Scientists have observed the seasonality of the sardines as the upwelling brings nutrients enhancing phytoplankton and consequently zooplanktons, and eventually fish. The oceanographic conditions of the strait are influenced by bi-annual monsoons. The southeast monsoon (noted as sardine season) lasts from June to September, while the southwest monsoon (also noted as non-sardine season) lasts from October to March. The strait has an average depth of 150m in the northern part, with deeper area (~400m to 1400m) in the southern part, adjacent to the Indian Ocean. The strait is a 120 Nm funnel-shaped marine environment that is located between the island of Java and Bali. This fishery targets lemuru (Indonesian common name for adult size), lemuru kucing or bei kocing (name for juvenile size), protolan (name for sub-adult size), sempenit (name for juvenile size), and banjang sero (Buchary 2010). These two monsoons govern the interchangeably every 2 to 7 years. Additionally, there are El Niño and La Niña events that occur, and El Niño and La Niña events that occur are known as boom and bust nature as expected for small pelagic planktivorous fish driven interchangeably every 2 to 7 years.

The strait is a 120 Nm tunnel-shaped marine environment that is located between the island of Java and Bali (Buchary et al. 2012). The strait has an average depth of 150m in the northern part, with deeper area (~400m to 1400m) in the southern part, adjacent to the Indian Ocean. Due to lemuru’s major presence in FMA 573 and the fact that Lemuruslemuru management Plan (KKP-RI 2018) is determined for FMA 573, the management unit for Bali sardinella in this profile is determined at this level. This profile last updated on 14 November 2017. The fishery is a single species fishery in nature and is managed by two provinces; more less bureaucratically. The fishery is ‘single species’ in nature and is mainly caught by a single type of gear (e.g., purse seine); less of multispecies, mixed fisheries nature. The fishery has been significantly supporting the local and national economy since mid-1990s, contributing to the creation of an ample governance structure for the management, comprising of representatives from the industry, government, and academic; increased concern from the central government about the potential demise of the fishery resulting to the creation of a road map to rehabilitate the fishery (KKP-RI 2018). Recent reform and decentralization of registration system for fish vessel = 30 GT would enable to sort out the problem of vessel size marking down (Subiakto 2015, Ambari 2017).

Weaknesses:
- Catch data has been seriously under-reported, discards and high-grading are not accounted for in official statistics; stock assessment use bachelor/aggregated approach where species are aggregated at the economically-related group per fisheries management area of FMA (Indrajaya 2017). Therefore, there is only one MSY value and one TAC value for all species combined within each group in the FMA per assessment.
- FMA has huge space and has no local of internal stratification (e.g., for near-shore small-scale fisheries, or for offshore deep-water fisheries).
- Small pelagic group (where lemuru is lumped into) in FMA 573 had reached over-exploited state ($ ≤ 1), and other studies on lemuru also showed similar results. However, managers have been issuing licenses for pair purse seine vessels, beyond the type agreed by the joint Management Committee.
- Fisheries compliance to management regulations is not only due to lack of facilities and governance efficiency, but also due to prevalent financial insecurity (Buchary et al. 2012).
- Deep challenges are faced by the Lemuruslemuru Management Committees, due to poor coordination and lack of funding.

Options:
- Improve the implementation of the joint agreement between East Java and Bali Province to control the efforts through limiting the number of license, fishing power, and boat size.
- Improve the statistics data collection system to obtain accurate catch data, including implementation of logbook system.
- Implement monitoring, control and surveillance.
- Improve research on stock assessment and the cycle to estimate the potential of the fishery and the stock status as a basis for management and licensing.


### ASSESSMENT

**Strengths**

- The lemuruslemuru fishery is confirmed to be a very small area (~1,200 km²) and is managed by only two provinces; less bureaucratically.

**Weaknesses**

- Catch data has been seriously under-reported, discards and high-grading are not accounted for in official statistics.

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**Options**

- Improve the implementation of the joint agreement between East Java and Bali Province to control the efforts through limiting the number of license, fishing power, and boat size.
- Improve the statistics data collection system to obtain accurate catch data, including implementation of logbook system.
- Implement monitoring, control and surveillance.

**Options**

- Improve the implementation of the joint agreement between East Java and Bali Province to control the efforts through limiting the number of license, fishing power, and boat size.
4. Improve the research on stock assessment to estimate the potential of the fishery and the stock status as a basis for management and licensing.

RETAILERS & SUPPLY CHAIN

1. Key buyers of shrimp (and other aquaculture products such as tilapia) from Indonesia to ask their suppliers (shrimp/farmed fishes exporters) if Bali Sardinella is an ingredient used in aquaculture feed in any of their supply chains.

2. If the partners use Bali sardinella as an ingredient for feed in aquaculture production, encourage the supplier to get involved in developing a proactive approach to sustainable aquaculture feed (including to develop a fishmeal strategy and using Bali sardinella as the case study) initiated by GMPT (Indonesian Feed Mills Association).