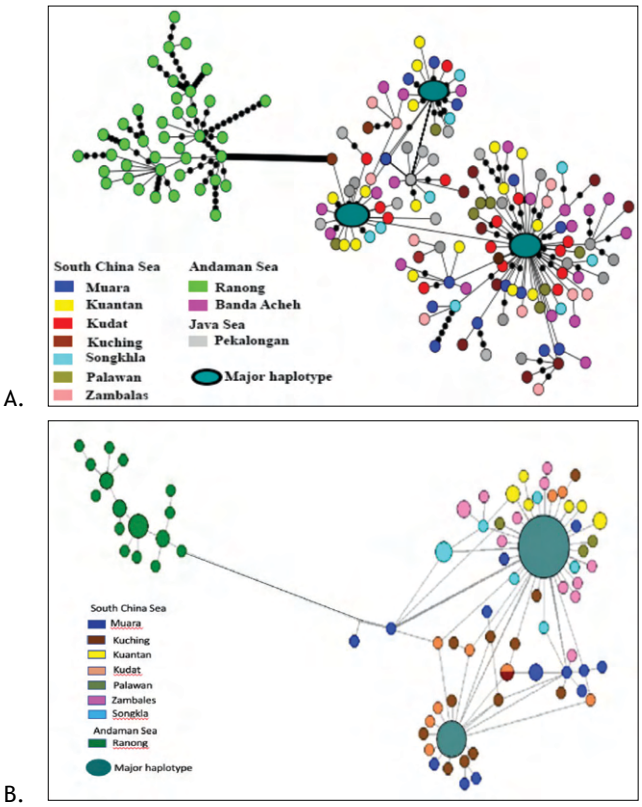

Figure 62. Minimum Spanning Network (MSN) inferred from mtDNA *Cyt b* (A) and *COI* (B) genes

- Misidentification of most common sardine species; thus, there is a need for morphologic, meristic, and molecular genetic tools to identify at the species level

Way Forward

The ongoing project of SEAFDEC/MFRDMD "Fisheries Management Strategy for Pelagic Fish Resources in the Southeast Asian Region" (2020–2024) under the JTF VI Phase II is developing the sustainable management strategy for pelagic fisheries including the fishery of sardines. For the AMSs, the Philippines as the leading sardine producer in the region through its Bureau of Fisheries and Aquatic Resources (BFAR), has initiated the National Sardines Management Plan (NSMP) 2020–2025 which envisions "A sustainable and equitably-shared sardine fishery that contributes to food security and increased income through responsible management." To contribute to this vision, the Plan aims to: 1) establish (reference points) and monitor progress with respect to biomass-based and fishing mortality-based reference points for the top three sardine species by 2023; 2) reduce juvenile catch by 10 % by 2025 in five priority sardine fishing areas by 2022; and 3) reduce poverty incidence of sardines fishers by 5 % (BFAR, 2020).

1.1.6 Marine Shrimps

In the Southeast Asian region, the economically important marine shrimps from capture fisheries include the tropical spiny lobsters *nei*, flathead lobster, slipper lobsters *nei*, banana prawn, giant tiger prawn, western king prawn, green tiger prawn, *Penaeus* shrimps *nei*, endeavour shrimp, *Metapenaeus* shrimps *nei*, and sergestid shrimps *nei*. Shrimps are mainly caught by beam trawls with relatively small mesh size, while in Brunei Darussalam and Singapore, *Penaeus* spp. are mainly caught by gill nets and trawls, respectively (SEAFDEC, 2020a).

The average production of marine shrimps from capture fisheries of the region during 2008–2019 was around 288,057 mt per year (**Figure 63**). In Fishing Area 57, the average production between 2008 and 2019 was around 95,815 mt with the highest at 118,445 mt in 2011 and lowest at 74,307 mt in 2019. On the other hand, in Fishing Area 71 production between 2008 and 2019 reached an average of 192,242 mt per year, with the highest in 2018 at 248,170 mt, and the lowest was in 2017 (157,786 mt).

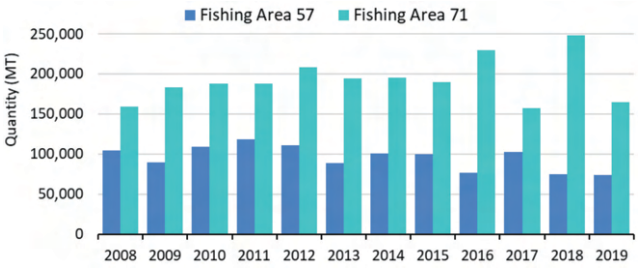

Figure 63. Production of marine shrimps from capture fishery of Southeast Asia from 2008 to 2019 by quantity (mt) (SEAFDEC, 2022)

1.1.7 Seaweeds

Seaweeds are aquatic plants that could be commonly differentiated by the predominant color of its pigments, *i.e.* red (*Rhodophyta*), green (*Chlorophyta*), and brown (*Ochrophyta*). Seaweeds have been traditionally exploited for centuries and generally collected from the wild as a source of food particularly in Asia. However, in the last 50 years, the increased demand for seaweeds and its by-products has led to the commercial exploitation and expansion of farming areas in tropical and temperate countries. The exponential increase in production of the eucheumatoid seaweeds in the Southeast Asian region has been attributed to the increased demand for carrageenan, an extract valued for its hydrocolloid polysaccharides. Carrageen-producing red algal seaweeds of the genera *Kappaphycus* and *Eucheuma* are the leading seaweeds being cultured in the region. Carrageenan is classified into three types, namely: kappa, iota, and lambda carrageenan. Kappa carrageenan is the hard-gelling type and comes from *Kappaphycus* spp; iota-carrageenan is a soft-gelling carrageenan sourced from *E. denticulatum*; and lambda is a non-gelling carrageenan usually used as a thickener in dairy products. Moreover, the red alga *Gracilaria* is known as an important source of agar. The discovery of other uses of seaweeds and its by-products other than food applications, including nutraceuticals, pharmaceuticals, and biofuels, contributed to the high demand for seaweeds.