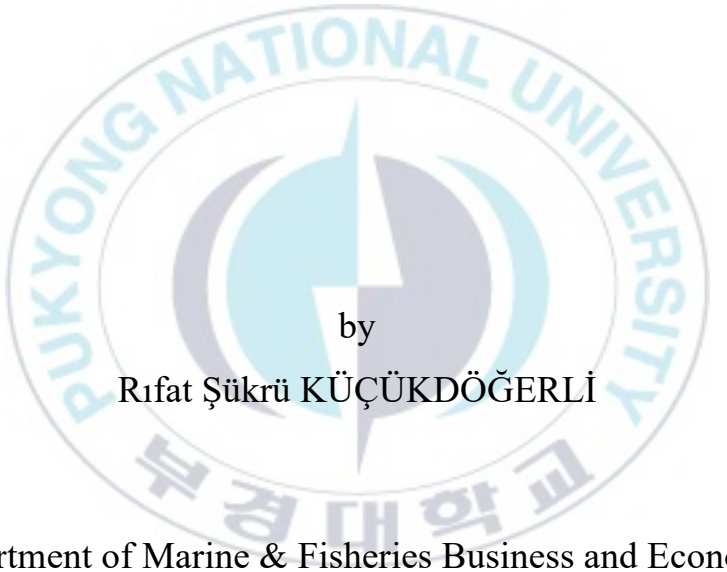
Thesis for the Degree of Master of Business Administration

A Comparative Analysis of Financial Feasibility for Fish Processing Plant in Turkey



by

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Department of Marine & Fisheries Business and Economic

The Graduate School

Pukyong National University

August 2020

A Comparative Analysis of Financial Feasibility for Fish Processing Plant in Turkey

터키의 어류가공장에 대한 재무적 타당성 비교분석

Advisor: Prof. HEE DONG PYO

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A Comparative Analysis of Financial Feasibility for Fish Processing Plant in Turkey

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ABSTRACT

One of the sectors that have high economic value and potential to be developed in Turkey is the fishing sector. The current status of Turkey aquaculture reaches 836 524 tons (2019). In Turkey, the most important commercial species include trout, tuna, a species such as a sea bream and sea bass. The most important types of catching in Turkey as anchovies, sardines, sea bass, and sea bream. Aquaculture mainly deals with fish species of trout, sea bream, sea bass, and tuna. Choosing the İzmir region are related to be designated as an organized industrial zone, and it is suitable for sea, air and road transportation which means this area is easily accessible to the raw materials and beneficial to the logistic. Analysis of the investment environment in Turkey will create more business opportunities and will contribute to the country's economy.

This study aims to analyze the financial feasibility of two different types of processing plants for freshwater (Trout) and salt water (Sea bass and Sea bream), using investment valuation techniques such as Net Present Value (NPV), Internal rate of Return (IRR), Return on investment (ROI) and sensitivity analysis. The discount rate used in this study is 24% during 10 years. The result of this research for freshwater processing plant shows that the NPV value of processing plants in the next 10 years is $1,516,684, IRR value of 45%, and return on investment 0.84. And result of this research for

salt water processing plant shows that the NPV value of processing plants in the next 10 years is $5,002,637, IRR value of 32%, and return on investment 0.54. The results reveal that this business is very profitable for both factories. However, trout is a little ahead because it has more market opportunities and more demand in the trout facility.

Annual net profit is 3,997,384 USD in freshwater and salt water fish is 2,560,753 USD. The annual operating cost is 3,174,070 USD in freshwater and salt water fish 3,439,247 USD. In this study, selling price, expected operating cost, and initial investment cost were used for sensitivity analysis. The sensitivity calculation used 3 parameters: initial investment, market price, and operating cost. The sensitivity analysis using the switching value method. Sensitivity analysis was done and as a result of these calculations, it has been revealed that both businesses are profitable.

CHAPTER 1. INTRODUCTION

1.1. Background of study

Turkey is a country that has large resources of freshwater and seafood production capability and aquaculture production. As of geographic location, it is an important place in the world and has an important transport network. Road, air, and rail transportation can be done from every part of the country. Turkey is a big country and is surrounded by sea on three sides. Also, Turkey population is 80 million, and the total area 814 thousand km^2, the coastline is 8333 km and Turkey has 33 rivers with their total length is 177km and also has 1326 lakes (Celikkale, Duzgunes and Okumus, 1999). However, Turkey is a country that has large resources of freshwater and seafood production capability and aquaculture production. Fisheries production comes from mainly the Black Sea and then the Aegean Sea, Marmora Sea, and the Mediterranean. However, freshwater production is carried out all over the country.

Total seafood production has increased from 653,080 tons to 836,524 tons from 2010 to 2019 in Turkey. The total production increase comes from aquaculture production. Unfortunately, capture production decreases with different reasons such as overfishing and global warming over the years. Turkey's aquaculture increased rapidly in recent years worldwide. Table 1 shows total capture production and total aquaculture production for the last 10 years in Turkey. The data clearly show the difference between aquaculture and capture production.

Table 1. Totally Seafood Production in Turkey

	Sea Production (Tones)	Aquaculture Production (Tones)	Totally (Tones)
2010	485 939	167 141	653 080
2011	514 755	188 790	703 545
2012	432 442	212 410	644 852
2013	374 121	233 394	607 515
2014	302 212	235 133	537 345
2015	431 907	240 334	672 241
2016	335 320	253 395	588 715
2017	354 318	276 502	630 820
2018	314 094	314 537	628 631

Source: For aquaculture production and freshwater products, Ministry of Agriculture and Forestry.

In 2018, while the capture of fishery products increases by 47.5%, aquaculture increased by 18.7%. While the production made by capture was 314,094 tons, aquaculture production occurred at 314,537 tones. The capture of marine production decreased by 11.9%, capture of inland water production decreased by 6.2% with respect to the previous year. Within all the production of marine products by capture, East Black Sea Region was the first with a ratio of 31.5%. The regions West Black Sea with 30.6%, Marmara with 18.4%, Aegean with 15%, and the Mediterranean with 4.5% followed this region (TUIK).

Seafood is the most commercially traded food product in the international arena. Over 22 million tons of seafood are produced for trade. This value corresponds to 40% of the production, and in recent years there have been approximately 130 million tons of fish production, 55 million dollars of

exports, and 60 million dollars of imports. Developed countries account for 85% of fisheries imports, while European countries have increased their foreign dependency in meeting their fish need (Anonim, 2005).

Turkey in terms of world aquaculture production is 35th, and 6 among European countries. 56% of production in Turkey through 2017 was obtained through hunting, while 44% of aquaculture. Total seafood production is increasing year by year. But capture production decreases and aquaculture production increase that comes from aquaculture production increase. The reason is that capture production decreases with different reasons such as overfishing, global warming, etc. in the years. Table 1 shows total capture production and total aquaculture production for the last 9 years in Turkey. The data clearly show the difference between aquaculture and capture production.

1.2. Import and Export of Seafood in Turkey

1.2.1. Export

Aquaculture is important to Turkey. In Turkey, they export high-value products which consist of low-value products and imported raw materials. Turkey has made 156 thousand tons of aquatic products for export and has a 854 million dollar value every year. We see aquaculture in Turkey made of fresh fish and we see a large part of the composition of the frozen fish. A large part of Turkey's export to the European countries and also exports its products to the entire world. Especially in the far east market, China and Japan stand out (Ozdemir, Aras, 2003).

Turkey, especially in the European market is growing rapidly in sea bream and sea bass. Turkey will catch up to Greece, the market leader in sea bass. It is known that the sector used the price advantage in the first years when it started exporting, but now Turkish fish has become a brand in the European

market and it is especially demanded. Turkey exports are the largest markets to the Netherlands, Germany, Italy, and France, and exports to Russia and the Middle East have been growing rapidly in recent years.

1.2.2. Import

Our imports vary according to our fish production. Turkey imports of seafood products in the amount of approximately 100 thousand tons by the year 2017 and was valued at $ 230 million (TUIK). First in the imports of fishery products in Turkey are followed by frozen fish and mollusks and fish fillets followed. One of the most important import countries is Norway and Norwegian mackerel is imported from here (Ozdemir, Aras, 2003). All in all, we look at the import and export of seafood products in Turkey, export has been increasing every year, we see that Table 2.

Table 2. Totally seafood export and import data in Turkey

	EXPORT		**IMPORT**	
Years	**QUANTITITY (TONS)**	**VALUE ($)**	**QUANTITITY (TONS)**	**VALUE ($)**
2000	14,533	46,374,937	44,230	36,647,254
2001	18,978	54,487,312	12,971	11,295,373
2002	26,860	96,728,389	22,532	18,754,783
2003	29,937	124,842,223	45,606	32,636,120
2004	32,804	180,513,989	57,694	54,240,304
2005	37,655	206,039,936	47,676	68,558,341
2006	41,973	233,385,315	53,563	83,409,842
2007	47,214	273,077,508	58,022	96,632,063

2008	54,526	383,297,348	63,222	119,768,842
2009	54,354	318,063,028	72,686	105,822,852
2010	55,109	312,935,016	80,726	133,829,563
2011	66,738	396,306,914	65,698	173,886,517
2012	74,006	413,917,190	65,284	176,402,894
2013	101,063	568,207,316	67,530	188,068,388
2014	115,381	675,844,523	77,551	198,273,838
2015	121,053	692,220,595	110,761	250,969,660
2016	145,469	790,303,664	82,074	180,753,629
2017	156,681	854,731,829	100,444	230,111,248
2018	177,539	952,001,252	98,314	188,951,045

Source: Turkish Statistic Institute

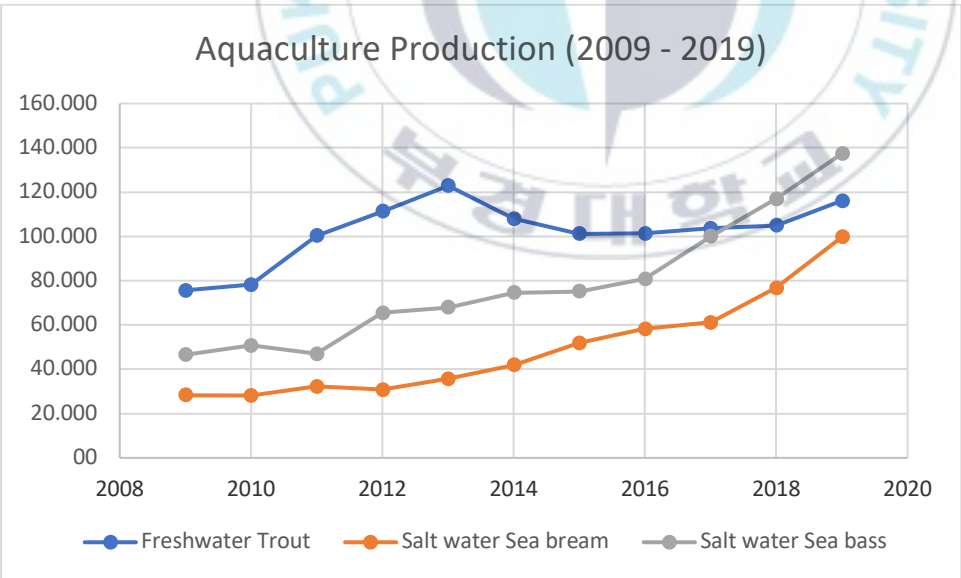

Figure 1. Aquaculture Production Data

CHAPTER 2. LITERATURE REVIEW

Some similar studies also are conducted about the economic structure of processing plants in Turkey that belongs to different regions. The studies conducted have begun to extend production in Turkey. However, the amount of studies examining the economic situation of fisheries processing plants has been very limited. Therefore, only a few studies are found on this subject in Turkey. The studies associated with the topic and which can be associated with the topic are summarized below.

This study made the structural and economic analysis of trout processing plant enterprises in the Elazığ Region. This company has four different types of production (Fresh cleaned, Quick Frozen, Filet, and Lox trout). The raw material is supplied from a nearby trout fish farm, and the processed fish will be imported and exported. According to the research findings; as a result of the average operation, the total of investment expenditures is $ 7,258,007 and the total of operational expenditures is $ 41,023,126.

In this study, we examine a processing plant in Gümüşhane. This project has been prepared for a total period of 10 years and trout will be processed and sold. It will be supplied from fish farms around focusing on trout. The amount of raw material procurement at the end of 10 years is 100.517.753TL, the total income at the end of 10 years is 110.463.167TL and the net profit 10.8484.812TL and return period of the investment is 3.97 years.

Fish Processing Plant Feasibility, in this study, 6,750 tons of processed trout will be produced annually in Adıyaman. 8,595,000 TL has been foreseen as the total fixed investment. These products are smoked fresh, frozen, and quick frozen.

This study is an analysis of a processing plant in India. It is aimed to increase canned fish production and shelf life in this factory. And the species used are tuna, prawn, pomfret, sardine, mackerel. NPV and IRR, the unit is expected to breakeven at approximately 56% capacity utilization during the first year and during the third year, the breakeven point will be 28.23%. The financial indicators like Net Present Worth (NPW), Benefit-Cost Ratio (BCR), Internal Rate of Return (IRR), etc. were analyzed by discounting cash flow 15% discounting rate. The internal rate of return is found to be 39.19% and BCR is about 1.03.

In this study, a feasibility report of the fish feed production facility is calculated. The fish feed processing plant built here only requests the domestic market. The NPV here is 2,221,891. IRR 13.96% the return period of investment 5 years 10 months Benefit/expense ratio was found to be 1.41.

In the Erzincan province milk processing factory feasibility study, the capacity of this project has been determined as 45 ton / day. Products will be made with butter, yogurt, buttermilk, feta cheese, kaşar cheese, and curd cheese. Here NPV 23.939.252, IRR 27.53% Payback Period 4 years Benefit / Expense ratio 3.33.

Yozgat province milk processing factory feasibility report, facility capacity in this report is 589,560 kg/year and total investment cost has been calculated as 2,417,753 TL. The return period of the investment was calculated as 1.38 years and the capital profitability was calculated as 114.58%.

Table 3. Previously Studies

Title	Methods of outcome	Remarks
Fish processing plant feasibility report in Elazig (Sen B, Guler T, Yucedag M, 2011)	The Project gain, Legal gain, Profitability of investment	This study investigated the Elazig region of Turkey. The structural and financial analysis of the trout processing plant was examined. The project gain 14.603.030$, Legal gain 14.398.405$, profitability of investment %154,7 and the return period of the investment 6.3 month. The similarities between the two studies performed are similar to the methods and calculations used. The initial investment, operating costs, and revenue are similar.
Fish processing, freezing and packaging facility investment in Gumushane (Akcay I, 2002)	Return on Investment, Return on Capital, IRR, NPV	In the study, it is the investment analysis of the tout factory to be established in Gumushane region. And this report, total investment amount 1.215.117$, the return period of the investment9,55 years, IRR %4,41 and first 5 years NPV -656.309$ and 10 years NPV 313.135$. The two studies here are the trout processing factory project. calculations are similar in both studies. NPV and IRR have an important role in both.
Fish processing plant feasibility of investment cost in Adiyaman Province (Kaya E, Acar N K, Citak M, Peymen A, 2012)	Initial Investment and Operating Cost	This research, structural and economic analysis of trout aquaculture enterprise have calculated in Adiyaman province. It has been calculated that the foreseen total investment cost 8.595.000Turkish Liras. In this study, the cost calculations of a traditional trout enterprise were made. These calculations correspond to our work here.
Model project report on fish processing plant in India (Nabard consultancy service private limited, 2016)	Cash flow Statement, Break even analysis, Debt service coverage ratio, internal rate of return	This study is an analysis of a processing plant in India. It is aimed to increase canned fish production and shelf life in this factory. The unit is expected to breakeven at approximately 56% capacity utilization during the first year and during the third year, the breakeven point will be 28.23%. The financial indicators like Net Present Value (NPV), Benefit-Cost Ratio (BCR), Internal Rate of Return (IRR), etc. were analyzed by discounting cash flow 15%

		discounting rate. The internal rate of return is found to be 39.19% and BCR is about 1.03. The common point between the two studies is NPV, and IRR.
Feasibility report of the fish feed production facility (Kalabak G, Sekmen F, Cingoz A, 2014)	NPV, IRR, Cost-Benefit Analysis	This study has been prepared within the scope of the Eastern Black sea development project. Financial analysis of the fish feed factory to be established in the Black sea has been made here. And if we look NPV 2,221,891 Euro, IRR %13.96 and the return period of the investment 5,10 years, and cost-benefit 1.41. The similarities in this study are only the methods used (NPV, IRR, and ROI). Both studies are different from each other, possibly related to the aquaculture industry. And we can only see what the difference is between the two businesses here.
The milk processing plant feasibility report in Erzincan (Akkaya S, Arasli Z S, Cingoz A, 2018)	NPV, IRR and Cost-Benefit Analysis	In this study, financial analysis of milk processing plant was made. And this factory plant NPV, IRR and cost benefit was examined. These NPV 24,939,295Turkish Liras, IRR %27,53 and cost benefit 3.33. These two businesses are different from each other, and these two studies only allow us to compare business. In contrast, the methods used are the same.
The milk processing plant feasibility report in Yozgat (Central Anatolia Development Agency, 2014)	Investment Cost, Return Period of the Investment, Capital Profitability	Facility capacity in this report is 589,560 kg/year and total investment cost has been calculated as 2,417,753 TL. The return period of the investment was calculated as 1.38 years and the capital profitability was calculated as 114.58%.

CHAPTER 3. MATERIALS AND METHODS

İzmir region was chosen as the establishment facility for this processing. The reason for this is that most of the fish farms are in the Aegean region. In other words, better possibilities due to the proximity to raw material and transportation. It is in an important position for trade because it is an airport and a port city in the region.

In this study, we chose species with marine fish (sea bream and sea bass) and freshwater fish (trout). Because they provide substantial import and export revenue for Turkey. Here, a comparative analysis was performed. Based on revenue, operation costs, investment cost, NPV, and IRR were calculated. In addition, sensitive analysis of the main variables is accomplished together. Shortly mention the habitats and biology of these fishes.

3.1. Taxonomy and Information

3.1.1. Trout

Figure 2. Trout

KINGDOM	Animalia
PHYLUM	Chordata
CLASS	Actinopterygii
ORDER	Salmoniformes
FAMILY	Salmonidae
GENUS	*Oncorhynchus*
SPECIES	*O. mykiss*

Table 4. Trout Taxonomy

In fact, it is a species originating in North America, but today it is cultivated in almost all continents. Generally, water consumption is raised in closed or continuously flowing systems. As a nutrition, a carnivore is a species and needs about 1.8 kilograms of food to be approximately one kilogram. This species is known for its rapid growth among other species. It has a wide water temperature range. It shows a minimum of 0 and a maximum of 27. But the ideal temperature for cultivation is 21 (FAO).

3.1.2. Sea bream

Figure 3. Sea bream

KINGDOM	Animalia
PHYLUM	Chordata
CLASS	Actinopterygii
ORDER	Perciformes
FAMILY	Sparidae
GENUS	*Sparus*
SPECIES	*S. aurata*

Table 5. Sea bream Taxonomy

Benthopelagic (demersal behavior). A coastal species, inhabiting seagrass beds, rocky and sandy bottoms also as within the surf zone commonly to depths of about 30 m, but the adults may occur to 150 m depth. A protandry hermaphrodite; the bulk of people are first males, then become females. Spawning occurs from October to December; maturity at 1-2 years (20-30 cm) for males, 2-3 years (33-40 cm) for females. Mainly carnivorous, (mollusks, particularly mussels which it can easily crush, crustaceans, and fish); but accessorily herbivorous (FAO).

3.1.3. Sea bass

KINGDOM	Animalia
PHYLUM	Chordata
CLASS	Actinopterygii
ORDER	Perciformes
FAMILY	Moronidae
GENUS	*Dicentrarchus*
SPECIES	*D. labrax*

Figure 4. Sea bass

Table 6. Sea bass Taxonomy

Demersal behavior inhabits coastal waters right down to about 100 m depth, but more common in shallow waters, on various sorts of bottoms; often entering estuaries and sometimes ascending rivers. Reproduction from January to March within the Mediterranean and therefore the Black Sea, March to June within the British Isles. A voracious predator, feeding on small shoaling fish and a good range of invertebrates including shrimps, prawns, crabs, squids, and mollusks (FAO).

In this study, financial analysis has been made supported the province of Izmir. the info was obtained through previous studies and interviews with businesses. A comparative analysis was done. Operating costs, investment costs, NPV, and IRR are calculated consistent with income. additionally, sensitivity analyzes are administered on the most variables.

3.2. Processing Plant

If we shortly look at the working principle of the factory, the raw material is taken from the manufacturer and brought to the factory by cold air vehicles. Here, firstly, fish-grading is done and sorted according to orders. Transactions continue according to how the sale will be done later. These processes are detailed in the processing plant flow chart.

3.2.1. Processing Factory Flow Protocol

1. Raw material input

The purchase of fish with refrigerated vehicles and separation in terms of quality parameters.

2. Front enclosure

Putting the fish in the crates and weighing them, keeping them in the storage room at 0 - 4 ºC, and keeping them in the process by protecting the cold chain.

3. Fish-grading

Fish kept in the front warehouse are taken to the production area where the internal organs will be removed or calibrated as a whole in line with customer requests.

a) Packing

The fish that are calibrated according to the customer order criteria are packed in Styrofoam boxes before being completely cleaned and packed after icing.

b) Storage

Packed fish are kept in the storage rooms at 0-4 ºC until the day they go.

c) Dispatch

The fish kept in the storage room is loaded by the staff at the shipping gates by forklifts and loaded into the vehicles.

4. Icing

Iced fish are added ice to keep their temperature at 0-4 ºC.

5. Storage and Front enclosure

Fish added with ice can be kept in the storage room until processed.

6. Internal organ cleaning

Fish calibrated according to the customer's request are given to internal organ cleaning machines and purified from their internal organs.

7. Washing

The fish, whose internal organs are cleaned, are taken to the fish washing machine to purify their blood.

8. Fish-grading

Fish that are washed and cleaned of blood are calibrated according to customer requests.

a) Packing

According to the customer order, the fish, which are calibrated by cleaning their internal organs, are placed in Styrofoam boxes and labeled after ice, and processed fresh or frozen.

b) Storage

Packed fish are kept in the storage rooms at 0-4 ºC until the day they go.

c) Dispatch

The fish kept in the storage room is loaded by the staff at the shipping gates by forklifts and loaded into the vehicles.

9. Freezing

Calibrated fish are weighed by stacking in the pan according to customer requests. It is then placed in pan trolleys and kept in freezing rooms at -40 ºC for 6-9 hours, after which the product temperature is lowered to -18, -20 oC, and a sudden shock is applied. Shocking is completed by applying the glazing process at the product exit.

10. Glazing

Glaze formation is by immersing the fish in warm water between 0-4 oC and forming an ice layer on the surface of the fish.

a) Packing

The fish coming out of the glaze are labeled by putting them in bags and left in cardboard craft boxes.

b) Storage

Packaged fish are taken to cold storage rooms at -18, -25 ºC.

c) Dispatch

The fish kept in the storage room is loaded by the staff at the shipping gates by forklifts and loaded into the vehicles.

11. Brine

Calibrated fish is put into brine water with a salinity of 011% and waited for 8-10 hours to compress the fish. The fish coming out of the brine are placed in the skewers one by one and taken to the drying room.

12. Drying Room

Fish hanged in skewers are taken to the drying room with cars and it is ensured that the water and moisture of the fish are dried by drying the air blown by the fans for 1-3 hours to minimize the cooking time.

13. Fume

The fish dried in the drying room are placed in mechanical or electric ovens and the oak wood shavings are burned from the bottom and exposed to its smoke and the fish is cooked in 2.5 hours. The internal temperature of the ovens is 150-200 ºC, the fish internal temperature is 75 ºC.

14. Precooling 1

Cooked fish is expected to cool in the rooms at 0-4 ºC.

15. Crating

The fish waiting in the precooling 1 room are carefully placed in the crates.

16. Precooling 2

The fish taken into the crates are taken to the rooms at 0-4 ºC and waited until they are taken to the fillet area and they are expected to cool thoroughly.

17. Fillet and Weighing

The smoke is taken to the fillet counter and the head and tail are cut, and then the fish fillet prepared from the skin is prepared. It is weighed on Styrofoam plates in 100-125-250-500 gr packages according to the orders.

18. Packing and Vacuum

The fish weighed by stacking the Styrofoam dishes are packed together with their dishes and their air is reset with a vacuum machine and packed with pressed mouths.

19. Freezing

The fish that are desired to be frozen in the IQF is left in a room at -60 ºC by stacking the band system and kept for 45-60 minutes. The temperature of the product is lowered to between -18 and -25 and they are suddenly shocked.

20. Packing and Labeling

Frozen fume fillet fish coming out of IQF are labeled by stacking them in cardboard boxes.

21. Storage

Fish left in cardboard Kraft boxes are kept in storage rooms at 18-25 ºC.

22. Dispatch

The fish kept in the storage room is loaded by the staff at the shipping gates by forklifts and loaded into the vehicles.

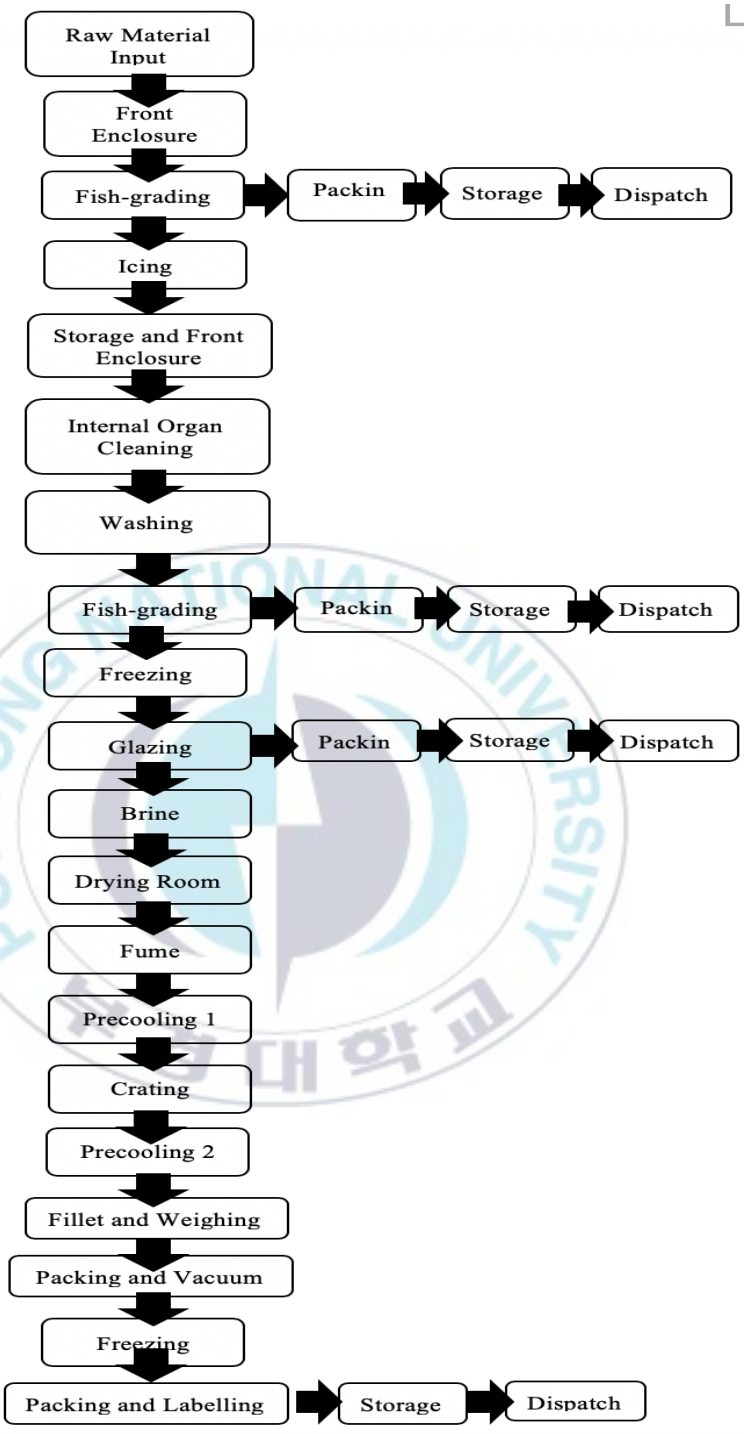

Figure 5. Processing Factory Flow Protocol

3.3. METHOD

3.3.1. Cash Flow

“The discount cash flows, not earnings, when performing a capital budgeting calculation. Earnings don't represent real money. You can’t spend out of earnings, you can’t eat out of earnings, and you can’t pay dividends out of earnings. you'll do that stuff only out of cash flows.

In addition, only income that is incremental to the project should be used. These incomes are the changes within the firm’s income that occur as an instantaneous consequence of accepting the project. That is, we have an interest within the difference between the income of the firm with the project and thus the income of the firm without the project.

The utilization of incremental income sounds easy enough, but pitfalls abound in the important world. We describe how to avoid a variety of pitfalls of determining incremental income” (Stephan, Randolph, Jeffrey, Joseph, Ruth, Helen).

“In financial accounting, an income statement, also mentioned because the statement of money flows, a handout that shows how changes in record accounts and income affect cash and cash equivalents, and breaks the analysis right down to operating, investing, and financing activities. Essentially, the income statement cares with the flow of money in and out of the business. As an analytical tool, the statement of money flows is beneficial in determining the short-term viability of a corporation, particularly its ability to pay bills. The income statement was previously mentioned because the flow of funds statement. The income statement reflects a firm's liquidity” (Helfert, Erich).

“The statement of monetary position could even be a snapshot of a firm's financial resources and obligations at one point in time, and thus the earnings report summarizes a firm's financial

transactions over an interval of a while. These two financial statements reflect the accounting employed by firms to match revenues with the expenses related to generating those revenues. The income statement includes only inflows and outflows of money and cash equivalents; it excludes transactions that don't directly affect cash receipts and payments. These non-cash transactions include depreciation or write-offs on bad debts or credit losses to call a couple of. The income statement could even be an accounting report on three sorts of financial activities: operating activities, investing activities, and financing activities. Non-cash activities are usually reported in footnotes" (Epstein, Barry, Eva, 2007, 2007).

"The income statement is meant to

1. Provide information on a firm's liquidity and solvency and its ability to vary cash flows in future circumstances,

2. Provide additional information for evaluating changes in assets, liabilities, and equity,

3. Improve the comparability of various firms' operating performance by eliminating the consequences of various accounting methods,

4. Indicate the quantity, timing, and probability of future cash flows.

The earnings report has been adopted as a typical budget because it eliminates allocations, which might be derived from different accounting methods, like various timeframes for depreciating fixed assets" (Epstein).

3.3.2. Cash Inflow

"Cash inflow is that the cash going into a business. that might be from sales, investments or financing. it's the other of cash outflow, which is that the cash leaving the business. A business is taken under consideration healthy if its cash inflow is greater than its cash outflow.

One way to look the health of an organization is to look at its cashflow statement, otherwise mentioned as a CFS. A CFS shows you what money is coming into the company from all its various sources. It also helps you to determine the long-term trends of what and therefore the way the company makes and spends its money. it's vital to remember that a company's past performance should not be held as an indicator of future success. the worth of your investments can go up also as down" (Capital, n.d.).

3.3.3. Cash Outflow

"Cash outflow is that the number of moneys that a business disburses. the explanations for these cash payments fall under one among subsequent classifications: Operating activities. Examples are payments to employees and suppliers. Investing activities. Examples are loans to other entities or expenditures made to accumulate fixed assets. Financing activities. Examples are payments to shop for back shares or pay dividends.

These general categories of money flow are located within the statement of money flows, which is one among the financial statements that a business produces. the quantity of money outflows revealed within the statement of money flows are for the amount of sometime covered by the statement.

The amount of money outflow is typically obscured by record keeping under the accounting of accounting, where accruals could even be recorded that alter the amount of reported expenditures, albeit no cash has been paid. Consequently, it's useful to look at the cash outflow on the statement of money flows on a line, to work out if a corporation is gaining or losing cash. an entire knowledge of money outflow is required to make sure that a business has sufficient cash (or can decide to acquire new debt or sell shares) to make sure that it remains in business." (Bragg, 2018).

3.3.4. Net Cash Flow

"Net cash flow refers to the difference between a company's cash inflows and outflows during a given period. within the strictest sense, net income refers to the change during a company's cash balance as detailed on its income statement. Net cash flow is additionally referred to as the "change in cash and cash equivalents." it's vital to notice that net income isn't an equivalent as net, free income, or EBITDA. you'll approximate a company's net income by watching the period-over-period change in cash on the record. However, the statement of money flows may be a more insightful place to seem. Net cash flow is that the sum of money be due operations (CFO), cash flow from investing (CFI), and cash flow from financing (CFF).

Net cash flow is that the fuel that helps companies expand, develop new products, repurchase stock, pay dividends, or reduce debt. it's essentially what allows companies to conduct their day-to-day business. this is often why some people value net quite almost the opposite financial measure, including earnings per share. Revenues and expenses are important, too, because they're big drivers of net. Without long-term positive net, an organization will fail, but it can offset short-term negative cash flow by borrowing. it is vital to note that short-term negative net isn't a nasty thing. as an example, if an

organization must spend cash to make a second factory, the investment pays off within the top as long because the plant eventually generates extra money than it cost to make." (Anonym, 2019)

3.3.5. Incremental Net Cash Flow

"Incremental income refers to income that an organization acquires when it takes on a replacement project" (Incemental Cash Flow, n.d.). "If you've a positive incremental income, it means your company's income will increase after you accept it. That's an honest indicator that it's worth investing during a project. On the other hand, a negative incremental income indicates that your income will decrease which suggests that it's getting to not be the only option." (What are incremental cash flows, n.d.).

"Net incremental cash flows are the combination of the cash inflows and the cash outflows occurring in the same time period, and between two alternatives. For example, a company could use the net incremental cash flows to decide whether to invest in new, more efficient equipment or to retain its existing equipment" (Incremental cash flow, n.d.)

"Discounting models of capital budgeting such as net present value and internal rate of return, compare the present value of future incremental cash flows and terminal cash flow with the initial investment outlay. If the present value of the future cash flows exceeds the investment required, the project is accepted, otherwise rejected. Non-discounting models, such as payback period, compare the face value of incremental cash flows with initial investment" (Incremental Cash Flow, n.d.).

Net incremental cash flows are the mixture of the cash inflows and thus the cash outflows occurring within an equivalent period of your time, and between two alternatives. as an example, an

organization could use internet incremental cash flows to form a choice whether to require an edge in new, more efficient equipment or to retain its existing equipment. The equation as follows;

NCF = (ΔR - ΔC - ΔD) X (1 - T) + ΔD

ΔR = total revenue

ΔC = total cost

ΔD = depreciation

T = times

NCF = [(R2 - R1) – (C2 - C1) – (D2 - D1)] X (1 - T) + (D2 - D1)

R1 = total revenue outflows

R2 = total revenue inflows

C1 = total cost outflows

C2 = total cost inflows

D1 = total depreciation outflows

D2 = total depreciation inflows

T = times

3.3.6. After Tax Cash Flow

"Cash flow after taxes (CFAT) could also be a measure of monetary performance that appears at the company's ability to urge income through its operations. it's calculated by adding back non-cash

charges like amortization, depreciation, restructuring costs, and impairment to net after taxes may be a crucial measure of cash flow that takes into account the impact of taxes on profits. This measure is used to figure out the income of an investment or project undertaken by a corporation. To calculate the after-tax income, depreciation must be added back to net, since depreciation could also be a non-cash expense that represents the declining value of an asset, but isn't an actual cash outflow.

The present value of cash flow after taxes are often calculated to form a choice whether or not an investment during a business is worthwhile. CFAT is significant for investors and analysts because it gauges a corporation's ability to pay dividends or distributions. the upper the CFAT, the better-positioned a business is to make distributions. However, a positive CFAT doesn't necessarily mean that an organization is during a healthy financial position to make good on its cash distributions. CFAT also measures a company's financial health and performance over time and as compared, to competitors within the same industry, since different industries have different levels of capital intensity and, thus, different levels of depreciation. While income after taxes may be a superb because of determine whether a business is generating positive cash flows after the results of income taxes are included, it doesn't account for cash expenditures to accumulate fixed assets" (Kenton, 2019).

3.3.7. Net Present Value (NPV)

"In finance, internet present value (NPV) or net present worth (NPW) applies to a series of cash flows occurring at different times. this value of cash flow depends on the interval of sometime between now and thus the income. It also depends on the discount rate. NPV accounts for the worth of money. It provides how for evaluating and comparing capital projects or financial products with cash flows cover

time, as in loans, investments, payouts from insurance contracts plus many other applications" (Lin, Grier, Nagalingam,, 2000).

"Time value of money dictates that time affects the price of cash flows. This decrease within the present value of future cash flows is based on a specific rate of return (or discount rate). If as an example there exists a statistic of identical cash flows, the income within this is that the foremost precious, with each future income becoming less valuable than the previous income. An income today is more valuable than identical income within the longer term because a present flow is often invested immediately and begin earning returns, while a future flow cannot" (Berk, DeMarzo, and Stangeland).

"NPV is about by calculating the prices (negative cash flows) and benefits (positive cash flows) for every period of an investment. After the income for every period is calculated, this value (PV) of every one is achieved by discounting its future value at a periodic rate of return (the rate of return dictated by the market). NPV is that the sum of all the discounted future cash flows. because of its simplicity, NPV could even be a useful gizmo to work out whether a project or investment will end during a net or a loss. A positive NPV leads to profit, while a negative NPV leads to a loss. The NPV measures the surplus or shortfall of money flows, in present value terms, above the price of funds. during a theoretical situation, of unlimited capital budgeting, a corporation should pursue every investment with a positive NPV. However, in practical terms, a company's capital constraints limit investments to projects with absolutely the best NPV whose cost cash flows, or initial cash investment, don't exceed the company's capital. NPV could even be a central tool in discounted income analysis and will be a typical method for using the price of cash to appraise long-term projects. it's widely used throughout economics, finance, and accounting. within the case when all future cash flows are positive, or incoming the sole outflow of money is that the price, the NPV is just the PV of future cash flows minus the acquisition price. NPV are often described because the "difference amount" between the sums of

discounted cash inflows and cash outflows. It compares this value of cash today to this value of cash within the long run, taking inflation and returns under consideration" (Berk, DeMarzo, and Stangeland).

The sign of NPV can explain a lot about whether the investment is good or not:

NPV > 0: The PV of the inflows is greater than the PV of the outflows. The money earned on the investment is worth more today than the costs, therefore, it is a good investment.

NPV = 0: The PV of the inflows is equal to the PV of the outflows. There is no difference in value between the value of the money earned and the money invested.

NPV < 0: The PV of the inflows is less than the PV of the outflows. The money earned on the investment is worth less today than the costs, therefore, it is a bad investment (Net Present Value, n.d.)

The following formula is used to calculate NPV:

$$NPV = \sum_{t=1}^{N} \frac{NCF_t}{(1+r)^t} - I_0$$

NCF_t = Net cash flow in year t

r = Discount rate or return that could be earned in alternative investment

I_o = Total initial investment cost

t= year

3.3.8. Discount Rate

“The rate won’t to discount future cash flows to this value could even be a key variable of this process. A firm's weighted price of capital (after tax) is usually used, but many people believe that it's appropriate to use higher discount rates to manage for risk, cost, or other factors. A variable discount rate with higher rates applied to cash flows occurring further along the time could be wont to reflect the yield curve premium for long-term debt.

Another approach to picking the discount rate factor is to make a choice the speed during which the capital needed for the project could return if invested in an alternate venture. If, as an example, the capital required for Project A can earn 5% elsewhere, use this discount rate within the NPV calculation to permit an instant comparison to be made between Project A and thus the selection. associated with this idea is to use the firm's reinvestment rate. The re-investment rate is often defined because the speed of return for the firm's investments on the standard. When analyzing projects during a capital-constrained environment, it's going to be appropriate to use the reinvestment rate instead of the firm's weighted price of capital because the discount factor. It reflects the prospect cost of investment, instead of the possibly lower cost of capital.

An NPV calculated using variable discount rates (if they're known for the duration of the investment) may better reflect things than one calculated from an unbroken discount rate for the whole investment duration. ask the tutorial article written by Samuel Baker for a more detailed relationship between the NPV and thus the discount rate. for a few of professional investors, their investment is committed to targeting a specified rate of return. In such cases,

that rate of return should be selected because the discount rate for the NPV calculation. during this way, an instant comparison is usually made between the profitability of the project and thus the required rate of return. To some extent, the choice of the discount rate depends on the utilization to which it'll be put. If the intent is just to work out whether a project will add value to the corporate, using the firm's weighted price of capital could even be appropriate. If trying to make a choice between alternative investments to maximize the worth of the firm, the company reinvestment rate would probably be a way more sensible choice.

Using variable rates over time, or discounting "guaranteed" cash flows differently from "at-risk" cash flows, maybe a superior methodology but is seldom utilized in practice. Using the discount rate to manage for risk is usually difficult to undertake to in practice (especially internationally) and it's difficult to undertake to well. an alternate to employing a discount factor to manage for risk is to explicitly correct the cash flows for the danger elements using rNPV or a consistent method, then discount at the firm's rate" (Baker, Samuel, 2007)

3.3.9. The Internal Rate of Return (IRR)

"The internal rate of return (IRR) could also be a metric utilized in capital budgeting to estimate the profitability of potential investments. it is the discount rate that makes this value of the project's cash flows capable the investment amount. In other words, it is the discount rate that makes this value of the investment project capable zero. IRR is additionally mentioned because the marginal efficiency of capital. If the IRR is above the value of capital, the project is accepted. IRR calculations believe the same formula as NPV does." (Hayes, Mansa, n.d.)

A business needs to look at the IRR as the plan for future growth and expansion. The formula and calculation used to determine this figure follows.

$$0 = NPV = \sum_{t=1}^{T} \frac{NCFt}{(1 + IRR)t} - Io$$

NCF_t = Net cash inflow during the period t

I_o = Total initial investment costs

IRR = The internal rate of return

t = The number of times periods

To calculate IRR using the formula, one would set NPV capable zero and solve for the discount rate (r), which is that the IRR. because of the character of the formula, however, IRR can't be calculated analytically and must instead be calculated either through trial-and-error or using software programmed to calculate IRR.

Generally speaking, the upper a project's internal rate of return, the more desirable it's to undertake. IRR is uniform for investments of varying types and, as such, IRR are often wont to rank multiple prospective projects on a comparatively even basis. Assuming the prices of investment are equal among the various projects, the project with absolutely the best IRR would probably be considered the sole and be undertaken first.

IRR is usually mentioned as "economic rate of return" or "discounted income rate of return." the utilization of "internal" refers to the omission of external factors, a bit like the worth of capital or inflation, from the calculation (Adam, Lulius, n.d.).

One popular use of IRR is comparing the profitability of building new operations thereupon of expanding existing ones. as an example, an energy company may use IRR choose whether to open a replacement power station or to renovate and expand a previously existing one. While both projects are likely to feature value to the corporate, one will likely be the more logical decision as prescribed by IRR.

3.3.10. Cost Benefit Ratio (B/C Ratio)

Benefit Cost Ratio is a comparison between the present value of the benefits and the present value of the costs. The equation used to calculate BCR is as follows:

$$BCR = \frac{\sum_{t=0}^{n} \frac{Bt}{(1+r)^t}}{\sum_{t=0}^{n} \frac{Ct}{(1+r)^t}}$$

or

$$\text{B/C Ratio} = \frac{\text{present value of benefit stream}}{\text{present value of cost stream}}$$

Where Bt, benefits in period t; Ct, costs in period t; n, life of the investment; r, discount rate

If the value of BCR = 1, then the value of NPV = 0. If the equation gives a higher result than 1, then NPV> 0. If BCR ≥ 0 then the project is feasible to work on, if BCR <1 then the project is not feasible to work on.

3.3.11. Initial Investment

The initial investment is that the quantity required to start out a business or a project. it is also called initial investment outlay or simply initial outlay. It equals capital expenditures plus capital requirement plus after-tax proceeds from assets disposed of or available to be used elsewhere.

Capital budgeting decisions involve careful estimation of the initial investment outlay and future cash flows of a project. Correct estimation of these inputs helps in taking decisions that increase shareholder's wealth. However, during this study enterprises used only their own money. Initial investment equals the number needed for capital expenditures, like machinery, tools, shipment, and installation, etc.

Annual cost = Cost/Economic Life

The initial investment was examined (See Table 7 and Table 8). Salt water processing plant's total initial investment cost is 6,190,955 USD and the annual cost is 619,096 USD. Freshwater's total initial investment cost is 7,065,955 USD and the annual cost is 706,596 USD.

Table 7. Initial investment Freshwater Processing Plant

Initial Investment (Trout)					
	Useful Life(years)	**Unit Cost (US$)**	**Quantity**	**Costs (US$)**	**Annual Costs (US$)**
Construction	10		4	$40,000	$4,000
Building (container)	10		4	$155,455	$15,546
Etude and Projection	10	$30,000	1	$30,000	$3,000
Machine and equipment	10		4,000	$6,417,000	$641,700
Transportation and insurance	10	$40,500	1	$40,500	$4,050
Assembly	10	$83,000	1	$83,000	$8,300
Vehicles	10	$100,000	3	$300,000	$30,000
Total		**$253,500**		**$7,065,955**	**$706,596**

Table 8. Initial investment Salt Water Processing Plant

Initial Investment (Sea bass and Sea bream)					
	Useful Life(years)	**Unit Cost (US$)**	**Quantity**	**Costs (US$)**	**Annual Costs (US$)**
Construction	10		4	$40,000	$4,000
Building (container)	10		4	$155,455	$15,546
Etude and Projection	10	$30,000	1	$30,000	$3,000
Machine and equipment	10		4,000	$5,442,000	$544,200
Transportation and insurance	10	$40,500	1	$40,500	$4,050
Assembly	10	$83,000	1	$83,000	$8,300
Vehicles	10	$100,000	4	$400,000	$40,000
Total		**$253,500**		**$6,190,955**	**$619,096**

3.3.12. Annual Operating Cost

A company's financial health isn't almost money coming in: it's also about money going out. One measure of the cash that it takes for a business to operate—think rent, staff salaries, travel expenses—is the business's operating cost, which is a crucial component of a business's bottom line. you'll determine a company's operating cost from its income statement, which details the expenses associated with bringing in sales revenue and producing a company's goods or services, also because it's overhead and other costs. The bottom-most line of the income statement shows the company's net, whether it's positive (a profit) or negative (a loss). This tells you ways the company performed during the quantity. Operating costs are a key component of the income statement.

You can't determine what proportion money you're making if you don't skills much it costs to make that cash. That's the thought behind operating costs. If you subtract operating costs from total sales, you come up alongside your operating profit (otherwise mentioned as operating income). That's

the measure of profitability from your core business, not including income from non-core sources, like investments, sales of assets, or the likes of.

Here, the duration of work in both businesses is 12 months. While sea fish are sold only fresh and frozen, there are 4 different products in the trout facility. These are fresh, frozen, filet, and smoked (Fume). If we look at both businesses here; the Salt water processing plant, total production is 1 200 000 kg. The sale price for Sea bream 4.55 USD and Sea bass 5.45 USD, the purchase price for Sea bream 1.82 USD, and Sea bass 2.73 USD. Freshwater processing plant, total production is 1 200 000 kg. The sale price for fresh cleaned and quick-frozen trout 5.2 USD, filet, and lox trout 7.1 USD, the purchase price or Trout 1.82USD.

Apart from this, the highest costs arise as electricity, water, and packaging (See Table 9 and Table 10).

Table 9. Annual operating cost of Freshwater processing plant

Operating Cost (Trout)	
Cost of Purchase (Raw material)	$ 2,181,818
Salt	$ 1,350
Wood	$ 59,090
Packing Cost	$ 245,454
Electric Cost	$ 128,400
Water Cost	$ -
Diesel Cost for Transport	$ 21,818
Labor Cost	$ 444,000
Rent a car	$ 14,600
Land Price	$ 66,540

Sales and Marketing Cost	$ 5,000
Accounting & Legal Fees	$ 6,000

Table 10. Annual operating cost of Salt Water processing plant

Operating Cost (Sea bass and Sea bream)	
Cost of Purchase (Raw material)	$ 2,727,273
Packing Cost	$ 150,000
Electric Cost	$ 80,200
Water Cost	$ 75,000
Fuel Cost	$ 25,000
Labor Cost	$ 276,775
Land Price	$ 67,000
Rent a Car	$ 30,000
Sales and Marketing Cost	$ 2,500
Accounting & Legal Fees	$ 5,500

CHAPTER 4. RESULTS

4.1. Financial Analysis

Evaluation of the financial viability of the combined fish processing plants requires consideration of annual operating costs and annual revenues. The flow of costs and returns over the projected 10 years lifetime of the system was evaluated using investment choice criteria including net present value (NPV), internal rate of return (IRR), and return on investment (ROI).

The financial performance of the enterprise was evaluated with some indicators like internet present value (NPV) and therefore the internal rate of return (IRR) for a period of 10 years with a 24% rate of interest.

4.1.1. Fixed Cost

The initial fixed costs for the fish production system total of approximately $7,065,955 (Freshwater processing plant), and $6,190,955 (Salt water processing plant). It is seen in detail table 7 and 8.

4.1.2. Annual Variable Cost

Annual variable costs for the two systems are presented in Tables 9 and 10. Approximately 74.02% of the two system costs represent raw material expenses. Labor costs account for a marine factory 8.05%, and freshwater factory 13.99% of the two system costs.

4.1.3. Annual Revenue

Annual revenues for the two systems are based on the yearly sale of 1,200,000 kg of trout and 1,200,00 kg sea bass and sea bream. Annual revenues for the marine system are based on 50% production of sea bass and 50% production of sea bream. Annual revenues for the freshwater system are based on 58.33% production of fresh cleaned and quick-frozen trout and 41,67% production of filet and fume trout. Annual revenues are estimated to be $7,171.455(freshwater factory) and $6,000,000(salt water factory) at the end of the 10 years (Table 12, and 13).

4.1.4. Investment Analysis

The purpose of investment analysis is to demonstrate the profitability over the expected lifetime of the investment. The financial viability of these two fish production systems was evaluated using net present value analysis (NPV), which takes into account the worth of money and thus the variability of annual cash flows over time. The NPV method is used to reduce the 10-year stream of revenues and expenses from the two systems (Table 12 and 13) to at least one number during which these future annual cash flows are discounted. NPVs of the two systems assuming various discount rates are found in Table 11. The NPV indicates the price of the investment within the 2 systems over its 10-year life in terms of today's dollars. Lower discount rates increase the NPV because the price of future cash flows are reduced but they could be for higher discount rates.

The IRR is that the discount rate that equates a project's cost with the sum of its discounted future cash flows. In other words, IRR is that the discount rate which may reduce the NPV of a project to zero. The results of the IRR analysis show that for the initial investment freshwater factory show that

for the initial investment of $ 7,065,955 this technique could potentially yield a forty-five return over the lifetime of the plant. The results of the IRR analysis for the salt water factory show that for the initial investment of $ 6,190,955 this technique could potentially yield a 35% return over the lifetime of the plant.

Table 11. Net present value (NPV), internal rate of return (IRR), and return on investment for the freshwater and marine production system.

	Freshwater Processing Plant	**Salt Water Processing Plant**
Interest Rate	**NPV**	**NPV**
4%	$19,520,387	$10,781,792
9.24%	$13,749,785	$7,099,169
16%	$8,776,665	$3,925,363
22%	$5,793,675	$2,021,551
IRR	45%	34%
ROI	0.84	0.54

4.2. Statement of Cash Flow

Net cash flow refers to the difference between the company's cash inflows and outflows during a given period. Briefly, net indicates changes during a company's cash balance, within the earnings report.

Net cash flow is additionally mentioned because the "change in cash and cash equivalents." it is vital to note that net isn't the same as net, free income. you'll approximate a company's net by watching

the period-over-period change in cash on the record. However, the statement of cash flows could also be a more insightful place to look.

Table 12. Statement of Freshwater Processing Plant

Statement of Cash Flow Trouth											
Cash Flow	0	1	2	3	4	5	6	7	8	9	10
Sales Revenue	$ -	$ 7,171,455	$ 7,171,455	$ 7,171,455	$ 7,171,455	$ 7,171,455	$ 7,171,455	$ 7,171,455	$ 7,171,455	$ 7,171,455	$ 7,171,455
Inflow Total	$ -	$ 7,171,455	$ 7,171,455	$ 7,171,455	$ 7,171,455	$ 7,171,455	$ 7,171,455	$ 7,171,455	$ 7,171,455	$ 7,171,455	$ 7,171,455
Cash Outflow											
Cash Operating Costs	$ -	$ 3,174,070	$ 3,174,070	$ 3,174,070	$ 3,174,070	$ 3,174,070	$ 3,174,070	$ 3,174,070	$ 3,174,070	$ 3,174,070	$ 3,174,070
Income Tax	$ -	$ 708,814	$ 708,814	$ 708,814	$ 708,814	$ 708,814	$ 708,814	$ 708,814	$ 708,814	$ 708,814	$ 708,814
Capital Expendutire	$ 7,065,955	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Outflow Total	$ 7,065,955	$ 3,882,885	$ 3,882,885	$ 3,882,885	$ 3,882,885	$ 3,882,885	$ 3,882,885	$ 3,882,885	$ 3,882,885	$ 3,882,885	$ 3,882,885
Net Cash Flow	$ -7,065,955	$ 3,288,570	$ 3,288,570	$ 3,288,570	$ 3,288,570	$ 3,288,570	$ 3,288,570	$ 3,288,570	$ 3,288,570	$ 3,288,570	$ 3,288,570

Table 13. Statement of Salt Water Processing Plant

Statement of Cash Flow Sea bass and Sea bream											
Cash Flow	0	1	2	3	4	5	6	7	8	9	10
Sales Revenue	$ -	$6,000,000	$6,000,000	$6,000,000	$6,000,000	$6,000,000	$6,000,000	$6,000,000	$6,000,000	$6,000,000	$6,000,000
Inflow Total	$ -	$6,000,000	$6,000,000	$6,000,000	$6,000,000	$6,000,000	$6,000,000	$6,000,000	$6,000,000	$6,000,000	$6,000,000
Cash Outflow											
Cash Operating Costs	$ -	$3,439,247	$3,449,248	$3,449,249	$3,449,250	$3,449,251	$3,449,252	$3,449,253	$3,449,254	$3,449,255	$3,449,256
Income Tax	$ -	$ 447,705	$ 445,905	$ 445,905	$ 445,905	$ 445,905	$ 445,905	$ 445,904	$ 445,904	$ 445,904	$ 445,904
Capital Expendutire	$ 6,190,955	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Outflow Total	$ 6,190,955	$3,886,953	$3,895,154	$3,895,154	$3,895,155	$3,895,156	$3,895,157	$3,895,158	$3,895,158	$3,895,159	$3,895,160
Net Cash Flow	$ -6,190,955	$2,113,047	$2,104,846	$2,104,846	$2,104,845	$2,104,844	$2,104,843	$2,104,842	$2,104,842	$2,104,841	$2,104,840

4.2.1. The Interest Rate of Turkey

The rate of interest is that the quantity a lender charges for the use of assets expressed as a percentage of the principal. the speed of interest is typically noted on an annual basis mentioned because the annual percentage rate. The assets borrowed could include cash, commodity, or large assets sort of a vehicle or building. Interest is really a rental or leasing charge to the borrower for the use of an asset. within the case of an outsized asset, sort of a vehicle or building, the lease rate may function the speed of interest. When the borrower is taken under consideration to be low risk by the lender, the borrower will usually be charged a lower rate of interest. If the borrower is taken under consideration high risk, the speed of interest that they are charged are getting to be higher. Risk is typically assessed when a lender looks at a possible borrower's credit score, which is why it's vital to possess an outstanding one if you'd wish to qualify for the only loans.

For loans, the speed of interest is applied to the principal, which is that the quantity of the loan. the speed of interest is that the value of debt for the borrower and thus the speed of return for the lender.

Central Banks determine the monetary policies of the countries. They decide what proportion money to print and determine the interest rates of the loans given to banks. the speed of interest is used to relax the overheated economy as a weapon in improving countries like Turkey. When interest rates go up, economic activity slows down, and inflation is predicted to mention no. High-interest rates also adversely affect growth policies.

You can see the recent historical change of rate of interest in Figure 4 and Figure 5. during this section is taken into account as an assumed rate of interest changes on NPV forecast. When the economy improves, the rate of interest will fall and therefore the NPV will increase. during this case, if the rate

of interest decreases 4% NPV are going to be 19,520,387 $ within the freshwater and 10,781,793 $ within the salt water processing plant.

Figure 6. Interest Rate of Turkey from 2016 to 2020

Calendar	GMT	Reference	Actual	Previous	Consensus	TEForecast
2020-01-16	11:00 AM	TCMB Interest Rate Decision	11.25%	12%	11.50%	12%
2020-02-19	11:00 AM	TCMB Interest Rate Decision	10.75%	11.25%	10.75%	11%
2020-03-17	11:05 AM	TCMB Interest Rate Decision	9.75%	10.75%	10.25%	9.5%
2020-04-22	11:00 AM	TCMB Interest Rate Decision	8.75%	9.75%	9.25%	9%
2020-05-21	11:00 AM	TCMB Interest Rate Decision		8.75%	8.25%	7.75%
2020-05-29	07:30 AM	CBRT Financial Stability Report				
2020-06-01	11:00 AM	MPC Meeting Summary				
2020-06-25	11:00 AM	TCMB Interest Rate Decision				7%

Go to our Calendar for more events. Or learn more about the Calendar API for direct access.

Figure 7. Interest Rate of Turkey Recently Changes History

4.2.2. Comparison of NPV and IRR

Net present value (NPV) is that the difference between this value of money inflows and thus this value of money outflows over a quick time. NPV is employed in capital budgeting and investment getting to analyze the profitability of a projected investment or project. the within rate of return (IRR) could even be a metric utilized in capital budgeting to estimate the profitability of potential investments. the within rate of return could even be a discount rate that creates internet present value (NPV) of all cash flows from a project capable zero. IRR calculations believe an equivalent formula as NPV does. A business must inspect the IRR because the plan for future growth and expansion.

In this study, both projects can be done because they give positive results in two projects. On the other hand, if we compare these two businesses and choose one project, they should choose the freshwater processing plant project, which gives the highest net present value. The annual net profit is 3.997.387 USD in the freshwater and 2,560,753 USD in the salt water processing plant. The annual operating cost is 3,174,070 USD in the freshwater and 3,439,247 USD in the salt water processing plant.

4.2.3. Return on Investment

In finance, Return on Investment, usually abbreviated as ROI, could even be a typical, widespread metric won't to measure the forecasted profitability on different investments. Before any serious investment opportunities are even considered, ROI could even be a solid base from which to travel forth. The metric is typically applied to anything from stocks, land, employees, to even a sheep farm; anything that features a price with the potential to derive gains from can have an ROI assigned thereto. While far more intricate formulas exist to assist calculate rate of return on investments

accurately, ROI is lauded and still widely used due to its simplicity and broad usage as a quick-and-dirty method. Many money-making schemes involve several businessmen seated at a table during lunch talking about potential investments to dive into, until one of them exclaims about one with a very high ROI after doing the calculations on a napkin. ROI maybe confused with ROR, or rate of return. Sometime, they're going to be used interchangeably, but there's a huge difference: ROR can denote a period of some time, often annually, while ROI doesn't.

It allows you to calculate how much income you will get from an investment you will make. It is a data collection that shows you how your investments are and how you can get back. It is a method that provides feedback with numerical data. It allows you to see your earnings and losses clearly according to the amount of money you invest in and tells you that you are making a profit or loss in the figures, usually expressed as a percentage.

Table 14. Results of NPV, IRR, and Return on Investment

	Freshwater Processing Plant	Salt Water Processing Plant
NPV	$5,002,637	$1,516,684
IRR	45%	32%
ROI	0.84	0.54
Interest Rate	24%	24%

4.3. Sensitivity Analysis

The range of potential outcomes for differing inputs are often gauged employing a sensitivity analysis. A sensitivity analysis is additionally useful to work out the potential where internet benefits of the project won't be positive, as highlighted within the Figure below.

For example, some projects calculated benefits and costs could also be suffering from how the project is scheduled, determining an appropriate project lifetime, the geographic scale of the impacts of the project, and knowing what discount rate to pick.

Sensitivity Analysis may be a tool utilized in financial modeling to research how different values of a gaggle of independent variables affect a specific variable under certain conditions. Market price, and interest rate assumptions are individually considered among reliable ranges on the NPV forecast in this section. The financial performance was given in Figure 6 and Figure 7 needs to be critically examined in order to test their sensitivity to changes in important assumptions. In this study, the internal rate of return was sensitive in both cases. But it is seen that the freshwater business is more profitable.

Table 15. Sensitive Analysis Using Sensitivity Indicators (SI)

	Fresh water Processing Plant		**Salt Water Processing Plant**	
%change	**SI +10%**	**SI -10%**	**SI +10%**	**SI -10%**
Initial investment	-0.96	1.23	-1.10	1.31
Revenue	2.34	-2.24	3.34	-3.58
Cost	-1.30	1.28	-2.29	2.20

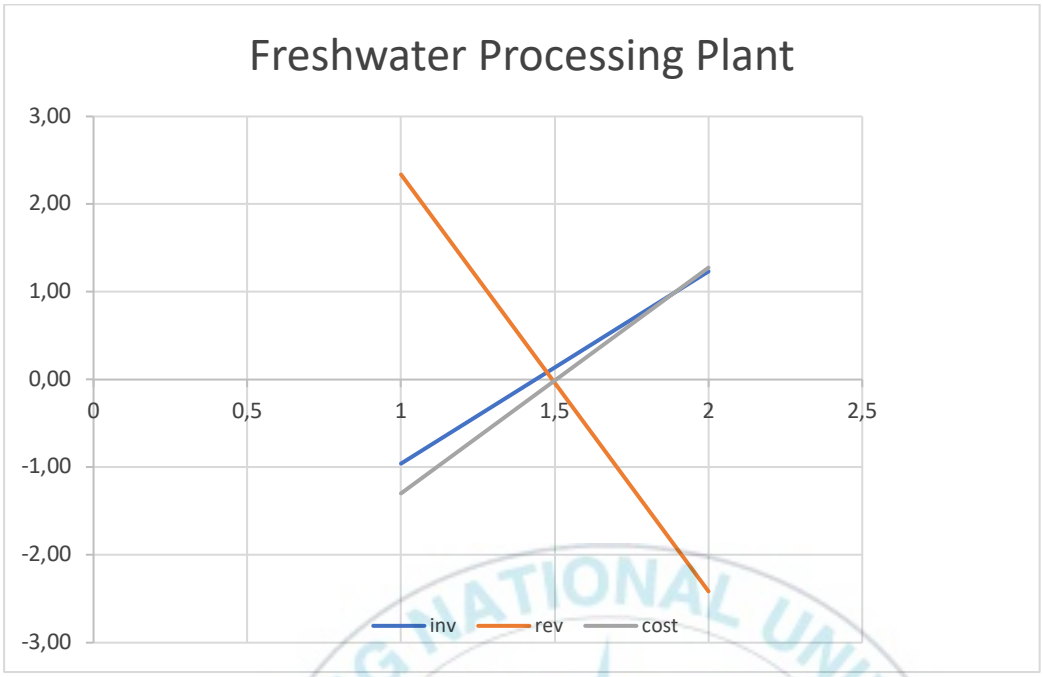

Figure 8. Sensitivity Analysis using SI in Freshwater Processing Plant

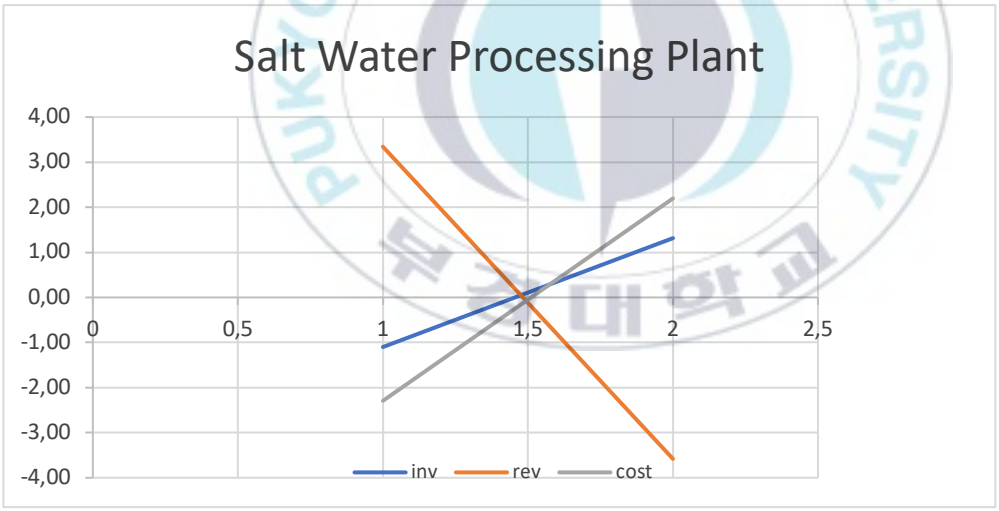

Figure 9. Sensitivity Analysis using SI in Salt Water Processing Plant

4.3.1. Sensitivity Analysis of Interest Rate

If Turkey passes the crisis and discount rate it would have been 4% or under that such as other countries, there is going to be a huge difference in NPV. In this situation, NPV is 5,002,637 and will be 19,520,387 with a 4% interest rate on the Freshwater processing plant. NPV is 1,516,684 and will be 10,781,793 with a 4% interest rate on Marine processing plant.

CHAPTER 5. CONCLUSION

Despite the increasing world population, the protein deficit is increasing day by day and cannot be met. For this reason, the importance of fishing and accordingly frozen or other fish species (such as fresh, smoked, canned) increases. Only fish stand out in fishery consumption in our country. For this reason, it has become a necessity to pack the caught or obtained fish by cultivating and packing them in hygienic conditions. Turkey's government knows how important this issue. And they support the projects on this subject.

This study includes a comparison of two companies producing 1200 tons. The results reveal that this business is very profitable for both factories. However, trout is a little ahead because it has more market opportunities and more demand in the trout facility. However, in this study, both processing plants were examined only for a certain period of time. In this case, this study is limited. This information does not provide that they are the same for all processing plants in Turkey. Repeating similar studies with more factories and calculating NPV and IRR will benefit the sector. Particularly due to the lack of knowledge in the sector, some companies may suffer as we can see in the previous studies.

The highest expenditures for both enterprises are determined as raw materials, packaging, and labor cost. The NPV calculation is more than zero which represents the projects are feasible to run. Then, the value of the IRR freshwater processing plant is 45% and the marine processing plant is 32%. The IRR value for both projects is more than the Turkey interest rate. When prices drop to 45.28% for the freshwater processing plant, the net present value will be zero, which means that the business is unprofitable. And When it drops to 31.66% for the salt water processing plant, the net present value will be zero, the business is unprofitable.

If we look at the sensitivity analysis, profitability decreases as the interest rate increases. If Turkey's interest rate came to around 4% then company profit will increase. Another important factor here is the value of the Turkish lira against the dollar. While making these calculations, 1 Turkish lira was accepted as an average of 5.5 dollars. Given the interest rates and fluctuations in the dollar in the future, it will be redefined whether the investments of the businesses are profitable or not. Additionally, many businesses with an equivalent condition were compared within the same area and different profit margins were obtained in previous studies. At now, knowledgeable staff and good management are thought to be effective. the tactic of this study is aimed to shed light on future studies. it's also intended to be used as a cloth to point out what proportion profit is managed by a well- managed enterprise.

REFERENCES

Adam Hayes, Lulius Mansa. Internal Rate of Return - IRR. Investopedia: https://www.investopedia.com/terms/i/irr.asp adresinden alındı

Adigüzel and Akay. (2005). Economic Analysis of Rainbow Trout Farms in Tokat Province,. Journal of Agricultural Faculty of Gaziosmanpasa University, 31-40.

Akova, S. B. (2015). Aquaculture and Its Distrubution in Turkey. Journal of Aquaculture Engineering and Fisheries Research, 160-190.

Aydin and Sayili. (2009). Structural and Economic Analysis of Trout Breeding Farms in Samsun Province. Journal of Agricultural Faculty of Gaziosmanpasa University, 26(2), 97-107.

Aydin, Dagdemir and Kocaman. (2013). Structural Analysis of the Trout Farms in the Provinces of Antalya and Isparta . Menba Journal of Fisheries Faculty ISSN: 2147-2254 , 15-20.

Baker, Samuel L. (2007, 1 12). Perils of the Internal Rate of Return. Retrieved: (http://sambaker.com/econ/inve st/invest.html

Baltaci and Aydin. (2016). Current Status of Water Resources and Trout Farms in Sakarya Region. Biyoloji Bilimleri Araştırma Dergisi , 49-52.

Berk, DeMarzo, and Stangeland. s. p.94.

Birinci.(2014). Structural and Economic Analysis of Trout Breeding Farms in Elazig Province. Yunus Arastirma Bülteni, 23-48.

Bragg S. (2018, 11 24). AccountingTools ACCOUNTING CPE COURSES & BOOKS. https://www.accountingtools.com/articles/2017/5/5/cash-outflow

Bragg S. (2018, 11 24). AccountingTools ACCOUNTING CPE COURSES & BOOKS. https://www.accountingtools.com/articles/2017/5/5/cash-outflow

BSGM. (2019). Fisheries Statistics (March). Ankara: Republic Of Turkey Ministry Of Agriculture And Forestry.

Celikkale, Duzgunes and Okumus. (1999). Türkiye Su Ürünleri Sektörü (Potansiyeli, Mevcut Durumu, Sorunları ve Çözüm Önerileri). Istanbul: Istanbul Chamber of Commerce.

Cetin and Bilguven. (1991). Structural and economic analysis of trout farms in South Marmara Region. Aquaculture Symposium at 10th Year of their Education (s. 12-14). In Ege University, Fisheries Faculty.

Demir and Akyuz. (2012). The Determination Structural Problems and Solution Proposal of Rainbow Trout (Oncorhynchus Mykiss) Farms in Kahramanmaraş Province. 2. Ulusal Sulama ve Trimsal Yapilar Sempozyumu (s. 1-8). Izmir: E.Ü. Ziraat Fakültesi Tarımsal Yapılar ve Sulama Bölümü.

Demir: Kiziloglu. (1997). Cost and Profitability Analysis of Trout Farming in Tortum-Uzundere District. Alinteri Journal of Agriculture Science 22 (B) ISSN:1307-3311, 16-25.

Emre, Sayin, Kistin, N. Emre and Karaman. (2010). Some Evaluations on Present Status of the Rainbow Trout (Oncorhynchus mykiss L.) Cage Farming. Research Journal of Biological Sciences ISSN:1308-3961, E-ISSN1308-0261, 119-127.

Elbek, A. (1981). Structural and Economic Analysis of Freshwater Products in Aegean Region (Doctoral dissertation). İzmir, Turkey: Ege University.

Ekmekci and Gul. (2017). Economic Structure and Problems of Trout Enterprises: A Case of Fethiye . Turkish Journal Of Agriculture - Food Science And Technology, 5(1), 33-42.

Epstein, Barry J.; Eva K. Jermakowicz. (2007). Interpretation and Application of International Financial Reporting Standards.

FAO. (2018). The State of World Fisheries and Aquaculture Meeting the Sustainable Development Goals. Rome: Food and Agriculture Organization of the United Nations.

Hayes A, Mansa J. (tarih yok). Internal Rate of Return – IRR. Investopedia: https://www.investopedia.com/terms/i/irr.asp

Helfert, Erich A. The Nature of Financial Statements: The Cash Flow Statement. Financial Analysis - Tools and Techniques - A Guide for Managers.

Incremental Cash Flow. XPLAIND: https://xplaind.com/174931/incremental-cash-flows

Incremental cash flow. Accounting Coach: https://www.accountingcoach.com/blog/what-are-net-incremental-cash-flows

Incemental Cash Flow. Corporate Finance Institute: https://corporatefinanceinstitute.com/resources/knowledge/accounting/incremental-cash-flow/

Investing Answer. (2019, 10 9). https://investinganswers.com/dictionary/n/net-cash-flow

Karabulut, B., Demir, O., Celik, M., Sonmez, A. (2017). Structural and Economic Analysis of Trout Breeding Farms in Kastamonu Province. Kastamonu University Journal of faculty of Economics and Administrative Sciences, 321-333.

Karataş, Sayili and Koc. (2008). Structural and Economic Analysis of Rainbow Trout Farms in Sivas Province. Research Journal of Biological Sciences, (2), 49-55.

Kenton W. (2019, 4 26). Cash Flow After Taxes (CFAT). Investopedia: https://www.investopedia.com/terms/c/cfat.asp

Kocaman and Sayili. (2014). Economic Analysis of Rainbow Trout Farms in Gümüshane Province. Anadolu Journal of Agriculture Science, 36-45.

Korkmaz, Zencir and Coskun . (2008). Trout Farming Technics Applied in Turkey. Journal of Egirdir Fisheries Faculty (SDU-JEFF), 58-64.

Lin, Grier C. I.; Nagalingam, Sev V. (2000). CIM justification and optimisation. London: Taylor & Francis. ISBN 0-7484-0858-4., s. p. 36.

Net Present Value. lumen Boundless Fiance: https://courses.lumenlearning.com/boundless-finance/chapter/net-present-value/

Occean, N. R. (2017). Economic Viability of Tilapia (Oreochromis niloticus) Cage Culture in the Lake Azuei. Haiti. Busan: Graduate School of Global Fisheries Pukyong National University.

Pinar, A. (2011). Financial Analysis of Salmon Producing Facilities in Ermenek Region. Turkish Journal Of Scientific Review 4(1), ISSN 1308-0040, E-ISSN 2146-0132, 57-62.

Pirali Kheyrabadi, Salehi Farsani, Samadi Kuchaksaraei. (2014). A Comparision on FCR in fish ponds of Rainbow Trout (Oncorhynchus mykiss) fed by extruder food and pellete food . Iranian Journal of Fisheries Sciences , 503-507.

Sahinoz, Dogu and Aral. (2017). Current Situation of Fishery in Turkey and the World . Rewieved Journal of Urban Culture and Management , 466-476.

Sayili, Karatas, Yucer and Akca . (1999). Structural and economical analysis of trout culture fish farms in Tokat Province. Ekin Journal (7), 66-72.

Sen and Rad. (1999). Capacity, Supply and Price Evolutions in Rainbow Trout (Oncorhynchus mykiss, Walbaum, 1792) Farming in Turkey. Turkish Journal Agricultural Economics ISSN 1303-0183, 1-8.

Sidoti, A. (2019, January 31). European market observatory for fisheries and aquaculture products. https://www.eumofa.eu/documents/20178/137160/Rainbow+trout_31-1.pdf/c2e55bac-15ef-479f-9baa-b16bd7e7706a

Stephan A Ross, Randolph W Westerfield, Jeffrey J, Joseph L, Ruth T, Helen W. (tarih yok). Corporate Finance.

TUIK. (2019). Fisheries Statistics. Ankara: Turkish Statistical Institute.

Uzmanoglu and Soylu. (2008). Economic analysis of aquatic products enterprises on the Yene stream in Balkaya-Kırklareli Region. Journal of FisheriesSciences.com, 2(2),, 164-173.

Yavuz, Kocaman and Ayik. (1995). Structural and economical analysis of trout breeding farms in Erzurum province. Ataturk Univ.,. Journal of Agricultural College, 64-75.

What are incremental cash flows? (tarih yok). GOCARDLESS: https://gocardless.com/guides/posts/what-is-incremental-cash-flow/