

Maintaining soil fertility and maintaining high and stable crop yields cannot be achieved without scientific and reasonable agricultural management measures.

This handbook introduces several technical models of soil quality protection and improvement through EU International Cooperation Project (Sino-European Farmland Soil Quality Evaluation and Improvement Technology, iSQAPER) survey, research and summary, and is currently being promoted at the Qiyang Red Soil Experimental Station of the Chinese Academy of Agricultural Sciences where several agricultural management measures adopted.

Qiyang Experimental Station



In recent years, the unreasonable application of chemical fertilizers has caused problems such as soil compaction and acidification, and reduced soil quality. With the national "weight loss and efficiency" principle, the organic planting model has been promoted. Agricultural management measures such as combined application of organic and inorganic fertilizers, application of green manure instead of chemical fertilizers, return of straw to the field, and different planting systems between rounds are not only in line with the national "weight loss and efficiency" policy, but can also improve fertility while maintaining food production. The organic combination of land use and cultivated land is an agricultural management method worth learning and promoting.

1. Soil rotation and fertilization in paddy field



Long-term positioning experiment of different paddy field planting systems (beginning in 1982), processing includes rice-rice-Zoyin, rice-rice-rapeseed, rice-rice-ryegrass, rice-rice-winter idle. Among them, the first two rotation modes can significantly improve soil fertility, reduce the use of chemical fertilizer by more than 20%, and produce high and stable crops.

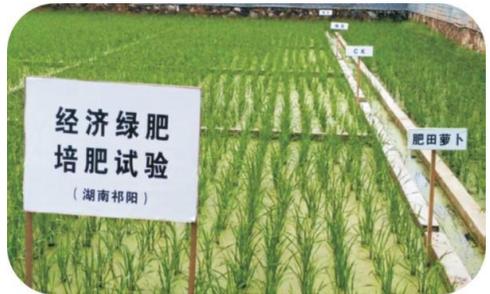


Different rotation and straw return patterns of red soil paddy fields. Compared with non-rotation and straw return, the yield increased by 15%, and the stability of production increased by about 20%.

2. Planting green manure in winter fallow fields



The planting of mallow in winter and fertilizing the soil can reduce the amount of chemical nitrogen fertilizer used in rice fields by about 25%.



Demonstration of economic green manure planting in paddy fields, fertilizing soil, and reducing fertilizer use



Demonstration of Green Manure-Hongping Farmland



Demonstration of combined soil fertilization with green manure and straw returning to the field

3. Green manure breeding ground-Ziyunying cultivation technology

Technical overview

Green manure is an important source of organic fertilizer in southern paddy fields. The so-called green fertilizer refers to a green plant body used as a fertilizer and contains various nutrients and organic matter such as nitrogen, phosphorus, and potassium. Planting green manure in winter can make full use of the water and heat resources in the second rainy season in southern Hunan. Promote the steady increase of grain production, quality and efficiency, and the healthy development of agroecology in southern Hunan and northern Guangxi. Vigorously develop green manure, especially leguminous green mangosteen, which can not only provide rich organic matter, but also fix free nitrogen in the air, enrich and activate mineral nutrients such as soil phosphorus and potassium, reduce carbon emissions, and effectively curb soil acidification. It is necessary to combine land use with cultivated land to achieve the purpose of sustainable agricultural development.



Green manure planting and pressure

Increase in production and income

Purple cloud acres produce 2,000 to 3,000 kg of fresh grass and can absorb 500 kg of carbon dioxide; 6 to 10 kg of fixed nitrogen (N); 5 to 8 kg of activated and absorbed potassium (K₂O). In the full flowering period, the total nitrogen content of the whole plant is 3.5-4%, the total phosphorus content is about 0.35%, and the total potassium content is about 3.7% -4%. Compared with winter leisure, green manure in winter can increase rice yield by 17% to 26%. Compared with rice-rice ryegrass and rice-rice-rapeseed rice, rice-rice yin can increase yield by 8% and 6%, respectively; purple yunying (1500kg / 667m²) can replace 20-30% of chemical nitrogen.



Demonstration field of long-term green fertilizer

Technical points

- i. Select the variety. As the saying goes, good seedlings are good. According to surveys, Xiangzi No. 1, Xiangzi No. 2, and Xiangzi No. 3 are suitable for planting in Hunan paddy fields.
- ii. Open the "three ditch". Paddy field damage is one of the important obstacles of Ziyunying. Before planting, "box ditch, enclosure ditch and main ditch" should be opened according to the standard. It is required that the bottom of the ditch is flat, the ditch is connected, and the drainage channel is connected so that water does not accumulate in the rain stop ditch.
- iii. Do a good job in seed processing. Prior to sowing, Ziyunying should be treated with seeds to improve the seed germination rate and make the emergence neat and stout. It mainly includes ① sun-seeding; ② soaking seeds; ③ 5 kg of calcium, magnesium, and phosphate fertilizers and 20-25 kg of soil mixed fertilizer per acre are mixed evenly, mix well with the dried seeds, and sow immediately after mixing.
- iv. Timely sowing. Ziyunying is usually sown in mid-September to early October. The sowing is premature, the rice-fertilizer symbiotic period is long, and the seedlings are weak. If the sowing is too late, it is susceptible to freezing damage and insufficient wintering seedlings.
- v. Turn over pressure at the right time and reduce fertilization in later season crops. Ziyunying should be pressed when the flowering period (more than two flowers) is in mid-April to achieve high yield and ensure fertilizer efficiency.



Large-scale planting of green manure in winter in Hunan paddy field

Matters needing attention:

- Green fertilizer replaces chemical fertilizer (nitrogen fertilizer), and the amount of chemical fertilizer, especially nitrogen fertilizer should be reduced in the later stage.
- Tillage (flowering period) in time to ensure fertilizer efficiency.
- It is advisable to control the amount of overturning at 1500kg / mu.
- After adding pressure, add appropriate amount of lime to adjust soil pH and accelerate decay.



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