Jelly-FAD Construction Guide

Building Netting-Free, Biodegradable FADs for Sustainable Tuna Fishing

Photo by Gala Moreno © 2022

ISSF INTERNATIONAL SEAFOOD SUSTAINABILITY FOUNDATION

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Contents

Building a Better Biodegradable FAD

Our step-by-step guide shows tuna fishers how to build "jelly-FADs." The jelly-FAD is a new model for a more ecologically sustainable fish aggregating device (FAD) design.

Collaboration for Sustainable Fishing

To reduce the impacts that FADs have on marine animals and ecosystems, ISSF scientists developed the jelly-FAD in collaboration with physical oceanographers from the Institut de Ciències del Mar (CSIC) and tuna fleets — testing and refining the design through workshops, lab research, and at-sea trials in real fishing conditions.

Jelly-FADs are not only non-entangling but also biodegradable. And they offer additional sustainability and durability advantages over previous non-entangling FAD (NEFAD) and bio-FAD designs.

Jelly-FAD Research and Testing

Since 2018, ISSF scientists have been exploring practical biodegradable options for tuna fishing gear. In 2021, they began working on the design that has evolved into the jelly-FAD.

The jelly-FAD we present here is more of a *model* for tuna fishers than a fixed design. It also represents a new *concept* for drifting FADs (DFADs), whose construction methods in tropical tuna purse-seine fisheries have not changed in decades.

FISH AGGREGATING DEVICES (FADs)

A FAD is a human-made floating object specifically designed to encourage fish aggregation at the device. FADs can be anchored to the ocean floor (anchored FADs) or set to drift in the open ocean (drifting FADs, or DFADs).

FADs are widely used as a fishing method due to their high efficiency, although they have been associated with several negative ecosystem impacts, such as bycatch and overfishing.

For a FAD's lifespan, flotation and weight are key considerations. Until now, having more weight and more flotation components resulted in a better DFAD performance, but in return, DFADs endured a high structural stress.

The jelly-FAD concept, however, has shifted the paradigm toward a lighter, neutrally buoyant DFAD: Reducing both weight and flotation components — and allowing FAD drift with neutral buoyancy — guarantees a better performance and longer lifespan than conventional DFAD designs, even those made of biodegradable materials.

Fisher Customization and Feedback

Fishers have options in what kinds of biodegradable materials they choose for their jelly-FADs. We anticipate they will evolve the jelly-FAD, very likely improving it to suit their needs. For example, fishers may want to change the shape of the drogue, as long as it remains a symmetrical 3D structure — such as making it round instead of a cube. They also might vary the attractors or raft.

In the meantime, the ISSF team will continue working to improve the design to make it lighter and more biodegradable while maintaining its neutral flotation and ensuring the drogue is at the deepest part of the FAD — the basis of the jelly-FAD concept.

As fishers across oceans learn to build and use jelly-FADs with the help of this guide, ISSF welcomes their suggestions and feedback.

This guide shows tuna fishers how to build what we believe is the **most sustainable FAD to date.**

Our research team designed jelly-FADs to greatly reduce the need for plastic in FAD construction. Only the jelly-FAD's flotation buoys are recommended to be made with plastic; the rest of the structure is biodegradable.

Designed for Neutral Buoyancy and Durability

The jelly-FAD is a type of drifting FAD (DFAD), not an "anchored" FAD. It is a simpler structure than previous FAD designs.

The neutrally buoyant structure of the jelly-FAD — including its three-dimensional bottom cube — allows it to drift without structural stress. The cube acts as a drift anchor moved by the slow drift of the currents found in deeper layers.

In addition, the raft is submerged at about 5–8 meters (3–4 fathoms) to avoid "wear and tear" from wind and waves, which increases its durability and extends lifespan.

Many of the jelly-FADs in our trials with commercial tuna fleets remained in perfect condition 5–6 months after deployment. Thereafter, most of them were appropriated by other vessels or drifted out of the fishing zone, and a few lasted up to 12 months. In ISSF tests under controlled conditions, they degraded slowly after about 9–12 months of use.

Photo by Shutterstock

INSPIRED BY NATURE

Jellyfish, which drift gracefully in ocean currents, inspired the design of the jelly-FAD. Jellyfish are lightweight, free-swimming marine animals.

Like jellyfish, jelly-FADs achieve "neutral buoyancy" in the ocean — they neither sink nor rise.

JELLY-FAD CONSTRUCTION

An Accessible and Adaptable Design

We intend the jelly-FAD design to be as simple and affordable as possible for fishers around the world to build.

To make jelly-FADs, you do not need to have unusual materials, special equipment, or advanced carpentry skills.

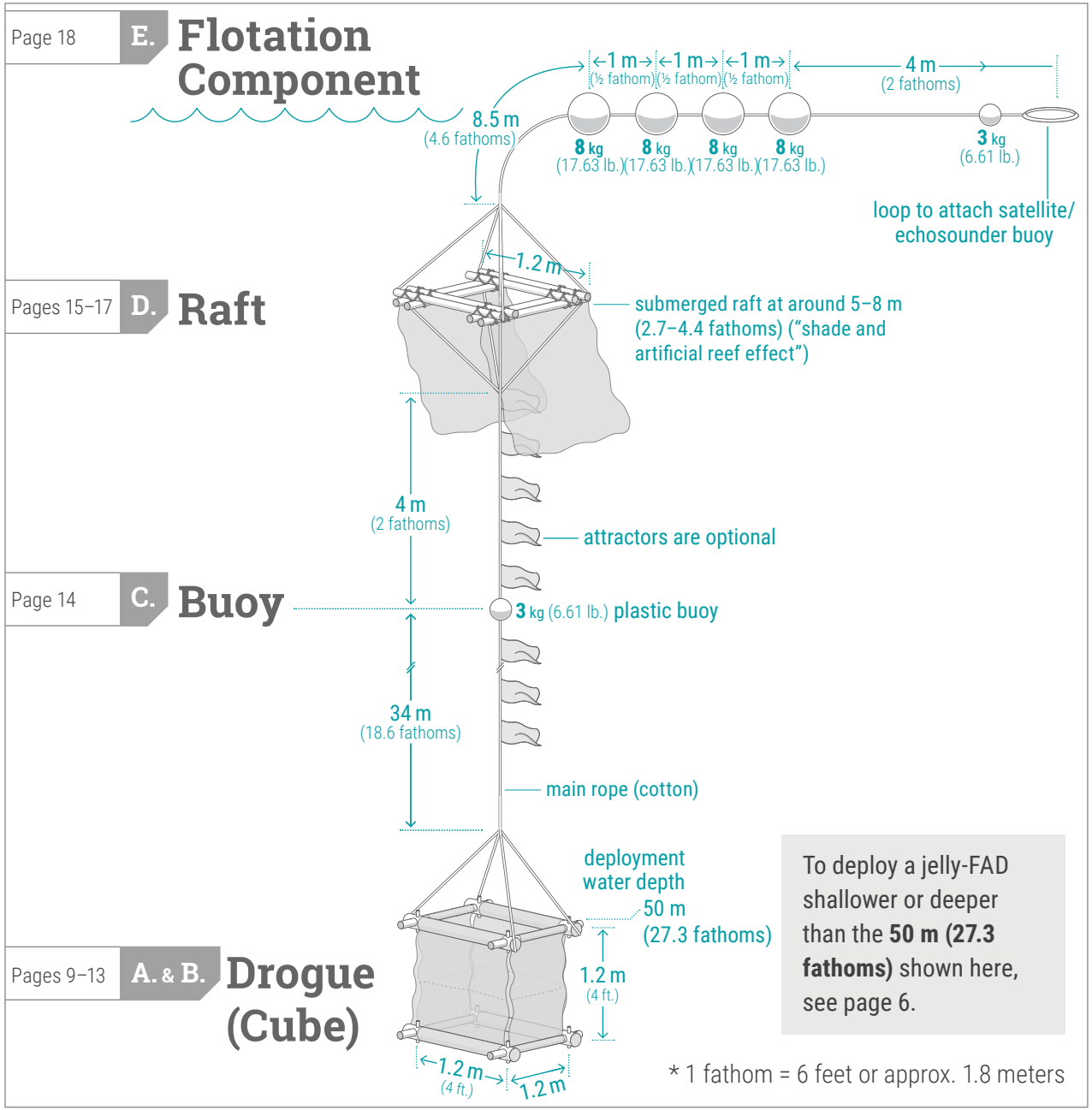
You will naturally become more proficient over time in building them. You may also discover ways to modify the jelly-FAD design or vary the biodegradable materials to better suit your fleet, vessel, and fishing operations.

The jelly-FAD has less mass and less weight than previous FAD designs (**Figure 1**).

MEASUREMENTS IN THIS GUIDE

We designed the jelly-FAD using metric measurements, which are a global standard. But we have included equivalent imperial measurements for U.S. fishers.

FIGURE 1



Gather the Materials

To build several jelly-FADs at once, simply multiply the quantities below.

To build **one jelly-FAD**, you will need these materials in total.

Quantity for 1 jelly-FAD	Materials	FOR EACH INDIVIDUAL ITEM Metric Measurements	U.S./Imperial Measurements
4	Thick bamboo canes	90–100 mm diameter cut to 1.2 m length	3.54–3.93 in. diameter cut to 3.93 ft. length
12	Thin bamboo canes	30–50 mm diameter cut to 1.2 m length	1.18–1.96 in. diameter cut to 3.93 ft. length
2	**Clay or mud bricks or balls** of 4 kg, or equivalent weight in gravel, sand, or small stones	4 kg (8 kg) in total	8.81 lb. (17.63 lb.) in total
4	**Pieces of cotton or manila hemp canvas** of about 350–400 gr/m^2 (12.34–14.10 oz.) for the drogue	110 cm (wide) x 150 cm (long)	3.60 ft. (wide) x 4.92 ft. (long)
2	**Pieces of cotton canvas** of about 350–400 gr/m^2 (12.34–14.10 oz.) for the raft	110 cm (wide) x 150 cm (long)	3.60 ft. (wide) x 4.92 ft. (long)
	Sewing thread and needle		
8	**Bamboo or wooden sticks** to use as nails or pins	10 mm diameter 20 cm length	0.39 in. diameter 7.87 in. length
1	**Thick cotton rope***	20 mm diameter approx. 65 m length	0.78 in. diameter approx. 35.5 fathoms length
1	**Thin cotton rope for attachments**	10–12 mm diameter approx. 22 m length	0.39–0.47 in. diameter approx. 12 fathoms length
	Attractors (optional): Palm leaves, cotton canvas, or cotton ropes hanging from the main rope and/or from the raft		
4	**Plastic buoys**** or purse seine corks painted dark blue or black for flotation component	8 kg (32 kg in total)	17.63 lb. (70.54 lb. in total)
2	**Plastic buoys**** or half purse seine cork, one for the submerged component and one for the echosounder	3 kg plastic buoy or half 7 kg purse seine cork	6.61 lb. plastic buoy or half 15.43 lb. purse seine cork
	Dark blue or black paint for flotation buoys or corks, if needed		

JELLY-FADS IN ACTION

We developed a video showing ISSF researchers, other scientists, and tuna fishers developing and deploying jelly-FADs.

Watch the video: youtube.com/watch?v=3JMJH4PKLKA

*Choose twisted cotton rope with four strands and central core (torsion).

**Four flotation buoys are in addition to the submerged buoy and the echosounder buoy. See the "Customize" box on page 6 for additional weight information.

Customize Jelly-FAD Depth for Your Fleet

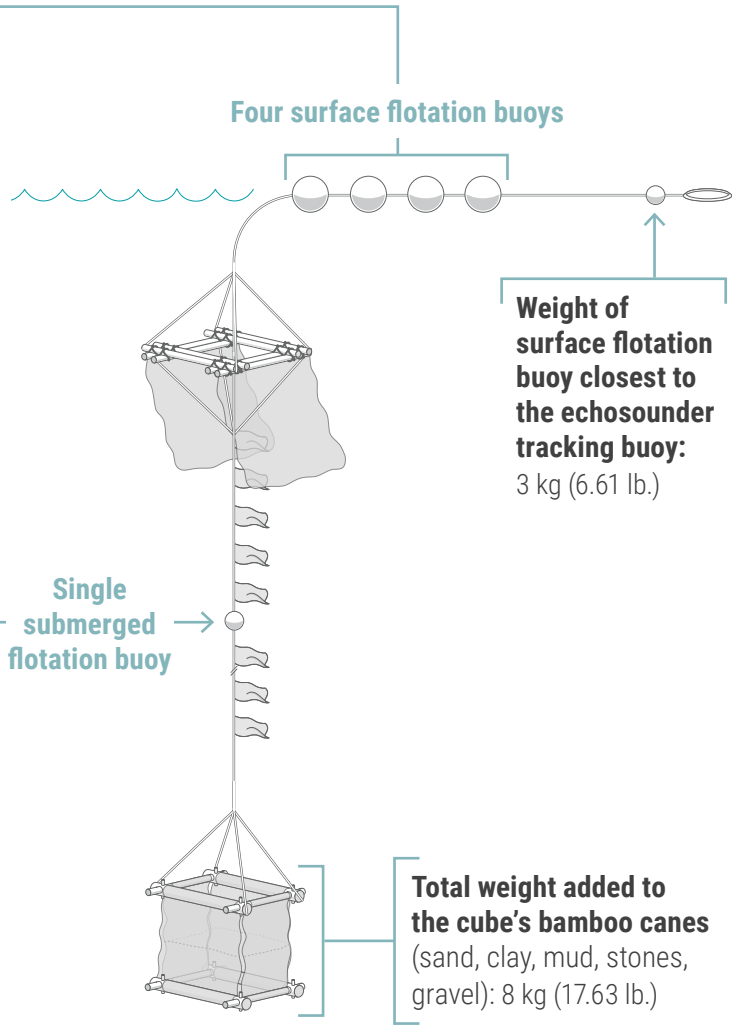
This guide is based on building a jelly-FAD that will be deployed about 50 m (27.3 fathoms) deep.

But fishers can customize a jelly-FAD to drift shallower or deeper in the ocean. To do so, you can adjust the (1) flotation and (2) length of the main rope.

This table shows how to adjust the flotation.

Generally the length of main rope needed is the depth of the FAD + 10 m for the cube + 5 m for the emerged flotation (or, overall, the depth of the FAD + 15 m). (For U.S. fishers, it would be the depth of the FAD + 8.2 fathoms.)

	DEPTH OF THE FAD		Total weight of surface flotation buoys	Weight of single submerged flotation buoy (below the raft)
	Metric	**U.S./Imperial**		
SHALLOWER	15 m	8.2 fathoms	25 kg (55.11 lb.)	None
	20 m	10.9 fathoms	23 kg (50.70 lb.)	3 kg (6.61 lb.)
	25 m	13.7 fathoms	25 kg (55.11 lb.)	
	30 m	16.4 fathoms	26 kg (57.32 lb.)	
	35 m	19.1 fathoms	28 kg (61.72 lb.)	
	40 m	21.9 fathoms	29 kg (63.93 lb.)	
	45 m	24.6 fathoms	31 kg (68.34 lb.)	
	50 m	27.3 fathoms	32 kg (70.54 lb.)	
	55 m	30 fathoms	31 kg (68.34 lb.)	6 kg (35.27 lb.)
	60 m	32.8 fathoms	32 kg (70.54 lb.)	
	65 m	35.5 fathoms	34 kg (74.95 lb.)	
	70 m	38.3 fathoms	35 kg (77.16 lb.)	
	75 m	41 fathoms	37 kg (81.57 lb.)	
DEEPER	80 m	43.7 fathoms	38 kg (83.77 lb.)	



Visual Guide to Materials

To create a jelly-FAD, you need to build a few components — then connect them together with rope. (Not all materials listed on page 5 are pictured here.)

Bamboo canes: Example of thick and thin bamboo canes for the cube and the raft

Wooden or bamboo pins to use as nails (with a pen to show scale)

Cotton rope for connecting the raft and cube

Cotton and manila hemp canvas

Attractors (optional): organic ropes (left), canvas (right), or palm leaves to add to the raft and main rope

Clay or mud bricks or balls (left), or small stones (right)

Plastic buoys (left) or purse seine corks painted blue with satellite/echosounder buoy (right)

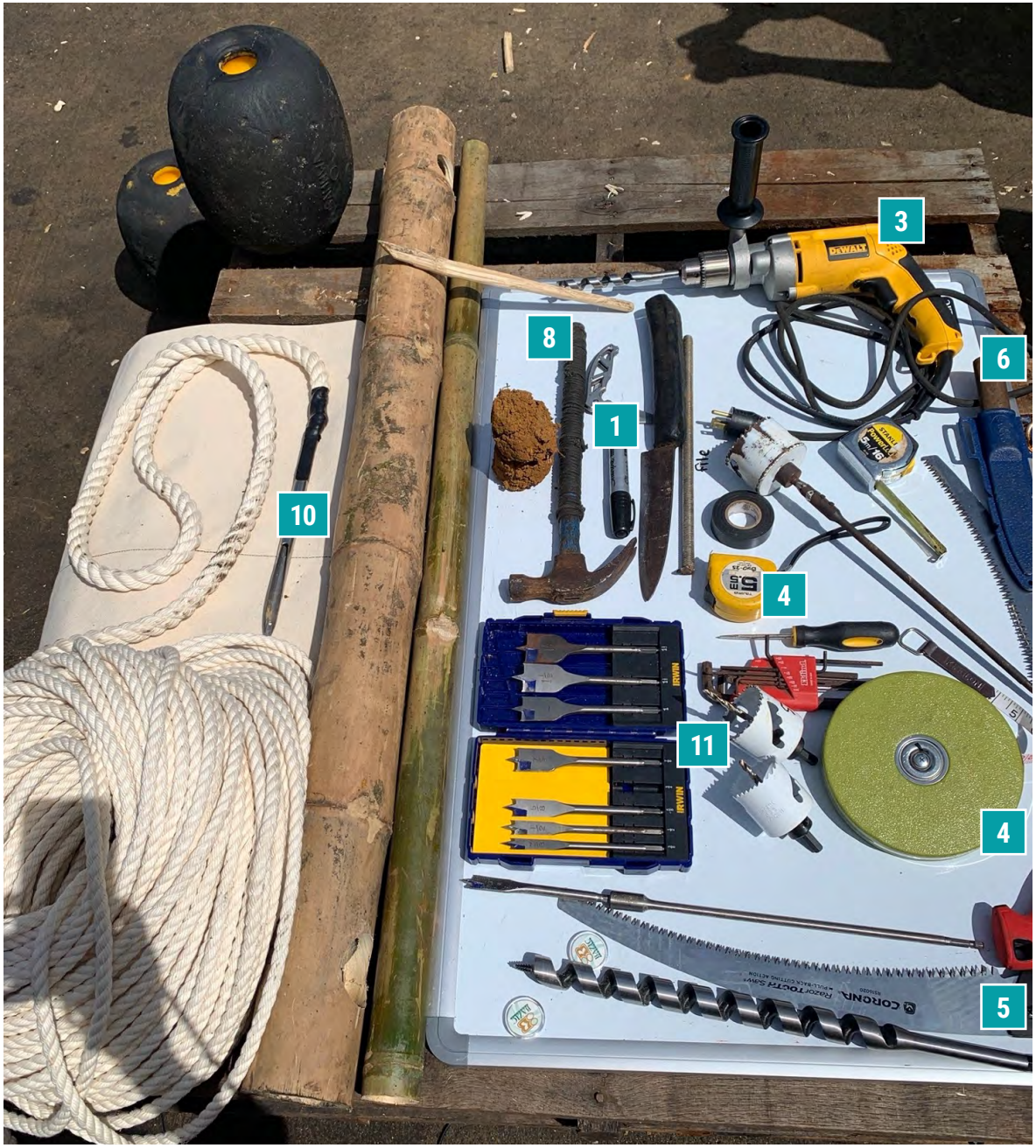
RMFO RATINGS FOR BIODEGRADABILITY

The tuna RFMOs use category labels to rate the biodegradability of a FAD design. "Category 1" is the best biodegradability rating. "Category V" is the lowest rating. Tuna vessel owners should be familiar with the FAD biodegradability ratings that the Regional Fisheries Management Organizations (RFMOs) use.

The jelly-FAD design is in Category II.

- **Category I:** All parts (i.e., raft and tail and floating components) of the DFAD, with the exception of materials used for the instrumented buoys, are built with biodegradable materials.
- **Category II:** All elements (i.e., raft and tail) of the DFAD, with the exception of materials used for the instrumented buoys and floating components, are built with fully biodegradable materials.
- **Category III:** The tail and other underwater hanging parts of the DFAD are fully biodegradable materials, while the raft and materials used for the instrumented buoys are made of non-biodegradable materials.
- **Category IV:** The raft is fully biodegradable, while the tail, underwater hanging parts of the DFAD and materials used for the instrumented buoys and floating components are made of non-biodegradable materials.
- **Category V:** All parts of the DFAD (i.e., raft, tail and instrumented buoy) are built partly or fully with non-biodegradable materials.

Gather the Tools



You will need these tools (most pictured at left) **to assemble the jelly-FAD:**

1. Marker pen
2. Scale*
3. Power drill
4. Tape measure or tape rule
5. Wooden hand saw
6. Sharp machete knife
7. Sharp knife for cutting rope*
8. Mallet or hammer
9. Electrical tape for splicing ends and marking points of splice*
10. Large and small splicing tools
11. Assorted drill bits, auger, and Speedbor with extension
12. Wooden hole cutters* 50–65 mm** (1.96–2.55 in.), 22–24 mm (0.86–0.94 in.)

    ***The hole should allow the thin bamboo cane to pass through it, so the size of the hole cutters needed would depend on the diameter of the thin bamboo canes being used.*
13. Paintbrushes for painting buoys/corks (if needed)*

**Item not pictured*

Do Not Cut the Main Rope

One long length of rope is used to tie together all of the components. Avoid cutting this main rope. To attach different components to the main rope, it's recommended to splice the ropes — rather than knot them — as knots represent weak points.

CONSTRUCTION STEPS

If you have all of the materials and equipment listed here, you can construct a jelly-FAD in one session.

To show each step of the construction process as clearly as possible, we have broken the instructions down into several detailed sections.

Watch the Step-by-Step Video
The Pacific Community (SPC) developed a complementary video that shows fishers building jelly-FADs. You may find it helpful to watch the step-by-step video in addition to reading these written instructions.

Watch the video: youtube.com/watch?v=I7z-CRMCks8

MATERIALS

- ☐ 4 pieces of cotton or manila hemp canvas, starting size of 150 cm (4.92 ft.) long x 110 cm (3.60 ft.) wide
- ☐ 2 pieces of cotton or manila hemp canvas, starting size of 150 cm (4.92 ft.) long x 110 cm (3.60 ft.) wide
- ☐ Sewing thread and needle

A. Prepare the Canvas

The canvas sheets are part of the jelly-FAD "drogue" or cube. They drape the bamboo cane structure.

1.

Prepare the canvas for the drogue. For each of the four canvas pieces sized 150 cm x 110 cm (4.92 ft. x 3.60 ft.), sew one 20 cm (7.9 in.) sleeve on top and another on the bottom. Finished size of sewn sheets should be 110 cm x 110 cm. (3.60 ft. x 3.60 ft.).

2.

Prepare the canvas for the raft. For each of the two canvas pieces sized 150 cm x 110 cm (4.92 ft. x 3.60 ft.), sew only one 20 cm (7.9 in.) sleeve on top. Finished size of sewn sheets should be 110 cm x 110 cm. (3.60 ft. x 3.60 ft.).

FIGURE 2 – CANVAS SHEETS FOR THE DROGUE

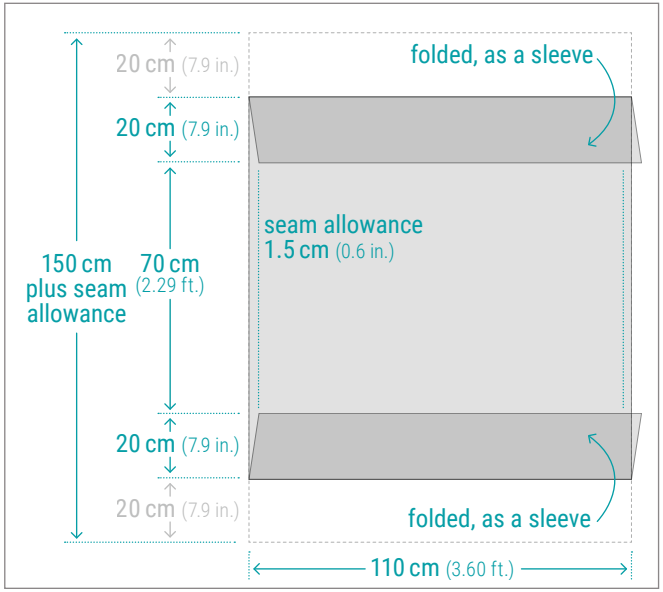
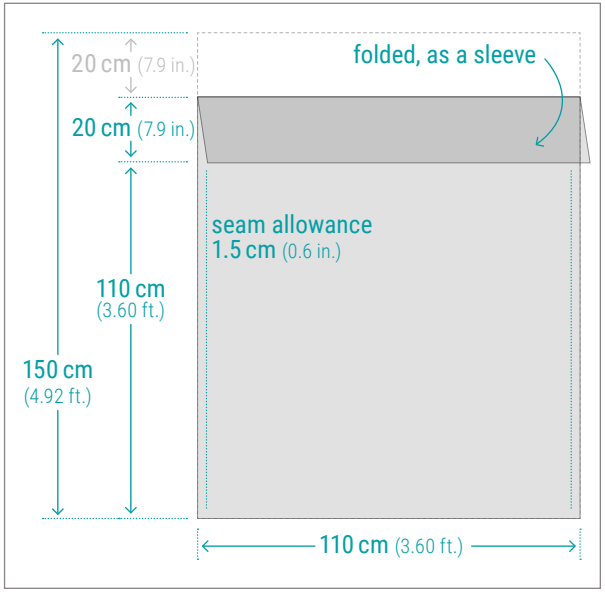


FIGURE 3 – CANVAS SHEETS FOR THE RAFT



B. Build the Drogue (Cube)

The three-dimensional, symmetrical structure of the drogue slows the FAD's drift, which helps to keep it in the intended fishing grounds. The drogue is made entirely of biodegradable materials.

1.

Cut 4 thick and 4 thin bamboo canes to measure 1.2 m (3.93 ft.) in length.

NOTE: Two thick bamboo canes for the cube bottom will be filled with the clay, sand, or gravel for weight.

2.

Using a pipe (iron or PVC) with a sharp end, remove the partition walls inside all canes — except for the two large canes being used for the cube bottom. In those two canes, keep the middle partition walls to prevent the weight that is inserted in step 5 from sliding from side to side — and to help maintain the jelly-FAD's balance (**Figure 4**).

3.

Drill two approximately 40–50 mm (1.5–2 in.) holes (depending on the diameter of the thin bamboo to be inserted) in each of the thick bamboo canes, at 10 cm (3.93 in.) distance from each end (**Figure 5**). These holes will be used to insert the thin canes (30–50 mm diameter) through.

FIGURE 4 – SHOWS STEP 2

FIGURE 5 – SHOWS STEP 3

MATERIALS

- ☐ 4 thick bamboo canes, about 90–100 mm (3.54–3.93 in.) diameter
- ☐ 4 thin bamboo canes, about 30–50 mm (1.18–1.96 in.) diameter
- ☐ 4 pieces of cotton canvas, finished size 110 cm x 110 cm (4.92 ft.) with one sleeve on top and another on the bottom
- ☐ 8 bamboo or wooden sticks to use as nails or pins
- ☐ Approximately 65 m (35.5 fathoms) of thick cotton rope, 20 mm (0.78 in.) diameter
- ☐ Approximately 16 m (8.7 fathoms) of thin cotton rope, 10–12 mm (0.39–0.47 in.) diameter
- ☐ 2 clay or mud bricks or balls of 4 kg (8.81 lb.) each, or equivalent weight in gravel, sand, or small stones, to be inserted into two thick bamboo canes — 4 kg (8.81 lb.) per cane, or 8 kg (17.63 lb.) per jelly-FAD

B. Build the Drogue (Cube) *continued*

4.

Rotate the thick canes to be perpendicular. Then drill two (2) 22 cm (8.66 in.) holes in each at 30 cm (11.81 in.) from each end (two holes per cane). NOTE: These holes, which will be used to pass the rope through, must be drilled in a different plane than the previous holes (**Figure 6**). Make sure there are no splinters near the holes, which could later cause rope abrasion.

5.

Insert 4 kg (8.81 lb.) of clay bricks/balls (or other weight materials) inside each of the two thick canes that will form the bottom frame of the cube. Place 2 kg (4.40 lb.) on each side of the cane separated by the middle partition wall. (**Figure 7:** Cane is split in photo only to show how the weight materials fit inside.)

The total clay weight per jelly-FAD should be 8 kg (17.63 lb.).

6.

Now insert the bamboo canes through the canvas sleeves as follows (**Figure 8**).

First, insert the two large bamboo canes with weights and two small bamboo canes through the bottom pockets of four different canvas sheets.

FIGURE 6 – SHOWS STEP 4

Holes to pass the ropes (22 mm) through to connect the 2 bamboo frames.

FIGURE 7 – SHOWS STEP 5

FIGURE 8 – SHOWS STEP 6

B. Build the Drogue (Cube) *continued*

Next, insert the two other large bamboo canes and two small bamboo canes through the top sleeve.

Then construct the bottom weighted frame of the cube by inserting the small bamboo canes into the large weighted ones. Do the same for the top frame of the cube.

7.

Lock the joints of the thick and thin bamboo canes by drilling a 1 cm (0.39 in.) hole and using a bamboo nail to secure each joint in place (**Figure 9**). To make the bottom frame and finish constructing the cube, repeat steps 6 and 7.

8.

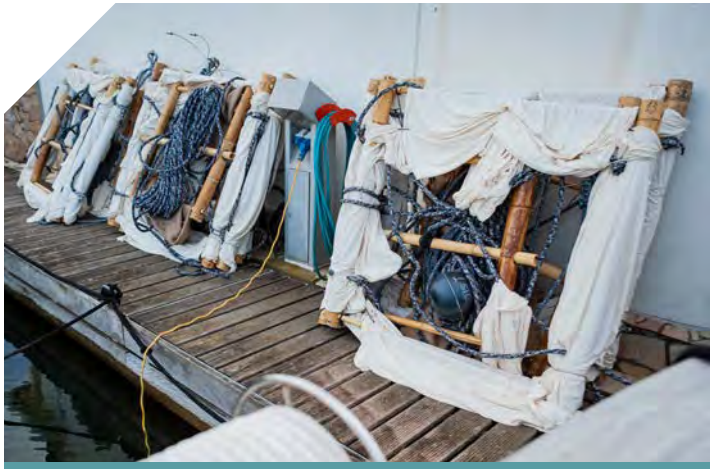
Use approximately 9.5 m (5.2 fathoms) of the 20 mm main rope (without cutting it) and insert it through the holes of the two bamboo frames of the cube, first in the upper part and then in the lower part (see "Jelly-FADs in Action" video link on page 5).

The drogue should be a 1.2 m (3.93 ft.) cube.

NOTE: Because the rope must support the weight of the drogue frame at the bottom, the canvas should be loose and the rope should be tight (**Figure 10**).

This step is shown here: youtu.be/l7z-CRMCks8?si=U5TKtn1Af-tmA8lP&t=250

FIGURE 9 – SHOWS STEP 7



JELLY-FADS FOLD FOR EASY STORAGE

Another advantage of the new jelly-FAD design is that it can be folded when not in use, and takes up less space on board a vessel.

FIGURE 10

9.

Next, lock the main rope, which passes through the bamboo canes, by making a knot at the top and bottom. Use thin rope (10-12 mm [0.39-0.47 in.] in diameter) to make the knots. The knots prevent the upper bamboo frame from sliding down. Repeat this step for the other side of the cube (**Figure 11**).

NOTE: The rope should be placed after the canvas is draped. However, these pictures were taken without all of the canvas in place to better show how to configure the cotton rope to attach the two (2) bamboo frames.

10.

Measuring a 9.5 m (5.2 fathom) segment from the end of the main rope, mark the splice point for joining the three points to the main rope. From the top of the cube, splice the three points of the joining rope back onto the main rope passing through the cube (**Figure 12**).

Jelly-FAD Saturation
Once the bamboo and canvas are saturated with seawater — about 20–25 days after deployment — they allow the jelly-FAD to neutrally drift in the water at the depth where placed.

FIGURE 11 – SHOWS STEP 9

FIGURE 12 – SHOWS STEP 10

DROGUE CONSTRUCTION TIP

These instructions are for building a drogue 1.2 m long x 1.2 m wide x 1.2 m high (3.93 ft. x 3.93 ft. x 3.93 ft.). But you can make the cube larger or smaller.

The larger the cube, the more material you will need. Larger cubes will drift more slowly in the ocean, but will be more difficult to lift from the water.

C. Add a Submerged Buoy

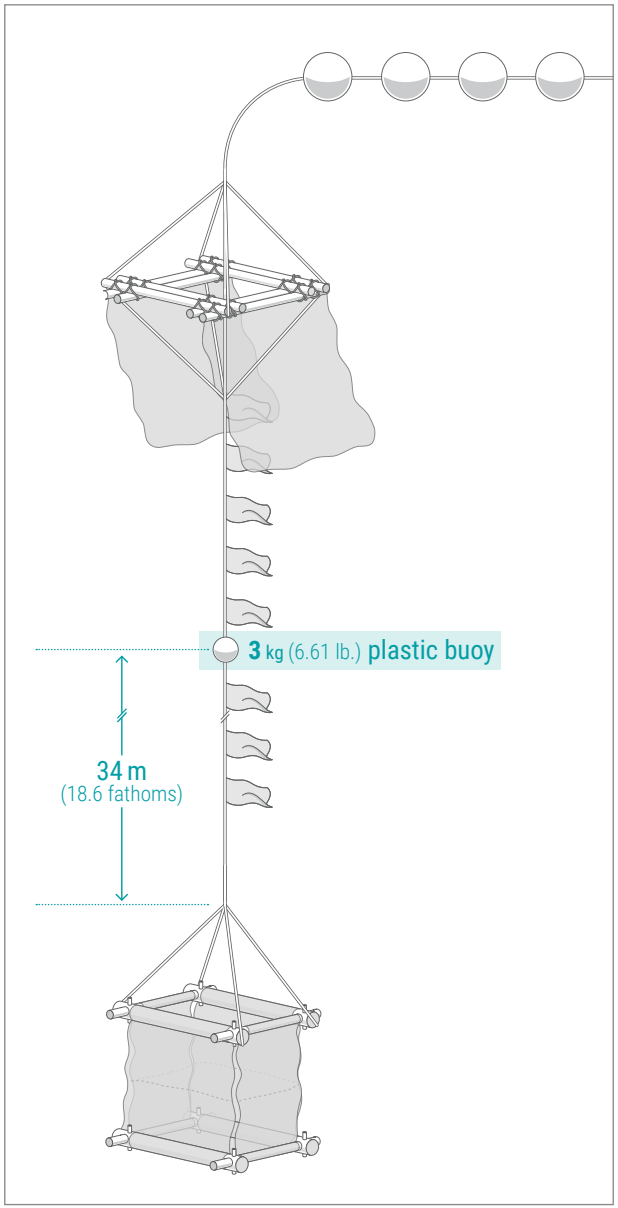
The submerged buoy that is placed above the cube and below the raft helps to distribute the flotation along the main rope of the jelly-FAD.

1.

Use 10–12 mm (0.39–0.47 in.) diameter cotton rope to attach the 3 kg (6.61 lb.) buoy or cork 34 m (18.6 fathoms) above the blast joint (splice) of the cube.

Choose a Plastic Buoy
For the submerged buoy, select a plastic one rather than cork, if possible. Over time, cork loses buoyancy.

FIGURE 13



MATERIALS

- ☐ 1 plastic buoy or cork, 3 kg (6.61 lb.)
- ☐ Thin cotton rope, 10–12 mm (0.39–0.47 in.) diameter

D. Build the Raft

The flat, two-dimensional-shaped submerged raft is designed to avoid wind and wave drag forces.

The raft creates shade and an artificial reef effect below the sea surface. It is made entirely of biodegradable materials.

1.

To help the raft sink faster, remove all partition walls inside the 8 thin bamboo canes, as in the B. section instructions.

2.

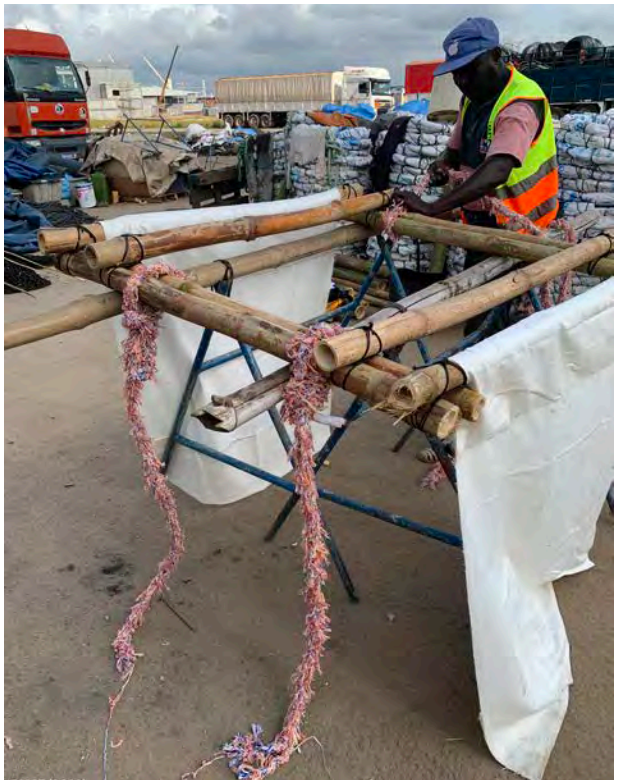
Insert the bamboo canes through the sleeves at the top of the two (2) canvas sheets, which have been draped on two bamboo canes on opposite sides of the cube (**Figure 14**).

3.

Assemble the bamboo canes in pairs to create a frame, and drill two (2) small 10 mm (0.39 in.) holes at all four (4) corners of the frame. Use a bamboo pin in each corner joint to lock the frame in place temporarily (**Figure 15**).

NOTE: These holes need to be diagonal with the frame for maximum stability.

FIGURE 14 – SHOWS STEP 2



MATERIALS

- ☐ 8 thin bamboo canes, about 30–50 mm (1.18–1.96 in.) diameter
- ☐ Approximately 9.2 m (5 fathoms) of thin cotton rope, 10–12 mm (0.39–0.47 in.) diameter
- ☐ 2 pieces of cotton canvas, finished size 110 cm (long) x 110 cm (wide) (4.92 ft. x 4.92 ft.) each, with one sleeve sewn on top
- ☐ 4 bamboo or wooden sticks to use as nails or pins
- ☐ Palm leaves, cotton canvas, or cotton ropes for attractors (optional)

FIGURE 15 – SHOWS STEP 3

D. Build the Raft *continued*

4.

The main rope must pass through the middle of the raft. Attach the raft from the corners with four ropes to the main rope, both on top of and below the raft.

For that, use electrical tape or a marker pen to mark the center point of the raft's placement point on the main rope (20 mm in diameter) at 4 m (2 fathoms) above the submerged 3 kg buoy.

Mark 1 m (3.28 ft.) sections both above and below this location to indicate the splice and locking points of the raft to the main line.

5.

Use 1 m (3.28 ft.) rope length for three ropes on the top and bottom. Make one rope on the top and bottom 1.6 m (5.24 ft.) long to allow splicing to the main rope. Repeat this process for the next two corners.

For the last corner, use 1.6 m (5.24 ft.) of rope for this process, which helps to secure the splice points on the main rope. Mark the last inserted rope differently, such as with red tape.

The desired length from raft to splice point is 1 m (3.28 ft.) from all corners of the frame top and bottom. Depending on the size of the canes used, allow for extra rope length to achieve this.

FIGURE 16 – SHOWS STEPS 4 & 5

6.

With the three (3) marks in place, begin the splice connections one corner at a time (**Figure 17**).

7.

If you want to add attractors — such as palm leaves, cotton canvas, or cotton ropes — attach them to the main rope and/or the raft using biodegradable rope. **This step is optional** (**Figure 18**).

Avoid Additions
Do not add additional flotation, weight, or aggregators to the jelly-FAD beyond what's recommended in this guide.

FIGURE 17 – SHOWS STEP 6

Photos by James Wichman © 2022

FIGURE 18 – SHOWS STEP 7 (optional)

E. Make the Flotation Component

Buoys and/or purse-seine corks at the water line help the jelly-FAD to float.

1.

If you want to camouflage the buoys or corks, use blue or dark-colored ones (**Figure 19**).

2.

At 8.5 m (4.6 fathoms) above the raft's splice, insert the first 8 kg (17.63 lb.) buoy/cork through the main rope. Then place the next three buoys/corks at 1 m (3.28 ft., or ½ fathom) intervals from each other.

At 4 m (13.12 ft., or 2 fathoms) from the last 8 kg (17.63 lb.) buoy/cork, attach the 3 kg (6.61 lb.) buoy/cork (**Figure 20**).

3.

Make a loop in the end of the main rope (a "rope eye") for attaching the echosounder buoy (**Figure 21**).

FIGURE 19 – SHOWS STEP 1

FIGURE 20 – SHOWS STEP 2

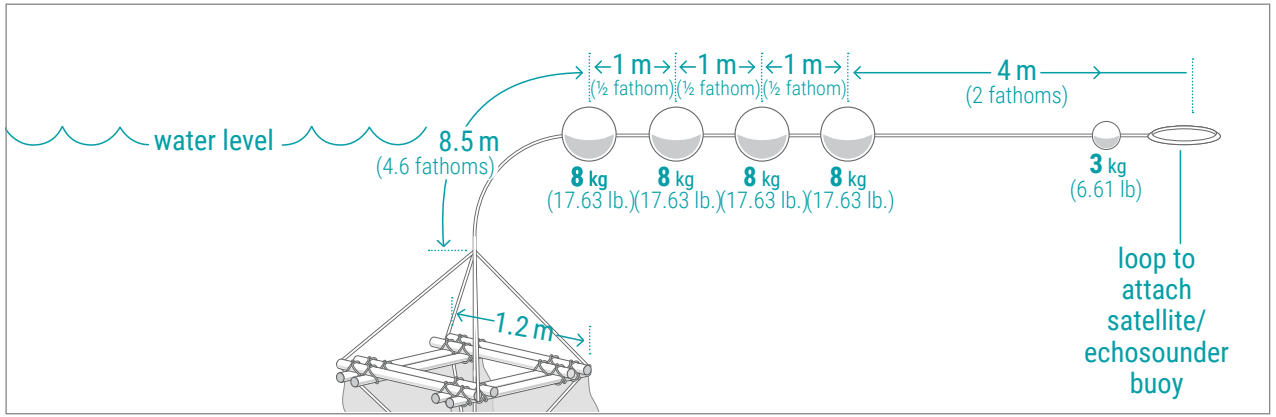


FIGURE 21 – SHOWS STEP 3

You have built a Jelly-FAD!
See the next page for deployment tips.

MATERIALS

- ☐ 4 plastic buoys or purse seine corks, 8 kg (17.63 lb.) each
- ☐ 1 plastic buoy or cork, 3 kg (6.61 lb.)
- ☐ Approximately 2–3 m (1–1.5 fathoms) of thin cotton rope (10–12 mm in diameter)
- ☐ Additional rope, to attach buoys to the main line

Do Not Use Knots
On the main rope, **use blast joints** — rather than knots — to attach the raft, cube and flotation line. Knots weaken the structure and can be a breaking point on jelly-FADs.

CONCLUSION

Deploying Jelly-FADs

Now that you have built jelly-FADs for your fleet, follow these steps for successful deployment:

1. When storing jelly-FADs on board, cover them from the sun and keep them dry.
2. If you want to compare jelly-FAD performance to conventional FADs, deploy the jelly-FADs near the conventional FADs.
3. Lower the jelly-FAD into the water when the vessel is moving slowly, starting with the cube. Then run the rope to ensure a long stretch, and deploy the raft. Deploy the corks and buoy last.

Making Replacement Components
Fishers may want to build extra drogues and rafts and store them on board (just as they typically stock extra raft and tail components for other types of FADs) to replace any jelly-FAD components damaged during fishing.

ISSF is interested in hearing about vessels' jelly-FAD experiences and modifications. Write to us at info@iss-foundation.org.

Transitioning to Jelly-FADs

As fishers learn how to build jelly-FADs and use them at sea, vessel owners and crew should keep these recommendations in mind:

- Of the total FADs your vessel deploys, make jelly-FADs a significant portion, such as 20%. Deploying jelly-FADs on a regular basis ultimately will yield more information about their effectiveness, which accelerates the learning process for everyone.
- When visiting your jelly-FADs, examine them to note any weak points or defects in materials or structure to consider in future construction.
- Be patient in the early stages of integrating jelly-FADs into your fishing operations. Any new fishing equipment or method has a "learning curve."
- Share your jelly-FAD observations and experiences with fisheries scientists, including the ISSF research team, and consider participating in jelly-FAD research projects.

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COMMON OCEANS

All photos in this guide are by Gala Moreno, ISSF, unless otherwise indicated.

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