the region, accompanied by Rafael Martinez, María de J. Contreras García and María Fernanda Cifuentes Alonso.

**Thursday August 19, 2010**

McIntosh departs Villahermosa Mexico and travels to his home in Delaware.

**Summary of Activities**

A series of PowerPoint presentations were made by Dennis McIntosh in an attempt to educate the workshop participants on integrated agriculture. The intent was not to provide a rigid approach to the design and establishment of IAAS, but rather to provide the participants with an understanding of the basic principles associated with fish and plant production that need to be incorporated into any IAAs plan.

Copies of the PowerPoint presentations used in this workshop will be provided if desired. Please contact Dennis McIntosh at 302-857-6456 or [dmcintosh@desu.edu](mailto:dmcintosh@desu.edu) to make a request.

## Workshop Participants

1. Salomón Páramo Delgadillo
2. María Fernanda Cifuentes Alonso
3. Estuardo González Arévalo
4. María de J. Contreras García
5. Pablo González Alanís
6. Lili Pérez Martínez
7. Rosa Aurora Pérez Pérez
8. Asunción Pérez Demecio
9. Flavio Pérez Pérez
10. Librado Demecio Álvarez
11. Petrona del Carmen Govea Ek
12. Anahi del Carmen Cachón Camacho
13. Jesús David Magdonel Zurita
14. Julián Sánchez Álvarez
15. Fernando Víctor Iriarte Rodríguez
16. Irma Gallegos Morales
17. Mario Fernández Pérez
18. Maximiano Antonio Estrada Botello
19. Roberto Flores Botello
20. Nancy Patricia Brito Manzano
21. Álvaro Alejandro Zacarías Sánchez
22. Alfonso Manuel Güemez Flores
23. Benigno Domínguez Santiago
24. Marisol Palma López
25. Isaías López Castañeda
26. Ady Ramírez Hernández
27. Henry Manuel Ramos Jiménez
28. Beatriz Adriana Hernández Vera
29. María Domitila de la Cruz Valencia
30. Álvaro Hernández Sosa
31. Luis Domínguez Trejo
32. Priscila Anaís González Pérez
33. María del Carmen De la Cruz Ávalos
34. Luis Manuel Gómez Díaz Durán
35. Rafael Martinez Garcia

Dennis McIntosh

Kevin Fitzsimmons

Wilfrido Contreras Sanchez