NOTES OF THE

STAKEHOLDER MEETING ON FISHING VESSEL DESIGN ADAPTATION TO CLIMATE CHANGE

Organizer: Ministry of Fisheries – FAO Project GCP/GLO/352/NOR
Venue: UN Conference Hall, 202, Bauddhaloka Mawatha, Colombo
Date: 19.08.2022
Time: 9 - 12.30

Participants: 24 participants representing (Sri Lanka NAVY, Sri Lanka Coastguard, Disaster Manage Center (DMC), Department of Meteorology, Ministry of Fisheries, Department of Fisheries, National Aquatic Resources Research and Development Agency (NARA), Cey-Nor, Fisheries harbor Cooperation, Representative from boat yards. NERD, Academia)

Opening of the meeting

Mr. Dammika Ranathunga, Director General (Technical), Ministry of Fisheries, welcomed the participants and provided the opening remarks on behalf of the Ministry. He referred to the challenges in the fisheries sector to adapt to climate change and the fuel price crisis. Due to climate change fishers need to travel further offshore to get to the fish stocks they target. The dangers further at sea are substantial and can increase the number of accidents and fatalities among fishers. It is therefore important that the fishing vessels get safer. The fuel costs to travel to the fishing grounds has increased and Sri Lanka needs to find ways to increase fuel efficiency in fisheries. Mr Ranathunga thanked FAO for the continued support to fisheries (e.g. in fisheries law review and update, sea cucumber management and fishing boat design). He looked forward to FAO advice on safe and more fuel efficient fishing vessels. His welcome was followed by an introduction of the participants.

Project background and objectives

Dr. Raymon van Anrooy, Senior Fisheries Officer, FAO, Rome, started his presentation by outlining the negative impacts of climate change on fisheries, followed by a list of climate change adaptation and mitigation measures for the fisheries sector. He explained that the FAO project "Responsible use of fisheries and aquaculture resources for sustainable development" (GCP/GLO/352/NOR) has five components and that under component 2 of this global project Sri Lanka will be assisted with "Fishing vessel design adaptation to climate change". The expected project impact would be a reduced numbers of fatalities and fishers lost at sea in small-scale fisheries. The immediate project objective is to increase the safety of vessels used in small-scale fisheries to adapt to climate change.

Dr. Raymon van Anrooy gave a range of examples of how to improve fishing vessel performance in the process of adapting to climate change and identified 5 areas for improvements:

1. Cost reductions and energy savings
2. Increasing fishing efficiency
3. Reducing environmental impact
4. Improving fish handling, quality and safety
5. Improving safety at sea and working conditions

The project on vessel design and safety would focus on the 5th area, but will likely lead to improvements in the other areas as well.

The expected project results were outlined and a short overview of the mission conducted in the period 15-18 August was presented. The mission team visited boatyards and fisherfolk communities in Colombo, Negombo, Kalpitya, Chilaw, Kandakuliya and Kalutara.

Preliminary conclusions included:

Small-scale undecked FRP fishing vessels	Multi-day decked FRP fishing vessels
• Affordable, but lack adequate safety measures • Boat builders commonly copy each other's designs – limited variation • Most common vessel sizes: 19.5 ft and 23 ft • Small innovations can improve safety, stability, working conditions, vessel quality, vessel lifespan, gear deployment, and fuel efficiency.	• Safe design, but lack of adequate safety equipment and gears • Boat builders construct similar longliner/gillnetter vessels of sizes 42 & 59 ft – > 55 ft is preferred. • Fishers are hesitant to accept vessel layout changes. • Compulsory refrigeration system installation is a challenge for <50 ft vessels. • Innovations in hull design (bulbous bow) can improve fuel efficiency.

In the discussion following the presentation the option of hybrid engines installation on the multi-day fishing vessels was mentioned. It was noted that hybrid engines can be useful to reduce fuel costs for running freezing/refrigeration systems on board, but would require a larger investment as the engines are more expensive. Moreover, the current vessel design is not very suitable for such engines and the vessel lifespan is rather short. From an economic perspective the use of hybrid engines on the current vessel types has a low feasibility.

Innovations in small-scale undecked fishing vessel design

Mr Derrick Menezes, FAO International Consultant-Naval Architect, presented the mission findings on potential innovations in small-scale fishing vessel designs of undecked boats of 19 to 23 ft.
The innovations proposed are:

1. Safety –> increase reserve buoyancy so that the boats become unsinkable. The additional weight of this buoyancy increase would be approximately 10-15 kg.
2. Improve the vessel strength and structure framing by adding longitudal frames. Now only transversal frames are applied.
3. Improve the vessel quality and lifespan by applying better lamination schedules during construction and quality assurance processes
4. Insert simple bilge options to remove water from the boat
5. Design -> Marginally increase the aft deadrise angle together with an increased beam and spray rails, to improve vessel stability and behavior at sea.
6. Finish rough FRP edges, to avoid cuts of crew and damage to nets.
7. Add a sail mast socket to have mast foot base below deck for the use of a sail as an alternate means of propulsion.
8. Add a stainless steel keel shoe to prevent damage during beach launching and recovery.
9. Add rounded gunwales for smooth deployment and recovery of gill nets.
10. Add stainless steel eyes for mooring and anchoring

Given that most fishers only carry lifejackets, it was considered useful to also carry first –aid kits (or a safety grab bag), life ring and communication equipment.

Following the presentation participants expressed general agreement with the proposed design modifications. They asked FAO advice on fuel efficiency (speed vs fuel consumption) and material quality. It was noted that the V-shape proposed for the aft should not be too much, as some lagoons where the boats operate are very shallow. The additional costs of the proposed design modifications vs longer lifespan of the boats should be considered. It was also noted that many fishers carry removable iceboxes that should be held firm between transversal frames. Furthermore, the use of an autopilot, emergency warning and refrigeration systems was shortly discussed.

Innovations in semi-industrial decked fishing vessel (longliner) design

Mr. Menezes presented various examples of how to improve fuel efficiency of multi-day fishing vessels of 35 - 60 ft in length. He gave some options to optimize the hull form and proposed that a bulbous bow could be tested on a longliner vessel with a displacement hull. He gave examples of tests done by FAO on bulbous bow design and the gains made in fuel efficiency. The option of adding a cort nossle around the propeller to increase speed was presented as well. He discussed refrigeration systems in relation to the Government requirement to install these on new vessels in Sri Lanka, as well as the need for good insulation of the fish holds. Deck space requirements and safety equipment needs were also discussed.

The participants were in favour of the testing of the bulbous bow and insertion of refrigeration systems and fish hold insulation in the vessel design improvements. The options of solar- and wind power use were discussed, but it was noted that most fishers carry buoys, poles, water and safety equipment on the roof of the wheelhouse/crew accommodation, making the space for solar panels limited. Stability issues were discussed, as well as the need to increase battery power for refrigeration when the engine is not running. As an option for reducing fuel consumption in fisheries also the use of motherships and transshipment was proposed.

It was proposed to FAO to also: 1) carry out an energy audit to monitor energy consumption by the various systems on board, and 2) do a small study on the water usage on multi-day fishing vessels and the costs and benefits of adding a freshwater plant in the design update. FAO will share vessel energy audit information and is willing to support the study proposed.

Project next steps and work plan

Dr. van Anrooy presented the updated list of activities proposed, which included also the requests from fishers for more safety awareness and training activities. The meeting agreed with the following updated project outputs and activities, to be completed before November 2023:

Project output 1: Two safer small-scale open (un-decked) FRP fishing vessels of 20 ft and 23 ft designed, built and tested.

- Safe design for small-scale open (un-decked) FRP fishing vessels of 20 ft and 23 ft, available in English, Spanish and French languages.
- Two FRP fishing vessels constructed in Sri Lanka, tested and provided to fishing cooperatives as demonstration vessels.
- Moulds available at local shipyards for construction of more vessels of the same types.
- Step-by-step fishing vessel construction manuals for the vessels in 3 languages.

- Step-by-step vessel construction videos available in English language on FAO's YouTube channel. At least 5 short videos are foreseen
- Vessel designs and manuals produced disseminated globally via the recently launched FAO Fishing Vessel Design Database https://www.fao.org/fishery/en/collection/vesseldesign

Project output 2: Bulbous bow testing on a 55 ft long-line vessel to increase fuel efficiency

- Bulbous bow design produced for a 55 ft multi-day boat
- Model tested in a water tank in Spain
- Plug & mould produced for the bulbous bow
- Vessel equipped with a bulbous bow, and trials at sea conducted for resistance, speed and energy savings.
- Short report and brochure produced on bulbous bow test results.

Project output 3: boat builders and inspectors trained in FRP boat building quality assurance

- Training materials prepared for FRP boat quality assurance (including good lamination practices) in Sinhala and Tamil languages
- Two day training conducted on FRP quality assurance in boat building for senior technical staff of at least 8 boatyards and Government inspectors

Project output 4: safety trainers competent in training small-scale fishers on all safety at sea aspects

- Safety at sea Training of Trainers package produced in Tamil and Sinhala languages.
- 1 week training of trainers on safety at sea conducted for at least 10 safety trainers

Project output 5: Key international vessel safety and fuel saving standards translated in Sinhala and Tamil languages and disseminated widely in Sri Lanka

- International vessel safety standards and fuel saving guidance for fishers translated in Sinhala and Tamil languages.
- 1) Gulbrandsen, O. 2012. Fuel savings for small fishing vessels - a manual. Rome, FAO. 57 pp.
- 2) FAO/ILO/IMO. 2012. Safety Recommendations for Decked Fishing Vessels of Less than 12 metres in Length and Undecked Fishing Vessels. Rome, FAO. 254 pp.
- Documents printed and disseminated among boatyards and fishers.

Meeting closure

Mr. Sarath Premalal, National Project Coordinator, Component 2 of the Project, thanked all the participants for their active participation and the good discussion. He also thanked his FAO colleagues for organizing and technically assisting the meeting and looked forward to work with all towards a safe fishing sector in Sri Lanka.

For more information on the project activities, please contact Mr Premalal at kehelella.premalal@fao.org or write to Fishing-Safety@fao.org.

The presentations given can be found at https://www.fao.org/fishing-safety/en/