Yemen and Regional maritme management to enhance blue economy in Red Sea and Indian Ocean by using GIS

Author: Mr. Mohammad Ali Ahmad Humran.

Ph.D. researcher, Department of Geography, College of Arts and Humanities, Sana'a University.

Humran976@gmail.com, 00967773292655

Abstract.

The Yemeni maritime domain constitutes a geostrategic center of gravity in the strength of Yemen and effectiveness in the global balance of power. Considering the absence of intellectual development in achieving regional strategic management, the region has become a place of ambition and a conflict zone for the dominant powers and constituted a source of threat to maritime security. The study aimed at applying. GIS in discovering the Yemen and Regional geographical strategic characteristics to help formulate the Yemeni maritime strategy and achieve regional management to enhance regional maritime security. Mixed of geographical approaches were used in GIS and remote sensing, information technology, marine geopolitics, marine regional geographical approach, marine spatial planning approach to study, describe, explore, collect information, analyze and manage a modern database. The experiences of applying of GIS, marine studies, as well as the experiences of the EU and IORA, beside that the relations between TUOAA, YGS and AGS to collect data. The importance of the study comes in raising awareness the importance of geographical applications to assist the political and strategic planning and political decision-maker in order to formulate the precise maritime strategic decision and plans to contribute to the achievement of Yemeni maritime development and benefit from the geographical conference in the importance of regional cooperation and partnership in achieving regional maritime planning. study divided into three levels. First, the definition of GIS, analyzing and managing data to formulate maritime strategic plans. Second, the role of geographical conferences, Yemeni & regional maritime alliances such as Arab-Chinese partnerships. Third, discussing maritime problems and conflicts. The study is expected to unify Yemen maritime policy that build modern maritime strategy and working with Arab and IORA for conducting spatial marine planning that contributes to achieve regional maritime strategy for marine development, as well as to build regional maritime power for protection maritime and national security in the Red Sea and Indian Ocean region.

Keywords: Yemeni maritime domain, strategic spatial maritime planning, information technology systems, maritime security, maritime policy.

1. Introduction.

Yemeni maritime field constitutes an influential strategic center of gravity in regional maritime economic relations and point for building and implementing the objectives of Yemeni maritime strategy in Red Sea and Indian Ocean region . However, Yemen has been facing local and international challenges, which being obstacles rock to develop strategy and employee marine elements power to secure food and national security, in addition that Arab League, GCC and IORA failed to use both soft and solid power to control and neutralize regional conflicts on the same time failed to protect maritme security at Red Sea and Indian ocean area.

There are numerous of studies proved that an international factors more affected at Yemen national security and lunched war anti Yemen since 2015. According to theory and realities of maritme power, which is Key element at International, regional and local comprehensive national power and geostrategic location is precisive factor affected today course of action friends, enemy policy as well as at Global balance. diversity of Grand and national policy.

Alferd Mahan get advantages of maritme power and understand the nature the importance of maritme geostatic location at Hight sea , International trade , straits , as well as have knowledge's of nature of maritme policy that could more role at Global balance at building U.S maritme strategy that have ability to control international policy and American hegemony, which U.S and forging policy dominate Yemeni, Arab and regional political sphere and increasing unstable as well as threaten Yemen, Arab and regional national security.

Based on Red Sea and Indian ocean is constant variable connected Yemen, Arab and IORA west and east Indian ocean, so Stated and local, Arab and regional community that they are sharing national, historical, cultural and national interest based on international theories, on the same time they face same threaten maritme since cold war till today by west collation. So, Study aimed study discover and analysis characteristic natural and human maritme environment by using GIS, collet data's that could help making decision and political geostrategic planning to build Yemeni and regional maritime strategy by using mixed of modern geographical and maritime approaches. It Based on theories and regional marine application, as well as conducting MSP as modern policy that EU and many countries succeed to solve marine issues and enhance resources productions in blue economy. Study divided to four levels, first discover general features in red sea and Indian ocean, second conducting MSP in Yemen islands in red sea, third analysis challenges, fourth results and suggestions, and conclusion.

Study anticipated that will get advantage of Geography conference to understand maritme regional geostrategic elements that could unify efforts to create joint Yemen , area and regional maritme security , to clarify important of Unifying Yemen ,Arab and Regional policy for conducting MSP to able to build joint maritime strategy development in increasing fish production and exports , regulating imports , improving local and regional

legislation and laws , providing Yemeni and regional maritime trade bodies and it also comes in response to the direction of the Ministry of Fisheries in updating the marine fish strategy in 2022 and the Supreme Agricultural and Fisheries Committee in the Republic of Yemen. The study total cost of approximately $800 million, that estimated to conduct at 10 years. The study will be a good project for stockholders such as Yemen navy and Coast Guard and fish ministry to investment in blue economy of YIRS due to various opportunities for jobs and increase income as well as protect Yemen food security. The future goal is to strengthen regional cooperation, maritime unions with Arab, African, and IORA in order to achieve and build regional naval power that could projected regional marine policy and strategy, as well as to get advantages of changing international policy for liberation from American and Western hegemony, and for building active Arain regional power that contribute to achieving regional and international balance.

2. Scope

The study will cover Yemen maritme geostrategy and regional in Red Sea and Indian ocean to understand the regional maritime power at international maritme security system, and the role of Yemen maritime geostrategic that influence and affected according to function maritime reginal. It focus and chose specific area as example to conducted maritme strategic , management , observing, MSP in Yemen islands in Red Sea**,** as well as the preparation of an executive strategic plan for sustainable marine development and blue economy, the field of models and samples will be chosen and using GIS , including five points as sample of islands in which MSP is carried out to identify the natural and human marine characteristics of the islands, and to explore the extent of marine , knowing the island's inhabitants, how to inspire and entice them, how to contribute to the colonization and development of YIRS in accordance with the needs u using novel techniques for a minimum of two years. and it will clarify the important of partners and allies as well as the role of IORA for conducting MSP to build joint maritime strategy.

3.Study Approaches and Methodology:

3.1. Geography approaches

The study used approaches mixed, marine management, integrate marine policy, innovation regional, economic, policy, physical and strategic marine regional to find parameter that could help Authority and agencies and making decisions , to understand and get comprehensives general idea at Red Sea and Indian Ocean features and situation, it used GIS, MSP to discover and analysis the geostrategic marine features (Shela & steinbure, 2010, pp. 4-10)describe, analyze, and explore the characteristics of Yemeni maritime and implement Geomorphology approaches and international relations theories that locations and shape islands affected on international and region economic relation to enhance the effectiveness of Yemen rule to shape the Global and regional political order (Al-Zawak, p. 35). The legal approach used to confirmed implicating and respect maritime laws in Yemen maritime environment and the organization of marine activities in 1982, that we could complain UN and IOG and charge them for harming Yemen ecosystem by

Internal shipping trades as well as the Yemeni maritime laws issued after 1990, and taking advantage of them in the recruitment, exploitation of marine life (Al-Hakimi, 1988, p. 3), Law No. 2in 2006 and Law of fishing, exploitation and protection of aquatic life, and the pertinent provisions of the Yemeni Constitution, as well as the rules of the Supreme Political Council, which was established in 2015. The law that organizes YIRS, (Yemen, 2010, p1-100). As well as adopted modernize Arabian and regional marine law.

3-2. Tools

To study the topography of Red Sea , Indian Ocean , bathymetry , physical feathers it depend on Landsat's and Shi files and remote sensing by using ArcGIS, while YIRS region, it used Yemen topographic maps at a scale of 1-50000 issued by the Yemeni Survey Authority, Yemen (DEM12) (EARTH , 2022)and the bathymetry model (GEBCO, 2022), and Landsat 8 images, and marine charts issued by the UK (Admiralty chart, 1985,) and nautical charts Admiral (Dragoon, 2018, pp. 1-100). In addition, using GIS.10.8.1, meteorological stations, and a device (Navionics Asia and Africa) for the operations of reading marine maps, marine and island, blue economy surveys and used sonar, as well as the rate of sea waves and average depths from the coast and sea waves, marine debris, marine channels, marine distances in the sea appeared, and to learnt marine topography and many natural and human marine phenomena's that could affect on marine policy.

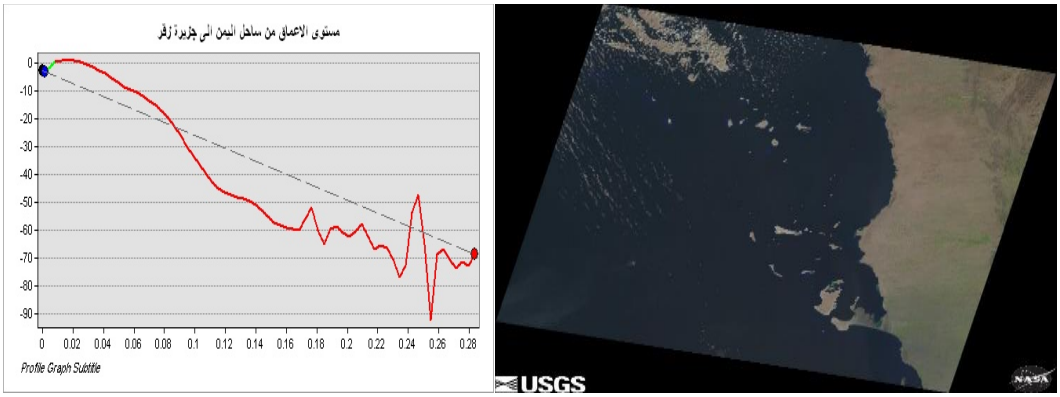

Fig (1). land Sate images and Topography map.

Source, USAG, 2021.

4.Study Objectives.

1. 4. To clarify the Important of using research , innovations strategic management , technology maritime systems, remote sensing, GIS at observing analyses, discover, collected and manage maritime, information, dates in Red Sea and Indian Ocean in order unify Yemen, Arab, and regional policy under IORA to build joint Yemen and regional maritime strategy in red sea and Indian Ocean.

2.4. To discover the role of Internation, region, nation Geography, maritme conference, working group to establish agenda to unify Yemen, Arab, regional and Asian maritme policy to protect maritme environment, conduct MSP, by using GIS to discover, collect, analyze and manage the marine natural and human characteristics to build new data base that could build modern maritime strategic plans that respond for risks and challenges and solve bule economy investment and archiving sustainable development as well as created joint maritme security system.

3.5. Highlighting the extent of maritme environment risks, and threats to maritime security because of international external actors, maritime alliances and the foreigner military from 34 countries present under the pretext of protecting maritime security.

4.4- Clarifying the important role of Yemeni and Arab governmental research and innovation centers and civil society organizations in contributing to achieving spatial maritime planning and Yemeni maritime development and determining their directions for building the Yemeni maritime security strategy and heading towards building the Arab and regional maritime strategy.

5.4. Contributing to building the Yemeni and Arab maritime security strategy to build a regional naval force to protect marine environment, deter, stop and neutralize hostile forces from being present in the region.

5. Importance

1.5. Considering the significance of reginal marine geostatic in Red Sea and Indian ocean which have regional power feathers and the location of YIRS and their abundant fish-rich marine and continental areas

2. 5. The significance of SMSP in advancing food security and the blue economy, conducting to chive UN.

3.5. It responds to the problems and dangers that threaten maritime security by aggregative, human activate conduct by nuclear strategic weapons deter such as Submarine and Aircraft Carer in the area, as well as to solve obstacles that face investment and growing blue economy.

4.5. Contribute to the strengthening of maritime economic relations and cooperation with the Res Sea basin area, intuitive Silk Road Project and IORA.

5.5. To highlight the importance of strengthening joint African and Asian regional cooperation for countries bordering the Red Sea and the Indian Ocean in conducting marine spatial planning under the supervision of the League of Arab States, the African Union, and IORA.

6.To support unify Arabian and regional policy to build and shift to be regional power to make stable in the area and stop foreign policy involvement and conflicts in red sea and Indian ocean.

6. Problems, Questionaries and justifications for the study:

*1 .6. Mean Problem***.** Due to the poor spatial strategic planning of the Yemeni marine in the Red Sea and the Indian Ocean, Yemen has not been taken advantage of, while red sea and Indian ocean have become a priority for foreign marine strategies that are exposed to illegal fishing, control marine resources and affecting marine environmental pollution Map(2) .

2.6. Source of problem that study area being located within dominant conflict forces that possess the capabilities and weapons of nuclear strategic maritime deterrence by International and regional factors. international regional maritime ambitions and conflicts over the region and their impact on Yemeni, Arab and regional maritime security related to the situation.

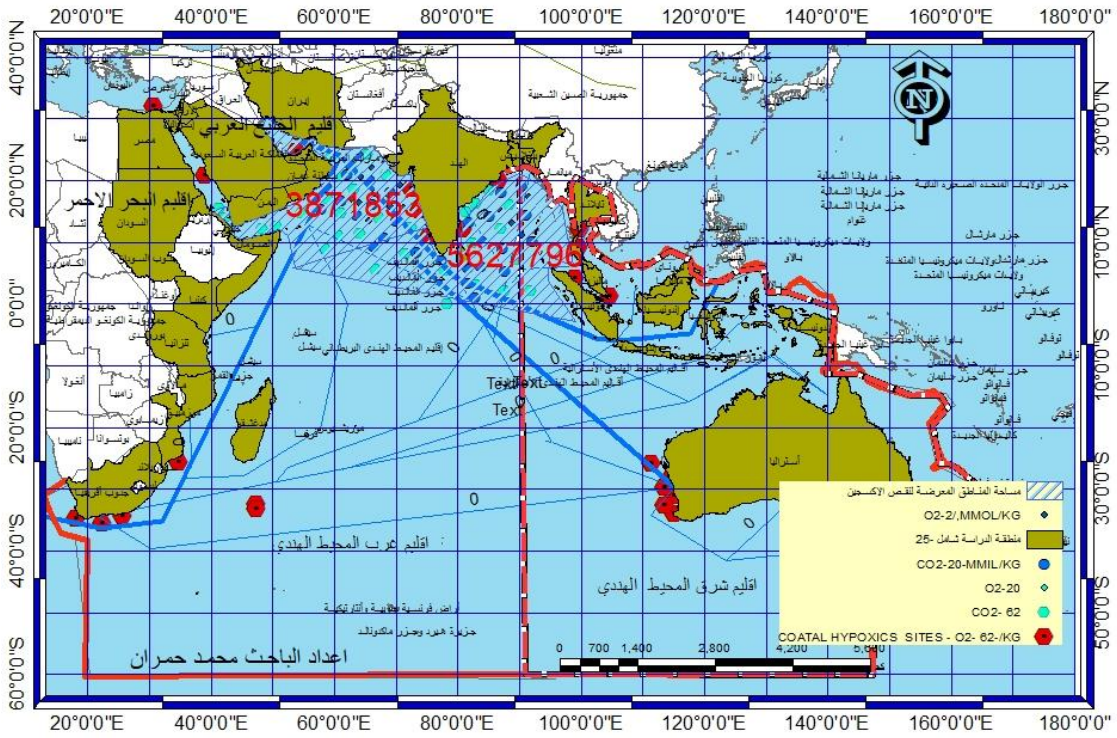

fig (2). marine enskinments on study area
Source, Author, depend on GIS

3.6. ***Questionaries'***. Yemen, Arab and regional area at Indian ocean have been facing same challenges and threat since cold war, which increase in 2025. The maritme threat become one of present challenges at Local, Arab and regional national maritme strategy, The question is how can we use marine innovation, MAP and GIS to understand the discover, analysis, collected and management marine environment and build a database in order to help making decision to build successful marine strategic planning, protection environment, to respond to climate changes. Is Red Sea and Indian ocean recognized, maritme geostrategic regional and how can regional maritme affected at International maritme security as well as to participate at one of multipolar in the future.

What is the importance of MSP, GIS to discover Yemen marine features in red sea and Indian ocean? Yemen maritime location is center of gravity in red sea and Indian ocean based on marine regional, physical, economic and management regional study?

How using, New maritme technology, MSP in Yemen islands in red sea, maritime regional study and IORA in finding solutions in building Yemeni marine strategy and increasing production of marine life? How can cooperation be achieved in the regional maritime strategic management between Yemen and IORA?

4.6. justifications. There are branches problems in study area have relation and that connected with major problem, for example: Yemeni population increase is witnessing a significant growth, as the proportion of the population in the coastal governorates and at a distance of 100 km from the coast is about 65.5%. (Ishteag, 2022, p. 57). Besides that, Yemen natural marine characteristics are unique from other in Red Sea.

It located in continental shelf areas and at medium and few depths along the Yemeni coast MSP procedure, which is known as the modern practical way to organize the use of the Yemeni marine field and the interrelationships between natural and human marine phenomena in order to respond and achieve balance in requirements to achieve development and protect the marine environment (Catrina, 2018, p. 6). Through the application of the SWAT system, strengths and weaknesses, opportunities and threats will be known. Analysis will be carried out and a strategic maritime development plan will be prepared for the fishing ports and Yemeni islands, which aims to achieve development.

5.6. Study hypothesis. The hypothesis is that if the marine area in red sea and Indian ocean is known well and understood by Yemeni decision makers and maritime strategic planning team, so they will be able to draw and design successful maritime strategy development

that could solve issue and problems as well as well be responded to counter international factors and differences types of challenges in the area

Second. It based on the fact that Yemeni and Arab maritime security witnessed many challenges and violations by the powers that were formed after the Cold War. The researcher tries to prove the necessity of developing the concept of Arab maritime security, which is linked to regional maritime security in the study area, through understanding, knowing, and demonstrating these maritime security challenges and benefiting from them. From the development of Arab maritime geostrategy from a regional perspective, which constitutes potential regional Arab powers, and there are many key factors today that can contribute to the development and transition to building effective Arab maritime powers, including understanding, knowledge, and awareness of the main constants of them.

Firstly. The unified connection between geography and unified Arab politics, including Arab maritime geostrategy, with the development of effective Arab maritime powers, as it constitutes the basic foundation in the development of the Arab maritime security strategy, through which it will contribute to the unification of the unified Arab political vision and strategy, including the unification of the elements of Arab national and maritime security, and the unification of strategic directions. Arab security navy, local Arab Qatari actors, building Arab maritime capabilities, setting the agenda and plans. The reason is that the Arab maritime strategic directions are the precondition for determining and measuring whether maritime security has an effective value or not, since the Arab maritime security strategy is a branch of the joint Arab defense strategy, which is linked to the supreme Arab national strategy and the Arab national security strategy and comes to achieve Established Arab national security goals, which constitute signs and directions of whether joint Arab efforts are heading towards the sea or unifying the Arab nation's orientations towards land, or will follow the minimum in the field of developing and protecting Arab maritime security.

secondly. Participation of the actors, which are represented by the Qatari Arab countries in the region, and requires developing proposals and sub-marine plans, participating in enhancing cooperation through Arab-structured meetings and meetings, and involving the maritime political and strategic planning team and specialists in maritime science and policies to determine the directions, perceptions, proposals and policies of the local Arab maritime authorities, etc. It must be the direction of the Arab nation, which is crystallized in accordance with the determinants and decisions of the Arab League and the modern Arab and regional maritime security council that was proposed, and the Arab maritime powers, the study has provided many proofs to prove this.

A. In the event of unification of Arab maritime geostrategy, the Arab nation was able to possess effective maritime and Arab powers in the region and compete with international powers.

B. The various issues today were dealt with from a narrow Qatari perspective and not from the perspective of Arab political geography, which led to the failure of the Arabs to protect the Palestinian territories due to the divisions of the Balfour Declaration and the Western powers.

C. The Arab individual security and national dealings led to a weakness in recovering the truth in the Greater and Lesser Tunb Islands, the Iskenderun region, the conflict over the Western Sahara, Egypt's conflict over the Nile River, Iraq's conflict with Turkey and Kuwait, and if these issues were dealt with from the perspective of Arab political geography A unified maritime geostrategy will contribute to reaching solutions, and the hypothesis is based on proving the role of Arab geopolitics in its various geopolitical branches and geopolitics. Arab maritime geostrategy is the main decisive factor in achieving the goals of the Arab and Islamic nation. In the event that the topics address the problems from the concept of a unified Arab maritime geostrategy, a solution will be reached. Solutions to various local, Arab and regional challenges with a focus on Arab maritime, security and defense geopolitics.

D. The hypothesis of the study stems from the fact that the failure of the war on Yemen, the naval wars, the instability in the maritime surfaces in the Red Sea and the Indian Ocean, and the conflicts in the Arab world, are the result of the lack of understanding and knowledge among Yemeni and Arab political decision-makers about the role and importance of Yemeni and Arab maritime geostrategy in the unified Arab policy, which led to The failure of Arab and regional maritime strategic plans related to elements of Arab national security.

G. In the event that the Arab will and intention are united in developing and unifying the joint Arab policy, the ability to achieve the joint Yemeni and Arab regional maritime strategic will, be able to become self-reliant, neutralize West ern powers, and be able to achieve joint Arab cooperation in protecting and strengthening maritime security.

2. **GIS Important.**

This level explains the of the importance of applications of GIS in exploring and collecting information, analyzing and managing data to help study project, Yemen, Arab and regional making political and strategic planning team, Asian Geography Conference in Vietnam 2023, to formulate maritime strategic plans at differences level, local, Arabian, Regional, IORA, Asian area. Based on the theory of GIS maritme , regional , regional maritme security , MSP , laws , and orientation of Yemen Geostrategy, Study aimed to achieve many proposes, how to develop ARC GIS of Asian maritme, remote sensing, wafer, and maritme technology tools and means that help making decision to understand and known Yemen maritme sphere to develop Yemen maritme geostrategy at Red Sea and Indian Ocean in order to be able work together and strength cooperation and

partners that could help to unity Asian maritme policy to be able to respond maritme challenges and danger sea and ocean in Asian, African and Australia continent.

8.1. The Definition of Geographic Information system (GIS) is computerized analytical tools that that process geographic data and production information that helps in making - intelligent decisions, there are valuable to planners, researchers, administrators, scientists, education, environment, social scientists, intuition researchers, students, strategists, analysis, and policy makers (Santos & Baylon, 2013).

The concept of GIS is one of the applications of modern technology systems that deal with geographic information, It is one of the scientific fields of geographic information, which is interested in scientific applications and through the reference of specialists in this science, which has a relationship with remote sensing, systems Global radars and satellite devices (Yang, 2017),GIS is one of the modern geographical developments that have a connection with the elements of maritime power, as space and time are among the elements of modern maritime power, as the dimension of space and time constitutes one of the concepts and foundations of geographic information systems.

For geographic information systems, time is considered universal for academic fields, as for spatial space. From a theoretical perspective, it includes many main foundations and levels within a system, as it constitutes the zero point or the first level in digital standard units, or what are called environmental points in the ocean or space, and thus the point on the various coasts of the study area is equal to zero, the second level is called the place or target space. The targets in the study area are transportation lines, ships, and maritime activities., and technical or tactical space. For example, the state has several spatial spaces: the marine environment, marine resources, difficulties, laws. The fourth level is the space and location of maritime risks and threats in their various forms. The fifth level is the place and space of materials or outputs, and the fifth level is the place and space of solutions (Cartwright & exl, 2018).

8.2. The importance of GIS.

GIS is new paradigm and a new of thinking since it appeared at 40 years ago. It convergence many discipline mainly, Geography, Cartography. Geodesy, Mathematics, statics, computer scientist, remote sensing, global navigation satellite system , spatial analysis , so it becomes one of the important means of identifying natural and marine features and characteristics in the study area, as it contributes significantly to understanding, knowledge, referral, management and output of information to help the political decision maker to make the appropriate decision and executive plan, and through the use of information systems biological characteristics can be distinguished, The social and economic situation of the state, as it gives a clear picture of the place and gives a visualization and determines the diversity and distribution of marine resources in the region, and areas of use in the form of maps.

It can also be used as an indicator in the performance of the national, Arab and regional maritime strategic management during the conduct of marine spatial planning and

implementation of MSP which is used during the course of the entire planning process. Information systems are also used as an indicator of the effects of marine, human, physical, social, economic and governmental factors, which constitute the most important factors for the process of conducting a spatial marine plan. They are specifically used to measure the impact of specific areas in the case study of the Yemeni islands in the Red Sea at various stages of time and compare them with other areas.

8.3 ArcGIS maritme. It is a complete system for managing, and production dates and products compliant international Hydrographic organization and contain tools that help to manage, analysis and collected dates, and exporting the rich continent within wide variety of GIS purposes, including planning (ESRI, 2023).

9. GIS and application of Yemen and Regional Marine Geostrategic in Red Sea and Indian Ocean.

GIS one of most important tools that help study to discover and analysis Yemen and regional maritme features to find and designated strategic element according to more affection at many levels policy, military, economics and maritme security. It found Yemeni maritime domain located in the heart of the Indian Ocean. its connection and relationship with elements of maritime natural and human power, including international markets, according to marine regional policy, economic, function, management. Cultural and geostrategic region, Yemen has more influence power and affection on the international policy because many kye maritime geostatic elements:

591. The economic characteristics of the exclusive Arab marine waters in the Red Sea, the Gulf of Aden, and the Arabian Sea and their contiguous maritime borders, and the absence from the area of Socotra Island to the Suez Canal, constitute exclusive economic zones shared by the Arab countries and member states of the Indian Ocean Organization. Map (1), shown in red, shows the maritime political boundaries. Yemeni and Arab regional economic waters in the Indian Ocean Organization.

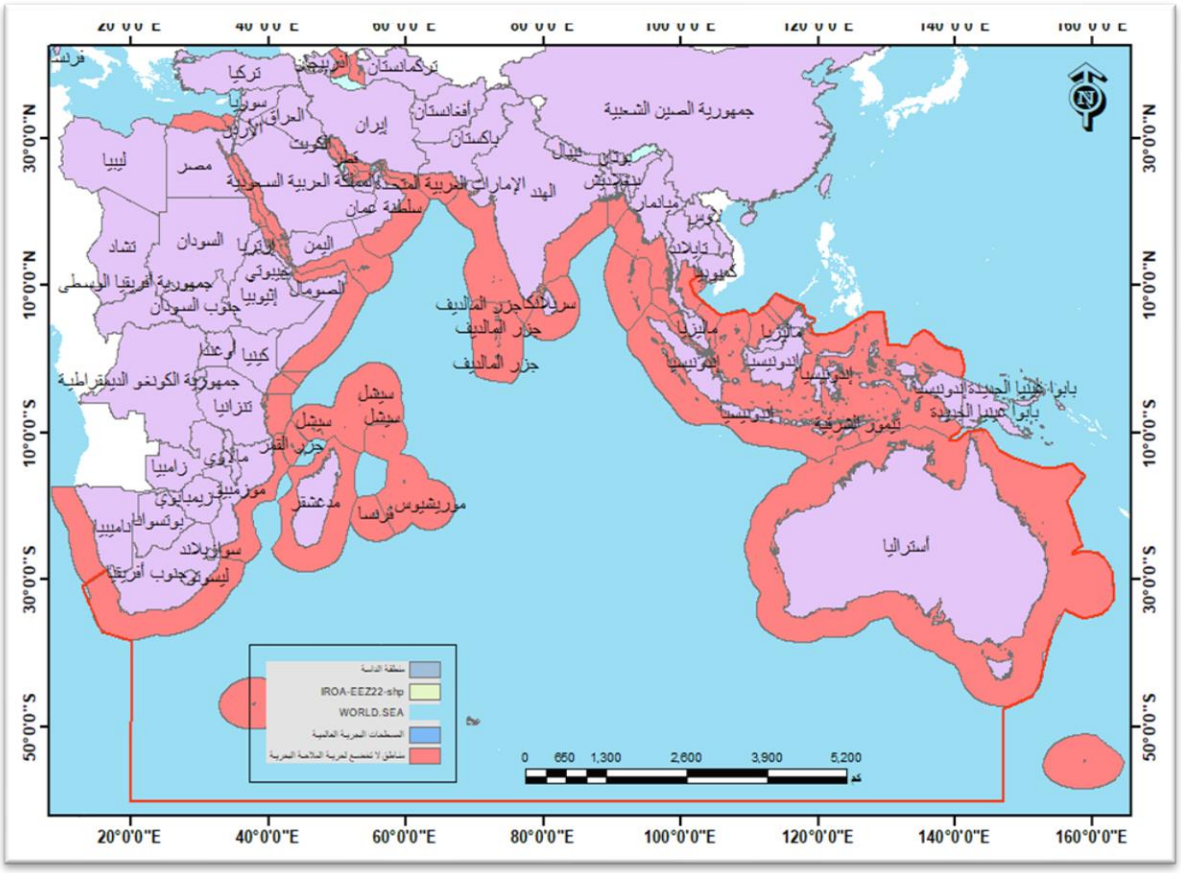

Fig (1.) IORA exclusive marine economic in the study area.

Source, Author, depend on GIS

Yemen controlled, Al, Mandeb that located in Chok Point and Yemeni maritime domain is in the Red Sea and the Indian Ocean that connected with letteral states in the area, it has marine bodies constitute about 545,000 square km^2, and include rich marine resources and high-quality fish. In addition, Yemen possesses about 282 islands, the most famous of which are Socotra, Abd al-Kuri, Mayun, Dhu Harab, and Kamaran, which control the shipping routes. Yemen has one of the most important transit ports in Aden, Hodeidah, and Mukalla, which have a great influence on international politics.

9.2. Maritime geopolitical influences and relationships.

The Yemeni maritime domain is considered livelier and more dynamic than the continental domain due to a number of factors, including connectivity with multiple neighboring units more than the continental domain through the Yemeni maritime borders with Saudi Arabia, Oman, Djibouti, Somalia, and Eritrea, in addition to the daily and continuous activities of the maritime spatial container with countries.

The world through daily commercial maritime traffic, in addition to the role of the spatial context and the vital maritime domain of the study area and its impact on international relations. We find that the study area is linked to a number of national security trends and

concepts at various levels, specializations and fields, whether national security, regional security, collective security, maritime security, cybersecurity. Due to the breadth of the study area and its degree of importance, the challenges that affect national security increase, as We find that the area of marine waters is wide and extends to the Arabian Sea, the Indian Ocean, the Gulf of Aden, the Red Sea, in addition to the separation and spread of the Yemeni islands, and the threats and challenges that have multiple dimensions to national security, including political, economic, religious, ideological, and environmental dimensions. , military such as maritime piracy (Humran M. A., 2023).

9***.3. Economic relationship*** and Geostrategic maritme Power.

The Republic of Yemen oversees the most important open seas that are globally connected to international maritime shipping lines, and their location in vital maritime areas for transporting energy supplies, and the proximity of the study area to global markets and consumption areas in the Gulf region, Southeast Asia, and the Horn of Africa, which constituted an area of attraction and investment in the Republic of Yemen to open markets with Countries bordering the Indian Ocean, which constitutes a vital maritime area for further exploration and investment in the future, map (1) (Map (2) Bab al-Mandab Strait and the most important maritime navigation routes for energy transport .We can find the connection between Yemen and Regional strategic maritme location at strategic oil and energy Straite, for example Hormoze , Suize Chanel , Bab , Almendeb, and Molca strait , as well as International maritme lines Islands, Decisive maritme area such as Gulf of Aden ,

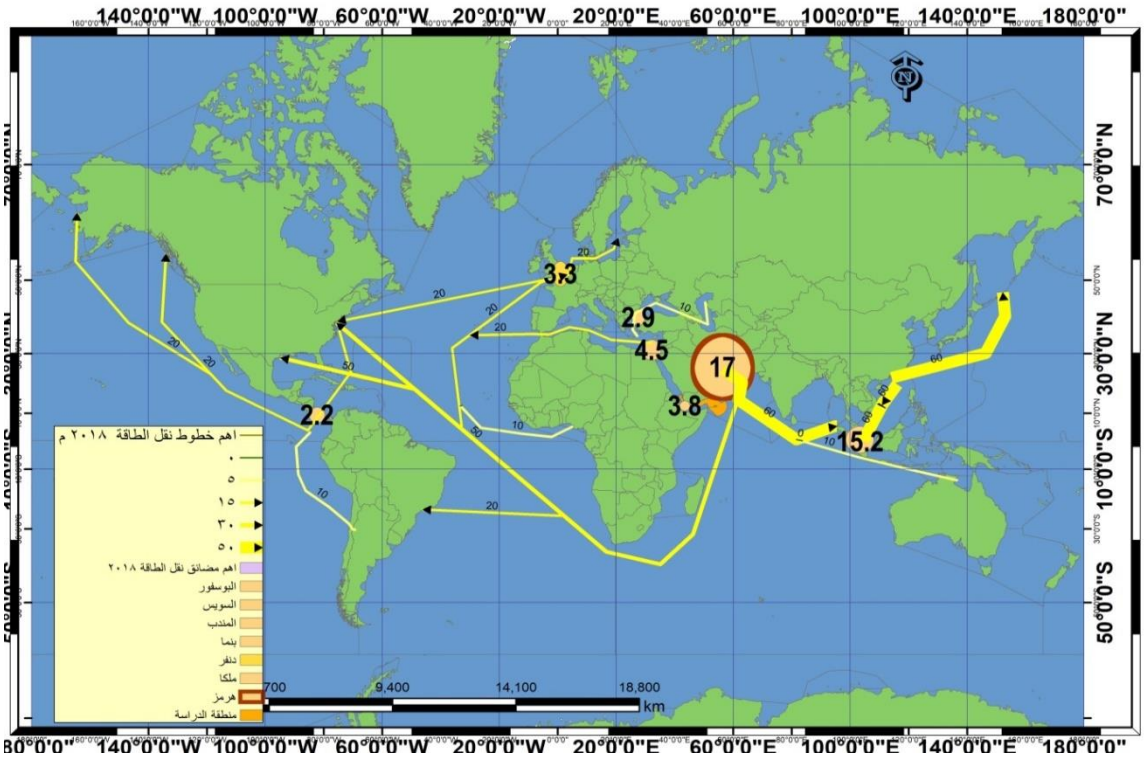

Fig (2) Geostatic Striates and International maritme trade at area study.
Source: Researcher using GIS10.8.1 program based on, US energy information administration analysis based on Panama Eia channel authority, 2013.

10.4. Human, Military activate, security and political relationship and influences.

From a military and security perspective, the Yemeni maritime domain constitutes points of communication and strategic depth for Yemeni and Arab countries, as they constitute advanced military defensive points on the island of Socotra in the Indian Ocean and the Arabian Sea, and on the islands of Dhu Harab, Hanish and Abd al-Kuri. They are also located within areas of interest and presence of American military forces and alliances in the south and north. The Western Indian Ocean, including the modern naval military alliances between America, Australia and Britain in 2021 in addition to the economic blocs in the Arab Gulf states, the Southeast Asian Forum (ASEAN), and the countries bordering the Indian Ocean (IORA), which qualifies the Republic of Yemen to be an international actor and partner at the regional level if it gives importance and priority to spatial maritime planning and works to direct development plans towards the study area. It overlooks the Indian Ocean about (26) countries, and the population is about (2.65 billion). Almost a person, equivalent to (39%) of the total population of the world, and it is characterized by the growth of population density and the difference and diversity in the approaches, political systems and the multiplicity of cultures and economic policies, so according to geostrategic perspective there are many blocs * (Jivanta, 2018, pp. 1-200)and geopolitical, economic and political alliances have a connection and interest in the Indian Ocean (Zhu, 2017, p. 205) The Indian Ocean constitutes is the third largest ocean in the world. Map (1) member states bordering the Indian Ocean and the Red Sea.

The geopolitical, economic and political alliances have a link and interest in the Indian Ocean (Clogan, 2017, p. 4). The study loofward to progress and development relation under umbrella of IORA, it has 23 member states, the population is about 3. 2 million people in 2017 census. (Blessing, 2020) Where the French island of Reunion joined, as well as the approval of Saudi Council of Ministers for membership in the organization in 2020, Egypt is also an observer member of the organization. (FAO, World Bank. Reports indicate that the international sea lanes in the Indian Ocean constitute (75%) of the global energy supply (Zhu, 2017, p. 17) and contribute to the strength of Yemen and the promotion of the development of international maritime relations, as well as the possibility of enhancing cooperation and partnership in various fields of investment in the blue economy sector, which appeared in 1989 and the emergence of the green economy, as Yemen is a partner and an active member of IORA .

11. Analyses of Spatial relation at Yemen and Reginal maritme elements power.

By conducting MSP buy using GIS for describing, discovering and analysis the physical and human marine features in red sea and Indian ocean which have major strategic elements power, but they are not invested and implemented by local state in Yemen and

IROA. Map (2). Yemen geostrategic location play major role at International and regional maritme power for decade.

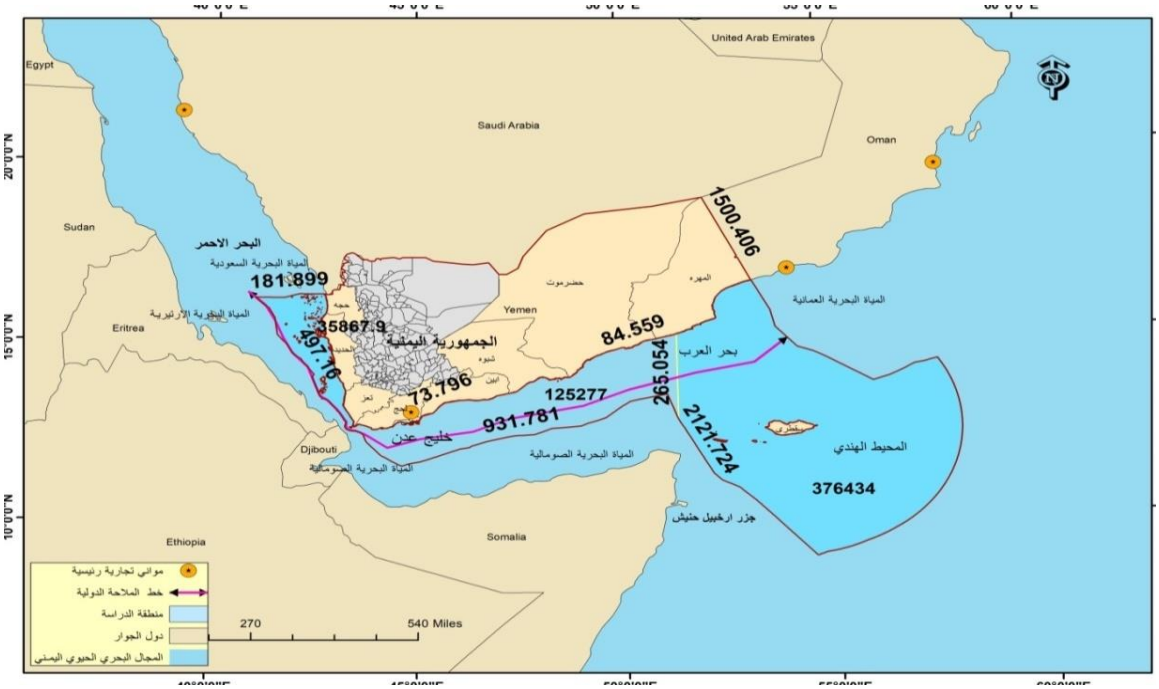

Fig (2) Yemen marine power

Source, Author.

11-1. Analysia Centers of strength and weakness points.

The Yemeni maritime field connect with red sea and Indian Ocean and constitute the most important natural marine geostrategic characteristics of Yemen, and who control Yemen can be able to controller of regional power, Yemen maritime is key elements at Arab national security as well as Islamic and reginal society. it connected between west and east continental area. Yemen filed connected and affected at four major straits Suze channel, Bab, Almendeb, Malka, and Hormoz Strite. Yemen has great civilization and affected on regional marine cultures for ages in south east Asia, Africa and EU.

Through the increase in the change in the geostrategic perspective of the Indian Ocean, its geostrategic importance as one of the pivotal geopolitical marine areas globally, due to its distinctiveness and differences in its changing, overlapping and different geographical entity, as well as its connection and relationship with many cultures and international systems, in addition to language and ideology. The importance comes through contact and partnership with the countries bordering the Indian Ocean, which constitute large areas of the world, in addition to the fact that many countries have good economic relations with Yemen and could be future markets for Yemeni exports, including Southeast Asian countries, which are among the first thirty countries to receive Yemeni exports, such as South Korea, China, and other countries.

11.2. Yemeni maritime it constitutes one of the important elements of the comprehensive national naval power, lies in investing in the blue economy in the Indian Ocean, and the exclusive economic zone in the Indian Ocean constitutes about 26.7-27.8 million km2, or 38% of the total area of the entire Indian Ocean.(Map 1) Which can contribute significantly to the benefit and partnership in the organization, given that the world today seeks to strengthen partnerships, cooperation, and regional and international competition, as the average per capita income in Indonesia's budget reaches 65,233 US dollars per person, which constitutes the highest percentage at the level of the organization. Yemen has good relations with Indonesia, and less the average per capita income in Somalia is 123 US dollars, Yemen is about 1123 dollars, and in poor countries is Mozambique and Madagascar. Through the study, the description and analysis of cooperation and investment in the group of countries bordering the Indian Ocean in the field of

12-3. Weaknesses and lack of strength in a regional freedom.

The political unstable in Yemen and Arab area, which Israel and Arab conflicts haven't solved yet, so it may be affected at regional conflicts and using nuclear weapons strategic detect that affected on stable in the area, maritme pollution, international factors that increased because seeking for International maritme power in the area and the index danger that being shift form coemptions, crisis to maritme war.

foreign policy involving and control marina resources on the same time local state couldn't depend on themselves to have right military power for marine protecting and secure the area (Robert ,2016, P1-20), as well as increasing reginal maritime power conflicts between USCENTCOM, AFRCOM and 34 foreign states that become major threaten marine security area (Humran, 2022, P1-200), including intra-trade among IORA countries is weak unstable.

13. Sample of using GIS at Yemeni islands in the Red Sea analysis.

By analyzing the statistics in Yemeni maritime trade and Yemen thick exports, and according to local and regional reports that mentioned there are keys challenges faced Yemen and the countries in the study area in the weakness of regional maritime power, the absence of modern joint and developmental maritime strategic plans. The study proposal constitutes an applied and executive work plan, that aimed to develop and enchase Arab and Asian group task force that enhances the value of Yemeni and regional fish production and exports and the settlement of the fish industry and the promotion of intra-marine trade with IORA, and work to enhance food security in Yemen and region countries.

13.1. ***Yemen Islands characteristics in red sea.***

YIRS is an important natural region in western coast of Yemen map (3). They distributed in differences long distance from coast line that lie from Saudi border to the edge Mayon island around 732km long, which affected on the width of Yemen base line to more that 60km, as well as Yemen shelf edge around 100 inlands located on shelf islands and 80 islands on off- shelf islands (Brodle, ROUPHALE, & TURAK, 1971, p. 1_100)) which is known

for its abundance of natural wealth, including fish and marine life)Abas الصفحات ،1996 ، (200-20) The majority of the islands are tiny in size (1–5km2) and are situated close to the maritime boundaries between Yemen and Saudi Arabia Map (3). One of the major Yemeni islands in the Red Sea is Kamaran, Hanish Al-Kubra, Jabal Zuqar, Hanish Al-Soghra, and Al-Fasht. A semi-continental climate with a hot summer and rising temperatures from north to south until Bab al-Mandab Strait dominates the islands and Yemeni marine area in the Red Sea. Due to the southern Red Sea's physical configuration as semi-inland waters, the sea currents there are more agile and swift.

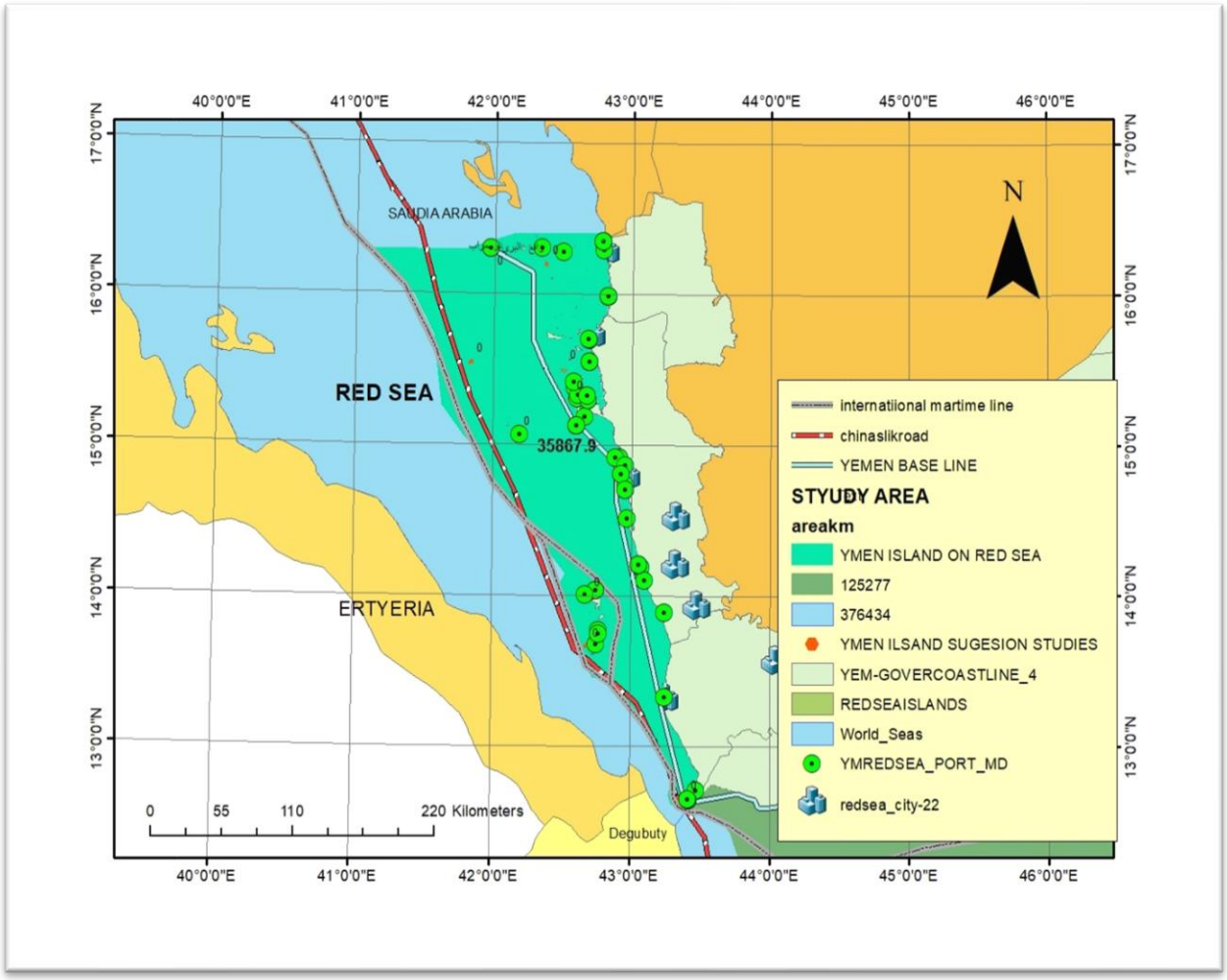

fig (3). study area
Source, Author, depend on GIS

13.2. Yemen Islands Characteristics analysis.

Study aimed to clarify the important of GIS for analysis, maritme feathers decisive at political policy at differences level as well as to discover the blue economy m buffer zone, international maritme line. by using GIS and MSP processing we found that YIRS distributed on northern and middle area, while Mayoin islands located on the southern part of Yemen red sea.

The northern islands which are situated on a mid-coast adjacent to the governorate of Hagah, Yemen's middle islands, which are situated on Hodeida coast; and Yemen's southern islands, which are situated on the Taiz governor coast. Midi Coast Islands have an area of 1 - 15 km2, Inland waters up to 2000 m deep near the sea gullies in corridor countries small fishing harbors, Antofash population centers, and the Midi coast islands of Dhuhrab, Ardain, Al-Morak, Ghorab, Dhahra, Al-Asheq Al-Kabeer, and Al-Saghir. Most of the Yemeni islands are in the Red Sea, according to bathometry, land sat images, and GIS in shallow waters running south from the northern Midi coast and north from the Midi coast. They contain small fishing harbors and population centers in Antofash. The strategic importance of the islands is formed in the Midi coast, for its border location with Saudi Arabia and includes many islands on a map (4) and administratively follows. Governorate (Humran M. A., 2022, pp. 1-200), The islands of the Midi coast are distinguished by a number of characteristics, they are located in areas rich in fisheries, allowing for the establishment of fishing ports on the island of Dhuhrab and the provision of modern marine vessels. They scattered close in the Red Sea, and through their geographical, topographical and morphological characteristics, located near and within the international trade navigation lines, and they have an impact and effectiveness in the movement of trade and maritime security through the presence of lighthouses, coast guard patrols. Yemeni island of Mayon controls Bab Al-Mandab is in the middle of the corridor, in addition to the fact that the islands are located near the coasts of neighboring countries, and thus it has importance in foreign policy and international relations.

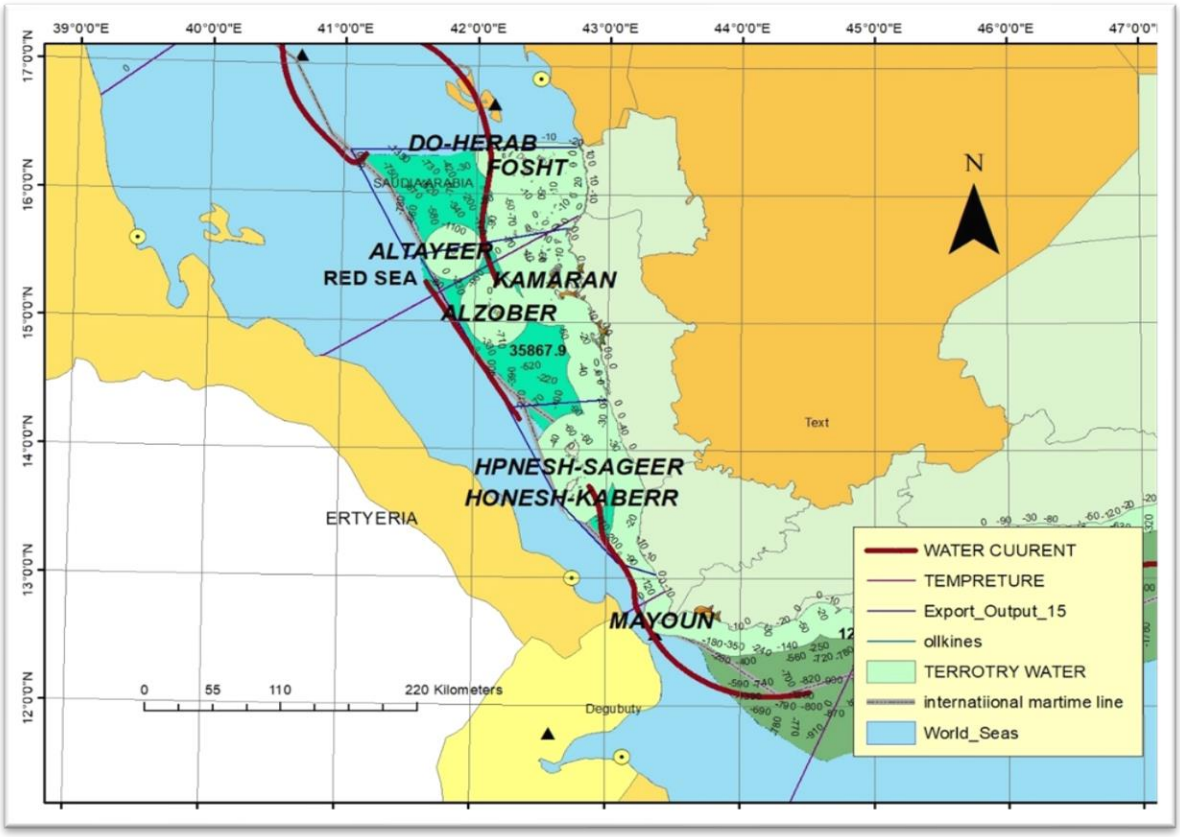

Fig (4). Islands Names and Characteristics**.**
Source: researcher. byGIS.10.8.

14.The Role of Geographic conference and (MSP).

This level aimed to explain the role of geographical conferences that based on the geographic regional theories and prospected. regional prospective in Red Sea and Indian ocean that that helped to collected new ideas and discusses and share regional interested red sea and Indian ocean, and build modern theories how to collected ides Yemeni & regional maritime alliances such as Arab-Chinese partnerships in applying the regional marine spatial planning in achieving strategic management Regional and strengthening maritime security

6.1. MSP is critical in determining the best location and assisting the government with economic development trends in the blue economy, including the development of Yemeni islands. A basic method of assessing and allocating the spatio-temporal activities of marine activities in marine areas to meet ecological, economic, and social goals is known as marine spatial planning, or marine space planning. These goals are then identified through a political process((Yates & Bradshow, 2018, pp. 10-200) In order to achieve economic, social, and geological goals, it defines a scientific management of the spatial and temporal distribution of human activities. Competition has grown in the twenty-first century; in

2017, there were 900 scientific papers and roughly 10,000 articles in the field of MSP (Zaucha & Gee, 2019, pp. 2-199)where there is a rise in interest in maritime transportation, fishing, marine biology, commercial and military ship building and development, resource exploration, seaport development, and pollution prevention in the ocean. Only EUA in araba and regional area has conducted MSP, because it so expensive.

The study confirms that enabling Yemen, in partnership with Arab and regional countries, to implement marine spatial planning is a strategic means of collecting a database through which political, Yemeni and Arab decision-makers can develop successful plans at various environmental, economic, political, social and security levels, through which the Giving the political decision-maker the knowledge and ability to draw strategic plans in the region, and in partnership with the countries of the region to achieve an Arab and regional naval force that will fill the void and contribute to achieving economic development for the peoples of the region (Humran M. A., 2022).

6.2. **Exclusive maritime economic the Red Sea and Indian Ocean and achieving maritime deterrence.**

GIS played major role to that help both International maritme laws experts and maritme organization to manage and order political and border maritme area such Economic water in Yemen and regional strategic area in red sea and Indian ocean that based on Geostrategy theories which insisted at location.

GIS is new paradigm and a new of thinking since it appeared at 40 years ago. It convergence many discipline mainly, Geography, Cartography. Geodesy, Mathematics, statics, computer scientist, remote sensing, global navigation satellite system , spatial analysis , so it becomes one of the important means of identifying natural and marine features and characteristics in the study area, as it contributes significantly to understanding, knowledge, referral, management and output of information to help the political decision maker to make the appropriate decision and executive plan, and through the use of information systems biological characteristics can be distinguished, The social and economic situation of the state, as it gives a clear picture of the place and gives a visualization and determines the diversity and distribution of marine resources in the region, and areas of use in the form of maps.

It can also be used as an indicator in the performance of the national, Arab and regional maritime strategic management during the conduct of marine spatial planning and implementation of MSP which is used during the course of the entire planning process. Information systems are also used as an indicator of the effects of marine, human, physical, social, economic and governmental factors, which constitute the most important factors for the process of conducting a spatial marine plan. They are specifically used to measure the impact of specific areas in the case study of the Yemeni islands in the Red Sea at various stages of time and compare them with other areas.

8.3 ArcGIS maritme. It is a complete system for managing, and production dates and products compliant international Hydrographic organization and contain tools that help to

manage, analysis and collected dates, and exporting the rich continent within wide variety of GIS purposes, including planning (ESRI, 2023).

The United Nations has determined that the exclusive economic waters of the state are approximately 200 nautical miles from the baseline of the coast of the state or island state. Article 56 of the United Nations law stipulates the right of the coastal state to manage and invest all marine resources located within the economic zone and is not limited to the type The size and area of the resource, and Article 60 of the United Nations Law has the right for the state to build facilities within its economic waters in accordance with international agreements, and Articles 16 and 62 affirm the right of the coastal and island state to establish the necessary laws to regulate marine fishing to protect marine creatures from penetration and to maintain sustainable development, in its exclusive economic waters. The state also has the right to pursue and arrest any non-combat ship during its voyage in the exclusive economic waters of the state. The United Nations has also determined the right of the coastal and island state to exploit its continental shelf in the depths of the sea, and it has the right to work to increase the breadth of its economic waters to more than 200 miles, but it must.

To submit reports to the organization in this regard. Article 72 of the United Nations Law allows the coastal state the right to invest in the continental shelf, exploit all marine and non-biological resources, and fish for living creatures and non-migratory marine creatures up to the water column. In Article 77, the United Nations Law allows the coastal state the right to It includes drilling, exploration and research work on its continental shelf, but in Article 78 it excludes the right of the coastal state to join the work of controlling international airspace, which extends from the line of the exclusive economic waters of the state to the high seas, such as those rights to economic waters. The law regulating international sovereignty and management of the ocean floors was defined, as the law emphasized that the state should pay compensation for any losses to the neighboring state if it was exposed to damage and risks due to imbalances during marine prospecting and exploration or any actions carried out by the coastal state, which was determined at the 1982 meeting of the United Nations General Assembly.

From a legal perspective, the geostrategy of the Yemeni and Arab exclusive maritime economic waters and the countries of the Indian Ocean Organization constitutes a soft power in modern diplomacy, in addition to being one of the maritime powers influencing Arab, regional and international security and military policy.

The Republic of Yemen has the right to use maritime surfaces during armed conflicts and in the event of a threat affecting Yemeni and Arab national security, including threats foreigner naval submarines from passing through maritime economic waters, as specified Yemeni law: Boundaries of exclusive Yemeni economic maritime waters in the Red Sea region, Gulf of Aden, and Arabian Sea. Map (1) Boundaries of exclusive economic maritime waters.

Yemen has the right to prevent and deter hostile forces in peace and war that constitute a source of danger and threat to Yemeni national security in the maritime field, whether the source of the threat on the surface of the sea is from the destroyers, battleships, and military warships of the hostile forces, as well as the hostile forces that pass under the surface of the sea, represented by Zionist naval submarines. And the hostile American forces, as well as the hostile forces in the air in the Zionist and American hostile aviation, preventing them from passing through the Yemeni maritime airspace, which constitutes a violation of maritime sovereignty in exclusive economic waters.

2. Maritime deterrence and terrorism. The United States and Western Naval Military Academy documents use terms that are consistent with its policies and its foreign political will, according to its spatial and temporal interest, as it uses the term deterrence, which literally means intimidating someone to go away, and in the Cambridge dictionary it means preventing someone or something from doing something, or deterrence, to reduce the enthusiasm to perform an act. Or an event, and the Webmaster Dictionary explains that terrorism and deterrence meet in the roots of the word, which means intimidation, and the concept of deterrence broadly means any use of implicit or explicit threats or specific force aimed at dissuading an effective group from taking any action and maintaining the status quo. Deterrence differs from Coercion, and the theory of nuclear deterrence, is a political mechanism that emerged after the Cold War and revolves around preventing the use of nuclear weapons and mutual assured destruction between countries (European, 2023).

3. Yemen, Arab and IORA exclusive economic marine activities.

The economic characteristics of the exclusive Arab marine waters in the Red Sea, the Gulf of Aden, and the Arabian Sea and their contiguous maritime borders, and the absence from the area of Socotra Island to the Suez Canal, constitute exclusive economic zones shared by the Arab countries and member states of the Indian Ocean Organization. Map (1), shown in red, shows the maritime political boundaries. Yemeni and Arab regional economic waters in IORA.

Yemeni, Arab and regional maritime diplomacy.

Yemeni maritime diplomacy constitutes one of the mechanisms for controlling and neutralizing crises and improving intra-Yemeni and Arab relations at the Arab national maritime security level, and regional and international economic relations at a second level, and aims to prevent sliding into maritime conflicts. The truth is that due to the weakness of Arab political theories and international relations and the absence of elements of unifying Arab national security and Arab governance, this has had a negative impact on the performance and application of Arab diplomacy and its failure in its management of Arab crises and crises, which has led to the local countries moving in directions and forces that help them in managing their own issues, and since 1945, which we can call the beginning of the development of intra- and bilateral Arab diplomatic relations, but it did not take place in the desired manner and in the absence of Yemeni and Arab capabilities to control internal and external crises, which America believes must separate crisis

management from bilateral relations, whether the relations are bad or good, America believes that control over crises is very strong, and should not be left without measures. This is the core of the Arab problem, as it has not been able to control crises and leave them without measures because of its vision from the perspective of the disparate bilateral Arab relations, which witness fluctuations from good too bad from time to time, as what The conflict is happening now in Yemen and many Arab countries since 1918 AD, 19945 AD, 1952 AD, 1962 AD, most notably 1990 AD, 2011, and the war on Yemen in 2015 AD, and what is happening today in the middle of 2023, Gaza, the Al-Aqsa flood, and the war with the Zionist entity constitute a failure in right-wing, Arab, and American diplomacy. Managing the Yemeni and Arab crises, which is due to the absence of unified Arab politics, and the study sees the necessity of developing the Yemeni and Arab maritime geostrategy from the standpoint of the unified Arab political system, specifically the foreign maritime policy, since if a unified Arab policy had been achieved, we would not have seen an Iraqi-Iranian conflict, and we would not have found the Greater Tunb issue. The problems of the imaginary inter-Arab borders, as well as the Moroccan conflict and the Western Sahara, will be solved if a unified Arab foreign policy is achieved. The Arab-Palestinian-Zionist crisis did not continue for seventy years except due to the absence of a unified Arab policy, which resulted in an increase in problems, and the responsibility today falls specifically on the sponsoring countries. For the file of the Palestinian issue, most notably Saudi Arabia, Egypt, Jordan, the Emirates, Morocco, and Sudan at the present time.

3***. Examples of regional maritime conflict and crisis management.***

Theories in foreign policies differ in crisis management, which constitute one of the influences on the trends and work of diplomacy. Diplomacy in general is affected by the trends of the state's maritime geostrategy and its management of international conflicts, relations and crises, which differ from one country to another according to the trends and doctrine of the state and its foreign policy directions, and China tends to practice diplomacy. The Navy, despite its possession of effective naval powers and its economic strength, based on the principle of protecting the Chinese political system, ideals of the Communist Party, was able to contain and neutralize internal problems during the popular demonstrations in Hong Kong in 2019 AD, which constituted one of the external interventions, as the Xi Pin-Chen regime did not Beijing sent tanks and army forces to the streets, and even practiced crisis management and Chinese governance procedures, which included reviewing laws and modernizing Chinese national security. The success of maritime diplomacy appeared in managing the American-Chinese conflict, Indonesia and Taiwan over the South China Sea, where China views America as a party. He is an outsider to the region and has nothing to do with regional issues.

4. Managing Yemeni, Arab and regional maritime conflicts and crises.

Yemen Maritme Diplomacy and Yemeni-Arab maritime crisis management constituted success in the case of Eritrea's occupation of Hanish Island, and Yemen was able, through diplomacy, to recover the island through the International Court in 1998 AD (Hamran,

2023 AD), and the form of air traffic over the state's maritime economic waters constituted a problem and a dispute between America and China, as it objected China, using its military aviation, one of the American planes that tried to bypass traffic and fly over the economic waters in the South China Sea. China also intercepted one of the American naval destroyers 200 feet from the deck of the ship, and forced it to leave the Chinese economic waters in the China Sea. America seeks to implement a policy of deterring China and preventing it from expanding and controlling the vast maritime domain. America uses its allies and partners in the region to put pressure on China and unify and strengthen the American deterrence strategy in deterring the Chinese army from practicing maritime activities and their presence and presence in the Indian and Pacific Oceans, as well as the South China Sea region. America is investing about $458 million in the study area (Garmony, 2023).

Based on the premise of Yemeni, Arab, and regional control and achieving the power to control crises in their various forms, the study recognizes the necessity of practical initiation, rising above internal issues, and paying attention to common Arab and Islamic interests by unifying efforts to confront American hegemony and Zionist racism, and from the standpoint of strengthening the strategy of Yemeni, Arab, and regional deterrence of the military naval powers in The maritime domain is in the exclusive Yemeni, Arab, and territorial economic waters in the study area, and because of its connection to the closure of the maritime and airspace, which is part of the sovereignty of Yemen and the Arab countries and their Arab national security, which extends from the Atlantic Ocean to the Arabian Gulf, map (8.1). The map shows the continental and maritime borders of the Arab nation and IORA.

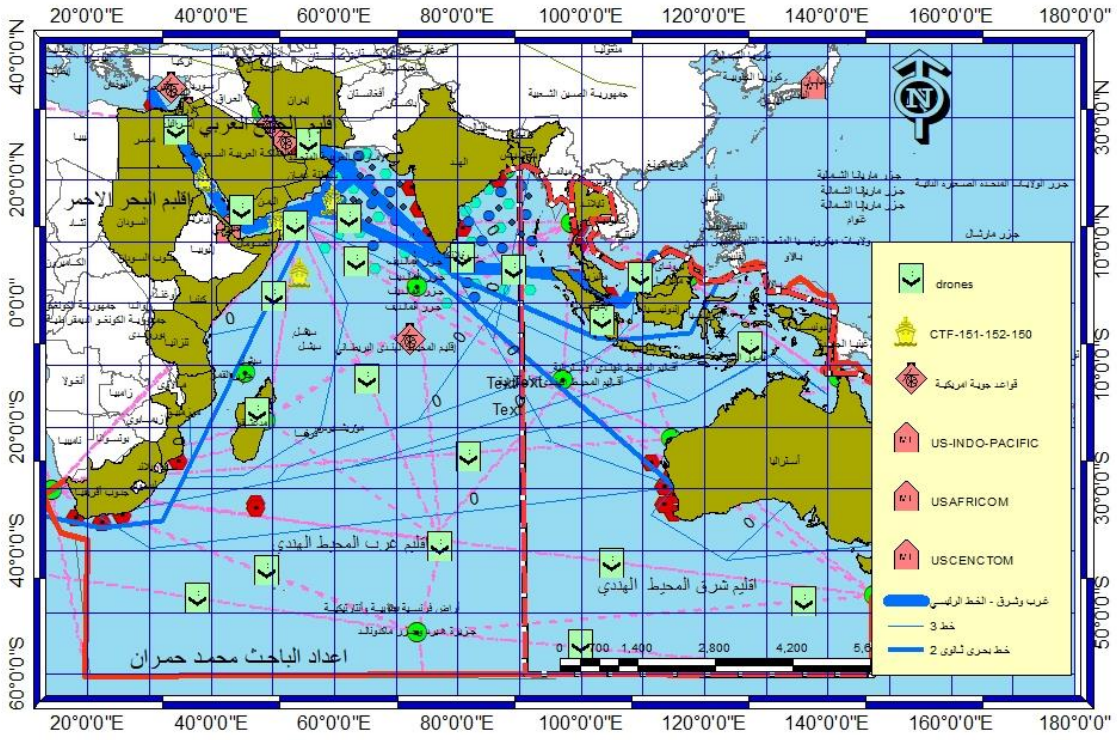

Fig (6) Control Air space by IORA

3.8. Challenges, pressures, problems and risks of the Yemeni marine environment in the Red Sea, Gulf of Aden, Arabian Sea and western and eastern Indian Ocean.

Based on the World Ocean Report 2024, which was prepared by more than 98 researchers from 25 countries around the world to identify the most important achievements in achieving the United Nations marine development goals, including Goal 14 in achieving sustainable marine development goals. It also addressed the most prominent problems identified by the ocean decades and how to reduce and mitigate them. It explained the most prominent marine environmental problems, which were divided into natural and human problems that are routine marine.

Marine problems and activities were divided into a number of sections, including marine activities in industries and coastal local communities, as well as the effects of multiple civilian and military shipping vessels that use fossil fuels, which have caused many problems that have affected the marine environment and ecosystem in the Red Sea and Indian Ocean region, including the problem of marine eutrophication and the lack of natural nutrients for marine life due to the impact of rising temperatures and climate change, and the increase in carbon dioxide in seawater. The importance of nitrogen and phosphate in the study area, in addition to marine litter pollutants and contributing to

maintaining clean seas through the application of regional marine spatial planning plans, (Bouwman, 2024).

4.8. Yemeni Marine Working Group and Blue Carbon Project Development. Field projects are essential to developing blue carbon as an approach to conserving, restoring and managing coastal ecosystems. Strategically designed and implemented field projects will demonstrate the feasibility of blue carbon, facilitate the development of practical science-based methodologies and build local and national capacities to protect and manage coastal ecosystems and countless ecosystem services in blue carbon-rich countries. The Blue Carbon Initiative partners, in addition to many other organizations around the world, are working on the science, policy and management of blue carbon ecosystems globally. Key objectives include national accounting of carbon stocks and emissions from blue carbon ecosystems, increasing the effectiveness of blue carbon ecosystem management within protected areas, and developing blue carbon offsets for tourism activities. Yemen faces many marine environmental challenges in various forms and as a result of many local and global reasons, including the absence of modern administrative marine policies and Yemeni, Arab and regional maritime political integration, the perspective of integration in marine sectors, in addition to the weak application of spatial marine planning, as well as the presence of US and Western naval fleet forces and their carrying out of many military marine activities in the exclusive marine economic zone, which affected the marine environment in the study area and posed one of the challenges in managing and protecting sustainable marine development.

At the local level, marine activities are gradually replacing natural environments with local environmental consequences. Marine activities have led to global crises in biodiversity and climate, and these problems are widespread and have overwhelming effects on the marine environment in the study area. The study relied on many methods and methodology in the global maritime political initiative, where the United Nations Educational, Scientific and Cultural Organization (UNESCO) has ten major challenges facing the international community in the seas and oceans around the world, including in numbers (UNISCO, 10 CHALNGES, OCEAN DECADE CHALLNGES FOR COLLECTIVE IMPACT, 2023),

1. In terms of marine pollution, there are many challenges in the absence of knowledge and understanding of marine pollution and overcoming it, and understanding the map and sources of marine and terrestrial pollutants and their impact on human health and ocean ecosystems and developing solutions to eliminate or mitigate them, which constitute the main goals.

2. We find that environmental problems exist everywhere, and at various local, Arab, regional and global levels, Yemen and many Arab and regional countries overlooking the Red Sea and the Indian Ocean face many challenges affecting the natural marine environment on the coasts of the region, and the vital marine area in the study area. The problems, risks, threats and challenges vary from one region to another, and many marine approaches have been followed to reduce deterioration, preserve and sustain marine life and achieve marine political and environmental development and integration. The study

was required in order to modernize and develop the Yemeni and Arab maritime policies, which are interoperable, integrated and value-based. These challenges were divided from the perspective of coastal marine management and strategic spatial planning into the Red Sea, Gulf of Aden, Arabian Gulf, Arabian Sea and various internal water bodies and gulfs, which are called the Arab maritime region in the northern Indian Ocean, the western Indian Ocean region and the eastern Indian Ocean region. From the perspective of economic theory, the study seeks to find economic integration and specialization at the same time, including discussing industrial coastal countries, countries with a geostrategic and agricultural coastal back, and logistical support areas in order to achieve strategic marine management.

.1. One of the most important challenges in the region is the increase in population growth and urban expansion in coastal areas, including the Red Sea and Gulf of Aden countries, which also suffer from a scarcity of clean water in coastal countries that rely on drinking water and irrigation of agricultural land.

2. Environmental pollution, which for some time has classified the Red Sea and Indian Ocean regions as areas of urban and industrial liquid waste, in addition to industrial areas that require a lot of fresh water for cooling and in industrial products that suffer from a shortage in water supplies, including Yemen, and at the same time affects

R. Exhaust and factory waste in the impact on the marine environment (Gerges, 2002, p. 3).

3. The marine waters in the study area constitute one of the main corridors for the transport of trade historically, which is exposed to environmental pollutants by sea vessels, which increases with the increase in demand for goods, in addition to the emergence of sources of pollution due to the different modern ships and nuclear submarines, in addition to pollutants from oil transport ships as well as ship washing and ship outputs and wastes, which affect marine life and marine biodiversity in the Red Sea region due to the geographical factor as it is a narrow area, in addition to the overlap of shipping lines through the Yemeni and regional islands in the region with Djibouti, Somalia, Eritrea and Egypt, which destroys fish, marine life and coral reefs, as the stations and industrial areas and oil export in Ras Issa affect fisheries in Hodeida.

4. Overfishing, lack of marine data and information, maps of fishing communities and areas, where names and marine life are exposed to destruction through overfishing and the use of licensed nets and fishing gear, as the Yemeni coasts witnessed major violations of illegal and overfishing by foreign ships after 2015, in addition to fisheries in the Gulf of Aqaba, which are affected by overfishing and the use of unlicensed nets, and marine life was exposed to depletion in karkadeh and shrimp, as squid fisheries collapsed in Yemen in the eighties and regained their activity after reforms in the maritime administration.

5. In a way that constitutes the greatest threat to fisheries products and marine life in the region is the destruction of coasts and the elimination of marine creatures through coastal innovations and activities, in addition to land reclamation work on the coasts without

licenses from the marine environmental authorities in the region, in addition to oil spills on the coasts that affect fishing products (Gerges, 2002).

.6.8Blue carbon management in the study area. Blue carbon is defined as the carbon stored naturally in coastal and marine ecosystems.

The Blue Carbon Initiative is currently focusing on carbon in coastal marine ecosystems, in mangroves, tidal marshes, and seagrasses. These marine ecosystems sequester and store large amounts of blue carbon in all the structures and sediments below. About 95% of the carbon in seagrass meadows is stored in the soil. Blue carbon is distributed in the Red Sea and Indian Ocean region in places where mangroves, salt marshes, and seagrasses occur along the coasts of every continent except Antarctica. These coastal ecosystems cover between 13.8 and 15.2 million hectares, 2.2 and 40 million hectares, and 17.7 and 60 million hectares, respectively. Together, these ecosystems cover about 49 million hectares. Through description and studies, we find that the Red Sea region, including Yemen, has a large stock of blue carbon on the coasts of Hodeida in the areas of Salif, Al-Arj, and Al-Jabana, extending off the coast in the port of Hodeida to Al-Salif area. Some countries have included coastal blue carbon ecosystems in their NDCs (as of 31 March 2024) and National Greenhouse Gas Inventories (GHGIs). Four out of 18 countries have coastal blue carbon ecosystems in both their NDCs and the GGIs (Indonesia, Republic of Korea, United Arab Emirates, and the United States). Six out of 18 countries have coastal blue carbon ecosystems in their NDCs only (Costa Rica, Fiji, Papua New Guinea, Seychelles, Sierra Leone, and the United Kingdom of Great Britain and Northern Ireland). Three out of 18 countries have coastal blue carbon ecosystems in their GHGIs (Australia, Japan, and Monaco). Four out of 18 countries have neither coastal blue carbon ecosystems nor their NDCs (France and Monaco). Norway and Somalia, for the record, Australia, Korea and the United States are the only countries that include blue carbon ecosystems in the greenhouse gases under wetlands. 7.8. Marine algae. The Harmful Algal Information System, HAIS, when fully established, will consist of access to information on harmful algal events, harmful algal monitoring and management systems worldwide, current use of harmful algal taxonomic names, and information on the biogeography of harmful algal species. Supplementary components are an expert guide and bibliography. HAIS is being developed within the International Oceanographic Data and Information Exchange (IODE) of the Intergovernmental Oceanographic Commission (IOC) of UNESCO, in collaboration with WoRMS, ICES, PICES, IAEA and ISSHA. HAIS components The IOC Taxonomic Checklist of Toxic Microalgae provides a reference for the use of names and information for each type of toxic microalgae. You can follow its integration into the World Register of Marine Species (WoRMS) here. The International Expert Directory on Harmful Algal Blooms and their Impacts on Fisheries and Public Health is a specialized section of the IOC Ocean Expert Directory. Biogeography of Harmful Algal Species, HABMAP within OBIS (with ISSHA), under preparation (IOC, 2024). 9.8. We are deoxygenating marine waters in the study area. Why is it necessary to establish a regional and global database region is exposed to oxygen deficiency and carbon dioxide escalation due to the crucial geostrategic location, which constitutes the center of strategic marine accumulations in the production, transportation, distribution, energy corridors and global maritime trade, which

requires monitoring, collecting, analyzing, managing and integrating high-quality and comprehensive marine data and integrating from the perspective of the study in the management of the non-linear marine system in modern marine technology and regional marine remote sensing by the Yemeni and regional multi-tasking marine working group and integrating it with the oxygen deficiency group and other marine environment elements and from multiple local, regional and global sources, which are increasingly dynamic marine environmental threats and risks that have been clarified by the problems of ocean contracts as well as marine environmental reports and international marine organizations in the oxygen deficiency in the seas and oceans for marine ecosystems and providing services related to society. The study aims to assist Yemeni, Arab and regional decision-makers in strengthening the joint security and environmental marine policy in the study area in order to preserve the marine surfaces in the Red Sea and the Indian Ocean, in a clean, healthy, flexible and renewable marine area capable of sustaining marine development and production, including the priorities identified by global marine policies in Goal No. 14 in Sustainable marine development for the United Nations for the year 2030 AD, the objectives of the Yemeni, Arab and regional maritime policy for the year 2024 AD and the oceans and United Nations Ocean Science Decades, the objectives of the Yemeni, Arab and regional General Authority for Marine Sciences and Marine Biology Research, in order to draw marine maps of the sound environment and identify and define areas of concentration of marine risks, and the capabilities of marine modeling in identifying areas affected by daily marine activities in the region.

10.8. The relationship and impact of the Yemeni and global maritime geostrategy and marine environmental impacts.

Due to the geostrategic location of the Red Sea and Indian Ocean region, which is one of the most important global maritime plans and one of the regions with global and decisive maritime dynamics, which has caused multiple marine risks and pollutants, including the effects of exhaust fumes from commercial marine vessels and oil tankers, in addition to the impact and risks of warships, aircraft carriers and naval nuclear submarines, which cause many risks and marine nuclear radiation for foreign ships and their impact on the lack of oxygen in the study area, which appears significantly, where current evidence indicates that oxygen at the global level in the world's seas and oceans has decreased by 0.5-3%, and that the minimum areas of oxygen are expanding, and due to the scarcity of global marine data, techniques and models were relied upon, as there are areas suffering from oxygen deficiency in the form of intermittent areas and appear in the form of points and border spots and appear within the boundaries of the bottom layer that covers the seabed, and the environmental effects have affected the lack of oxygen to the emergence of eutrophication, acids and marine oxidation (Grégoire, 2021). The global oxygen deficiency severity has reached more than 60 / micro milliliter / per kilogram in the world's coasts and oceans. The map shows the level of oxygen deficiency in the Red Sea, the Gulf of Aden, the Arabian Sea, and the western and eastern Indian Ocean region, and it varies from 2 per kilogram, which means that the Red Sea, the Gulf of Aden, the Arabian Sea, and the eastern and western Indian Ocean region are candidates for increased oxygen deficiency and

complications for the marine environment in the region. Map No. (2) The level of oxygen deficiency in the Red Sea and Indian Ocean region

Source: Researcher: Imad Ali GIS, and data from George, et al. Published by Frontier in the Navy, 2021.

500 sites have been identified for areas of low oxygen in the marine coasts, which appear in red dots, while in the open seas and oceans, areas of oxygen deficiency reach about 3 million km3, which appear in blue at an altitude of 300 m. International oceanographic data centers were used, as well as studies by Gruber et al. (2010), and applications of geographic information systems and remote sensing, and through the deployment of marine buoys for measuring and monitoring oxygen deficiency in the sea, called BGC-AGRO, and known as marine buoys for the abbreviation of chemical biology to measure and monitor areas of oxygen deficiency in seas and oceans (OCEAN CARBON, 2022), in 2021, the deployment of acoustic bathymetric systems, marine buoys dedicated to measuring biogeochemical, was carried out in a study of 12-36 marine sites at a depth of 2000 m. Through conducting initiatives and studies, including the GOOS strategy for BGC variables, the international BGC Argo program (Johnson and Claustre, 2016, and Romiti, Romich 2019), the program aims to operate global groups to enable cooperation in deploying more than 1000 BGC buoys, as the more buoys, measurement systems and marine studies contribute to understanding and knowledge of the effects of marine activities, and measure the main vertical features of all six basic BGC variables, and environmental variables in O2 at the global level. In order to benefit from these experiences, the working group in the Arab Academics Union, in cooperation and under the supervision of the General Authority for Marine Sciences and Aquatic Research, which aims to communicate with marine research centers, including the International Maritime Data Organization, the US National Oceanic and Atmospheric Administration (NOAA), and Copernicus, to add 1000-5000 BGC buoys, all of which measure O2 at the global level. The contribution of the Argo network to monitoring procedures in oxygen deficiency has also increased, which enhances the role of the working groups that aim to Achieving 50% of its targets in taking samples of marine buoys in the world's oceans, which enhances the capabilities of monitoring platforms and structures, including oxygen deficiency in the erasers.e of oxygen and carbon dioxide? Specifically, the study area Open, addressing the chronic lack of oxygen data, mapping and marine model analysis procedures, and using marine buoys for monitoring.

Researcher source, based on the study of Jober 2021, and NovAtel lectures- 2021

11.8. Data. Current network product in the study area. The researcher realizes the importance of unifying and integrating the management of marine innovations, industries and marine technology in artificial intelligence to achieve the unification and integration of the Yemeni, Arab and regional marine system in the Red Sea and Indian Ocean region by integrating marine technologies and marine artificial intelligence, modern marine innovations based on the non-linear methodology in a turbulent area in the exclusive economic waters of the sea, and reaching the construction and development of the Arab

marine automatic control mechanism in multi-task and multi-purpose drones, and benefiting from previous studies that emphasized the importance of the study of Garcia et al., 2005, 2013, 2019; Strama et al., 2008; Lavset et al., 2016; Schmidtko et al., 2017) which adopted Winkler and CTD data, and reached an acceptable mechanism and standard for monitoring, examining and analyzing data through integrated, high-quality and unified marine bases and platforms to monitor marine activities in the region, and developing installation products with marine technologies that contribute to the unification and development of the comprehensive marine technical system in the region.

Procedures Through the role of the Yemeni, Arab and regional marine working group, the four remote sensing systems are integrated, GIS, sonar, lidar, marine satellite images, Winkler data, biogeochemical buoys and many marine data sources that will provide and support a network product for monitoring the marine environment, the priority of which is the lack of oxygen in the Red Sea and Indian Ocean region shown in the map that has identified the work of modern Yemeni and Arab marine monitoring mechanisms, and facilitates the processes and procedures for an organized assessment of the development of the lack of oxygen in the study area, the role and impact of precautionary measures in maintaining oxygen in its natural state.

The study aims to achieve cooperation and participation with specialized Yemeni and Arab organizations through the Yemeni Maritime Affairs Organization, and Arab, regional and international maritime centers, from the perspective of cooperation in sharing data and allowing for its identification, management and analysis of marine data, and creating a roadmap towards unification, integration and building a Yemeni, Arab and regional marine database, and reaching participation with international groups in building a global database by producing an ocean oxygen atlas (GO2DAT) for regional seas, coastal areas and open oceans, including Yemeni and Arab protected areas in the study area, and the southern Red Sea region constitutes one of the characteristics of marine areas that require protection and the Marine Reserves Law. The TUOAAWGO oxygen deficiency group will, from the perspective of joint cooperation and lack of expertise, integrate O2 data, and benefit from the observations and guidelines of the Copernicus platform, the Eulerian and Lagrangian platform, the Winkler criteria, and modern marine technology measurements in remote sensing and O2 sonar, which have been conducted to reach knowledge of temperature, O2 depth, vertical and fixed structures, and autonomous marine platforms in ships and emerging Arab, regional and Chinese mobile marine buoys, modern marine technology and artificial intelligence systems in measuring marine bathymetry, and remote sensing in GNSS systems for monitoring and collecting marine information (NovAtel, Yoitub), with a focus on continuous coordination in the quality control procedures in the product in marine data and information by tracking it through (QC), with procedures for assessing the problem of uncertainty and confirming the possibility of the problem occurring, and coordination with the local community in the study area. The work of TUOAAWG is consistent with the principles and framework of ocean observation (FOO, UNESCO, 2012), and the directions of the ocean contracts for the problems of 20212, and in order to cooperate in achieving sustainable marine development, the center will be supported by the participation, donations and contributions of maritime transport companies, the

International Maritime Organization, the Silk Road Company, and EMRIX, as they contribute to influencing the study area, and will be available and important to Yemeni, Arab and regional research centers.

Marine environmental risks constitute a continuation in the emergence, diversity, increase and potential impact of problems that lead to the destruction of the Yemeni, Arab and regional marine environment, due to the critical location of the study area in global maritime trade, and the increase in the intensity of geostrategic conflict, with the development of technologies in modern marine technology, including nuclear radioactive materials from nuclear submarines and American and Western nuclear strategic deterrence weapons. It is currently required to raise local, Arab and regional social and media awareness of the danger of external marine pollutants in destroying the environment, forming Yemeni and Arab maritime associations and agencies that call for the protection of the marine environment and reducing the risks of marine pollution, addressing specialized international and legal bodies in the United Nations about the danger of increasing commercial and military maritime activities in the study area, in accordance with international maritime laws, and addressing the World Maritime Trade Organization to discuss the issue of the region and take measures to reduce the effects of commercial maritime transport vessels as well.

Setting Arab and regional restrictions to limit foreign military activities in the exclusive maritime economic zone, and enhancing the role of the Yemeni naval forces in limiting foreign military maritime activities in the exclusive economic zone.

It requires researchers, under the supervision of the General Authority for Marine Sciences and Aquatic Life Research, in coordination with the Ministry of Fisheries, the Ministry of Agriculture, and the Yemeni Authority for The Ministry of the Navy, Defense, Interior, and the Supreme Agricultural Committee, to form a Yemeni and Arab national maritime committee to unify the vision and draw up a modern Yemeni and Arab maritime policy that is unified in determining priorities in applied marine research to address the main problems, in line with the aspirations and orientations of the Yemeni political decision-maker, and the modern Yemeni and Arab vision for the year 2035 AD, and to enhance the role of the International Relations Unit in the General Authority for Marine Sciences and Marine Biology Research, in coordination with neighboring countries, in unifying the vision and integrating and integrating the Yemeni, Arab, and regional maritime political administration, in accordance with the requirements of regional maritime national security and in accordance with what was determined by the United Nations maritime development goals for the year 2023 AD, and the problems of ocean contracts. And enhancing coordination and effective and influential interaction by enhancing Yemeni, Arab and regional research maritime diplomacy with advanced and friendly countries in China, Malaysia, Oman, Iran and the Gulf coastal countries interested in unifying and integrating marine research, which contributes to collecting, unifying and managing data and information in a way that contributes to achieving monitoring and protecting the marine environment as a common interest, in addition to benefiting from the specialized global maritime agencies in the United Nations to provide the necessary marine technical goods

and technologies as this is their global maritime responsibility. The researcher suggested in his study to work on strengthening the proposal of the Yemeni, Arab and regional maritime working group, strengthening the team and working committee to unify maritime policies, and strengthening the convergence and unification of marine research and studies, communication and exchange of ideas and opinions on marine priorities, including achieving Yemeni, Arab and regional spatial marine planning. As for practical solutions in monitoring violations, attacks and marine pollution, the latest methods were used in the work of marine robots, including the GNSS system - and benefiting from the Global Marine Information and Data Center, which contributed to conducting applied marine studies in the study area, as well as the Copernicus Organization, NOAA, Asian maritime agencies, and regional Arab research centers. Among the scientific and practical methods at the present time is the use of the marine buoys mentioned above, in addition to strengthening the experimental marine research field landing for university students and marine studies in conducting preliminary studies and exercises in Yemeni marine areas for training.

11.Challenges and Obstacles.

There are many natural and physical challenges that threaten Yemen, araba md regional maritime security at Red Sea and Indian Ocean, which affected Yemen national security, international and regional maritime security ad well as fiery local society, marine ecosystem on the area map (5). According to author surveys, reports and studies results that conducted via online marine workshop with (wmu, 2022)“Ocean Decade programs”, WMU conference and “lets investigate ocean traveler together” hold on October 2019, International conference on marine /maritime spatial planning from 22-23, November, 2022, there are local, regional and international factors that have difference level on affections.

1..11 Local challenges.

The weakens of communication between islands and central authority, weakness of islands budgets Purified water desalination plants for drinking in the islands, First aid centers, The importance of establishing centers for marine research and control in the islands, Appointing management managers and approving a budget to operate the islands from the allocations of the governorates affiliated to it, Providing a daily routine patrol for the islands or a helicopter, Providing operational stations by energy solar panel, establishing protection centers and coast guard areas, we encourage authorly to get benefiting from the Egyptian experience in investing the Yemeni Ministry of Defense and the Ministry of Interior for its employees in the islands and working to settle them. Discharge on the beach, Hight level of letters, for example authority in Hodeah , lahg and Hagah should encourage students at schools , universities and local society to protect environment ,So the study suggested to hold training known (beach sampling training from 1-20 November, 2023 Also Safer oil tanker, Hael Saee instructress at Rass Esaa 10%,smuglimg (Humran M. A., 2023).

211..Regional and international challenges.

They have Highest percent of affection on YIRS, for example , International maritime lines that ships tankers , ships trades , ships oils , war ships that around 66 ships around Yemen economical and territorial water per day that affect 40% , while Foreign fish ships and boats company affected 20%,smuglimg , immigrations , armed smuggling, piracy affected 10% , untenability fishing efforts rear of investments at coral reef, seagrasses, international ship pollution on Yemen ecosystem, not modernize marketing, absent of maritime strategic plans that encourage youth for inventions and investment at islands on red sea. Beside that Fish community face fishing technical and equipment's that high prices. so, by using XGIS, Buffer zoon (Yang, 2017, pp. 1-30) integration, important points, variables certation evaluations, classifications, and responded of stockholder, as well as study used reports of Transports centers, FAOO, International trade conferences 2021, and Arab Transport conferences to evaluated the size of dangerous and threaten in red sea. Map (5)

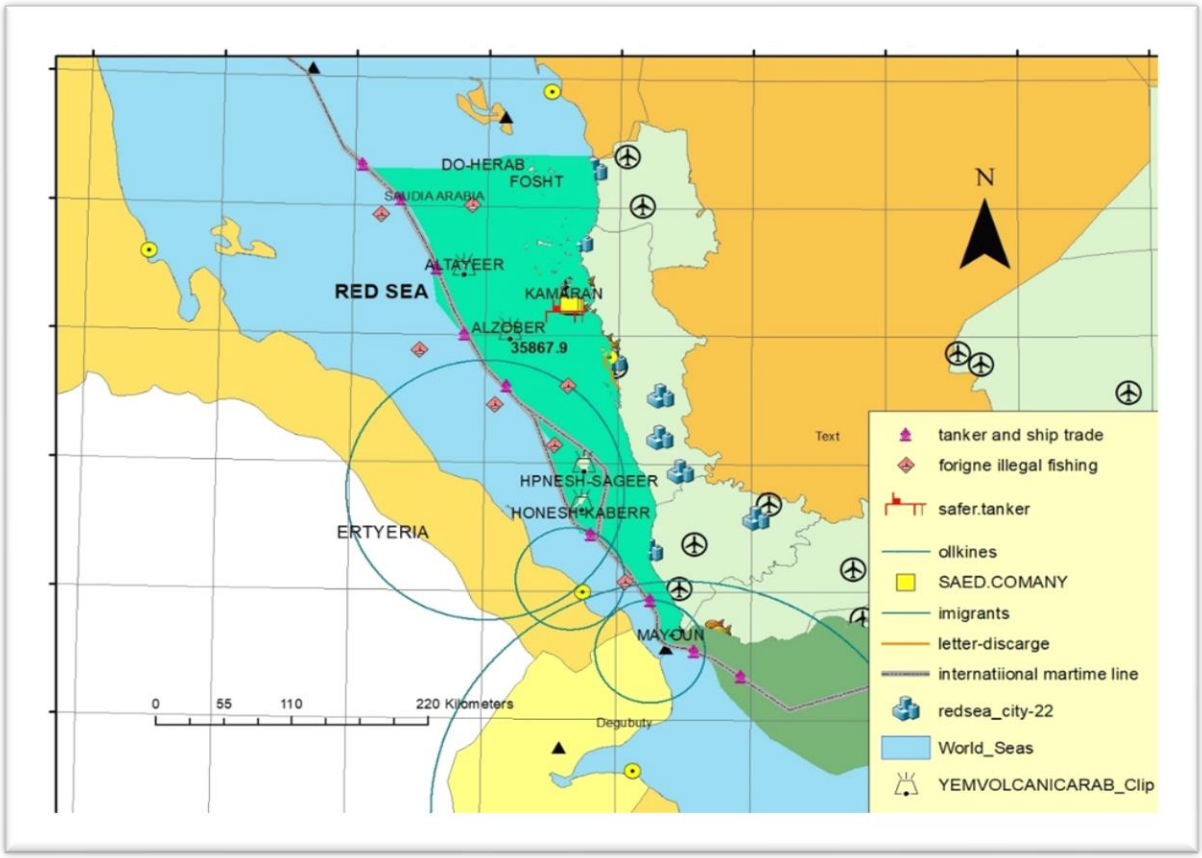

Fig (5). challenges and threaten Yemeni islands and marine security
Source, author, depend on GIS.

.3.11Climate change and marine dead zones.

The sea is a source of oxygen, and because of sea pollution, it contributes to covering sea surfaces, which reducing dissolved oxygen, it is dangerous areas that contribute to the killing of fish where marine life multiplies. Because of transport ships, naval destroyers, and stupid nuclear submarines, they contribute to the effect. The study expected that the Red Sea will be added to these dead areas, where oxygen is greatly reduced, which leads to suffocation and death of marine life and animals, as well as fish breeding ground. Three-dimensional methodology and strategy and finding solutions. Healthy seas and oceans constitute one of the foundations for the continuity of the planet and natural life, from the perspective of realistic theory and the environmental school.

Addressing the causes, where the focus is on reducing nutrient pollutants, including ships, that contribute to affecting oxygen. protecting the fragile marine environment and sea and ocean resources from marine pollution, by conducting studies in areas of expanding oxygen deficiency in Bab al-Mandab, the Suez Canal and near the Yemeni islands in the Red Sea, as well as developing a tracking plan to study the decline in the percentage of oxygen in the world's oceans, including the southern part. the Red Sea and the Indian Ocean, which are among the priorities of the Yemeni maritime geostrategy in the region, to be able to monitor and identify sites exposed to the influence of pollutants in the Red Sea and Indian Ocean region and place them on maps, and develop digital models for them that are most affected and the lines and methods of effective solutions.

11.Yemen's role in maintaining maritime, national, Arab and regional security.

In view of the Yemeni strategic location and the importance of the Yemeni maritime space in maritime, national, local, Arab and regional security, Yemen supported the theory of maritime alliances and called for the holding of the Jeddah Conference in 1956 AD and the annexation of the Moutawakel Kingdom of Yemen, Egypt and Saudi Arabia in order to preserve the Red Sea. It also called on Yemen to convene The Taiz Conference in 1973, and Yemen called for the importance of neutralizing the passages and maritime areas in the Red Sea from conflicts. Yemen contributed to the initiative to establish an Arab maritime alliance in the Red Sea, Gulf of Aden, and Indian Ocean regions. Yemen also contributed greatly. Yemen participated in an initiative called Rules and a Code that includes agreement on a number of rules. It was agreed upon and includes a number of countries in the region that have an interest in the study area and the vital maritime domain of the Republic of Yemen in the western Indian Ocean. Its aim is to combat piracy and maritime theft through theft of ships in the western Indian Ocean and the Gulf of Aden. The signatory countries are the governments of both Yemen. , Saudi Arabia, the Emirates, France, Djibouti, Somalia, the Comoros, Eritrea, Ethiopia, Jordan, Kenya, Madagascar, the Maldives, Tanzania, Mozambique, Sudan, South Africa, the Emirates, Oman, Egypt, Seychelles, and Moritz, where this agreement

was agreed upon. The code dated January 29, 2009 AD, where the code of conduct at work stipulates the reduction of piracy and armed robbery, in accordance with the resources available to countries and their harmony and compatibility with national local laws, and the rules of applicable international law.

The participants in this signing intend to achieve the goals, which are.

1-11. Exchanging cooperation in and reporting on relevant information, intercepting ships or aircraft suspected of involvement in acts of piracy and armed acts against ships, facilitating appropriate care for sailors and seafarers working on ships as well as passengers who have been exposed to threats, acts of piracy and armed robbery on ships, treating them and returning them to their homelands. With a guarantee that countries will arrest those accused of involvement in acts of piracy and armed robbery and send them to trial.

2- 11. The participants are committed to cooperating in implementing the code of conduct coded in the Gulf of Aden and the western Indian Ocean. Thus, it becomes clear that the Zionist entity is not participating and has not been approved to join this code. In addition, the brothers in the government of Bahrain are not signatories to the code of cooperation, and we do not know about any alliance. The Bahraini Ministry of Foreign Affairs speaks through the participation of one of the officers of the Zionist entity as a liaison officer in coordination and cooperation with the US Fifth Fleet stationed in Manama in the Kingdom of Bahrain, which from the perspective of maritime and Arab national security constitutes a threat to Arab national security and Yemeni national security. Likewise, it did not The Hadi government has decided to clarify this matter because participation is a violation of Yemeni laws and the Constitution of the Republic of Yemen. It is also a threat to Yemeni national security, which rejects the militarization of the maritime region in the western Indian Ocean, the Gulf of Aden, and the Red Sea, which was stipulated in the Taiz Conference. In addition to the position of the Ministry of Defense. The Yemeni naval forces, coastal defense forces, and coast guard forces are the naval institutions that are related to maritime security and Yemeni maritime national security, where cooperation and sitting with Zionist liaison officers and joint cooperation with Yemeni officers constitutes a violation of the security and military combat doctrine specified in the concepts and Military and security bases in the Republic of Yemen.

12.. The importance of the study area in Yemeni and Arab maritime national security.

From a geostrategic maritime security perspective, it includes the use of sea surfaces as a theater for military naval operations and maritime control and control, diplomatic use and diplomacy of naval gunboats, displaying the state flag on warships and police uses, maintaining maritime security and achieving social peace in the broad vital maritime domain, and strategic trends change. From one period to another as a result of

a number of factors and considerations for each coastal country, the maritime strategy has witnessed a major change in the twenty-first century due to the development of technology and the change in the geopolitical characteristics of a number of countries. The individual maritime natural and human centers of gravity are represented as follows.
1.12. The Yemeni maritime domain, with its various elements, constitutes an important and focal point in political geography, in addition to being one of the main elements in Yemeni and Arab national maritime security in order to achieve many goals, including preventing the arrival of foreign naval ships from influencing and threatening the Yemeni coast and waters, as they constitute these challenges and an issue. A first-class security threat, local, regional and international.
2. 12. Yemen constitutes a geostrategic center of gravity from various aspects, represented by its cultural and historical legacy and the geopolitical position of the Yemeni seas and islands, one of the most important pillars of Arab national security. It constitutes a source of inspiration for the Arab peoples at the military, cultural, political and strategic levels. Thus, it has become an object of ambition by the dominant and colonial countries, and a target for projects. Regional and international hegemony and control. The Yemeni seas and islands also constituted a fundamental geostrategic depth for the Arab world in general and the Gulf states in particular, as they are located at the flank of the Arabian Peninsula and the outlet for many Arab countries and the Arab Gulf states to the world. It also constitutes an advanced point for Arab national security on the island of Socotra, where it is affected. The Arab and the Gulf countries directly cause disturbances in Yemen, in addition to the effects and maritime disturbances in the study area that have a direct impact on the European countries and North America, since the vital maritime space of Yemen constitutes one of the most important corridors of maritime shipping routes for energy resources, which passes through Haram Strait.

12. Results:

1-12. Conducting MSP, by using GIS, drones survey and undertaker vehicles, Landsat are essential tools that processing easily to build general understand and illustrated for area even we couldn’t reach some islands because of war in Yemen, but study desktop in the islands and background for working on the area that help us.

2.12. Study discovered that red sea and Indian ocean is one of the geostrategic locations that have regional maritime power characteristic and required to unify Yemen, Arab and IROA Policy to shift to full of the political gap and build Arabian regional power to make stable and secure the area.

3.12. Study found that Islands have unique natural that have wide biosphere, EEZ which are wealthy and virgin maritime resources and valuable for opportunities blue economy activities.

4.12. Study found that Islands have geostrategic location that could play major role to serve, secure, support, protect the international maritime trade, as well as help international maritime for guiding ships and building maritime services and logistics points as well as investment on blue economy activities.

5-12. Study analyses by using MSP and GIS being able creating a database for fishing ports and structures on the Yemeni islands in the Red Sea, as well as it conducted and produced maps (6) that including results and illustrated elations and impacts on others phenomena.

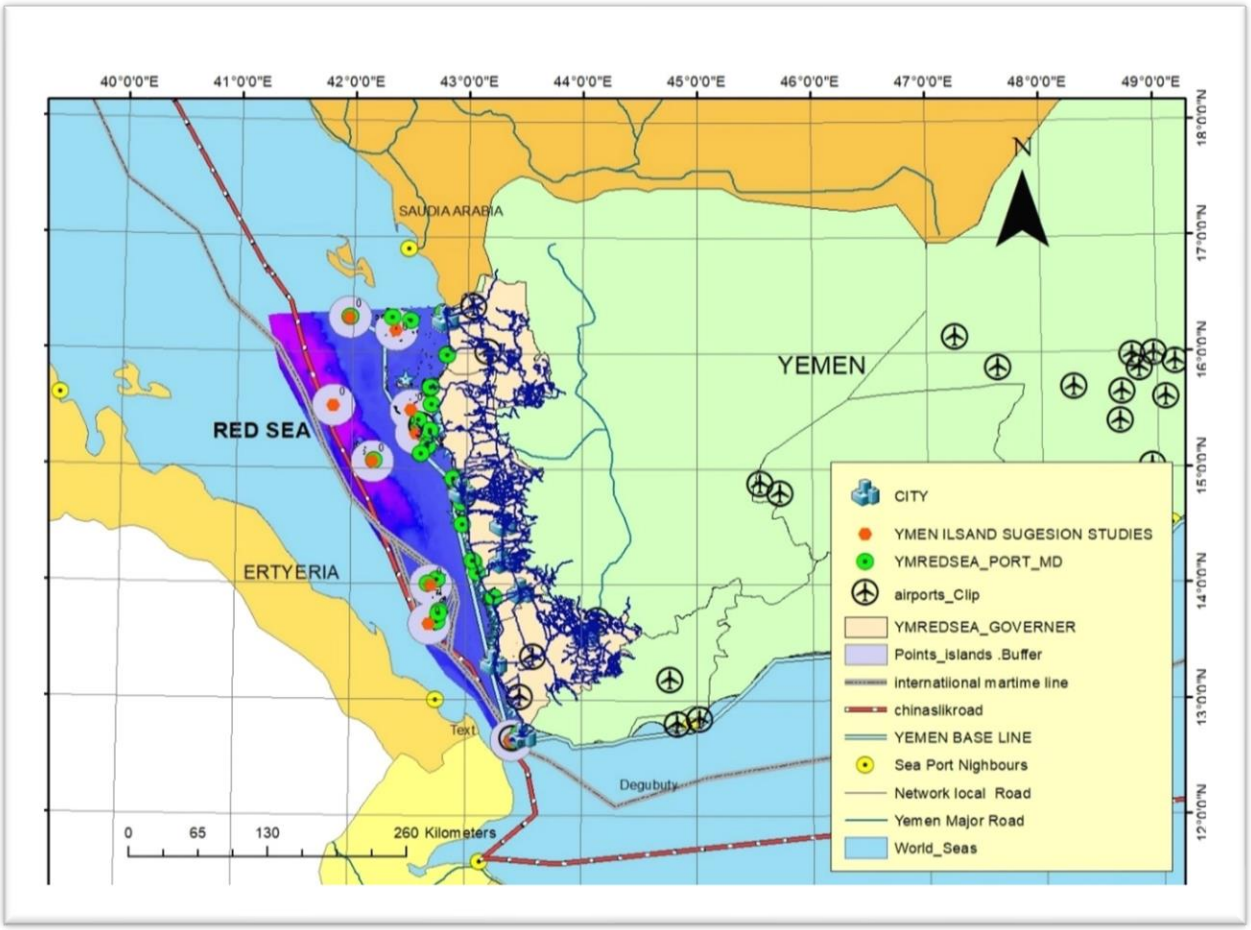

Fig (6). YIRS region's marine phenomena.

Source, researcher rely on GIS.

6.12. The study found that the best area for budling modern fish boat multi services in Kamaran island as well as Fosht, Honish, and for investment and growing blue economy at EEZ area and government should buy the boat's value in the common area and the purchase of two medium and modern boats is around 4,800,000 US$.

8.7The study found that cooperation and cement relationships, sharing efforts for SMSP, as well as building economic agreements with Red Sea and IORA is major step to achieve Yemen islands maritime strategy and protect maritime security.

9. Results.

9.1. There is a state of stagnation in the Arab thought, research and innovation knowledge of the Arab political decision-maker, which causes the continuation of the status quo and Western-American dependency, while the Yemeni and Arab nation lives in a state of vitality and aspiration to enhance the joint and effective Arab unity.

9.2. Theories and thought of changes in some Arab political systems and political decision-makers tend to move away from the Arab and Islamic center, resort to building modern alliances and forming Arab isolation, and escaping from reality in reforming and developing the current Arab situation and addressing challenges and problems based on applied scientific research, and guidance in enhancing and developing modern Arab national security.

9.3. The existence of a defect in the global system due to the absence and participation of the Arab and Islamic nation in employing its joint naval power in formulating and influencing global politics, and the control of Western powers according to liberal theory, which affected and was reflected in legal applications and achieving justice, security and global stability, including the management of seas and oceans, which required highlighting the Yemeni Arab and regional role and the direction in building a sustainable regional maritime development strategy for the countries of the Indian Ocean Organization, which forms the basis for the transformation in neutralizing Western power and updating maritime theories and concepts, freedom of navigation and development of marine resources in the region, which was one of the most important results of the negotiations between countries that led to a new agreement on the law of the sea, which is the codification of an idea that has become generally accepted for the encirclement movement, i.e. placing a large number of resources in the world under national control, unlike international jurisdictions. Thus, the concept of the archipelagic state and the concept of exclusive economic zones were recognized as traditional international law. 9.2. It is expected that the Arab, Islamic and regional coastal countries in the region will be able to manage large areas of exclusive marine economic waters, through the establishment and enforcement of modern regional maritime rules and regulations to preserve the marine environment, and extract living and non-living resources from it. However, the seas cannot be accurately divided into national pockets, there are inevitable overlaps between judicial claims where geographical location plays a major role in this aspect.

9.3. Through the events and experiences in Yemeni management and leadership and the Yemeni Arab role in controlling the resources and marine areas in the Republic of Yemen in various historical stages, it has become a fact that the control of resources and the environment by one country affects the oceanic ownership of its neighbors, and when such conflicts or problems arise, it requires countries to solve problems on a regional basis.

9.4. The idea of using a regional approach to marine environmental problems applies particularly to countries bordering closed or semi-closed seas, lands and seas in the Arabian Peninsula, Arab and Islamic geopolitics, and regionalism in the Atlantic Ocean, the Mediterranean, and the study focused on the Red Sea and Indian Ocean regions in southwest and east Asia, and the growing importance of marine resources, and numerous maritime overlaps.

9.5. The demands of coastal states in the region indicate the need to develop a logical framework for studying the problems and opportunities brought by the new law of the sea to a large extent, the United Nations has been keen to move towards achieving sustainable marine development

Dama for the year 2030, to achieve the development of the blue economy and various elements and objectives of marine development, which the study focused on developing the blue economy in its various sectors in the exclusive economic marine waters within the Indian Ocean Organization.

9.6. Knowing the level of performance between regions from a marine environmental perspective and comparing the compatibility in applying regional strategic marine management, through understanding the knowledge of the role of centers at the global level, and the relationship of the study area in the evaluation at the level of management and organization at the level of Arab and regional countries and organizations.

10.6. Many free people of the Arab and Islamic nation rely on the pioneering role and Yemeni leadership in the Sana'a government in its leadership role for the effective regional Arab force and its ability to influence and be effective in protecting Arab national security.

10. Recommendations.

10.1. Interest, awareness and effective Yemeni, Arab and regional communication in unifying and developing maritime geostrategy, maritime laws, concepts and theories of Arab strategic marine management and developing joint Arab regional alliances with the Indian Ocean Organization

10.2 Establishing the Yemeni, Arab and regional spatial marine analysis center. It is one of the working groups and training centers in geospatial marine information systems ((Arc GIS maritme - TUOAA) in the Union of Arab Academics and was established on November 18, 2023 AD and was approved and joined the Global Ocean Contracts Platform. Its importance lies in meeting and communicating with Yemeni and Arab experts and specialists and the countries of the region that are members of the League of Arab States and the Indian Ocean Organization in monitoring marine environmental basins, marine technology systems, spatial marine planning, and the blue economy through

channels, social media and the Internet. Among the most important benefits of establishing the following spatial analysis group and center:

10.2. Forming a Yemeni and Arab committee to unify maritime policies in the exclusive maritime economic zone to contribute to the unification, integration and integration of the joint Yemeni and Arab maritime security and defense policy, providing the Arab and regional center, as well as Yemeni, Arab and regional maritime institutions, the Yemeni Geographical Society, the Union of Arab Academics, the Asian Geographical Society, and the Indian Ocean Organization with many experiences and talents in geospatial information systems technology, and benefiting from Yemeni, Arab and Islamic Malaysian experiences. Indian, Chinese and Australian in this field.

10.3. Encourage innovators and inventors in developing modern marine technology and modern geographic information systems, modern marine geographic artificial intelligence, in remote sensing systems and systems in modern marine technology, and benefit from the cooperation and strategic partnership agreement signed between the Arab Academics Union and the Malaysian Innovative Organizations DIGIT-MTE., and many innovative organizations and associations in the International Innovators Association IFIA.

10.4. The Marine Working Group contributes to building a database in marine and geographic technology systems in the Red Sea and Indian Ocean region, and providing skills, expertise and strategic knowledge in geographic information systems and all applications, including marine applications.

10.6. Establish marine centers and laboratories in coastal management and the strategic marine environment, where many digital platforms specialized in managing marine information and data were utilized. The study established working groups with digital platforms interested in managing, collecting and analyzing information and data via satellites, including:

A. (EOS - Data analyses), and is one of the scientific space platforms of satellite systems that are used to contribute to finding solutions to terrestrial problems, including monitoring crops and their development around the world, and provides and produces a diverse image, as the researcher took advantage of the platform to establish a working group in monitoring crops and changes in marine phenomena and coasts in order to be able to make a positive change in which geospatial is used, contributing to defining and providing the study with information and developing strategic spatial knowledge by producing many images of satellites NDVI of different resolutions that are employed with geographic information systems.

10.7. Supporting the Data Technology Working Group in Spatial Marine Planning Model 12/20/2023 AD. It is the first working group in data technology for Arab and regional spatial marine planning, the Indian Ocean Organization and the Arab League, and the conference is expected to come out with a recommendation to adopt the working group in the League of Arab States and the Arab and regional maritime administrative centers that

are interested in managing, monitoring, evaluating, studying and planning regional and strategic spatial marine.

13.Sugessions:

1. Conducting Yemeni and regional spatial planning is essential step for understating and know the features of red sea and Indian ocean that help Yemeni, Arab and reginal leaders and decisions makers to have wide and clear vison about maritme challenges, threat and dangers conducted by international factors and build joint regional maritime strategy to achieve the right and successful development in the region area.

2- Establishing a command-and-control center to manage marine information systems and a regional marine strategy in order to enhance cooperation and exchange information and data for marine fishing activities and enhance communication with regional countries in the western Indian Ocean and South Africa.

3. Raising the capabilities of workers in fisheries sector and benefiting from regional expertise in the settlement of fisheries industries and the construction of fishing vessels, imparting the skills of the local community, decision-makers and political decision-makers in marketing management, and the importance of strengthening marine and fisheries economic relations in order to increase the quantity of production and increase marine exports.

4. Developing and rehabilitating fishing ports and providing them with services to increase production, building a tuna fish factory, developing and modernizing the traditional boat-making workshop, benefiting from local expertise and cadres in small and medium marine industries, as well as from the Arab countries and the Republic of China.

5.Establishing new Yemen, Arab and regional maritme group task force that interested in reginal maritme security in Red Sea and Indian ocean that will help to unify IORA national maritme security and defense strategy.

6.Contacting **Network platform of Yemeni, Arab and Regional Marine Spatial Analysis (COF).**

It is considered one of the unites , working groups and training centers in marine geospatial information systems ((Arc GIS maritme – TUOAA, that is part of the Union of Arab Academics, which constitutes one of the scientific platforms and established on November 18, 2023, the global ocean contracts platform was approved and regulated, and its importance is in meeting and communicating with Yemeni and Arab experts and specialists and countries of the region that are members of the League of Arab States and the Indian Ocean Organization in marine technology systems, marine planning. Spatial, blue economy through channels, social media and the Internet, and one of the most important

benefits in establishing the following spatial transformation group and center (Lewin, 2023):

1. Providing the Yemen, Arab and Regional researchers organization, intuitions, Center, and the Organization of Indian Ocean States with many experiences and talents in geospatial information systems technology, and benefiting from Malaysian and Chinese expertise in this field.
2. To enhance, researchers, inventors in technological development Modern marine, GIS, remote sensing, EU Copernicus, NOAAA, Argis Pro, QGIS, benefiting from the strategic cooperation and partnership agreement signed with TUOAA, innovative organizations.

3. Contribute to building a database in technological systems with AGA, IOR,

3. The group contributes to providing skills, experience, and strategic knowledge in geographic information systems and all applications, including marine applications.

2. Marine information systems in coastal management and the strategic marine environment.

Many digital platforms specialized in managing marine information and data were benefited from, and the study established working groups with digital platforms interested in managing, collecting and analyzing information and data via satellite satellites. Such as:

a.(EOS – Data analyses) ,It is one of the space scientific platforms of satellite systems that are used to contribute to finding solutions to terrestrial problems, including monitoring crops and their development around the world, and to provide and produce a diverse image, as the researcher took advantage of the platform in establishing a working group in monitoring crops and changes in phenomena and marine coasts in order to be able to make a positive change in which the use of geo- Spatial graphics)CORP(2023 ،It contributes to defining and providing the study with information and developing spatial strategic knowledge by producing many satellite images .NDVID different resolutions that are used with geographic information systems.

3. Data technology working group in marine spatial planning, model 12/20/2023.

We suggested to establish the first working group on data technology for Arab maritime and regional spatial planning is the Indian Ocean Organization, the Arab League, the South China Sea, and members of the Asian Geographical Society.

a. Objectives.

The Working Group for Data Technology in Marine Spatial Planning is not an institution or association and does not constitute a subgroup of the League of Arab States or the Indian Ocean Organization, nor is it a political group, but a voluntary scientific research group that is Yemeni, Arab, Islamic, and regional within the maritime domain in the Indian, Atlantic, and Mediterranean Oceans, which It includes sub-seas, semi-enclosed seas, and

gulfs within the framework of member states, and is a social networking platform to facilitate the process of communication and communication among experts and holding meetings via the Internet if necessary, in order to contribute to the discussion and exchange of development research, proposals and studies, which are presented within the main proposed regional maritime committees.

* It contributes to finding out what is new in the aspect of modern maritime innovations, and avoiding duplication and repetition in discussing topics, activities, proposals and innovations at the level of the Arab, regional and Asian regions. An example of this is reviewing current and future projects in planning in the region.

* Communicate to discuss new developments with Arab and regional institutions in the field of marine planning, modern data, marine means of communication, and new information about coastal management in the exclusive economic zone in the study area, and monitor developments and changes in the marine environment through communication with the competent institutions in the region.

* Working to establish a day a year to discuss and exchange opinions about what is new in maritime planning and recent data within the countries of the region.

C. mission.

. The team needs to know what data and information are available, how and where they can and can be used at the region level, and how to communicate and coordinate information to understand and know the extent of its use, specifically with regard to marine spatial planning in the region.

. One of the group's tasks is to enable members to learn about the marine areas in the region to discuss and identify needs regarding the application of marine spatial planning.

. Preparing awareness-raising guidelines regarding the necessary data and standards in marine spatial planning applications that are compatible with marine policies in the region.

. Work on standard criteria that allow harmonization of plans MSP In the regions, marine basins and oceans within the framework of the Indian Ocean Organization, the League of Arab States and the Asian Geographical Society, which is in line with the aspirations of the peoples of the region.

. The possibility of cooperation and communication in helping to create an electronic portal on the website of the League of Arab States and the Indian Ocean, as well as the Asian Geographical Society, containing information and plans for marine spatial planning.

3.Formation of the technical work team for the team.

a. Membership, including Members are from specialists in Data/ GIS (Geographic Information Systems) / SDI (Data Infrastructure). spatial), and Experts In marine spatial planning, planner MSP.

B.to choose Experts: A committee or body will be formed that will invite member states of the League of Arab States, the Indian Ocean Organization, and the Asian Geographical Society, provided that the Asian Geographical Society is tasked with addressing the authorities in those countries to raise proposed names of specialists and experts in marine spatial planning, geographic information systems, where they do not represent member states.

The experts do not represent Member States.

C. For their part, the former committee will identify and approve the experts, and the selection will be based exclusively on their CV, knowledge and experience in this field.

D. The committee will appoint a final list of experts and will report back Member States of the memorandum organizations, and addressing organizations, maritime regions and geographical associations in the field of marine spatial planning, and get advantages of specialists in the Esri platform, AGA, the African Union, and the EU.

C. They may participate in meetings at the invitation of the Chairman of the Working Group artistic, depending on the issues to be dealt with such as representatives of other organizations and technology Experts.

4. Presidency of the group's administrative body.

the chair is appointed by the committee

B. A deputy and assistant to the Chairman of the Authority shall be selected by the Committee.

C. Coordinates work group activities, meetings, sets agenda and tasks, and invites experts and other works.

And the. Will set goals and evaluate priorities/activities, with specific outcomes.

5.Meetings

a. Maximum 4 times a year.

B. They can be organized as group meetings or specialized workshops;

C. They can be held as face-to-face meetings or online conferences;

D .May prefer to hold consecutive meetings/conferences/other work

And the. Groups for example. Projects MSP related, today marine Arab, regional and Asian, Meetings International maritime planning, international data meetings and conferences.

Y. Expert participation in meetings will vary depending on the specific items/topics/task

The group sets itself up. Not all experts on the list need to be invited to attend all meetings.

6. The General Secretariat of the Group. The group has a minimum of a secretary, to keep reports and join the work and agenda for planning the marine location accomplishes this task.

7.Connection /Publishing.

a. The team can, in its work Inside that It benefits, inter alia, from the following:

. Dedicated pages in the marine forum for The League of Arab States, the Indian Ocean Organization, the Asian Geographical Society, benefit from the reports, data and publications on the site.

. Custom pages in a collaborative platform and communicate for group use for communication purposes, the group can make use of resources that Developed by the League of Arab States, Indian Ocean, Asian Geographical Society, the Chairman and/or individual experts to participate in meetings in order to provide reports on a regular basis.

14.Conclusion.

Maritme knowledges and innovation strategic management to get more information's and collected dates, to draw and build the future as well we to established new regional maritme system are one of essential goals for the Union of Arab Academics to achieve.

Yemen maritme geography. Arg GIS Pro, MSP. Red Sea and Indian regional geostrategic thought are main tools, and factors that found Yemen, Arab and Regional maritme strategic is have that contributed for building maritime geopolitics and contributed to strengthening African and Asian regional cooperation since centuries. Study believe that achieving marine development, security and stability in Yemen or an Arab country is linked to all Arab policy at strategic level and non-Arab country can to be alone and able to achieve development, security, and stability, and to move toward strengthening its foreign policy and international effectiveness on its own.

Study found even Yemen or Arabian and individual states in Asian area have geostrategic location but they count to implement and use it as element power among international and regional conflicts. It is a real time and necessary to unify Arab, African, and Asian efforts which is the geography commence is one of modern Asian maritme diplomacy goals and instruments that could help to build regional maritme power. It is time to encourage regional maritme studies and development because the size of the risks and limitations are greater than the size of the state alone, and from the perspective of alliances and military force, it is one of the means of obtaining regional power to achieve continuity and maintain. Survival.

By using GIS application that helped study to get general ideas and understand that Yemen geostrategic location have center of gravity and play major role at Yemen, Arab, IORA. regional maritme security s well as at Global Balance, but It can't use it as element transition for more affection without cooperation and working together with IORA. It is

clear that using GIS application found that Yemen Exclusive Economic maritme is connected with red sea states and there is not High Sea, if Yemen, Arab and IORA area united reginal maritme strategy maritme system, they will be able to create joint maritme strategy and achieve IORA maritme diplomacy at peace, war time.

By unifying Yemeni, Arab and regional politics at the present time, as the world is witnessing a number of transformations, including liberation from unipolar politics and the shift to multipolarity. Through unifying national and regional politics based on the theory of regionalism, the Arab countries will be able to build an effective and influential regional Arab force. In the global system by taking advantage of the characteristics of natural and human power and promoting the development of regional maritime alliances, including the Organization of Indian Ocean States. The question is, do the Arab countries possess the characteristics of a regional power from the perspective of the geostrategic maritime region, and what is the location and impact of Yemen and its geostrategic natural and human effectiveness in the maritime region? What are the factors of strength and weakness through which the elements of regional power can be measured, which are represented in size, economic strength, population, economy, culture, technology, and compare them with the countries of the world? The importance of Yemeni, Arab and regional maritime spatial planning in building foundations and databases that contribute to developing strategic visions and plans? What is the extent of the threats and challenges, and how is the role of studies and the art of maritime geostrategy highlighted in making regional maritime strategic decisions and plans at the present time, which constitute the focus and essence of the study.

15.References

Al-Haki, i. (1966). *Maritme Legeslation Development porposal in the Yemen OF Arab Repuplic.* Swedan: World maritme University Diessertaion.

Al-Hakimi. (1988). *Maritme Legslation development porposla in the Yemen of Arab Repuplic .* Sweden: World maritme universit dessetration .

Al-Zawak, M. (2000). *Econmic Geography.* Cairo: University Knowledges House.

Blessing. (2020, MAY 1). *ECOFISH*. Retrieved from he inland and marine coastal fisheries resources of the Eastern Africa, Southern Africa and Indian Ocean region: https://ecofish-programme.org/authors/mr-blessing-mapfumo/

Brodle, J., ROUPHALE, T., & TURAK, E. (1971). Seagrasses and Mangrove's at Yemen red sea.

Catrina, S. (2018). *Guide line for marine strategic planning.* New York: UN.

Clogan, C. S. (2017). the blue economy of the Indian ocean: context and challenges. *journal of indian ocean rims studies , v011, isse i*, 4.

Cnter, Y. S. (2017). *National Center For Statics .* sanaa: Ministry of Planning and International Cooperation.

corp monotring : تم الاسترداد من . *work with corp map* .(Novemper , 2023 22) .CORP
/https://eos.com/user-guide/crop-monitoring/work-with-crop-map

Dragoon, F. (2018). *Marine Survy.* Chairo : Haydrographic .

EARTH , E. (2022, May 1). *USGS*. Retrieved 2022, from USGS: https://earthexplorer.usgs.gov/

ESRI. (2023, 11 13). *ARCGIS maritme*. Retrieved from ESRI : https://desktop.arcgis.com/en/arcmap/latest/extensions/maritime-charting/what-is-the-arcgis-for-maritime-charting-.htm

GEBCO. (2022, May 1). *Gridded Bathmetry Data*. Retrieved from General Bathmetry Chart of the Ocean : https://www.gebco.net/

Humran, M. A. (2022). The Geostrategic Importanc of Yemeni seas and Islands, Master Degree. *Arab and Asian studies , Arab Demigratic Center*, 1-100.

Humran, M. A. (2023). Yemen Maritime Strategy Planning and development in Red Sea and Indian Ocean-Feasibility study for fishing ports and Yemeni islands in Red Sea. *ASIAN ISSUES*(18).

Ishteag, A. (2022). *Plastic debris in the Indian Ocean: a threat to the coastal population and.* , Musrsoish: IORA Press.

Jivanta, S. (2018). *Matitme Governance and south east asia, Trade, Securit, and sustinable development in the indian ocean .* Singfore : World Secentific .

Lewin, M. (2023). *GEOSPATIALSTRATEGY ESSENTIALS FOR MAMAGMENT.* ESRI CANDA , GEOSPATIAL . CANDA: ESRI CANADA. Retrieved from https://www.arcgis.com/apps/MapSeries/index.html?appid=19daf0d08b294e2fb38de3980613e03e

Saleh, A. A. (1999). *Yemen Decree.* sana,a : Yemen legslation .

Santos, &., & Baylon, A. (2013, Decemper). Introducing GIS to TransNav and its Extensive Maritime Application: An Innovative Tool for Intelligent Decision Making? *the International Journal on Marine Navigation and Safety of Sea Transportation, 7*(4). doi:DOI: 10.12716/1001.07.04.11

. sanaa: Abade center . *Yemen islnds* .(1996) .Shehab mphsen Abas

Shela, S., & steinbure, J. S. (2010). *GIS RESERCH METHODS. incorporating spatila Prespectives .* California, : Esri Press .

wmu. (2022, may 1). *Ocean Decade programs.* (online, Performer) online, Simothosonian,2, Berue.

Yang, C. (2017). *Introduction to GIS Progrmaing and funcdmnetals wirth Paython and ArcGIS.* NW. U.S: Taylor and Frances .

Yates, K. L., & Bradshow, C. A. (2018). *OFSHORE ENERGY AND MARINE SPATIAL PLANNING .* Abingdon, Oxon: Routledge, .

Zaucha, J., & Gee, K. (2019). *MARITME SPATIAL PLANNING, past, present, future.* Cham, Switzerland: Springer International .

Zhu, C. (2017). *Annual Report on the develpment in the indian ocean region , Indo -Pacific ;Concept Defination and strategy development.* Beijing, China: Social Sciences Academic Pres,v.

zHUE. (2019). *FISH .* NEW YORK: ROUDLTEDEH .