

Bagan fishing in Majuro, Marshall Islands

A bagan is a bait-fishing platform commonly found in Indonesia and neighbouring Asian countries. This fishing method targets small pelagic species that are sold fresh, sundried for secondary edible products or used as live bait for pole-and-line fisheries.

In August 2009, the Pacific Islands Forum Fisheries Agency (FFA) took active steps to explore the concept of implementing small-scale, pole-and-line fishing in the Pacific Islands region. The fishing method itself was previously carried out on pole-and-line boats in some Pacific Island countries but the economics of running these large-scale operations was not viable due to several logistical factors, particularly baiting ground access.

Many experts have attributed the failure of industrial pole-and-line fishing in the Pacific Islands region to a combination of reasons; but one of the factors that contributed to the restriction of baiting ground access was the exclusion of rural fishing communities and baiting ground owners from the actual ownership of pole-and-line fishing boats and seclusion to only receiving royalties for bait taken from their baiting grounds.

Now, one of the motives for encouraging small-scale, pole-and-line development is to involve stakeholders in the actual fishing operations, and encourage them to take ownership of providing bait for small-scale, pole-and-line boats. However, the bouke-ami baiting method used in large-scale, pole-and-line fishing could only be effectively used from fishing vessels of 18 m or more in length, and required many hands to perform the operation. Potential baiting alternatives were sought to complement small-scale, pole-and-line fishing.

In September 2009, FFA's Fisheries Development Adviser, Robert Stone, undertook a trip to Indonesia to observe the *bagan* bait-catching units, and this initiated the used of this method in the Pacific Islands

region, noting the adverse social and environmental issues that accompany any type of fishing method implemented without a proper management plan. The first step is to trial the method to determine its effectiveness in different locations and collect data on the type of species, seasonal abundance, and social and environmental implications. Since then, FFA and SPC have liaised on implementing *bagan* trials in the Solomon Islands and the Republic of the Marshall Islands (RMI). FFA engaged the renowned fishing boat designer, Oyvind Gulbrandsen, to work on a suitable *bagan* design that can be used in the region and several small-scale, pole-and-line boat designs.

SPC organised the *bagan* project in Majuro in cooperation with the Marshall Islands Marine Resources Authority (MIMRA). FFA's approach is to encourage *bagan* operations to supply bait for small-scale, pole-and-line boats while SPC looks more toward addressing food security issues. Some of the species caught with *bagans* are important food fish that can be sustainably exploited to alleviate food security concerns, or can provide an income to artisanal fishers when sold as fresh food fish, bait fish or processed food products (e.g. dried, salted, marinated).

The RMI *bagan* was built in Kiribati by the KiriCraft Central boat building company and shipped, in kit form, to Majuro at the end of October 2011. SPC's Fisheries Development Officer, William Sokimi, was assigned to work with MIMRA staff in November 2011 to assemble the *bagan* together in preparation for the second phase of the project. In February 2012, fishing trials will be



The bagan, built in Kiribati, ready to be disassembled and shipped, in kit form, to Majuro (Image: William Sokimi)

The *bagan* fishing technique

The *bagan* is a big raft anchored in bays close to shore, and equipped with a large net and a several portable bright lights or kerosene lanterns. The lights are used at night to attract small pelagic baitfish species such as anchovies, sprats, sardines, herrings, silversides, mackerels, scads and cardinals. When there is sufficient baitfish aggregated under the lights, the net is lowered to around 15-m depth and the lights dimmed to concentrate the fish closer to the *bagan*. Lights are then turned off one by one until only a single light is left on. This light is centralised above the middle of the submerged net and dimmed further to draw the baitfish to the centre. When the bait has settled directly under the light, the net is hauled with a winch fixed on the *bagan* deck, winding up ropes that are evenly spaced on the four sides of the net.

Pole-and-line fleets use a similar technique called *bouke-ami*. However, the *bouke-ami* method, which is conducted directly off pole-and-line boats, requires large boats and many hands to carry out the operation. The *bagan* method requires only three to six persons and a net that is 8 m x 8 m, while the *bouke-ami* method requires nets that are 18 m x 18 m or more.

carried out with MIMRA staff and local fishers who will eventually adopt the *bagan* and continue with fishing and marketing operations. A comprehensive data collection system will also be introduced by SPC Fisheries Development Officer, Michael Sharp, to determine the socioeconomic and food security impacts of *bagan* fishing in RMI. Arrangements are underway to recruit two Indonesian *bagan* experts to join the SPC and MIMRA team during the fishing trials. The assembled *bagan* is sitting on the dock outside MIMRA, waiting for launching. The net, lights and other accessories are already in

place for the project's second phase, which be reported in detail in the next issue of the *Fisheries Newsletter*.

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The *bagan* net was made of two nettings of different mesh size (Image: William Sokimi)