

# Regression Model of Land Area and Amount of Production to the Selling Price of Corn

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## ABSTRACT

Currently, land area, production and maize prices in West Nusa Tenggara province are sometimes unstable. One of the factors affecting the instability of maize prices is the shift in planting patterns at the farm level. The purpose of this study is to determine the effect of land area and total production on the selling price of maize. The method used is quantitative with data analysis techniques using multiple linear regression. The source of data is from the Central Bureau of Statistics, Department of Agriculture and Plantation of NTB. The regression equation found is  $Y = 3109.911 + 0.007X_1 - 0.001X_2$ . This result shows that the  $X_1$  variable of 0.007 means that every time there is an increase in the land area variable by 1%, the selling price increases by 7%. While the  $X_2$  variable decreased by 1%. The hypothesis with the calculation of the partial t-test of land area is 1.249, which means that land area has no influence on the selling price of NTB corn in 2012-2021. In future research, it is necessary to conduct research on the development of corn planting land area, production, productivity per unit of land area nationally associated with the rate of population growth, corn demand, and the growth of corn imports nationally.

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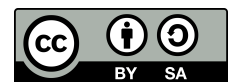
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## A. INTRODUCTION

One of the sectors that continues to be developed is the agricultural sector, this is done because the majority of the Indonesian population needs food to maintain life and there are even areas where the majority of the population works as farmers and is still supported by the availability of land that is high enough and has a fertile soil structure and is suitable for developing agriculture (Hidayah and Widayanti, 2019). One of the crops that is widely used is corn because it is easy to dry and easy to transport. Therefore, corn is an almost perfect starch grain crop for the food industry (Zhang et al., 2021).

Corn (*Zea mays* L) is a plant native to Central America that was spread to Asia and the rest of the world by the Spaniards. According to Fox, corn entered the Timor region, East Nusa Tenggara (NTT) Indonesian Province, in the 16th-17th centuries. Then the Dutch colonial government promoted corn as a food crop to overcome food insecurity and then quickly adopted by the people of West Timor (Leki et al., 2016). Corn is also the primary food source in the world. Corn contains several bioactive compounds that provide desirable health benefits beyond its role as the main source of food. In addition to corn kernels, Sweet corn is considered one of the most famous vegetables in North America and China, and its popularity is rising rapidly within the world (Siyuan et al., 2018). Corn is an agricultural commodity that has an important role as food and feed in addition to the food industry. The need for corn that continues to get higher in line with the continued development of the food and feed industry, indicates the large role of corn in the growth of the food crop sub-sector. To achieve the target of corn production, corn development is carried out in Indonesia.

one of them is in West Nusa Tenggara by utilizing the potential of dry land. The local government also has a regional superior commodity development program (PIJAR program), namely corn (Sari et al., 2012). The purpose of the PIJAR policy, especially corn, is to encourage economic growth in West Nusa Tenggara province while improving the welfare of farmers (Secretariat of the NTB Competitive Flagship Program, 2012) (Anwar et al., 2015). Meeting food needs from an increase in the human population requires increased production and also the main policy of changing the way food is produced, processed, distributed, and consumed. Another major challenge of global agriculture is minimizing impacts on the environment and human health. Agriculture occupies 38% of land worldwide, its contribution to gross domestic product (GDP) is less than 1% in developed countries and up to 50% in some developing countries and produces enough calories to meet the food demand of the human population today (Sandhu et al., 2020).

In the current, burgeoning debate on large-scale land deals, numbers matter. There are big economic and political stakes at play, and astonishing figures of millions of hectares play well in media and policy debates at different levels (Scoones et al., 2013). Corn production is the number of yields set and is the sum of reports per unit. Efforts to increase production in achieving food self-sufficiency must be followed using increased competitiveness so that these products can compete in the domestic and international markets (Asmara, 2017). Land area and corn production in NTB from year to year are increasing. In 2012 the corn land area in West Nusa Tenggara Province reached 117,303 ha and the total corn production reached 642,674 tons, increasing in 2021 the land area reached 697,000 ha and the total corn production reached 3,600,000 tons. In the last six years, corn production has shown an increase of 12.32% per year. Ten corn-producing provinces contribute 85% of the total national corn production. Domestic production has not been able to meet domestic needs. However, Indonesia has exported corn to the world market in limited quantities. Corn export destination countries from Indonesia are Singapore, Malaysia, South Korea, and several other countries (Susilowati et al., 2021).

In terms of productivity (amount of production per unit area of land), three provinces have productivity between 0.6 - 0.9 kg/m<sup>2</sup>, twelve provinces have productivity of 0.4-0.6 kg/m<sup>2</sup>, the rest have productivity below 0.6 kg /m<sup>2</sup>. It is known that there are 8 provinces that have a high amount of corn production and also high productivity per unit area of land, namely DI Yogyakarta, NTT, NTB, West Sumatra, Gorontalo, West Java, North Sumatra and South Sulawesi (Aini, 2019). Indonesia's corn production in 2020 is 29.02 million tonnes. East Java is the largest corn-producing province in Indonesia by producing 5.37 million tons of corn from a planted area of 1.19 million hectares (ha). Of that amount, the average corn is produced from the Pacitan, Ponorogo, Trenggalek, Tulungagung and Blitar regions. Nationally, East Java province contributes 23.6% to national corn production in 2020.

The selling price is the price set by the seller of the goods and services sold, so as to benefit from buying and selling activities (Wahyudi and Masrunik, 2019). The price of Corn at the national level is highly dependent on the world corn price. The demand for corn in the world is only filled by a few corn-producing countries such as the United States, China, Brazil, Argentina, and Mexico. According to the U.S. Grains Council in Supriyatna (2007), approximately twenty-five million tons of corn are used for animal feed and 3.9 million tons are used for feed and others (Bachtiar et al., 2014). The determination of the selling price is very important for the seller because it will determine the profit or income that the seller will receive. If the seller determines a high selling price, then the buyer/consumer moves to another seller who offers a lower price. This will cause the seller to lose consumers and get the expected profit. On the other hand, if the seller determines a low selling price, it will cause losses because the production costs incurred cannot be closed optimally (Huda et al., 2018).

West Nusa Tenggara is a province that is the center of corn production, because it has potential resources to support corn production. This year the price of corn in West Nusa Tenggara began to be unstable. A factor influencing the instability of corn prices is a shift in planting patterns at the farmer level. Originally, corn was planted only in the rainy season, now there are farmers who have planted twice. Pay attention in the future whether this planting area continues to increase which means that it indicates that farmers have planted twice a year. So that production increases but consumers are limited and selling prices are unstable (Head of the Agriculture and Plantation Service of NTB Province). Corn farmers in Bima regency, West Nusa Tenggara (NTB) suffered losses due to the declining selling price of corn. Even the price of corn at the farmer level is currently below Rp 4,000 per kilogram. The price of corn last year reached Rp 5,000 for each kilogram, but this year it has decreased to Rp 3,600. For farmers, it is already very detrimental because production costs such as the purchase of fertilizers, pesticides, and daily labor have increased. Many parties consider that national corn production has been able to meet the needs of farmers, but the fact is that farmers often find it difficult to receive local corn. This also seems to be the cause of the frequent unstable corn prices.

So it is necessary to do predictions or mathematical modeling to find out the level of influence of the land area and the amount of production on the selling price of corn, one of the mathematical modeling methods is multiple linear regression. Several studies that use linear regression for uplift modeling (Rudaś and Jaroszewicz, 2018), The effect of service quality and product quality on customer satisfaction using the multiple linear regression analysis methods (Arna et al., 2019), More data can hurt for linear regression: sample-

wise double descent (Nakkiran, 2019), the effect of selling price and production costs on corn farmers in semanding, kewedusan village, ponggok sub-district (Nisa and Suprayitno, 2020), the number of subjects per variable required in linear regression analyses (Austin and Steyerberg, 2015).

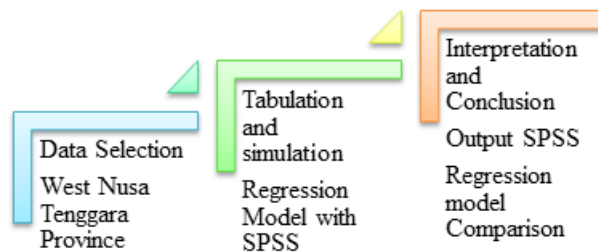
For this reason, this researcher used multiple linear regression analysis using SPSS version 25. Multiple linear regression analysis is a research hypothesis analysis to test the presence or absence of influences between one variable and another expressed in the form of mathematical equations. Based on this, it encourages the author to conduct research on the effect of land area and amount of production on the selling price of corn in Nusa Tenggara Barat in 2012-2021. The final results of this research are expected to be used as reference material and information for the development of corn farming businesses in the future. In accordance with the problems raised above, the purpose of this study is to determine whether there is an effect of land area and production volume on the selling price of corn in West Nusa Tenggara in 2012-2021.

**B. RESEARCH METHOD**

This research uses quantitative methods. The coverage area used in this research study was in West Nusa Tenggara. The source of data was taken from the Central Statistics Agency, and the NTB Agriculture and Plantation Service. The data analysis technique is a double linear regression analysis using SPSS. The data presented are factors that affect land area and production on the selling price of corn. These variables include: a) The variable land area is the corn land area of each city and regency in West Nusa Tenggara from 2012 to 2021. b) The variable amount of corn crop production is the amount of corn production (tons) of each city and regency in West Nusa Tenggara from 2012 to 2021. c) The price variable is the selling price of corn for each city and regency in West Nusa Tenggara from 2012 to 2021.

$$\hat{Y} = \alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \varepsilon \tag{1}$$

with  $Y$  is dependent variable;  $a$  is constant;  $b$  is coefficient of determination, and  $X$  is independent variable. Dependent variables (Related variables) are variables that are affected or that become a result due to the presence of independent variables (Free variables). Independent Variables (Free variables) are variables that affect or cause changes in dependent variables (Arya et al., 2020).



**Figure 1.** Stages in research

In this study, researchers performed multiple linear regression analysis with SPSS version 25. Where this analysis is to find out whether there is an influence of the land area variable ( $X_1$ ) and the production amount variable ( $X_2$ ) on the selling price variable ( $Y$ ). This research data has 10 samples, namely from 2012 to 2021. The complete data can be seen in the Table 1 below.

**Table 1.** Data on land area, amount of production, and selling price of corn in NTB

Year	Land area	Production quantity (ton)	Selling price
2012	117,030	642,674	3,400
2013	110,273	633,773	3,800
2014	126,577	785,863	3,000
2015	143,177	959,972	3,000
2016	206,885	1,278,271	3,000
2017	310,990	2,127,324	3,600
2018	326,377	2,084,928	3,642
2019	362,092	2,494,931	3,600
2020	282,893	1,726,575	5,150
2021	697,000	3,600,000	5,000

There is a partial influence of land area ( $X_1$ ) and amount of production ( $X_2$ ) on the selling price ( $Y$ ). There is a simultaneous influence of land area ( $X_1$ ) and amount of production ( $X_2$ ) on the selling price ( $Y$ ). 95% confidence level,  $\alpha = 0.05$ .  $H_1$ : If the signification value  $<$  probability 0.05 then there is an influence of the free variable ( $X$ ) on the related variable ( $Y$ ) or hypothesis in acceptance;  $H_0$ : If the signification value  $>$  probability 0.05 then there is no influence of the free variable ( $X$ ) on the related variable ( $Y$ ) or the hypothesis is rejected.

### C. RESULTS AND DISCUSSION

Some researchers who conducted the study using double linear regression were Jamner R. Lawendatu and Jonh. S. Kekenusa and Djoni Hatidja conducted a study to determine the effect of nutmeg farmers' income using multiple linear regression. From the results of the double regression analysis using the SPSS software based on Table 1, the signification values and regression coefficients were obtained which can be seen in Table 2. Multiples or multiple linear regression analysis serves to look for the influence of two or more independent variables (free variables or  $X$ ) on dependent variables (related variables or  $Y$ ).

**Table 2.** Multiple Regression Analysis Equations

Model	Unstandardized Coefficients <sup>a</sup>		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	3,109.911	434.860		7.152	.000
1 Land area ( $X_1$ )	.007	.005	1.574	1.249	.252
Production quantity ( $X_2$ )	-.001	.0001	-.934	-.741	.483

a. Dependent Variable: Selling price ( $Y$ )

Based on Table 2 of the assumption results of the Double regression equation  $Y = 3109.911 + 0.007X_1 - 0.001X_2$ , a constant coefficient value of 3109.911 is obtained, the regression coefficient of variable  $X_1$  is 0.007, which means that every time there is an increase in variable  $X_1$  by 1%, then increasing  $Y = 0.007\%$  assuming another independent variable its value is fixed, the regression coefficient of variable  $X_2$  is -0.001 which means that every time there is an increase in  $X_2$  by 1%, then it will increase  $Y = -0.001\%$ .

The test aims to find out whether a free variable or an independent variable ( $X$ ) partially (singly) affects the related variable or the dependent variable ( $Y$ ). In this case, there are two references that can be used as the basis for decision making, firstly by looking at the signification value and secondly by comparing the calculated  $t$  value and the table  $t$ .

#### 1. Based on the signification value

If the signification value  $<$  probability is 0.05 then there is an influence of the free variable ( $X$ ) on the related variable ( $Y$ ) or the hypothesis is accepted. If the signification value  $>$  the probability is 0.05 then there is no influence of the free variable ( $X$ ) on the related variable ( $Y$ ) or the hypothesis is rejected.

#### 2. Based on a comparison of calculated $t$ values with table $t$

Table 2 above provides information that the signification value for the land area variable ( $X_1$ ) is 0.252. Since the signification value is  $0.252 > 0.05$  it can be concluded that  $H_1$  or the first hypothesis is rejected. This means that there is no influence of land area ( $X_1$ ) on the selling price ( $Y$ ). It has no effect seen from the existing conditions, meaning that although the area of corn land has increased, only a slight increase is caused by changes in planting patterns.

1. Based on Table 2, it is known that the value of  $t$  calculate the variable land area ( $X_1$ ) is 1.249. Since the value of  $t$  counts  $1.249 < t_{table} 2.365$ , it can be concluded that the first hypothesis is rejected. This means that there is no influence of land area ( $X_1$ ) on the selling price ( $Y$ ).
2. Based on Table 2 it is known that the variable signification value of the amount of production ( $X_2$ ) is 0.483. Because the signification value of  $0.483 >$  probability of 0.05 so it can be concluded that the second hypothesis is rejected. This means that there is no influence of the amount of production ( $X_2$ ) on the selling price ( $Y$ ).
3. Based on Table 2 it is known that the variable  $t$  value of the amount of production ( $X_2$ ) is -0.741. Since the calculated  $t$ -value of  $-0.741 < 2.365$ , it can be concluded that the second hypothesis is rejected. This means that there is no influence of the amount of production ( $X_2$ ) on the selling price ( $Y$ ).

The  $F$  test aims to determine the simultaneous influence of variable  $X$  on variable  $Y$ . The hypothesis proposed in this  $F$  test is the simultaneous influence of the land area and amount of production on the selling price. To perform a simultaneous  $F$  test in multiple regression analysis, it is enough to pay attention to the results contained in the Anova output table. There are two ways that can be done as a reference or guideline for conducting hypothesis tests in the  $F$  test. The second is to compare the calculated  $F$  value with the table  $F$  value.

If the signification  $< 0.05$ , then the hypothesis is accepted. This means that the land area ( $X_1$ ) and the amount of production ( $X_2$ ) simultaneously affect the selling price ( $Y$ ). If the signification value  $> 0.05$ , then the hypothesis is rejected. This means that the land area ( $X_1$ ) and the amount of production ( $X_1$ ) simultaneously have no effect on the selling price ( $Y$ ). If the value of  $F$  counts  $> F$  of the table, then the hypothesis is accepted. So it means that the land area ( $X_1$ ) and the amount of production ( $X_2$ ) simultaneously affect the selling price ( $Y$ ). If the value of  $F$  counts  $< F$  of the table, then the hypothesis is rejected. So it means that the land area ( $X_1$ ) and the amount of production ( $X_2$ ) simultaneously have no effect on the selling price ( $Y$ ).

**Table 3.** F-test results using SPSS

Anova <sup>a</sup>					
Model	Sum of Squares	Df	Mean Square	f	Sig.
1 Regression	258,0782.364	2	2,129,0391.182	3.224	.102 <sup>b</sup>
Residual	280,1395.236	7	400,199.3194		
Total	538,2177.600	9			

a. Dependent Variable: Selling price (Y)

b. Predictors: (Constant) Production quantity ( $X_2$ ), luas lahan ( $X_1$ )

Based on Table 3, it is known that the signification value is 0.102. Since the signification value is  $0.102 > 0.05$ , according to the basis of decision-making in the  $F$  test, it can be concluded that the hypothesis is rejected or in other words, the land area ( $X_1$ ) and the amount of production ( $X_2$ ) simultaneously have no effect on the selling price ( $Y$ ). Based on Table 3, it is known that the calculated  $F$  value is 3.224. Since the value of  $F$  counts  $3.224 < F_{table} 4.46$  it is concluded that the hypothesis is rejected or in other words the land area ( $X_1$ ) and the amount of production ( $X_2$ ) simultaneously have no effect on the selling price ( $Y$ ). Conclusion, based on the two discussions in the  $F$  test above, it is concluded that the land area ( $X_1$ ) and the amount of production ( $X_2$ ) simultaneously at the signification value are rejected or have no effect on the selling price ( $Y$ ).

### 3. Coefficient of Determination (R Square)

The value of R Square indicates the magnitude of the contribution of the influence that the free variable exerts on the related variable, or the magnitude of the contribution of the free variable to the bound variable. This means that the value of the coefficient of determination or R Square is useful for predicting and seeing how much influence the variable  $X$  simultaneously contributes to the variable  $Y$ . The coefficient of determination  $R^2$  is a typically reported statistic, as it represents the proportion of variance defined by way of a linear model. The intraclass correlation coefficient (ICC) is a associated statistic that quantifies the proportion of variance defined by a grouping (random) factor in multilevel/hierarchical statistics (Nakagawa et al., 2017).

**Table 4.** Output result Coefficient of Determination using SPSS software

Model Summary				
Model	R	Sum of Squares	Adjusted R Square	Std. Error of the Estimate
1	.692 <sup>a</sup>	.480	.331	632.613

a. Predictors: (Constant), Production quantity, Land area

Based on the output of Table 4, it is known that the value of the coefficient of determination or R Square is 0.480. The magnitude of the coefficient of determination (R Square) is 0.480 or equal to 48.0%. This figure means that the variable land area ( $X_1$ ) and the amount of production ( $X_2$ ) can simultaneously explain the variable selling price ( $Y$ ) of 48.0%. The addition of corn land on Sumbawa Island is based on estimates that Sumbawa Island has a relatively large potential for non-rice fields when compared to Lombok Island. which is distributed in five regencies/cities on Sumbawa Island, namely West Sumbawa Regency, Sumbawa Regency, Dompu Regency, Bima Regency, and Bima City. The total corn production of NTB in 2017 then more than two million tons. In previous studies conducted research on the development of corn agricultural land area, corn production, productivity per unit area of land nationally which is associated with population rate growth, corn needs, and national corn import growth, this result support by research (Nisa and Suprayitno, 2020).

#### D. CONCLUSION AND SUGGESTION

Based on the results of the regression analysis equation  $Y = 3109.911 + 0.007X_1 - 0.001X_2$  with a coefficient value of 3109.911, the regression coefficient of the land area variable of 0.007 means that every time there is an increase in the variable land area by 1% then the increase in the selling price of 0.007%, every time there is a variable increase in the amount of production by 1% then the increase in the selling price of -0.001% assuming another independent variable is of a fixed value. The effect of land area on the selling price of corn is 0.252. This indicates that there is little influence of land area on the selling price of corn in West Nusa Tenggara. The effect of the amount of production on the selling price of corn is 0.483. This indicates that the slight influence of corn production on the selling price of corn in West Nusa Tenggara. While the influence of land area and the amount of simultaneous production amounted to 3,224. This indicates that there is little influence of land area and amount of production on the selling price of corn in West Nusa Tenggara. The value of the coefficient of determination or R Square based on the analysis is 0.480 or equal to 48%. The value of the coefficient of determination or R Square based on the analysis is 0.480 or equal to 48.0% which means that the amount of the contribution of the influence given by the land area and the amount of production simultaneously (together) on the selling price of corn is 48.0%. And it is expected for further researchers to utilize multiple linear regression analysis in conducting research related to statistics.

#### REFERENCES

- Aini, L. M. (2019). Penentuan provinsi-provinsi terbaik dalam produksi jagung nasional melalui analisis kuadran atas variable produksi dan produktivitas per satuan luas lahan. *Jurnal Ekonomi Pertanian dan Agribisnis*, 3(4):751–760.
- Anwar, A., Hamidi, H., Dipokusumo, B., and Zubair, M. (2015). Kajian kebijakan pijar dalam pengembangan komoditas unggulan dan kontribusinya terhadap ekonomi rumah tangga (kasus petani jagung di kabupaten lombok timur). *JURNAL AGRIMANSION*, 16(1):66–80.
- Arna, W. B., Arofah, I., and Belang, K. A. (2019). Pengaruh kualitas pelayanan dan kualitas produk terhadap kepuasan konsumen dengan menggunakan metode analisis regresi linear berganda. *Jurnal Statistika dan Matematika*, 1(1).
- Arya, D., Rochmawati, L., and Sonhaji, I. (2020). Koefisien korelasi (r) dan koefisien determinasi (r<sup>2</sup>). *Jurnal Penelitian*, 5(4):289–296.
- Asmara, R. (2017). Technical, cost and allocative efficiency of rice, corn and soybean farming in indonesia: Data envelopment analysis approach. *Agricultural Socio-Economics Journal*, 17(2):76–76.
- Austin, P. C. and Steyerberg, E. W. (2015). The number of subjects per variable required in linear regression analyses. *Journal of clinical epidemiology*, 68(6):627–636.
- Bachtiar, R. R., Chang, W.-I., Anindita, R., and Mustadjab, M. (2014). *Supply Response and Corn Price Volatility in Indonesia*. PhD thesis, BRAWIJAYA UNIVERSITY MALANG.
- Hidayah, N. and Widayanti, B. H. (2019). Analisis pengaruh produks komoditas jagung terhadap pengembangan wilayah di kecamatan manggelewa kabupaten dompu. *Jurnal Planoearth*, 2(1):24–30.
- Huda, A. M., Kurniasari, D., and Masrunik, E. (2018). Analisis perhitungan harga pokok produksi dengan metode full costing sebagai penentu harga jual pada produksi pak kembang cap'kressâ no'. *Owner: Riset dan Jurnal Akuntansi*, 2(2):73–84.
- Leki, S., Hanani, N., Dwiastuti, R., and Setiawan, B. (2016). Household economic decisions of corn farmers at west timor, indonesia. *Current Agriculture Research Journal*, 4(1):74.
- Nakagawa, S., Johnson, P. C., and Schielzeth, H. (2017). The coefficient of determination r<sup>2</sup> and intra-class correlation coefficient from generalized linear mixed-effects models revisited and expanded. *Journal of the Royal Society Interface*, 14(134):20170213.
- Nakkiran, P. (2019). More data can hurt for linear regression: Sample-wise double descent. *arXiv preprint arXiv:1912.07242*.
- Nisa, A. M. and Suprayitno, H. (2020). The effect of selling price and production costs on corn farmers income in semanding, kawedusan village, ponggok sub-district. *JOSAR (Journal of Students Academic Research)*, 5(2):8–16.
- Rudaś, K. and Jaroszewicz, S. (2018). Linear regression for uplift modeling. *Data Mining and Knowledge Discovery*, 32:1275–1305.

- Sandhu, H., Scialabba, N. E.-H., Warner, C., Behzadnejad, F., Keohane, K., Houston, R., and Fujiwara, D. (2020). Evaluating the holistic costs and benefits of corn production systems in minnesota, us. *Scientific reports*, 10(1):1–12.
- Sari, I. N., Winandi, R., and Atmakusuma, J. (2012). Analisis efisiensi pemasaran jagung di provinsi nusa tenggara barat. In *Forum Agribisnis: Agribusiness Forum*, volume 2, pages 191–210.
- Scoones, I., Hall, R., Borras Jr, S. M., White, B., and Wolford, W. (2013). The politics of evidence: methodologies for understanding the global land rush.
- Siyuan, S., Tong, L., and Liu, R. (2018). Corn phytochemicals and their health benefits. *food sci human wellness* 7 (3): 185–195.
- Susilowati, S., Ariningsih, E., Saliem, H., Roosganda, E., Adawiyah, C., et al. (2021). Opportunities and challenges to increase corn export from gorontalo province of indonesia. In *IOP Conference Series: Earth and Environmental Science*, volume 672, page 012027. IOP Publishing.
- Wahyudi, A. and Masrunik, E. (2019). Penentuan harga jual dengan metode entong pada penjual jenang (studi fenomenologi pada penjual jenang desa ngembul kecamatan binangun). *Akuntabilitas: Jurnal Ilmiah Ilmu-Ilmu Ekonomi*, 12(1):72–81.
- Zhang, R., Ma, S., Li, L., Zhang, M., Tian, S., Wang, D., Liu, K., Liu, H., Zhu, W., and Wang, X. (2021). Comprehensive utilization of corn starch processing by-products: A review. *Grain & Oil Science and Technology*, 4(3):89–107.

