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Journal of Nutrition and Food Processing

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Review Article

Agriculture High-Quality Development and Plant Nutrition

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Received date: February 06, 2025; **Accepted date:** March 05, 2025; **Published date:** March 18, 2025

Citation: Zhongsheng Guo, (2025), Agriculture High-Quality Development and Plant Nutrition, *J. Nutrition and Food Processing*, 8(4); **DOI:10.31579/2637-8914/299**

Abstract:

Modern Agricultural production want to efficiently produce plant products and benefits to meet people's needs. However, Because the excessive use of fertilizers and pesticides disrupts the balance of plant resource relationships, leading to soil degradation, vegetation decline, and crop failure or resource wastage. This not only affects the quality and yield of fruits but also hinders the sustainable utilization of natural resources and the high-quality development of crops. After a couple of years study, the results showed that Agricultural development went into agricultural high-quality development in 2017, which is to use effective measures or methods to maximize yield and benefits and meet the need of people's need for better Agricultural produce and a better life. The theory foundation of the sustainable utilization of natural resources and Agriculture high quality production is the resources use limit by plants, vegetation carrying capacity and critical period of plant resources relationship regulation. And the methods of Agriculture high quality development is to select excellent plant species or varieties based on site condition and market need before planting crop young plant and sowing seed, adopt appropriate initial planting density when planting crop young plant and sowing seed, and regulate the relationship between plant growth and resources need in the process of crop production in a timely and appropriate amount, specially the chemical fertilizer and pesticide to ensure plant grow well and obtain the maximum yield and benefits and realize the sustainable utilization of natural resources and achieve agricultural high quality development.

Key words: natural resources; clime change; sustainable utilization; chemical fertilizer; agriculture high quality development

1.Introduction

Agricultural development has gone through a long process. There are different kinds of agriculture concepts such as ecological agriculture (Li et al,2023), organic agriculture (Squalli & Adamkiewicz, 2023), smart agriculture and data agriculture and so on. Organic agricultural practices respond to and offer alternatives to the health and environmental problems related to conventional technologies and practices of production and embrace many alternative ideals such as alternative distribution and retailing networks and the counter-cultural wholefoods movement. But there still have some questions, such as soil degradation, crops shortfalls, fertilizer overuse, excessive use of pesticides, high cost and low economic benefit, which sever influence quality of fruit and benefit and are unfavorable for the sustainable utilization of nature resources and crops high-quality development.

2.Study method

In order to solve these questions and ensure the direction of Agriculture development and establish the new method to promote Agricultural development in the new era, Author reviews a lot of paper and find according to the efficiency of resource utilization by plants based on the innovation study(Guo et 1990, 2002,2003,2004,2009,2013, 2010, 2014, 2020, 2021, 2022, 2023), the whole process of agricultural development can be divided into three stages: Low level development stage or primitive agriculture, Level improvement stage and high-quality development new stage. The direction of Agriculture development is Agriculture High-quality development. Only in this way, land can produce more better and health food and service to meet the people's needs for a better life and crop types, yields and quality.

3.Results

3.1 The division of the process of agricultural development

Agricultural development has gone a long time. According to the efficiency of resources use, the whole process of agricultural development can be divided into three stages: Low level development stage or primitive agriculture, Level improvement stage and high-quality development new stage. That is the Low-level development stage or primitive agriculture, the Level improvement stage and Agriculture High-quality development.

3.1.1 Low level agriculture development stage

At Low level development stage or primitive agriculture, people pick up wild fruits and rely on nature for a living because science and technology are underdevelopment and people labor productivity are low. People must live on nature. Today in some African primitive tribe, you can see this

kind of Low-level agriculture development. However, with the economic and society development, this kind of Low-level agriculture development will disappear.

3.1.2 Level improvement stage

At the Level improvement stage, people start to select or cultivate better plant species, weeding, producing and applicating fertilizer and irrigating, if there are water resources, to increase food kinds, improving quality and amount of food. The turning point from the low level of development to the Level improvement is plant domestication and animal introduction domestication, the development of gathering economy to planting economy. There are some events such as overuse chemical fertilizer and the over dose application of pesticides and so on, which cause crops failure and resources waste happens, which is not good for Agriculture High-quality development but easily cause environment and healthy problem. In most of farmland, you can see this kind of agriculture development. Level improvement stage is a transition stage from low level agriculture development stage to agriculture high-quality development. With the economic and society development, this kind of agriculture development will be developing into Agriculture high-quality development.

3.1.3 Agriculture high-quality development

At the high-quality development new stage, people must take effective measures or method to get the maximum yield and benefit and produce more better and health food and service to meet the people's increasing needs for a better life and crop types, yields and quality. To carry out high-quality development, we must overcome the overuse chemical fertilizer and the over dose application of pesticides and so on in the production process to ensure sustainable use of nature resources and agriculture high yield and benefit.

3.2 The theoretical foundation of Agriculture high quality development

So, to carry out sustainable use of natural resources and agriculture high quality development, we must use the natural resources in sustainable way. The theoretical foundation of Agriculture high quality development is the natural resources use limit by plants, vegetation carrying capacity and

3.2.1 Natural resources use limit by plants

Natural resources are limit, so natural resources plants use is limit, the limit is resources use limit by plants is the controlling limit plants use natural resources, which changes with plant species and location (2017, 2021, 2023). The resources use limit by plants are expressed by the resources use limit by plants of indicator plant. The natural resources use limit by plants includes space resources use limit by plants, which is the natural resources use limit by plants in soil water and nutrient rich regions. The natural resources use limit by plants in water-limited regions is soil water resources use limit by plants (Guo 2010), and the natural resources use limit by plants in soil nutrient limited regions is the soil nutrient resources use limit by plants. For example, in semiarid loess hilly regions, natural resources use limit by plants is the limit of soil water resources use limit by plants, which is the soil water resources of 212.7 mm in the maximum infiltration depth of 290 cm when soil water content is equal to wilting coefficient in red plum apricot (Guo 2023). The indicator plant for original vegetation is dominate species, especially constructive species, the uppermost dominant species, which is native to the local region because for a long time they have developed a good relationship with the local condition. The indicator plant for non-Native vegetation is goal or cultivated plant species.

3.2.2 Vegetation carrying capacity

The vegetation carrying capacity is the ability of nature or land resources to carry vegetation in given time and space, expressed by the quality or plant density of indicator plant. The vegetation carrying capacity includes space vegetation carrying capacity, which is the vegetation carrying capacity in soil water and nutrient rich regions. The vegetation carrying capacity in water-limited regions is vegetation carrying capacity (Guo et al 2002, Guo and Shao 2003)), and the vegetation carrying capacity in soil nutrient limited regions is the soil nutrient vegetation carrying capacity. For example, the vegetation carrying capacity in water-limited region is soil water vegetation carrying capacity, which is the ability of soil water resources to carry vegetation in given time and space because soil water is the most important factor to influence plant growth, yield and benefit. Plant resources relationship is very harmony and plant grow well and bear fruit but the goods and service cannot meet people's need in the stage of primitive agriculture, a lot of original vegetation has been changed into non-native plantation such as Saskatoon berries, red plum apricot and corn in the semiarid region, China. some plant such as Saskatoon berries, grow and develop well, suitable for local climate, easy to develop. But another plant, such as corn and red plum apricot, they are not suited to the local climate and need to regulate plant resource relationships.

3.2.3 The critical period of plant resources relation regulation

Along with plant grow, plant canopy and root grow great, plant use more resources. Plant resources relation changes with time. When the resources plant use is equal to natural resources use limit by plants, plant resources relation enters the critical period of plant resources relation regulation, and the ending time of the critical period of plant resources relation regulation is the ineffective time of plant resources relation regulation, such as the ending time of fruit expanding for red plum apricot in the semiarid loess hilly region is Junly 15 (Guo 2022). At this period, vegetation carrying capacity will influence plant grow, which influence fruit quality maximum quality and benefit. The plant resources relation in the critical period of plant resources relation regulation is the most important time in the whole process of plant growth, fruit quality, yield and benefit cultivation, which is can be expressed by the amount of available natural resources in canopy or root zone. The carrying capacity in the critical period of plant resources relation regulation decides the maximum yield and benefit.

3.3. Method of agricultural high-quality development

We must select excellent tree species or varieties because species or varieties influence fruit nutrient, and take appropriate initial plant density (Guo 2014) because initial plant density influence plant growth, development and fruit nutrient and take effective measures to regulate the plant resources relationto ensure plant grow well and get the cultivated goal because the carrying capacity in the critical period of plant resources relation regulation decides the maximum yield and benefit. we must take the theories of resources use limit by plants, vegetation carrying capacity and the critical period of plant resources relation regulation as a guild, take weeding in time, apply fertilizer and so on. If the plant density exceeds the vegetation capacity, the plant resources relation should be regulated based on vegetation carrying capacity, especially the vegetation carrying capacity in the critical period of plant resources relation regulation, otherwise the further increase plant use natural resources will lead overuse of natural resources because available natural resources is more than natural resources used by plant, which will lead to the decline of vegetation and the decline of grain yield and quality (Guo et al, 2002; Guo & Shao, 2003, 2004, 2010, 2013; Guo 2014; 2021a and 2021b, 2023).

The vegetation carrying capacity is the function of plant species, time and location (Guo 2014,2021). For example, in water-limited region, vegetation carrying capacity is soil water vegetation carrying capacity, which is the ability of soil water nature resources to carry vegetation, which changes with plant species, times and location (Guo 2014, 2021, 2023).

4. Conclusion

We must take excellent tree species or varieties, appropriate initial plant density and effective measures or method to regulate the plant resources relation and ensure plant grow well and get the cultivated goal because.

Because of the large agricultural area and the increasing population, which has exceeded 8.2 billion at present, different regions have different climate and crops suitable for growth, so it is necessary to strengthen the research on the selection of excellent tree species or varieties, determination appropriate initial plant density, resources use limit by plants, vegetation carrying capacity and the critical period of plant resources relation regulation to ensure plant grow well and get maximum yield and benefit to realize sustainable use of nature resource and agricultural high-quality development and meet people's needs for a better life and crop types, yields and quality.

Acknowledgements

This project was supported by the National Science Foundation of China (Project No: 42077079,41271539, 41071193) and Study on high quality sustainable development of soil and water conservation (A2180021002). We thank two anonymous reviewers for their helpful suggestions.

Additional Information

Competing Financial Interests statement:

There are no competing financial interests

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DOI:10.31579/2637-8914/299