Mangrove Management Challenges on Tanakeke Island

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THE ISLAND OF TANAKEKE is a coral atoll, an hour's boat ride off the southwest coast of mainland South Sulawesi in the District of Takalar. Historically, the island maintained nearly 1776 hectares of mangrove forest, which was reduced to 500 hectares over the past 3 decades at the hands of aquaculture pond development. The level of pond abandonment over the past 15 years has been high, due to a variety of factors including low productivity, competitive disadvantage with mainland fish farmers, and the intermediate success of carageenan seaweed farming as a major livelihood.

In 2010, the Restoring Coastal Livelihoods project began work on Tanakeke, through a variety of programs, the most prominent of which was the hydrological rehabilitation of disused aquaculture ponds to enable mangrove re-growth. Additional programs on gender, livelihoods, literacy and education have been run in full partnership with communities from 9 of the island's 22 *dusun* (a sub-village unit, akin to a hamlet). In year three of the RCL project, an attempt to develop mangrove management plans will be spearheaded by women's groups from each of the dusun. This paper will attempt to provide a popular, and more global context for mangrove management challenges to be faced on the island, before this endeavor unfolds. It will be interesting to track the development of mangrove management from a variety of perspectives (social, cultural, political, economic and ecological) as local communities conceptualize key issues and engage government and other stakeholders in the development of an adaptive collaborative management system. To be sure, use of resilience theory and adaptive collaborative management was not at the original behest of the community. Nonetheless, resilience theory which is being introduced visually and through discussions to community groups, is proving common sense for those who have an intimate knowledge of life among the mangroves. What has been uncovered, however, is that there a general lack of memory of what a thriving mangrove forest looked and felt like on the island? How productive was it? What was life like for fisherfolk when the mangroves were large and fish more abundant?

As island populations have increased, with a majority of the population born after pond development, and nearly the entire population born after anthropogenic selection of two *Rhizophora* species as the islands "favorite" mangrove, theses questions are not only valid, but underpin the visioning process which is part of future planning.

Recent Developments

MAP-Indonesia staff made a recent trip to Tanakeke in July, 2012, as part of a rapid assessment of the ecological and hydrological feasibility of restoring disused aquaculture ponds in a trio of new locations; Bangko Tinggia, Balang Datu and La'butallua. This work usually entails a tromp around the perimeter of the area and a pair of diagonal crossings through it, looking at the degree of contiguity of ponds, their relative position in the inter-tidal, how water flows in and out of the system, at what relative substrate elevation are the pond bottoms, what condition are dike walls in,

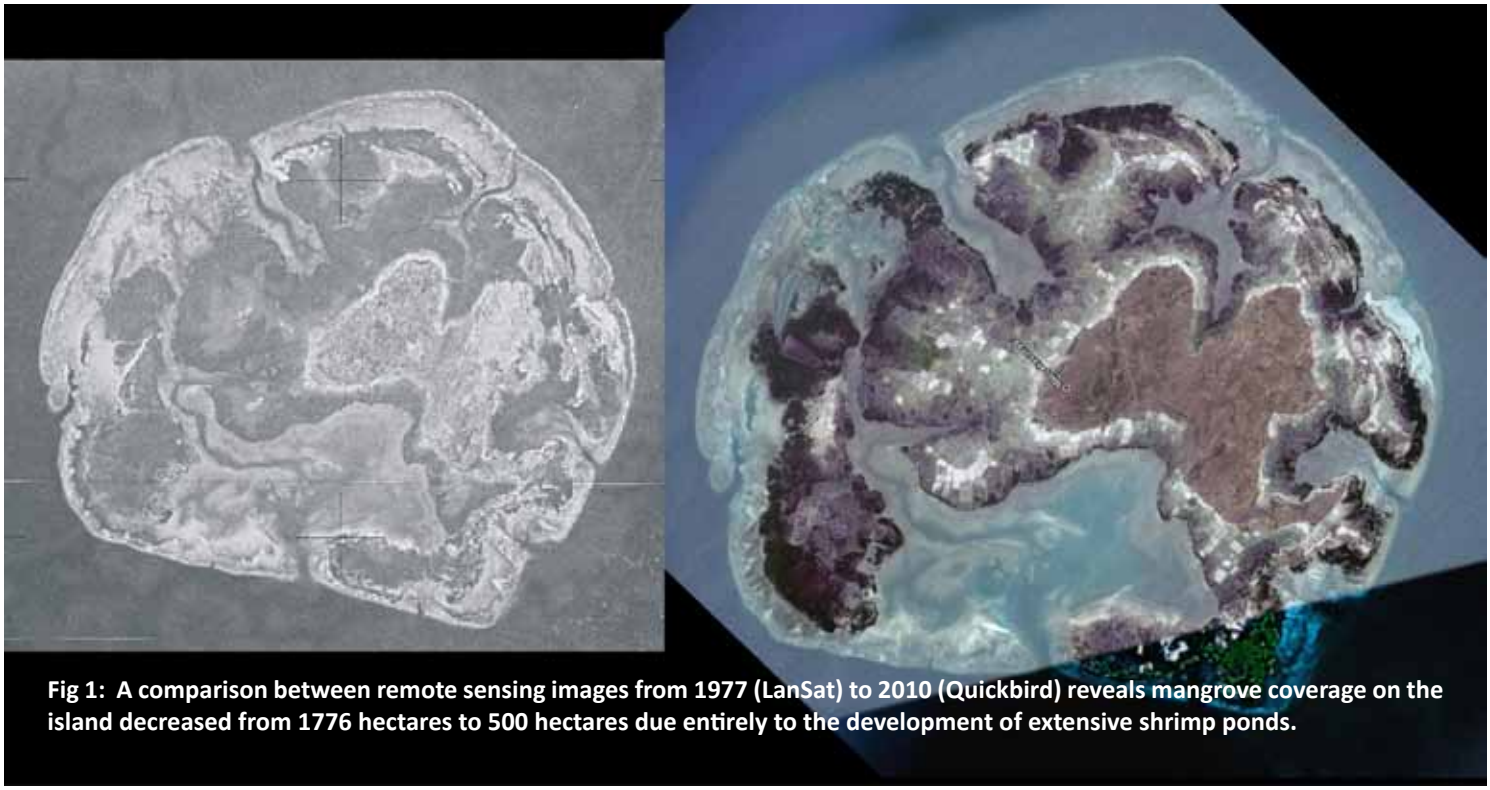


Fig 1: A comparison between remote sensing images from 1977 (LanSat) to 2010 (Quickbird) reveals mangrove coverage on the island decreased from 1776 hectares to 500 hectares due entirely to the development of extensive shrimp ponds.

evidence of natural seedling establishment and growth, and the presence of mother trees nearby, or better yet some degree of a reference forest.

These observations went apace in the three villages, uncovering at least another hundred hectares of pond area available for Ecological Mangrove Rehabilitation in year three of the project. More detailed land ownership patterns, interest in restoration and eco-physical measurements will now be undertaken. By the end of year three, it is likely that more than 350 hectares of mangrove area will have been hydrologically restored, with communities releasing a variety of mangrove propagules into the area at regular intervals, and engaged in some trial planting. Although underplayed in the paragraph above, achieving this level of community agreement to restore ponds is no mean achievement, albeit only one stepping stone along the path of improved management. What was more startling, was the increasing slipperiness of some of those other stones.

Indeed, charcoal making is not a new endeavor on Tanakeke Island. The main practitioners are a group of several families from one of the island's smallest dusun, Kampong Beru. During year two of the RCL program, a Mangrove Charcoal Field School was held with this group, which uncovered information about charcoal production and practices (summarized in Figure 3), and explored improved efficiencies with the addition of chimneys, use of recycled oil drums as kilns, and distillation of charcoal vinegar.

In separate studies, growth of Tanakeke's mangroves was deduced from several chronoseres (sites experiencing regrowth, due to planting or natural revegetation over time), aged 6, 8, 12 and 20 years. Growth data was compared to a pair of growth curves generated by JICA and the Ministry of Forestry (JICA, 1999), which included a high-growth curve with five algorithms and a low-growth curve with five algorithms. Growth data from Tanakeke matched up with the lowest alogorithim from the lowest growth curve.

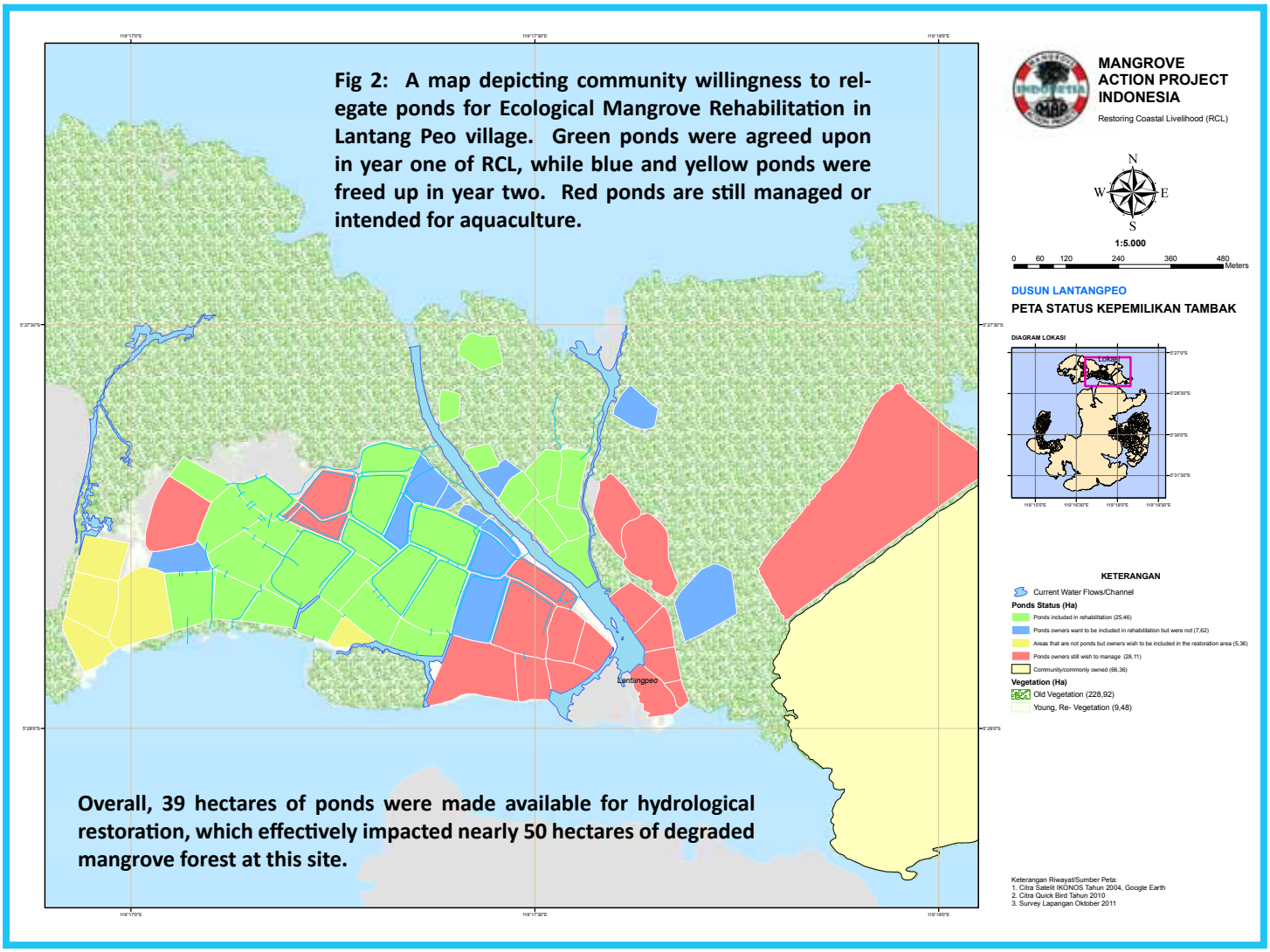


Fig 2: A map depicting community willingness to relegate ponds for Ecological Mangrove Rehabilitation in Lantang Peo village. Green ponds were agreed upon in year one of RCL, while blue and yellow ponds were freed up in year two. Red ponds are still managed or intended for aquaculture.

Overall, 39 hectares of ponds were made available for hydrological restoration, which effectively impacted nearly 50 hectares of degraded mangrove forest at this site.

Mangrove Timber Use on Tanakeke

During the walk through the first site as part of the rapid survey, we were followed by the acrid smell of charcoal making. This odor rejoined us at the second village, and upon docking up at La'Butallua, the third village, we were greeted by five long sand covered mounds of mangrove wood pyrolizing under the watchful eyes of village charcoal makers.

Mangroves on Tanakeke grow relatively slowly. This is normal on a coral atoll, with a calcareous rather than organic substrate, and very low freshwater inputs. Undoubtedly, mangrove growth rates, and overall volume are also affected by human pressures. Mangrove timber is the major source of fuelwood on the island, as well as providing timber for seaweed farms, fishing equipment and a myriad of purposes in the village.

Fig 2: CHARCOAL PRODUCTION on TANAKEKE

Dense, young mangrove forests are clear-felled for charcoal production, an occupation which does an inproportionate amount of ecosystem damage on the island compared to the small amount of financial return to a very few individuals (left)

Improving efficiencies with an adapted earthen mound kiln, with chimney and collection of pyrolytic acid for added value (below right).

Kampung Beru is home to seven individuals (representing 7 families) whose major source of income for half of the year comes from charcoal production. Charcoal makers cut mangroves on average at nine years of age, which usually grow in very dense stands (up to 10,000 stems per hectare) and exhibit low individual volumes per tree. Producers rent two 400m^2 plots of land (called borong) per month, which they clear cut and replant with five seedlings. per cut tree. Each producer, therefore, cuts 400m^2 x 2 borong/mo. x 6 months = .48 hectares of forest per year for charcoal production. **This comes out to around 3.5 hectares of mangrove clearing per year for the seven families or 31.5 hectares over a nine year cycle.**

The mangrove poles (of the genus *Rhizophora apiculata* or *R. stylosa*) are carbonized in earthen mounds. Each producer makes 40 sacks of charcoal per month, meaning 1680 sacks of charcoal are produced each year (production only occurs for around 6 months). Each sack weighs around 60kg, and is sold by the producer to a single buyer from Tanakeke at 40,000rp per sack. This is then sold for around 60,000rp on the mainland.

Charcoal production, as it stands on Tanakeke, with large inefficiencies and clearing of young trees with very low biomass, is not a sustainable livelihood option. The total carrying capacity of charcoal producers on the island a given the current mangrove resource is 111 individuals. However, this would leave no mangrove wood for the rest of the population (7000 individuals from 2500 families), who use mangroves daily for fuelwood, construction timber, seaweed farming and fishing equipment.

Charcoal production on Tanakeke only becomes viable when improved efficiencies are instituted, as well as longer cycles of silvaculture to result in higher overall biomass per hectare. Rehabilitation of disused shrimp ponds is also imperative to increase the island's available mangrove resource.

Producers involved	**7**	
Production cycle	**14 days**	
Cycles per year	**12**	
Age of tree at harvest	**9 years**	**between 6-15 years, average 9 years**
Harvest area per producer per month	**800m2**	
Total annual harvest area for 7 producers	**33,600 = approx 3.5 ha**	
Total area needed for 7 producers over 9 year harvest cycle	**31.5 ha**	**3.5 ha x 9 yrs**
Total area needed for 1 producer over 9 year harvest cycle	**4.5 ha**	**3.5 ha 7 producers x 9 yrs**
Production of charcoal/month/ Pproducer	**40 sacks (@ 70kg/sack)**	
Gross return/producer/month	**1,600,000 rp ($178)**	**40,000rp x 40 sacks**
Land rental/producer/month	**1,100,000 rp ($122)**	**per 2 borong**
Net return/producer/month (not counting own labor and tools)	**500,000 ($56)**	**1,600,000 - 1,100,000**
Total annual production (7 producers)	**1680 sacks**	**40 sacks x 7 producers x 6 months**
Total annual gross/net income from charcoal production	**$7500/$2333**	**$122 x 1680 $56 x 1680**
Current hectares available on Tanakeke	**500**	
Total producers possible for Tanakeke (current resource)	**111**	**500 ha / 4.5 ha**
Total # mangrove using individuals/families on Tanakeke	**7000/2500**	

Three - quarters of Tanakeke's settlements have no connection to dry land, meaning mangroves are the only source of fuel and timber available to most villagers. Increasing populations, sale of timber products to the mainland, and an over-simplified management practice of clear-felling of young mangrove trees (8-16 years old) followed by dense replanting (5 seedlings replanted per felled individual), have resulted in a patchwork of bare areas, and overdense monocultures of small trees.

A non-formal interview with a village leader was most telling. Daeng Nai has been village head of La'Butallua for the past 30 years. He claims he knows everything that goes on in the village and its surroundings, and is certainly a dominant character. Our boat quitely docked in the village early one morning, to drop off Ibu Murni, a teacher from neighboring Rewatayya and community organizer helping the RCL program since its inception year, after which we snuck away into the pond complex to continue our rapid survey. Upon return to La'Butallua, Daeng Nai greeted us warmly and bade us sit down for a cup of coffee and a chat. We commented on the five long charcoal mounds, and he began;

"This community usually doesn't make charcoal. It has been a while, and not everyone knows how to do it. But what can we do. Seaweed prices are low (5500 rp/kg down from 8,800 - 11,000 rp/kg three years ago) and disease is taking serious tolls on production for the first time for us."

"Sure, Ramadan is coming and people need extra income, but the problem is bigger than that. Aquaculture never panned out here. It is not like on the mainland or in Kalimantan. When investors came to build ponds, some villages believed it would make them rich. Look at Rewatayya, they are like us, in the direct path of the West Monsoon. They cut down their mangroves to make ponds and are paying for it now. I never let coastal mangroves be cut, just look around. Last year they came and tried to mine our coral and our sand. We stopped them. Without that protection or village is at risk. They threatened to come back with the police. Please do. I have made a dusun ordinance against coral and sand mining. We also do not allow mangroves from the coast to be cut either, although there is no formal regulation yet."

"We did turn some of our interior mangrove into ponds. We didn't let outside investors do it, the price they offered was not worth it. But some of our own villagers developed ponds. I helped run the excavator. Most of the ponds have been abandoned now. Some are growing back into mangroves. Others are still empty. Growing mangroves is easy if you know what you are doing. We know how. But for now we need to cut the mangroves. It doesn't matter. They don't grow big like the mangroves in Kalimantan. What can we do with them. They won't turn into large timber. We can't turn them into planks anymore. ***The mangroves are like grass*****.** We cut them and then plant them again."

Data on Tanakeke Island was taken in transects for trees aged approximately 9-12 years. Communities commonly cut trees aged 8-12 years on Tanakeke Island – with 12 years being preferred. The following measurements were taken from three distinct quadrats in forests considered for felling, and are indicative of wood volumes on the island.

	Estimated Age	Mean Height	Mean DBH	Trees/Ha	Volume m3/ha
Zone 1 – Plot 1	12 yrs	3.24	4.60	4000	**6.24**
Zone 1 – Plot 3	12 yrs	4.09	3.90	3200	**6.51**
Zone 2 – Plot 3	9 yrs	2.63	3.68	8200	**6.66**

Tree volume = 0.000029 x (D1.934575783) x (StemHeight1.121478932)

When compared with growth rates and volumes of Low Growth and High Growth Sites from the JICA study...

Age	10	15	20	25	30	35
Low Growth Site: Volume (m3/ha)	**7.94**	40.33	88.57	130.17	157.45	173.07
Low Growth Site: Effective Volume (m3/ha)	4.76	24.24	53.14	78.10	94.47	103.84
High Growth Site: Volume (m3/ha)	105.86	135.36	186.21	243.20	295.13	336.61
High Growth Site: Effective Volume (m3/ha)	63.52	81.21	111.72	145.92	177.08	201.97

...we see that volumes are comparable – albeit slightly lower than average 10 year old forests from the Low-Growth site of the above study. It is also important to note that most silvacultural practices for use of mangrove timber suggest harvest at 25 year cycles, when gains in effective volumes of wood are maximum.

Figure 3: Tables depicting mangrove (*R. apiculata*) growth versus benchmark studies of Low and High Growth Sites

Moving from Backloop to Foreloop

Mangroves are important to the lives and livelihoods of Tanakeke's villagers. Mangrove forests were the most dominant landscape feature on the atoll, before development of aquaculture ponds. Management, even before pond development, may not have been optimal, with anthropogenic pressure to harvest relatively young trees, and replace most naturally occurring species with *Rhizophora apiculata*. There is little memory, amongst current residents, regarding what a healthy biodiverse mangrove forest with large old trees looked like, let alone the value of such a resource. Nonetheless, there are remnants of that memory in the landscape.

The first village we visited during the rapid survey is named "Bangko Tinggia" – which in the Makassarese language means Tall (*Rhizophora*) Mangrove. This species indeed can attain amongst the tallest heights in the mangrove kingdom, with 40 meter giants recorded in Ecuador and trees nearly that height in pristine forests of Papua, and Kalimantan. Village elders say that there used to be trees in Bangko Tinggia whose girth could be encircled only by 3 or 4 people holding hands. Twenty five meter trees would not be unconceivable in that instance. There is also a remnant *Sonneratia alba* on the foreshore of Bangko Tinggia, which at only be 12 meters tall, at the least provides memory of a day when trees twice that height or more stood sentry over the coastline. This species has largely been cut along the foreshore, and replaced all too often with favored *Rhizophora*. It is possible that the island has entirely lost its seaward most mangrove zone, which the few remaining *Sonneratia* (which mostly exist in the interior) are unable to re-colonize.

A dozen or so mangrove species present themselves on the island in its current form. Intercropped amidst groves of small *Rhizophora apiculata* and *R. stylosa*, one may find the occasional *Brugueira gymnorhizza, Avicennia marina* and the above mentioned *Sonneratia alba*. Villagers know that *B. gymnorhizza* propagules can be eaten, mixed with rice in hard times of old, and some know that too of *A. marina*. Ripe *S. alba* are seldom eaten nowadays, but there is interest in re-discovering economic uses of these species. At slightly higher elevations, *Ceriops tagal* can be found dotting the landscape. Where the intertidal zone meets the hinterland at the core of the island, several more species appear. *Lumnitzera racemosa* and *Pemphis acidula* are common in this zone, as well as along dike walls which proliferate along ponds. There are parts of the island where decent size *Heritiera littoralis* struggle to grow large on saline, desiccated margins between the mangrove and land or *chenier* formations. An occasional *Xylocarpus molucennsis* can also be found. There may have been several more true mangroves in older days, although interviews with elders using visual cue cards have not revealed a plethora of additional species. Add to this list, a dozen or more common mangrove associates, and Tanakeke Island can be seen to maintain a diverse enough fauna.

In terms of habitat to support mangroves, all pond areas were created in ex-mangrove forests. Many of these, when abandoned and dike walls begin to crumble, will experience re-colonization of mangroves.

Some, however, especially ponds which were excavated, remain barren. Even when the surface elevation of the substrate is at an appropriate height to support mangrove growth, excavated pond bottoms have filled up with fine silt, creating a fluvial mudflat which is too waterlogged and thus anoxic to support mangrove growth. Where, however, a harder substrate has been left in tact, comprised of mangrove roots, or sandier soils above the islands everpresent calcareous base, mangroves have taken root and proliferate.

The model of the adaptive cycle was derived from the comparative study of the dynamics of ecosystems. It is meant to be a tool for thought. It focuses attention upon processes of destruction and reorganization, which are often neglected in favor of growth and conservation. Including these processes provides a more complete view of system dynamics that links together system organization, resilience, and dynamics. (Resilience Alliance, website)

The adaptive cycle exhibits two major phases (or transitions). The first, often referred to as the foreloop, from r to K, is the slow, incremental phase of growth and accumulation. The second, referred to as the backloop, from Omega to Alpha, is the rapid phase of reorganization leading to renewal (ibid)

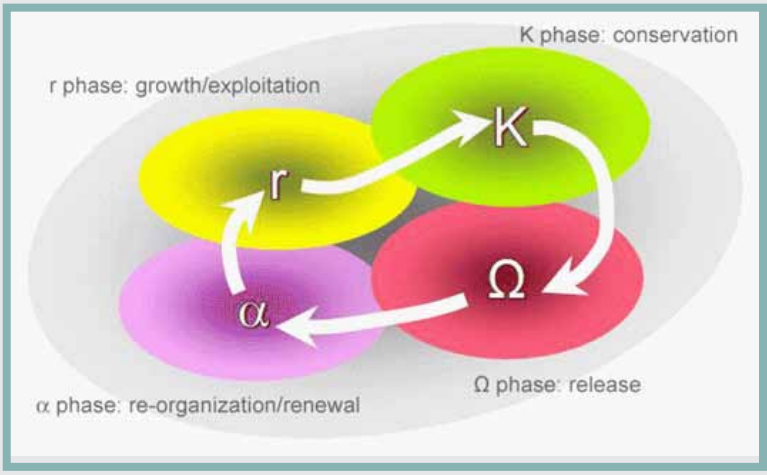


Fig 3. The Apative Cycle

During the slow sequence from exploitation to conservation, connectedness and stability increase and a capital of nutrients and biomass (in ecosystems) is slowly accumulated and sequestered. Competitive processes lead to a few species becoming dominant, with diversity retained in residual pockets preserved in a patchy landscape. On Tanakeke Island, we are in the early part of the growth and accumulation phase where mangroves exist, and also in the backloop in the barren ponds which are primed for revegetation. Memory of the previous system include both the dominant *Rhizophora* species that have been selected for by humans, as well as isolate patches of mangrove diversity which exist scattered throughout the atoll.

Fig 4: CBMRM in Thailand

Two members of a 60 member women's group from Ban Tung Taseh present on their community based mangrove resource management practices (above left).

Their mangrove area is divided into four sections which include areas for conservation, selective logging and collection of traditional medicines. All areas excpet for the conservation area are open to capture fisheries for crabs, molluscs, shrimp and fish (upper right).

The rules for the management of the area are clearly posted. Enforcement takes place by the group with the assistance of a local policeman who is also a school teacher (mid right).

The author purchasing crabs and shrimp paste at a bridge over the main river feeding the mangroves (lower right).

Looking Back to Find Ways Forward

In 2000, the author traveled to Southern Thailand at the invitation of Mangrove Action Project and Yadfon Association, to take part in the third "In the Hands of the Fishers Workshop." A group of two fisherfollk and an NGO worker from Northern Sulawesi joined for the month long trip which included three weeks staying in coastal communities who had worked with Yadfon.

During this stay, our group came across mangrove areas which were truly in the hands of the fishers, men and women alike. On a visit to Ban Tung Taseh, a group of around 60 women presented on their mangrove management activities in a gazebo built along a raised boardwalk in the middle of their management area. The area was zoned into four use categories which included a full conservation area, managed fisheries area, selective logging area and area for non-timber forest products. Although community based zonation was not new to us, we were impressed with the genuineness of the effort. Every woman in the group understood the regulations and means of enforcement well, equally adept at answering our questions. Livelihoods from the mangrove such as crab and shellfish sale, shrimp paste production, and a host of economic uses for *Nypah* palm were evident, both in the community and at nearby roadside stalls.

In another village -Ban Laem - fisherfolk had collaborated with fisheries researchers from a University in Songkhla to better understand the dynamics of their oyster population. Due to limited rocky habitat, they discovered that exploitative fisheries would all but eliminate their oyster resource. The community declared a one kilometer stretch in front of their village as a limited take zone for oysters, with a no-take zone in the middle, where they enhanced rocky habitat that were once disturbed by bottom trawlers. Oysters were now harvested only once a year, as part of a community event, after which buyers from the nearby town of Trang would line the banks bidding for the catch, a percentage of which was used for community projects. This ability to place limits on fisheries exploitation is something which coastal communities in Indonesia have by-and-large not embraced.

Daeng Ngenjeng of Lantang Peo on Tanakeke sums up the predominant attitude in Indonesia when discussing the idea of placing a capture limit on the size of mangrove crabs, "If my sons don't catch the small crabs, our neighbor's sons will."

And all too often, the discussion has ended here. Fishing communities, and especially men directly involved in capture fisheries, are notorious for working alone. Indeed, why would you divulge your favorite fishing hole, or log where a lunker crab usually lurks. But this secrecy has contributed to overall degradation of the value and richness of coastal resources, and the continuing decline in the welfare of fishing communities.

On Tanakeke, a fisher can sell a one kilogram crab for a whopping 130,000 – 150,000 rp (around US$16.00) depending on the season. However, a crab weighing 700-800 grams sells for only 50,000 rp/kg (around US$6.00). By not letting crabs attain a one kg size, fishers are losing around $10 per kilo. Crab populations studies have been run around the world, in Australia, Philippines, Tanzania, etc. A study from Thailand shows that an average of 24 mature crabs existing in a hectare of healthy mangrove forest (Moer, 2004). Let's say that Tanakeke's mangroves, being a low-growth system, supports 75% of that amount, that's still 18 crabs a hectare a year or around $288 per hectare per year (18 x $16.00) if crabs are being harvested at 1 kg size. However, if you harvest 750g crabs, you end up with only around $81/ha/yr (18 x $6.00 x o.75kg). Currently, with around 500 ha of mangrove forest and 700 ha of disused aquaculture ponds with degraded dike walls, mangrove crab habitat can be estimated at 1200 ha. If the community could limit themselves to catching and selling 1 kg crabs, the potential net annual income from crabs would be $345,600 ($288 x ha1200) versus $97,200 ($81 x 1200) or a difference of around $250,000. Enough to double the annual income ($800/yr) of over 300 families on the island.

Of course, poverty alleviation it is not that simple. Environmental problems, by their nature, are complex, requiring a thorough understanding of social, cultural, political, economic and environmental aspects. It would also require consensus by the community, to limit their catches, a significant challenge in a community living day to day in terms of aquiring the most basic needs of food, fresh water, education and health.

Towards Improved Management

The community of Tanakeke seems keen on rehabilitating disused aquaculture ponds. *Mais, bien sûr*. The ponds are currently of no use to anyone. On an island, where access to fresh water is a daily challenge, and nearly everyone is living on the edge, change, especially for the worse, can take place quickly. In years one and two of RCL, only one dusun regularly produced charcoal, whereas on a single two-day survey, three of four dusun visited were engaged in the practice (notably, Lantang Peo, the first village to attempt EMR, was not producing charcoal).

With regards to mangrove proection, there is currently no formal regulation at any level, village or island-wide. Tanakeke's mangrove forests are somewhat unique, in that many parcels are privately owned, and none of the islands 1776 hectares of mangrove area are under the jurisdiction of the Forestry Department. Through programs like Ecological Mangrove Rehabilitation, and Coastal Field Schools (which on Tanakeke include Silvaculture, Non-Timber Forest Product Development, Seaweed and Biointensive Farming Field Schools), communities are being engaged to begin to think about the purposeful management of their mangrove resources, rather than being driven by the whimsy of economic trends and investors.

The RCL program has a special opportunity to engage communities in management planning with a focus on gender equity. Gendered seasonal calendars created during Field School programs reveal that men and women are both equally, although differentially involved in using mangrove areas and mangrove timber. However, women have little control over how mangroves are managed (for instance, whether or not their household mangrove area can be rented to a charcoal producer) and have zero ownership of mangrove lands, whose titles are all in the hands of men.

To address this inequity, RCL partners will be using a guided curriculum to Community Based Mangrove Resource Management Planning, with a special emphasis on gender considerations. Although mixed groups of men and women will be engaged in the process, the focus is in working with women's groups (being developed as "Womangrove" groups), to highlight their perspective and strengthen their ability to negotiate with other stakeholders. Only with a special focus on women's involvement and gender issues, will any real inclusive management be possible.

The curriculum (see Fig. 5) goes through sections on gender awareness, division of labor, gender communication, facilitation and sensitivity, and gender activity plans, before getting to facilitation of creating management plans.

About the Guidebook

The ***objectives*** of this guidebook are:

- Increase knowledge and awareness on the roles and responsibilities of women in mangrove management,
- Increase understanding that women are as capable participants in mangrove management activities as men,
- Improve skills to discuss with village leaders when preparing for coastal management programs and explaining why women should be involved from the onset, due to their roles and responsibilities in mangrove resource use and management in the village,
- Improve planning skills to include gender issues, and develop plans that are gender sensitive, and ways to carry out these plans.

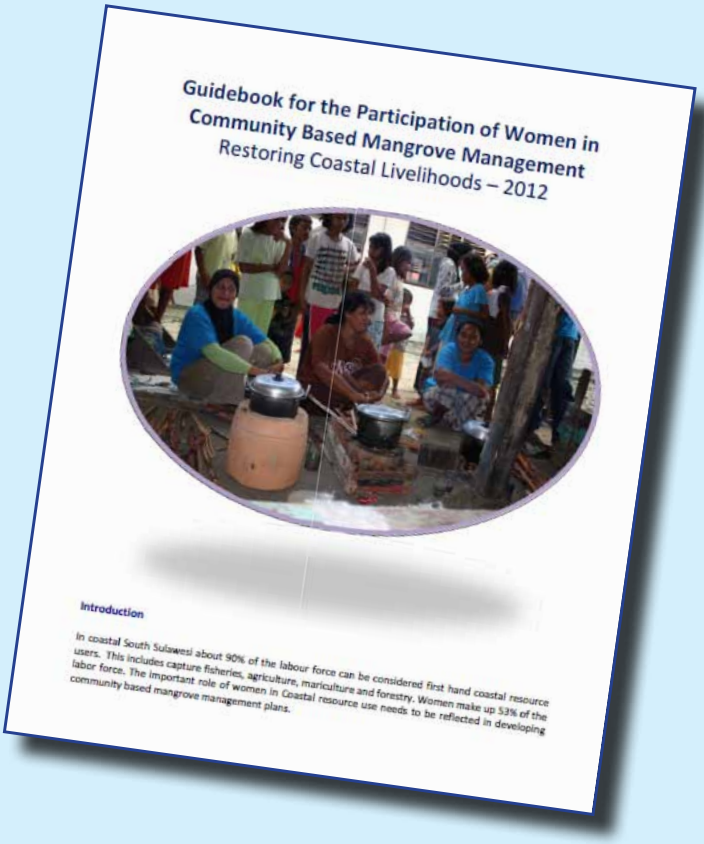
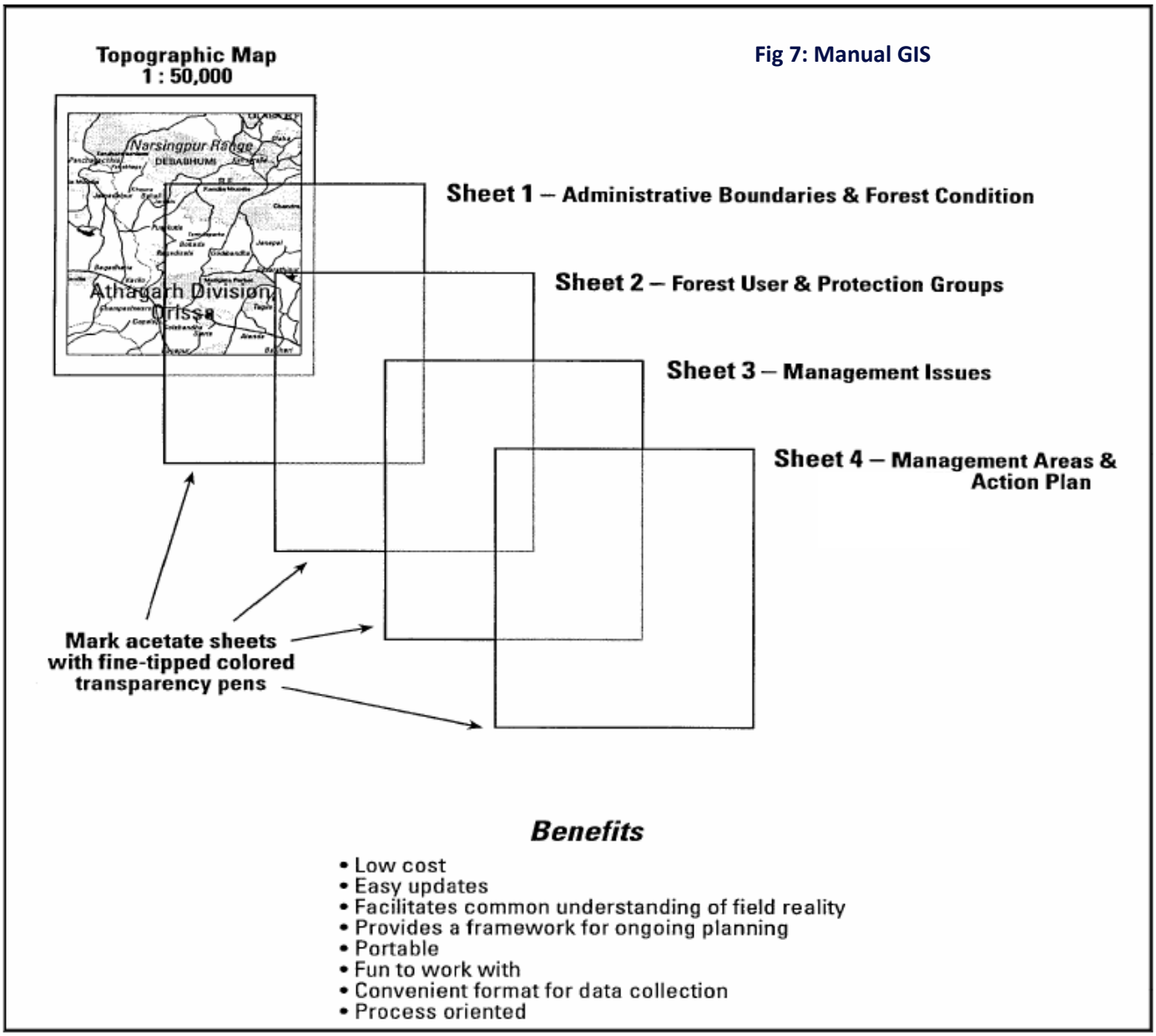


Fig 6: "Guidebook for the Participation of Women in Community Based Mangrove Management"

Fig 7: Manual GIS



Smaller working groups on the island will also be engaged in profiling Tanakeke's mangroves, by creating a Manual Geographic Information System. This Manual GIS will be a visual inventory of administrative, ecological, social, and management information on Tanakeke's mangroves

It is also a tool designed to be used by communities, field workers and other stakeholders to identify and record strategic actions needed to accelerate a transition to community forest management. Together, they illustrate administrative, ecological, social and management information and ultimately an "Adaptive Collaborative Forestry Management Resource Plan" for each dusun and the island as a whole. By recording particular data onto separate acetate sheets, the different types of information can be analyzed independently as well as together. As changes occur, profile information can easily be updated either on the existing acetate sheet or by replacing it with an updated version.

Still Challenged

In 2007, the coastal community of Kuala Indah, North Sumatera hosted an In the Hands of the Fishers Workhop, for fisherfolk from North Sumatera, NW Malaysia (Kedah, Perlis and Penang Island) and Southern Thailand. Themes of this workshop included appropriate technologies, ecological mangrove rehabilitation, and sustainable livelihoods. A memorable moment occurred during an open discussion evaluating the workshop. The Thai contingency, who had been active participants and gracious guests, expressed their frustration, that they had not learned anything of value at the workshop.

They stated, that back home in their own community, they had been working together for a more than a decade, and had already resolved about half of their major issues with regards to the coastal zone. It was now a matter of continued diligence, and they would continue to resolve issues of concern. Indeed, community empowerment was evident amongst these fisherfolk, through both speech and practice.

The Thai fisherfolk went on to express that they felt that the community in Kuala Indah, and perhaps the other participants from North Sumatera, had yet to truly resolve a single issue. It seemed, to them, that the Indonesian fisherfolk failed to recognize the need to place limits on their utilization of coastal resources, and were instead caught up in pattern of depletion of a valuable resource, followed by a swtich to the exploitation of an alternate resource, often of lower value. This cycle, noted the Thai fisherfolk, results in ever-degraded habitat and small, scattered populations of sea-life.

As practitioners and supporters of community based coastal resource management, we need to ask ourselves this same question. Are there any mangrove areas in Indonesia that are well managed by communities? Are there communities willing to regulate their fisheries, places limits on their catches, protect and improve coastal habitats? To what extent are governments supportive of such ventures? Are they project based only, or has there been any lasting change? Perhaps readers of this article have information of such a place.

For my part, I close this piece without attempting to provide case studies, the best of which in Indonesia are still works in progress, but with a challenge to fisherfolk, community workers and government agents Indonesia-wide. Let us not pat ourselves on the back after each trivial gain, such as the planting of a hectare of mangroves, the hosting of a conference, the completion of a field school. Indonesia has lost half of its mangrove forests over the past few decades, and has witnessed, or facilitated the greatest extent of deforestation in the history of the world. The question is, are we willing to sacrifice the instant gratification of a small crab, five-cents for a mangrove pole, a million rupiah for looking the other way, or a new car for landing a large development contract, for the betterment of our community? Are we willing to let women have a shot to do what men have largely failed to achieve? Or are we going to allow the paradox to continue, where a village named "Tall Mangrove" is in actuality home to a vast expanse of dead roots and stumps?

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