

A sunset over the ocean with several fishing boats silhouetted against the horizon. The sky is a mix of blue, orange, and yellow, with scattered clouds. The water is calm, reflecting the colors of the sky. Several small fishing boats are visible on the water, some with masts and rigging. The overall scene is peaceful and serene.

C A L E N D A R
2015

Fish for the Future

*A calendar showcasing the efforts of
Lakshadweep's live-bait pole and line tuna
fishermen in monitoring their fishery*

Fish for the Future

Lakshadweep's live-bait pole and line tuna fishery is one of the last remaining examples of a sustainable fishery in India. It targets oceanic skipjack tuna (*Katsuwonus pelamis*) via the use of small planktivorous reef and lagoon fish as live-bait. This skilled technique is highly species specific and results in very little by-catch, has minimal habitat impact, and provides employment to a large number of individuals.

As an archipelago of coral reef atolls, Lakshadweep is highly dependent on the health of its diverse but fragile coral reef ecosystems. Safeguarding the pole and line tuna fishery is essential to reef health, as this fishery helps divert fishing pressure off the sensitive coral reef resources. Unfortunately, the tuna fishery now faces severe threats from rising costs and declining catch. Lack of information on this fishery further confounds management decisions.

In an effort to fill data gaps and increase stakeholder participation, a community-based catch monitoring programme was initiated in the islands of Agatti, Kadmat, Kavaratti and Minicoy in early 2014. Boats shown in this calendar have shown an exceptional interest in catch monitoring, regularly participating in the programme and helping generate detailed records of the fishery.

01 JAN



Drying skipjack tuna or *mas* on an Agatti beach.



Pole and line tuna fishing has been practised in the Maldives for over 2000 years. From the Maldives, this technique reached the island of Minicoy 200-300 years ago. Seeing commercial potential in this traditional practice, the Lakshadweep fisheries department systematically introduced the pole and line tuna fishing technique to the rest of the Lakshadweep Islands in the late 1950s and early 1960s. Many traditional management practices associated with this fishery are still practised in Minicoy and such practices need to be adopted by other Lakshadweep islands before they are permanently lost. The main product of the pole and line fishery is dried skipjack tuna or *mas* - a favourite among these islanders, Sri Lankans and Japanese. Today, the demand for pole and line caught tuna is on the rise in western markets due to the sustainable nature of its harvest.

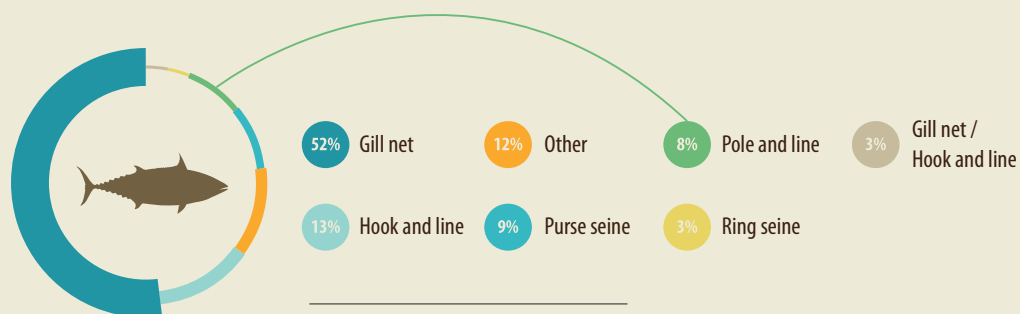
Map not drawn to scale

THU	01
FRI	02
SAT	03 •
SUN	04
MON	05
TUE	06
WED	07
THU	08
FRI	09
SAT	10
SUN	11
MON	12
TUE	13
WED	14
THU	15
FRI	16
SAT	17
SUN	18
MON	19
TUE	20
WED	21
THU	22
FRI	23
SAT	24
SUN	25
MON	26 ••
TUE	27
WED	28
THU	29
FRI	30
SAT	31

02 FEB



Tuna caught by a pole and line fishing boat from Minicoy.



% OF TUNA CAUGHT BY GEAR TYPE IN INDIA IN 2009

Tuna caught by pole and line in the Lakshadweep islands constitutes only a small portion of India's total tuna landings. Despite its low volume, this fishery is very important as it targets fast growing, early maturing tuna species in a manner that has little to no ecosystem impact. Additionally, the pole and line fishery helps divert fishing pressure off Lakshadweep's sensitive coral reefs, safeguarding ecologically significant reef fish like groupers and snappers from overharvest. Promoting and preserving this traditional practice is in the best interest of the fishing community and Lakshadweep's marine ecosystems.

Source: Vijayakumaran & Varghese report to the IOTC, 2010

SUN 01

MON 02

TUE 03

WED 04

THU 05

FRI 06

SAT 07

SUN 08

MON 09

TUE 10

WED 11

THU 12

FRI 13

SAT 14

SUN 15

MON 16

TUE 17 •

WED 18

THU 19

FRI 20

SAT 21

SUN 22

MON 23

TUE 24

WED 25

THU 26

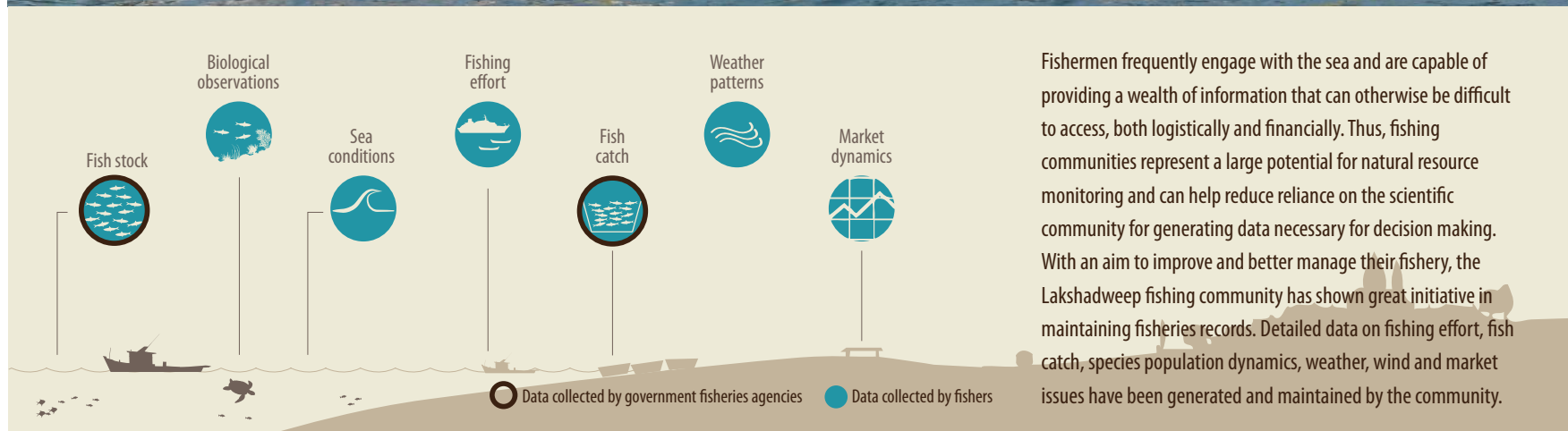
FRI 27

SAT 28

03 MAR



Agatti boat Muhajir owned by Sadik. Sadik has been catch monitoring onboard this boat since 31st January 2014. Crew members on Muhajir include Sadik, Savad, Saifudeen, Sharaf, Koyamma, Abdullah, Abdul Manaf, Ahmed, Allavayi and Shukoor.



Fishermen frequently engage with the sea and are capable of providing a wealth of information that can otherwise be difficult to access, both logistically and financially. Thus, fishing communities represent a large potential for natural resource monitoring and can help reduce reliance on the scientific community for generating data necessary for decision making. With an aim to improve and better manage their fishery, the Lakshadweep fishing community has shown great initiative in maintaining fisheries records. Detailed data on fishing effort, fish catch, species population dynamics, weather, wind and market issues have been generated and maintained by the community.

SUN 01

MON 02

TUE 03

WED 04

THU 05

FRI 06

SAT 07

SUN 08

MON 09

TUE 10

WED 11

THU 12

FRI 13

SAT 14

SUN 15

MON 16

TUE 17

WED 18

THU 19

FRI 20

SAT 21

SUN 22

MON 23

TUE 24

WED 25

THU 26

FRI 27

SAT 28

SUN 29

MON 30

TUE 31

04 APR



Agatti boat Al Hamdulillah owned by Ashik. Ashik has been catch monitoring onboard this boat since 2nd January 2014. Crew members on Al Hamdulillah include Ashik, Hidayath, Hussain, Iqbal, Amanullah, Hamsa Koya, Ali Koya and Malikan Koya.

M	T	W	T	F	S	S	
			✓	✗	✗	✓	✓ 53% Fishing
✗	✓	✓	✗	✓	✗	✓	✗ 25% Limited diesel supply
✓	✗	✗	✓	✗	✗	✗	✗ 9% Holiday
✗	✓	✓	✓	✗	✗	✗	✗ 13% Poor weather
✗	✓	✓	✓	✗			

Today, the Lakshadweep fishery faces significant threats from declining catches, rising costs and poor market access. Lakshadweep fisher maintained records provide details on limitations to fishing including limited diesel supply, engine issues, weather conditions, etc. For example, such records from a boat in Agatti show that, for nearly a quarter of the time, it was unable to go fishing due to limited access to diesel.

Daily fishing data collected by a boat in Agatti

WED 01
 THU 02 •
 FRI 03 ••
 SAT 04
 SUN 05

MON 06
 TUE 07
 WED 08
 THU 09
 FRI 10
 SAT 11
 SUN 12

MON 13
 TUE 14 •••
 WED 15 ••••
 THU 16
 FRI 17
 SAT 18
 SUN 19

MON 20
 TUE 21
 WED 22
 THU 23
 FRI 24
 SAT 25
 SUN 26

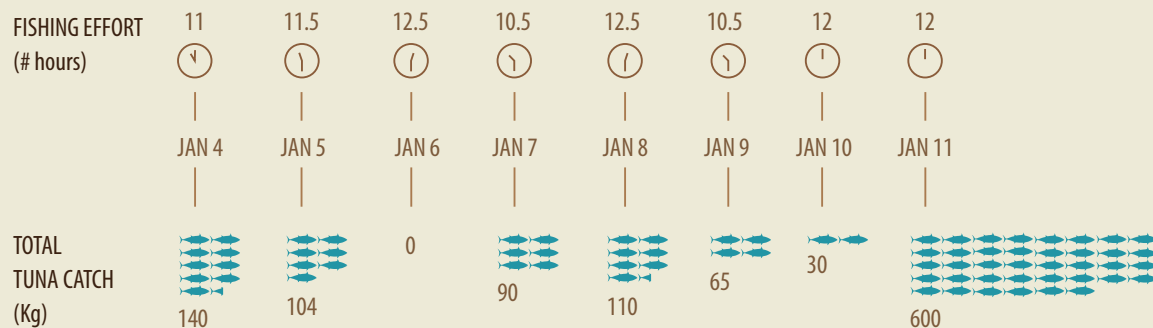
MON 27
 TUE 28
 WED 29
 THU 30

Mahavir Jayanti •
 Good Friday ••
 Dr. Ambedkar Jayanti •••
 Vishu ••••

05 MAY



Agatti boat Sulthan owned by Yousuf KP. Yousuf KP has been catch monitoring onboard this boat since 8th February 2014. Crew members on Sulthan include Yousuf, Buzar, Anees, Rafiq, Nizhamudeen, Irshad, Fathauallah, Salam, Mohammed and Mahummed.



Fishers document their effort in terms of time spent fishing, fuel usage and distance covered. These indicators of daily fishing effort when compared to daily tuna catch, help reveal patterns of tuna availability. Maintaining reliable fishing data on a regular basis provides a wealth of information to fishers, scientists and managers, and can help guide decision making.

Daily account of time spent fishing and total weight of tuna caught by a boat in Agatti over a period of 8 days

- FRI 01 •
- SAT 02
- SUN 03

- MON 04
- TUE 05
- WED 06
- THU 07
- FRI 08
- SAT 09
- SUN 10

- MON 11
- TUE 12
- WED 13
- THU 14
- FRI 15
- SAT 16
- SUN 17

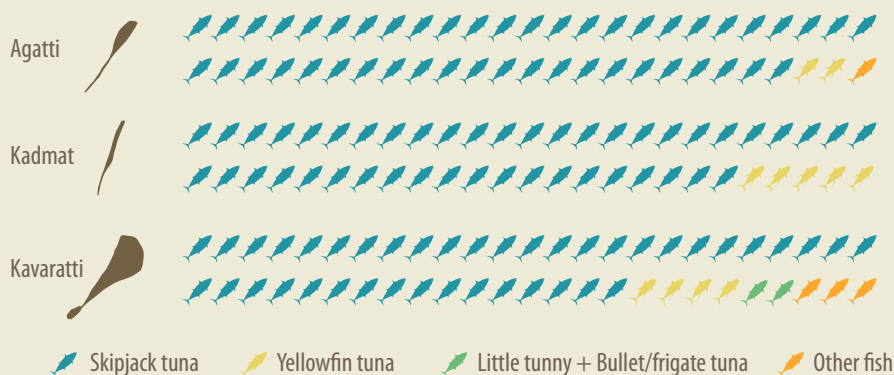
- MON 18
- TUE 19
- WED 20
- THU 21
- FRI 22
- SAT 23
- SUN 24

- MON 25
- TUE 26
- WED 27
- THU 28
- FRI 29
- SAT 30
- SUN 31

06 JUN



Kavaratti boat Jupiter owned by Ismail. Dilshad has been catch monitoring onboard this boat since 1st January 2014. Crew members on Jupiter include Dilshad, Usuma, Hussain, Farooq, Muhjib, Saleem, Ashraf and Mukthaleef.



The Lakshadweep pole and line fishery harvests a variety of tuna species including skipjack, yellowfin and little tunnies. The community-based catch monitoring effort is revealing interesting differences in species composition between islands. Kavaratti has a higher diversity of catch than Agatti and Kadmat, often landing large sized yellowfin that commonly occur in its surrounding waters. Although globally of high value, yellowfin have little demand locally and are also undesirable for *mas* making. Enabling the transport of pole and line caught tuna in fresh or frozen form can help open better markets for this best practice fishery.

Average species composition of pole and line catch calculated from data generated by Lakshadweep pole and line boats

MON 01
 TUE 02
 WED 03
 THU 04
 FRI 05
SAT 06
SUN 07

MON 08
 TUE 09
 WED 10
 THU 11
 FRI 12
SAT 13
SUN 14

MON 15
 TUE 16
 WED 17
 THU 18
 FRI 19
SAT 20
SUN 21

MON 22
 TUE 23
 WED 24
 THU 25
 FRI 26
SAT 27
SUN 28

MON 29
 TUE 30

07 JUL

WED 01
 THU 02
 FRI 03
 SAT 04
 SUN 05

MON 06
 TUE 07
 WED 08
 THU 09
 FRI 10
 SAT 11
 SUN 12

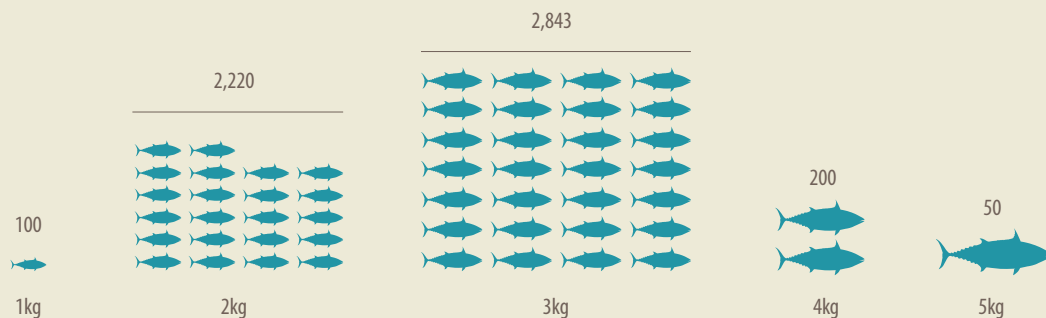
MON 13
 TUE 14
 WED 15
 THU 16
 FRI 17
 SAT 18 •
 SUN 19

MON 20
 TUE 21
 WED 22
 THU 23
 FRI 24
 SAT 25
 SUN 26

MON 27
 TUE 28
 WED 29
 THU 30
 FRI 31



Kavaratti boat Zayeema Ziab owned by E P Farooq, Rashid has been catch monitoring onboard this boat since 25th January 2014. Crew members on Zayeema Ziab include Rashid, Ashim, Shihab, Abdul Qadar and Sabith.



Skipjack tuna take 1.5 years to reach adulthood i.e. 45 cm body length or 1.7 kg in weight. Daily record of the proportion of sizes caught can inform our understanding of the targeted populations. Between January and May 2014, a Kavaratti boat involved in the community-based catch monitoring programme mostly caught 2 – 3 kg skipjack tuna.

Number of skipjack caught as a function of fish size by a boat from Kavaratti

08 AUG



Kavaratti boat Mohammed Kasim owned by Fathahudeen. Fathahudeen has been catch monitoring onboard this boat since 30th January 2014. Crew members on Mohammed Kasim include Fathahudeen T P, Ashik V, Wahab U P, Sabith V, Ameer H M, Azeeb B, Sayed Abdullah Koya C P, Assarudin K P and Hakim A P.

SAT 01
SUN 02

MON 03
TUE 04
WED 05
THU 06
FRI 07
SAT 08
SUN 09

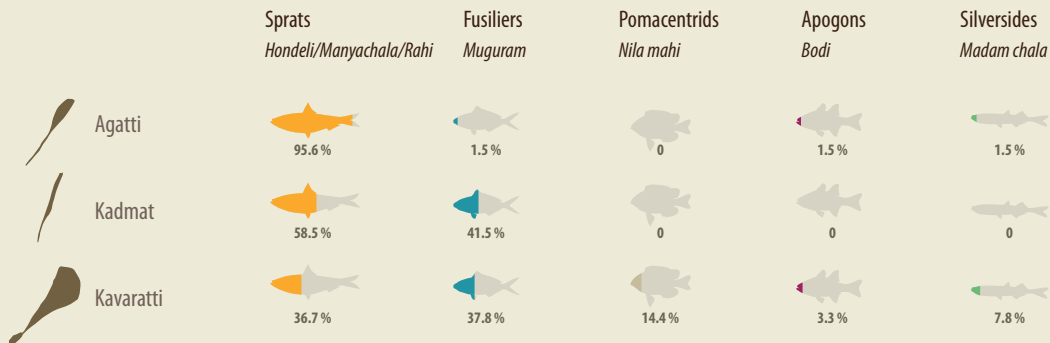
MON 10
TUE 11
WED 12
THU 13
FRI 14
SAT 15 •
SUN 16

MON 17
TUE 18
WED 19
THU 20
FRI 21
SAT 22
SUN 23

MON 24
TUE 25
WED 26
THU 27 ••
FRI 28 •••
SAT 29
SUN 30

MON 31

Independence Day •
First Onam ••
Thiruvonam •••



The catch monitoring programme is revealing interesting interisland differences in baitfish use. Kavaratti utilises a wide variety of baitfish, while Agatti and Kadmat depend on only a few. Regularly recording baitfish catch and effort data can inform fishers, managers and scientists about baitfish availability, a critical resource for the pole and line tuna industry.

Frequency of baitfish used, separated by island, as recorded by Lakshadweep catch monitoring boats

09 SEP



Minicoy boat Annar owned by Ibrahim Annarugothi. Ibrahim R M has been catch monitoring onboard this boat since 22nd February 2014. Crew members on Annar include Ibrahim Annarugothi, Ibrahim R M, Ali Ahige, Sadik D D, Ibrahim B R, Sainudeen Annarugothi, Moosa K N, Ashraf B R, Ashraf M L G and Firoz L G.

Photo: Ali Manikfan



Conserving baitfish stocks and reducing wastage is important to sustainably manage baitfish resources. In most cases, baitfish get left over at the end of the fishing day. At times fishermen discard the baitfish stock at sea while at other times, it is kept in in-water tanks for use the next day. In Minicoy, these in-water tanks, called *labiri*, have been used for years to conserve baitfish resources.

Fate of baitfish used by a pole and line boat in the catch monitoring programme

- TUE 01
- WED 02
- THU 03
- FRI 04
- SAT 05
- SUN 06

- MON 07
- TUE 08
- WED 09
- THU 10
- FRI 11
- SAT 12
- SUN 13

- MON 14
- TUE 15
- WED 16
- THU 17
- FRI 18
- SAT 19
- SUN 20

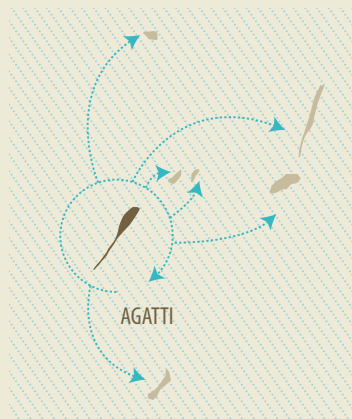
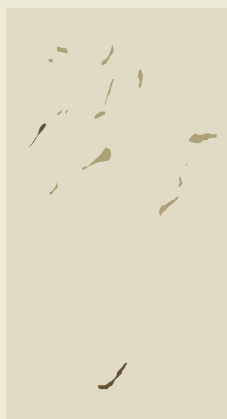
- MON 21 •
- TUE 22
- WED 23
- THU 24 ••
- FRI 25
- SAT 26
- SUN 27

- MON 28
- TUE 29
- WED 30

10 OCT



Kadmat boat Riyana owned by Abdulla Koya PC. Abdulla Koya PC has been catch monitoring onboard this boat since 9th February 2014. Crew members on Riyana include Abdullah, Aboo Backer, Saleem, Hamid, Haider, Sainil Abid, Jawahar, Haider K P and Usuma.



The pole and line fishery utilises small planktivorous fish from island lagoons and reefs. Islands that have access to other atolls for baitfish collection, like Kavaratti and Agatti, cover a wide area in search of baitfish. Isolated islands like Minicoy on the other hand are entirely dependent on their own stocks and thus take additional care in managing them.

Baitfish fishing locations for boats from Agatti and Minicoy, respectively, as indicated by the community-based catch records

THU 01
 FRI 02 •
 SAT 03
 SUN 04

MON 05
 TUE 06
 WED 07
 THU 08
 FRI 09
 SAT 10
 SUN 11

MON 12
 TUE 13
 WED 14
 THU 15
 FRI 16
 SAT 17
 SUN 18

MON 19
 TUE 20
 WED 21
 THU 22 ••
 FRI 23 •••
 SAT 24
 SUN 25

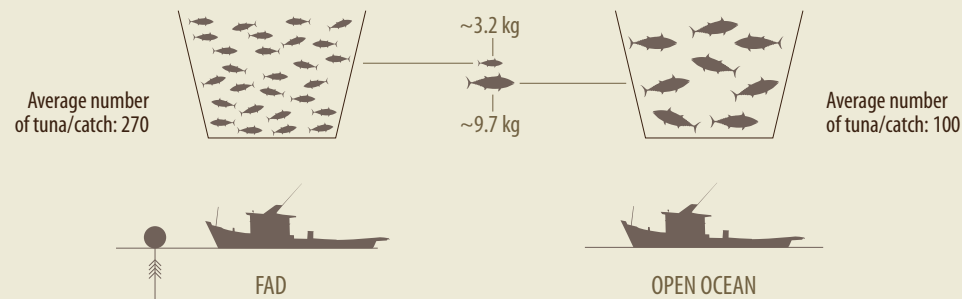
MON 26
 TUE 27
 WED 28
 THU 29
 FRI 30
 SAT 31

Gandhi Jayanti •
 Mahanavami ••
 Vijaya Dashami •••

11 NOV



Kadmat boat Baharul Kabeer owned by Jabir Khan K. Mohammed Sadique has been catch monitoring onboard this boat since 1st March 2014. Crew members on Baharul Kabeer include Sadique, Ulummudeen, Sainul Abid, Saleem, Hashim, C.B. Koya and Thajudeen.



Lakshadweep fishers use man-made fish aggregating devices (FADs) to supplement their catch in this time of rising costs, as they help reduce fuel expenditure and ensure catch. The community-based catch monitoring is revealing that FADs tend to attract a larger number of undersized mixed species of tuna as compared to the open ocean, where free swimming schools are mono-specific and larger in individual size.

Differences in tuna caught at FADs and in the open ocean by Kavaratti catch monitoring boats

SUN 01

MON 02

TUE 03

WED 04

THU 05

FRI 06

SAT 07

SUN 08

MON 09

TUE 10 •

WED 11

THU 12

FRI 13

SAT 14

SUN 15

MON 16

TUE 17

WED 18

THU 19

FRI 20

SAT 21

SUN 22

MON 23

TUE 24

WED 25 ••

THU 26

FRI 27

SAT 28

SUN 29

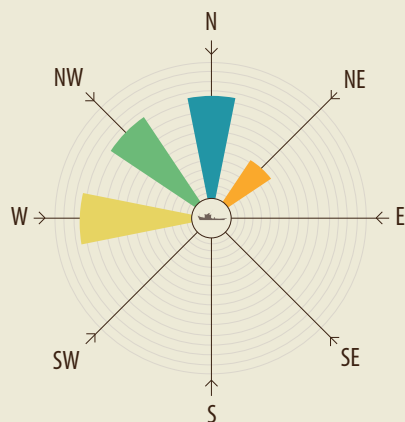
MON 30

12 DEC



Kadmat boat Safeenath Nooh owned by Safiyulla. Safiyulla has been catch monitoring onboard this boat since 19th February 2014. Crew members on Safeenath Nooh include Safiyulla, Sayaad, Hamid, Nawaz, Niyas, Amjad, Jaleel and Shahad.

● N	183.2 kg
● NE	72.5 kg
○ E	0
○ SE	0
○ S	0
○ SW	0
● W	192.2 kg
● NW	148.1 kg



By maintaining supplementary data, fishers aid in understanding the factors that affect tuna populations. Kadmat fisher recorded wind direction data is showing interesting relationships with catch, where winds from the north, northwest and west are associated with higher catch. Being a highly migratory species, skipjack distributions are under the influence of wind and currents. Regularly recording both environmental and anthropogenic metrics such as weather, wind, sea condition, external fishing pressure, etc. can help tease apart factors that affect this fishery.

Average tuna catch as a function of wind direction for catch monitoring boats from Kadmat

TUE 01
WED 02
THU 03
FRI 04
SAT 05
SUN 06

MON 07
TUE 08
WED 09
THU 10
FRI 11
SAT 12
SUN 13

MON 14
TUE 15
WED 16
THU 17
FRI 18
SAT 19
SUN 20

MON 21
TUE 22
WED 23
THU 24 •
FRI 25 ••
SAT 26
SUN 27

MON 28
TUE 29
WED 30
THU 31



In addition to the boats showcased in this calendar we would also like to acknowledge the monitoring work of **Muhjib** of **Quamarul Ulama**, **Abdu Samad** of **Jiddah Queen**, **Abdul Shukoor** of **Thurisina**, **Abu Backer** of **Karthika**, **Naushad** of **Dinnooraini**, **Umar** of **Bairuha** and **Muthu Koya** of **Mohammed Suhail**.

Other boats recently involved in the community-based catch monitoring programme include **Jeenathul Bahar**, **Malooty**, **Rahmathul Jazayir**, **MD Iqbal**, **Marhaba**, **Kaosar** and **Ganjularsh** of **Agatti** and **Sayed Musafir**, **Assayyed Aboosalih**, **Sunni Markaz**, **Imam Basari** and **Ahamadiya 2** of **Kavaratti**.

The Lakshadweep community-based catch monitoring project is a part of Dakshin Foundation's Biodiversity and Resource Monitoring Programme. Dakshin Foundation is a non-profit, non-governmental organisation that works towards natural resource conservation and management via approaches that are based on sound science and support sustainable livelihoods, and social and environmental justice. Our interdisciplinary approach draws from the fields of ecology, conservation biology, sociology, economics, and law. In Lakshadweep, our work aims to generate knowledge towards and empower local communities in natural resource monitoring. By encouraging stakeholder participation, we hope to increase stewardship as well as provide a platform for policy-making and management.

Our work in the Lakshadweep Islands is possible due to the support of the Lakshadweep Administration, Department of Fisheries, Department of Environment and Forests, Department of Science and Technology and Lakshadweep Marine Research and Conservation Centre. We would also like to thank the Lakshadweep fishing community, in particular the fisheries union in Agatti and Minicoy and individuals in Kavaratti and Kadmat, who make this work possible.

Concept and content Mahima Jaini, Shwetha Nair and Naveen Namboothri

Photographs Shwetha Nair (except where indicated)

Calendar design and layout Arjun Shankar and Seema Shenoy

Funding Rufford Small Grants Foundation and Rohini Nilekani

