the field farmers face is that the seeds recommended by the government often need to match the arrival time with the planting season. This causes farmers to frequently use seeds they produce themselves even though they have not been tested.

In addition to land and seeds, crop management is the variable that partially has a significant effect on rice farming production. Research shows that crop management is carried out by those with the power to make decisions. Power in decision-making does not depend on the landowner alone but can also be seen in sharecroppers. In sharecropper relations, the decision to implement crop management is in the hands of the sharecropper, while the owner farmer passively waits for the distribution of results. The decision to implement good crop management is related to the farmer's experience. Crop management, such as the decision to use pest and disease-resistant or superior seeds, the decision to carry out maintenance, or the decision to use certain fertilizers, significantly affects rice farming production.

Fertilizers, pesticides, and labor are input variables that partially do not affect rice farming production. These three input variables have one thing in common: they can be substituted. Chemical fertilizers used by farmers can be substituted with organic fertilizers. Likewise, chemical pesticides can be replaced with natural pesticides or specific techniques such as crop rotation or other treatments, such as using light to overcome insect attacks. Meanwhile, labor variables can be replaced with different equipment to improve rice farming efficiency.

C. Review of Independent Variables in Rice Farming Input-Output Model

In the previous section, the input-output model of rice farming was analyzed through multiple regression analysis. The results show that each of the six independent variables has its characteristics, which is essential to note. This section will explore the role of each input based on the results of the multiple regression analysis. The input-output analysis, as presented in Table I, shows two groups of inputs based on the regression coefficients. The first group includes inputs with significant regression coefficients. The other group has very small coefficients (not up to 1), and even one variable shows a negative number. This can also be seen in the T-test, where three variables (land, seeds, and crop management) with significant coefficients partially influence rice farming production (Table III).

In the first input group, this study shows that the potential for rice production can still be increased. This can be done through the extensification of farming, namely the addition of land or the printing of new rice fields. The land is not just a means of agricultural production as an expanse; land for farmers can be collateral to obtain agrarian credit, which can be used to increase capital to finance their farms. Culturally, land is also a symbol of one's social status in the countryside. One's prominence is also largely determined by land ownership. Land is thus not merely an expanse where rice grows but can also function as credit collateral and a symbol of social status [39].

The problem farmers face in Indonesia concerning land is that land ownership is narrow and scattered in various places. Local farmers rarely have rice farming land that stretches widely in one stretch. Generally, the land needs to be more cohesive, resulting in efficient rice farming management. This differs from rice farming land owned by transmigrants who receive 2 hectares of land to manage. The land is centralized, making it easier for farmers to use equipment in rice farming.

In addition, technology is needed for seeds that provide optimal yields, are resistant to pests and diseases, and can adapt to climate change. However, it is equally essential to increase the capacity of farmers to manage their farms. The current farmers are older. They have experience but need to gain more knowledge of technology. The government must pay serious attention to these older farmers so that they can keep up with agricultural developments, including updated information on marketing, prices, and the quality of paddy desired by the market [24], [40].

The three variables with small regression coefficients, and some even minus, are fertilizers, pesticides, and labor. The results show that farmers are highly dependent on chemical fertilizers, which can cause soil fertility to decline over time. As a result, farmers will continue to increase the fertilizer used until production yields decline.

In addition to the chemical content of fertilizers that can cause soil damage, the availability of fertilizers in Indonesia is currently minimal. Farmers must register to become members of farmer groups and enter the need to buy subsidized fertilizers based on land area; fertilizers are also often late in reaching farmers. The scarcity of fertilizers means that farmers must purchase non-subsidized fertilizers, which are very expensive. The scarcity of fertilizers has caused the price of non-subsidized fertilizers to increase, and in some cases, this scarcity has contributed to the illegal trade in subsidized fertilizers.

IV. Conclusion

Research on input-output using multiple regression allows the combination of technical and non-technical variables as independent variables. The technical variables are land, seeds, fertilizers, pesticides, and labor. The non-technical variable in this research is farm management. This combination provides a new perspective on the input-output model of rice farming that can examine the contribution of each factor to rice production in Indonesia. From multiple regression analysis, the land, seeds, and farm management variables contribute significantly to rice production. In another articulation, this study succeeded in showing that these three inputs have the potential to be developed to achieve optimal production. This study benefits farmers by optimizing farm management variables and expanding land for optimal rice production. This analysis is also helpful for the government as a policy maker in developing a sustainable agricultural development design.

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