

Natural Resources (Oil and Gas) Leading Sector Timor-Leste: Until When?



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ABSTRACT: After independence, the economic recovery of Timor Leste depended on the oil and gas extractive industry sector. While it is true that oil and gas revenues are essential to achieving the goals set out in Timor-Leste's national development program, it is also true that oil revenues pose challenges to governance capacity, with international experience showing that countries rich in natural resources often experience more waste and corruption than others. The negative effects of abundance on natural resources have been known as the curse of natural resources. And on the other side of Timor Leste facing major social challenges and remaining one of the countries less developed in East Asia. Non-renewable mining wealth, of course, in the long term becomes a problem. Tell me when the dependence on oil and gas can be fulfilled? What leading sectors are possible that can be a reserve for the depletion of "oil and gas natural resources"? Based on the results of the investigation, the possible sectors that will drive the depletion of oil and gas natural resources are the agriculture and fisheries sectors, tourism, processing and manufacturing industries, and renewable energy.

KEYWORDS: Natural resources, oil and gas, leading sectors, non-renewable

I. INTRODUCTION

After the international recognition of Timor-Leste's independence on May 20, 2002, (1) for leader East Timor to negotiate return agreement with Australia on exploiting " Timor Sea " reserves. This agreement is much more benefiting Timor-Leste than the previous one between UNTAET-Australia, namely 90%-10% And income oil And gas very expected can enabling huge increases in income and welfare for the people East Timor. Funds which is obtained the has managed by Authority Banking And Payments ((Banking and Payments Authority, ABP 2), which is headquartered in Avenue Bispo Medeiros , Dili, Timor Leste, Which responsible answer on management operational and is the registered owner of all oil and gas fund assets earth. Management funds petroleum done in accordance with Agreement Management between the Department of Planning and Finance and ABP signed on date October 12th, 2005.

After independence, the economic recovery of Timor Leste depended on the extractive industry sector of Oil and Gas (Oil and Gas). While it is true that income from OIL and Gas is very important to achieve the goals set in the national development program of Timor-Leste, it is also true that oil income poses challenges to governance capacity, where international experience shows that countries rich in natural resources (OIL and Gas) often experience more waste and corruption than other countries. The negative effects of abundance on natural resources have been known as the curse of natural resources (2) (3) . However, on the other hand, Timor Leste facing major social challenges and remaining one of the countries less developed in East Asia. Poverty is high at 41.8% (poverty rate, World Bank 2014 and ADB 2019 3) and human and physical capital are very low. One from five person live in lower threshold poverty international (people live below the \$2.15 per day poverty line in 2019 . (4) .

Mining is a non-renewable resource, so activity exploitation mine in a way massive should No done in term long . (5) (6) . The government needs to effectively strive to ensure that income from the sector... mining can used For increase sector other. So that future sector other economy can become a sector featured in Timor Leste.

When viewed from Table 1.1, the data shows that, since 2019, the mining industry has been the main contributor to TimorLeste's economy, followed by the public administration, education, health, and social activities sectors, and agriculture. Meanwhile, the trade, real estate, and infrastructure sectors also play an important role in the economy. However, the growth in contribution from the mining sector was recorded as more prominent compared to other sectors which were seen to have experienced a decline in their contribution.

Timor Leste is country Which new formed after previously is at in lower government colonial Portuguese And 24 year in lower government Indonesia. Resident country. This always life in dependence on sector agriculture (around 75 percent), and other sectors that are not too significant. After independence, part Which more important for repair economy, that is sector industry extractive (oil and gas).

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Table 1.1 Contribution of Industrial Sector to Timor-Leste's GDP

(In percent)

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
AT CURRENT PRICES										
Agriculture, forestry and fishing	20.9	20.9	17.7	16.6	16.8	17.6	14.1	13.3	8.5	10.1
Mining and quarrying	0.1	0.1	0.1	0.1	0.1	0.1	16.8	27.2	56.4	47.3
Extraction of crude petroleum and natural gas	0.0	0.0	0.0	0.0	0.0	0.0	16.7	27.1	56.4	47.3
Other mining and quarrying	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0
Manufacturing and other industry *)	0.8	0.8	1.0	1.1	1.6	1.7	1.9	1.6	0.8	1.3
Of which: manufacturing	0.7	0.8	1.0	1.1	1.5	1.7	1.8	1.6	0.7	1.3
Construction	18.8	15.9	17.1	17.5	13.8	14.5	11.6	8.6	4.5	4.7
Wholesale and retail trade, transportation and storage, accommodation and food services	16.5	17.1	18.2	19.0	18.3	16.7	14.1	11.5	6.7	8.2
Information and communication	3.1	1.5	2.3	2.5	2.4	2.6	2.7	2.9	1.3	1.1
Financial and insurance activities	0.8	0.9	0.7	0.8	1.5	1.4	1.6	1.2	0.6	1.2
Real estate activities	11.0	12.1	11.3	11.1	11.6	12.4	9.3	8.8	5.2	6.3
Professional, scientific, technical, administration and support services	2.9	3.3	3.1	2.9	3.1	2.6	1.9	0.8	1.1	1.3
Public admin., defence, education, human health and social work activities	21.6	23.9	24.1	24.2	27.3	28.9	23.0	22.2	13.6	17.1
Other service activities	4.4	4.0	3.6	3.9	3.6	3.2	2.4	1.6	1.5	1.8
Equals: VALUE ADDED, at factor cost	101.0	100.6	99.4	99.7	100.3	101.7	99.3	99.7	100.5	100.3
Oil sector	0.0	0.0	0.0	0.0	0.0	0.0	16.7	27.1	56.4	47.3
Non-oil sector	101.0	100.6	99.4	99.7	100.3	101.7	82.5	72.6	44.1	53.1
Plus: Taxes less Subsidies on products	-1.0	-0.6	0.6	0.3	-0.3	-1.7	0.7	0.3	-0.5	-0.3
Oil sector	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.1
Non-oil sector	-1.0	-0.6	0.6	0.3	-0.3	-1.7	0.6	0.1	-0.6	-0.5
Equals: GDP (Production)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Oil sector	0.0	0.0	0.0	0.0	0.0	0.0	16.9	27.3	56.5	47.4
Non-oil sector	100.0	100.0	100.0	100.0	100.0	100.0	83.1	72.7	43.5	52.6

*) Electricity and gas ; plus water supply; sewerage, waste management and remediation activities

During mandate UNTAET¹ (1999-2002), has start his government with the highlight that the oil wealth off the coast of the Timor Sea, would be very central to the development of this country, began renegotiating with the government Australia For replace position government Indonesia. Interest This to imply negotiation Which still profitable for Australia Because still maintain principle negotiation Which has agreed with Indonesia (50%: 50% from royalties).

After international recognition of Timor-Leste's independence (20 May 2022), for leader East Timor to negotiate return agreement with Australia on exploiting " Timor Sea " reserves. This agreement is much more benefiting Timor-Leste than the previous one between UNTAET-Australia, namely 90%-10% and income oil and gas very expected can enabling huge increases in income and welfare for the people East Timor.

The Timor-Leste Petroleum Fund ('Petroleum Fund') was established through Law No. 9/2005, published in Jornal da República, Series I, dated August 3, 2005. According to Article 139 of the Constitution Republic of Timor-Leste, said that the source Petroleum resources belong to the state and must be used fairly and equitably for the national interest. From the inspiration of the Constitution, it can be emphasized that allocation Which as big as possible on formation "reserve funds must" (reservas financeiras obrigatorias) for purposes generation now and then which will come, with still give consideration to adequate for interest term long inhabitant East Timor.

Funds which is obtained the has managed by Authority Banking And Payments ((Banking and Payments Authority, ABP²), which is headquartered in Avenue Bispo Medeiros, Dili, Timor Leste, Which responsible answer on management operational and is the registered owner of all oil and gas fund assets earth. Management funds petroleum done in accordance with Agreement Management between the Department of Planning and Finance and ABP signed on date October 12th, 2005.

Its implementation on September 9, 2005, the government transferred balance beginning First Oil Tranche (account "Timor Gap ") Which taken in ABP, together with US\$ 125 million from the consolidated fund, to be an opening balance of US\$ 205 million as Petroleum Fund to be deposited at the Reserve Bank of New York , USA as stated on Table 1. 2.

¹ United Nations Administration in East Timor

² *Autonomy Bank e Payments (ABP)* is institution banking Which founded by Union United Nations (UN) during the UNTAET administration, 18 October 1999 - 19 May 2002. ABP still do his authority up to founded Bank Central East Timor in the year of 2011

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Table 1. 2 Timor Leste State Oil and Gas Opening Fund Deposited in Reserve Bank of New York, USA US\$.000

Assets	
Earmarked Receipts Account	228
Overnight Repurchase Agreement	300
US Treasury Notes (market value)	243,192
Accrued Cupon	3,587
TOTAL	247,367
Capital	
Transfers from Government	204,604
Receipts from Taxpayers	43,482
Retained Income	611
Unrealized market gain/(loss)	(1,330)
TOTAL	247,367

Source: Quarterly Report Petroleum Fund of East Timor for the Quarter ended 30 September 2005, Petroleum Fund Report (bancocentral.tl)

Since 2005, the government through ABP and the Central Bank of Timor-Leste (established in 2011), based on the mandate stated in the law, has carry out his obligation For deposit funds Which obtained from oil and gas on a quarterly basis at the Reserve Bank of New York, USA. On Table 1.3. below is shown from the quarterly period of March 31, 2015 to March 31, 2016. December 2019.

Reception funds petroleum And gas For Year Fiscal 2015 on Quarter I (2005 – 2022), amounting to US\$ 284.47 million and increasing deposit funds to US\$ 16,823.09 million. And on report the Parliament The nation approved the allocation of oil and gas funds to finance the state budget amounting to US\$215 million (Table 1.3).

Table 1. 3 Timor-Leste State Oil and Gas Resources Revenue Report every Quarterly from 2015-2019 deposited in Reserve Bank of New York, USA

No.	Report Quarterly	Income Source Power Oil and Gas Which deposited (millions) USD	Reception Source Power Oil and Gas (millions) USD)/Quarterly	Allocation Income Resource Oil And Gas to State Budget (millions) USD)
1.	31 March 2015	16,823.09	284.47	215
2.	June 30th 2015	16,862.73	39.64	230
3.	30 September 2015	16,436.58	-426.15	193
4.	31 December 2015	16,217.57	-219.01	640
5.	31 March 2016	16,577.82	360.25	100
6.	June 30th 2016	16,466.07	-111.75	340
7.	30 September 2016	16,604.91	138.84	204.8
8.	31 December 2016	15,844.33	-760.58	600
9.	31 March 2017	16,265.91	421.58	180
10.	June 30th 2017	16,504.59	238.68	240
11.	30 September 2017	16,687.5	182.91	315
12.	31 December 2017	16,799.31	111.81	343.8
13.	31 March 2018	16,846.81	47.5	-
14.	June 30th 2018	16,927.32	80.51	70
15.	30 September 2018	17,155.58	228.26	140
16.	31 December 2018	15,803.64	-1351.94	772.5
17.	31 March 2019	16,980.22	1176.58	-
18.	June 30th 2019	17,447.36	467.14	220
19.	30 September 2019	17,553.68	106.32	200
20.	31 December 2019	17,691.82	138.14	549

Funds Which obtained from oil And gas the has give a very dominant contribution to the development of the wheels of the economy and government. In fact, oil and gas revenues have become a major determinant growth country's economy.

While it is true that oil revenues and gas is very important for reach objective Which set in program development national country Timor Leste, It is also true that oil revenues pose challenges for governance capacity, where international experience shows that countries rich in natural resources (oil and natural gas) often experience more waste and corruption than other countries. The

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negative effects of abundance on These natural resources have been known by the term the curse of natural resources " **natural resource curse** " (Lewis, 1984), (Davis, 1995) and (Veli Yilanci et al., 2021).

East Timor located in a way geographical in border Asia Southeast (Indonesia) with Oceania (Australian) with wide region + 14,874 km² (Area of Timor-Leste).

Timor-Leste faces major social challenges and remains one of the poorest countries in the world. less developed in East Asia. Poverty is high at 41.8% (poverty rate, World Bank 2014 and ADB 2019 3) and human and physical capital are very low. One from five person live in lower threshold poverty international (people live below the \$2.15 per day poverty line in 2019 pip.worldbank.org/country-profiles/TLS).

At US\$2.15 per day, Timor-Leste is the fourth poorest country in Asia. East, with only Laos PDR, Cambodia, And PNG Which most lack. Life expectancy is only 57 years. Timor-Leste is not only a young country, but also country race young, in where 43% its population aged in lower 15 year, compared to with countries Europe, only around 18% (Census Resident and Housing area 2004, p.39). Population East Timor is 1.4 million (2021) And has grown on level around 4% per year. Implications from growth Which tall This is the difficulty give service for fulfil need together (convenience) education and health). This produce effect on level work, reduce quality life urban, produce problem social and stimulate change culture Which significant and produce problem environment, especially in the nation's capital Dili.

Timor-Leste's Gross Domestic Product (GDP) growth without revenue oil funds declined by around -4.1% in 2017 and the decline was the most drastic happen on year 2020 around -7.3%, caused by by disaster Covid-19 Which hit the world. The increase started significantly at 8.8% to 1.3% on year 2021.

Table 1.4 Indicator Economy Country East Timor

No	Description	Year Fiscal				
		2015*	2016	2017	2018	2019
1	Level growth GDP (% per year)	3,5	3,4	-4,1	-1,1	1,8
2	GDP growth rate per capita (%per year)					
3	The growth rate of value added in field agriculture (% per year)	1,6	1,4	-6,0	-3,0	-0,2
4	The growth rate of value added in industry (% per year)	-	-1,3	-3,0	2,9	2,5
5	The growth rate of value added inservice (% per year)	-	7,6	-26,5	5,3	-4,7
6	Inflation (% per year)					
7	Change in money supply (% per year)	-	5,7	3,2	-2,5	3,1
8	Income government center (% from GDP)					
9	Central government expenditure (% of GDP)	0,6	-1,3	0,6	2,4	1,0
10	Central government fiscal balance (% of GDP)	7,1	14,2	12,1	3,1	-7,1
11	Growth rate of goods exports merchandise (% per year)	92,5	61,0	67,9	79,9	91,3
12	Level growth import goods merchandise (% per year)	106,6	110,5	85,5	85,9	83,1
13	Balance Sheet trading (millions) \$)					
14	Balance of transactions walk (% from GDP)	-14,1	-49,4	-17,5	-6,0	8,2
		16,6	11,1	-17,4	48,6	5,5
		-15,4	-13,3	11,4	-2,9	-3,4
		-635	-546	-615	-589	-566
		16,4	-33,0	-17,7	-12,3	7,9
15	Mark swap to Dollar American Union (average annual)	1,0	1,0	1,0	1,0	1,0
16	Reserves international gross (millions) \$)	-	16,125	17,344	16,467	18,118
17	Debt outside country (millions) \$)	46	76	104	146	228
18	Debt service ratio (% from export goods And service)	0,0	0,6	3,0	3,9	8,6

Source: ADB – Asian Development Outlook 2021. Financing a Green and Inclusive Recovery, pgs . 372-389 * ADB – Asian Development Outlook 2017. Transcending the Middle Income Challenges, pgs . 300-317

In fact, when viewed from the contribution to Gross Domestic Product (GDP), The agricultural sector is a sector that provides a fairly high contribution. As described in Table 1.1. In addition, the trade, real estate, and infrastructure also provides a fairly high contribution. However, the increase is indeed contribution sector mining more significant, And sector other tend decrease his contribution.

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Mining is a non-renewable resource, so activity exploitation mine in a way massive should No done in long term . The government needs to effectively strive to ensure that income from the sector mining can used For increase sector other. So that future sector other economy can become a sector featured in Timor Leste.

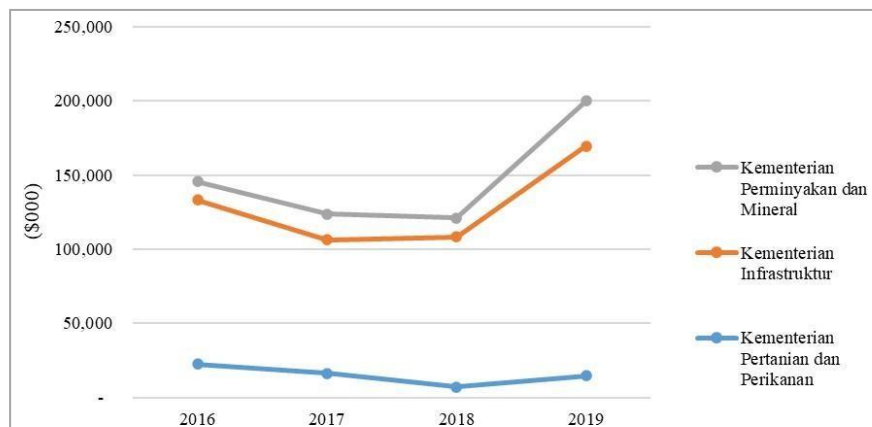
Budget Income And Shopping Country (State Budget) Which approved in Parliament National for fiscal year 2019 amounted to US\$ 1,395 million and received an increase as big as 13% from year previously. From funds Which approved in Parliament, allocated to sector agriculture And fishery as big as US\$ 14,709,000 or an increase of 13% from the previous year, whereas in the 2016 fiscal year it actually Far more tall, namely US\$ 22,343,000, as well as seen on Table 1.5 in below i:

Table 1.5 State Budget Country East Timor

Budget Year Fiscal	The APBN which approved in Parliament National (\$000)	Rate	Ministry Agriculture And Fishery (\$000)	Ministry Infrastructure (General) (\$000)	Ministry Petroleum and Minerals (\$000)
2019	1,395,000	13%	14,709	154,839	30,364
2018	1,215,772	-6%	7,016	101,405	12,808
2017	1,285,000	-44%	16,192	90,012	17,447
2016	1,845,935	NA*	22,343	110,840	12,506

Source: Leis do Parlamento Nacional | Jornal and República (mj.gov.tl) NA*: Note Available³

Observing data Table 1.5, budget Which allocated on three ministry main tend fluctuate. Where is the explanation? presented in Figure 1.1.



Picture 1.1
Fluctuation State Budget on Three Ministry Main in Timor Leste

Figure 1.1 clearly shows that the budget allocation in Ministry Petroleum And Mineral as well as Ministry Infrastructure show significant increasing trend. While the budget of the Ministry of Agriculture and Fishery is at on amount lowest And tend constant. Whereas has It was previously explained that the agricultural sector dominates Timor's economy. Leste previously (data in Table 1.5), and of course the majority of the people depend on agricultural sector.

II. THEORY SOURCE

Power Natural

Source Power natural is factor input still And the result enforce restrictions on potential growth economy. Restrictions This depends on characteristic production technology, where it causes growth in labor and stock capital. This is reason First For effect bad source Power natural on growth economy.

According to North House (1992) that: **First**, level growth production per chapter Which stable in economy with source Power natural proportional to the rate of technological progress adjusted to the balance population growth due to decreasing returns and the implications of resource depletion Power natural consequence the decline level exploitation source Power natural. **Second**, exploitation of huge natural resources can create opportunities for character rent seeking scale big by manufacturer, result excavation

³ [Plano-Estrategico-de-Desenvolvimento PT1.pdf \(timor-leste.gov.tl\)](#)

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source Power nature is far from the natural productivity of economic activities (Auty, 2001; and Gelb, 1988). For example, Tornell and Lane (1998) show that the terms of trade Which No unexpected and explosion source Power natural can activate interaction political between groups interest Which strong, Which result in deficit transaction walk, redistribution tax Which No proportional And decrease economic growth. In extreme cases, civil wars emerge, such as the war diamonds in Africa, which not only diverts inputs from productive use but also destroy institutions and law which are already established. Collier and Hoeffler (1998) in a way empirical show How source Power natural increase possibility war you. **Third**, abundance natural resources, can cause Dutch disease . The explosion source Power natural And wave related in export material standard can cause the real currency exchange rate, which may reduce the industry manufacturing and service exports (Corden, 1984). Boom and depression journals also tend to increase volatility mark swap real, However, reduce investment in sector which can be negotiated as well as the export and import of goods and services. The Dutch disease also can attack countries that do not have their own currency (for example, Greenland wears the Danish crown (Paldam, 1997). The boom in the primary sector increase wages in the sector, and attract workers from other industries, especially in countries with wages centralized. For part or all over channel This, disease The Netherlands could reduce total exports in relation to GNP (Gylfason, 1999) or at least reduce the composition of exports from manufacturing and service exports. can contribute more Lots to growth economy. Idea This based on on perspective, that invention technology and innovation appear in field manufacturing than in field agriculture (Kaldor, 1966). So far improvement major productivity gains that have occurred in the agricultural sector in recent decades The latter reflects the spillover of technology from other sectors, in this case, disease. Dutch can reduce speed growth economy in decline manufacturing and service exports which may be good for growth (Frankel and Romer, 1999), not only quantity but also type and quality. **Fourth**, the abundance of natural resources can weaken private and public incentives to accumulate source Power man Because level income non-wage Which tall. For example, dividend, expenditure social, And tax low. Proof empirical show that, in between countries, school in all levels compared to in contrast to dependence on natural resources, as measured by workforce occupying primary production (Gylfason et al., 1999). There are also evidence that, among countries, public spending on education is related to national income, expected years of education and tuition fees in secondary schools are all inversely proportional to the share capital natural riches national (Gylfason, 2001). Importance is that education Which more and better looks good for growth.

Finally, abundance source Power natural can fulfil people with a false sense of security and managing the government to forget the needs will be the accumulation of human capital as well as in good economic administration and growth Which friendly, including trading free, efficiency bureaucracy, quality institutional And development sustainable (Rodriguez And Sachs, 1999; and Sachs and Warner, 1999).

Lewis (1984), based on the basics of the classical model of economic growth, states that the lack of capital, or domestic savings, is one of the obstacle main for countries develop For reach dream economic development. In an extractive basic economy, income from exports Mineral goods can be a source of financing that is often not available to countries other. For Lewis (1984), countries rich in mineral resources do not only own "profit", but Also problem Which related with economic development, due to the concentration of resources in the extractive industries on Finally can hinder performance activity other. Difficulty the originate from various intrinsic characteristics to extractive industry activities. Economic indicators mining-based often shows poor income distribution, diversification economy Which bad, improvement export Which only concentrated on primary products, and lower growth rates in the non-primary sectors of the economy. mineral than economy non-mining other, between other. Besides That, mining produces a monopoly labor market, that is, one firm The big one is the main one who is directly and indirectly responsible (through company Which contracted) For absorption power ker yes Which destroyed And play role important but slave as catcher eye Money For to finance industrial development in the area others in country Which The same.

According to Lewis (1984) , " resource curse " a series of effects negatives typical of extractive-based economies. The causes of this "curse" will be related with specific characteristics of the mineral sector, such as: the existence of differential results from quality of the sediment; the low wage share in that amount will add; Part big income mineral enter to company multinational or government, which results in problems of financial intermediation and savings allocation. (fluctuating in nature), which often causes extractive companies to work in the zone red, Because inelasticity of production in term short.

Another perspective that follows along these lines is known as the Dutch disease. This Also state that There is connection negative between mining And development. According to Bomsel (1992), the term "Dutch disease" was inspired by Dutch natural gas production experience in the North Sea in the 1970s. For Auty and Warhurst (1993), disease Dutch happen Because height level profitability segment mineral, it is possible by results differential mining, Which cause appreciation mark swap Which excessive And reduce Power competition non-mineral activities. Wages in the mining sector also tend to grow and This wage inflation spreads to other sectors of the economy, which in turn eventually lost power Work skilled to sector mineral. If they want to Keep going production, these other sectors need to pay wages on par with the industry mineral. The result is the descent Power competition product non-mineral in market international. These factors result from the negative symbiosis between the mineral sector And sector non-mineral, like agriculture And manufacturing. Symbiosis This on Finally damage Power competition sectors This And slow down process growth economy And investment generation (Auty and Warhurst, 1993).

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Meanwhile, Davis (1995) tries to differentiate between the thesis of "source curse" and "source curse". power" and "Dutch disease". It states that the latter refers to coexistence negative from sector economy Which dynamic with Which other step back, Which produce connection Which dangerous for economy Because profit export from dynamic sectors cause high inflation and a decline in growth rates sector other, or industrialization economy. Thesis "curse source Power", on its turn, disclose that countries Which blessed with Good with mineral, compared to with countries Which No exploit source Power the, always perform worse. According to Bomsel (1992), the negative effects of Dutch disease can be reduced, or even avoided, If steps taken For control exchange Which strong And evaluation wages. The problem is that in Lots economy Which based on on exploitation source Power natural, policy Which related with use income from activity That make it difficult or even it is not possible to implement such measures. According to this view, in countries This country's abundance of income fuels an elite that suits this bonanza and who uses these resources to perpetuate themselves in power. Thus, steps are needed to fight Dutch disease will become hard And No popular, like limit expansion wages And control mark swap (make consumption luxurious elite more expensive), between other.

Lewis (1984) follows a very similar line of argument to Hirschman (1997), that the power of mining is taxation, but also states that the potential of these benefits requires competence and the qualifications of the ruler to manage this additional income. For Gelbt (1998) wise use of natural resource revenues is much more exception rather than rules. For this writer, the main problem is waste of income mining on period boom mineral. Alternative Which proposed For avoid problem This involving policy economy macro orthodox And commitment to fiscal prudence with value swap Which competitive.

Constitution Base (Constitution) Country Republic Timor Leste, Article 139 o concerning Natural Resources, states that: 1. Land resources, subsoil, territorial waters, continental shelf and exclusive economic zone, which vital for economy, must become owned by Country And must used in a way fair and equivalent in accordance with national interests. 2. Conditions for use source Power natural as meant in paragraph previously must used for the formation of mandatory financial reserves, in accordance with the law laws and 3. The use of natural resources must maintain ecological balance And prevent damage ecosystem.

Oil Earth

Based on chapter 2 o Act No. 13/2005, dated 2 September 2005 about Activity Petroleum, that: "Operation Petroleum" means activity Which intended for:

- Prospecting (prospect) oil;
- study, development, exploration, sales or export oil earth; or
- construction, installation or operation of any structure, facility or support for development, exploration and export of petroleum , or demolition or deletion one of from this is the structure, installation or supporters; On Article 2 o UU no. 13/2005, it is also said that:

a. Oil Earth means:

- hydrocarbon whatever Which originate from natural, in condition gas, liquid or congested;
- mixture hydrocarbon What even Which originate from natural, in condition gas, liquid or solid; or
- Oil What even so, as defined in above, which has been entered back to in deposit;

b. Crude Oil means mineral oil crude and all liquid hydrocarbons in natural state or obtained from wet gas by condensation or extraction;

c. Well means drilling on the surface of the earth dug or drilled for objective produce oil Earth;

d. Region East Timor means region Timor Leste, including sea its territory, together with its economic zone and continental shelf, which according to law internationally, Timor-Leste enjoys sovereign rights for research purposes And resource exploitation Power its nature;

e. East Timor means Republic Democratic East Timor; And

f. Treaty means the Timor Sea Treaty agreed on May 20 2002 between Government Timor-Leste and the Government Australia.

According to the Decree of the Minister of Environment Number 128 of 2003, petroleum is the result of a natural process in the form of hydrocarbons under conditions of pressure and temperature atmosphere in the form of liquid or solid phases, including asphalt, mineral wax, or ozokerite, and bitumen Which obtained from process mining, but No including rock coal or other hydrocarbon deposits in solid form obtained from activities that No related to business activities and petroleum.

Petroleum is a complex mixture of organic compounds consisting of on compound hydrocarbon And non-hydrocarbon Which originate from the remains microorganisms, plants, and animals that have been buried for millions of years. The hydrocarbon compound content in petroleum is more than 90% and the rest are non-hydrocarbon compounds such as sulfur, nitrogen, oxygen in low levels varying volatility, specific gravity , and viscosity (Speight, 1991).

Characteristics Oil Earth

Crude oil and petroleum products are very complex mixtures. and varies from thousands of individual components having varying physical properties. Understand composition This important For can know behavior spill oil And response options Which according to (Zhu et al., 2001).

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Hydrocarbon compounds are organic compounds consisting of carbon and hydrogen. Hydrocarbons are one of the contaminants that can have an impact bad Good for man and environment. Oil earth And its derivatives is one example of hydrocarbons that are widely used by humans. And has the potential to pollute the environment (Notodarmojo, 2005). Speight (1991) stated that the composition of petroleum is as follows: following:

Carbon, 83 – 87%

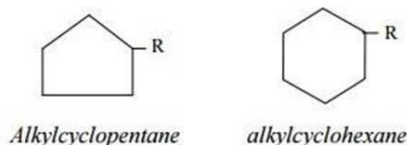
Hydrogen, 10 – 14%

Nitrogen, 0.1 – 2%

Oxygen, 0.05 – 1.5% Sulfur, 0.005 – 6%

Speight (1991) Also share component hydrocarbon in oil earth become three class, that is:

1. Paraffins : saturated hydrocarbons with chain straight or branched, However without ring structure.
2. Naphthenes : saturated hydrocarbons Which own One or more ring, Where each ring has one or more chain groups paraffinic (more known as alicyclic hydrocarbons).



3. Aromatics: hydrocarbons containing one or more aromatic nuclei, such as system ring benzene, naphthalene, and phenanthrene Which connected with substituted ring naphthalene and/or group chain paraffinic

Natural Gas

Natural gas, or often also called natural gas, is a fuel that... very simple. Around 90% from gas natural is methane (CH_4), which only One atom carbon with four atom hydrogen attached, with the rest consists of from ethane (C_2H_6), propane (C_3H_8), butane (C_4H_{10}) And components other as well as component impurity like Water, H_2S , CO_2 And etc with type And the amount Which varies according to with gas source natural (Chandra, 2006).

Natural gas can be found in oil fields, natural gas fields and also mine rock coal. When gas Which rich with methane produced through decay by bacteria anaerobic from ingredients organic besides from fossil, so He called biogas. Source biogas can found in swamps, place disposal end rubbish, as well as shelter dirt man And animals. On that basis, natural gas is often also called swamp gas. (Lyons, 1996).

The composition of natural gas always varies from one location to another. Which other. In a number of location certain gas natural need tool operation special For carry out the natural gas process. Locations like this are usually natural gas locations Which have level component impurity like Water, H_2S , CO_2 outside limit specification Which has determined. Specification product gas natural usually stated in its composition and performance criteria. These criteria include: Heating Value, inert total, content water, oxygen, And sulfur. Heating Value is criteria in burning gas natural, whereas criteria other related with protection piping from corrosion and plugging (Chandra, 2006).

Agriculture and Fishery Agriculture

Sector agriculture is the sector that strategic And play a role important in economy national And continuity life public, especially in contribution to GDP, employment and food provision in country (Julius R. Latumaresa, 2015). Agriculture is an activity that utilizes natural resources. Power biological Which done man produce material food, material standard industry, or source energy, as well as For manage environment life. By therefore sector agriculture is sector Which most base in economy Which is life support of production sectors others such as subsector fishery, subsector plantation, subsector farm (Iskandar Putong, 2005).

Development in the agricultural sector is something that cannot be negotiated. again, because the majority of Indonesian people consume rice and work in sector agriculture (Subandi, 2011). Whereas role important from agricultural sector itself is in forming the provision of employment opportunities and contributing towards the formation of gross domestic product and exports (Tulus TH Tambunan, 2006).

According to Mosher, agriculture is a unique form of production that based on the growth process of plants and animals. Farmers manage and stimulate growth plant in a business farmer, here activity production is business, so that expenditure and income very important It means. According to Van Aarsten, agriculture is a human activity used for to obtain results Which originate from plants And animal Which on at first achieved with road on purpose to perfect all possibility Which has given by nature use grow plants and the animal⁴.

⁴ <http://www.budidayapetani.com/2015/06/11/> - definition - agriculture - according to tpara.htm l downloaded match July 10, 2023, 21.00 WIB

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Contribution Economy of Sector Agriculture

According to Kuznets' classical analysis, agriculture in developing countries is... develop is a sector economy Which very potential, there is 4 form his contribution to growth And development economy (Sincere) T. H. Tambunan, 2006) namely as follows:

- Expansion from sectors economy non agriculture very depends on product- products from the agricultural sector, not only for the continuity of supply growth food but Also For provision material standard For needs activity production in the sectors nonagricultural.
- Due to the strong agrarian bias of the economy during the early stages of development, then the population in the agricultural sector of rural areas forms a large part very large domestic demand market for products from the industry And sectors other in in country, Good For goods manufacturer and goods consumers, kuznets calls it market contribution.
- Because relatively importance agriculture Can seen from donation output his towards the formation of gross domestic product and its contribution to absorption workforce inevitably decreases with growth or increasing high level of development economy.
- The agricultural sector is able to play a role as an important source of surplus balance sheet trading or balance sheet payment, Good past export results agriculture or increasing the production of agricultural commodities to replace import.

Terms and Conditions Development Agriculture

Agriculture to obtain energy from ray sun And the process through processes biological from growth animal And plant, farmer is man-man And members family as well as member public local. According to AT Mosher (1965) in his book lincoln Arsyad economy development, analyze terms and conditions development agriculture If agriculture developed well. Mosher groups the requirements for agricultural development divided into two, namely absolute requirements and facilitating conditions (Lincoln Arsyad, Economy Development, 2017).

- Terms and Conditions Absolute
 - The existence of market for the results business farmer
 - Technology Which always develop
 - Availability ingredients And tools production in a way local
 - The existence of stimulant production for farmer
 - Availability the transportation that fluent And continuous
- Terms and Conditions Means Launcher
 - Education development
 - Credit production
 - Mutual assistance activities work together farmer
 - Repair And land expansion agriculture
 - Planning national development agriculture

Theory Request And Offer In Field Agriculture

As is known, the results of the agricultural sector are products that are not durable, are needed a lot but demand is inelastic (price fluctuations do not have much effect on demand). in the long term consumption of agricultural sector products increases naturally, meaning that the increase is not because of the increasing purchasing power of the people, but because of the increase amount resident.

In his theory put forward by Engel, he stated that If people's income increases more than before, then consumption will increase. goods primary results agriculture relatively will the more decrease the ratio. Following picture balance of supply and demand for agricultural sector commodities in term long:



Picture 2.1 Curve Request And Offer Sector Agriculture

Based on the image above, it is known that the balance between demand and supply offer Agricultural commodities are at point E_p , when the price is P_1 , demand is as much as Q_1 . In the long term, agricultural technology is developing rapidly soil processing technology, fertilization and preservation. while the demand for agricultural products are relatively slow so that agricultural yields will be relatively greater, And This cause price will down. Will but % change price more big from % change request. on the contrary

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% change amount offer Which relatively The small amount of agricultural commodities actually causes a decline. more big on % price changes (Iskandar Putong, 2005).

Fishery

In Indonesia, according to the law Republic of Indonesia N0. 31/2004 as has in change with Act Republic of Indonesia NO. 45/2009, activity Which including in fishery started from pre-production, production, processing to marketing, which is carried out in a fisheries business system or what is called agribusiness.⁵ Fisheries is a human activity related to management with management and utilization biological resources waters. generally fisheries intended For the importance of providing food for humans.

- g. Fish Resource Management. Fish resource management is all effort including process Which integrated in collection, allocation resource fish, as well as enforcement law from Constitution in the field fishery.
- h. Arrest Fish. Arrest fish is activity Which aiming to obtain fish in waters that are not in a state of cultivation by any means or means including activities who uses a ship arrest fish For load, transport, keep or preserve it.
- i. Fish Farming. Fish farming is an activity to maintain, to grow up And or breed fish, harvest the result in environment Which controlled.

Infrastructure

Until moment this not yet there is definition which certain about infrastructure. but there is some broad agreements regarding the infrastructure. According to the Dictionary In Indonesian, the term infrastructure can be interpreted as facilities and infrastructure. Public facilities. Facilities are generally known as public facilities such as hospitals, roads, bridges, sanitation, telephones etc. Meanwhile, according to the MacMillan Dictionary' Of Modern Economics (1996) infrastructure is a structural element of the economy. to facilitate current goods and service between buyer And seller. Meanwhile The Routledge Dictionary Of Economics (1995) provides a broader definition namely that infrastructure is also the main servant of a country help economic activities and community activities so that they can take place that is with provide transportation And Also facility Supporter other. Larimer (1994) stated the foundation of a work plan that underlies basic services, facilities and institutions on which the growth and development of a country depends areas, communities and infrastructure systems encompass a wide variety of services, institutions and facilities that include transportation systems and means to finance the system, law and law enforcement on education and research.

In connection infrastructure buzz development economy, a number of Economists also give their opinions regarding infrastructure, Hirschman (1958) define infrastructure as something Which very needed. Without infrastructure. activity production on various sector activity economy (industry) No can function, Todaro (2006) also defines infrastructure as one of the factor important Which determine economic development.

In the World Bank Report, infrastructure is divided into 3 groups, namely (Bank Dunin. 1994: 12) :

- a. Economic infrastructure is a physical asset that provides services and used in production And consumption final covering public utilities (telecommunications, drinking water, sanitation and gas), public works (dams, channel irrigation And drainage) and sector transportation (road, railway, transport port and airfield).
 - b. Infrastructure Social, is asset Which support health And skill society covering education (school And library), health (House sick. center health) For recreation (parks and etc)
 - c. Infrastructure Administration/Institution, covering enforcement law, control administration and coordination and culture.
- Apart from that, there are those who divide infrastructure into basic and complementary infrastructure. (Ian Jacob, et al, 1999):
- a. Infrastructure base (basic infrastructure) covering sectors Which have characteristics public And interest Which fundamental For sector economy other, No can for sale (non-tradable) And No can separated both technically and spatially. For example, highways, train, canal, harbor sea, drainage, dam, And and so on.
 - b. Complementary infrastructure such as gas and electricity. telephone and procurement drinking water.

In the discussion Infrastructure can it is said own characteristic as Public goods. Public goods have two main characteristics in terms of their use. (consumption of public goods) namely non-rivalry and non-excludability. Rivalry is the nature of rivalry or competition in consuming or using a product. The meaning is that if an item is used by someone (the owner), the item the No can used by person other (user). If somebody consume or use a product and there is no competition with it other people in consuming the goods so that they cannot influence satisfaction somebody in consume goods the, so can called as goods public.

Excludable is characteristic emit or obstruct somebody in the middle consume or use a goods. It means, desire somebody (user) in consume a goods can obstructed with by party other (supplier). As example is road toll Which its use can restricted with the implementation of toll rates in its use. In other words, if consumption a person's use of an item cannot be restricted by another party, then goods can be called goods public.

⁵ <https://id.m.wikipedia.org/wiki/perikanan> downloaded on 19 July 2023 o'clock 20.00 WIB

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Goods public pure is goods Which Where marginal cost in the provision is zero from the increase in usage (non-rivalry) , and no make it possible obstruct somebody in consume goods the (non-excludable) (Stiglitz, 2000).

In understanding characteristic infrastructure as goods public so infrastructure has a positive externality impact. The definition of externality itself is a condition where the actions of a company or individual have an impact on other individuals or companies without having to pay for those impacts (Stiglitz, 2000), In accordance with its nature where the infrastructure is provided by the government, parties who use the infrastructure do not provide payment directly on use infrastructure. Munnell (1990) (in his research in USA states that infrastructure generates positive externalities. Variables such as road, school, House Sick, facility water drink, gas, electricity And infrastructure non military other have impact on productivity output. External positive from infrastructure that is existence spillover effect in form improvement productivity companies without such companies must increase capital input And power Work.

Infrastructure on generally have characteristics monopoly natural (natural monopoly) Which due to by height cost still as well as level its importance in economy, And Also procurement And operation infrastructure will more economical If only done by One company than two or more companies. Therefore public goods can be said to be market failure , because of provision goods public No will provided or No will be sufficient in number with provision based on market mechanisms. Natural monopoly usually appear if scale economical Which required For provide a good or service is so great that it would be more useful if supply of goods or services is handed over to one company only (Mankiw, 2001). Based on existing experience, the items included in monopoly natural will cause height intervention government in provision goods the. Thus Also For infrastructure, intervention government for very high procurement either through direct procurement or through price regulations and laws issued by the government, Infrastructure very I need it Because support achievement growth economy And sustainable economic development because the infrastructure supports it Lots aspect economy And activity And similar the consequences If happen failure infrastructure will provide impact Which wide towards society.

Procurement infrastructure is an account results strength offer And request , added to public policy (Cunning. 1998). Public policy plays a role which is great especially because of the absence , the lack of perfection of the pricing mechanism procurement infrastructure. However improvement procurement infrastructure to income No can interpreted as elasticity income of demand (income elasticity of demand) unless infrastructure costs are the same in all country. The World Bank show cost development road in country earning intermediate not enough more 2/3 from country rich And country poor, matter This show that connection GDP per chapter with infrastructure is results interaction Which complex more than just an offer and requests.

Strategy the one who can price on company Which have structure monopoly natural things like infrastructure are not easy because in general company the need investment Which very big And goods Which produced very needed public. Implementation price Which done government for infrastructure services in addition to paying attention to economic aspects Also must notice aspect social. Because That role intervention government very needed so that implementation price too efficient. Wrong One role government so that output Which produced optimal is with enforce subsidy in provision. This subsidy is needed because, so that the output produced is maximized then the company produce price cost . Whereas average cost Which covered company is at in on marginal its cost , By because That required subsidy government in cover difference between average cost with marginal cost provision goods public.

CONCLUSIONS

Timor Leste is a small country located in Southeast Asia and has a large dependence on natural resources (SDA), especially oil and gas (oil and gas), which play a significant role in the country's economy. The existence of oil and gas natural resources contributes significantly to state revenues, export earnings, and employment. However, considering that oil and gas are nonrenewable resources, there are major challenges related to economic sustainability if these resources run out , the country could face serious financial difficulties. And if this happens it will affect several important aspects of the economy:

- **State Revenue:** With the loss of revenue from oil and gas exports, the country must find alternative sources of revenue. If there is no adequate economic diversification effort, the country could experience a fiscal crisis.
- **Unemployment:** Loss of jobs related to the oil and gas industry, including direct workers and support workers, could lead to a spike in unemployment.
- **Energy Crisis:** Dependence on natural gas for power generation and domestic needs could lead to an energy crisis if oil and gas supplies decrease.
- **Economic Stability:** Dependence on oil and gas adds to economic instability, especially if there is an unanticipated decline in oil prices or depletion of oil and gas reserves.

Sectors Capable of Boosting the Economy after Running Out of Oil and Gas Natural Resources

Given the non-renewable nature of oil and gas, it is important for Timor Leste to start developing alternative sectors that can boost the country's economy after oil and gas resources run out. Here are some sectors that have great potential to replace dependence on oil and gas:

a. Tourism

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Timor Leste has extraordinary natural and cultural riches, including beautiful beaches, historical sites and biodiversity. Tourism has the potential to become a major economic driver in the future, if managed well.

- **Natural Beauty:** The beaches and coral reefs in Timor Leste have great potential to be developed as tourist destinations, both for nature tourism, ecotourism, and marine tourism.
- **Culture and History:** The historical heritage of Timor Leste, which is part of Southeast Asia, can attract tourists who are interested in historical sites, such as former independence battles and local culture.
If this sector is boosted with proper infrastructure investment, human resource training, and international tourism promotion, tourism could become one of the main sectors that boost the economy after oil and gas.
- **Agriculture and Fisheries**
Apart from oil and gas, the agriculture and fisheries sectors also have great potential to become the main sectors in Timor Leste.
- **Agriculture:** Timor Leste has fertile land for the production of various agricultural commodities, such as coffee, cocoa, coconut, and other horticultural products. In addition, developing organic farming and agro-industry could be an important economic driver.
- **Fisheries:** The country has a long coastline and great marine fisheries potential. Developing the fisheries sector for fish exports, marine products, and fisheries cultivation can increase state revenue and create jobs.
- **c. Processing and Manufacturing Industry**
To reduce dependence on imports and create added value from domestic products, Timor Leste needs to develop the processing industry sector, especially in the fields of food and beverages, textiles, and other products.
- **Agricultural Processing Industry:** Processing local agricultural products into finished products (e.g. coffee, cocoa, or coconut oil) can create jobs and increase state revenue.
- **Manufacturing:** Improving the competitiveness of manufacturing industries, such as metal processing, plastic goods, and textiles, can also open up new economic opportunities.

d. Renewable Energy

Given the limited fossil fuel resources, developing renewable energy (such as solar, wind, and hydro) could be an excellent alternative. Timor-Leste has a high potential for solar energy, given its geographical location close to the equator. Investment in renewable energy could help Timor-Leste become more energy independent and less dependent on oil and gas.

Diversification and Sustainable Development Efforts

Timor-Leste's dependence on oil and gas is indeed a major challenge, but also an opportunity to drive change and more sustainable economic development. Economic diversification by developing alternative sectors such as tourism, agriculture, fisheries, renewable energy, and technology are important steps that need to be taken early on. The government of Timor-Leste must plan long-term policies to reduce dependence on oil and gas and ensure that the country's economic future is not dependent on limited natural resources.

Running out of oil and gas natural resources is not the end of Timor Leste's economic potential, but rather the beginning of a transformation towards a more diverse and sustainable economy.

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