Strategies For Increasing Plant Productivity in Dry Land Indonesia

Rahayu Sri[1], Budi Luluk Sulistiyo[2], Puspitawat Indah Rekyani[3], Nurwantara Ma'ruf Pambudi[4]
{luluksb@unmer-madiun.ac.id}

Agriculture Faculty, Program Study of Agrotechnology, Merdeka Madiun University, Madiun, Indonesia

Abstract. Dry land is one of the conditions found in Indonesia. At least this potential is estimated at 76 million hectares to become productive land. This study aims to formulate a strategy to increase the productivity of dry land in Indonesia. The data sources of this study used primary data: observations, questionnaires and expert discussions, as well as secondary data: data processing, library studies and government data. This research method uses IFE EFE to identify the factors of dry land conditions in Indonesia, SWOT analysis is used to formulate strategies to increase productivity. The results showed that 10 strategies were formed consisting of strategies for strengthening farmer institutions, integrated training strategy on a regular basis for dry land farmers, design and manufacture of irrigation systems, strategy for the formation of integrated information design, motivational strategy through the pilot of successful farmers in dry land management, strategy for improving the technology transfer approach through agricultural extension workers, strategy of mentoring program for the application of new technology for farmer groups, pilot land strategy using suitable planting methods and varieties on dry land., strategy for cooperation with universities in the Independent Campus Learning Program (MBKM), strategies to build a literacy culture. The results of this study can be concluded that there are factors that need to be improved in increasing the productivity of dry land in Indonesia, which consists of the active role of farmers, community leaders, government policies and regulations, and collaboration with universities.

Keywords: Dry land; productivity; strategy; SWOT.

1 Introduction

The dynamics that occur in the community which include population growth and regional development patterns that continue to increase every year cause land conversion or commonly called land conversion is unavoidable. Based on data from the Ministry of Agriculture of the Republic of Indonesia (2019), Indonesia's productive land has decreased by 5% every year, with an area currently of 78,483.70 ha. Meanwhile, non-productive land in Indonesia tends to be stable with an area of 239,481.20 ha.

Land is one of the natural resources that has the potential to be developed as optimally as possible to increase local revenue (PAD). The form of agricultural land in Indonesia is divided into two types, namely dry land and wet land. Agricultural development in dry land is

WICSTH 2021, September 07-08, Denpasar, Indonesia

DOI 10.4108/eai.7-9-2021.2317727

expected to be able to make a real contribution to agriculture in Indonesia. Most of the paddy fields in Indonesia were originally the result of clearing dry land areas. Many dry lands that were originally used for forests and plantations have now been used as rice fields. Dry land is a stretch of land that has never been flooded or flooded most of the time of the year. The use of dry land for agriculture in Indonesia is generally grouped for yards, fields/gardens/fields, grasslands, plantations, woody plants, and uncultivated land. Dry land that has not been cultivated is still extensive, which is accompanied by a low crop index, this indicates that some of the land has not been managed properly [1].

Management of dry land resources is one solution in improving human welfare. Dry land resources with all the components in them including soil, rocks, slopes, water, and biota must be managed properly in order to obtain optimal and sustainable benefits between their uses. Some dry land management can be realized through several aspects: dry land as the main support system for human life, the use of land resource technology, policies, institutions/institutions, and spatial planning for its utilization.

Problems in dry land management vary in each region, both technical and socio-economic aspects. However, with the right strategy and technology, these problems can be overcome. In terms of area, the potential for dry land is high, but there are biophysical and socio-economic problems that must be overcome to increase productivity in a sustainable manner. Several actions to overcome the biophysical limiting factors of land include management of soil fertility, soil conservation and rehabilitation, and efficient management of water resources. Soil fertility management is not limited to increasing chemical fertility, but also physical and biological soil fertility. This means that the management of soil fertility is not enough just to apply fertilizer, but also needs to be accompanied by the maintenance of the physical properties of the soil so that a good environment is available for plant growth, the life of soil organisms, and to support various important processes in the soil [2].

Production constraints in dry land are the physical condition of the land (relatively shallow soil depth, sloping slopes, drought), weak technology/application of conservation techniques and socio-economic (lack of capital to apply recommended technology). As a result of these physical, technological and socio-economic constraints, land productivity continues to decline so that the number of poor people continues to grow [3]. Therefore, proper dry land management that leads to a sustainable increase in production is absolutely necessary. One of the efforts that can be done to solve the problems faced by farmers in dry land is to develop farming technology that is in accordance with local conditions. Dry land management technologies that are commonly used include: water conservation and the use of organic matter and will be more meaningful if integrated with livestock farming, because in its implementation land and water conservation will be guaranteed sustainability if integrated with livestock [4].

According to Wahyunto and Shofiyati [5] dry land is one of the resources that has great potential for agricultural development, both food crops, horticulture, plantations and livestock. In addition, dry land is one of the potential resources that are owned as the basic capital of development in the region, so that increasing dry land productivity is increasingly needed in the current era of development. The purpose of this study was to develop a strategy to increase the productivity of dry land through internal and external factors approach.

2 Research Methods

This research was conducted in May 2021 – August 2021. The study used primary data sources: observations, questionnaires and expert discussions, as well as secondary data: data processing, library studies and government data. This research method uses IFE EFE to identify the factors of dry land conditions in Indonesia, SWOT analysis is used to formulate strategies to increase productivity.

SWOT analysis is used to determine the internal factors (strengths and weaknesses) and external factors (opportunities and threats) that are being faced. According to Rangkuti [6] SWOT analysis is a useful analysis to obtain the right strategy formulation. SWOT analysis has several advantages, including this analysis model is able to detect every weakness and strength of an institution so that it is useful in minimizing the impact or consequences that will occur in the future [7]. External internal factor analysis is a SWOT analysis method that can be used to identify internal and external factors that exist in the research object environment. Furthermore, it can be known internal and external factors and how they affect the object of research.

3 Results and Discussion

Table 1. Internal Factors

Internal Factor	Rating	Weight	Rating x Weight
Strenght Factor			
Availability of large dry land	4	0,25	1
Availability of Human resources as labor	3	0,25	0,75
Personal land ownership	3	0,13	0,39
The role of community leaders as information centers	3	0,12	0,36
Weeknes Faktor			
Low information transfer capability	1	0,1	0,1
Low technology transfer capability	1	0,1	0,1
Unfavorable environmental conditions	2	0,05	0,1
Total		1	2,8

Based on the analysis of internal factors in table 1, it is found that the strength factor of Availability of large dry land has the highest weight of 1. Availability of large dry land available in Indonesia is dry land owned by individuals or conversion of new land clearing. Of the 191.9 million ha of land in Indonesia, the largest land cover is primary forest on dry land (mineral soil) around 20.0% and secondary/selective logging forests around 19.7%, and 15.5% abandoned land. While the largest agricultural land is dry land mixed with shrubs/mixed gardens around 14.2%, upland only 5.3%, plantation 6.6% and rice fields 4.1% [8]

While the weakness factor of Low information transfer capability, Low technology transfer capability, Unfavorable environmental conditions has a weight of 0.1, indicating that the weaknesses possessed by farmers are these three factors. This is in accordance with the research of Mulyono and Munibah [9] which explains that rice fields, markets and information sources must be optimized to encourage the success of food crop farming.

Table 2. External Factors

External Factor	Rating	Weight	Rating x Weight
Opportunity Factor			
Development of agricultural land processing technology	3	0,15	0,45
Development of research results on dry land	3	0,15	0,45
Government program on potential land management	4	0,2	0,8
Availability of potential new springs	3	0,15	0,45
Treats Factor			
Information on dry land management with unclear sources and proven results.	1	0,1	0,1
Panic in receiving information	1	0,1	0,1
Professional trends that affect the changing profession of young farmers.	2	0,15	0,3
Jumlah		1	2,35

Based on the analysis of internal factors in table 2, it is found that the opportunity factor, namely the Government program on potential land management, has the highest value with a value of 0.8. The government as a driver of agricultural development with its policy of providing agricultural technology as well as facilities and infrastructure such as holding intensification procurement [10].

While the threat factor, professional trends that affect the changing profession of young farmers has the highest weight of 2.35. Various reasons for the declining interest of young workers in the agricultural sector are mainly the image of the agricultural sector which is less prestigious and unable to provide adequate compensation. This stems from the relatively narrow average tenure of farming land. Another reason is that the perspective and way of life of young workers has changed in the era of the development of postmodern society as it is now. For young people in rural areas, the agricultural sector is increasingly losing its attractiveness [11].

Table 3. Matrix SWOT

IFAS & EFAS	***Strength* (S)**	**Weakness (W)**
	1. Strength Factor 2. Availability of large dry land 3. Availability of Human resources as labor 4. Personal land ownership 5. The role of community leaders as information centers	1. Low information transfer capability 2. Low technology transfer capability 3. Unfavorable environmental conditions
Opportunities (O)	**Strategi (SO)**	**Strategi (WO)**
1. Development of agricultural land processing technology 2. Development of research results on dry land 3. Government program on potential land management	1. Strategy for strengthening farmer institutions 2. Integrated training strategy on a regular basis for dry land farmers 3. Design and manufacture of	1. Strategy of mentoring program for the application of new technology for farmer groups 2. Pilot land strategy using suitable planting methods

4.	Availability of potential new springs		irrigation systems		and varieties on dry land
	Threats (T)		**Strategi (ST)**		**Strategi (WT)**
1.	Information on dry land management with unclear sources and proven results.	1.	Strategy for the formation of integrated information design	1.	Strategy for cooperation with universities in the Independent Campus Learning Program (MBKM)
2.	Panic in receiving information	2.	Motivational strategy, through the pilot of successful farmers in dry land management	2.	Strategies to build a literacy culture
3.	Professional trends that affect the changing profession of young farmers.	**3.**	Strategy for improving the technology transfer approach through agricultural extension workers		

The results of the SWOT analysis in Table 3 show that there are 10 strategies formed based on the conditions arranged in the table of internal factors and external factors. The 10 strategies are:

a. SO strategy
   Strategy for strengthening farmer institutions, Integrated training strategy on a regular basis for dry land farmers, Design and manufacture of irrigation systems.
b. ST strategy
   Strategy for the formation of integrated information design, Motivational strategy through the pilot of successful farmers in dry land management, Strategy for improving the technology transfer approach through agricultural extension workers
c. WO strategy
   Strategy of mentoring program for the application of new technology for farmer groups, Pilot land strategy using suitable planting methods and varieties on dry land.
d. WT strategy
   Strategy for cooperation with universities in the Independent Campus Learning Program (MBKM), Strategies to build a literacy culture.

The learning process in the Merdeka Campus is one of the most essential manifestations of student-centered learning. Learning in the Merdeka Campus provides challenges and opportunities for the development of innovation, creativity, capacity, personality, and student needs, as well as developing independence in seeking and finding knowledge through realities and field dynamics such as ability requirements, real problems, social interaction, collaboration, self-management, performance demands, targets and achievements. Through a well-designed and well-implemented independent learning program, students' hard and soft skills will be formed strongly.

The Independent Learning Program - Merdeka Campus is expected to be able to answer the challenges of higher education to produce graduates who are in accordance with the times, advances in science and technology, the demands of the business and industrial world, as well as the dynamics of society. Directorate General of Higher Education, Ministry of National Education, Indonesia (2020).

4 Conclusion

Strategies for improving Indonesia's dry land require multiple roles from the farmer sector, community leaders, government research institutions and universities. Each sector has a role in increasing dryland productivity. The role of each sector is key in implementing the

strategies that have been arranged in an effort to increase the productivity of dry land in Indonesia. Conclusions should answer the objectives of the research. Tells how your work advances the field from the present state of knowledge.

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