Chapter 7

STRENGTHENING DOWNSTREAM POLICY FOR ECONOMIC REVIVAL

Downstream policy is a strategic step to increase added value and productivity while supporting economic stability. Downstream policies to support economic stability and increase added value and productivity can be pursued through the downstreaming of both food and minerals and coal. In the future, policy synergies need to be strengthened further in order to hasten downstreaming in support of Indonesia's transformation towards a developed country, including through improving factors of production, strengthening regulatory and institutional aspects, while encouraging trade cooperation and promotion.

Studies show that downstreaming will not only strengthen efforts to bolster added value and productivity, but also support economic stability. On the one hand, downstream policy as a transformational policy has the potential to significantly increase added value and economic productivity, thereby raising economic growth through increased investment and exports. At the same time, the increase in economic productivity from downstream policies will also boost the capacity of the economy, which can help to safeguard economic stability. In this way, the economy can grow more rapidly without additional inflationary pressures.

Downstream policies to support economic stability and increase added value and productivity can be pursued through the downstreaming of both food and minerals and coal. Policies for food downstreaming (covering the agriculture, plantations and fisheries sectors) can be pursued through three types of commodities, namely: commodities that support price stability and regional competitive advantage; commodities that strengthen growth; and commodities that can absorb a significant amount of labor. Using this Three-Pronged Downstream Strategy Approach, seven priority food commodities can be identified, namely: palm oil; fishery products; seaweed; sugar cane; rice; various types of chili peppers; and onions. For minerals downstreaming, policies can focus on four strategic metal minerals, namely: nickel; bauxite; tin; and copper. This approach is expected to attract more investment, especially foreign capital investment, and to boost the added value of exports.

Going forward, policy synergies need to be strengthened further in order to hasten downstreaming to support Indonesia's transformation towards a developed country. Policy strengthening can be achieved by mapping the challenges of food and minerals downstreaming with a focus on three aspects. First, attention should be paid to factors of production in order to reduce productivity gaps, including by making improvements to supporting infrastructure, logistics services and vocational education. Second, there is the need to strengthen regulatory and institutional impediments aspects that hamper investment, export competitiveness and production. Third, trade cooperation and promotion should be encouraged to improve access to global markets. Synergy and policy coordination between stakeholders is crucial in the implementation of national programs related to downstreaming.

7.1. The Strategic Role of Downstreaming in Supporting Sustainable Economic Growth

Various policies are being undertaken to support Indonesia's transformation towards a developed country with strong, sustainable, balanced and inclusive economic growth. Policies are both cyclical and structural in nature. Cyclical policy, using fiscal and monetary instruments, is undertaken to ensure that short-term economic dynamics can be adequately accommodated given the capacity of the economy. Meanwhile, structural policies are aimed at increasing the capacity of the economy so that stronger economic growth can be sustained without risking inflation.

Structural policies to encourage Indonesia's economy to grow at a brisker pace and more sustainably may be inferred from the endogenous growth model approach.[7] This approach states that the economic growth of a country depends upon the growth of the factors of production (the stock of capital and the workforce population) as well as the rate of technological progress. A study by Juhro and Trisnanto (2018) takes a simple, endogenous growth model approach and shows that Indonesia's growth paradigm needs to at least

7 With the endogenous growth model approach, the level of output of the economy can be calculated using the following formula:

$$Y_t = A_t K_t^{\alpha} L_t^{1-\alpha}$$

Where:
Y_t: The level of output in period t
A_t: The level of technology in period t
K_t: The amount of capital stock in period t
L_t: The size of the workforce in period t
α: The elasticity of output with respect to capital

partly focus on the creation of new sources of economic growth. This involves the role of "nontraditional" sectors that rely not only on natural resources, but also on sectors that have the potential to grow with the support of innovation and human resources.

Downstream policy is a structural policy aimed not only at improving efforts to increase added value and productivity, but also to support economic stability. On the one hand, downstream policy is a transformational policy that has the potential to significantly increase the added value and productivity of the economy, ultimately promoting stronger economic growth through increased investment and exports. On the other hand, the increase in economic productivity from downstream policies will also increase the capacity of the economy, which allows higher, non-inflationary growth.

In more detail, downstream policy is directed toward supporting high growth through the on-going process of improving the economic structure, to promote broad-based and inclusive economic growth. Indonesia's economy is growing briskly, *albeit* supported by post-pandemic recovery in 'contact intensive' sectors, namely the business fields of Transportation and Warehousing (Transgud), Trading, Accommodation and Food/Drinks (Akmamin). Since the continuing, multiplier impact of these contact intensive sectors will be relatively limited, structural efforts need to be hastened to further increase the added value of the economy, including through the downstreaming of sectors that have high intersectoral linkages and significant economic impact.

Internal BI research indicates that food downstreaming through agriculture, plantations and fisheries can support price stability, while promoting national food security. Some food commodities are included in the Volatile Food group, which often contributes significantly to rising inflation. For example, chili peppers and assorted types of onions have high price volatility in comparison to other strategic commodities, thus driving up inflation in the Volatile Food group, due to both structural and cyclical issues. Supply availability, for example, is constrained by structural factors related to price disparities between different times and across different regions, including bad weather. In this regard, food downstreaming is expected to support the sustainability of food commodity supply while encouraging the consumption of alternative food staples to support national food security.

Food downstreaming will also drive economic growth and sustain improvements in the economic structure. Increasing the added value of food commodities through downstreaming plays an important role in driving growth on a broader basis, given the considerable linkages between downstream food industries in the economy. The downstreaming of agricultural subsectors (such as Food Crops, Horticultural Crops and Plantation Crops) is intended to strengthen linkages to other sectors such as Food and Beverage Industry, facilitating the production of value-added and highly competitive agro-industrial products to bolster exports. As such, downstream programs in the food sector will have a greater economic impact in supporting improvements in the economic structure whilst promoting higher growth.

Food downstreaming can also support the overall performance of industry, absorbing more workers. A Bank Indonesia study shows that a number of agricultural, plantation and fishery commodities, including CPO, seaweed, sugar cane and fishery products, are highly competitive, implying that they have the potential to sustain high value-added exports (Anggraeni *et al*. 2023). From the labour side, whilst most of the workers are predominantly working in the informal sector, the contribution of the food sector in absorbing workers is quite significant at about 30%, dominated by CPO commodities. Downstreaming focused on the food sector and derivative industries has the potential to strengthen industry overall whilst absorbing more workers and thereby creating brisker and more inclusive growth.

"Food downstreaming through agriculture, plantations and fisheries can support price stability."

Other studies also show the minerals downstream policy plays a crucial role in driving economic growth as well as strengthening the structure of the manufacturing industry and the economy as a whole. Indonesia is a country with large reserves of mining commodities such as coal, petroleum and gas. In this regard, the utilization of mining resources, which are still mainly in the form of raw materials, needs to be encouraged, especially in relation to the production capacity of downstream products and exports (Ika, 2017). As such, minerals downstreaming is crucial in strengthening the manufacturing industry and the overall structure of the economy, with three major benefits (Bank Indonesia, 2022). First, downstreaming of mining natural resources can support strengthening the structure of the manufacturing industry through the creation of more complex, higher value-added goods. The production of such downstream products can boost exports and strengthen Indonesia's position in the Global Value Chain (GVC). Second, increasing the capability of national industries to produce competitive, downstream products meets domestic demand directly, thereby reducing imports. Third, the production of downstream mining goods will support the development of a Local Value Chain (LVC) and inclusive economic growth, with the formation of downstream product industries in regions where the supply of raw materials or goods comes from other regions. The implementation of the minerals and coal downstream policy is expected to create added value for exports, raise economic capacity through investment and promote sustainable economic growth.

The government has taken various strategic steps in relation to the downstreaming of minerals and coal. This initiative began with the issuance of Law No. 4 of 2009 on the Mining of Minerals and Coal, which marked the beginning of efforts to increase the value added of natural resource commodities. In implementing the Act, the Government issued several Government Regulations (PP) which banned the export of unprocessed minerals in stages. The Regulations also mandated the processing and refining of minerals and mining products within the country. This measure is aimed at ensuring that Indonesian mineral commodities can be processed in an integrated manner in the country to produce high added value products. In addition, the Government also provides various incentives, while making it easier for business operators to obtain business licences and improve investment competitiveness from the development stage to the refining stage (the operation of smelters). The incentives include exemptions from import tax on the operational machinery and strategic goods used in smelter investments, as well as the implementation of tax holidays, tax allowances and super deduction tax schemes. Besides incentives, the Government also strengthened the automation of the licensing system with the Online Single Submission Risk-Based Approach (OSS-RBA) and published the Investment Priorities List (DPI) in 2021 to improve investment competitiveness. These various measures are intended to strengthen the sector's industrial structure and increase the export of semi-finished goods or finished goods, so that downstream mining can optimally benefit the national economy.

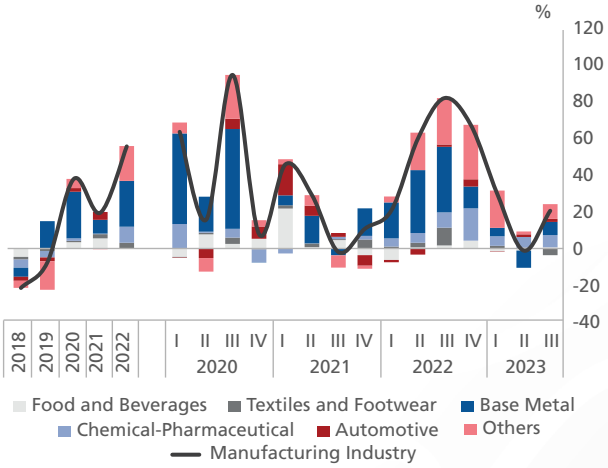
Acceleration of mineral and coal downstreaming, particularly nickel, has already produced positive results as reflected in increased investment in addition to a better exports structure and stronger performance of the base metals industry. Success in the development of downstream nickel products can be seen in investment, particularly foreign capital investment (PMA), in the strongly growing

base metals sector (Graph 7.1). As investment increases and more downstream products are developed, the exports structure should also see improvements marked by higher exports of products with higher added value, such as iron and steel (HS 72). The share of exports of this particular product increased from only 0.8% in 2010 to 6.2% in 2020 (Bank Indonesia, 2022). Furthermore, the positive impact of the downstream mining policy is also reflected in solid GDP performance in the base metals sector over the last three years. The GDP contribution of the base metals sector remained solid amid the COVID-19 pandemic and it rose further from 2020 through the third quarter of 2023, thus supporting the performance of the national economy (Graph 7.2). The solid performance of downstream nickel activities encouraged the Government to broaden the policies to include other minerals.

7.2. Development Strategy for Food Downstreaming

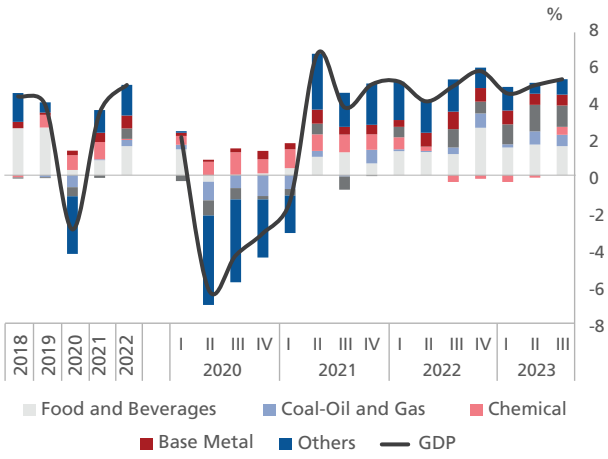
The development strategy for food downstreaming encompasses three stages, namely commodity selection, commodity prioritization and the identification of constraints. In the commodity selection stage, the priority sectors that have leverage on the economy are updated to form the basis from which the priority food commodities are initially selected for downstreaming. In this regard, the selection of food products will be the focus of the Government and Bank Indonesia. The next stage is the prioritization of food commodities, which is done by taking into account a number of criteria using the Three-Pronged Approach, mentioned above. The last phase is focused on identifying constraints that can then form the basis for the formulation of policy recommendations (Anggraeni *et al.* 2023) - (Figure 7.1).

Graph 7.1. Development of FDI in the Manufacturing Industry Sector



Source: Ministry of Investment/BKPM

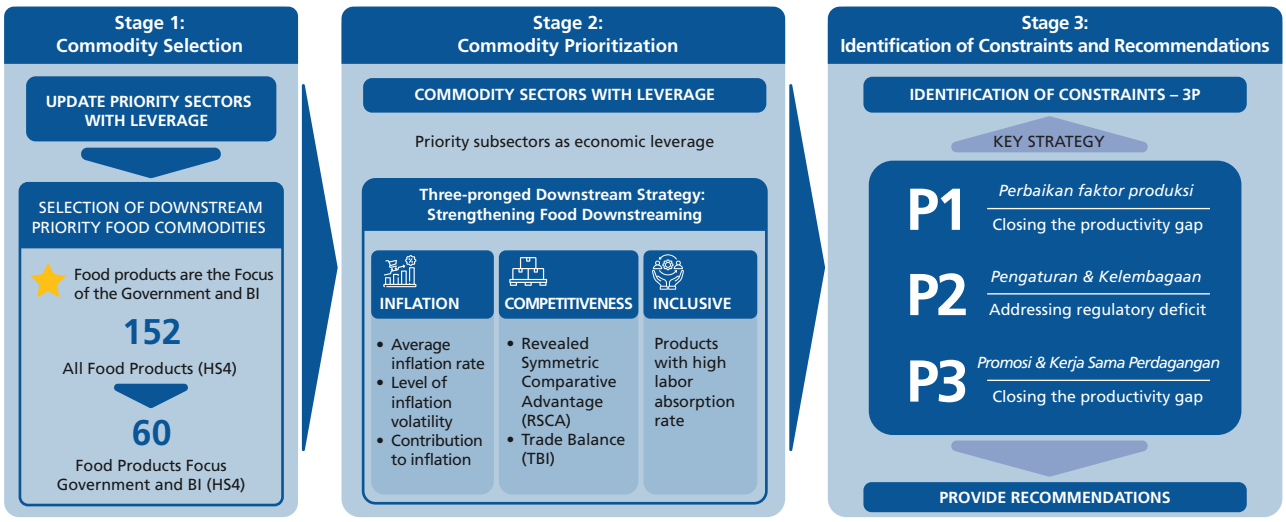
Graph 7.2. Development of GDP Contribution from the Main Subsectors of the Manufacturing Industry



Source: Ministry of Investment/BKPM

At the commodity selection stage, updates of priority sectors are done by taking into account which priority sectors have greater leverage to promote broader economic growth. A priority sector is defined as a sector that is the focus for the implementation of a particular policy. Certain priority sectors have already been identified by Bank Indonesia and used as the basis for a unified policy package by the Financial System Stability Committee (KSSK) in February 2021 to support economic recovery amid the pandemic. Following this model, priority sector updates were directed towards identifying sectors that have a high intersectoral interrelation and a large economic impact. Priority sectors were updated by using the 2016 Input-Output (I-O) and 2015 Inter Regional Input-Output (IRIO) tables which made reference to two considerations. The first consideration, the

Figure 7.1. Methodology of Food Downstreaming Strategy



Source: Bank Indonesia

magnitude of the economic impact, is portrayed by the level of the multiplier to output, value added and labor on other sectors of the economy. The second dimension, namely the GDP trend, is ascertained by looking at the growth of the economic sector in the first quarter of 2023 compared to the economic sector's average growth in the last 5 years.

The results of priority sector updates show that efforts to encourage growth in a more broad-based manner and support inflation stabilization can be focused on a number of main sectors, including the agricultural sector. Sectors which have strong linkages and significant economic impacts are in quadrants 2, 3, 5 and 6 (Table 7.1). These sectors include: Agricultural; Construction; Food and Beverages; and Basic Metals. Agriculture sub-sectors (such as Food Crops, Horticultural Crops and Plantation Crops) can be interpreted as sub-sectors of the food and beverage industry which has a relatively large economic relevance and impact. The development of food downstreaming in these priority sectors is expected to encourage these sectors to grow more briskly and generate higher added value. Next, the selection of food commodities is aligned with the food downstreaming policies of the relevant ministry or institution. From the selection results in this first stage, 60 candidates were identified from a total of 152 food products that had been recommended as priority downstream food products.

At the commodity prioritization stage, the Three-Pronged Downstream Strategy Approach is used, seeking to combat inflation; support growth; and create an inclusive economy. This strategy is aimed at supporting the acceleration of downstreaming by achieving three objectives, namely (i) supporting inflation stability; (ii) promoting growth; and (iii) encouraging more inclusive economic growth through labor-intensive industries. Implementation of the food downstreaming policy is pursued through three mutually supporting strategies. *First*, in the short-term, the development of food downstreaming is focused on maintaining domestic price stability and supporting the acceleration of regional economic growth through the selection of flagship regional commodities. *Second*, food downstreaming is focused on commodities supporting economic growth which improve the current account balance as seen in two main indicators, namely the ability to boost the production of high added value exports and import substitutes. *Third*, food downstreaming is focused on labor-intensive commodities to encourage more inclusive economic growth, as reflected in increased labor absorption in various regions.

Table 7.1. Mapping of Priority Sectors to Accelerate Economic Recovery

GDP TREND \ ECONOMIC IMPACT (Output Multiplier, Employment, and Added Value)	1	2	3
3	**7 HIGH GDP – LOW IMPACT 4.0%** • Oil, Gas and Geothermal Mining • Metal Goods Industry, Computers, Electronic Goods, Optics and Electrical Equipment	**8 HIGH GDP – MEDIUM IMPACT 3.9%** • Forestry and Logging • Coal and Lignite Mining • Gas Procurement and Ice Production • Water Procurement, Waste Management, Waste and Recycling • Sea Freight	**9 HIGH GDP – HIGH IMPACT 7.5%** • Rubber Industry, Goods made from Rubber and Plastic • Transportation Equipment Industry • Financial Intermediary Services • Insurance and Pension Funds • Financial Support Services • Health Services and Social Activities
2	**4 MEDIUM GDP – LOW IMPACT 5.7%** • Mining and other Excavation • Air Freight • Warehousing and Transportation Support Services, Post, and Courier Services • Real Estate	**5 MEDIUM GDP – MEDIUM IMPACT 44.5%** • Fisheries • Wood Industry, Goods made from Wood, Cork and Woven Goods made from Bamboo, Rattan and the like • Non-Metals Excavated Goods Industry • Electricity • Government Administration, Defense, and Mandatory Social Security • Education Services • Basic Metals Industry • Furniture Industry • Construction • Trade of Cars and Motorcycles and their Repair • Wholesale and Retail Trade, other than Cars and Bicycles • Information and Communication • Other Services • Chemicals, Pharmaceuticals and Traditional Medicines Industries	**6 MEDIUM GDP – HIGH IMPACT 18.3%** • Plantations • Food and Beverages Industry • Tobacco Processing • Preparation of Food and Beverages • Textile and Apparel Industry • Paper and Paper Goods Industry, Printing and Recording Media Reproduction • Land Transportation
1	**1 LOW GDP – LOW IMPACT 1.8%** • Coal Industry and Oil and Gas Refineries	**2 LOW GDP – MEDIUM IMPACT 1.30%** • Metal Ore Mining • River, Lake and Other Water Crossing Transportation	**3 LOW GDP – HIGH IMPACT 8.8%** • Food Crops • Horticulture Crops • Animal Husbandry • Agricultural and Hunting Services • Leather, Leather Goods and Footwear Industry • Machinery and Equipment Industry • Other Processing Industries, Repair Services, and Installation of Machinery and Equipment • Rail Transportation • Other Financial Services • Company Services

Source: Bank Indonesia

A number of agricultural, plantation and fishery commodities are highly competitive so they can potentially support high added value exports.[8] The Revealed Symmetric Comparative Advantage (RSCA) criteria approach is used to determine the level of comparative advantage of downstream products in international markets.[9] Meanwhile, the Trade Balance Index (TBI) is a rough measure of the extent to which exports might substitute for imports, indicating that downstreaming could boost exports performance.[10] Based on calculations using the RSCA and TBI methods, it can be concluded that food and beverage industry products have the potential to support high added value exports (Table 7.2). By contrast, the majority of products for industrial and household needs are competitive products, that is, they already enjoy a sizable trade surplus. These products include a number of commodities such as CPO, seaweed, sugar cane and fishery

8 The construction of the Three-Pronged Downstream Strategy Approach is based on the criteria of four main indicators, namely: (i) priority sectors that offer leverage; (ii) the inflation rate; (iii) the level of competitiveness; and (iv) labor absorption.

9 Revealed Comparative Advantage (RCA) is used to gauge the comparative advantage (competitiveness) of a country's export products in the export basket of countries across the world, using the formula:

$$RCA_{it} = \frac{X_i / \sum_{i=1}^{N} X_i}{X_{iw} / \sum_{i=1}^{N} X_{iw}}, i = 1 \ldots . N;$$

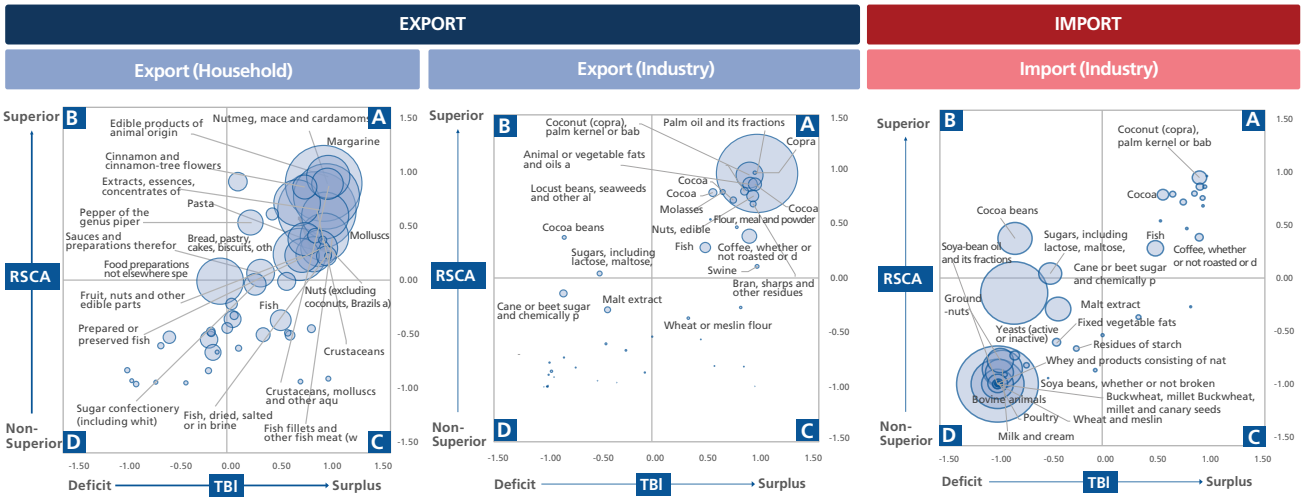
RCAit is the RCA of industry i year t; Xi is the export of product i from a certain country; Xiw is the export of product i from across the world. RCA is converted into a symmetric RSCA number using a formula to facilitate visualization and the grouping of products, with values in the range of 1≤RSCA≤1.

10 Formula to calculate TBI

$$TBI_i = \frac{X_i - M_i}{X_i + M_i}, i = 1 \ldots . N;$$

Xi is the export of product i from a certain country; Mi is the import of product i from a certain country; and N is the number of commodities..

Table 7.2. Mapping of Export and Import Competitiveness



Top Commodities	IDN Nom	IDN Share	WORLD Nom	WORLD Share	IDN to World Share	Commodities
Crustaceans	1,711	3.5%	33,337	1.8%	5.1%	Fisheries
Margarine	1,634	3.3%	8,154	0.4%	20.0%	CPO
Crustaceans, molluscs and other	1,207	2.4%	13,810	0.8%	8.7%	Fisheries
Bread, pastry, cakes, biscuits, other	771	1.6%	42,922	2.4%	1.8%	Other
Fish fillets and other fish meat	648	1.3%	25,192	1.4%	2.6%	Fisheries
Molluscs	615	1.2%	13,998	0.8%	4.4%	Fisheries
Food Preparations	602	1.2%	55,529	3.0%	1.1%	Other
Extracts, essences, concentrates	602	1.2%	9,021	0.5%	6.7%	Other
Edible products of animal origin	518	1.0%	1,035	0.1%	50.1%	Other
Nuts (products of animal origin)	374	0.8%	18,452	1.0%	2.0%	Other

PRIMARY PRODUCTS: Fisheries, CPO

Top Commodities	IDN Nom	IDN Share	WORLD Nom	WORLD Share	IDN to World Share	Commodities
Palm oil and its fractions	26,665	53.9%	47,203	2.6%	56.5%	CPO
Coconut (Copra), palm kernet or bab	2,885	5.8%	7,132	0.4%	40.4%	CPO
Coffee, whether or not roasted	851	1.7%	34,243	1.9%	2.5%	Coffee
Animal or vegetable fats, oils	838	1.7%	5,644	0.3%	14.8%	CPO
Cocoa	838	1.3%	4,513	0.2%	14.8%	Other
Nuts, edible	669	1.1%	7,038	0.4%	7.9%	Other
Fish	557	0.9%	21,971	1.2%	2.0%	Fisheries
Cocoa	433	0.5%	2,758	0.1%	9.2%	Other
Locust Beans, seaweeds and othel at	254	0.5%	2,401	0.1%	9.2%	Seaweed
Cane or beet sugar and chemically p	206	0.4%	24,808	1.4%	0.8%	Sugar cane

PRIMARY PRODUCTS: CPO, Coffee, Fisheries, Seaweed, Sugar cane

Top Commodities	IDN Nom	IDN Share	WORLD Nom	WORLD Share	IDN to World Share	Commodities
Wheat and meslin	3,548	4.9%	46,998	1.3%	7.5%	Other
Cane or bee sugar and chemically p	2,382	3.3%	23,011	0.6%	10.3%	Sugarcane
Soya beans, wheter or not broken	1,483	2.1%	86,411	2.4%	1.7%	Other
Milk and cream	845	1.2%	20,106	0.6%	4.2%	Other
Cocoa Beans	617	0.9%	9,761	0.3%	6.3%	Other
Bovine animals	533	0.7%	9,228	0.2%	5.8%	Other
Residues of starch manufacture	411	0.6%	6,300	0.2%	6.5%	Other
Ground-nuts	358	0.5%	4,213	0.1%	8.5%	Other
Malt extract	340	0.5%	21,654	0.6%	1.6%	Other
Sugars, Including lactose, maltose	276	0.4%	8,294	0.2%	3.3%	Sugar cane

PRIMARY PRODUCTS: Sugar cane

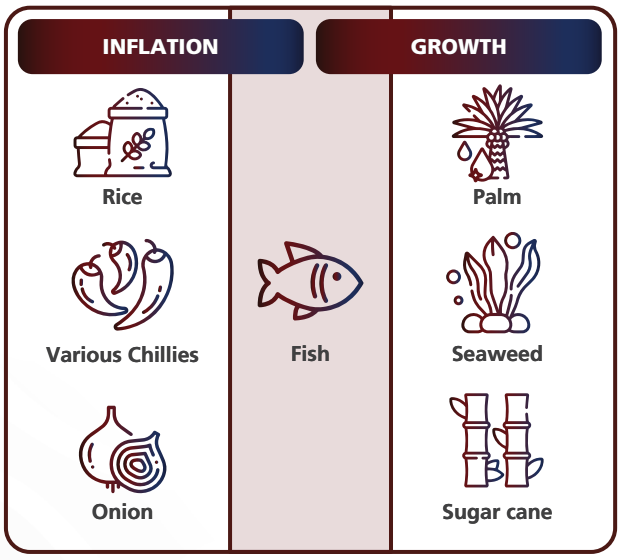
Note: **1) IDN Share:** Share of exports (imports) of Indonesian X products to total exports (imports) of Indonesian Food and Beverages; **2) World Share:** Share of total exports (imports) of World X products to total world exports (imports) of Food and Beverages; **3) IDN Nom:** Nominal export (import) of product X Indonesia (in USD Thousands); **4) World Nom:** World total nominal export (import) of product X (in USD Thousands); **5) IDN to World Share:** Share of exports (imports) of Indonesian product X to world exports (imports) of product X, using HS4 data

Source: Bank Indonesia

products. Nonetheless, there are some products that are imported in the form of raw materials for the food and beverages industry, especially sugar cane.

Based on the criteria of the Three-Pronged Downstream Strategy Approach, downstream diversification should be focused on seven food commodities, namely palm oil, fishery products, seaweed, sugar cane, rice, various types of chili peppers and onions. In this stage, the downstreaming of onions, rice and various chilies is a short-term priority with the main focus being to rein in the inflation rate before moving on to further downstream stages (Figure 7.2). Fish commodities are another priority, whether to help rein in inflation or to support improvements in the current account balance to achieve

Figure 7.2. Commodities Priority of Food Downstreaming



Source: Bank Indonesia

growth. Three other commodities, namely palm oil, seaweed and sugar cane, are medium- to long-term priorities with a focus on pursuing growth through improving the current account deficit and creating a more inclusive economy.

Efforts to accelerate food downstreaming can be directed towards aspects of improving production factors (P1), regulations and institutions (P2) as well as promotions and trade cooperation (P3). In regard to the P1 aspect, increasing productivity, providing facilities/ infrastructure and technology, in addition to giving formal financial institutions better access to financing are several factors that need to continue to be strengthened. For the P2 aspect, various efforts need to be made to encourage optimal government incentives/policies, as well as the integration of institutional systems and farmer institutions. Meanwhile, for the P3 aspects related to trade and promotion factors, stronger efforts need to be made, especially in regard to distribution lines; supply chain efficiency; partnerships with private parties; inter-regional cooperation; as well as tariff and non-tariff barriers for export products. As such, it is necessary to strengthen synergy strategies and coordination with various relevant stakeholders, both at the national and regional level, in order to accelerate and promote the success of the downstream food program.

The strengthening of production factors can also be supported by efforts to increase the availability of infrastructure and sources of financing. The provision of basic infrastructure will support the development of food downstreaming, especially in the supply of sufficient electricity at lower tariffs in remote areas. Besides that, the provision of 'clear and clean' land for building industries also warrants attention. From the industrial structure perspective, the increase in the added value of further-downstream products is not optimal given that mastery of production technologies remains low. There is a more integrated structure of downstream industries abroad so that domestic downstream industries are less competitive. On the financing side, small corporations still have to rely on direct financing schemes, mainly through the distribution of bank loans, such as investment loans and working capital loans. However, these financing schemes tend to target only specific food business lines of corporations and they do not optimally impact the food industry chain as a whole. Against this backdrop, small corporations tend to make use of internal funds to finance their expansion needs, which include downstream activities.

Furthermore, the development of food downstreaming also needs to be supported by strengthening of regulatory and institutional aspects as well as promotion and trade, whether at the national or regional level. Acceleration of food downstreaming, especially of rice, chilies and onions, in order to support price stability, still faces a number of major obstacles at the national and regional levels. From the regulatory and institutional aspects, the obstacles faced are mainly related to institutional systems that are not yet integrated so that the licensing and regulatory processes do not optimally support production activities and downstream efforts. Meanwhile, efforts to encourage promotion and trade need to be strengthened further, especially in relation to efficient supply chain routes, more optimal inter-regional cooperation and lower price disparities between regions.

7.3. Strategies for Strengthening the Downstreaming of Minerals and Coal

The strategies for prioritizing downstream metal products and sharpening the focus of the national downstreaming program plays an important role in supporting policy effectiveness. In view of the positive impact of nickel downstreaming, the Government is committed toward continuing the downstream policy for other minerals. To determine the next priority commodity for downstreaming, a comprehensive analysis needs to be undertaken. Prioritization is a crucial aspect in devising downstream policies, especially to ensure resources can be allocated efficiently (Yu *et al*., 2014), ensure policy objectives can be met effectively (Saediman, 2015), and mitigate potential risks (Van Asselt *et al*., 2018). Product prioritization

also becomes relevant given the limited reserves of metal minerals and the very large investment requirements for downstream projects. Furthermore, a de-bottlenecking strategy needs to be implemented; that is by identifying the main obstacles in the development of downstream products, whether at the national or regional levels. It is hoped that the formulation of downstream policies will be more targeted through the identification of the main obstacles, specifically in the downstream center areas.

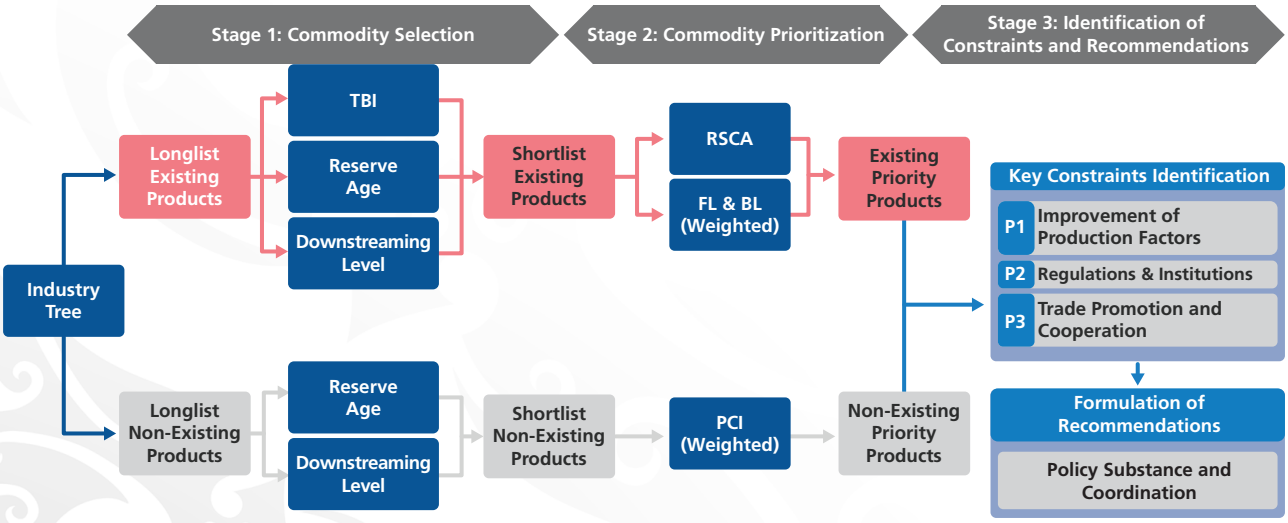
Determining the priority products for metal minerals downstreaming is done in three stages, namely selection, prioritization and identification of constraints (Tirtosuharto *et al.*, 2023). The selection stage begins with longlist mapping of downstream products from each mineral, as carried out by BKPM (2022) based on the industrial tree of each mineral. Products are divided between those which have been produced in Indonesia (existing) and those which have not yet been produced in Indonesia (non-existing). To obtain a shortlist of products, two criteria are used, namely the number of years of reserves and the downstream level (Figure 7.3).

The number of years of reserves indicates the availability of metal mineral reserves for future downstream development. The downstream level refers to the industrial tree from the Ministry of Industry which consists of five levels with a scale of 0-4, starting from ore for the most upstream product, followed by the smelting/refining level; formation; final product; and application for the most downstream products. Specifically for the selection of existing products, apart from the age of reserves and the downstream level, TBI criteria (described in the previous Section) are also taken into consideration to ensure sufficient room for product downstreaming to boost exports.

At the prioritization stage, three criteria are used, namely: (i) RSCA; (ii) Forward Linkage and Backward Linkage (FL and BL); and (iii) Product Complexity Index (PCI). The FL and BL criteria indicate the level of linkage between a sector and the input sector that has been used in the production process. PCI criteria are used on non-existing products to determine the level of complexity of products that could be produced. Next, the constraint identification stage is carried out based on the 3P approach, namely: (i) improving production factors; (ii) regulatory and institutional considerations; and (iii) promotion and trade cooperation.

Based on the methodology for determining the prioritization of downstream products, downstream priority products are ranked in order coming from four strategic metals, including both existing and non-existing products. In the existing downstream product group, anode slime (which is a by-product of

Figure 7.3. Methodology of Downstreaming Product Prioritization Flowchart



Source: Bank Indonesia

copper refining that can be further processed into precious metals) has the most potential to be developed. Other than that, the downstreaming of mixed hydroxide precipitate (MHP) and tin ingot needs to be given priority. Meanwhile, for non-existing products, EV batteries - which are downstream nickel products – are the priority product (Table 7.3).

To strengthen mineral and coal downstreaming, one approach that can be used is to use the Trade Competitiveness Diagnostic (TCD) concept developed by Reis and Farole (2012). In adopting the TCD framework, focus is on three aspects, namely: (i) improving productivity through infrastructure support, logistics services and vocational education; (ii) regulatory and institutional considerations that act as obstacles to investment and export activity; and (iii) promotion and trade cooperation to increase access to global markets. Research by Tirtosuharto *et al.* (2023) uses this three-aspect approach to identify various obstacles that need to be addressed in order to improve and ensure the sustainability of mineral and coal downstreaming in Indonesia.

7.4. The Future Direction of Downstreaming

In the future, the development of food downstreaming and the strengthening of mineral and coal downstreaming policies need to be improved further to support economic revival. The development of food downstreaming needs to be supported by comprehensive strategies and analysis to achieve the goal of price stability while encouraging more inclusive economic growth through higher labor absorption. Meanwhile, the strengthening of mineral and coal downstreaming needs to be supported by a strategy of prioritizing metal mineral downstream products and sharpening the focus of the national downstream program so that it can play an important role in supporting policy effectiveness. Overall, strengthening synergy and policy coordination are key to encouraging the accelerated development of both food downstreaming and strengthening mineral and coal downstreaming.

The Development of Food Downstreaming Policy (Agriculture, Plantations and Fisheries)

Based on the results of the prioritization and mapping of challenges in the previous section, strategies for the strengthening of food downstreaming need to be strengthened further. The strategy to strengthen food downstreaming is aimed at controlling inflation and supporting growth by reducing the current account deficit, while encouraging a more inclusive economy through higher employment. As previously reported, the Three-Pronged Downstream Strategy Approach came up with a list of seven

Table 7.3. Top 10 Priority Products for Metal Mineral Downstreaming

EXISTING INDUSTRY		NON-EXISTING INDUSTRY	
Primary metals	Downstreaming products	Primary metals	Downstreaming products
Copper	Anode Slime	Nickel	EV Batteries
Nickel	MHP	Tin	Tin Powder/Flakes
Tin	Tin Ingot (Pure or Alloy)	Nickel	Ni Powder
Nickel	Nickel Matte	Tin	Tin Rod
Tin	Tin Bar/Tin Solder	Tin	Tin Profile
Tin	Tin Wire	Tin	Tin Slab
Nickel	Stainless Steel Slab	Copper	Foil
Nickel	Stainless Steel Billet	Nickel	Ni Metal
Nickel	Stainless Steel HRC	Copper	Slab (Plate/Strip/Sheet)
Nickel	Ferronickel	Copper	Billet (Pipe/Tube)

commodities that are a priority for development over different time horizons. These commodities are rice, onions and various types of chili peppers in the short-term; fishery products in the short- to medium-term; and CPO, seaweed and sugar cane in the medium- to long-term. This strategy also needs to be formulated to address a number of challenges, especially in relation to productivity, regulatory and institutional considerations, as well as market access.

Strengthening policy synergies is key in driving acceleration of downstream food development. Coordination and synergies with various parties (including business operators; local governments; financial authorities; and other agencies) is required in strategy formulation and policy implementation. In the short-term, an integrated food downstream roadmap is needed, supported by business models and financing schemes. This support is expected to lead to increased production capacity and the use of technology in downstream products. Another necessary form of support is institutional strengthening, so that partnerships can be built between farmers and industrial players. In the medium- to long-term, support also needs to come from strengthening regulations, expanding trade cooperation and improving the competency of human resources.

Policy synergies in strengthening financing sources and mechanisms need to be continuously improved to address the challenges and support the expansion of downstream food financing schemes. Synergy and policy coordination are also needed in regard to strengthening of financing business models that are in accordance with the needs of food downstreaming. Cooperation mechanisms in facilitating the financing of Financial Institutions (business matching) can support the distribution of working capital and investment for business operators in the agricultural, plantation and fishing sectors. Cooperation mechanisms in facilitating the financing of Financial Institutions (business matching) can support the channeling of working capital and investment loans to business operators in the agricultural, plantation and fishing sectors. The innovation of credit products whose terms match the length of the harvest cycle of each commodity can also be applied in the future. In terms of financing risk management, cooperation among academics, Central and Regional Governments and guarantor institutions can help to channel financing with minimal risk of default.

The role of the authorities in facilitating the financing needs of food corporations through innovation and synergies across Ministries/ Institutions also needs to be strengthened further. One Bank Indonesia innovation is to strengthen macroprudential policy stimulus to encourage the growth of bank financing through the implementation of the Macroprudential Liquidity Incentive Policy (KLM) for Conventional Public Banks (BUK) and Sharia Public Banks (BUS)/Sharia Business Units (UUS). This is valid from 1 October 2023 in various sectors including downstream mining and non-mining sectors (including agriculture, livestock and fisheries). The government also advocates the formulation of priority budgets to support national food security in order to underpin the transformation of the national economy.

Strengthening Downstream Minerals and Coal Mining Policy

The strategy for strengthening downstream Minerals and Coal Mining is formulated based on the results of mapping the challenges faced. As stated earlier, strengthening strategies may refer to at least three of the following aspects: (i) Improvement of production factors to reduce the productivity gap through infrastructure support, logistics services and vocational education; (ii) Strengthening regulatory and institutional aspects capable of reducing regulatory deficits as a barrier to investment, export competitiveness and production activity; and (iii) Strengthening trade and promotion cooperation to improve access to global markets.

Efforts to create a superior downstream industrial ecosystem need to be accelerated to encourage improvements in production factors for minerals and coal downstreaming. A superior downstream industrial ecosystem can be established through efforts to improve the

quality of Local Value Chains, distribution system improvements and supply chain integration. Furthermore, improvements are needed in strategic mining minerals governance that will support the development of a superior downstream industrial value chain ecosystem. In this context, it is necessary to formulate a governance framework for the development of downstream mining over the medium- and long-term, accompanied by a strong legal umbrella and integrated and coordinated implementation planning for optimal resource allocation. This formulation also requires weighing the gradually diminishing mining reserves and the limitations of technologies that could be developed independently. This effort also needs to be supported by the integration of trade governance from upstream to downstream industries for the availability of raw materials at competitive prices. Furthermore, this formulation also needs to take into consideration the gradually diminishing mining natural resource reserves and the limitations in developing technology independently. Further support should also come from the integration of trade governance for upstream and downstream industries to ensure the availability of raw materials at competitive prices.

Efforts to improve production factors through increased investment can also be supported by several other aspects. Financing support, including through the banking system, needs to be strengthened to fund downstream industries, especially on smelter construction; supporting infrastructure; and research and development (R&D). The acceleration of smelter development can also be achieved by industry players through the use of facilities and incentives in Special Economic Areas (KEK). In order to ensure support is provided to improve the production factors in question, a coordination mechanism is needed for the monitoring, evaluation and de-bottlenecking of downstream mining programs at both the central and regional levels.

Trade cooperation and promotion needs to be expanded, especially to nontraditional market countries that are also encouraging the development of downstream industries. This is done through a business matching mechanism between producers and consumers of downstream mining products, which can be initiated by a number of agencies such as the Chamber of Commerce, State Representatives abroad, as well as the relevant Ministries. For example, India is one country that is developing its electronics industry, and it could be a potential export destination for downstream products of tin and copper.

Synergy and policy coordination between stakeholders are important factors in driving the implementation of national programs related to downstream mining. In this regard, a single vision will be important in determining the priorities for strategic mineral downstream policies, especially to have common objectives. Moreover, de-bottlenecking (or resolving constraints in minerals downstreaming) and the development of priority industries is a crucial step in driving the sector's growth. Good coordination and synergies between the various Ministries and related Institutions are expected to accelerate the downstream process and help build a strategic minerals industry that is competitive.