

Analysis of the Effective Application of Straw Returning to the Field Measures in Arable Land Fertility Protection

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Abstract

Straw return to the field is a fundamental measure for increasing fertilizer and yield in the agricultural production process, which plays a positive role in the protection of arable land fertility. It holds an irreplaceable and important position in the process of modernization and technological advancement of agriculture in the new era. Taking the effective application of straw return to the field in arable land fertility protection as the main line, this paper expounds the application value and path of straw return to the field technology methods, and puts forward relevant suggestions.

Keywords

Straw Returning to the Field; Land Fertility Protection; Effective Application.

1. Introduction

China is a large agricultural country, ensuring the increase of agricultural production and income is not only related to national strategic security but also closely related to the production and life of the vast majority of the people, which must be highly valued. The issue of arable land has always been the core of agricultural issues, and the "red line of 180 million mu of arable land" defined by the state clearly shows the national attention to the protection of arable land resources. In the process of protecting the fertility of arable land, it is necessary to abandon the traditional wrong thinking, use scientific practice methods, and comprehensively adopt measures such as straw return to the field, policy inclination, and subsidy support to effectively improve the quality of land protection, maintain the area and high yield of arable land, and provide a strong guarantee for the bottom line of national strategic food security. Especially the straw return to the field technology and related measures have a positive effect on the protection of arable land fertility and should refine the related work to improve the comprehensive application efficiency of straw return to the field.

2. The Role of Straw Return to the Field Measures in the Protection of Arable Land Fertility

Straw return to the field, as the name implies, refers to a technical measure where the straw of crops "returns to the land," and it is also an important measure to increase the fertility and yield of the soil. With the increasing modernization and technological advancement of agricultural cultivation, straw return to the field measures have a unique strategic advantage and are an important sign of modern cultivation [1].

On one hand, protecting the fertility of arable land requires straw return to the field, which is the basic need for the recovery of soil fertility and the improvement of soil structure [2]. On the other hand, straw return to the field measures can avoid the hidden dangers of clearing crop residues, and to a large extent, reduce air and soil pollution, ensuring the stability of the regional ecological environment. In the current process of agricultural modernization, straw return to the field is a basic trend and has played a positive role in the construction of agricultural ecological civilization.

From a technical perspective, measures of straw return to the field can increase soil organic matter, improve soil structure, make the soil loose, increase porosity, reduce volume, promote microbial activity, and the development of crop root systems. In China's main grain-producing areas, such as the Northeast, Henan, Shandong, Jiangsu, and other places, measures of straw return to the field have been effectively implemented and have achieved good practical results. From the perspective of the vast number of farmers, scientific straw return to the field measures can reduce the cost of fertilizer expenditure, gradually improve soil fertility, and lay a good foundation for stable production and increased income.

In summary, in order to further enhance the fertility, fertility, and overall cultivation effect of arable land, it is necessary to implement straw return to the field measures. Adhering to scientific straw return to the field technology and measures as a guide has significant value for the protection of arable land fertility and should attract enough attention.

3. Specific Application Ideas for Straw Return to the Field Measures in Arable Land Fertility Protection

The core demand of arable land fertility protection is to maintain the fertility, output level, and income benefits of the arable land, which is also the basic guarantee for improving the productivity of the arable land. Promoting straw return to the field under the guidance of scientific concepts can effectively protect the fertility, ensure stable production and increased income, and reduce the consumption of fertility. Therefore, it is necessary to further implement straw return to the field measures and refine this work.

3.1. Conduct Field Cleaning and Promote Straw Crushing and Turning into the Field

Effective field management is the foundation of straw return to the field work and is also a basic requirement for protecting the fertility. After the harvest of crops, it is necessary to clean the fields and soil in a timely manner, mainly including the removal of crop straw residues, high stubble, etc., and not to use direct burning, "burning the base" and other extensive methods for cleaning. It is necessary to comprehensively use straw crushing and turning technology to promote the return to the field work, improve the crushing and turning effect, and ensure that the soil can fully absorb the organic matter released after straw crushing, to meet the needs of fertility recovery. Straw crushing and turning into the field technology is a more widely used and quite mature return to the field measure at present, which refers to the way of using mechanized crushing of crop straw to leave the crushed material in the arable land, and use agricultural machinery to directly turn it into the soil [3].

This way of straw return to the field is not only conducive to the soil fully absorbing the organic nutrients of the straw, but also not easy to appear soil compaction and other situations, which can well improve the physical and chemical properties of the soil and meet the basic requirements of fertility protection.

In addition, the fully turned soil can actually be fully integrated with the chemical fertilizer when planting later, ensuring the utilization rate of fertilizer while improving the soil moisture, meeting the growth needs of the next crop. From the perspective of arable land fertility

recovery, this kind of straw return to the field technology can also improve the drought resistance and salinity-alkali resistance of crops, ensuring better growth [4]. Therefore, straw crushing and turning into the field measures should be promoted on the basis of effective field cleaning to meet the needs of soil fertility enhancement, and better protect the fertility.

Straw crushing and turning into the field measures should pay attention to the following three points: 1) Grasp the amount and proportion of arable land straw, generally it is appropriate to return 200-300 kg of straw per 667 m². If the amount of straw is excessive, it is easy to appear "burning the ground, burning seedlings" phenomenon. 2) Straw crushing and turning into the field should be operated in conjunction with fertilizers, lime and other substances to ensure the recovery of fertility and eliminate the adverse effects of straw return to the field. Especially some nitrogen fertilizers should be applied to promote the decomposition of straw in the soil to avoid competition between decomposing bacteria and crops for nitrogen. At the same time, some lime can be added during the return to the field process to neutralize the organic acid substances produced when fresh straw is crushed and turned into the ground, and the amount of lime per 667 m² should be 30-40 kg to prevent poisoning and promote the decomposition of straw. 3) The timing of crushing and turning into the field should be grasped, and fresh straw should be the main focus to prevent some crop straw from drying quickly due to sun exposure, and the dried straw is easy to lose nutrients, which has an adverse effect on the effectiveness of returning to the field. Therefore, on the basis of rapid field cleaning, improve the efficiency of straw crushing and turning into the field, which is beneficial to the protection of fertility and the recovery of fertility.

3.2. Promote the Return to the Field Through the Belly and Piling, and Improve the Efficiency of Returning to the Field

Returning to the field through the belly and piling is also an important technical method of straw return to the field, which is generally regarded as an indirect return to the field measure. Compared with the direct mechanical crushing and turning after the harvest of crops, returning to the field through the belly and piling often takes a longer time and requires technical measures to intervene, which also has a positive impact on the protection of fertility.

Returning to the field through the belly is a more traditional rural straw return to the field method, which actually goes through a process from straw to livestock to soil. Returning to the field through the belly is to use straw as feed for animals, and the animals here are mainly common livestock such as pigs, cattle, and sheep raised by farmers. After the harvest of crops, the remaining straw in the animals' abdomen is absorbed and digested a part of the nutrients, in addition to sugars, proteins, cellulose and other nutrients, the rest becomes feces, and then after the operation of the farmers, the animal feces are applied to the cultivated soil, which can cultivate the fertility of the soil and there are no other side effects. Returning to the field through the belly actually achieves the dual purpose of "raising livestock and protecting the fertility of the soil," which is also a general way to deal with crop straw in rural areas. The technology of returning to the field through the belly connects the planting industry with the breeding industry, which actually conforms to the interests of farmers, and is conducive to increasing the organic fertilizer content of the soil, reducing the cost of agricultural production, and also reducing the use of feed and forage, which is also a great benefit to the development of the breeding industry.

Piling is also an important measure for the protection of fertility, which refers to the process of making compost, fermenting manure, biogas fertilizer, or fermenting the straw with microbial ripening fermenting agents into mature fertilizer. In agricultural production, when using straw, it can be crushed into 1-3 cm in length with a shredder, and then treated with water to keep it moist, while the water content of the straw should be controlled at around 70%. Subsequently, the mature organic fertilizer should be evenly mixed with the moist straw into a pile, and it

needs to be sealed with plastic film or mud on the top. After about 15 days, in a high temperature and humid environment, the piling fertilizer is basically formed. Piling is rich in a large number of nutrients required by the soil, which can be directly applied to the farmland, with high fertility, and is conducive to the rapid recovery of fertility.

3.3. Pay Attention to the Refined Management of Straw Return to the Field and Focus on Protecting the Fertility

In the process of promoting the protection of arable land fertility, it is necessary to include the refined control and management work of straw return to the field into the important agenda, continuously improve the efficiency and level of straw return to the field, reduce the loss in the process of returning to the field, and better protect the fertility. Research has proved that scientific and effective straw return to the field technology can generally increase the microbial elements of the land by 18.9%, and the activity of catalase can be increased by 47%, the activity of contact enzyme can be increased by 33%, and the activity of urease can be increased by 17%, and the overall yield of the land can be increased by 5%-10%, which is extremely prominent. However, if the operation method is improper and the technology of returning to the field is lacking, it may also lead to an increase in soil bacteria, an increase in crop diseases, and adverse phenomena such as seedling shortage (stagnant seedlings). Therefore, strengthening the scientific and technological guidance of straw return to the field, especially improving the implementation level of returning to the field measures according to refined control methods, has an outstanding impact on releasing the efficiency of straw return to the field [5].

1) Scientific and precise control of the amount and proportion of straw return to the field is required to ensure that the straw can play a role in enhancing the fertility and fertility of the land, rather than having the opposite effect. Taking the conventional crushing and turning into the field as an example, the straw returned to the field should not exceed 300 kg per 667 m², and at most should not exceed 500 kg, otherwise it is easy to affect the soil moisture and the absorption of nutrients, and is more likely to cause seedling burning, seedling death and other situations. 2) According to the condition of the arable land, grasp the timing of straw return to the field, carry out artificial intervention and water disposal in time, moderately increase the fertilizer and other auxiliary substances, so that the fertility and fertility of the arable land are maintained within a reasonable range. For example, some crop arable land can be harvested and buried at the same time, which can speed up the process of straw decomposition and decomposition, and make full use of the existing land water.

In addition, according to the soil moisture and fertility conditions, timely supplement water and fertilizer after straw return to the field, moderately add lime and other substances that help improve soil moisture, and enhance the comprehensive efficiency of returning to the field. At the same time, it is necessary to carry out effective screening of crops and straw, effectively clean up sick seedlings, weak seedlings and their straw, to prevent bacteria or other harmful substances from being turned into the soil, causing a decline in fertility, and bringing hidden dangers to the growth of the next crop.

4. Conclusion

Straw return to the field work carried out under the premise of arable land fertility protection must be steadily promoted in accordance with existing scientific and technological means, effectively improving the efficiency and level of straw return to the field, reducing the loss of straw nutrients, and ensuring the effective absorption and utilization of the soil. At the same time, against the backdrop of the national promotion of land fertility protection subsidy policies, straw return to the field work should further refine measures, pay attention to targeted implementation, and ensure that the relevant work conforms to the local soil fertility conditions, meets the needs of agricultural production, and produces the greatest benefits.

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