Fishing Industry In Costa Rica

The Republic of Costa Rica is based in Central America in between the Caribbean Sea and the Pacific Ocean. It shares boarders with the neighbouring countries of Panama and Nicaragua. The land size of the country is 51,100 square kilometers that is mostly used for agriculture, specifically coffee and bananas. With today's population growing to 4.8 million people the economy has expanded to tourism and technology. This increase in tourism and technology has increased the value of Costa Rica's oceans and coasts. Between the Caribbean and the Pacific, the country has 1290 kilometers of coastline and 589,697.99 square kilometers of EEZ. Costa Rica has been an active member of the United Nations since November 2, 1945. Costa Rica has been taking many steps to protecting their oceans and coasts. These include providing government subsidies and supplying extensive marine studies, reducing fishing vessels and exported fish, and

Costa Rica's fishing sector has been a vital source of foreign currency in both the social and economic aspect. It also provides needed jobs in the economically weak area of the country, mainly the areas by the ocean. Throughout the year of 2002, between the fishing and aquaculture departments accumulated 0.32% of the national gross domestic product. Costa Rica also exported at total of $138.2 million fish products. With all this value, the government of Costa Rica have been creating many programs and providing subsides to help sustain the fishery sector. For numerous year now, Costa Rica, through INCOPESCA have been working on methods to strengthen aquaculture. They have either extended or maintained the sector of aquaculture stations in the majority of the country. At these stations, they have been promoting research, the production of seeds, and the exchange of new technology for the raising of cold and warm water specimens. There was a regional project in 2004 that surveyed the Central American isthmus that researched the potential of reservoirs and bodies of water with the purpose of creating fish farming projects. This was funded by the Taiwan government that lasted until March 2006. Many states universities along with the help of INCOPESA have research projects in the sector of aquaculture and fishing resource management on the coasts. These programs are specializing on nutrition of farmed specimens and genetic advancement. Another program was established to research the potential of larger pelagic fish. It was run with the use of a National Learning Institute training vessel and it was sent from Puntarenas Port to Puerto Limon in the Caribbean. This program was ultimately inconclusive, it did reveal that there was a large amount of resources in the region that were mostly unexploited. Even though this project wasn't exactly a success they still found useful information and continued to fund more projects like this one. A sizeable amount research and development has been put into the sector of farming of marine species such as fish and molluscs in the Gulf of Nicoya. There are still many more programs that need to be implemented if Costa Rica is going to have sustainable oceans. To ensure the future of these ecosystems multiple state universities have been looking into creating upper level education programs that specialize in marine fisheries, aquaculture, and limnology. The University of Costa Rica, with the help of many institutes such as the Marin Sciences and Limnology Research Centre and the School of Biology and the Pacific Regional Headquarters, has programs and classes for undergraduate and postgraduate students in the fields of aquaculture, fisheries, and marine biology. The National University, with the help of the School of Biological Science, has programs and classes for undergraduate and postgraduate students in the fields of aquaculture, fishing resource management, and marine

biology. The private school San Jose University will have an aquaculture engineering class at several locations like San Isidro de Perez Zeledon and Guapiles. All of these programs that are offered at schools across the country shows Costa Rica's devotion to the future of their oceans and coasts. A way to monitor how well Costa is doing at preserving their oceans and coasts is to look at the amount of government subsidies that Costa Rica gives out to programs and services related to oceans and coasts. Between 2003 and 2009 Costa Rica has increased the number of subsidies they give to Fisheries management and services and Fishery research and development. This shows the countries devotion to these programs that preserve and protect their oceans and coasts.

Costa Rica has a total of 11 Conservation Areas throughout their land and water borders. One of the areas is called the Area de Conservacion Guanacaste (ACG) and located on the northwest Pacific coast of Costa Rica. This sector has an area of 163000 hectares, 43000 hectares are marine, and it also contains 150 kilometers of protected coastline. It was declared a UNESCO World Heritage Natural Site in 1999. In 2015 the project named BioMar ACG was started and its purpose was to record all of the marine organisms in the sector. All of this information is catalogued, photographed, bard coded, and deposited at the Museum of Zoology at the Universidad de Costa Rica and then is made available to the public through the internet. The sector of ACG was originally explored by multiple marine explorations from the United States of America in the 1930's where they took samples and wrote papers. Numerous institutions, collection of researchers, and individuals have made contributions to the accumulated knowledge of ACG marine biodiversity. Some examples are Elmer Y. Dawson's papers on macro algae in Costa Rica, Richard and Hughes work on marine turtles in the ACG, Marques and Monks observations on fish parasites, and the Instituo Nacional de Biodiversidad collection of mollusks in the ACG. There are many more examples of these studies of marine life in the ACG over the years. The main principle of these studies is to collect a baseline of the marine biodiversity of ACG's Sector Marino and nearby unprotected areas. Costa Rica is continuously trying to create more of these protected areas that they can study and learn more about. Currently, there is a five-year project in the works from 2015-2019 that will record and identify the majority of species marine macro-organisms and microorganisms located in the ACG, and with will make the information found available to the public. So far 594 have been identified in the ACG, which accounts for 15.5% of the reported species on the Pacific coast of Costa Rica. Most of the found specimens comprised of 32% crustaceans, 31% molluscs, and 8% cnidarians. Related to the other sectors on the Pacific side of Costa Rica, the ACG has fewer known marine species than other protected sectors of Costa Rica like Golfo Dulce, Isla del Coco, and Bahia Culebra. The collecting and reporting of species in an area is a crucial step in understanding and preserving the marine biodiversity in that area. Even with all the studies and expeditions to date there are still large holes in Costa Rica's knowledge of taxonomy and geographic distribution of marine organisms in the ACG. A lot more work is required to have a general understanding of the inventory, ecological role of the species, their habitats, population structure, and distribution. Costa Rica has made great progress to date on researching these protected areas that surround the country. A way to indicate how well Costa Rica is doing at conserving and protecting their oceans and coasts is to monitor the number of projects and research studies into marine diversity. Overall both the subsidies and marine studies and projects indicate Costa Rica's drive to sustain the environment and their oceans and coasts.

At the moment in Costa Rica the fishing industry has a problem with sustainability. Costa Rica has a large number of wild tuna that has a great importance in trade terms. This resource needs to be looked after to make sure that it maximizes its contribution to the sustainable development

of Costa Rica's ocean-based economy. The history of tuna fishing in Costa Rica began around 500 BC, around the time when Costa Rica was inhabited by indigenous pre-Columbians. They would catch black skipjack tuna in several settlements on the coast up until the 17th century when the populations of indigenous communities decreased. After that large-scale tuna fishing did not return to Costa Rica until the commercialization of tuna began in the 21st century. From 2006-2015 Costa Rica fished 5 different species of tuna, that included yellowfin tuna (75.14%), skipjack tuna (23.54%), and bigeye or black skipjack (1.32%). In Costa Rica, they classify their fishing vessels into small and medium scale or advanced scale. The small and medium scale fleet includes ship that have engines LOA 0 – 11.09 (mts). These vessels mainly go after artisan shrimp, squid, shark, and scales fishes. The other type is the advanced scale fleet that include ships with engines LOA 12 – 23.9 (mts). These vessels target large pelagic and demersal species mainly and most of the tuna captures are done by the advanced scale fleet. Over the course of 2010-2015 the total fishing fleet of Costa Rica has dropped significantly from over 5000 vessels in 2010 to under 2000 in 2015. This shows that the country as a whole has decreased its large scale commercial fishing to make sure the fishing stocks can be maintained. This is especially important for the tuna market. The reason for this drop in the number of vessels can be because of the large number of fees set by INCOPESCA for commercial fishing vessels. In 2018 some examples of these fees include $23,700 for a small scale commercial fishing license, $71,000 for a medium scale commercial fishing license, and $260,800 for an advanced scale commercial fishing license. Those are just the licenses to being fishing, after that there are up to a total of $600,000 in other fees that some vessels have to pay over the course of catching, selling, or exporting the product. The total number of products, destinations, and exporting companies in Costa Rica has diminished over the course of the last five years. This means less fish being caught ever year, less destinations fish being shipped to, and less exporting companies in Costa Rica. This drop in fishing will allow fish stocks to grow year after year. With the tuna industry, it is not enough to just reduce the amount of fish being caught every year, there has to regulations put in place to protect these fish. Costa Rica is trying to strengthen the tuna industry by introducing a system for monitoring and verifying the tuna captured with and without mortality of dolphins. There are 8 regulations set forth in this system. The first one is "The dolphin safe tuna and the non-dolphin safe tuna shall be unloaded from the ship in different containers. The transport guide of each container shall clearly indicate the ship's origin and the corresponding RSA number, either if it is tuna dolphin safe or non-dolphin safe". The next rule is "dolphin safe tuna shall be classified, weighed and stored separately from the not dolphin safe tuna in the company's refrigerator, in duly identified hoppers and whose weights and codes shall be recorded in the control system of inventories such as dolphin safe tuna or nondolphin safe with the corresponding RSA." The following rule is "If the Processing Plant requires to sell or transfer untreated whole tuna, it must notify in writing the change in ownership to the official designated by INCOPESCA, and will also follow-up with AIDCP, indicating the corresponding RSA number, the weight transferred and the species, so that the authority continues with the monitoring and control of that tuna." Next is "The requirements for processing dolphin safe tuna and non-dolphin safe tuna shall be made separately in terms of inventory. It shall be recorded on the inventory exit guide if it is dolphin safe tuna or non-dolphin safe, as well as the numbers of the storage chutes that are sent to production and the RSA number to which they correspond." The next regulation is "Dolphin safe tuna and non-dolphin safe tuna will not be processed on the same production line at the same time." Next is "Each production lot will be identified in the processing records as dolphin safe or nondolphin safe indicating the date of production, manufacturing codes, volume, finished product and corresponding RSA." The following rule states, "Tuna processed from a purse-seine vessel, operating within the Agreement Area and not covered by the AIDCP, will oblige

the National Authority to consign it in a document; a copy of the same shall be delivered to the consignee of the tuna, who shall record in his system of refrigerated inventory records, processing records and export records, the notation that the specific tuna is not covered by the AIDCP." The last rule is "Any export of tuna produced with dolphin-safe tuna must be accompanied by an official certification issued by INCOPESCA, in which the dolphin-safe origin of the processed tuna and the corresponding RSA numbers shall be recorded so that an audit can easily follow the tradability of the tuna in its different management stages." This framework is a great example of Costa Rica's constant work at conserving and protecting their marine life especially tuna.

Although Costa Rica is a relatively small country it has a large amount of fresh and saltwater resources. With all these resources, it makes the country suitable for aquaculture development. Aquaculture originally began around the 1960's with the main goal being the promotion of socio-economic development in rural areas by adopting technologies produce introduced tilapia species. In 1974 the Department of Aquaculture was established and its objective was to increase the development of aquaculture throughout the country. They did this by creating and improving the simple framework of experimental stations. These stations included the Research and Aquatic Production Centre Ojo de Agua in Dota, the Aquatic Station in Cuestillas de San Carlos, the Los Diamantes Aquatic Station in Limon, and the Enrique Jimenez Nunez Aquatic Station in Guanacaste. Over the next few decades they would expand to species like rainbow trout, freshwater prawn, shrimps, and Pacific oysters. Recently, Costa Rican aquaculture has becoming more and more important both as a different way of producing protein of aquatic origin and on the business side. In 2018 the Costa Rican Institute of Fisheries and Aquaculture collected the countries production of aquaculture. It concluded that 3% was snapper, 4% rainbow trout, 13% marine shrimp, and 80% tilapia. Other species in aquaculture production include oysters and freshwater prawns, but only in small amounts yearly. Both the production of rainbow trout and snapper have increased by 400 tonnes in 8 years and 250 tonnes in 3 years respectively. Overall there are 287 producers of species through aquaculture, that provide 2005 domestic jobs, and they contribute 0.10% of the Costa Rica's total GDP. Marine aquaculture has mostly involved research on the production of commercially imported species that pertains to their biometric and gonad evaluation in captive situations. Over recent years Costa Rica has increased the number of Hectares under production of aquaculture and as well the annual production of aquatic species. From 2000-2004 the number of hectares under production by cultured species increased from 1107.1 to 1931.75. Also over the course of that same time Costa Rica has increased its production of Tilapia, Trout, and Shrimp. On March 29th, 1994, the Costa Rican government along with INCOPESCA created Law 7384. Article 2 of this Law goes over its basic function and it states, "Coordinate the fisheries and aquaculture sectors; promote and regulate the development of fisheries, maritime hunting, aquaculture and research; promote, based on technical and scientific criteria, the conservation, exploitation and sustainable use of the ocean and aquaculture biological resources. Regulate the regional exploitation of the fisheries resources, in order to achieve greater economical yields and to protect marine and aquaculture species. Elaborate, enforce and follow up the application of legislation, in order to regulate and avoid the pollution of marine and aquaculture resources, as a result of fishing, aquaculture and other polluting activities, which menaces the afore said resources."