

Farmer & Fish Farmer Field Schools

Final Report to Rufford Foundation

Yayasan Akar Rumput Laut
(Mangrove Action Project - Indonesia)



Synopsis: Financial support from the Rufford Foundation enabled 100 villagers from two villages to design and implement their own development projects in the fields of agriculture and aquaculture. A 64 person farmer organization from Motean Island called *Kelompok Petani Gragalan Mataram* was formed and together with farmer facilitators IPPHTI built a farmer meeting center (with their own funds and resources) called "Wadah Petani Gragalan Mataram." They next developed a 1/8 hectare sustainable agriculture demonstration plot featuring 12 types of organic fruits and vegetables. The group also received permission for each husband and wife couple to open 1/8 hectare of previously unclaimed land. The farmer group has prepared a rice-aquaculture demonstration plot but is waiting until the onset of this rainy season (October, 2005) for planting and fish stocking.

In the nearby village of Lempong Pucung, 30 farmers will begin farmer field school in August 2005. Before field school begins, a subset of this group was involved in a sustainable aquaculture project in a disused milk fish pond adjacent to a Livelihood Training Center recently completed in August 2005. The sustainable aquaculture project involves hydrological improvements to the disused pond, and planting of various species of mangroves on terraces at the pond edge. The group studied raising crabs or shrimp from nearby communities but chose tilapia for ease of rearing, abundance of initial stock, tolerance to low-oxygen levels and self establishment. Other species inhabiting the ponds will be harvested for subsistence. The group is now expanding the project to a larger disused shrimp and milkfish pond nearby.

Cost-benefit analyses of both programs will be made available by Yayasan Akar Rumput Laut in June 2006; data is being recorded by the farmers and fish farmers themselves.

Motean Island – Gragalan Farmers Group Case Study

Project Selection

After working with Asia Pacific Study Center for 3 years on a multi-disciplinary participatory research project, the community of Motean identified three development needs; 1) assistance in developing open ocean fisheries, 2) assistance in developing farming activities, 3) assistance in developing small-scale aquaculture. Upon receipt of the Rufford Foundation support, Yayasan Akar Rumput Laut and the Asia Pacific Study Center of University of Gadjah Mada held village meetings to determine the best way to proceed. Twenty-five village members agreed that development of open-ocean fisheries was beyond our means, but were split in deciding to pursue development of agriculture or aquaculture activities. An idea to combine activities was suggested by Yayasan Akar Rumput Laut, and the group opted for a rice-aquaculture project. Yayasan Akar Rumput Laut enlisted the assistance of farmer trainers from IPPHTI (Association of Indonesian Farmers for Integrated Pest Management).

IPPHTI was invited by 25 villagers from Motean to teach "Farmer Field School," at an area of newly accreted land in Gragalan, 1 hour from their island by boat. Around 8 farmers had already begun to open lands in that region for agriculture, but worried that the government would force them off the land, to which they had no claim. Land ownership issues in the region are complicated. It was the thought of YARL and IPPHTI to go ahead with the project, expecting that the process of working the land would unite and empower the farmers, who could then approach the government to request land utilization titles (which as it turns out worked).

Because the farmers were newly converts to farming from fishing, it was decided to begin with a field school on soil ecology and to open a demonstration plot for sustainable agriculture.

Since it was the onset of the dry season by the time we got started, the group opted to raise dry land crops and to dig a well

near the demonstration plot for irrigation purposes. If things went well, they would begin the rice-fish demonstration during the onset of the rainy season. So it was settled that the group would meet every Sunday morning for half a day for a total of 20 farmer field school sessions, practicing what they learned in their own fields during the week. Farmer field school was to last 4 months (in reality it is in its 6 month) with farmer trainers coming from nearby mainland Java.



Program Implementation

From the first meeting of 25-30 individuals, farmer field school gained popularity. By the third week, 32 husband and wife partners (plus a few dozen children) were attending each meeting. The meetings followed the following pattern: 1) Agro-ecosystem observation, 2) Agro-ecosystem analysis and presentation of results; c) 'Special topic'; and d) a 'Groupdynamics' activity. The first month of meetings began with soil ecology as the special topic and moved in time to integrated pest management.

Within a month, 64 farmers were deeply involved in farming activities. At the onset of farmer field school the group also became engaged in developing Gragalan for as a potential settlement. A bamboo structure was built to house the farmer meetings and hold equipment. This building was built with the volunteer labor of the group and bamboo from the nearby forest. Other building materials were donated by IPPHTI. A well was dug to provide water for cooking and irrigation. Electricity is provided with a diesel generator.

As the farmer group became more unified they made plans for further development. It was noted that many tourists passed the area to visit nearby Nusa Kambangan on the weekends. A kiosk was constructed on the river to sell organic produce and handicrafts. Proceeds from kiosk sales will be split amongst the farmers with a portion going to the farmer group treasury. All financial and development decisions are made by the group.

Activities at the Farmer Center of Gragalan (clockwise from top right) Discussing ways to control mung bean pests; learning theory in the farmer center; today's lesson is on planting shallots; spacing, height, water requirements, and even the ergonomics of using a hoe are demonstrated.

Halfway through the program, members of the group along with IPPHTI petitioned the regency government for land use titles. The region has a long history of land disputes, but the group felt strongly that they had the right to access and use these newly formed lands that they were farming. The head of the regency came to the farming center and was impressed with what he saw. He expressed that this type of community development for landless poor was a program that should be the responsibility of the government. He agreed to give each family in the group land utilization titles for ¼ hectare. Half of this property will be conserved as wetlands and the other half developed for sustainable agriculture. The farmer group has already cleared half of the group's plots.

Other village leaders began to take notice of the results as well. Farmer field school trainers have now been requested for 4 more villages in the region. Several of the new trainers will come from the Mataram farmer group itself.

During this coming rainy season the group will extend their farmer field school lesson to a fish-rice system. The fish rice system that they will employ is described in Appendix A. They are also buying two water buffaloes to produce organic fertilizer and fermented urine for fertilization and pest management purposes.



GRAGALAN

Lessons Learned

This activity has been highly evaluated by both the farmers group and trainers. We feel the success of this program hinged on the flexibility of all organizations involved (Rufford, YARL, IPPHTI, Community) to allow the community to identify their own needs, find solutions to their own problems and develop according to their own pace and natural conditions. The original concept was a fish farmer field school, but the group decided that they wanted to begin with agriculture and add an aquaculture component during the second part of the program.

Another major lesson learned involves the issue of land use/ownership. For a number of years the issue of community claiming these newly accreted lands (land formed by excessive sedimentation of the lagoon due to erosion from mainland Java) was discussed by various stakeholders. Local government was intent on claiming the lands for themselves. As opposed to an advocacy focus, fighting for the right to utilize the lands, the route chosen was to begin economic activity on the lands while building the strength of the community organization. When it came time to approach the government, both community and supporters were prepared to struggle for the rights to use these lands. The government in the meantime was impressed by this example of sustainable development, which is one of their own mandates for the region. In the end, both government and community are pleased with developments and are interested in using the Gragalan case study as an example of appropriate sustainable development for the entire region.



Four months after the construction of the farmer center, 64 men and women have made the transition from struggling fisherfolk to farmers and the corn is so sweet you can eat it raw.



The Future

Farmer field school will continue in Gragalan. The fish/rice demonstration will begin this rainy season (October) Expansion will take the form of each member managing their own organic farm plot and with the produce, fish and fowl going to local consumption as well as for sale at the riverside kiosk and in the markets of nearby Cilacap.

An "eco-agro-tourism" package is also being prepared by the group, enabling visitors to the region to take a boat tour that will stop for an organic lunch and cultural performance at the farmer center, and tour of the agricultural fields, before continuing onto cultural and ecologically interesting sites located on the nearby island of Nusa Kambangan.

Expansion of Farmer Field School integrated with aquaculture beyond Gragalan will occur in 3-4 more villages in the region.

GRAGALAN



Clockwise from top left:

Two fresh water wells were dug for watering the demonstration plot; The farmer center was built primarily with volunteer labour and donated bamboo; 12 kinds of crops were planted which are be harvested on weekly, monthly and seasonal rotations; Organic fertilizers are being produced and sold both amongst group members as well as regionally; Morning stretches before studying soil ecology theory.



GRAGALAN



Clockwise from top right:

*Participatory survey to shrimp auction in Pondan Village;
Participatory survey to Pondan milkfish ponds;
Program participants making physical alterations to first pond complex in Lempong Pucung*

LEMPONG PUCUNG

Lempong Pucung - Fish Farmer Field School

Project Selection

A group of 30 individuals (mostly men and many youth) met to discuss development goals for Lempong Pucung. It was decided first to create a meeting space as the village had no meeting hall. A Coastal Community Resource Center was built from local materials (primarily bamboo) during 2004-2005 with support from the Goldman Foundation. Second and third development goals were identified by the community as the need for technical assistance in developing fish farming and farming activities. Two groups were identified but as of yet no community organization has been created.

In terms of fish farming a 15 people participated in initial planning and implementation. In choosing the type of aquaculture practices to undertake the group relied on their own experience and also made several study tours of the area. The nearby village of Pondan has been operating an extensive shrimp and milkfish operation for 8 years now in an abandoned industrial shrimp farm complex. The group from Lempong Pucung felt there were too many difficulties in getting shrimp for stocking, and also was worried about expending too much of an effort on shrimp farming, taking time away from their agricultural activities. One lesson they did take away from Pondan was a low-cost method of feeding. The fish farmers of Pondan float coconut halves (coconuts are in overabundance in the region) on the surface of the ponds. Flies come and feed on the coconuts and breed, which in time yield (fly larvae) maggots on the coconut surface in decent numbers. These maggots drop into the pond and feed the milkfish.

In another nearby village, mangrove crab fattening is taking place in disused shrimp ponds. Problems of seed stock, as well as frequent cannibalism have persuaded the Lempong Pucung group from attempting mangrove crab fattening.

It was finally decided to try a silvaculture method in which disused shrimp ponds were re-graded, mangroves planted on terraces, and various fish species encouraged in the pond plus stocking of Tilapia. Feed was to be self-produced and no piscicides, chemical fertilizers or artificial aeration are to be employed. Tilapia were chosen for their ease of rearing, leaving time for farming activities as the major form livelihood.



The two ponds at left were connected to increase water circulation and pond size by creating a channel (above). The pond bottoms were deepened in places to act as reservoirs during low tide, terraces were also constructed providing variable substrate levels to support the growth of a variety of mangrove trees. The local community created the entire plan for pond rehabilitation based on experience and comparison with other small scale aquaculture in the region.

LEMPPONG PUCUNG

Community Comments

"Sorry ya, but we are not going to even think about our mangroves until we get our problems with rice farming straightened out."

- Sub-village leader when discussing future plans (Lempong Pucung).

"If we study farming, we need both men and women to study farming together, because the women in this village work in the fields with the men."

- Village woman during planning meeting (Lempong Pucung).

"I already have ideas of how I would like to farm fish, I learned from the mistakes of the larger fish ponds that used to operate here, I just need some small capital to begin."

- Fish farmer field school participant (Lempong Pucung)

"Most farmer field schools are more farmer-driven, learning from the farmer's own experiences, but in this case, being fishers, the group needed to learn the very basics of farming. Farmers and fishers have different muscles, different tools, they even squat on the ground differently."

- Farmer trainer from nearby community talking about FFS in Gragalan

"I was surprised to find out that after each season of farming rice I am losing 250,000 rupiah (US \$30)."

- Farmer field school participant (Gragalan)

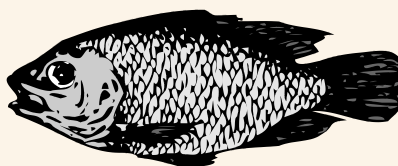
"These are the kinds of trainings that we need, directly involved in doing something practical. Too many trainings in this region are only talk."

- Village Head from Motean Island talking about FFS in Gragalan

Program Implementation

Two plots were chosen for the initial demonstration. The first small plot measures 1/8 hectare in size and is adjacent to the Coastal Community Resource Center. It is intended that some of the proceeds from this pond will be used to maintain the center. This pond is mostly to be managed by village youth. A second plot measuring 1/2 hectare in size has been chosen for a larger scale venture. This plot will be managed by a group of 10 villagers including the village leader.

The first plot has already been rehabilitated and stocked with Tilapia and Nile Perch. The rehabilitation plan involved adding culverts for increased water flow, deepening of pond interior and creation of terraces to facilitate growth of mangroves. 15 mangrove species were planted on the terraces as a test of suitability. It was originally the participants intention to plant only *Rhizophora mucronata*, but information learned from Mangrove Action Project advisor PhD. Jurgenne Primavera indicated that the leaves of *Rhizophora mucronata* contain high levels of tannin and if used exclusively in a silvafishery system can result in high mortality levels of fish.



Tilapia



Nile Perch

The first pond will be operated by village leaders and youth. The second plot was re-habilitated and stocked in the same manner of the first pond, but will be managed by the land owner directly.

Three feeding methods are being employed in the first pond.

1. Fermented stalks of water spinach (*Ipomea aquatica*) mixed with rice bran and yeast
2. Fermented water hyacinth (*Eichhornia crassipes* - 10% max), grass, rice bran, yeast
3. Duck Weed (*Lemna* spp.)

Four feeding methods will be employed in the second pond.

1. Floating coconuts to stimulate fly larvae production
2. Fermented stalks of water spinach mixed with rice-bran and yeast
3. Fermented water hyacinth (10% max), grass, rice bran, yeast
4. Duck Weed

Lessons Learned

Flexibility was again a key issue in working with this group. Farming and fish farming development will take time. Fish farming went along on schedule, studying first the various opportunities available, and then designing and building the fish pond, followed by stocking and local feed production. Continued technical support in the form of studying aquatic ecology and low-cost water quality monitoring are being facilitated by Yayasan Akar Rumput Laut staff.

Farming activities began with the Gragalan group as they were already self-organized and also because the Lempong Pucung group was involved in constructing the Coastal Community Resource Center. Originally it was thought that these activities go run simultaneously, but both community and community organizers cautioned against too busy of a schedule.

There is also quite a difference in terms of the level of organization between the Gragalan Farmers Organization and the community at Lempong Pucung. The Lempong Pucung villagers are willing to organize, but they are going slower. One reason for this is that there are already economic options available to Lempong Pucung villagers (farming) whereas the Gragalan group needed to develop farming and fish farming activities as replacements for fishing in the lagoon which could no longer support a viable livelihood. Also there are issues between the villagers and the village leaders in Lempong Pucung, whereas village leaders from Motean Island were in full support of the Gragalan Farmers Organization from the onset.

In terms of Ecology, as facilitators we were interested in aquaculture of endemic species only, but were unable to influence species selection due to community preference and availability of fry. Tilapia and Nile perch are already being cultured in the region and escapees to the wild are common. Over time, as the region changes from mangrove swamp, to fresh-water marsh to forest the region will likely see the expansion of small scale fresh-water aquaculture.



The Future

Further organizational strengthening needs to occur for the sustainability of the effort in Lempong Pucung. Formation of organizations to manage the Coastal Community Resource Center and a fish farmers group have already begun, and it is likely that a separate farmers group will form. There will likely be overlap between the members of these groups.

Fish farming activities will likely continue and expand for some time in the region, but farming seems to be the best candidate for the primary livelihood of the future. The community has also prioritized farming over fish farming and fishing for the future. This is congruent with the drastic ecological change taking place in the region. Continued sedimentation of the Segara Anakan Lagoon will further disrupt water flow into the area of Lempong Pucung making long-term aquaculture expansion unlikely. PhD. Tjut Djohan of the Forestry Faculty of University of Gadjah Mada has studied the Segara Anakan Lagoon for 30 years and is of the opinion that shortly we will see the conversion of the lagoon into a freshwater wetland ecosystem and eventually lowland forest.

For the meantime, however, aquaculture activities will continue to take place vis-a vis the Coastal Community Resource Center. The Lempong Pucung group will integrate fresh water fish farming with rice agriculture patterned after the Gragalan group (see appendix A). Other economic activities/trainings taking place over the next year at Lempong Pucung include "Farmer Field School," "Healthy Kitchen Program," and the continuation of bamboo industries (construction, furniture making, and handicrafts). Cost benefit analyses of farming and fish farming activities will be prepared by July 2006 by Yayasan Akar Rumput Laut in coordination with the community of Lempong Pucung.

LEMPONG PUCUNG

The farmer group "Rukun Petani" from consists of 35 individuals from 3 sub villages in Pakem Binangun. This group resides in the upper watershed, and issues are different than in the Segara Anakan Lagoon. One of the goals of the program is to link fishers and farmers from upper and lower watersheds, where dialogue and skills sharing can take place.

Rukun Petani chose to start with a 5 lesson soil ecology field school, followed by a four month integrated Low External Input Sustainable Agriculture (LEISA) farmer field school with a fish farmer field school component. In terms of marketing, orders for organic produce have already been placed by small business owners in the nearby city of Yogyakarta, and the group also maintains a kiosk where organic produce will be sold on the weekends at a farmers market.

A women's group is also being formed to think about post harvest processing for added value. Fish is for local consumption and recreation, with visitors from outside the area charged per hour to fish with hook and line in the ponds.



Testing soil for its capacity to retain cat-ions and nutrients (top-left) and aeration (top-right). Study tour to learn about home production of virgin coconut oil - VCO (right); This cooperatively owned field was planted with 4 varieties of bananas and will be intercropped with organic vegetables (bottom right) A rice/fish plot will be developed starting in the rainy season. A fish farmer measuring turbidity (bottom left) to determine level of feed/fertilizer to add to the ponds which flow out to feed the banana/vegetable patch.



Conclusions

Yayasan Akar Rumput Laut is guided by the following philosophy of Lao Tzu in our approach to community organizing and development in Lempong Pucung;

The best leaders [organizers] are scarcely known by the people;
The next best are loved and praised;
The next are feared;
The next despised:
They have no faith in the people,
And the people become unfaithful to them.

When the best leaders [organizers] achieve their purpose
The people claim the achievement as their own."

-Tao Te Ching, Verse 17 "Leaders"

So YARL is concerned in building from what already exists in the village, both human and natural resources. Feed for the fish farm comes from local vegetation and agricultural waste. Design for the fish ponds came from the fish farmers themselves. Fertilizer for the crops from water buffalo urine. The best pest control agents are traditional farmer knowledge. The facilitators in each case merely guide the process of learning/remembering. The facilitators never answer a direct question directly. During one lesson a participant asked "how do we control the insect that is harming the mung bean." The facilitator answered, "do you know the difference between an insect and a bacteria?" "Let us go and find out," and so began the days exploration.

During development of fish farming the same Socratic method is employed. "What should we feed our fish?" was answered with, "What will the fish around here eat? Let's go find out."

During the first lesson of farmer field school, the facilitator asked the farmer group if they were "merdeka" or independent. They answered in unison "independent." The trainer went on to ask if they produced their own seedlings or bought them at a store.

"Store-bought!"

"Do you produce your own fertilizer or purchase it?"

"Purchase!"

"Pesticides?"

"Purchase!"

"When you buy seedlings, fertilizer and pesticides, who sets the price, the farmers or the seller?"

"The seller!"

"When you sell your produce, who sets the price, the farmers or the buyer?"

"The buyer!"

The facilitator closes with, "...and you call that being independent?" Nervous laughter from the group.

Next the group from Gragalan was asked to count their expenditures and profits. It turned out that they spent 250,000 rupiah each month to raise a crop of rice which sold for 700,000 rupiah at the end of 4 months. They were losing 200,000 rupiah each crop. Much of this cost went to seedlings, fertilizers and pesticides. So the aim of farmer field school became the goal of liberating the farmers from external forces, making the farmers independent and autonomous. The same is the goal for fish farmer field school. So far it is working.

So without aerators and pumps, without pesticides and factory fertilizers, without buying seedlings or fish stock* the fishers and farmers are learning learn how to solve their own agriculture and aquaculture issues. In this way, when YARL and the Asia Pacific Study center are no longer directly supporting the farmers and fish farmers, "the people will continue to claim the achievement as their own."

**Note: Initial fish brood-stock were purchased, but as Tilapia will reproduce their own brood stock naturally in the ponds after initial stocking.*