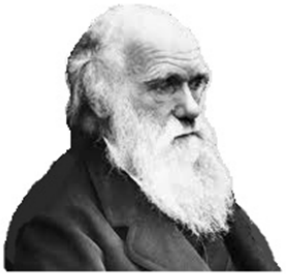
Available online at www.worldnewsnaturalsciences.com



World News of Natural Sciences

An International Scientific Journal

WNOFNS 50 (2023) 197-205 EISSN 2543-5426

Identification of Fishing Business Activities with Encircling Gillnet in Anambas Islands Regency, Indonesia

Izza Mahdiana Apriliani[1,*], Lantun Paradhita Dewanti[1], Heti Herawati[1], Pringgo KDNY Putra[1], Farhan Ramdhani[2]

[1] Department of Fisheries, Faculty of Fisheries and Marine Science, Universitas Padjadjaran, Bandung, 45363, Indonesia

[2] Faculty of Animal Husbandry, Jambi University, Jambi, 36361, Indonesia

*E-mail address: izza.mahdiana@unpad.ac.id

ABSTRACT

Batu Belah Village is one of the areas in the Anambas Islands Regency. Most of the people in Batu Belah have their main source of livelihood as fishermen so the capture fisheries business is the dominant type of fishery business in the area. One of the fishing gear units used by fishermen in Batu Belah is the encircling gillnet. Research is focused on providing an overview of fishing business activities using encircling gillnets. Operations to catch encircling gillnets in Batu Belah Village are carried out every day except on rest days, which are Fridays. The fishing operation is carried out by 1–2 fishermen. The fish species that dominate the catch is the kalat fish. Encircling gillnet fishermen are divided into 2 groups based on the material for making nets, namely Polyamide (PA) and Polyethylene (PE) net fishermen. The business capital expended for fishing using PE nets is far greater than PA nets. The total operational costs incurred by PE encircling gillnet fishermen amount to IDR 347,500.

***Keywords*:** net material, Batu Belah village, capital, operational costs, fishermen, Anambas Islands

1. INTRODUCTION

Anambas Islands Regency is geographically located between 2°10'0" - 3°40'0" N to 105°15'0" - 106°45'0" E. To the north, Anambas Islands Regency is bordered by the South

(Received 12 July 2023; Accepted 04 August 2023; Date of Publication 06 August 2023)

China Sea, to the south by the Tambelan Islands, to the east by the Natuna Sea, and to the west by the South China Sea [2]. The characteristics of the Anambas Islands Regency area are different because most of its territory consists of seas and distribution of islands.

Changes in wind direction greatly affect the climate conditions in Anambas Islands Regency. The dry season occurs around March–May when the wind blows from the north, while the rainy season occurs around September–February when the wind blows from the south.

Anambas Islands Regency is part of the 711 Fisheries Management Area (WPP) of the South China Sea, Natuna, and its surroundings. The total area is dominated by the sea with 98.73% covering an area of 46,033.81 km^2, and the remaining 1.27% of the area is land covering an area of 592.14 km^2. As many as 66% of the population of the Anambas Islands Regency work as fishermen. The type of capture fisheries business group is the largest type of fishery business, namely as many as 226 groups compared to other types of fishery business groups.

Therefore, the people in Anambas Islands Regency belong to a society that depends on marine products. The various types of fishing effort that exist, one type of fishing gear used in fishing operations in the Anambas Islands Regency is the encircling gillnet. The fishing business is an economic activity in which each activity is based on economic considerations so that the ongoing business makes a profit.

The development of a fishery business in an area can be an indicator of the success of ongoing fishery development. The development of fisheries in the Anambas Islands Regency is an important matter to monitor given the abundance of existing marine potential and the community's dependence on it. There is no information regarding the potential of the sea, especially fishing efforts in detail in the Anambas Islands. The research focused on describing fishing efforts using encircling gillnets in Anambas Islands District.

2. MATERIALS AND METHODS

The research was conducted on 1–5 October 2015 in Batu Belah Village, Anambas Islands District (Figure 1). The research was conducted using a survey method. Data is taken in the form of primary data and secondary data. Primary data in the form of information regarding the general condition of the Anambas Islands Regency was obtained through a literature study. Secondary data is in the form of characteristics of fishing gear, catches, and costs in the fishing effort. Secondary data was obtained through direct interviews with fishermen using a questionnaire tool. Respondents were purposively selected for encircling gillnet fishermen as many as 20 fishermen. Other tools used are cameras, boats, and GPS. Then the data was tabulated and analyzed descriptively. Descriptive analysis is used to provide an overview of existing phenomena, in this case, capture fisheries businesses using encircling gillnets.

3. RESULT

3. 1. Characteristics of Encircling Gillnets

Encircling gillnets are fishing gear that are classified into gillnets. A gillnet is a fishing gear that has a rectangular shape equipped with floats, weights, top and bottom lines, and the same size of mesh throughout the body of the net or adjusted to the target fish caught.

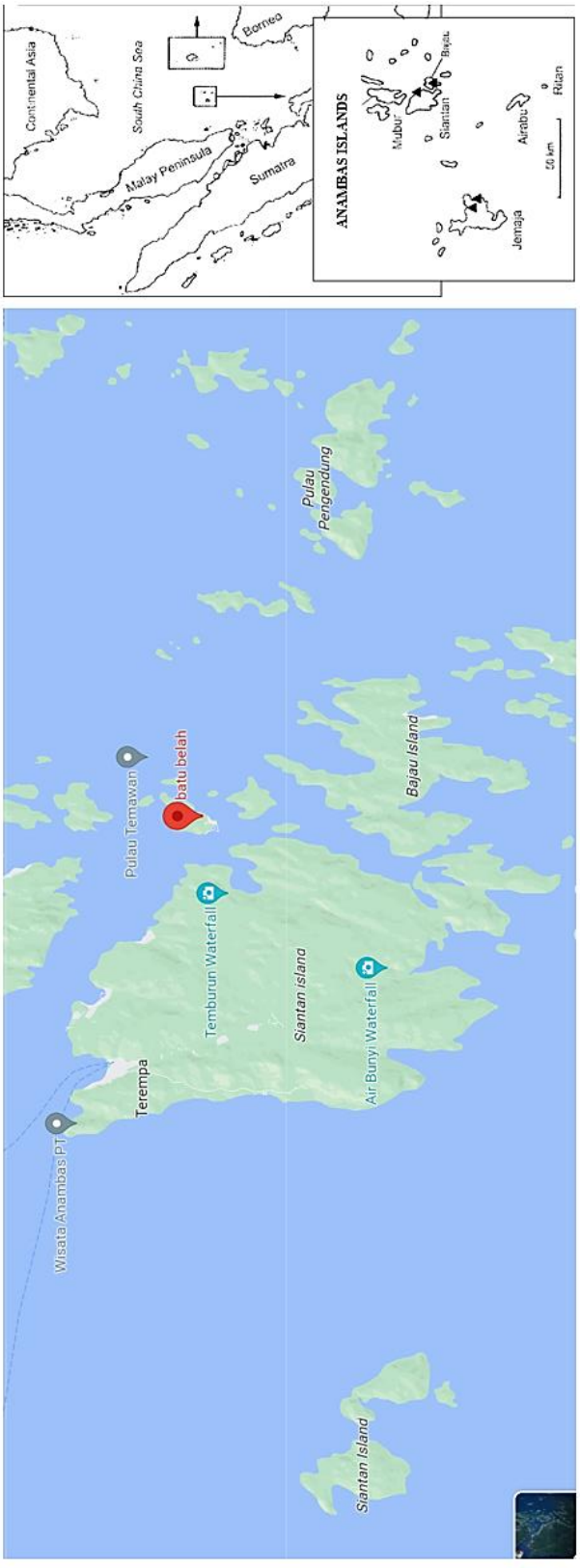


Figure 1. Map Location of Batu Belah Village, Anambas Islands District, Indonesia

Encircling gillnets are operated by circling the net to target a school of fish. The net is made of 2 mm monofilament polyamide (PA) material measuring 120 × 1 m and a mesh size of 2 inches. Gillnets in general use polyamide material. Top-rise rope made of 5 mm polyethylene (PE) material with plastic or rubber floats and weights made of lead or stone. The ship used in the fishing operation uses a motor boat with a power of 8 PK which is made of wood material. Fishing vessels in Indonesia are generally made of wood. The operation of this fishing gear is generally carried out by 1–2 fishermen. The encircling gillnet construction is shown in Figure 2.

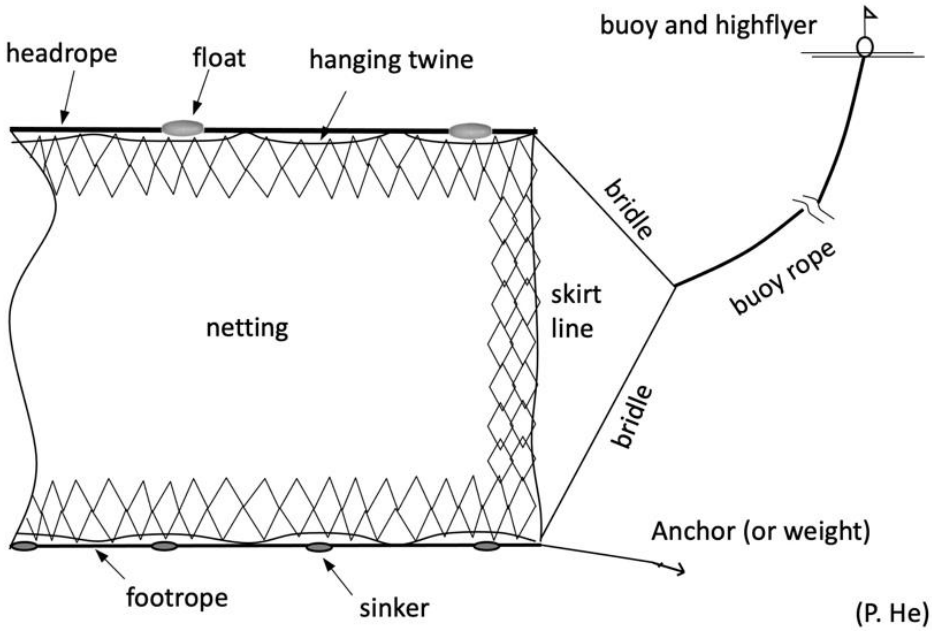


Figure 2. Construction of encircling gillnet.

Fishing operations using encircling gillnets are carried out every day except Friday in Batu Belah Village. Friday is used as a rest day by fishermen. The arrest operation was carried out from morning to evening. The operation of the encircling gillnet is divided into three stages, namely the preparation, setting, and hauling. The preparation stage includes various activities such as fuel preparation, engine inspection, food supplies, water, and other needs. Setting the fishing gear begins by circling the fish aggregation or fishing target area, then lowering the marking buoy, then the body of the net, until the last marking buoy. The time needed for setting the net is approximately 20–30 minutes. The last stage, hauling is carried out by lifting nets to take the catch.

3. 2. Catch Composition

The composition of the catch is different for each fishing gear used. This is related to the variety of operating methods, characteristics, and fishing areas for each fishing gear used. The composition of fish caught using encircling gillnets consisted of three species of fish (Figure 3), namely *Scaridae* spp dominated by 25 kg, equivalent to 68% of the total catch. 8.25 kg (22%) of the catch was *Crenimugil seheli*, and 10% (3.75 kg) *Epinephelus* spp.

Crenimugil seheli *Scaridae* spp *Epinephelus* spp

Figure 3. Catch of encircling gillnet.

3. 3. Fishing Business Capital

Encircling gillnet fishermen are divided into two groups based on the material the net is made of, namely polyamide (PA) or single nylon, and polyethylene (PE) multifilament. The fishing areas and fishing methods for the two materials are also different. PA net fishermen tend to operate not too far from the island. The depth of the fishing area is <2 m, so fishermen tend to use non-motorised boats, or small motorized boats for fishermen operating around neighboring islands. The business capital for the procurement of PA and PE encircling gillnet fishing units is attached in Table 1.

Table 1. Business capital for the procurement of encircling gillnet fishing units.

Material	Fishing units	Technical age	Purchase price (IDR)	Purchase time	Exp.
PA	Fishing vessel	5 years	3.000.000	2008	non-motorised boats
	Fishing gear	3 months	300.000	2008	
PE	Fishing vessel	5 years	30.000.000	2010	1 GT
	Engine	5 years	7.000.000	2010	12 PK
	Fishing gear	2 years	2.500.000	2010	

PE net fishermen generally operate in areas around coral reefs, with the main target being reef fish. PE netting is more expensive than PA netting by almost 100% over 5 years. The encircling gillnet fishing gear utilizes calm waters to make fishermen have side jobs, such as being the owner of a clove garden, coconuts, and so on.

3. 4. Fishing Operational Costs

Operational costs are incurred when fishing operations are carried out and are generally incurred by the fisherman owner. The operational costs of each fishing gear are different due to

certain factors such as differences in the length of operating time, the distance to the fishing ground, and the number of workers needed in fishing operations. The operational costs of the PE encircling gillnet fishing gear are divided into 2 components, namely fuel and fishermen's consumption. The cost incurred for fuel is IDR 297,500. The price for 1 liter of diesel in Batu Belah village is IDR 8,500, so 35 liters of diesel can is needed in one fishing trip using PE encircling gillnets. The costs incurred are quite large because the distance traveled in the fishing operation is quite far. The cost incurred for consumption needs is only Rp. 50,000, because it only requires 1-2 fishermen when the fishing operation takes place. The pattern of fuel consumption in a fishing unit can be influenced by the number and type of fishing vessels and the distance to the fishing ground,

4. CONCLUSIONS

Fishing operations using encircling gillnets in Batu Belah Village are carried out every day except Friday by 1–2 fishermen. The catch is dominated by kalat fish. There are 2 groups of fishermen based on the net material used, namely PA and PE net fishermen. The business capital expended is much larger for the PE encircling gillnet fishing operation.

References

[1] Hs DS, Seniwati E. Application of the SAW (Simple Additive Weighting) Method for Scholarship Acceptance in Anambas Islands Regency. *INFOS Journal-Information System Journal* 1(3) (2019) 39-43

[2] Purba NP, Kelvin J, Annisaa M, Teliandi D, Ghalib KG, Ayu IPR, Damanik FS. Preliminary Research of Using Ocean Currents and Wind Energy to Support Lighthouse in Small Island, Indonesia. *Energy Procedia* 47 (2014) 204-210

[3] Utama G, Hendratno A. Integration of Developing Sea Border Area through Archipelago Ecotourism in Anambas Archipelago Regency. *Proceeding of Indonesia Heritage Tourism Forum* 2019 (IHTF 2019) 2-7

[4] Karana S, Andi C. Existance of Transportation Facilities and Infrastructures in Tourism Industry in Anambas. *MPI* 10 (2) (2016) 87-98

[5] C-P. Chang, Zhuo Wang, John McBride, Ching-Hwang Liu. Annual Cycle of Southeast Asia - Maritime Continent Rainfall and the Asymmetric Monsoon Transition. *Journal of Climate* 18 (2005) 287-301

[6] Jun-Ichi Hamada, Manabu D Yamanaka, Jun Matsumoto, Shoichiro Fukao, Paulus Agus Winarso, Tien Sribimawati. Spatial and Temporal Variations of the Rainy Season over Indonesia and their Link to ENSO. *Journal of the Meteorological Society of Japan* 80 (2) (2002) 285-310

[7] Widiyarini W, Latuconsina S. Determinants of the Performance of the Fisheries Sub Sector to Support Economic Resilience in the Riau Archipelago Province. *Journal of National Resilience* 28 (2) (2022) 222-241

[8] Putra Iras. Human Development Anambas Archipelago District. *Journal of Home Affairs Governance* 7 (2) (2015) 173-184

[9] Albasri H, Sammut J. A Comparative Study of Sustainability Profiles between Small-Scale Mariculture, Capture Fisheries and Tourism Communities within the Anambas Archipelago Small Island MPA, Indonesia. *Aquaculture* 551 (2022) 737906

[10] Arieta S, Gunawan B, Sumadinata RWS, Ihsan YN. Calling for Institutional Arrangements in Napoleon Wrasse Conservation and Management in Indonesia: The Anambas Islands case. *Marine Policy* 145 (2022) 105258

[11] Khumara G, Mujiburohman D. Examining the Tenure of Abandoned House Settlements in Anambas Islands Regency. *Scientific Journal of Administrative Sciences* 12 (1) (2022) 17-27

[12] Pregiwati LA, Wiryawan B, Wisudo SH, Satria A. The Superior Commodity and Fishing Technology Selection in Anambas Island Regency. *Marine Fisheries* 8 (1) (2017) 113-122

[13] Kusumawati P, Rosyid A, Kohar MA. Efforts to Improve Fishery Business through Improving the Business Environment on Cantrang Fishing Gear (Boat Seine) and Local Government Policies in Rembang Regency. *Journal of Fisheries Science* 6 (1) (2010) 36-45

[14] Kusdiantoro K, Fahrudin A, Wisudo SH, Juanda B. The Performance of Capture Fisheries Development in Indonesia. *Maritime and Fishery Socio-Economic Marina Scientific Bulletin* 5 (2) (2019) 69-84

[15] Voyer M, Barclay K, McIlgorm A, Mazur N. Using a Well-Being Approach to Develop A Framework for an Integrated Socio-Economic Evaluation of Professional Fishing. *Fish and Fisheries* 18 (2017) 1134-1149

[16] Arthur RI, Skerritt DJ, Schuhbauer A, Ebrahim N, Friend RM, Sumaila UR. Small-Scale Fisheries and Local Food Systems: Transformations, Threats and Opportunities. *Fish and Fisheries* 23 (2022) 109-124

[17] Boopendranath MR. Basic Principles of Fishing Gear and Classification. *Fish Harvesting Systems for Resource Conservation* 11 (2012) 125-151

[18] Krisyawensya GB, Supriadi K, Apriliani IM. Identification of Vessel and Fishing Gear in Fish Landing Place (PPI) Cikidang, Pangandaran, Indonesia. *World Scientific News* 178 (2023) 23-43.

[19] Subramania Pillai N, Boopendranath MR, Kunjipalu KK. Studies on the Suitability of HDPE Material for Gill Nets. *Aqua Docs* 26 (1989) 1-4

[20] Rizal A, Herawati H, Zidni I, Apriliani IM, Ismail MR. The Role of Marine Sector Optimization Strategy in the Stabilisation of Indonesian Economy. *World Scientific News* 102 (2018) 146-157

[21] Maulana M, Apriliani IM, Riyanti I, Iskandar. Suitability of Gross Tonnage of Grant Boat by Kementerian Kelautan dan Perikanan (KKP) based in Pangandaran, West Java, Indonesia. *World Scientific News* 124(2) (2019) 119-130

[22] Simbolon D, Jeujanan B, Wiyono ES. The Effectiveness of Using FADs in Fishing Operations in Kei Kecil Waters, Southeast Maluku. *Marine Fisheries: Journal of Marine Fisheries Technology and Management* 2 (1) (2011) 19-28

[23] Sunarto S, Nurruhwati I. Selectivity of Purse Seine Fishing Gear at Muara Angke Fish Landing Base (PPI), Jakarta. *Journal of Marine Fisheries* 7 (2) (2016)

[24] Marenkov O, Fedonenko O. Ways of Optimization of Breeding Conditions of Fish by Using Artificial Spawning Grounds. *World Scientific News* 49 (1) (2016) 1-58

[25] Lleonart J, Maynou F, Recasens L, Franquesa R. A Bioeconomic Model for Mediterranean Fisheries, the Hake Off Catalonia (western Mediterranean) as A Case Study. *Scientia Marina* 67(1) (2003) 337-351

[26] Rahmasari L. The effect of Distance to Sea, Length of Work and Technology on Fishermen's Income. *Journal of Maritime Science and Technology* 2 (2017) 163-174

[27] Parker RWR, Blanchard JL, Gardner C. Green BS, Hartmann K, Tyedmers PH, Watson RA. Fuel Use and Greenhouse Gas Emissions of World Fisheries. *Nature Climate Change* 8(4) (2018) 333-337

[28] Rizal DR, Purwangka F, Imron M, Wisudo SH. Fuel Needs for Fishing Vessels at Palabuhanratu Nusantara Fishing Port. *ALBACORE* 5 (1) (2021) 29-42

[29] Apriliani IM, Hamdani H, Rizal A. Productivity of Fishing Gear on Shrimp Catching Operation in Pangandaran Regency. *ALBACORE* 4 (2) (2020) 141-148

[30] Via Anggania, Ujang Suherman, Izza Mahdiana Apriliani, Identification of Rainbow Shrimp (Parapenaeopsis sculptilis (Heller, 1862)) Catch at Fish Auction Place (TPI) Minasari Pangandaran Regency, West Java, Indonesia. *World Scientific News* 178 (2023) 101-114

[31] Daffa Dzul Faqqar, Yuli Andriani, *Mangrove Ecosystem Identification and Density in Geopark Ciletuh, Sukabumi, West Java, Indonesia.* World Scientific News 175 (2023) 25-36

[32] Achmad Rizal, Izza M. Apriliani, Lantun P. Dewanti, Effect of Additional Soybean Oil in Feed Commercial on Pangasius djambal Bleeker, 1846 for Growth, Feed Efficiency, and Survival Rate. *World Scientific News* 172 (2022) 236-250

[33] Achmad Rizal, Izza M. Apriliani, Lantun P. Dewanti, Heti Herawati, The Effect of Adding Fermented Coconut Husk Extract in Feed on The Growth Rate of Tilapia Fish (Oreochromis mossambicus (Peters, 1852)). *World Scientific News* 172 (2022) 282-295

[34] Fauzia H. Nadya, Mega Laksmini Syamsuddin, Subiyanto, Qurnia Wulan Sari, Estimation of Ocean Wave Energy using Wave Forecasting in Pangandaran Bay, Pangandaran, West Java Province, Indonesia. *World Scientific News* 170 (2022) 85-98

[35] Reinaldy Firdaus, Lantun Paradhita Dewanti, Ai Sumiasih, Review of Trammel Net Fishing Activities as Traditional Fishing Gear That Used by Fisherman at Pangandaran Fish Landing Place, Indonesia. *World Scientific News* 167 (2022) 53-68

[36] Achmad Rizal, Izza M. Apriliani, Lantun P. Dewanti, Bioeconomic Analysis of Cutlassfish (Trichiurus spp.) in Sikakap Strait, Mentawai Island, Indonesia. *World Scientific News* 166 (2022) 54-70

[37] Achmad Rizal, Izza M. Apriliani, Lantun P. Dewanti, Correlation analysis of oceanographic parameters to the production of trammel nets in the Mentawai Islands District, West Sumatra, Indonesia. *World Scientific News* 171 (2022) 108-125

[38] Meriyanti Ngabito, Muhammad Yasin Umsini Putra Olii, Sri Vinka Binol, Nurul Auliyah, Izza Mahdiana Apriliani, Gonad Maturity and Fecundity of Mackerel Tuna (Euthynnus affinis (Cantor, 1849)) in North Gorontalo Waters, Indonesia. *World Scientific News* 182 (2023) 104-114

[39] Yuli Andriani, Lantun Paradhita Dewanti, Asrina Desy Permata Fitri, Rusky Intan Pratama, The Productivity of Seine Nets Fishing Gear at Several Fish-Catching Areas in Indonesia. *World Scientific News* 182 (2023) 133-142

[40] Rollin Devasa, Silmi Biladyah Azzahra, Ainun Nahar, Annisa Maysabila, Fahira Adisti Adiara, Nora Akbarsyah, Analysis of Maximum Sustainable Yield (MSY) and Catch Per Unit Effort (CPUE) Multi Fishing Gear in PP Cikidang, Pangandaran Regency, West Java, Indonesia. *World Scientific News* 180 (2023) 14-24

[41] Junianto, Helmalia Asri, Veronica, Zulfiqor Meetrand, Andrean Alief Musthopa, Fajar Dwi Noeryana, Processing and organoleptic quality of salted kadukang fish (Hexanematichthys sagor (Hamilton, 1822)) in Pangandaran Regency, West Java, Indonesia. *World Scientific News* 180 (2023) 38-49

[42] Achmad Rizal, Izza M. Apriliani, Heti Herawati, Analysis of Water Quality and Carrying Capacity Based on Plankton and Benthos Bioindicators in Cibuni River, Cianjur District, West Java Province, Indonesia. *World Scientific News* 173 (2022) 14-26

[43] Achmad Rizal. Implementation of Tourism Development Policies in Garut District, West Java Province, Indonesia. *The Institute of Biopaleogeography named under Charles R. Darwin* 5 (2021) 1-40

[44] Achmad Rizal. Urgency of Coastal Resources Management Through Coastal Tourism in Wondama Bay District, West Papua Province, Indonesia. *The Institute of Biopaleogeography named under Charles R. Darwin* 8 (2021) 1-39

[45] Achmad Rizal, Chandra Arief Wirawan, Fittrie Meillianawaty Pratiwy, Dian Yuni Pratiwi. Integrated Development of Marine and Fisheries of Sangihe Islands District, North Sulawesi, Indonesia. *The Institute of Biopaleogeography named under Charles R. Darwin* 12 (2022) 1-63

[46] Gunawan Undang, Achmad Rizal, Nuryani R. Eny. Policy Implementation: Expedition of Development Potential and Inequality in the Southern Region of West Java, Indonesia. *The Institute of Biopaleogeography named under Charles R. Darwin 17* (2022) 1-105