



**Regional Fisheries Livelihoods Programme  
for South and Southeast Asia (RFLP)**

## Case study

# Introducing a more stable 12-meter wooden fishing vessel in Cambodia

### Overview



The Regional Fisheries Livelihoods Programme for South and Southeast Asia (RFLP) has sought to reduce fisher vulnerability in Cambodia by introducing a safer and more stable design of the commonly used 12-meter wooden fishing boat. A new design was developed by a naval architect and a training course held during which boat builders learned how to build the new vessel. In all, nine of the new design boats were built and provided to Community Fisheries to use for patrolling purposes. The planned outcome of this initiative was that fishers would recognize the benefits of the new design and that the boat builders could supply it. However, after a year of use some fishers reported that they found the new vessels too heavy to navigate in the shallow waters in which they operate, while the increased cost of the safer design was too much for fishers to afford. However, boat builders

were putting to use some of the improved building and maintenance techniques that they had learned on the RFLP provided training course during their everyday work.

### Key lessons learned

- If fishers can't afford a new design they won't buy it, however safe or long lasting it may be.
- In depth community consultations are needed to ensure local conditions (including fuel cost, ability to carry out boat maintenance, etc.) are fully taken into account.
- Even experienced boat builders benefit from learning new maintenance and boat building skills.
- The limited life-span of a fixed-term development project is too short a period over which to assess the performance of a wooden boat, which is likely to have a life span of a decade.

## Context

In Cambodia, the most common traditional timber fishing vessel is approximately 12 meters in length. During consultations held with Community Fisheries during the early part of the Regional Fisheries Livelihoods Programme (RFLP) in 2010, concerns were raised regarding the stability of this type of vessel design. These concerns were confirmed during rolling period tests. The traditional design was found to be unstable, particularly with increased loading typical with the continual evolution of modern and heavier fishing equipment and their operation.

In general, there are very high levels of skills in boat building in Cambodia, and this is especially the case in rural areas. However, even experienced boat builders in Cambodia at times use poorly cured and low quality wood to reduce costs. Boat builders also normally paint the wooden planks after attaching them to the frame of the boat. This results in marine insects being able to destroy the timber in the small gaps between each plank left unprotected by the paint. Maintenance costs, safety and boat life are therefore affected.

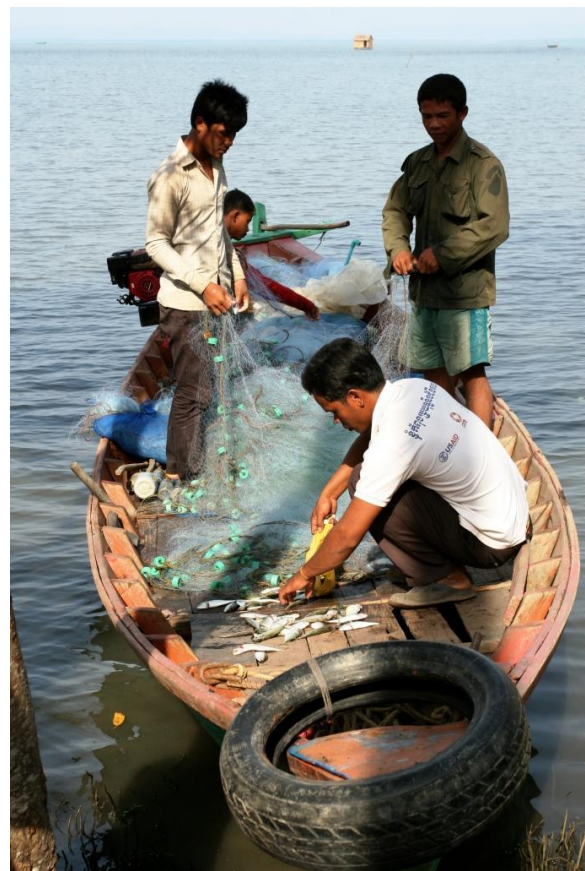
## The initiative

In order to address this problem and as part of its efforts to improve the safety of coastal fishers, RFLP engaged an FAO naval architect and a master boat builder to develop an improved design for a traditional 12 meter wooden 'long stern' fishing boat. In addition, to enhancing stability, the new design would increase longevity and hence reduce costs over the longer-term. Improved construction techniques would utilize shorter pieces of timber (rather than long pieces that are expensive and hard to find). Improved selection of quality timber also helped ensure longevity.

RFLP designed the intervention in two parts. In the first phase, a master boat builder was hired

to make an on the ground assessment and review in Cambodia of:

- Existing policies, laws and regulations related to safety at sea and vulnerability of coastal fishing communities, including navigation, and provide recommendations for improvement; and,
- Review current standards for fishing vessel design, construction, equipment, servicing, maintenance, inspection and licensing and give recommendations for improvement.



Traditional 12 meter timber fishing boat

The consultant visited Community Fisheries (CFis) in the Cambodian coastal provinces of Preah Sihanouk (CFi Tumnuop Rolork), Kampot (CFi Chang Hoan) and Kep (CFi O'Krasa). Poor construction quality and the instability of traditional wooden boats were identified as being a major safety risk for small-scale fishers.

### **An improved vessel design**

Working with a naval architect, the master boat builder devised a new design which with minimal modification gave significant increases in stability. In addition, the new design should last several years longer.

In order to make the boat more secure and safer, a keel and hog construction system was used. This is a doubling of the present traditional backbone system. A sacrificial keel protection was also included to protect the keel from marine worm attack, therefore saving on expensive replacement, maintenance and repair costs of this part of the boat which is almost permanently under water.

In the Cambodian traditional design, local boat builders use long naturally curved timbers directly from the trees to make the frames. However, it is time consuming and becoming ever more difficult to find such long naturally curved pieces of wood, mainly due to the depletion of forest resources. To deal with this problem, the modified design introduces a new frame construction method which uses two shorter, straight timbers joined together with a wooden gusset, instead of a longer single piece of naturally curved timber.

The boats were powered by a 13 horse power (HP) long-tail petrol engine, which is commonly used in Cambodia.

### **Introducing the new design**

To introduce the new design RFLP trained 18 Cambodian boat builders including members of the Community Fisheries working with the project to construct it. A hands-on, 12-day boat building course was conducted in Preah Sihanouk Province from 8 to 20 August 2011. During the course two boats were built under the supervision of the master boat builder.

In addition to constructing the new boat design the participants were also trained on how to

select and dry quality timber. They furthermore put into practice new skills such as lofting, which is the process of drawing the shape of the new improved boat design in cross section to be able to guarantee replication of the new hull shape.

Following the course a further seven boats were constructed over a 4-5 month period by the participants. All nine vessels were later donated by RFLP in June 2012 to Community Fisheries to carry out patrolling activities.



Constructing the new design of boat

### **Cost of vessels**

The total cost of materials for the nine boats constructed was USD 19,195. This works out at approximately USD 2,130 per boat. However according to the builder he underestimated the number of bolts used in the new design and the actual cost was closer to USD 2,600 per boat. These prices do not include the cost of labour. The overall price of the new design boats is

therefore approximately 40 percent higher than the traditional design which costs in the region of USD 1,500 per boat.

It has to be expected that an improved boat design would cost more and as a responsible development organization FAO is obliged to provide safe and stable vessels to ensure fisher safety. In the context of this evaluation however it proved extremely difficult to obtain realistic costings for locally built craft as local fishers and boat builders generally do not accurately record construction costs and therefore the prices quoted for traditional vessels may have been underestimated.

However, it is envisaged that any additional cost would be offset by the longer operational life of the new design boats. With regular maintenance these are estimated to last 12-15 years compared to the 8-10 years of the traditional design.

## Results/impact

Monitoring and evaluation actions took place in March 2013 with communities using the boats, as well as with the boat builders who had been trained in constructing the new design. At this stage the boats had been in operation only a year, but the short remaining time period of RFLP meant the evaluation had to be conducted sooner than was ideal.

Feedback from a number of communities indicated that the new boat design was not popular with some fishers. They reported that although it was definitely more stable and safer than the traditional design, the increased weight and size of the boat made it hard to operate in the shallow waters around some of the Community Fisheries.

The improved wooden boat design means that it actually sits higher in the water because of its more stable pregnant hull shape, while the new design was actually only marginally heavier than

a same sized traditionally designed boat. The statement from fishers may therefore have been as a result of contrasting the new improved wooden boat with smaller boats.

A number of communities reported that the boats were underpowered and unable to catch illegal fishers. It is unrealistic to expect that the boat could catch all illegal fishers operating in CFi waters (as some are 150-200 HP engine trawlers). However the use of a single 13 HP engine (as commonly used on the traditional design boat) on the slightly heavier new design boat resulted in them being slower than those it was supposed to replace.

Boat builders reported that they had not built any more of the new design of boat as fishers were unwilling to pay the extra cost.

However boat builders did report that they had been putting into use some of the new techniques they had learned such as timber selection and repairing cracks with the use of fine string. Some of the boat builders who had attended the course also advised that they had passed on these skills to others in their communities.



Photo: Nhim Nour, CFi Chroy Svay

Mr. Nhim Nour a fisher-boat builder from CFi Chroy Svay reported on 21 March 2013, that since taking part in the training he had not yet built a new design boat. He had explained the benefits of the new boat design to potential

customers advising them that it was stable and could help to reduce accidents at sea. However, none of the customers chose the new design mainly due to the shallow waters around CFI Chroy Svay which make it difficult for fishers to navigate the heavier vessels.

Nhim Nour was able to put into practice the skills he learned from the boat building training such as checking the quality of timber and the correct use of different timbers for the inner and outer parts of the boat to prevent cracking. He had also learned new skills such as filling cracks with fine string and how to paint the boats properly with protective paint.



Completed boats ready for handover

Mr. Liv Sophal, vice chief of CFI Trapaing Sangkae in Kampot province also took part in the training. He stated that as the CFI now had its own boat repair facility (supported by RFLP) the skills he learned had been shared with other boat builders/fishers who use the facility. This included timber selection as well as basic maintenance techniques such as filling the cracks with fine string and boat painting.

The stability of the new design boat was also recognized with the vice chief stating that should the CFI have sufficient funds they would build this type of vessel for ecotourism purposes as it could carry more people and was very stable.

## Maintenance issues

Severe flooding in Thailand in 2011 resulted in problems procuring engines due to the closure of the Honda factory. Alternative engines needed to be sourced, leading to six month delays. As a result, boats which had already been built and were in the water could not be handed over and this period of inactivity led to some deterioration of the boats which were built first.

All wooden fishing boats require regular routine maintenance and ideally should be lifted out of the water at least once a year for cracks to be filled. Certain CFIs which received a vessel from RFLP were unable to fund this cost and hence cracks and leakage became a problem. Other CFIs, which tended to be those with stronger community cohesion and leadership, were able to fund maintenance costs, usually through other income generating activities.

## Lessons learned

- It does not matter how much safer or how longer lasting a boat may be, if fishers are unwilling (or unable) to meet the extra cost they are highly unlikely to purchase it.
- Local vessel designs are adopted and remain popular for good reasons e.g. practicality and affordability. New designs of boats ideally need to be able to match these criteria. However for donors or other organizations, this may not be possible due safety considerations.
- Analysis of fishers' purchasing power and patterns should take place before any new design is introduced.
- If unsafe vessels are being commonly used then regulatory measures matched with effective enforcement will be needed to enhance safety and standards rather than relying on voluntary adoption of better quality boats.

- Considerable emphasis needs to be placed on community consultations so that vessels provided are suitable to local conditions.
- Boats need to have engines suitable to their size and intended function (e.g. catching illegal fishers).
- Efforts need to be made to enhance fisher understanding of the capabilities of the boats, so as to avoid community dissatisfaction.
- In the absence of official accident data it is very difficult to accurately assess the risks posed by vessel stability. Potentially dangerous designs may not equate to high accident rates due to the skill of fishers and their knowledge of local fishing grounds, conditions, etc.
- Although no new boats have been built to the improved design a number of basic skills taught during the course have been widely put to use and should help contribute to enhanced vessel longevity and safety.
- Boats should only be provided to communities that have the capacity to

effectively manage the use of the boat and that can afford maintenance and fuel costs.

- Use of the new-design boats should be considered for eco-tourism or other suitable purposes to generate income for boat maintenance.

## Recommendations

- Longer-term monitoring should take place regarding the use and condition of the new design boats to compare their longevity and cost against the traditional design, under conditions where both boat types are docked and serviced twice a year.
- Efforts should also be made to assess whether boat builders build any more boats to the new design or incorporate elements of the design/improved techniques (such as timber selection).

**This case study was written by Steve Needham, RFLP Information Officer, Wirya Khim, RFLP Cambodia Monitoring and Evaluation Officer and Don Griffiths, RFLP Chief Technical Advisor**

**A publication detailing the steps taken to construct the new design double ended timber fishing craft can be downloaded at [www.rflp.org/cambodia](http://www.rflp.org/cambodia)**

## About RFLP

The Regional Fisheries Livelihoods Programme for South and Southeast Asia (RFLP) sets out to strengthen capacity among participating small-scale fishing communities and their supporting institutions in Cambodia, Indonesia, the Philippines, Sri Lanka, Timor-Leste and Viet Nam. By doing so the RFLP seeks to improve the livelihoods of fisher folk and their families while fostering more sustainable fisheries resources management practices. The four-year (2009 – 2013) RFLP is funded by the Kingdom of Spain and implemented by the Food and Agriculture Organization of the United Nations (FAO) working in close collaboration with the national authorities responsible for fisheries in participating countries. For more information about the Regional Fisheries Livelihoods Programme for South and Southeast Asia (RFLP) see [www.rflp.org](http://www.rflp.org) or contact the Regional Information Officer [Steve.needham@fao.org](mailto:Steve.needham@fao.org)