INCOME AND FEASIBILITY OF LOWLAND RICE FARMING IN PARIGI MOUTONG REGENCY, CENTRAL SULAWESI

1st* Rustam Abd. Rauf
Agribusiness Study Program
Faculty of Agriculture, Tadulako University
Palu, Indonesia
email: rustam.untad@gmail.com

2nd Erny
Agribusiness Study Program
Faculty of Agriculture, Tadulako University
Palu, Indonesia
email: ernysirappa79@yahoo.co.id

3rd Hardiyanti Sultan
Agribusiness Study Program
Faculty of Agriculture, Tadulako University
Palu, Indonesia
email: hardiyantisultan91@gmail.com

4th Lien Damayanti
Agribusiness Study Program
Faculty of Agriculture, Tadulako University
Palu, Indonesia
email: lien_damayanti@ymail.com

5th Shintami R. Malik
Agribusiness Study Program
Faculty of Agriculture, Tadulako University
Palu, Indonesia
email: shintami978@gmail.com

6th Yulianti Kalaba
Agribusiness Study Program
Faculty of Agriculture, Tadulako University
Palu, Indonesia
email: yulianti610@gmail.com

Abstract—The agricultural sector is the leading sector in an agrarian country and has several supporting sub-sectors, one of which is the food crops sub-sector. Food crops are the most important sub-sector as a support to meet the needs of many people, especially the basic needs of human food. Food is a basic human need other than clothing and shelter. Food is needed as an effort for human survival. Parigi Moutong Regency is one of the potential food storage areas in Central Sulawesi Province, especially for rice production. The area of paddy fields in Parigi Moutong Regency in 2020 was recorded at 313,315 Ha, with a productivity of 5.89 Tons/Ha. This research aims to determine the income of farmers and the feasibility of lowland rice farming in Parigi Moutong. The results showed that the income of lowland rice farmers in Torue District, Parigi Moutong was IDR 25,298,971/ 0.87 Ha/ planting season and lowland rice farming were feasible to be cultivated and developed regarding the R/C value of more than 1, which was 4.12.

Keywords: Paddy Rice, Production, Income, Feasibility

I. INTRODUCTION

The agricultural sector, the leading sector in an agrarian country, has several supporting sub-sectors, one of which is the food crops sub-sector. Haris (2017) explained that food crops are an important sector in Indonesia's development in line with the establishment of the main target of strengthening the food supply and diversifying food consumption in Indonesia's growth for the period 2014 to 2019, namely increasing the availability of food sourced domestically for essential commodities, including rice, corn, and soybeans (Barinda and Ayuningtyas, 2022; Nasikh et al., 2021). The importance of the role of rice commodities in the economy is a major issue in realizing rice self-sufficiency (Agus et al., 2019; Malahayati and Masui, 2022).

Fulfillment of food as a basic human need has prompted President Joko Widodo and all ranks of the Indonesian Working Cabinet for 2014 - 2019 to formulate the concept of the NAWACITA priority agenda, which includes an agenda to "realize economic independence by moving strategic sectors of the domestic economy", including food affairs which are the the domains and responsibilities of the Ministry of Agriculture in an effort to realize food sovereignty and farmers' welfare (Ismail, 2018). Increasing agricultural production as the basis for realizing food security shows very significant progress, even the increasing population growth does not make food security decrease, what happens is the production of rice and corn increases, as well as other strategic food commodities (Bell et al., 2022; Frimawaty et al., 2013).

Food self-sufficiency is one of the Ministry of Agriculture's target programs that must be realized immediately, including self-sufficiency in rice, corn, soybeans, and increasing beef and sugar production (Kementerian Pertanian, 2015b). Efforts to increase rice productivity and rice production in Indonesia to achieve rice self-sufficiency, cannot be separated from lowland rice farming activities cultivated by farmers. (Boly and Sanou, 2022; Rozaki, 2021).

Food is a basic human need other than clothing and shelter. Food is needed as an effort for human survival (Hairiah et al., 2022; Widyatmanti and Umarhadi, 2022). The fulfillment of food needs from various aspects such as safety, affordability, and other aspects is often associated with food security. One of the basic human needs is fulfilled from the food aspect. Food contains nutrients that are used to maintain life (Saputro and Fidayani, 2020). Agriculture is the most important sector as a support to meet the needs of people's lives, especially the basic needs of human food as a form of improving the welfare of the nation and state (Nasikh et al., 2021; Sofiyuddin et al., 2021).

Parigi Moutong Regency is one of the potential food storage areas in Central Sulawesi Province, especially the production of rice/. Based on the description of the background that has been stated, this study aims to determine the income and feasibility of lowland rice farming in Parigi Moutong Regency.

II. RESEARCH METHOD

A. Research Location and Sample

The research location was determined purposively in Parigi Moutong Regency, due to the location being one of the centers of lowland rice production. This research was conducted from July to September 2022. The number of samples used was 65 farmer respondents from a total population of 341 farmers. Respondents were taken by proportional random sampling technique. The determination of respondents is done using a simple random sampling method (Ghasempour Ardakani and Shahvandpour, 2021; Stehman and Xing, 2022).

B. Data Type and Source

The data taken in this study include primary data, obtained directly from respondents and secondary data, obtained from literature studies and other sources (Hox and Boeije, 2005).

C. Data Analysis Method

In order to answer the stated objectives, the income equation and the feasibility of lowland rice farming (Wang et al., 2022; Yan et al., 2021) are described as follows :

a. Income Analysis, with the following formula:
$$\pi = TR - TC \qquad (1)$$
Description:
π = Rice paddy income (IDR)
TR = Total Revenue (IDR)
TC = Total Cost (IDR) (Soekartawi, 2014)

b. Feasibility Analysis:
The feasibility of farming is calculated by the following equation:
$$R/C = \frac{TR}{TC} \qquad (2)$$

Description:
R/C = Revenue/Cost Ratio
TR = Total Revenue (IDR)
TC = Total Cost (IDR)
By the criteria:
R/C >1, business has advantages so it is worth working on,
R/C = 1, business is at the break-even point,
R/C < 1, the business is not worth working on.

III. RESULT AND DISCUSSION

A. Lowland Rice Farming Income in Parigi Moutong

Farming income is the farm income minus the expenditure (Soekartawi 2002). Components of farm income include income on cash costs and income on total costs. Income on cash costs is the total revenue minus cash costs, while income on total costs is the total revenue minus calculated costs (Bellotti et al., 2018; Hairiah et al., 2022). The amount of total revenue and total costs or production costs incurred by rice farmers will affect the total income of farmers. Production costs consist of variable costs and fixed costs (Hardaker et al., 2022; Liu et al., 2020).

Increasing the income and production of lowland rice farmers cannot be separated from the cultivation process carried out by each farmer, both traditional and modern (Komatsu et al., 2022; Silva et al., 2022). Increased farm production is an indicator of the success of developed farming, but the high production of commodities obtained per unit area of land does not guarantee high rice farming incomes because it is influenced by the prices received by farmers and the costs of using farm production inputs (Munizar dan Tangkesalu, 2019).

Rice farming production costs can be classified based on the relationship between changes in production volume, which are variable costs and fixed costs, in this study, the variable costs included are seed costs, fertilizer costs, drug costs, and labor wages (Agus et al., 2019; Paman et al., 2014). The sum of the two costs can produce the total cost in one rice planting season in Torue District, Parigi Moutong Regency. The details of the costs are presented in Table 1.

Table 1. Average Cost of Lowland Rice Farming in Torue District, Parigi Moutong Regency, 2022

No	Details	Total (IDR)	Percentage (%)
1	Variable Costs:		
	- Seed Costs	477,077	5.88
	- Fertilizer	486,515	5.99
	Costs	222,486	2.74
	- Drug Costs	5,386,154	66.34
	- Labor wages	6,572,232	80.95
	Total Variable Cost		
	Fix Costs:		
	- Field Rent	1,350,000	16.63
	- Tax	13,942	0.17
	- Tool Shrink	52,116	0.64
	- Other	130,385	1.61
	contribution	1,546,443	19.05
	Total Biaya Tetap		
2	Total Costs (TC)	8,118,605	100.00

Source: Data Analysis Result, 2022.

The costs incurred by farmers in one planting season for lowland rice in Torue District, Parigi Moutong Regency, farmers spend a total cost of IDR 8,118,605 or IDR 9,339,988/ha (Table 1). The total cost spended by rice farmers is the sum of the total variable costs plus the total fixed costs for one growing season. Labor costs are costs with the highest value and percentage of 66.34% because rice farming activities in Torue District have a series of activities ranging from land processing, planting, fertilizing, pest eradication, and harvesting with a labor wage of IDR 100,000/day.

Rice farmers' income is the result of subtraction from the receipts received by lowland rice farmers with the total costs incurred, in line with Ningrum (2016), the income received by farmers is the difference between total revenues and total costs incurred during one planting season (Nitta et al., 2020; Ojo and Baiyegunhi, 2021). Increased farm production is an indicator of the success of farming carried out, but the increase in commodity production obtained per unit area of farmer's land does not guarantee an increase in lowland rice farming income because it depends on the price received and input costs for farming use (Munizar dan Tangkesalu, 2019). The income received by lowland rice farmers in Torue District, Parigi Moutong Regency is presented in Table 2.

Table 2. Average Production, Price, Revenue and Income of Rice Farming in Torue District, Parigi Moutong Regency, 2022.

No	Details	Total (0,87 Ha)
1	Production (Kg)	3,543
2	Price (IDR)	9,432
3	Total Revenue (IDR)	33,417,576
4	Total Income (IDR)	25,298,971

Source: Data Analysis Resut, 2022

Table 2 shows that the average lowland rice production in Torue District is 3,543 kg (4,076 kg/ha), and the price level received by farmers is IDR 9,432, thus farmers receive income from lowland rice farming of IDR 33,417,576/0, 87ha/ planting season (IDR 38,442,914/ha/planting season). The average income received by paddy rice farmers is IDR 25,298,971/0.87 ha/planting season or IDR 29,136,226/ha/planting season.

B. The Feasibility of Lowland Rice Farming in Parigi Moutong District

Business feasibility is a measure to find out whether a business is feasible or not to be developed. It is feasible in the sense that it can generate benefits for farmers (Masse & Afandi, 2017). The Revenue-Cost Ratio (R/C) is an indicator that can be used to determine the feasibility of a business. Analysis of the R/C ratio is calculated by comparing the revenue (revenue) with the Total Cost (TC). The R/C value of lowland rice farming in Torue District, Parigi Moutong Regency is presented in Table 3.

Tabel 3.   Results of Feasibility Analysis (R/C) of Lowland Rice Farming in Torue . District, Parigi Moutong Regency, 2022

No	Details	Total (IDR)	
1	Total Revenue		33,417,576
2	Total Cost	8,118,605	
3	R/C	4.12	

Sumber: Hasil Analisis Data, 2022

Table 3 shows that the R/C > 1, this means that for every production cost of IDR 1.00, an income of IDR 4.12 will be obtained, thus rice farming is carried out by farmers in Torue District, Parigi Moutong deserves to be developed and cultivated. The results of this study are in line with research conducted by Ica, et al., (2021) that lowland rice farming in Tatakalai Village, North Tinangkung District is feasible to be cultivated with an R/C > 1 or 5.49.

IV. CONCLUSION

Based on the results that have been presented, it shows that the income of lowland rice farmers in Torue District, Parigi Moutong Regency, is IDR 25,298,971/ 0.87 ha/ planting season with an R/C of more than 1, which is 4.12. This value means that lowland rice farming is feasible to be cultivated and developed.

ACKNOWLEDGMENT

REFERENCES

[1] Agus, F., Andrade, J.F., Rattalino Edreira, J.I., Deng, N., Purwantomo, D.K.G., Agustiani, N., Aristya, V.E., Batubara, S.F., Herniwati, Hosang, E.Y., Krisnadi, L.Y., Makka, A., Samijan, Cenacchi, N., Wiebe, K., Grassini, P., 2019. Yield gaps in intensive rice-maize cropping sequences in the humid tropics of Indonesia. Field Crops Research 237, 12–22. https://doi.org/10.1016/j.fcr.2019.04.006.

[2]   Barinda, S., Ayuningtyas, D., 2022. Assessing the food control system in Indonesia: A conceptual framework. Food Control 134, 108687. https://doi.org/10.1016/j.foodcont.2021.108687

[3] Bell, L.W., Hossang, E.Y., Traill, S.R., Dalgliesh, N.P., Budisantoso, E., Nulik, J., 2022. Short phases of tropical forage legumes increase production of subsequent cereal crops in the seasonally dry tropics of eastern Indonesia. European Journal of Agronomy 132, 126406. https://doi.org/10.1016/j.eja.2021.126406.

[4] Bellotti, W., Lestari, E., Fukofuka, K., 2018. A Food Systems Perspective on Food and Nutrition Security in Australia, Indonesia, and Vanuatu, in: Advances in Food Security and Sustainability. Elsevier, pp. 1–51. https://doi.org/10.1016/bs.af2s.2018.10.001

[5] Boly, M., Sanou, A., 2022. Biofuels and food security: evidence from Indonesia and Mexico. Energy Policy 163, 112834. https://doi.org/10.1016/j.enpol.2022.112834

[6] Frimawaty, E., Basukriadi, A., Syamsu, J.A., Soesilo, T.E.B., 2013. Sustainability of Rice Farming based on Eco-Farming to Face Food Security and Climate Change: Case Study in Jambi Province, Indonesia. Procedia Environmental Sciences 17, 53–59. https://doi.org/10.1016/j.proenv.2013.02.011

[7] Ghasempour Ardakani, A., Shahvandpour, M., 2021. A simple method to achieve a directional and resonant random lasing emission using graphene quantum dots as scattering elements. Physica B: Condensed Matter 616, 413133. https://doi.org/10.1016/j.physb.2021.413133

[8] Hairiah, K., Fiantis, D., Utami, S.R., Nurbaity, A., Utami, S.N.H., Ginting, F.I., Ariyanto, D.P., Nurcholis, M., Minasny, B., van Noordwijk, M., 2022. Hundred fifty years of soil security research in Indonesia: Shifting topics, modes of research and gender balance. Soil Security 6, 100049. https://doi.org/ 10.1016/j.soisec.2022.100049

[9] Hardaker, A., Bodner, T., Dandy, N., 2022. Tree planting for climate change: Coverage in the UK farming sector press. Journal of Rural Studies 94, 140–149. https://doi.org/10.1016/j.jrurstud.2022.06.001

[10] Hox, J.J., Boeije, H.R., 2005. Data Collection, Primary vs. Secondary, in: Encyclopedia of Social Measurement. Elsevier, pp. 593–599. https://doi.org/10.1016/B0-12-369398-5/00041-4

[11] Ica Fitriana, Hertasning Yatim, Ruslan, Zainuddin., 2021. Analisis Pendapatan dan Kelayakan Usahatani Padi Sawah di Desa Tatakalai Kecamatan Tinangkung Utara. Jurnal Celebes Agricultural, Volume 1, Nomor 2, Februari 2021. p-ISSN: 2723-7974, e-ISSN: 2723-7966

[12] Ismail, E.H. 2018. DPR: Program Kementan Terkuat Dukung Nawacita Jokowi-JK. Republika Online edisi Oktober 2018. https://republika.co.id/berita/ekonomi/pertanian/18/08/18/pdn nt4453-dpr-program-kementan-terkuat-dukung-nawacita-jokowijk (diakses 21 september 2022).

[13]   Kementerian Pertanian. 2015b . Rencana Strategis Kementerian Pertanian Tahun 2015-2019. http://www1.pertanian.go.id/file/RENSTRA_2015-2019. pdf (diakses 21 September 2022).

[14] Komatsu, S., Saito, K., Sakurai, T., 2022. Changes in production, yields, and the cropped area of lowland rice over the last 20 years and factors affecting their variations in Côte d'Ivoire. Field Crops Research 277, 108424. https://doi.org/10.1016/j.fcr.2021.108424

[15] Liu, X., Bakshi, B.R., Rugani, B., de Souza, D.M., Bare, J., Johnston, J.M., Laurent, A., Verones, F., 2020. Quantification and valuation of ecosystem services in life cycle assessment: Application of the cascade framework to rice farming systems. Science of The Total Environment 747, 141278. https://doi.org/10.1016/j.scitotenv.2020.141278

[16] Malahayati, M., Masui, T., 2022. Potential impact of the adoption of food loss reduction technologies in Indonesia. Journal of Environmental Management 319, 115633. https://doi.org/10.1016/j.jenvman.2022.115633

[17]   Masse A & Afandi. 2017. Analisis Pendapatan dan Kelayakan Usahatani Kelapa dalam di Desa Kasoloan Kecamatan Bambaira Kabupaten Mamuju Utara Privinsi Sulawesi Barat. Jurnal Agrotekbis 5(1):66-71.

[18] Munizar, Andi, dan Dance Tangakesalu, 2019. Analisis Pendapatan dan Kelayakan Usahatani Padi Sawah Sistem Hambur Benih Langsung di Desa Dolago Kecamatan Parigi Selatan Kabupaten Parigi Moutong. Agrotekbis, Vol. 7 No. 1, Februari 2019: 51-58.

[19] Nasikh, Kamaludin, M., Narmaditya, B.S., Wibowo, A., Febrianto, I., 2021. Agricultural land resource allocation to develop food crop commodities: lesson from Indonesia. Heliyon 7, e07520. https://doi.org/10.1016/j.heliyon.2021.e07520

[20] Ningrum NW & Efendi. 2016. Analisis Pendapatan dan Kelayakan Usahatani Padi Sawah di Desa Laantu Jaya Kecamatan Witaponda Kabupaten Morowali. Jurnal Agrotekbis 4(3): 350-355

[21] Nitta, A., Yamamoto, Y., Kondo, K., Sawauchi, D., 2020. Direct payments to Japanese farmers: Do they reduce rice income inequality? Lessons for other Asian countries. Journal of Policy Modeling 42, 968–981. https://doi.org/10.1016/j.jpolmod.2020.02.006

[22] Ojo, T.O., Baiyegunhi, L.J.S., 2021. Climate change perception and its impact on net farm income of smallholder rice farmers in South-West, Nigeria. Journal of Cleaner Production 310, 127373. https://doi.org/10.1016/j.jclepro.2021.127373

[23] Paman, U., Inaba, S., Uchida, S., 2014. The mechanization of small-scale rice farming: Labor requirements and costs. Engineering in Agriculture, Environment and Food 7, 122–126. https://doi.org/10.1016/j.eaef.2014.03.001

[24] Rozaki, Z., 2021. Food security challenges and opportunities in indonesia post COVID-19, in: Advances in Food Security and Sustainability. Elsevier, pp. 119–168. https://doi.org/10.1016/bs.af2s.2021.07.002

[25] Saputro, W.A., Fidayani, Y., 2020. Faktor-Faktor Yang Mempengaruhi Ketahanan Pangan Rumah Tangga Petani Di Kabupaten Klaten. AGRICA 13. https://doi.org/10.31289/agrica.v13i2.4078

[26] Silva, J.V., Pede, V.O., Radanielson, A.M., Kodama, W., Duarte, A., de Guia, A.H., Malabayabas, A.J.B., Pustika, A.B., Argosubekti, N., Vithoonjit, D., Hieu, P.T.M., Pame, A.R.P., Singleton, G.R., Stuart, A.M., 2022. Revisiting yield gaps and the scope for sustainable intensification for irrigated lowland rice in Southeast Asia. Agricultural Systems 198, 103383. https://doi.org/10.1016/j.agsy.2022.103383

[27] Saputro, W.A., Fidayani, Y., 2020. Faktor-Faktor Yang Mempengaruhi Ketahanan Pangan Rumah Tangga Petani Di Kabupaten Klaten. Agrica 13. https://Doi.Org/10.31289/Agrica.V13i2.4078

[28] Soekartawi. 2002. Analisis Usahatani. Jakarta: Universitas Indonesia

[29] Sofiyuddin, M., Suyanto, S., Kadir, S., Dewi, S., 2021. Sustainable land preparation for farmer-managed lowland agriculture in Indonesia. Forest Policy and Economics 130, 102534. https://doi.org/10.1016/j.forpol.2021.102534

[30] Stehman, S.V., Xing, D., 2022. Confidence intervals for proportion of area estimated from a stratified random sample. Remote Sensing of Environment 280, 113193. https://doi.org/10.1016/j.rse.2022.113193

[31] Supartama, Made, Made Antara, dan Rustam Abd Rauf, 2013. Analisis Pendapatan dan Kelayakan Usaha Padi Sawah di Subak Baturiti Desa Balinggi Kecamatan Balinggi Kabupaten Parigi Moutong. Agrotekbis, Vol. 1 No. 2, Juni 2013: 166-172.

[32] Wang, Y., Fu, Y., Ghazi, P., Gao, Q., Tian, T., Kong, F., Zhan, S., Liu, C., Bloom, D.E., Qiao, J., 2022. Prevalence of intimate partner violence against infertile women in low-income and middle-income countries: a systematic review and meta-analysis. The Lancet Global Health 10, e820–e830. https://doi.org/10.1016/S2214-109X(22)00098-5

[33] Widyatmanti, W., Umarhadi, D.A., 2022. Spatial modeling of soil security in agricultural land of Central Java, Indonesia: A preliminary study on capability, condition, and capital dimensions. Soil Security 8, 100070. https://doi.org/10.1016/j.soisec.2022.100070

[34] Yan, L.D., Ali, M.K., Strombotne, K.L., 2021. Impact of Expanded Medicaid Eligibility on the Diabetes Continuum of Care Among Low-Income Adults: A Difference-in-Differences Analysis. American Journal of Preventive Medicine 60, 189–197. https://doi.org/10.1016/j.amepre.2020.08.013.