

Lack of Downstream Processing in the Agriculture Sector in Papua New Guinea

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Abstract

Papua New Guinea (PNG) is part of the second largest island in the world situated in the Pacific Ocean. This developing nation is rich in many resources from renewable to non-renewable resources, however the act of downstream processing for the country's income is still an issue as it is lacking. Therefore, the 2023 Papua New Guinea University of Technology (PNGUOT) Industrial Engineering and Operations Management Student Chapter has taken up the initiative to emphasize on lack of downstream processing in other significant resource extraction sectors in PNG, which in this case is the Agriculture Sector. PNG has surplus agricultural crops and livestock, however, there is a lack of PNG owned companies that can carry out downstream processing, that can allow income to be generated from the exported finished products in the agriculture sector. This paper focuses on investigating the condition and presenting factual information on the condition and recommendations that could be implemented to rectify the lack of downstream processing in PNG.

Keywords

Agriculture, downstream, processing, and resources.

1. Introduction

On the month of March, 2023, Papua New Guineans all throughout the nation encountered a situation regarding downstream processing in the mining industry that caused an uproar and has come to the attention of many students. There are so many sectors that can be looked into when downstream processing is discussed, narrowing it down to the Agricultural sector will help to emphasize on this sectors importance apart from the many other sectors experiencing lack of downstream processing in PNG. Agriculture is defined as “the art and science of cultivating soil, growing crops and raising livestock” (McDaniel, et al., 2023) and is one of the most rewarding and much needed field throughout the world as every physical being requires food products to sustain life. PNG has many small-scale businesses and markets where the agriculture sector is thriving, but more can be done.

At the moment, there is a significant lack of downstream processing businesses in the country that is hundred percent PNG owned, where fresh agricultural crops and livestock can be produced, developed and exported out to other countries for commercial and economic reasons. By the production of this paper, the Student Chapter hopes to bring awareness across on the effect of the downstream processing operations in PNG and how it is being managed and its contributions to the country as a whole with factual information.

2. Literature Review

To define downstream processing, it involves the procedures for the recovery and purification for the final products of interest (Fan & Chen, 2007). In this case, the products of interest include agricultural crops such as coffee beans and livestock, fisheries, wood, fibers and many more. These raw materials are needed not only for satisfying biological and physical needs but can also contribute to creation of more local businesses, increase in jobs, country's economic growth and development. Basically, apart from the human needs being provided, it can immensely contribute from a commercial and economic point of view because agriculture plays a dominant role nationwide.

Papua New Guinea has fertile soils and favorable climate and ecosystems for animals and plants from the highlands to the islands. Traditional extraction methods such as farming and hunting has been done for decades and centuries as a way to sustain life, however, with globalization and development, people are able to further improve living with agricultural technology. At the moment, the main agricultural exports of the country include cocoa, coffee, copra, palm oil, rubber and tea and not only that PNG also accommodates extensive and valuable marine resources (Price

Waterhouse Coopers (PwC), 2023). Most of the rural population in PNG benefit from subsistence farming and their small-scale businesses, that is, selling in markets. However, they have little to no contact with the country's bigger and more profitable economy. So, judging from all this, PNG can be capable of creating a wide variety of different products from processed food to clothes and many more but are limited to mostly to subsistence farming and upstream processing.

Although, the country is lacking in downstream processing, it does not mean there is completely none of it, the issue is that most of the businesses that could be fully and locally owned is not. The tuna industry in the country has evolved from harvesting by international fishing vessels to now include in-country production and canning operations allowing PNG to deliver 14% of the world's tuna catch and duty-free exportation of tuna (Price Waterhouse Coopers (PwC), 2023). PNG is already dominant in terms of agriculture and can feed its own population, therefore, there should not be a need for imported food (Nonwo, 2018). According to a published newspaper article it states, "Our raw resources have been leaving our shores for decades to feed factories and mills or plants for other countries, providing employment and spin-off businesses for the citizens" (Sawala, 2021). Therefore, if there is an increase of fully, locally owned downstream processing businesses that benefit from the agriculture sector it will contribute positively to the country and its people.

In conclusion, a wide variety of products can be downstream processed from the agricultural sector as it plays a huge role in the country affecting the country very positively outweighing the negatives. There is a lack of downstream processing because although there are companies in place, PNG can further manufacture extracted resources from hundred percent locally owned industries and export processed products instead of just raw materials.

2.1 Objectives

The lack of downstream processing in the agriculture sector in PNG is a major barrier to the development and growth of the nation's economic independence. The country with its rich natural resources and an environment suitable for a vast variety of agricultural activities is thriving agriculturally but is lacking exponentially in terms of processing especially downstream processing. This ultimately has a negative implication on the country's economy. Categorizing the lack of downstream processing in Agriculture sector into; lack of downstream processing in farming for crops and rearing of animals (Livestock farming).

This research paper will be providing the conditions and presenting factual information on the conditions and recommendations that could be implemented to rectify the lack of downstream processing in PNG. In order for this country to deviate from its current course, it has to improve on its traditional way of trade relations by being actively industrialized in terms of processing our own raw products especially the home-grown farming produce (i.e.; coffee, cocoa, copra, palm oil, etc.) together with livestock farming (i.e., piggyery, poultry, fisheries.).

Stemming from the agriculture sectors as aforementioned, this paper will look specifically into the downstream processing of coffee beans, palm oil and fisheries. All these agricultural sectors come from different regions of the nation from the islands to the highlands. These products are surplus in the country and have industries that process these products; however, it is not generating surplus income as it should. This leads to the following questions:

- What are some issues that lead to the lack of downstream processing in Papua New Guinea?
- What can be done to boost the downstream processing of these products over time?
- What are the current statistics for the overall agricultural sector?
- What are the current statistics for downstream processing of the specific agricultural sectors chosen?
- How can more income be generated from the products?
- How has the lack of downstream processing affected the livelihood of Papua New Guineans?
- What are the benefits of downstream processing?

Therefore, the objective of this research paper will be to look into the questions mentioned above.

3. Methods

The conditions leading to lack of downstream processing in Agriculture sector is being investigated and identified through qualitative and quantitative research approach. The research is done through the village level up to the national level of how the lack of downstream processing has impacted the lives of Papua New Guineans and specifically the economy of the nation.

People in Papua New Guinea have relied mainly on agriculture their entire history dated back to when history was recorded. Agriculture has been the sustainable lifestyle and a basis of survival over the years and still today. Young children in PNG are raised and taught agriculture as early as six years of age and almost 75% of the country's population relies on Agriculture. These practices have been practiced and have passed on from generation to generation and have evolved over time. Due to the introduction of machines that aids in the farming and raising of livestock, it has contributed immensely to the agriculture sector which improves and increase the agricultural activities in the last three (3) decades.

This has improved the country's economy as the country started exporting coffee, copra, crude oil, sugar, palm oil, fish, cattle and more but still more could be done. The country has exported its under-processed raw products such as coffee in the form of green beans and other agricultural products to other countries like Australia, Japan and USA for the past three (3) decades and is still doing this today.

These raw materials are being machined and processed in those countries and are sold at higher prices back to PNG in the world market which is four times more the price of the initial raw product. The country has been doing that over the years which has greatly impacted the economy causing a phenomenon known as economy deficit which is a phenomenon that occurs when the country's imports exceed its exports. This very much affects the poor people of this country due to inflation, high fares to travel due to high fuel costs, etc. Making it almost impossible for poor people to have excess to basic needs and wants.

Therefore, a qualitative and quantitative research is done to collect data and provide recommendations to rectify the lack of downstream processing in the agriculture sectors in PNG, specifically the products: coffee, palm oil and fisheries sector. The data presented will look into the current statistics of the chosen agricultural sectors in terms or imports, exports, and its downstream processing. As well as researching into the reasons for lack of downstream processing for such a significant sector. From an economical point of view, the paper will discuss how the issue has affected the livelihood of many Papua New Guineans, especially for those working in local farms that are involved with the chosen sectors.

By identifying all the issues that lead to the lack of downstream processing and by presenting evidence, the solutions that have been put in place to rectify the issue will be researched and presented as well. Recommendations will also be given, if certain solutions that are in place is not doing enough for the boost of downstream processing in the agricultural sector.

4.0 Data collection

The data presented in this paper was collected from government's documents, newspaper, public records and journals from organization and researches that were already retrieved by the authors of this paper.

5. Results and Discussion

In order for a country to grow and flourish in its endeavors especially in its development in economic, infrastructural, telecommunication and agriculture, it has to improve and update its normal ways of dealing with challenges and issues that affects the economy of the nation. This is done by looking into the challenges encountered at the lower level up to the national level. In the Agriculture sector; Below are some of the common challenges that have faced the local farmers that directly hinders the production rate of agricultural products simultaneously negatively impacting economic growth of the country. These challenges are;

- lack of sufficient funds to help support the emerging local farmers.
- Lack of basic facilities that will aid in the production.
- Lack of infrastructure.
- Lack of market access to sell the local grown produce.
- Lack of supply and value chains.
- Lack of downstream manufacturing and processing plants.

These challenges encountered by the local farmers in Papua New Guinea have immensely contributed to the low economy and increased poverty rate in the country. These has also restricted young children from going to school due no school fees/project fees, it has also led to the rise of unemployment in the country resulting in an increased criminal activities and other illegal activities such as smuggling of drugs by the youths. This can be frustrating and discouraging as the lively hoods of about 30% of the fellow Papua New Guineans are below minimum standard.

Analyzing and evaluating the economy of the country to precisely demonstrate how the economy of PNG current state is; considering Papua New Guinea's exports and Imports rate for the year 2022. The Independent State of Papua New Guinea shipped US\$15.9 billion worth of exported products around the world in 2022 which was an estimated dollar amount results from a 55.7% rise from \$10.2 billion during 2018 according to World's top exports.

5.1 Graphical Results

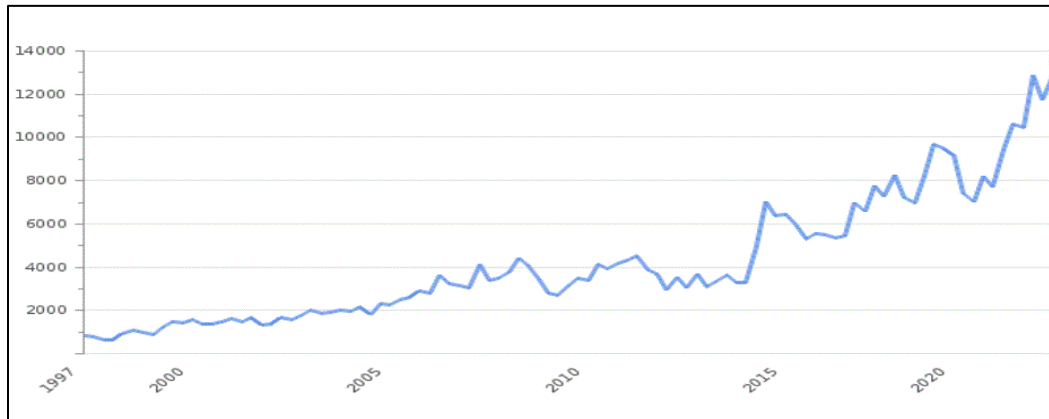


Figure 1. Papua New Guinea's exports from 1997 to 2020.

This figure 1 demonstrates the general exports of Papua New Guinea from the year of 1997 to the year of 2020. This shows that the rate of exports increased almost 10 times from the initial state which indicates that due to the increased technologies such as in using automatic system and machines for production- the more exports and more income resulting in a stable economy.

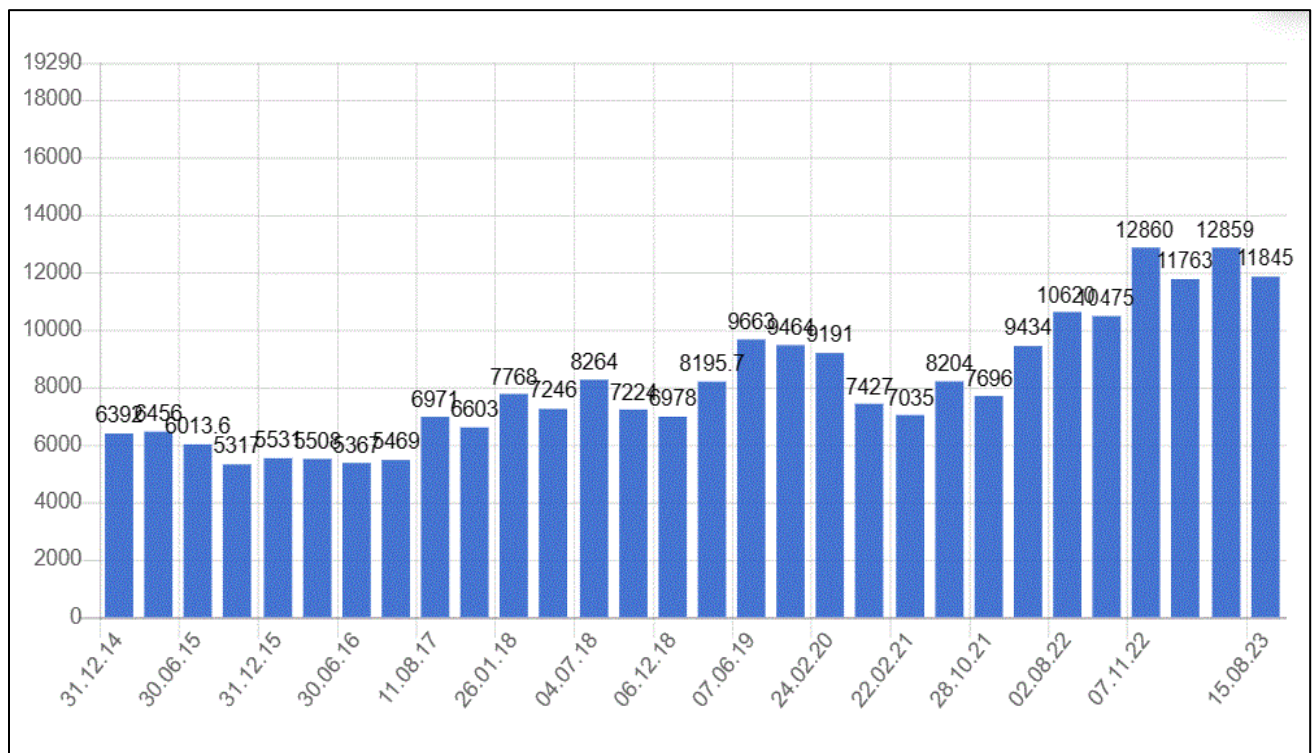


Figure 2. Papua New Guinea's export in year 2023.

The graph on figure 2 denotes the current status of the export and the income at the very last bar which was dated 15/08/2023, this shows the amount of money generated by the export's ranges from the mean of 6000 PGK Million from 2014 up to 2018. Then a decrease from 2019 to 2021 and an increase again. If you look closely, the export decrease in the year 2023 compared to year 2022.

Imports in Papua New Guinea increased to 2479.90 PGK Million in the second quarter of 2023 from 2064.30 PGK Million in the first quarter of 2023. Imports in Papua New Guinea averaged 2075.24 PGK Million from 1997 until 2023, reaching an all-time high of 5744.20 PGK Million in the second quarter of 2022 and a record low of 518.00 PGK Million in the first quarter of 1998. source: Bank of Papua New Guinea (Figure 3).

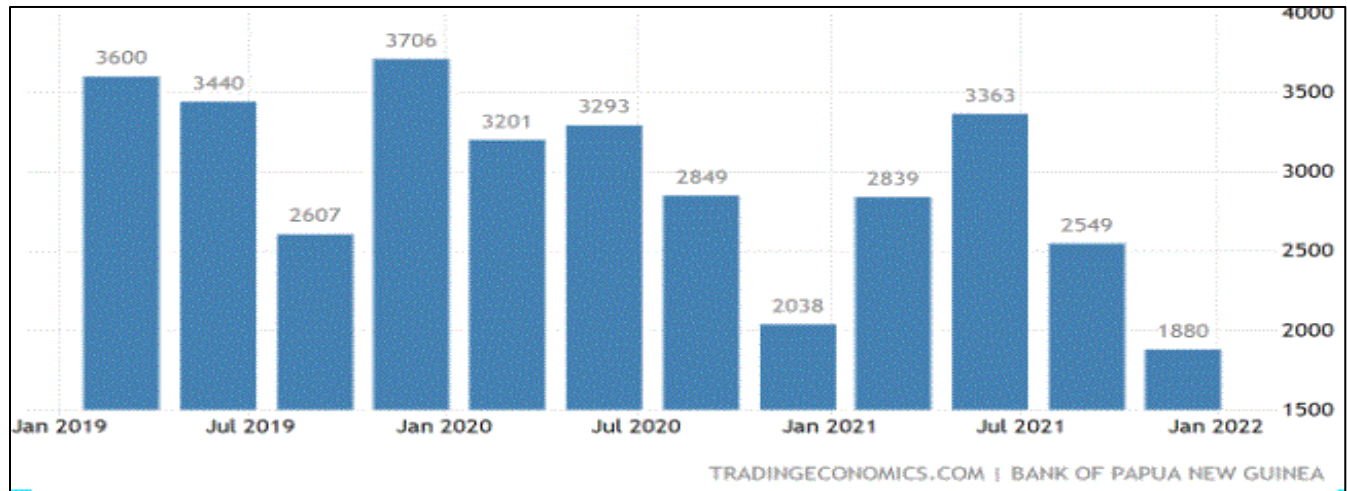


Figure 3. Imports in Papua New Guinea from 2019 to 2023

Agriculture is an important sector in the economy of Papua New Guinea as it provides employment and income for the subsistence farmers. An article stated by the Asian Development Bank states that the forestry, finishing and the agriculture sector are estimated to grow by 3.0% this year (i.e. 2023) which will most likely contribute to the 25% of the Gross Domestic Product (GDP). However, the exact revenue from agriculture in PNG for 2023 is not yet available, as the year is not over yet. Based on the 2023 National Budget document, the estimated revenue from agriculture and livestock for 2023 is K 1.2 billion, which is about US\$ 338 million. This is an increase of 9.1% from the 2022 budget estimate of K 1.1 billion. However, this estimate may change depending on the actual performance of the sector and the exchange rate fluctuations.

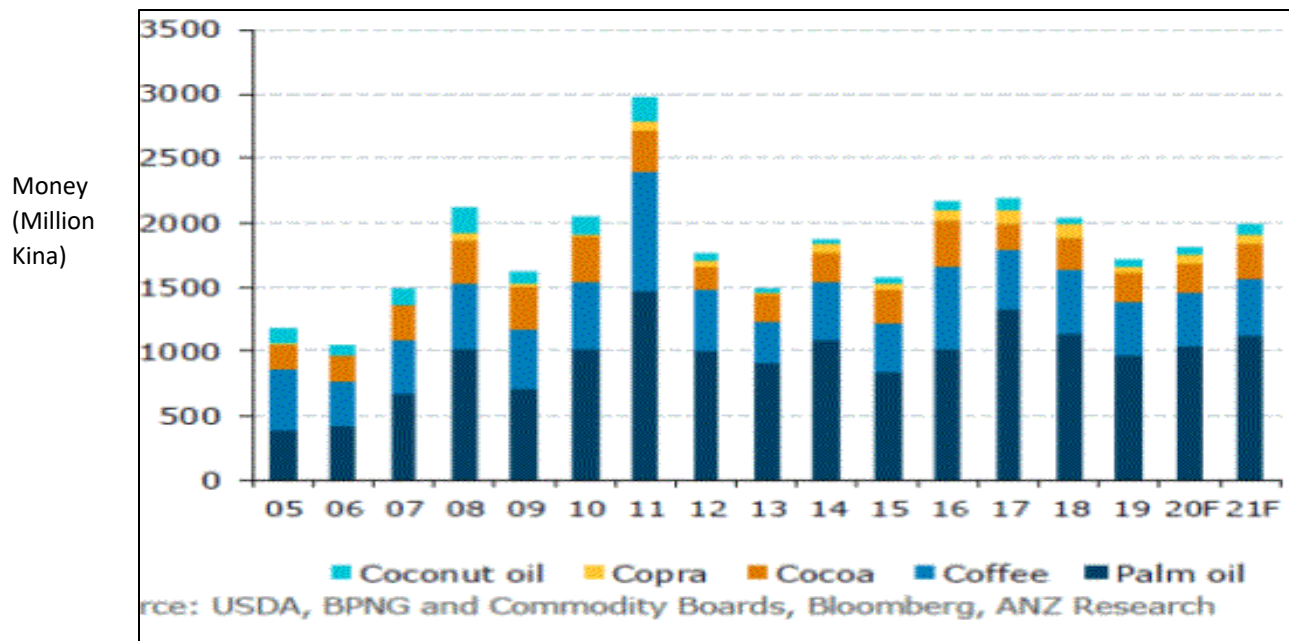


Figure 4. PNG key agriculture commodities exports.

Based on the key agriculture commodities shown in Figure 4, it can be noted that the main agricultural exports are Palm oil, coffee and cocoa. However, the two main commodities, coffee and palm oil will be elaborated on.

5.2 Lack of Downstream Processing in the Coffee Industry

Coffee Industry is an important sector in the agriculture department, it is one of the most widely traded crops. It is grown mainly in the highland's region of PNG due to its tropical weather with abundance sunlight and rainfall. However due to lack of downstream processing, most of the local coffee cherry producers are not able to process their own coffees. Therefore, they sell them in parchment to the factories and the factories only do the downstream processing of converting parchment beans to green beans and they export them.

Downstream processing of coffee beans refers to the transformation of cherry beans into finished products, such as roasting and grinding coffee beans into coffee powder. Downstream processing can add value to the products and increase the income of the producers. However, PNG faces some challenges in developing its downstream processing capacity for coffee, they are as follows:

- No proper basic services to the rural areas such as construction of roads, bridges, water and electricity.
- High transportation costs.
- High costs of logistics and other necessary processes involved in the exportation of the coffee beans.
- Inadequate market opportunities for the farmers to sell their produce.
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Which is however fair but more can be done as the number of coffee-farmers are increasing and there are only few factories which is a challenge that puts pressure on the local farmers as they will have to pay for transports in order to transport the coffee to the factories and also if they want to process their coffee beans then a processing fee is charged on top of the other fees. At the end of the day, more money is used and not enough profit is made based on the hard work that have been invested.

The lack of downstream processing affects the coffee production and exports in PNG in several ways, below are few of the ways;

- Reduced income for the farmers as the coffee beans are sold as under-processed parchment to the factories.
- Coffee prices are very low due to the limited coffee markets available in the country
- The value and standards of the coffee sometimes deteriorated due to the amount of time it stays before exporting.

- Sometimes the longer the bean stays, the more likely it is to lose its quality and that results in price fluctuation causing loss in revenue.

These are all factors that affect the country's economy and the livelihood of its citizens.

In order to conquer these challenges and enhance its downstream processing capacity for coffee, PNG should start looking at the experience of other coffee-producing countries and learn from them. This will successfully contribute to develop its downstream processing. PNG government should start focusing on:

- Investing on human resource by educating farmers on how to grow coffee and improve their skills and knowledge on the quality of the coffee standards and the Processing techniques for quality production.
- Providing basic services such as roads, bridges and electricity to communities where coffee is grown so that there is a possible route for transporting and processing the coffee beans.
- Investing in infrastructures that aids in the production and processing of quality coffee standards.
- Developing the coffee facilities and infrastructures involved in all the processing stages.
- Create more market opportunities for the local farmers.

5.3 Lack of Downstream Processing in the Palm Oil Industry

Palm oil is a prestigious agricultural commodity and generates more income compared to other agricultural products, this can be proven in Figure 4. In 2017, palm oil contributed to \$344 million to the country's economy in terms of exports, providing employment to 200,000 Papua New Guineans (UNDP, 2023). In 2021, Papua New Guinea was also one of the top exporters of Palm oil generating \$706 million (. The oil palm industry has an annual production rate of 12% since 1997 and has grown annually by 15.5% since then. The three major industries are located in Hoskins, Bialla and Popondetta in PNG, where they produce bulk of the palm oil. However, these three major schemes operate their mills producing palm oil that is mostly for exports (SPREP , 2023). The palm oil is only produced into crude oil for exports, when that same palm oil could be used to make many other products as well.

Palm oil is a very viable resource option in the agricultural sector as the oil consumption and demand is rising globally. Traditional palm oil producing countries such as Malaysia, are slowly but surely decreasing in production due to land use and productivity concerns. Therefore PNG, is perfectly capable of using it to their advantage to fill future supply shortages. The following points can be taken into consideration to seriously start boosting the downstream processing of palm oil in the country:

- Over the next decade, global demand for palm oil will increase by 30% which reflects the growing consumption of palm oil in food product and usage as a renewable energy source i.e. biofuel
- Palm oil's contribution to the growth of the agricultural sector from upstream to downstream processing will help eradicate the negative effects of population growth by securing a needed supply of food products as well as contributing significantly to the livelihood of Papua New Guineans
- Growth in the agricultural sector in terms of Palm oil can help diversify the economy and reduce resource reliance on other countries

So far, there is only upstream and midstream processing of palm oil where the process begins with planting and growing palm trees, extracting the palm fruits then further processing the extracted fruits into palm oil and crude oil for exporting. If there was more downstream processing of palm oil, thousands of finished products such as soap, cooking oil, household items, personal care/health and beauty items, snacks and beverages, etc. could be manufactured as well and exported out and even sold in the country which will contribute to decreased prizes of goods. The only plans the government has envisioned for the production of sustainable oil palm to achieve by 2027 (PNG Business News, 2023) are the following:

- Increase palm oil export value to US\$1.594 billion (K5.313 billion)
- Raise crude palm oil (CPO) export volume by 1.3 million tons
- Expand oil palm planting by 200,000 hectares
- Engage 50,000 households in cultivating oil palm and
- Enhance rural income and self-employment opportunities, leading to improved livelihoods.

Although, these plans are beneficial, the benefits could be doubled if downstream processing is also included. Papua New Guinea's Minister for Oil Palm, Honorable Francis Meneke stated that, "It was unfortunate that over the years the cash crop had been allowed to deteriorate through lack of attention, research and development, downstream

processing and other value adding innovations” (PNG Business News, 2022). From this statement it can go on to prove that there is definitely a lack of downstream processing within the country especially in agriculture.

5.4 Proposed Improvements

Giving more attention to improving the lack of downstream processing will be beneficial in the following ways along with all the aforementioned benefits:

- Creates added value to agricultural resources and the economy
- Create more job and income-earning opportunities for thousands of unemployed citizens
- Helps reduce inflation and over pricing of store-bought products, lowering the economy’s vulnerability to effects of fluctuations in international commodities that have been processed downstream and sold as a finished product back to the country
- Diversified and increased food production that can cater for the country’s growing population

Listed above are just some of the main and most important factors that can help grow PNG’s economy and improve the livelihood of thousands of Papua New Guineans. In recent years the government has come to realize that vital nature of promoting downstream processing of certain commodities and therefore, have set policies in place. These policies are aimed at promoting greater downstream and domestic food processing, however, factors such as land use and increased cost in processing raw materials, negate the promotion of downstream processing. This is where the nation’s Department of Commerce and Industry comes into play to formulate, coordinate, implement and monitor policies that provide a conducive economic environment, promoting international competitiveness and achieving the Governments goals. So far, the Government has been proactive in encouraging downstream production, as stated by PNG’s Prime Minister James Marape, “We are focused on downstream processing as far s going forward is concerned instead of exporting raw products, we want to go downstream to satisfy our local markets as well as to export to economies around us” (PNG Business News, 2021). Therefore, there are certainly improvements on the way to promote downstream processing in PNG’s growing nation.

One of these improvements include the government launching the National Agriculture Development Plan (NADP) early in 2007. This plan is ambitious and broad with the vision of overcoming various obstacles in the agricultural sector. The key area’s for NADP included research and technical services, food and horticulture, tree and industrial crops, livestock, apiculture and aquaculture, spices and strengthening the NADP management (Department of Treasury, 2008). Also, apart from the NADP, the government seeks to increase the value of exports by PNG’s manufacturing sector, focusing on the downstream processing or raw materials from the extractive industries. The strategy is to remain commercially driven and to target PNG’s areas of current and emerging competitive strength such as the palm oil industry.

5.5 Recommendations

Some of the recommendations that can be made to improve the lack of downstream processing, starts from small efforts that will create a bigger impact include intellectuals and leaders of the country taking up the initiative to enhance the skills of country men and women, start local PNG owned businesses that create downstream products, investing into the industrial and technological facilities, proper maintenance of downstream processing facilities, promoting local finished products on a global platform and most importantly emphasizing and promoting the downstream processing of the agricultural sector, which is by far the most prestigious.

6. Conclusion

Lack of downstream processing in PNG is an issue that affecting the economy of this country. It is a serious issue that cannot be ignored, if government would want to improve its economy and the citizens of its citizens. The government has to work on to implement the necessary facilities and infrastructures that will aid and improve the processing of its agricultural produce. This is by ensuring that proper basic services such as roads, bridges, electricity, water, etc. are provided to accommodate for processing of its raw produce. And also, by creating processing factories and market opportunities in the country will enable minimizing the issue. Two classical examples of lack of downstream processing in the coffee and palm oil has been explained by providing challenges and the proposed improvements. Therefore, this will in turn improve the livelihoods of the local citizens and also the economy of the country.

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Biographies

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Stephanie Laki is currently an undergraduate student aiming to take up a Bachelor in Mechanical Engineering at the Papua New Guinea University of Technology. She graduated from St. Josephs International Catholic College in Port Moresby from where she went on to pursue further studies. In the near future, she aspires to gain as much experience in the working industry and take on challenges to contribute back to PNG significantly.