

# The Links Between Food And State Defense In Indonesia: An Input-Output Analysis

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## Abstract

Food scarcity is a non-military threat that potentially abrupts the internal state stability. Regional and international dynamics are also accelerating its possibility. However, issues regarding the food sector and national defense are one of the rarest topics studied by the Indonesian community. As an agrarian country, this topic should be considered urgent to be discussed among scholars and authorized in facing food scarcity. Thus, it is necessary to scrutinize this topic using the economic and state defense framework. This research aims to find the links between the Indonesian food sector with the national defense sector. The quantitative method had been done used the Input-Output Table from the year 2016 was obtained from Indonesia Statistic Bureau (Badan Pusat Statistik). The result shows that there is a link between the food and defense sector, but the value of each sector is not significant. The defense sector has a higher value than the food sector in terms of total forward and backward linkage. The defense sector also has a higher multiplier output value than the food commodities listed in this research.

**Keywords:** food, defense industry, Input-output analysis.

## Introduction

Indonesia is known worldwide as an agrarian and maritime country with the potential for natural wealth and abundant food sources. On the other hand, with about 17.000 islands located in the path of an active volcanic chain, Indonesia's soil is rich in nutrients needed for food production activities. Since the early history of the birth of Indonesia, the food sector has become the main support for the life of the nation. The food sector originates from agriculture, plantations, animal husbandry, and fisheries is not only seen as a basic material for meeting the primary needs of the community but also affects the social, economic, cultural, and political conditions of the country (Krisnamurthi.B, 2012).

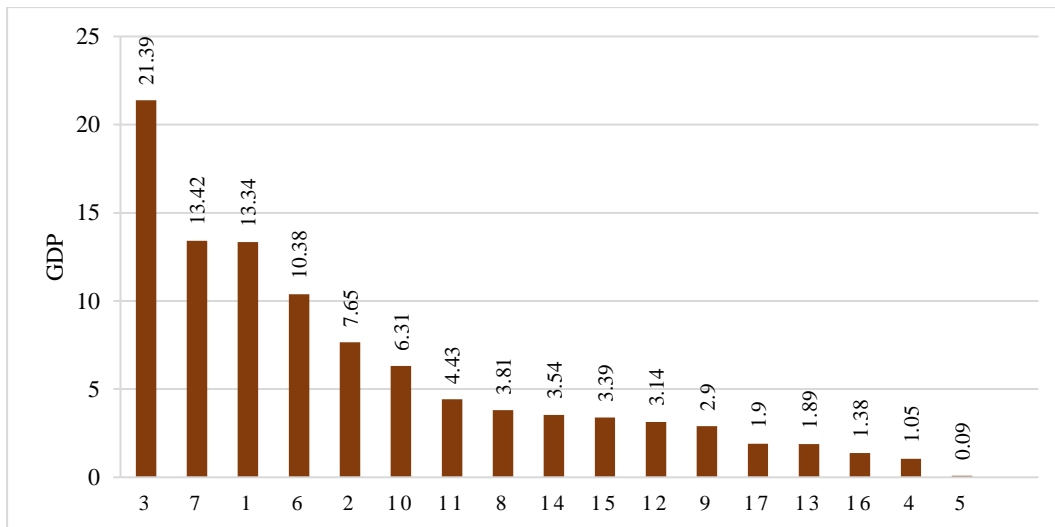
As the country with the fourth-largest population in the world, food is a key sector that plays a role in the country's economic development. The dynamics of the food sector

ecosystem (which can be viewed as the primary economic sector), will affect the other subject of economic. Identified as a fundamental contribution to Indonesia's growth, agriculture has provided more than 40 percent of the new jobs for the labor force from 1969 to 1994 (Timmer, 1998 in Gardner, 2003). In contrast, the contribution trend of the food sector, specifically the agricultural sector to the Indonesian economic structure, tends to decline. Gross Domestic Product (GDP) in the agricultural sector in 1975 reached 30% and 23% in 1985. The decline continued in the following decade, namely 15.3% in 2010 and 13.1% in 2017. On the basis of current prices, the structure of the Indonesian economy has not changed significantly since 2016 – 2020 (IFRI & Bappenas, 2019). The manufacturing industry is the largest contributor to GDP every quarter from 2016 to 2020. In the same period, the agricultural sector occupies the third-largest

position, with a range of 13% (see figure.1)( Indonesian Statistic, 2020). The data clearly shows the importance of the agricultural sector in the country's economy. However, the role of the agricultural sector is not sufficiently seen

from its contribution to GDP. It is also necessary to analyze the impact on other sectors as input providers (goods and services) between sectors.

Figure 1. Indonesia's economic structure in 2020 according to GDP



- 1: Agriculture, Forestry, and Fisheries
- 2: Mining and Quarrying
- 3: Processing Industry
- 4: Electricity and Gas Supply
- 5: Water Supply, Waste Treatment, Waste and Recycling
- 6: Construction
- 7: Wholesale and Retail Trade, Car and Motorcycle Repair
- 8: Transportation and Warehousing
- 9: Accommodation and Food & Drink Provider
- 10: Information and Communication
- 11: Financial Services and Insurance
- 12: Real Estate
- 13: Company Services
- 14: Government Administration, Defense, Social security mandatory
- 15: Education Services
- 16: Health services and Social Activities
- 17: Other Services.

Based on the Presidential Regulation of the Republic of Indonesia Number 48 of 2014, the national defense sector, especially the main weapon system tool, is included in Indonesia's main economic activities which will be focused

on Indonesia's sustainable development agenda towards 2045. Moreover, based on the 2020 GDP chart above, the defense sector is included in category number 14 (government administration, defense, and mandatory social security), which has contributed to GDP in 9th place. On the other hand, from the perspective of state defense policy, as stated in Presidential Regulation Number 8 of 2021 concerning General Policy on National Defense, the food sector is one of the non-military elements included in the national defense agenda when facing threats in the form of a food shortage. In this context, the use of an economic framework is needed to find the behavior and measurable structures of the two sectors, so that the results can be used to optimize policy strategies for each sector that will be implemented in the future. The urgency to analyze the relationship between the food sector and the national defense sector is reinforced by the dynamics of the strategic environment both at the national and regional levels. Both levels are interconnected and give different difficulties that require a divergent problem-solving approach.

Food scarcity is a type of threat that connects the food sector with the national defense sector. Food scarcity can be a source of friction that triggers a conflict of interest if its management fails (Indonesia Ministry of Defense, 2012). More than seven decades after the declaration of independence of the Republic of Indonesia, the challenges of national development and the food sector in Indonesia are considered complex. The challenge, as well as the threat of food scarcity, is not only seen in the increase in population (the global population is 7.4 billion with Indonesia alone contributing almost 260 million). Ecological risks, climate change, extreme weather, and decreased food production capacity add to the long list of causes of food problems (IFRI & Bappenas, 2019). The issue of a food scarcity has been warned by the World Food and Agricultural Organization (FAO) in 2020 as a result of the Covid-19 pandemic (Wahyudi E.A, 2020) and is still seen as a potential threat that could occur at any time.

The food crisis has had a negative impact on Indonesian history. The agriculture sector's troubles prompted the food crisis, which triggered economic instability and posed a challenge to national sovereignty. Domestic rice output was insufficient to fulfill Indonesian food demands during the Old Order era (1945-1965). As a result, to address local food demands, the Old Order administration continued to import rice (Suwidjana, 1981). Because rice imports were so crucial at the time, the job of importing rice was shifted from the Minister of Agriculture to the Minister of Economy. However, the rice import policy does not fulfill the community's food demands. In 1961, the government was more concerned with the Cilegon Steel Project and the provision of defensive equipment to deal with the war between Malaysia and West Papua than with the needs of the people (Suwidjana, 1981). When the economic crisis struck and the rice import strategy was forced to halt, there was a food scarcity that led to the Old Order regime's demise in 1965. The examples that happened in the early 1960s clearly illustrated the

consequences of food import dependency and a failure to prioritize the food sector in order to maintain stability and sovereignty.

The New Order administration, the pattern was almost repeated. Due to the economic crisis and food shortages caused by the extended drought in 1997, basic necessities became more expensive, resulting in significant social protests. Even though the government had concentrated on food policy through the implementation of the Five Year Development Plan during the Suharto era, the confluence of these two crises contributed to the end of the New Order era (REPELITA). In this setting, the national defense sector is required to serve as the primary defender of state sovereignty. As a result, several research in related sectors are required to ensure that the food disaster does not occur again.

The food industry is viewed as a competitive sector that operates under the premise of perfect competition when utilizing the market method. The current food scarcity is driven by policy considerations such as subsidies and the inefficiency of most food production, as evidenced by efficient use of resources to maximize profits (Blandford and Hill, 2006 in Loizou et al., 2019). The integrated structure method, on the other hand, demonstrates the unique characteristics of the food industry (agricultural), which cannot be studied and evaluated in absolute terms using only financial indicators and characteristics (Gardner, 2003). Food is a sector that is influenced by more than just local factors and market principles. The majority of food-related problems are impacted by structural factors, global markets, and market distortions caused by policy actions (Darnhofer et al., 2010). As a result, a quantitative measurement that can accommodate the attributes of food as a sector with a paradoxical economy in the form of price instability dynamics as well as very significant foreign exchange earnings is required. A framework combining economic and policy methods is required to determine which sub-sectors can stabilize or have the ability to promote development in the food sector

(Loizou et al., 2019). Input-Output Analysis (I-O) is the appropriate tool for determining the relationship between two or more essential sectors.

Economic practitioners and scholars have commonly used I-O tables to investigate the interrelationships between economic sectors in order to formulate policies. Table I-O, as a quantitative instrument, gives full information on the structure of the economy, both nationally and regionally, throughout a specified time period (Indonesia Statistic, 2016; Daryanto, 2010). The I-O table may be used to assess various economic structures (output structure, added value of each sector, intermediate input structure, supply and demand for products and services). Furthermore, the I-O table may be used to evaluate the impact of a sector's behavior on the economic structure, as well as a reference to which sectors have the most influence on economic growth (Wikarya, n.d.). Data from the Input-Output table can be collected in the form of a total linkage index, which is used to build economic growth strategies (Pangaribuan, 2014)

Many scholars, both inside and outside the nation, have used I-O analytic methodologies to study the interaction between the agriculture sector and other economic sectors. However, no research has been conducted that particularly evaluates the link between the food and national defense sectors utilizing the I-O approach. In Indonesia, most research linking the two industries is qualitative. Meanwhile, the majority of I-O analysis research focuses on the interaction between the food sector in general and the economic sector in general, both at the national and regional levels. Arsyil Tanjung et al. (2021) did qualitative study on the issue of food and national security. The findings of this study concentrate on the influence of the Republic of Indonesia's Ministry of Defense (RI) on food estate policy. Similarly, Dina Hidayana et al. (2021) conducted a qualitative study on the influence of defense institutions in the food industry. In the face of the prospect of food shortages, the Indonesian Ministry of Defense

plays a key role in ensuring the availability of national food reserves. The authors discovered none while doing quantitative research, especially utilizing the I-O Analysis tool to establish the link between the food industry and national security.

Is there a link in the context of the economy, between the food sector and the national defense sector? If so, what is the form of the relationship? What is the structure formed from the linkage of the two sectors? These questions form the basis of research that has the opportunity to be elaborated. By considering the urgency and research gaps in the need for quantitative analysis of the food sector on the national defense sector, this study aims to find out the impact of the linkage between the food sector and the defense sector (backward and forward linkage) as well as the multiplier value resulting from the linkage of the two sectors.

This paper is consist of three subsection: introduction, method, and result and discussion. The linkage of food sector and national defense sector is analysed by forward and backward linkage, total forward and total backward, and multiplier output analysis which is discussed in the result and discussion subsection.

## Method

This research uses quantitative methods with I-O analysis tools from Wassily Leontief. I-O analysis is one of the methods of economic analysis to see the reciprocity and interrelationships between economic sectors with one another in a region and a certain period of time (Cahyono & Sumargo, 2005; Daryanto, 2010; Firmana & Tjahjawardita, 2016; Statistik, 2016; Wikarya, 2015). Table I-O acts as a provider of statistical data that comprehensively describes the interrelationships and analysis of the impact of changes in each economic sector. In applying the I-O model, at least three basic conditions or assumptions must be met, namely: (1) Uniformity/homogeneity, (2) Comparability/proportionality, and (3) Addition/additivity (Cahyono & Sumargo,

2005). The assumption of uniformity/homogeneity means that each sector is considered to produce only one type of output in the form of goods or services with the same single input and no output substitution between sectors. The assumption of proportionality / proportionality means that changes in a level of output produced are preceded by changes in inputs used by the sector and are proportional. The assumption of addition/additive means that the total impact of the implementation of production in various sectors is produced by each sector separately (Cahyono & Sumargo, 2005; Rachman, 2016).

The I-O table used in this study is the 2016 I-O Table by Indonesian Bureau Statistic (Badan Pusat Statistik /BPS). The table consists

of 185 x 185 economic sectors, which are then aggregated by the authors into an I-O table with 9x9 sectors. The basis for determining commodities in the food sector group refers to national strategic commodities that have a significant impact on the structure of the Indonesian economy, namely: rice, fruits, oil palm (Irawan & Soesilo, 2021), coffee, cocoa (Hadinata & Merry Marianti, 2020). Meanwhile, other food commodities are grouped into one category, namely "other foods". For the national defense sector, it is obtained from the defense industry sector and government services for the state defense function. The aggregation of each sector is described in detail in the table below.

Table 1. Sector Aggregation Codes in the Input-Output Table

No	9 Code
1	1. Rice
2	2. Fruits
3	3. Palm Oil
4	4. Coffee
5	5. Cocoa
6	6. Other food commodities
7	7. Defense Industry
8	8. Government Services and state defense function
9	9. Non-foods and Non-defense

Note \* : the non-food sector non-defense is an aggregate of all sectors that are not included in the food sector and the national defense sector.

### Total Forward and Backward Linkage Analysis

The authors limited the I-O analysis in this study to determining the impact (forward and backward linkage). An impact study was undertaken to learn more about the relationship between the food and national defense sectors. Total forward linkage is the type of forward linkage that will be examined. The Index of Forward Linkage (IFL), also known as the degree of sensitivity, indicates the extent of a sector's forward linkage measure. If a sector's IFL index is greater than one, it implies that the sector is highly linked to downstream sectors. It

may also be stated that the sector has a strong interaction with the final goods industry.

The backward linkages that will be analyzed are total backward linkage. Total backward linkage of a sector is seen based on Index of Backward Linkage (IBL). If the IBL score is more than one, it indicates that the sector's ultimate need for encouraging production growth is larger than the average for other industries. A sector's IBL value is greater than one, suggesting a strong relationship to upstream sectors. This industry can be classified as strategic since it is a major driver of economic growth. Column displays the IBL value.

$$IFL_i = \frac{\sum_{j=1}^n b_{ij}}{\sum_{i=1}^n \sum_{j=1}^n b_{ij}} n \quad IBL_i = \frac{\sum_{i=1}^n b_{ij}}{\sum_{i=1}^n \sum_{j=1}^n b_{ij}} n$$

Where:

IFL<sub>i</sub> : Total forward linkage index of sector-i

IBL<sub>j</sub> : Index of total backward linkage of sector-j

b<sub>ij</sub> : the inverse matrix elements of row-i and column-j Leontief

n : Leontief matrix size (I-O table sector size)

i : the number of sectors in the row (input structure)

j : number of sectors in column (demand structure)

n : number of sectors

### Multiplier Analysis

Multiplier analysis is the core of the I-O table analysis, aiming to measure the total impact on the structure of output, income, and labor (labor) if there is an increase in one unit of input or one unit of output in a sector. It can also be said that the multiplier is a measure of the response to stimulus changes in an economy expressed in a causal relationship. The multiplier assumption in the I-O table is a response to increasing final demand for an economic sector (Firmana & Tjahjawardita, Table 2. Forward and Backward Linkage Value

2016). In this study, the authors focus on the output only. To calculate the multiplier, the output is obtained by the formula which is also called the Leontief inverse matrix.

$$X = (I - A)^{-1} Y$$

Where:

X: Output

Y : Final demand

(I - A)<sup>-1</sup> : Leontief Inverse Matrix

### Results and Discussion

#### Forward and Backward Linkage Analysis

The results of the 2016 BPS I-O table processing show that the food commodity that has the highest direct forward linkage coefficient is cocoa, which is followed by fruit, coffee, oil palm, and rice commodities. The state defense industry (defense), and government services with the function of defense are ranked sixth and seventh, respectively. For the eighth and final position are other food groups and non-food non-defense groups. In general, the agricultural commodities analyzed in this study have a direct forward linkage coefficient value above the average. In other words, these commodities are widely used as a direct supply of raw materials for the production processes of other economic sectors downstream.

No	Sector	Direct forward linkage	ranking	Direct backward linkage	ranking
1	Rice	0,8626	5	0,7885	4
2	Fruits	0,9548	2	0,8383	3
3	Palm Oil	0,8769	4	0,7376	5
4	Coffee	0,9311	3	0,8420	2
5	Cacao	0,9787	1	0,8490	1
6	Other food commodities	0,6606	8	0,4735	7
7	Non-food and non-defense	-0,7827	9	0,4606	8
8	Defense Industry	0,7878	6	0,5622	6

9	Government Services and state defense function	0,6914	7	0,4094	9
	Mean	0,6624		0,6624	

The value of the direct forward linkage coefficient for cocoa commodity is 0.9787. This figure shows that if the final demand for cocoa commodities is increased by 0.9787 rupiah, it will encourage the overall economic growth by 1 rupiah. Cocoa has the largest backward linkage coefficient value, which is 0.8490. Thus, if 1 rupiah is injected into the final demand for cocoa, it will increase the total economy by 0.8490 rupiah. Thus cocoa is a leading food commodity in 2016.

The results above are relevant because food commodities are widely used for the production process of the manufacturing sector. The manufacturing sector contributed the largest GDP to the structure of the Indonesian economy in 2016. The manufacturing sector includes economic activities that convert raw materials into new products which generally use sources derived from agricultural, forestry, fishery, mining products (Central Bureau of Statistics, 2020). If examined more specifically, food commodities have a higher direct correlation coefficient value because the production of the commodity sector is needed for various types of processing industries: foodstuffs and beverages, medicines, cosmetics, convection, and chemical industries. The manufacturing industry in Indonesia accounts for the majority of GDP, so that economic activity in this sector becomes the backbone of the economic structure. In other words, the manufacturing sector absorbs a larger flow of production than other sectors, particularly the food sector, which is the upstream sector. This result also does not rule out the impact of the downstream industrial policy which was initiated by the Indonesian government in 2010. In general, the industrial downstream policy is focused on increasing the production output of downstream industries which will automatically absorb more production output

from the raw materials sector (Hadinata & Merry Marianti, 2020; Irawan & Soesilo, 2021).

The backward linkage study shows a similar pattern to the forward linkage analysis, but with some ranking variations. Cocoa is still the commodity with the highest backward linkage coefficient. Coffee, fruits, rice, and oil palm are also in the second to fifth places. The military industry, other food, non-food non-defense industries, and government services with defense ministry functions are ranked sixth to ninth in a row. Food-related industries drew more Indonesian economic activity in 2016, according to the statistics. Five food commodities have coefficient values that are higher than the average (cocoa, coffee, fruit, rice, and palm oil). These findings suggest that the industry makes better use of the output of other upstream industries. The findings of Soffya et al. (2018)'s research on I-O Analysis in the food industry indicated comparable benefits to those of this study. Rice and fruits are considered outstanding and prospective commodities because their forward and backward linkage coefficients are higher than the average.

Further investigation is needed from the results of this study considering that the food sector is positioned as the upstream sector which actually uses little production from other economic sectors. The assumption is that the backward linkage coefficient for the defense industrial sector, government services with the national defense function, and non-food non defense can be greater than the backward linkage coefficient for food commodities. Benny Rachman's research on the Analysis of Inter-Sectoral Linkages in the Economy of the West Java Region, which includes the food sector as one of its variables, demonstrates the opposite conclusions to this study by comparing various sectors. Because it is stated

that the food sector does not directly utilise output goods from other economic sectors, the direct backward linkage of the food sectors has a low coefficient (below the average). Another explanation is that the majority of the production of the five categories of food commodities studied comes from smallholder plantations, which are often traditional and still rely on other economic sectors (Rachman, 2016).

### Total forward and backward linkage Analysis

Total linkage or total effect is the overall influence in the economy where a sector is located, including direct and indirect influences (Sahara, 2016). The total linkage index in the I-O analysis is data to be used as the basis for formulating a country's economic strategy based on the relationship or linkage

between sectors in the economy. The total linkage index consists of forward linkage/ IFL and backward linkage/ IBL. The total forward linkage of a sector shows the relationship or impact for each unit of final demand for the sector concerned to the total output sales of all sectors. While the total backward linkage shows the relationship or impact for each unit of final demand for the sector concerned on the total input purchases of all sectors (Badan Pusat Statistik, 2016; Cahyono & Sumargo, 2005; Daryanto, 2010; Pangaribuan, 2014). Below, the results of processing the IFL and IBL for the food sector and the national defense sectors. The results show that the sector with the highest total forward linkage coefficient is non-food and non-defense. The non-food non-defense sector is the only one that has a total forward coefficient value above the average, as presented in the table below.

Table 3. Total forward and backward linkage

No	Sector	Total forward linkage	Rank	Total backward linkage	Rank
1	Rice	1,1867	5	1,4095	6
2	Fruits	1,0521	8	1,3193	7
3	Palm Oil	1,1658	6	1,5309	5
4	Coffee	1,0773	7	1,2882	9
5	Cacao	1,0254	9	1,3152	8
6	Other food commodities	1,5132	2	1,9679	3
7	Non-food and non-defense	5,4048	1	2,1685	2
8	Defense Industry	1,3233	4	1,9459	4
9	Government Services and state defense function	1,4526	3	2,2559	1
	<b>Mean</b>	<b>1,6890</b>		<b>1,6890</b>	

The total forward linkage between a sector and other sectors shows a relationship consisting of the supply of that sector's output which is used as raw material by other sectors in the production process (Wikarya, 2015). The result shows, that the highest total forward linkage index (IFL) came from the non-food non-defense sector at 5.4. In contrast, the lowest IFL value is Cocoa at 1.02. Government services

and State Defense function are the third largest with an IFL value of 1.45. Meanwhile, the highest total backward linkage index (IBL) is Government Services and state defense function at 2.2, followed by non-food non-defense sector at 2.1 and other food commodities at 1.9.

The IFL value indicates that if final demand falls by 1 million rupiahs, non-food non-defense sector will be diverted to other



sectors, resulting in a 5.4 million rupiah drop in this sector. In other words, a rise in non-food non-defense sector production might induce an increase in output in other sectors, particularly those that use manufacturing as intermediary consumption. Furthermore, as seen from the table.3, the IBL value for food commodities (number 1-5) is under average. In contrast, the defense industry showed IBL value above the average at 1,9. This can be interpreted that the defense industry has more leverage power rather than food commodity listed above. It is indicated that when raising final demand in these industries will raise output, which will increase input demand in other sectors. As a result, the production of another sector will rise, and economic activity will rise as well.

The results above show that the non-food and non-defense sector have the largest impact on the output of all economic sectors, compared to other sectors. This result is reasonable, because the non-food non-defense sector is an aggregation of the majority of economic sectors from table I-O 2016. The manufacturing sector and the electricity, water and gas sectors, for example, are the two sectors with the highest forward linkage values whose output significantly affects all sectors of the Indonesian economy. These two sectors plus the rest of sectors in table I-O 2016 are concluding in the non-food non-defense sectors in this study.

In general, the national defense sector (defense industry and Government Services and state defense function) has higher IFL and IBL value compared with the food commodities listed above (rice, fruits, palm oil, coffee, and cacao). In other word, the national defense sector potentially has valuable influence to the

national economic structure. Although the value is not significantly different, this finding can be seen as the signal for the authorities for strategize the future economic. The other interpretation is, that the food commodities listed in this study categorized as a significant and valuable product originated from Indonesia. But, the IFL and IBL values of this commodities is lower than the defense sector showed that might be the management and economic strategic steps related the agriculture sector is not yet optimal and not yet prioritized. Thus, this sector needs more improvement and initiative strategic.

### Multiplier Output Analysis

After processing the data based on the I-O table of the Central Statistics Agency in 2016, the data obtained from the linkages of the selected sectors. In this model, output has a reciprocal relationship with the final demand of the sectors. In other words, the amount of output that can be produced from a sector depends on the final demand for that sector. This is not absolute in all conditions. There are several conditions where the output determines the final demand for the sector concerned (Daryanto, 2010). The output multiplier appears when there is an increase in the final demand of one sector which will increase the output of other sectors. The output multiplier can also be interpreted as the magnitude of the multiple of changes in regional output due to changes in the final demand of a sector (Widyawati, 2017) It can also be concluded that the output multiplier for a sector is the total output produced by the economy to meet a one-unit change in the final demand for the sector concerned.

Table 4. Multiplier Output index value of 9 Sector

No	Sector	Multiplier Output Index	Rank
1	Rice	1,4095	6
2	Fruits	1,3193	7
3	Palm Oil	1,5309	5

4	Coffee	1,2881	9
5	Cacao	1,3151	8
6	Other food commodities	1,9679	3
7	Non-food and non-defense	2,2559	1
8	Defense Industry	2,1685	2
9	Government Services and state defense function	1,9459	4

Based on the results of data processing, it was found that the largest multiplier figure was from the non-food sector and the non-defense sector. The second largest multiplier figure was occupied by the Defense industrial sector, followed by other food sectors. The defense industry sector has a multiplier value of 2.255 which means that an increase in final demand in the defense industry sector by one rupiah will increase the output of the entire economy by 2.255 units of money due to an increase in final demand. The lowest output multiplier value was occupied by coffee, which was 1.288, which means that the coffee commodity only increased the economy's output by 1.288 when there was an increase in the final demand for the sector by one unit.

The results above show that the food sector in general has a lower output multiplier value than the non-food non-defense sector and the defense industry sector. So that it can be interpreted, the food sectors in this study (coffee, cocoa, fruits, rice, and oil palm) have a lower ability than the non-food sector, non-defense and the defense industry sector in boosting or stimulating additional output. in the economy. In fact, these food commodities are vital and strategic commodities for Indonesia. The results of a similar study, where the food sector multiplier rate is lower than other sectors, were also obtained by Widyawati (2017). See Table.4.

Table. 5

Sector	1n	2n	3n	4n	5n	6n	7n	8n	9n
Output	1,270	1,415	1,700	2,551	1,950	1,572	1,699	1,482	1,669

Note

1. : Agriculture, Forestry, and Fisheries
2. : Mining and Quarry
3. : Processing Industry
4. : Electricity, Gas, and Clean Water
5. : Building.
6. : Trade, Hotel and Restaurant
7. : Transportation and Communication
8. : Finance, Leasing, and Corporate Services
9. : Services

Source: Indonesian Input-Output Table 2010, classification of 9 sectors (processed by Widyawati, 2017).

Based on research conducted by Widyawati used I-O data in 2010, it is known

that the position of the food sector in the structure of the Indonesian economy from 2010 to 2016 has not changed much. The food sector is still not sufficiently able to be a factor driving economic output in Indonesia. One of the reasons is because of the limitations of existing facilities and infrastructure and the lack of use of technology. Farmers in Indonesia generally still use conventional methods and use tools that are still simple in the production process, and the average production area is relatively small, less than 2500m<sup>2</sup>. These limitations affect the production time which results in non-optimal product output. Another reason for the low carrying capacity of the food sector in the economy is due to land management, irrigation, and limited capital. Fertilizers, pesticides, and

other food production facilities are still not sufficient. This has an impact on the low output of the food sector (agriculture) (Widyawati, 2017).

The findings need special attention because they are evidence of the low role of vital commodities for the Indonesian economy. This is an irony, because Indonesia, as an agricultural country, is not capable enough to utilize this potential for national economic development. There needs to be further research based on quantitative data that examines more broadly and comprehensively the role of vital agricultural commodities that are the backbone of Indonesia's food. Further findings from this study is that the defense industry sector shows a higher driving force for the Indonesian economy. This is most likely affected by the existence of financing for the defense sector in Indonesia which absorbed the second largest state budget funds in 2016, which amounted to 99.5 trillion Rupiah. While the APBN for the Ministry of Agriculture ranks the tenth largest at 31.5 trillion rupiah (Indonesian Ministry of Finance, 2016)

### Conclusion

The findings of this study indicate that there is a link between the food sector and the national defense sector, but quantitatively is not strong enough. The national defense sector has a stronger forward and backward linkage to the food sector but is not significant. The non-food and non-defense sectors show stronger forward and backward linkages to the food sectors and the national defense sector. The food sector in general has a lower output multiplier value than the non-food non-defense sector and the defense industry sector. So that it can be interpreted, the food sectors in this study (coffee, cocoa, fruits, rice, and oil palm) have a lower ability than the non-food sector, non-defense and the defense industry sector in boosting or stimulating additional output in the economy. The low influence or driving force of the important commodity food sector on the output of the Indonesian economy is an indicator that the management of food

productivity in Indonesia is not yet optimal. It is necessary to evaluate policies at the concept level to the implementation process and at the central to the regional levels. This is also an irony for Indonesia as a country that is naturally an agricultural country, but has not been able to take full advantage of this natural potential.

Although our study yielded quite interesting data, our research is still faced with many limitations. One of the obstacles and limitations is related to the lack of research in the field of national defense, especially with regard to economic reports in the defense industries. Moreover, the limited information related to the selection of the food sector is also one of the factors that influence the research.

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