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Cultural Translatory of Horticulture Plants in Cold Lands and Cabapatenes

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ABSTRACT: Dry land is defined as an area of land that has never been filled or watered for most of the year. This type of land can be found from low plains (0–700 m dpl) to high plains (> 700 m dpl). Dry land is one of the resources that has great potential for agricultural development, including both food crops, horticulture, planting, farming, and fishing. The district of Ngada is one of the regions on the island of Flores that has a large area of dry land. This article aims to present the preservation of the cultivation of horticultural crops on dry land and hills, in particular in the territory of Ngada Regency. The method or approach of the study used in this study used the method or library approach (library research). The result is that horticultural commodity prospects are also highly strategic commodities and are continuously pushed to be able to improve the welfare of farmers and the economy. Innovative technologies are used for horticulture cultivation in dry land, such as the use of high-yielding cultivars suitable for dry land and their multiplication, water harvesting practices, integrated nutritional management, mulch, organic farming, and other technologies to improve storage capacity. Various barriers to horticultural cultivation on dry land can be overcome by applying horticultury cultivation technologies in dry lands that include horticultura cultivation through the application of organic fertilizers and bio-fertilizers, mulching, adjustment of planting patterns, and improvement of irrigation systems.

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INTRODUCTION

Agricultural land is generally categorized as wetland, dry land, and hilly or mountainous land. Dry land is defined as an area of land that has never been filled or watered for most of the year. This type of land can be found from low plains (0–700 m dpl) to high plains (> 700 m dpl). (Noywuli, 2023). Dry land is one of the resources that has great potential for agricultural development, including both food crops, horticulture, planting, farming, and land fishing. (Alim et al., 2022).

Wet climate Dry soils have a fairly higherosion potential due to their steep slopes. Wet climates have a relatively high potential for erosion (slopes). Very sensitive to erosion, especially during the high rainy season. Farming is generallydone on rather flat land with slopes of more than 15%. However, land with topographic conditions like this is more suitable for annual crops. (Abdurachman et al., 2008).

Potential resource development in agriculture on dry land, one of which is cultivating horticultural crops, is a supportive factor in increasing national food sustainability production. According to Zulkarnain (2010), horticulture is the science and art of cultivating high-value plants, including fruits, vegetables, ornamental plants (flowers, trees, and parsley), herbs, and medicinal plants. In terms, horticulture comes from two words: "hortus," meaning garden, and "cultura," meaning cultivation. Horticulture is also a subsector of agriculture that plays an important role in the economy of society, human nutrition, gender preference, and employment. (Alim et al., 2022).

The development of agriculture through the development of potential horticultural commodities in a region is one of the efforts to boost the economy of the region and its communities, which will ultimately improve the region's competitiveness. The problems faced by dry land farmers in trying to farm, among others, are not supported by the availability of adequate irrigation infrastructure; the level of knowledge and skills of farmers, especially in the management of horticultural commodities, is relatively low; the rate of participation of the farmers is still relatively small; the low ownership of enterprise capital owned by farmers; and the lack of market guarantees for the horticulture products produced by farmers (Jayaputra, dkk. 2022).

Ngada Regency is one of the regions in East Nusa Tenggara Province that has agricultural land that belongs to dry land. There are some problems that often arise in the process of dry land management in the district of Ngada, namely the decline in soilfertility due to erosion and water laundering, very steep topography, water availability, and problems in production. Based on these obstacles, alternative solutions can be applied, such as using vegetative or mechanical soil management methods, increasing rainwater harvesting, managing water resources thoroughly, and growing drought-resistant crops (Noywuli at al., 2024). Sustainable agriculture should be supported, in particular, with regard to the management of dry land. Sustained farming on dry land to exploit limited water resources without the use of dangerous cultivation techniques or excessive pasture that jeopardizes marginal land. (Solowey et al., 2013).

Horticultural plants are one of the kinds of plants that can be cultivated in order to improve the production of food resistance in dry land areas. Therefore, to solve the problem of the cultivation of horticultural crops in dry lands and mountains, it is necessary to apply the cultivation technology related to the application of organic fertilizer and bio-fertilizer, mulching, setting plant patterns, and improvement of irrigation systems. This is done in order to improve the economy of the region and more efficient communities, optimize land, water, and labor resources, and optimize the use of limited natural resources.

METHOD

A library study can be understood as a series of activities relating to the methods of collection of library data, reading, recording, and processing research material. A questionable approach in this study is that the collection of data in the research is carried out by scanning and/or exploring several journals, books, and documents (whether printed or electronic), as well as sources of data and/or other information considered relevant to the research or study.

RESULT AND DISCUSSION

Horticulture Prospects

According to Ali, D. and Gelsdorf, K., (2012), the projection of the world's population by 2025 is 8 billion people. It is recorded that more than 1 billion people suffer from hunger and more than 3 billion people are undernourished. Obstacles in the development of horticultural crops at the site of the activity are: first, the agricultural land is in the low plains with characteristics of dry land, pile and limited availability of water. In addition, relatively small land ownership leads to special difficulties for farmers to develop their agricultural system, as well as limited knowledge of how to cultivate horticulture and also financing.

The challenge is to reduce the number of people suffering from hunger and malnutrition. The contribution of horticulture crops and related industries to the wider society is enormous, generally accepted but often underunderstood or recognized. These contributions include:

1. sustainable provision of safe, healthy, and nutritious foods, generally of very high quality and in abundant quantities in many countries.
2. Provision of many essential vitamins and minerals, helping consumers have a balanced diet.
3. Contribution to the economy through export-related activities and excellence associated with all elements of the supply chain.It is becoming increasingly important in developing countries that contribute more frequently to food supplies to developed countries, especially in Europe and North America.
4. The survival of rural populations directly through employment and the sustainability of the provision of services, thusining the population that justifies the delivery of services such as health and education
5. Generating overall wealth through the activities of those involved in production, processing, marketing, services, and related sectors.
6. Contribution to recreational, sporting, and recreational activities through specialized areas such as lawn management, landscaping, and the creation and management of private and public gardens.
7. Horticulture is very environmentally friendly when compared to other crops.
8. Has a high value-added potential so that it can play a positive role against a recipient of a country's currency.

In Indonesia, horticulture commodities are also highly strategic commodities and are continuously promoted to improve the welfare of farmers and regional and national economies through exports. The increased need for horticultural products due to increased per capita consumption, the number of consumers, and changes in consumer preferences are essentially attractive factors for the growth of horticulture agribusiness. The vast territory of Indonesia, with its varied agroclimate characteristics, enables the development of various types of horticultural crops.

Application of Horticulture Crop Technology in Dry Land

According to Kumar, H., Singh, M. K., Gupta, MP, and Madaan, J. (2020), innovative technologies are used for horticulture cultivation in dry land, such as the use of high-yielding potent cultivars suitable for dry land and multiplication, water harvesting practices, integrated nutritional management, mulch, organic farming, and other technologies to improve conservation. Here are some examples of the application of horticulture technology used to solve various problems on dry ground:

1) Horticulture cultivation through the application of organic and organic fertilizers

The provision of organic material is aimed at improving soil structure, thus increasing water infiltration into the soil, increasing water binding capacity, and making more efficient use of chemical fertilizers. The donation of BO will increase the C content of the soil. The carbon (C) of this soil will affect the properties of the soil, making it better. The presence of these elements in the soil will stimulate the activity of microorganisms, thereby enhancing soil drainage processes that have an effect on the increase in the volume of slow-drainable pores. (VPDnL). The application of organic fertilizer also needs to be supplemented with the addition of humic acid.

Efforts to apply technology to improve soil fertility in dry soil areas can also be done through the application of soil polishing materials such as biochar, zeolite, and blotong. Biochar is a solid organic residue obtained from partial lignin-cellulose carbonization derived from plants and biomass waste through pyrolysis. (pembakaran). The use of biochar, among other things, can be used as a soil fertilizer that has a significant effect on soil fertility by changing soil chemical, biological, and physical characteristics so that soil quality and growth of plants with harvest yields improve even in long-term use. Biochar does not interfere with the carbon-nitrogen balance and is able to hold and make water and nutrients more available to plants.

Zeolite is a natural inorganic soil fertilizer that is a hydrated aluminosilicate crystal mineral from cations and soil alkali. Zeolite has the following properties: it can carry out ion exchange, acts as a molecular filter, is a catalyst, can undergo dehydration and rehydration, and contains bases such as K, Na, and Ca. Zeolite is also known to increase nitrogen fertilization efficiency and can release microelements such as Fe, Zn, Mn, and Cu. In addition, the application of zeolite to the soil can improve the value of cation exchange capacity, increased water retention (0,05-0,43%), and cation conversion capacity. (0,5–5,8 cmol kg-1).

Blotong is a waste resulting from the disposal of garbage from the sugar plant. This material is solid mud that comes from rubber purification processes. The blotong can be used directly as organic fertilizer, as such material can serve to improve soil fertility by improving soil texture characterized by soil physical properties, in particular increasing water retention capacity, reducing the washing rate of harvest elements, and improving soil drainage. Another benefit of the blotong is that it functions to neutralize the influence of Al-dd, which can cause the availability of P in more available soil.

Biological fertilizers are living microorganisms that are given into the soil as inoculants to help plants provide certain nutrients to plants. Bio-fertilizers can boost plant growth and production in several ways, including by supplying fertilizers, either through direct fixation such as the fixation of nitrogen from the air or through the dissolving mechanisms of fertilizers such as phosphorus and potassium and synthesizing growth regulators (ZPTs) such as auxin, cytokinin, and giberelin. Fertilizers that contain only inoculants can also be called microbial fertilizers. (microbial fertilizer).

The application of organic fertilizers such as PGPR that have been enriched by Trichorderma sp. is an effort to improve the fertility of the soil. PGPRs that have enriched Trichoderma sp. are expected to play a role in boosting plant growth and play a part in mechanisms directly or indirectly through disease control to maintain plant productivity. The mechanisms occur directly through the fixation of nitrogen, the dissolution of phosphate, as well as the production of siderofores, phytohormones, and 1aminocyclopropane-1-carboxylate deaminases, whereas the mechanism is indirectly through the manufacture of antibiotics, hydrogen cyanide (HCN), and siderofore, ecological niche competition, and systemic resistance induction.

2) Giving the Mulsa

The treatment that can be done to modify the fertility and growth of plants on dry soil is by giving mulch. There are generally two types of mulch: synthetic and organic. Most synthetic mulches used by farmers are silver-black mulches with a silver side outside, which is black in its function. Besides, so that weeds do not grow, they can also keep the moisture in the soil so that the evotranspiration process is not too high. The effect of the use of black silver mulches on pumpkin crops can increase the growth and production of red pepper crops on dry soil.

3) Plant Pattern Settings

As for some cultivation pattern management that can be applied in dry land farming, include:

a) Agroforestry

Agroforestry is an optimal land management system. One of the agroforestry planting patterns known to society is the commonly known plant pattern in the West Java region, which combines different types of crops so that the entire surface of the soil is closely covered by plants and the fruit can be harvested continuously. In addition, the advantages of this system are the addition of organic material from the trees, reduction of evaporation and transpiration, decrease of weed growth, deep silver, which plays a role in improving the harvest cycle, increase of some harvest compounds such as the presence of leguminous plants grown with fruit plants, as well as reducing the risk.

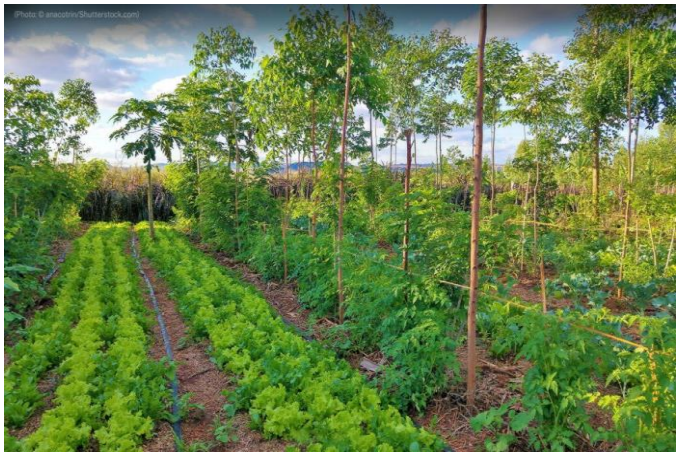

Figure 1. Agroforestry Pattern.

b) Cultivation of the Alley Croping corridor.

This planting pattern is a combination of row intercropping and strip intercropping. The legumanosae plant is planted in rows, and the seasonal plant is grown in stripes like a banana plant.

In this planting pattern, seasonal plants are planted between rows of tree-shaped or vertical leguminosae plants. Leguminoseae plants are periodically chopped, and their height is reduced to 75–100 cm to reduce the length. They can be used as mulch or livestock feed. (Pitaloka, 2018).

Figure 2. Cultivation of the Alley Croping corridor

c) Stage Title Planting Pattern/Multistorey Crroping

With a vertical-dimensional setting that approaches the forest ecosystem, i.e., on top of the title growth soil and in the root-growth soil with the intersection between the annual and seasonal plants. This pattern of planting titles is approaching forest ecosystems where trees of different heights and canopy shapes and different digging systems grow together, and at the bottom are planted various seasonal crops that have different types of growth. The upper layer will cover the lower layer.

The planting patterns developed by the farmers include:

1) Planting protective trees for shaded plants like coffee and cocoa.
2) Increasing the productivity of space use between and under commercial crops like rubber and coconut.
3) Enriching beetles by planting different kinds of plants, such as roots and bubbles.
4) Planting different types of crops with low inputs and little maintenance.

d) Irrigation System Repair

In dry-land farms, farmers generally use irrigation systems from artesis wells or other water sources that are still available. The available water is then watered onto the plantation grounds. This application is actually still inefficient because there can be a lot of water leaks, and high evaporation causes water to be unequal. Therefore, there is a need for water-saving irrigation technical efforts, especially in the rainy season, to more effectively maintain the sustainability of production and the productivity of commodities developed, for example, with the application of drip irrigation systems.

The basic principle of this irrigation system is to drain water with the help of gravitational aid pumps to the area of plant burning so as to minimize water loss due to percolation, evaporation, and surface flow, so it is very appropriate if applied in areas with very limited water resources. Using this system can save water consumption by up to 87%–95% and can save labor.

CONCLUTION

Dry land is one of the resources that has great potential for agricultural development, whether food crops, horticulture, farming, agriculture, or land fishing. (Alim et al., 2022). Potential resource development in agriculture on dry land, one of which is cultivating horticultural crops, is a supportive factor in increasing national food sustainability production.

Various barriers to the cultivation of horticultural crops in dry land can be overcome by applying horticulture cultivation technologies in dry land, which include cultivating horticultures through the application of organic fertilizers and bio-fertilizers, mulching, adjusting planting patterns, and improving irrigation systems.

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