



(RESEARCH ARTICLE)



## Analysis of the contribution of rubber plantations to economic growth in Tebo District Jambi-Indonesia

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### Abstract

Plantation rubber is all activity who cultivate rubber plants which play a role in producing latex which can act as a source of state and regional income, so that the rubber commodity has an important role in the economic growth of a region. The aim of this research is to determine and analyze the picture of GRDP and rubber plantations in Tebo Regency, as well as the contribution of rubber plantations to economic growth in terms of income (GRDP) and labor absorption in Tebo Regency. The results of the research show that the PDRB picture in Tebo Regency includes the average ADHB GRDP from the plantation subsector during 2011-2021 amounting to IDR 31,528,494 million per year with an average growth of 20.01% each year, while the average ADHK's GRDP is IDR 22,948,684 million per year with an average growth of 9.27%. The contribution of rubber plantations to the regional economy seen from the aspect of income (GRDP) in Tebo Regency during 2011 to 2021 includes the average contribution of rubber plantations to ADHB GRDP of Tebo Regency during 2001 to 2021 of 37.81%, while ADHK's GRDP is 37.81%. 34.68%, where rubber plantations have an impact on the economy so that rubber plantations become a basic sector and can trigger rapid economic growth in Tebo Regency.

**Keywords:** Rubber; Contribution; Location Quotient; Shift-Share; GRDP

### 1. Introduction

One of the plantation crops that has potential for the Indonesian economy is rubber, where based on data from the Central Statistics Agency in 2021 the area of rubber plantations in Indonesia is 3776.80 thousand hectares (BPS, 2022). The area of rubber plantations is spread across several provinces in Indonesia, including Jambi Province. Based on BPS (2022), in 2021 the area of rubber land in Jambi Province will be 655,688 hectares or an increase of 2.59% from the previous year. Apart from land area, the production of rubber plants also continues to increase so that it has become one of the leading sectors, apart from oil palm, coconut, coffee and cocoa. The contribution of the agricultural sector of Jambi Province can be seen from the income aspect, namely from the Gross Regional Domestic Income (GRDP) aspect. Percentage of income from the plantation subsector The GRDP of Jambi Province has changed from year to year. The plantation subsector makes a large contribution to the agricultural sector, an average of 64.5 percent of the total other agricultural subsectors. This percentage shows that the plantation subsector has a positive impact on driving the economy of Jambi Province.

One of the areas in Jambi Province where there are many rubber plantations is Tebo Regency. In 2021, Tebo Regency has a rubber plantation area of 115,914 hectares with a production output of 51,904 tons. The productivity of rubber plantations in Tebo Regency is only 0.44 tons/ha while in Jambi Province it is 4.51 tons/ha. This shows that the productivity of rubber plantations in Tebo Regency is still low and below the average productivity of rubber plantations in Jambi Province, so productivity in Tebo Regency still needs to be increased to support the contribution of agriculture to economic growth in Tebo Regency. This condition is because rubber plantations are the plantation subsector with

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the highest land area in Tebo Regency compared to oil palm, coconut, cocoa and coffee plantations. The area of rubber plantations in Tebo Regency is the land area of PR, PBN and PBS. Rubber plantations in Tebo Regency have a very important role in the economy of Tebo Regency and can contribute to the GRDP of Tebo Regency.

Agriculture is a sector that makes a large contribution to Tebo Regency's GRDP among other sectors, reaching 5.51 trillion rupiah from Tebo Regency's GRDP in 2021. This contribution increases every year, but in 2019 the contribution of agriculture decreased by 0.11 percent. In the last five years, the average percentage contribution of agriculture to Tebo Regency's GRDP was 51.3 percent. This shows that more than 50 percent or half of the GRDP of Tebo Regency is owned by the agriculture, forestry and fisheries sectors so that agriculture has a very significant influence on the GRDP in Tebo Regency. As previously explained, rubber plantations in Tebo Regency have a very important role in the economy. However, the productivity of rubber plantations in this district is still low, so this condition will have an impact on rubber plantation income and its contribution to the economy of Tebo Regency. The rate of economic growth is calculated based on changes in GRDP at constant prices for the year in question compared to the previous year (Sukirno, 2013).

In 2014-2021, Tebo Regency's economic growth rate in 2020 was the lowest economic growth rate in the last eight years, namely -0.44 percent. Seeing the condition of Tebo Regency's economic growth which tends to fluctuate means that Tebo Regency's total income is unstable. Regional economic development can be said to be successful if the economic growth of a region increases every year. This condition is thought to be due to the influence of the high and low productivity of rubber plantations as superior potential in this district, where these rubber plantations can contribute to the economy, become a basic or non-basic sector, and have an impact on the economy of Tebo Regency.

## 2. Material and method

This research was carried out in Tebo Regency, this location was chosen on a purposive basis because the location is an area with a fairly large area, with the potential to develop rubber productivity in Tebo Regency. and support revenue growth. The time period used in this research is 2001-2021, this is due to the availability of data in that year. The data used is secondary data sourced from the Plantation Service of Jambi Province and Tebo Regency in the form of annual or time series with data collection using library research.

Data analysis in this research was carried out quantitatively, where the contribution of rubber plantations was reviewed through the income aspect (GRDP) to the economy in Tebo Regency:

$$Ks = \frac{NTBks}{PDRB} \times 100\%$$

Information

Ks = Contribution of rubber income to the economy of Tebo Regency

NTBks = Gross Added Value of rubber plantations in Tebo Regency (Million Rupiah)

After calculating the contribution of rubber plantations to GRDP in Tebo Regency, the next step is to compare the contribution of rubber plantations in Tebo Regency using the *Location Quotient* (LQ), *Shift Share* and *Multiplier Effect methods*. The LQ formula used is as follows:

$$LQ = \frac{vi/vt}{Vi/Vt}$$

Where:

LQ = Location Quotient amount

vi = Rubber plantation income in Tebo Regency (value/yield)

vt = Total income from rubber plantations in Tebo Regency (value/yield)

Vi = Rubber plantation income in Jambi Province (value/yield)

Vt = Total income from rubber plantations in Jambi Province (value/yield)

*Shift Share* analysis is used by comparing the GRDP growth rate in Tebo Regency to the reference area, Tarigan (2005). The analysis is intended to be able to see the potential for economic activity in the Tebo Regency area and the reference is Jambi Province. Analysis using the formula:

$$\Delta Er.t_i = (NS + Pr.i + Dr.i)$$

$$NS = Er.i,tn (EN.t / EN.tn) - Er.it-n$$

$$Pr.i,t = ((Er.it / EN.it-n) - (EN.it-n)) \times Er.it-n$$

$$Dr.i,t = (Er.it - (EN.it / EN.i,tn)) - Er.it-n$$

Where :

- $\Delta$  = Increase (end of year t minus the number at the start of year tn)  
 N = National level region or higher (Jambi Province)  
 r = region or analysis area (Tebo Regency)  
 E = Employment (amount of employment, income and GRDP)  
 i = agricultural sector  
 tn = initial year

In order to determine the impact of the base sector on the regional economy, the multiplier effect formula is used, namely :

$$Ms = \frac{Y}{Y_B} \text{ atau } Ms = \frac{Y}{Y - Y_N} \text{ atau } Ms = \frac{Y/Y_N}{Y - Y_N} \text{ atau } Ms = \frac{1}{1 - Y_N/Y}$$

$$\text{With } Y = Y_N + Y_B$$

Where:

- Ms = Base sector *multiplier*.  
 YN = Tebo Regency Income  
 YB = Income of Jambi Province  
 Y = Total Income

The coefficient of the rubber plantation income multiplier illustrates that every Rp. 1-unit investment in rubber plantations will be followed by an increase in regional income equal to the *multiplier value*.

### 3. Results and Discussion

#### 3.1. Overview of Rubber Plantations and Gross Regional Domestic Product (GRDP) in Tebo Regency

In the 2001-2021 period, the average production of rubber plantations in Tebo Regency was 48,785 tons with an average annual growth of 0.24 percent. Table 10 shows that rubber plantation production in Tebo Regency has fluctuated or fluctuated, where in 2001 to 2003 rubber plantation production in Tebo Regency decreased by 0.28 percent and in 2005 it increased to 5.62 percent. However, in 2006 it decreased again by 0.34 percent. In 2007, rubber plantation production in Tebo Regency increased by 4.96 percent and this increase was stable until 2016 at 2.29 percent. However, in 2017, rubber plantation production in Tebo Regency decreased to 1.35 percent and in 2018 there was a slight increase to 0.38 percent. From 2019 to 2021 it fluctuated again with a decrease of 0.13 percent.

Meanwhile, during 2001-2021 the average price of rubber commodities in Tebo Regency was IDR 9,621 per kg, whereas from 2001 to 2021 the price of rubber commodities in Tebo Regency tended to fluctuate. Meanwhile, the average value of rubber in Tebo Regency from 2001 to 2021 is IDR 469,337,777,116 per year. This value is obtained from multiplying the production of rubber commodities by the price of rubber in Tebo Regency per year. Furthermore, during 2001-2021, the average GRDP of ADHB in Tebo Regency was Rp. 6,698,089 million rupiah per year with an average annual growth of 16.52 percent, while the average GRDP of ADHK was Rp. 4,807,946 million rupiah with average growth of 14.72 percent. From 2001-2019, the PDRB ADHB and GRDP ADHK Tebo Regency continued to increase. Although in 2020 it decreased again by 0.04 percent. The decline in Tebo Regency's GRDP in 2020 was due to changes in the structure and economic conditions of each sector due to the extraordinary outbreak that attacked all regions in Jambi Province, including Tebo Regency.

### 3.2. Contribution of Rubber Plantations to the Regional Economy Seen from the Income Aspect (GRDP of Rubber) in Tebo Regency

The GRDP contribution of rubber plantations to the GRDP of Tebo Regency in 2001-2020 can be seen in Table 1 below:

**Table 1** Contribution of Rubber Plantations to GRDP in Tebo Regency 2001-2020

Years	Rubber PDRB (Million Rupiah)	Plantation PDRB (Million Rupiah)	ADHB PDRB (Million Rupiah)	ADHK PDRB (Million Rupiah)	ADHB Contribution (%)	ADHK Contribution (%)
2001	775.265	537.116	179.448		1.44	4.32
2002	508.900	673.291	191.613		75.58	2.66
2003	679.697	754.378	200.163		90.10	3.40
2004	745.940	1.089.136	633.254		68.49	1.18
2005	3.166.089	1.203.621	663.283		2.63	4.77
2006	2.905.200	1.367.444	695.627		2.12	4.18
2007	3.038.257	1.816.226	822.756		1.67	3.69
2008	4.513.914	1.951.808	817.651		2.31	5.52
2009	5.106.587	2.185.811	858.592		2.34	5.95
2010	2.706.832	2.619.142	898.592		1.03	3.01
2011	6.664.279	6.623.809	6.248.308		1.01	1.07
2012	7.300.296	7.137.747	6.729.417		1.02	1.08
2013	7.528.505	8.236.641	7.242.752		91.40	1.04
2014	6.283.110	9.237.438	7.882.591		68.02	79.71
2015	7.062.505	10.402.081	8.299.159		67.90	85.10
2016	5.055.864	11.634.168	8.744.340		43.46	57.82
2017	9.494.941	12.995.953	9.240.247		73.06	1.03
2018	7.966.215	13.881.660	9.704.247		57.39	82.09
2019	6.266.584	14.593.085	10.160.987		42.94	61.67
2020	5.440.705	14.758.935	10.156.575		36.86	53.57
2021	6.918.111	16.960.380	10.597.493		40.79	65.28
Total	100.127.804	140.659.870	100.966.856		771.57	528.13
Mean	4.767.990	6.698.089	4.807.946		36.74	25.15

Source : Data Processing 2022

The average contribution of rubber plantations to the PDRB ADHB of Tebo Regency from 2001 to 2021 is 36.74 percent. Meanwhile, the contribution of rubber plantations to PDRB ADHK Tebo Regency from 2001 to 2021 was 25.25 percent. This shows that the contribution of rubber plantations to ADHB GRDP is higher than to ADHK PDRB Tebo Regency. The results of this research show that the contribution of rubber plantations to the PDRB ADHB of Tebo Regency is higher when compared to the contribution of rubber plantations to the economy in Muaro Jambi Regency, as per the research results of Manalu (2021) that the contribution of rubber plantations to the economy in Muaro Jambi Regency is 10.70 percent. When compared with the contribution of the oil palm plantation sub-sector to the economy, the contribution of rubber plantations to the ADHB GRDP of Tebo Regency is also higher than the results of Silaban's (2022) research that the contribution of oil palm plantations to the GRDP of Muaro Jambi Regency is 9.69. Meanwhile, research results from Sidabutar (2021) state that the contribution of oil palm plantations to the GRDP of Batanghari Regency is 9.23%. From this contribution value, further analysis was carried out regarding the production capabilities of rubber

plantations in Tebo Regency with wider rubber plantation production such as in Jambi Province. Furthermore, it is also necessary to carry out an analysis to determine the role of rubber plantations in the economy of Tebo Regency, as well as the influence of the contribution of rubber plantations to the economy of Tebo Regency with the following results:

### 3.2.1. Location Quantity (LQ)

The LQ analysis in this research was carried out based on the amount of rubber production in Tebo Regency and compared with rubber production results at the provincial level. The results of the LQ analysis in this research can be seen in Table 2 as follows.

**Table 2** Results of *Location Quotient* (LQ) Analysis of Rubber Plantations in Tebo Regency 2001-2020

Years	LQ PDRB ADHB	LQ PDRB ADHK
2001	2.10	1.43
2002	1.08	0.68
2003	1.33	0.84
2004	1.25	0.87
2005	4.68	4.64
2006	3.11	3.40
2007	2.85	3.41
2008	3.59	4.78
2009	3.19	5.05
2010	0.68	2.49
2011	1.46	5.69
2012	1.66	5.76
2013	1.39	1.00
2014	1.03	0.74
2015	0.99	0.78
2016	0.59	0.52
2017	1.11	0.93
2018	0.82	0.76
2019	0.65	0.58
2020	0.50	0.49
2021	0.51	0.58
Total	34.55	45.42
Mean	1.65	2.16

Source : Data Processing 2022

The results of the LQ analysis show that the average LQ value of ADHB GRDP for rubber plantations in Tebo Regency in 2001-2021 was 1.65, while the average LQ value for ADHB GRDP of rubber plantations in Tebo Regency in 2001-2021 was 2.16. This shows that the LQ value of rubber plantations is greater than 1 ( $LQ > 1$ ). This means that rubber plantations are a basic commodity and a mainstay commodity for the economy of Tebo Regency, so that rubber plantations in Tebo Regency are able to compete with other districts/cities in Jambi Province in terms of productivity. The LQ value in this study is lower than Sidabutar's (2021) research, which stated that LQ ADHK was 2.24 and LQ ADHB was 2.22. Furthermore, the results of Silaban's research (2022) show that the LQ GRDP value is 1.90. However, when

compared with the Manalu research (2021), the LQ value in this study is higher, because the LQ value in the Manalu research is only 0.60.

### 3.2.2. ShiftShare

Furthermore, the results of the *shift share analysis* in the research can be seen in Table 3 below.

**Table 3** Results of Rubber Plantation Shift Share Analysis from ADHB and ADHK GRDP Aspects in Tebo Regency 2001-2021

Year	ADHB GRDP		ADHK GDP	
	RPs	RPR	RPs	RPR
2001	0.00	0.00	0.00	0.00
2002	-0.03	0.20	-0.03	0.06
2003	0.20	0.11	0.20	0.04
2004	-0.02	0.31	-0.02	0.68
2005	0.20	0.10	0.20	0.05
2006	-0.04	0.12	-0.04	0.05
2007	0.02	0.25	0.02	0.15
2008	-0.09	0.07	-0.09	-0.01
2009	-0.49	0.11	-0.49	0.05
2010	0.37	0.17	0.37	0.04
2011	0.25	0.60	0.25	0.86
2012	-0.26	0.07	-0.26	0.07
2013	-0.08	0.13	-0.08	0.07
2014	-0.48	0.11	-0.48	0.08
2015	-0.07	0.11	-0.07	0.05
2016	0.10	0.11	0.10	0.05
2017	0.07	0.10	0.07	0.05
2018	-0.03	0.06	-0.03	0.05
2019	0.13	0.05	0.13	0.04
2020	0.00	0.01	0.00	0.00
2021	-0.05	0.13	-0.05	0.04
Mean	-0.01	0.14	-0.01	0.12

The *shift share analysis* show that the *shift share value* of rubber plantations in Tebo Regency in 2001-2021 was 0.14 for ADHB GRDP and 0.12 for ADHK GRDP and was in the positive (+) category. The shift share value is lower than Manalu's research (2021) with a value of 2.168. Meanwhile, the results of Sidabutar's (2021) research show that the shift share value is 1.528, while Silaban's (2022) research is 5.80 and 1.67. This shows that the development of rubber plantations in Tebo Regency can trigger growth in the agricultural sector because it has rapid growth. This can also be seen from the increasing area of rubber plantations planted. Almost all areas in Tebo Regency are dominated by rubber plants. This is thought to be because the majority of people prefer to carry out rubber farming.

### 3.2.3. Multiplier Effect

*Multiplier effect analysis* of this income indicator is seen based on ADHB GRDP and ADHK GRDP with the results shown in Table 4 below:

**Table 4** Results of Multiplier Effect Analysis of Rubber Plantations from ADHB GRDP and ADHK GRDP Aspects in Tebo Regency 2011-2021

Year	ME ADHB	ME ADHK
2001	0.21	2.05
2002	0.14	1.39
2003	0.15	1.48
2004	0.17	1.66
2005	0.56	5.62
2006	0.53	5.34
2007	0.55	5.46
2008	0.88	8.84
2009	1.49	4.92
2010	0.50	4.97
2011	0.91	0.01
2012	1.26	0.01
2013	1.41	0.01
2014	1.73	0.02
2015	2.09	0.02
2016	1.34	0.01
2017	2.33	0.02
2018	2.02	0.02
2019	1.38	0.01
2020	1.20	0.01
2021	1.60	0.02
Mean	1.07	2.00

The results of the multiplier effect analysis show that the average Ms value of ADHB GRDP is 1.07. This means that every increase in rubber plantation investment of IDR 1 billion will be followed by a change in total regional income in Tebo Regency of IDR 1.07 billion, assuming that other sectors are considered non-basic. Meanwhile, the MS value of ADHK's GRDP is 2.00, which means that every increase in rubber plantation investment of Rp. 1 billion will be followed by a change in total regional income in Tebo Regency of Rp. 2.00 billion, assuming that other sectors are considered non-basic. The multiplier effect value of ADHB's GRDP and ADHK's GRDP fluctuates but tends to increase, so that every investment in rubber plantations can increase Tebo Regency's income. The multiplier effect value in the research is lower than the Manalu (2021) research with a value of 9.60. Meanwhile, the results of Sidabutar's (2021) research show that the multiplier effect value is 35.53, while Silaban's (2022) research is 12.63.

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#### 4. Conclusion

Based on the research results, it can be concluded that the contribution of rubber plantations to the regional economy as seen from the aspect of income (GRDP) in Tebo Tebo Regency during 2011 to 2021 includes the average contribution of rubber plantations to the ADHB GRDP of Tebo Regency during 2001 to 2021 of 36.74 percent. Meanwhile, the contribution of rubber plantations to PDRB ADHK Tebo Regency from 2001 to 2021 is 25.25 percent, where these rubber plantations have an impact on the economy, so that rubber plantations become a basic sector and can trigger rapid economic growth in Tebo Regency.

## Compliance with ethical standards

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### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

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## References

- [1] Indonesian Central Statistics Agency. 2022. Rubber Plantation Plantation Area by Province 2015-2021. Indonesian Central Statistics Agency. Indonesia
- [2] Jisiekie, C. F., & Betiku, E. 2020. Rubber seed oil extraction : effects of solvent polarity, extraction time and solid-solvent ratio on its yield and quality. *Biocatalysis and Agricultural Biotechnology*, 24 (February), 101522.
- [3] Junaidi. 2020. Strategy to Increase the Added Value of Rubber Plantations Through Business Diversification. <https://journal.trunojoyo.ac.id/agriekonomika>
- [4] Kouassi, G. 2020. Effect of Hevea brasiliensis seed meal or Euphorbia heterophylla seed supplemented diets on performance, physicochemical and sensory properties of eggs, and egg yolk fatty acid profile in guinea fowl (*Numida meleagris*). *Poultry Science*, 99(1), 342–349.
- [5] Manalu, L. 2021. Analysis of the contribution of rubber plantations to the economy of Muaro Jambi Regency. <https://jurnal.unigal.ac.id/index.php/mimbaragribisnis/issue/view/371>
- [6] Nainggolan, S. 2023. Analysis of Rubber Prices Based on Rubber Quality at The Auction Market in Penerokan Village, Bajubang Subdistrict, Batanghari District. Thesis. Faculty Jambi University Agriculture.
- [7] Nainggolan, S. 2022. Income And Welfare Analysis of Rubber Farmers of Sarolangun Regency Jambi-Indonesia. *Randwick Internasional of Social Science journal*, 3(2), 427-434.
- [8] Sidabutar, F. 2021. Analysis of the Role of Oil Palm Plantations on Economic Growth in Batanghari Regency. Thesis. Faculty Jambi University Agriculture.
- [9] Silaban, G. 2022. Analysis of the Contribution of Community Oil Palm Plantations to the Economic Development of Muaro Jambi Regency. Thesis. Faculty of Agriculture, Jambi University.
- [10] Sukirno, Sadono. 2000. *Modern Macroeconomics*. Jakarta: Rajawali Press.
- [11] Tarigan, Robinson. 2005. *Regional Economics Theory and Applications*. Jakarta: Bumi Literacy.
- [12] ZA, Abel. 2019. The Influence of Monetary Variable Indicators on The Value of Crude Palm Oil (CPO) and Rubber Exports in Jambi Province. Thesis. Faculty Jambi University Agriculture.