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THE IMPACT OF AGRICULTURAL REGULATION ON CORN PRODUCE IN SUMBAWA

A Story of Self Sufficiency

MAY 2018

Contextual Outline

Self-sufficiency of the national corn production is a pressing issue for Indonesia, and one that is in the forefront of President Joko Widodo's current policy agenda. Widodo's interest in this growing national issue is outlined in the second stage of Indonesia's Long-Term Development Plan. This plan is a national reference point for achieving the country's objectives.

Corn demand for poultry feed in 2018/2019 is predicted to increase by 6.25% compared to 2017/2018. In the same period, the demand for corn for the consumption of food, seed, and industrial use is forecasted to increase by 8.3%. The Director General of Animal Husbandry, Professor Muladno, emphasized that self-sufficiency must be immediately pursued regardless of current conditions.

As the demand for corn outweighed its supply in the Indonesian economy, farmers were forced to compete with the inflow of international produce. The archipelago imported 3.2 million tons of corn alongside domestic production during the harvest time of March through June 2015. This placed downward pressure on the selling price of corn at the farm gate level in Bima and Dompu, Sumbawa. During the period of March through June 2015, the price fell to roughly Rp 1,800. As an indication of this excess in demand, all farmers interviewed for this report noted that their stock of corn was consistently sold.

The Minister of Agriculture has now responded to these pressures with aggressive import controls and pricing regulations. As of July 2015, through Regulation Number 57, Indonesia only imported 900,000 tons of corn into the country. Regulation Number 21 of 2017 has also stabilized the price of corn, and as a result, the pricing expectations of farmers on the local level.

Introduction

This learning document presents the findings of research on Regulations Number 57 and Number 21 in the districts of Bima and Dompu, Sumbawa. This paper describes the research methods and continues with a discussion and analysis of key findings. It then outlines future policy challenges that require attention in order to improve the economic welfare of Bima and Dompu. The conclusion evaluates the success of the Indonesian Government's regulations in relation to their national goal of increasing the country's income. Finally, this learning document will make recommendations for ensuring that economic welfare in the local economy increases in the future. This document is proposed as a tool for humanitarian programs, private sector pursuits, and government policymaking.

Regulation Number 57

Regulation Number 57 of 2015 is entitled "Importation and Exportation of Plant Originated Feed Materials Into and From the Territory of the State of the Republic of Indonesia." Chapter One explores the requirements of importation and exportation. Chapter Two and Three outline the logistics associated with the importation and exportation of plant-originated feed materials. Lastly, Chapter Three further examines the procedures of importation and exportation.

The effect of Regulation Number 57 on the importation of corn into Indonesia is summarised succinctly by The United States Department of Agriculture (USDA) in the 2016 "Indonesia Grain and Feed Annual Report." The Indonesian Minister of Trade will now issue all import permits for any plant-based feed ingredients. Originally, importers needed to acquire a bill of lading prior to applying for an import recommendation from the Ministry of Agriculture. As a result, importers were only required to apply for this recommendation after a corn import contract was established between the purchaser and supplier. This regulation poses a substantial change as most domestically demanded corn is used for animal feed in Indonesia.

The corn import quota placed upward pressure on the domestic price of corn at the farm gate level, as international competition was reduced for the production of corn. As a result, corn producers gained due to this policy implementation. Consumers were priced out of the market after the introduction of the quota because they were no longer willing or able to pay for the higher price of corn. Those who can still afford and are willing to pay for it will be required to pay a higher price. This means that domestic consumers in general are disadvantaged.

This type of economic regulation has the potential to be altered or removed depending on the political climate. Furthermore, Indonesia is known for policy volatility across different political administrations. Given these fluctuating political conditions, the economic gains and losses of farmers and consumers have the potential to change again in the future.

Regulation Number 21

In 2016, the price of corn at the farm gate was volatile. According to the USDA, figures fluctuated between Rp 2,850/kg to Rp 3,200/kg in March 2016, compared with Rp 3,300/kg to 3,500/kg in March 2015. The government implemented a price floor through Trade Regulation Number 21, to stabilise the price of corn at the farm gate level. For a moisture content of 35%, the government set the price to Rp 2,500/kg. For a moisture content of 15%, the government set the price to Rp 3,150/kg.

These stable prices, in addition to import restrictions, meant that many farmers preferred to begin or increase their production of corn as an alternative to other crops. Price stability has given farmers better control of their level of risk.

However, the price of corn at the farm gate level is now higher than the price set by the government. Agents in the local economy trade based on the market equilibrium price of corn. Therefore, the price floor does not directly affect farmer income levels or consumer decision-making. However, as farmer confidence has risen with reference to corn production, supply increases in the domestic economy and with it, the price of corn itself. Ultimately, this regulation will have an indirect effect of pricing out of some consumers from the market for corn and increase farmer income levels.

Research Methodology

This qualitative research was conducted through interviews with different agents involved in the value chain in the production of corn, and local government branches in Bima and Dompu. The research is based on established economic models. Detailed depictions of these models are provided in an earlier desk review. The research process requires providing evidence for the validity of these models.

Limitations of Research

There are other economic forces that have been in play since the implementation of Regulations Number 57 and Number 21. It would be a lengthy and financially infeasible task to measure the extent in which the findings found in this research are a result of the regulation or other economic factors. That is beyond the scope of this qualitative research. However, through our research we can determine that the economic models previously presented are indeed justified.

For example, the Agricultural Financing Model for corn farmers (facilitated by the AgriFin Mobile Program) has also expanded local corn production. It can be assumed that this increase in corn production in the local economy should decrease its price. Contrary to our expectations, we see that the domestic price of corn has actually been steadily rising since 2015. Therefore, it must be the case that the change in price due to the loans programs is less significant than that as a result of tightening import restrictions and rising demand.

Key Findings

The research resulted in ten key findings, which are analysed below:

1. Changing Revenue

Quantity of corn produced: We can infer from the data that there has been an average increase in the quantity of corn produced in Bima and Dompu. Farmers note that an increase in members joining their farmers groups is reflective of the increase in land used for the production of corn. Additionally, Oi Nungga Farmers Group (Oi Nunga) reports that the number of cars used to transport farm hands to and from the fields has increased. These indicators reflect an increase in the quantity of corn produced.

In addition, the research often identified skepticism amongst farmers. Many preferred to wait and observe the yields and incomes of other farmers before switching to the production of corn or increasing their current production levels.

The price of corn at the farm gate level: We can infer from the data that there has been an average increase in the price of corn at the farm gate level. Evidently, there is a significant difference in the price of corn depending on the level of moisture content. A higher moisture content reflects a cheaper price for corn in the market. Additionally, officials from Economic Division note that during the harvesting season, the price of corn is unstable. This is due to local speculation surrounding government regulation.

The revenue of corn farmers: As a reflection of the average increase in the price and quantity of corn produced in Bima and Dompu, the revenue recorded on behalf of local corn farmers has also increased. In general, farmers have decided to increase their production of corn, as it has become marginally more profitable in comparison to the production of other agricultural goods.

The revenue of grain traders: Regulation has meant that grain traders have had to accept a higher price for corn at the farm gate level. Mr. Zasari, the President Director of the Rural Bank in Bima (BPR) notes that traders live in fear of regulation. However, he also stated that many traders still pressure farmers for a lower price, as the traders are bound by strict contracts with their buyers. PT. Seger Agro Nusantara, the corn drying and warehouse facility, noted that they are facing pressure from both sides of the value chain. Feed producers in Java are pressuring these firms to maintain their price levels; however, the price they must pay at the farm gate level is slowly rising.

2. Changing Costs of Production

An increase in the production of corn in the local economy has meant that the cost of producing corn has experienced a similar rise. As this occurs, suppliers of the inputs used in the production of corn receive more revenue for selling their goods to farmers. However, this places downward pressure on corn farmers' profits. Furthermore, the rising costs of production have generally not exceeded the increase in revenue for the production of corn in Bima and Dompu.

General costs of production: Farmers have seen an increase in the cost of corn millers, seeds, crop protections, and land as their production levels of corn have increased.

Transportation costs for farmers: Oi Nungga reported growing issues in regards to transportation. It has become more expensive as oil prices rise and more cars are being required to transport additional farmhands longer distances. As the production of corn expanded, land use has extended to areas further

from roads and established infrastructure. In addition, marginal productivity has lowered, reflected in the costs of production as farmers are required to carry heavy farming equipment further distances. Water also has to be carried further, as farmland is growing further away from rivers and streams.

Transportation costs for grain traders: Farmers are not the only economic agents in the corn production value chain who are feeling the effects of rising transportation costs. The rising price of oil is also impacting PT. Seger Agro Nusantara. As farmers experience rising transportation costs, they don't bear the entire load. Farmers are demanding compensation from their buyers, and often these requests are granted. Consequentially, farmers still take on the costs of these rising prices because the warehouse pays a relatively lower price for corn at the farm gate level. In addition, other rising production costs are being passed on to grain traders.

Labour costs for farmers: Research suggests that farm hands in search of higher wages tend to travel outside of Bima to become farmers in areas such as Lombok and the Sumbawa Regency. They are drawn to do so because of the prospect of cheaper land. Hence, there is a shortage of suitable labour in the local economy. As workers migrate further outwards, this decreases supply and places upward pressure on the price for farmhands. These farm hands also tend to be from a young demographic. Mr. Zainuddin agrees with this sentiment, as he noted that a lack of adequate human resources has resulted in the rising price of farm hands in the local economy. Additionally, he highlighted the increase in local migrants from East Nusa Tenggara from 2014. Lombok and Flores have been identified as key origins of migration. Workers are also reported to have migrated from West Nusa Tenggara. The Mada Selly Farmers Group (Mada Selly) indicated that workers from these areas are willing to work at cheaper rates than those from the local labour market of Bima and Dompu. Over time we would expect these issues in the labour market to adjust, and wages to reach a general equilibrium position. However, if the import restrictions did not exist, domestic firms would import corn at the expense of higher levels of unemployment in the local economy.

According to Mada Selly, as of 2017 new migrants from Flores are bringing a holistic farming service. They are willing to undertake responsibility for every step in the process of the production of corn. This begins with clearing the land to make it suitable for the production, planting, maintaining, and harvesting of crops. This allows farmers to minimise their costs of production, as it is a relatively cheaper method of employing labour to the production of corn in Bima and Dompu.

Labour costs for grain traders: PT. Seger Agro Nusantara reports rising labour costs for the warehouse due to workers demanding higher wages. They are making this demand because of an increase in the general price level in the local economy. Research indicates that these inflationary pressures are partly a result of the increase in incomes and spending of corn farmers. This concept is discussed in detail in Key Finding Number 6, entitled "Increase in Living Standards." This upward pressure on the wage level of warehouse workers is not beneficial in terms of competition for PT. Seger Agro Nusantara. However, we would expect other firms to be experiencing similar economic conditions.

Farmers purchasing new machinery: In 2014, farming was a very manual task in Indonesia. As of 2016, it has become more automated through the use of sophisticated machinery for Mada Selly. A rise in incomes has allowed them to purchase their own inputs to production and reduce long-term input costs. In addition, farmers reported purchasing second hand motorcycles to make transport to and from farmland more efficient, in turn increasing productivity.

Farmers hiring female workers: With the recent increase of automated machinery, there is now less of a

requirement for heavy lifting in the field for Mada Selly. As a result, female farm hands now tend to be preferred because they reportedly do not demand the additional benefits (such as coffee and cigarettes) that men often do. In addition, women are reportedly culturally perceived to be more diligent in comparison to men and therefore will enable farms to have higher efficiency and lower production costs.

3. **Quality Improvements Through Syngenta**

Syngenta, an agrochemical and seed firm, reported that their partnership with Mercy Corps Indonesia is the first of its type for this organisation. They reported a break-even point of 5,000 hectares per 100 tons of seeds for their contribution to their program in Sumbawa. The objective for 2020 is to provide seeds that cover 10,000 hectares of land in Sumbawa Island. Agricultural regulation has meant that the number of farmers producing corn has increased. This increase in scale provides a potentially profitable business model for companies like Syngenta in their sale of inputs to the production of corn.

A cyclical improvement: Research has found that many farmers were incentivized by the products and services that Syngenta provides. This indicates that Syngenta's involvement has indirectly resulted in an increase in output through incentivizing additional farmers to join the market for the production of corn. This is beneficial for Syngenta, as they can move closer to achieving their objective of increasing economies of scale.

The pattern seems to be as follows:

- › Regulations Number 57 and Number 21 have enabled farmers to afford quality inputs of production.
- › Therefore, corn farmers' yields and product quality have increased.
- › Syngenta is further incentivized to expand within the market.
- › Corn farmers' revenues improve again, and the cycle repeats until quality constraints are met.

Education: Syngenta provides education on the correct planting procedure for the production of corn. Additionally, Syngenta will travel to the farmers' locations to assist them if they have questions in relation to corn production. Farmers note that travelling is often costly, as it consumes time in the day that could otherwise be spent more efficiently on agricultural work. Therefore, they have quite a substantial incentive to purchase inputs of production from Syngenta.

New source of corn seeds: A farmer and his wife (Fir'an and Sarlah) reported that before Syngenta, seeds were sourced from the local market. In 2016, they used mostly NK 7328 seeds and some of seed 999, which were sourced from Syngenta. In 2017, they reported using only NK. However, they note that the yield from NK 7328 is only slightly larger than seed 999. In addition, the chemical Gramaxon is sourced from Syngenta.

Between 2014 and 2016, the So'peto Farmers Group (So'peto) reported using seed BISI 2. As of 2016, they also began using NK 7328, providing a higher quality product with a lower moisture content and a substantially higher yield.

Oi Risa Farmers Group (Oi Risa) noted similar benefits. In 2015, after using chemicals sourced from Syngenta, the production of corn increased. Between 2014 and 2015, they used NK 999, also sourced from Syngenta. The crop from this seed grew high and was difficult to harvest. In addition, they utilised NK 212, which was easier to harvest but contained a relatively higher moisture content. Both seeds produced

the same quantity of corn per hectare covered. Between 2016 and 2017, after beginning to use NK 7328, both issues from the use of the aforementioned seeds were corrected.

Oi Risa reported that seed 7328 is incredibly high quality and easily harvested. This seed also substantially increased yields for the farmers. As of 2015, they sourced seeds entirely from Syngenta. After more than three years of help from Syngenta, they have been able to increase their production in relation to other areas.

However, Mada Selly notes that NK seeds experienced issues with disease. Additionally, they are an attractive food source for animals, who will eat them before the corn has an opportunity to grow. Regardless of the shortcomings of NK, they are still seen as a superior alternative to other seeds on the market or those that are subsidised by the government. Indeed, many farmers who receive seeds from the government are stockpiled.

4. **Farmer Exploitation**

Issues prior to government regulation: Mada Selly reported that non-specified buyers tricked the farmers in 2014. They purchased the corn with fake money, took the corn without paying, and later paid at a price below market value. As of 2015, the farmer group reported an improved process: the corn produced is sold directly to a warehouse in Dompus with fixed prices. Therefore, no bargaining is required. The warehouse also has a machine to detect the moisture level of the corn. The consistent buyers are from large firms such as PT. Seger Agro Nusantara. Payments are transferred to the group leader of Mada Selly, who pays the cash directly to the members of the group.

Protecting against exploitation: This type of sale has been made possible by agricultural regulation, improvements in production, and increasing economies of scale. Big firms are often only interested in purchasing from farmers that can sell in large quantities at a time. In this case, the new process has increased the farmers' senses of convenience, consistency, security, and confidence.

5. **Improved Resiliency to Shocks**

Oi Nungga reported that their marginal propensity to save has increased due to an increase in scale, meaning that funds are available for future emergencies. For example, if weather events damage crop yields, savings can be used to help mitigate the effects of falling incomes.

6. **Rising Living Costs**

The general cost of living in Bima and Dompus is reportedly slowly rising over time. As the incomes of corn farmers increases, so does spending in the local economy. This results in an increase in the demand for goods and services relative to their supply and causes a rise in the general level of prices. For example, Fir'an and Sarlah reported that the cost of food for their children's lunches have gradually increased over recent years. However, it is not difficult for people to fulfill their basic needs.

The cost of livestock feed: An increase in the price of corn ultimately places upward pressure on the price of feed in the local economy. This is substantial, as USDA reports that the feed ingredients for corn are 90-95% locally sourced and are used for 50% of livestock feed in Indonesia. Many farmers produce agricultural livestock for commercial use, so this can impact the costs of production in other business ventures. It also affects local agents who produce livestock for personal consumption.

7. Increase in Living Standards

Local investment: The Economic Division notes that the development of modern markets (such as Alfamart and KFC) in the local economy is an indicator of increased living standards. The people of Bima and Dompu now have access to facilities that were otherwise only available in more developed areas. The presence of large corporations, who now find it lucrative to invest in these areas, is reflective of economic growth.

Commercial goods: The ability of farmers to purchase commercial goods is an additional indicator of the improvement in living standards. Many farmers reported being able to purchase 3-4 motorcycles and televisions. In addition, farmers can afford to partake in Hajj, an annual religious pilgrimage to Mecca. Farmers can also afford house renovations, hospital visits, and much needed medications.

Education: More farmers can now afford to send their children to school. In Bima, education is considered to be a symbol of wealth. Therefore, from a local perspective, the level of wealth in the economy is rising. As rates of educational attainment improve, human capital develops in society that perpetuates future economic growth and increases in living standards.

Satisfaction of work: Farmers have reportedly taken greater satisfaction in their jobs due to increased incomes.

8. Reaching Capacity Constraints

The local economy is experiencing supply constraints in regards to the production of corn.

Indicators of capacity constraints: So'peto reports that much of the forestry area is already covered in Dodu, and most is already covered in Rasnaid Timur. The rest of the land is inaccessible due to a lack of infrastructure. Additionally, the research finds that farmers are cutting down trees on land with an elevation greater than 45 degrees, reflecting the fact that the region's fertile land is exhausted.

Cause of capacity constraints: Officials from the Agricultural Agency in Bima District note restrictions in regards to the expansion of land into state forests. This contributes to capacity constraints.

Impacts of capacity constraints: Producing on land with an elevation greater than 45 degrees has caused substantial flooding to PT. Seger Agro Nusantara's warehouse and drying plant. As farmers are clearing uphill from the site, this has the indirect effect of damaging the firms' facilities. In turn, these costs are seen in the lower price that PT. Seger Agro Nusantara is willing to pay for corn in order to compensate for their losses. Ultimately, farmers indirectly reduce their income potential by farming on land above their buyers' facilities.

The Regional Development Planning Agency in Bima (BAPPEDA) noted that this type of practice is unsustainable. The land will be unusable for future planting as a result of flooding and land erosion. However, the Economic Division notes that the government often encourages the replanting of trees to promote sustainability.

A capacity constraint for grain traders: PT. Seger Agro Nusantara noted that the port they use to ship corn to Java is small. This means that they are forced to purchase fewer kilos of corn at any given time than would prefer. The alternative is that they must hold it for period of time that creates a decrease in quality and price for the grain.

9. Bridging the Gender Wage Gap

An interesting dynamic identified throughout the research process were wage disparities between men and women and different farmer groups.

Identifying wage disparity: Oi Nungga reported that male farm hands are paid a substantially higher wage than female farm hands. They attributed this to the general disparity in physical ability between men and women. Female workers can be paid more cheaply, as they often cannot lift heavy farming equipment. Additionally, they note that this disparity is increasing as more male farm hands are required relative to female farm hands. This is due to rising production requiring the expansion of land, a task that is physically demanding for Oi Nungga. There is also a cultural perception that men are considered to be the breadwinners and that women can be paid less, as the husband provides a substantial proportion of the family income. This perspective does not give much consideration to single mothers or women in the local community who value financial independence.

Identifying wage equality: Mada Selly, in contrast with Oi Nungga, reported no pay disparity between male and female farmhands. This is a substantial finding because it helps to highlight a pathway in which women are able to earn the same wage as men in the local economy. The key factor that differentiates both farmer groups is their level of agricultural development. This helps bridge the gap between wages and creates greater gender equality. In other words, as the ratio of male to female farm hands slowly narrows, so does the wage gap between men and women.

The cause of wage disparity: The proportion of male and female farm hands is quite different across the local economy. For example, So'peto reported a substantially greater ratio of men for every women compared to Mada Selly. However, a female farmer interviewed (Zaitun), reported her ratio to be quite even. It's possible that the Economic Division provides the most holistic perspective with regard to the local economy. They noted that as of 2018, women were more dominantly employed in the industry than men. Findings throughout this research indicate that these differences are due to the different levels of agricultural development. Less agriculturally developed farmers have less of a need for farm hands that can complete physically demanding tasks. Therefore, as the level of agricultural development improves, less importance is given to hiring men who have the ability to lift relatively heavy farming equipment. This helps to bridge the wage gap between male and female farm hands.

Social cohesion: Uncovering the reason for agricultural development in Bima and Dompu can help bridge the gender wage gap. What was particularly noticeable with Mada Selly was the level of social cohesion. The farmer group has 180 members, with a chairman that independently recruits. The leader of the group is chosen through a democratic process and is responsible for many of the logistical duties within the group. Those responsibilities include delivering corn to storage facilities, receiving payments from buyers, and distributing it to the farmers. Ilham (the current group chairman) reports complaints to BPR, ACA Asuransi (ACA), and Syngenta and shares news and updates with the group. He helps members with farming practices and informs them about new agricultural training programs. They use technology such as mobile phones to communicate issues to relevant bodies.

The cause of social cohesion: Research has found that farmers have joined farmer groups as a form of emergency insurance. These farmers gain financial support from other members. In 2017, a weather event destroyed most of the crops of one of the Mada Selly farmers. The group acted as a community, using their collective resources as a safety net for the individual farmer. They were able to support the farmer financially to maintain living expenses. Farmers are further encouraged to stay within the farmer group due to the many benefits of being a member. Overall, these groups prove useful in minimising the risks involved in agricultural production.

In addition, farmers are encouraged to join these groups by the incentive of achieving economies of scale

through the pooling of collective resources. It has allowed them to increase their revenue and purchase sophisticated machinery that they would not have been able to otherwise afford. As a result, they have increased their efficiency in the production of corn, and with it, their incomes.

The increase in the number of farmers in the local economy switching to the production of corn means that new opportunities for collaboration are appearing on a daily basis.

Increasing revenue: Syngenta is incentivized to offer programs specifically to Mada Selly for reasons related to scale. Mada Selly reported the use of slips, that when handed to buyers, provides an additional payment to every unit of corn sold. Syngenta provides economic incentives to large farmer groups as to maintain their seed and pesticide sales. Mada Selly hope to scale up their member base in the future.

Increasing resilience to shocks: Younger farmers tend to be more knowledgeable than older generations about new technologies. Through farmer group collaboration, the younger members have been able to share their knowledge with older farmers. For example, they can share technology that helps farmers keep better records of the different types of evidence needed if an insurance claim is required. As a result of this information sharing, it is found that larger farmer groups are conducive to being more resilient to shocks.

Agricultural loss: The economies of scale created by farmer groups provide security in the sale of corn. Factories are willing to purchase in bulk consistently, as groups now have the member base to pool their individual produce into larger quantities.

Decreasing production costs: Greater economies of scale have given farmers the opportunity to invest in trucks, allowing them to take fewer trips when transporting corn to their buyers. This reduces costs on behalf of the farmers, and ultimately improves their incomes.

Improving the quality of corn: Economies of scale have also given farmers the opportunity to purchase inputs of production that are of a higher quality.

Improving living standards: The more advanced level of agricultural development can be seen in the types of commercial goods farmers can purchase. Members of Mada Selly are able to purchase refrigerators, televisions, and other goods that they could not otherwise able to afford. These goods are still not affordable to relatively less agriculturally developed farmers and farmer groups.

Exacerbate rising living costs: Rising income levels of corn farmers through social cohesion results in increased spending in the local economy. This, in turn, contributes to the rising living costs in Bima and Dompu.

10. **Creating Undesired Markets**

The production of corn has taken priority over the production of other crops and agricultural industries in Bima and Dompu.

Falling quantity: BAPPEDA notes that mung beans, cashew nuts, and soybeans experienced a decrease in production between 2014 and 2017. This is a consequence of recent agricultural regulation. So'peto notes that the large quantity of soybeans being imported reflects the fall in the amount that is being domestically produced.

Conclusion

All agents interviewed in Bima and Dompu agreed on the outcome of Agricultural Regulations Number 21 and Number 57 on the local economy. Rising prices have incentivized an increase in the production of corn, and with it, the rising incomes of farmers. Grain traders expressed that their benefit comes in the form of rising quantity. However, they are often pressured through set pricing contracts with their buyers.

Chapter 1, Article II of Regulation Number 57 indicates that one of the Indonesian government's goals in pursuing this regulation is to "increase the country's income." As the income levels of farmers rise, so does the income and output of the local economy more generally. In this way, the government is successfully meeting its goal in Bima and Dompu. If these regulations did not exist, domestic firms would buy from overseas firms at the expense of domestic corn farmers. This would result in lower income levels in the local economy.

The President Director of BPR noted that Bima still cannot provide for the entire national consumption. They can, however, satisfy the demands of West Nusa Tenggara Province. BAPPEDA agreed, noting that corn from BIMA can fulfill the demand for corn in Eastern Indonesia. They additionally noted that if they stop importing corn completely, Bima could then fulfill the national demand for corn.

The Economic Division noted that self-sufficiency efforts are also going well. Despite strong domestic demand, the USDA notes that 2014/15 saw corn exports reach 255,000 MT, compared to the 2013/14 exports of 12,000 MT. The Indonesian government has used this information to justify the success of its objectives. However, the USDA states that this could be the result of regional trade advantages.

Ultimately, as productivity rises, farmers could achieve the economies of scale required to provide corn at a competitive price without the support of government regulation. However, this is dependent on the ability of farmers to improve their relative efficiency.

Recommendations

Responding to key finding 1: changing revenue

On current government agricultural regulation: So'peto, wanting clear prices from the market, noted that a higher price floor would reduce uncertainty in the price of corn at the farm gate level. A higher price floor would increase farmer confidence, and with it, the quantity of corn produced in the market. BAPPEDA agreed with the need to expand this type of regulation.

On greater financial access: Farmer groups and farmers note that they want greater access to loans for the harvesting season. This would reduce supply constraints with regard to the production of corn. This could be an opportunity for Bank Andara to expand their branchless banking service through individual agents. The use of agents to finance microloans is effective in providing services for communities in remote areas and providing financial inclusion. This is particularly important, as Mada Selly stressed the need for BRI and other banks to be located closer to farmland. This would increase productivity and revenue because farmers would not be required to travel to the city in order to access these resources.

On government training: Outside of Rasane Timur, there has been no reported government training on the production of corn. Even there, it is not offered to the public, only to farmer groups. It was commonly reported that government involvement lacked on a microeconomic level. Government training through human capital formation can be used to correct for errors in agricultural production and increase efficiency. This would increase the quantity of corn produced, and ultimately, farmer revenue.

On introducing feed production facilities: BAPPEDA noted that the region requires factories to process corn into feed material. Currently, it is produced in Java. Producing it locally would reduce transportation costs and result in higher revenue for corn farmers. To do this would require increased regional investment. However, the Economic Division noted that corporations perceive Sumbawa to be unsafe, and thus are reluctant to invest in the area. This lack of investment can be seen in the area's low levels of educational attainment and constant water shortages.

On redistributing subsidised fertiliser: Fertiliser is subsidised by the Indonesian government. Mr. Yasin is a local supplier of fertiliser to Bima. Fertiliser is a government controlled commodity, and as such, individuals must obtain permits to distribute it. Due to the government's current fertiliser system of subsidisation, distribution and control, fertiliser is in short supply. Fir'an and Sarlah note that they prepare fertiliser 2-3 months before agriculturalisation begins, as the quantity provided by the government is substantially insufficient. They also note that the government does not consider the amount of corn production when supplying fertiliser, and therefore does not supply enough.

Benny Rachman and Tahlim Sudaryanto from the Indonesian Ministry of Agriculture noted that government planning surrounding the quantity of fertiliser demanded is not fully accurate and supervision of the projections has not been implemented properly. This, in turn, causes the quantity of fertiliser in the local economy to be lacking. To help rectify this, a more streamlined process is required from producer to farmer. The government needs to accurately determine the quantity required in the local economy, through stringent checks of individual demand.

On government provided facilities: In 2016, the government made corn millers available to rent in Bima. After that, Zaitun, a female farmer interviewed, no longer needed to mill corn manually. Through the use of these government provided facilities, she was able to increase her corn yield productivity. Through the further provision of facilities, the government can continue to achieve these sorts of results in the future.

Responding to key finding 2: changing costs of production

On owning the means to production: Farmer ownership of the means to production would reduce costs and increase incomes over the long run. This can also be achieved through government-provided or subsidised facilities.

Responding to key finding 3: quality improvements

On improving farmers' facilities: Farmers and farmer groups wish to have access to a corn dryer. This is especially important as the area can experience rainfall unexpectedly. Rainfall increases the moisture content of the corn and reduces its market value.

On greater financial access: Greater access to loans would allow farmers to purchase higher-quality inputs.

Education on optimal farming practices: PT. Seger Agro Nusantara noted that farmers tend to harvest corn before it is ready. The company has told farmers that they can only accept corn that is of a 25% moisture level or less because their facilities cannot handle higher levels. Farmers need to receive education to correct this behaviour. Fir'an and Sarlah believe that many farmers use non-subsidised fertiliser, as the quality is better than that what the government provides. They rely on government fertiliser, as it is cheap and decent. They are also afraid of new chemicals and often wait until other farmers try them first. However, they noted that educating farmers on the benefits that stem from using these chemicals would result in a better quality product.

Responding to key finding 4: reduced agricultural loss

On environmental sustainability: Future falls in production will be a result of farmers cutting down farmland. There should be a requirement for replantation after the land has been used, not just suggestions and recommendations for doing this.

On coordination with BMKG: The Economic Division noted that greater coordination with the Indonesian Agency for Meteorology, Climatology, and Geophysics is required. This collaboration could allow for more notice to farmers of upcoming weather events that could potentially destroy corn crops.

On the Control of Pests: Fir'an and Sarlah noted that improvements in pest control are required. This can be achieved through further government investment into research and development, as well as greater collaboration with Syngenta.

Responding to key finding 5: improved resilience to shocks

On the improvement of insurance: Without avenues to insurance, income levels in the local economy become unstable. Mada Selly reported that Dompu suffers from strong winds that damage corn crops. In 2017, a member of the farmer group lost a substantial portion of his crops and incurred damages to his home. However, he did not receive an insurance payout. Stressing the importance of maintaining extensive documentation is important in improving farmer's resilience to shocks. ACA stated that it is difficult to provide services due to the level of risk associated with a lack of government insurance subsidies. Government subsidies could help ACA extend into the area and ensure the stability of the farmers' wealth.

Responding to key finding 6: the rising cost of living

On introducing feed production facilities: Feed facilities in the local economy would ultimately reduce the cost of feed for chickens and other livestock. Corn that is otherwise shipped to Java could instead be produced locally. This means that the transportation costs would no longer be imposed on the value of the final product.

Responding to key finding 7: improvements in the standard of living

On the transfer of money: Mada Selly noted that they wish to transfer money to their children on different islands more easily. Currently, they are finding it difficult to access the banking system to do this. Bank Andara could extend their services through the rural bank to give farmers the ability to transfer funds to other islands.

Responding to key finding 8: bridging the gender wage gap

On increasing access to agricultural facilities: Government spending on sophisticated machinery would help to bridge the gender wage gap.

On increasing social cohesion: The education of smallholder farmers on the importance of farmer groups is key to expanding member bases. Cross communication between groups through the promotion of technology is paramount to forming efficiencies within the local economy.

On further research into female farmers: In future studies it could prove beneficial to analyse the relationship between the gender of farmers and the farm hands they employ. Zaitun had employed a relatively high number of female farm hands. Perhaps there is a relationship that exists between the gender of the farmer and the gender composition of their farm hands. It would benefit gender equality if the government and NGOs promoted it in the local community.

Responding to key finding 9: reaching capacity constraints

On the expansion of infrastructure: So'peto reported that they want increased government infrastructure spending so they can expand their production capacity. Building roads in closer proximity to expanding farmland and rivers would lower transportation costs. It would also increase productivity as farmers would require less energy to transport heavy objects. For example, PT. Seger Agro Nusantara noted that farmers were finding it difficult to send corn to the warehouse because a local bridge had collapsed. Government infrastructure could also help in expanding the local port, which would help relieve the capacity constraints faced by PT. Seger Agro Nusantara.

Responding to key finding 10: creating undesired markets

On the expansion of other industries: The fishing industry is an example of a sector that is slowly developing in Bima and Dompu. BAPPEDA notes that there are many primary goods and raw material industries that can be processed locally. This may help offset falling incomes in other agricultural sectors caused by government policy.

Additional point: government disconnect

Many of these recommendations require significant government spending efforts. This section will provide recommendations in which the government can increase their revenue.

Rethinking the subsidised seed program: President Director of the Rural Bank reported that farmers receive seeds from the government but do not plant them because of their poor quality. The agricultural season is lengthy, so farmers are not willing to commit to unproductive practices by planting government subsidised seeds.

Rethinking the subsidised fertiliser program: Tahlim Sudaryanto proposed perspective on the issue that could help to increase the quantity of fertiliser available to smallholder farmers. He proposed that subsidies should only be made available to farmers that experience working capital constraints. He indicated that the savings could also be used for more productive investments such as agricultural infrastructures, research and development, natural resource conservation, standard and certification, and market promotion. In 2018, Mada Selly started buying

fertiliser in the Bima market. This farmer group is an example of one that does not face substantial working capital constraints. As a result, they are comfortable paying for fertiliser in the private market.

Government disconnect: A disconnect exists between farmers and the local government. Stronger communication and transparency amongst both parties is needed for the government to provide continued support on a local level. The following are points of disconnect between the government and local farmers:

1. The Agricultural Agency noted that the cost of labour has not increased much over the last couple of years. However, farmers reported that it has increased substantially.
2. The Economic Division noted that the impact of rising costs of production have been minimised through government subsidised seeds program. However, farmers consistently reported that the government seeds go unused because they are poor quality.
3. The government noted that the prices have remained the same for chemicals and pesticides. However, farmers reported that these costs of production have been steadily rising over time.
4. The Economic Division noted that inexperienced farmers purchase fertiliser that is more expensive. However, farmers noted a marked improvement in fertiliser quality that is sold in the private market

Annex

Actors of the Value Chain Interviewed

1. **Occupation: Farmer**
Name: Fir'an
Name of Wife: Sarlah
Group's Name: Oi Risa
Head of the Group: Junaldi
District: Kecamatan Rasanae Timur
Products produced: Corn and rice
2. **Occupation: Head of farmers group**
Name: Imran
Group's Name: Oi Nungga
3. **Occupation: Head of farmers group**
Name: Mr. M. Yasin
Group's Name: So'peto (120 hectares)
District: Dodu and Rasanae timur
Product: Corn
4. **Occupation: Female farmer**
Name: Zaitun
Others: Evi and Khadijah
Occupations: wives of farmers
Group's Name: Sori Baru (AgriFin group)
District: Lelamase (Kelurahan) Rasanae Timur (Kecamatan), Bima
Product: Corn
5. **Occupation: Manager of corn drying plant and warehouse**
Website: Seger.co.id
Name: Daniel Wahyudi
Company Name: PT. Seger Agro Nusantara
6. **Occupation: Group Chairman and Grain Trader**
Name: Ilham

Group: Mada Selly

Address: Desa Palama RT. 03 / RW. 02

Crop: Corn

Occupation: Farmer

Name: Umar

Address: Desa Palama RT.04

Occupation: Farmer

Name: Harudim

Address: Desa Palama

7. **Organisation: PT. BPR (Bank Perkeditan Rakyat) PESISIR AKBAR**

Name: H. ZAS'ARI H. ZAINUDDIN, SE, CR

Position: President Director

Local Government Organisations Interviewed

1. **Institution: Economic Development Planning Sector (BAPPEDA)**

Name: Agus Salim

Position: Head of Field

Name: M. Badar

Phone: 085239557075

Position: Head of Investment and Business

2. **Institution: Agriculture, Livestock and Plantation Agency**

Name: Sri Suryani

Position: Planning and Reporting Staff

Name: M. Natsir

Position: Secretary of Bureau

3. **Organisation: Economic Division**

Name: Syafrudin

Position: Head of the Village Administration

Name: Suhari

Position: Evaluation of the Village

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