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Prioritization strategy of horticulture for agriculture development in north Toraja regency

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Abstract

Horticulture is currently a prima donna commodity that has very good prospects, considering the paradigm shift in food consumption towards the consumption of nutritious, cheap, and affordable food and easy to grow (maintain). The type of horticulture plant is one type of food crop that is classified as a staple food need such as; vegetables and fruits. This plant is commonly found in the North Toraja Regency, such as; in hot peppers, onions, and potatoes. North Toraja Regency is one of the areas that have the potential to develop horticulture agriculture. The purpose of this study is to determine the priority of the horticulture agriculture development strategy in North Toraja Regency. The research method used is a quantitative method with a type of survey research. The study was conducted in North Toraja Regency, South Sulawesi Province, from July to September 2022. The types of data collected include secondary data in the form of research results and formulations of national and regional agricultural policies, as well as primary data in the form of opinions of stakeholders related to horticulture agricultural development strategies in North Toraja Regency. The data analysis method is carried out with the AHP (Analytical Hierarchy Process) technique. The results of the study obtained that the main strategy in the development of horticulture agriculture in North Toraja Regency is a strategy of improving technology and business funding assistance.

Keywords: Horticulture; Center; Agriculture; AHP; North Toraja

1. Introduction

Horticulture is the cultivation of vegetables, fruits, and various ornamental plants, where horticulture crops are currently a prima donna commodity that has very good prospects, considering the paradigm shift in food consumption towards the consumption of nutritious, cheap and affordable food and easy to grow (maintain). The type of horticulture plant is one type of food crop that is classified as a staple food need such as; vegetables and fruits. The increase in demand for vegetable and fruit crops is due to the current lifestyle of the people who are more health-preserving by trying to consume vegetables and fruits every day. Horticulture plant type is a type of plant that is relatively easy to grow and is included in plants that can be planted in the yard of the house or garden so that its availability and maintenance are relatively easy and light to do. Horticulture also in addition to acting as a source of community nutrition, also functions as a provider of employment, and supports agro-tourism and agro-industrial activities. This shows that the development of horticulture is related to broader aspects that include techno-economics with socio-eco-culture. In terms of the production time process, the short growing season allows for a relatively fast capital turnover and can minimize uncertainty due to natural factors, including pests and plant diseases [1].

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The development of Horticulture crops in Indonesia is also supported by the Government in the form of regulations, namely through Law No.13 of 2010 concerning horticulture, and the blueprint document for horticulture development 2011-2025, as well as the Agricultural Development Master Strategy (SIPP) 2013-2045, biodiversity, agro-climatic, availability of agricultural land, technology, availability of labor, market availability, determination of superior commodities, support for horticulture seed systems and support for the system horticulture crop protection. The development of horticulture crops is an effort to develop products that are needed in a sustainable manner by the people of Indonesia and the world generally. Indonesia's large population is actually an opportunity for a potential domestic market. But in reality, the large domestic market share has not been optimally utilized. This is reflected in the low level of consumption of horticulture products which is still under the recommendations of the World Food *and Agriculture Organization (FAO).* The flood of imported products has also caused competitiveness for local products and has damaged Indonesia's image as a tropical horticulture-producing country in international circles. The implementation of horticulture product development in Indonesia besides having the potential for development is also still experiencing many obstacles, including the implementation of regulations and technical guidance is not optimal, the capacity of human resources (HR) is not adequate, farmer institutions still weak, and the application of technological innovations has not been massive, so it is not optimal.

The conditions for the development of horticulture crops are also relatively the same in North Toraja Regency. The development of horticulture crops in North Toraja Regency is one of the focuses of the development of the agricultural sector, especially in chili, onion, and potato crops. Various efforts and programs continue to be carried out to increase horticulture crop production in North Toraja Regency. Geographically, the North Toraja regency is a very potential area (very suitable) for the development of horticulture crops. The results of the study [2] that the physical conditions of the area such as topography, slope, and land use have the potential for village development, especially agro-tourism based on plantation commodities, food crop agriculture, and horticulture in Lembang Sillanan. Thus, it becomes very important to formulate a strategy for the development of horticulture crops supported by the geographical potential of the region. On the other hand, the development of horticulture crops also has the potential to improve the regional economy. The development of rural areas is carried out to encourage growth and balance between rural areas and other regions [3]. Furthermore, regional development is the decentralization of functions where independence of the resources owned will greatly support the success of the development based on superior commodities in an integrated manner that can increase the added value of commodities, community income, and the regional economy. [4, 5]. The development of horticulture crops, in addition to producing products in the form of food which will naturally drive the wheels of the economy of the community and the region, will also provide development potential in the form of agro-tourism. The potential of agro-tourism has become one of the leading tourist destinations today, especially after the COVID-19 pandemic.

In order for horticulture crop development activities in North Toraja Regency to be optimized, it is necessary to conduct research related to the formulation of a strategy for the development of sustainable horticulture crops. For this reason, this research is important to do.

2. Material and methods

2.1. Description of the study sites

The study was conducted in North Toraja Regency, South Sulawesi Province. The study was conducted from July to September 2022. North Toraja Regency is one of the areas in South Sulawesi that has the potential for the development of horticulture crops, especially vegetables. The area is expected to become a center for vegetables and other kitchen condiments.

2.2. Method of the study

The study method used in this study is a quantitative research method with a type of survey research. Quantitative research is a method carried out in research based on research design based on theory or previous research results which are then compiled by a series of research instruments to collect data [6]. While the type of survey research is used considering that in the study a questionnaire was used as a research instrument to obtain data from a number of respondents. This is stated [7] that survey research is a study that takes a sample from one population and uses questionnaires as a central data collection tool [8]. Furthermore, according to [9] that the survey method is a quantitative research method used to obtain data that occurred in the past or present, about beliefs, opinions, characteristics, and behavior of variable relationships and to test several hypotheses about the sociological and psychological variables of a population. Thus, quantitative calculations with the type of survey research are considered appropriate (suitable) and good enough to be used as a research approach.

2.3. Method of collecting data

The method of data collection is based on the type of data that is collected. The type of data collected is primary data in the form of answers (opinions) from a number of questions in the questionnaire. The questionnaire developed is a type of closed questionnaire, that is, there are no open answers available to respondents, but all choices of answers to the questions asked have been provided, and respondents only need to choose (put a tick) on the desired answer. Before preparing the questionnaire, the formulation of a strategy for the development of horticulture crops is first carried out by collecting libraries (books and the results of previous research related to the development of horticulture crops). The method of collecting data (books and research results) is carried out using the library study method (*desk study*).

2.4. Method of data analysis

The data analysis method used is based on the research objectives, namely prioritizing the strategy for developing horticulture crops in North Toraja Regency, namely the AHP (Analytical Hierarchy Process) method. According to [10] that AHP is a decision-making method that involves a number of criteria and alternatives that are selected based on the consideration of all related criteria in the form of a hierarchy. It is argued [1 1] that AHP is a simplification of a complex and unstructured, strategic, and dynamic problem into its parts, and organized in a hierarchy. Furthermore [12] mentions that the AHP method is a decision-making method that uses several variables with a multilevel analysis process that is comprehensive. More specifically according to [6] that AHP aims to determine the best choice (the main priority) of several alternatives. The advantage of AHP is that it can provide a comprehensive and rational framework for structuring decision-making problems [13]. Furthermore [6] that the AHP stage consists of, 1) The model building stage (structure/hierarchy creation), 2) the analysis stage (run software), and 3) the result evaluation stage (decision making). The following is the hierarchy of formulating strategies for the development of horticulture crops in North Toraja Regency.

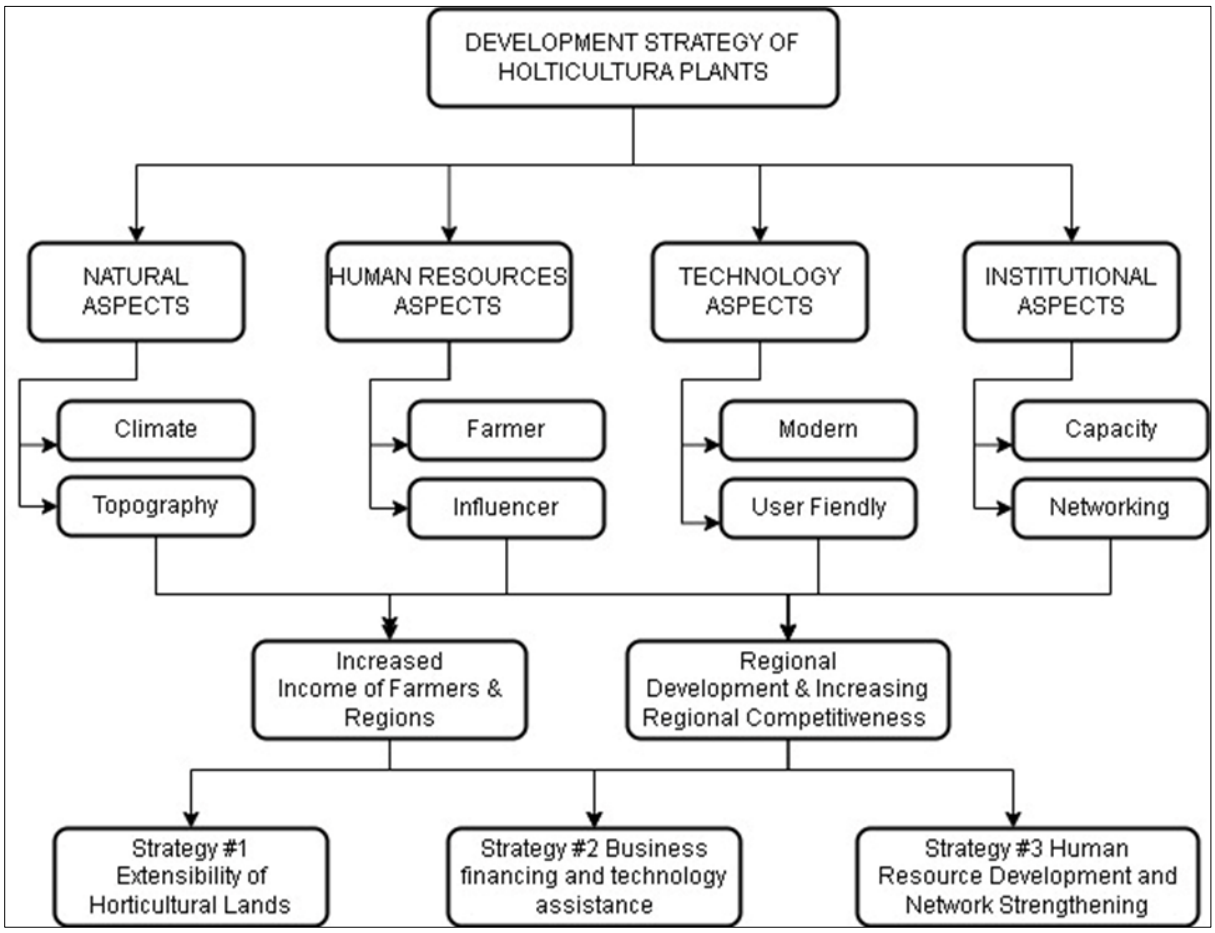

Figure 1 Hierarchy of Horticulture Plant Development Strategies in North Toraja Regency

3. Result and Discussion

The results of the process hierarchy analysis consist of 3 main outputs, namely;

- The main aspects in the development of horticulture crops in North Toraja Regency,
- The main objectives of horticulture crop development activities in North Toraja Regency,
- The main strategy (strategic priority) in the development of horticulture crops in North Toraja Regency.

3.1. Main aspects

The main aspects of developing horticulture crop development in North Toraja Regency based on the results of the expert assessment are the technical aspect with a priority value of 28.50%, then the human resources aspect with a priority value of 28.10%, then the institutional aspect with a priority value of 23.70 and the natural resource aspect with the lowest priority value of 19.70%. It seems that the results obtained show that in fact of these four aspects, they are not too prominent so it can be understood that these four aspects are very important in the development of horticulture crops in North Toraja Regency. Here are the analysis results/outputs from the Experts Choice software.

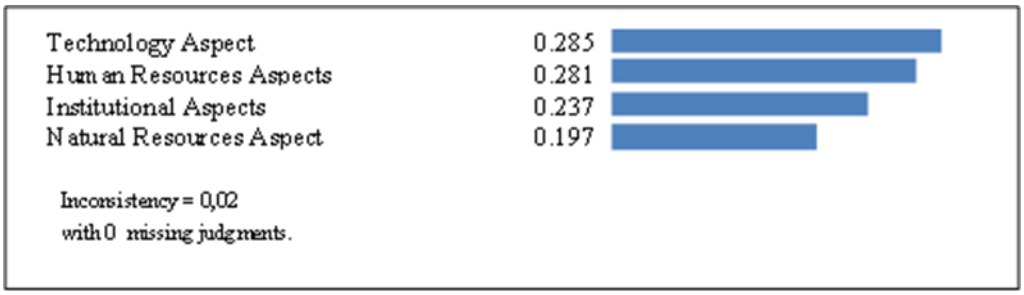

Figure 2 Analysis Output of Aspects Priority

Based on the results as shown above, it appears that the technological aspect is the top priority in the development of horticulture crops in North Toraja Regency. According to [14] that technology has a very large role in agricultural activities, especially in industrial-scale agriculture as well as advanced and sustainable modern agriculture. Furthermore [15] that agricultural technology innovation plays an important role in increasing agricultural productivity, given that increasing production through land expansion (extensification) is difficult to implement in Indonesia, amid the widespread conversion of productive agricultural land to non-agriculture. Through the application of technology in the agricultural process, the productivity of agricultural land can be increased to the optimum point, so as to increase production yields. The results of the study [16] that the most dominant factor in influencing changes in the structure of GDP is agricultural technology. The results of the analysis show that the marginal impact of technological changes on the structure of GDP producers is getting bigger year by year. This shows that agricultural technology innovations are increasingly effective and increase the added value of the agricultural sector. Some examples of the application of agricultural technology can be done, such as; the preparation of superior seeds, application of fertilizers, processing of land with modern machines, and weeding plants to handle pests and plant diseases. Furthermore [17] that the application of advanced technology in agriculture including in plant breeding is very important and strongly supports the increase in crop production, where increasing crop productivity is generally the main goal carried out from plant harvesting activities, both through seeding and tissue culture. This is because increased productivity has the potential to be economically beneficial. For farmers, increasing productivity is expected to compensate for the production costs that have been incurred, so that it can provide significant benefits. Some examples of agricultural plant breeders' results are; the release of 31 rice hybrid cultivars, IRXX type (resistant to leafhopper pests), IR64 (savory and delicious taste), Ciapus and Gilirang cultivars, as well as various other types of cultivars. According to [18] that the rice yield power of the plant breeders is able to increase the productivity of agricultural land per unit area from 2-3 tons/ha to 4-6 tons/ha. Whereas according to [19] that in order to improve quality and competitiveness, molecular breeding techniques have an opportunity to be developed. The development is related to quality characters or the QTL (*Quantitative Trait Loci*) approach to quality characters, which has the potential to be a step away to compile cultivars that have superior quality. Furthermore, some molecular breeding techniques that can be used to support quality improvement and competitiveness are such as; gene transformation (transformation of controlling genes with a unique character, metabolic engineering, anti-sense, RNA-interference). In addition, to obtain high agricultural production results, good crop management must be carried out, including carrying out good and correct fertilization techniques and handling pests and plant diseases to good and correct harvesting techniques and

processes [20]. Thus, it can be stated that the technological aspect is an important (main) aspect of agricultural development, including in the development of horticulture crops in the North Toraja Regency.

In addition, implementing sustainable agriculture (modern and optimal), also requires the support of competent, reliable, and highly innovative human resources, so that every agricultural process carried out can run optimally. Based on the results of the analysis, it was obtained that the human resource aspect is the second priority in the development of horticulture crops in North Toraja Regency. Human resources can increase productivity, and experience and facts are also factors combined that can help build the State. According to [21] increasing the capacity and skills of farmers can be done in various ways such as through formal education and non-formal education such as training activities and regular counseling. The results of the study [22] showed a significant influence of farmer training activities on the performance of soybean farming in East Java. This can be seen from the relationship between agricultural products from farmers who have attended agricultural training. The same result was obtained [23] that the intensity of meetings between extension workers and the intensity of training had a significant effect on the competence of agricultural extension workers, while the level of formal education that extension workers followed after becoming civil servants was not significant enough to have an effect in shaping the competence of agricultural extension workers. Therefore, the intensity of meetings between extension workers and the intensity of training needs to be increased. Similarly, the results of the study [24] that there is a real and positive influence of agricultural extension on increasing the productivity of paddy rice. Thus, it can be stated that the human resources aspect is one of the important aspects of agricultural development, including the development of horticulture crops in the North Toraja Regency.

Meanwhile, the institutional aspect and the natural resources aspect are also the main aspects but are on the second layer compared to the technological aspects and human resources aspects that occupy the first layer in agricultural development, especially sustainable agriculture. Farmer institutions also have an important role to strengthen the competitiveness of farmers in the era of free trade, especially after the economic disruption period and the COVID-19 pandemic, where the world order has completely changed. For this reason, institutional strengthening by first strengthening human resources and technology, is very important, including increasing the institutional capacity of farmers to continue to encourage farmers to implement GAP-GHP, pay attention to product quality, and provide quality assurance of agricultural products.

3.2. Key Strategies

The results of the analysis obtained that the main priority related to the horticulture crop development strategy in North Toraja Regency is the technology assistance strategy and business funding with a priority value of 58.90% or more than half. The second priority of the strategy that must be carried out in the development of horticulture agriculture in North Toraja Regency is the strengthening of human resources and business networks with a priority value of 32.50%. Meanwhile, the last priority is the strategy of extensibility of horticulture agricultural land. More details as in the following image.

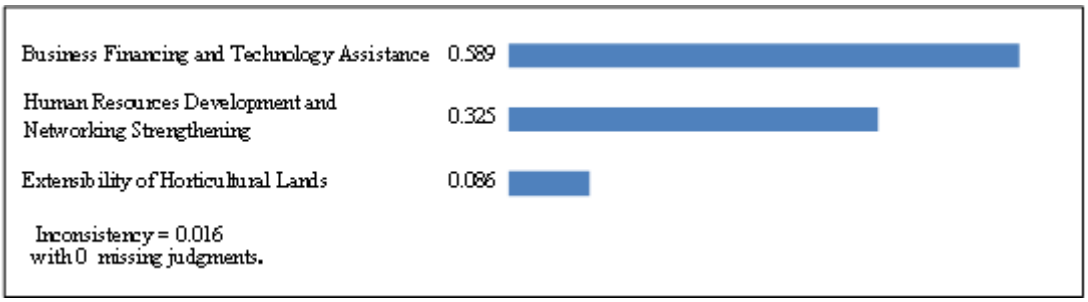

Figure 3 Strategy priority of horticulture development in the North Toraja

The results as shown above show that the strategy that must be carried out in the development of horticulture crops in North Toraja Regency is a strategy of strengthening and assisting technology as well as business funding assistance (business capital). Such as findings on priority aspects where technological aspects are the top priority in the development of horticulture agriculture in North Toraja Regency. The potential of large land with contours and topography that is ideal for agricultural activities, especially in horticulture crops such as; Chili, onions, and potatoes makes for a very good agricultural business prospect, especially said it is supported by good technology and business funding. The importance of technology in a farming business rather than expanding agricultural areas (extensification), for example, the use of technology can increase production, reduce the use of human resources, and reduce crop losses which in turn will be able to improve the welfare of farmers. The application of technology today has developed very

advanced and very rapidly, especially in IoT (internet of things) technology with artificial intelligence (artificial intelligence). Modern agriculture relies heavily on artificial intelligence considering that agricultural areas are generally very large areas and conditions with activities that require strong (physical) energy.

4. Conclusion

The results of the study obtained that the main strategy in the development of horticulture agriculture in North Toraja Regency is a strategy of improving technology and business funding assistance. While the second strategy is to increase human resources and business networks. The strategy with the lowest priority is the extensibility of horticulture farmland.

Compliance with ethical standards

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