

Research on Ecological Improvement in the New Socialist Countryside Based on Imitative Biology Group System

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Abstract: During the process of building-up the new socialist countryside in China, ecological problems of all kinds have been rising one after another. Therefore, the comprehensive ecological improvement in countryside is a systematic project that is the main job of building a new socialist countryside. The paper, based on the ecological problems in countryside in China, from the perspective of imitative biology group system, with the help of ecology and the circular economy, raises a new model for ecological improvement in new socialist countryside, and presents a feasible suggestion to achieve a sustainable development of both ecological environment and economic society.

Key words: Imitative biology group system; New socialist countryside; Ecological improvement

1 Introduction

The building-up of the new socialist countryside is a historical task raised on the Fifth Plenary Session of the Sixth Central Committee. In the eleventh Five Year Plan, it was made clear that the objective and requirement of building a new socialist countryside is to devote to “developed production, rich life, civilized ethos, clean village and democratic administration”, which guides the current and the future build-up of a new socialist countryside.^[1] With the fastening development of modernization, environment in cities are improving. However, it should not be neglected that pollution in countryside keep emerging, which exerts a hindrance to agriculture and rural development. Therefore, to achieve the coordinated and sustainable development of rural areas, effective measures should be taken against ecological pollution. However, the traditional economy has imposed a pullback on the structuring of a new development model. How to implement the new development model effectively has become a key issue in the building of new socialist countryside.

2 Definition of Imitative Biology Group System

Under a normal ecological system, the energy flow and material flow have always kept a dynamic balance, endowing it a self-regulation ability to free from systematic and environmental destruction. This system is mainly composed of various kinds of biology groups, which would be called function unit when combined together. This function unit means a organized, regular co-existence among biology groups, rather than a random distribution of each biology group.

The following flow chart shows how the self-purification system works. The system consists of botany, animals and various kinds of microbe, which, through the regulation of quantity and quality, form a balanced relationship in the biological system.

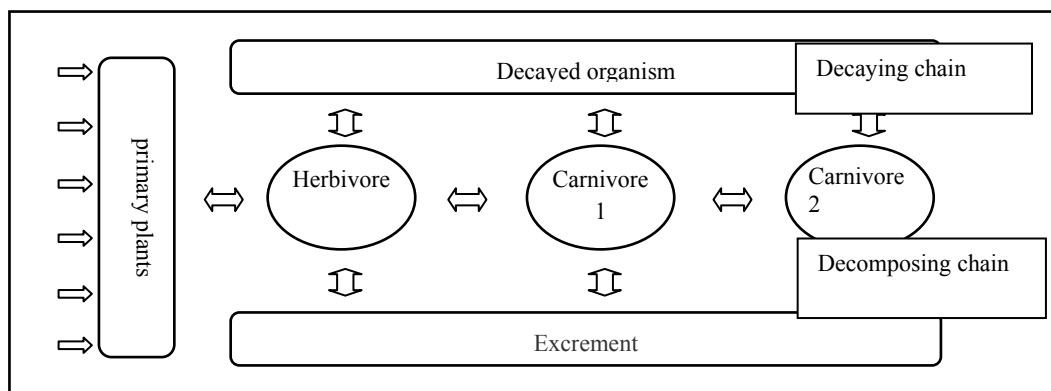


Figure 1 The Self-Purification System of Fine Biology Group

Biology groups, especially the fine biology groups, have been living on fixed land for thousands of years, but they have exerted no harm on the environment. Instead, they have contributed to the

improvement of ecological environment of the earth. This is the result of its inner circulation system and ideal self-purification system, which contributes a lot to the organized combination of "production, consumption, and purification". This inspired us with a new idea to build an environment-improvement system based on imitative biology group system. However, we shall never fail to notice the big differences between human hood and biology group. And what we can learn from the biology group system is only a small fraction. Therefore, considering the differences, we name the new system as an imitative biology group system.^[2]

3 Status Quo of Ecological Problems in the New Socialist Countryside

Resource and environment concern the existence and development of the human hood, as well as the society. However, with the rapid advancement of Chinese economy, human's insatiable material needs for resources have imposed an adverse effect on the environment, leading to the intensified contradiction between human and nature, as well as among human themselves. As a result, environment pollution has become a bottleneck for the economy development. On the macro level, such problems as degradation, reclamation, desertification, deforestation, grassland degeneration, extinction of species are getting more and more serious.^[3]

While on the micro level, as in the case of the rural areas, the rural environment suffered greatly from various pollutions, such as pesticide, chemical fertilizer, manure crop-straw burning, companies waste, urban trash, rural water pollution, and air pollution and so on. In summary, in rural areas, the environment is fragile to any pollution, and the situation is getting worse. With the worsening environment, the land productivity has decreased, leading to a reduction of agricultural output, poor quality of agricultural product, which exert an adverse effect on agriculture, people's well-being, intensified social problems and on the whole, on the build-up of harmonious society, as well as the whole and the future generation.

In the imitative biology group system, through the comparison between Chart 1 and the current rural environment status, we can see that the manure and crop-straw burning pollution could be turned into nutrition through the decaying and decomposing chain. Therefore, it is of great significance to make full use of the imitative biology group model to improve the environment.

4 Causes of Environment Problems in the New Socialist Countryside

4.1 Extensive management of modern agriculture gives rise to the heavy burden on self-purification

The agriculture production model has shifted from traditional to modern model, and from nature-friendly to nature-hazardous model. Firstly, excessive use of fertilizer and pesticide has become one of the most important factors for environment pollution. In 2010, the use level of fertilizer and pesticide was respectively 47 million and 1.3 million tons, topping the list in the globe^[4]. Due to its excessive and ineffective use, more than 15 million tons has drained outside the land and to the lakes, ponds, rivers and so on, adding to an over-nutritious environment, which boosts the growing of algae. The consequent lack of oxygen leads to the death of aquatic life. This kind of environment in rural areas is widely different from that in urban areas. Secondly, as a result of booming agriculture in plastic shed, pollution from the plastic film is worsening day by day. Up till now, there is about 500 thousand farm film left in the land, accounting for 40% of the total farm film^[5]. In the recent 20 years, the use level of farm film, and the coverage rate have topped the list in the globe. Thirdly, pollution from husbandry bears no neglect. With the fast development of domestic poultry, various kinds of wastes from poultry have been generated. Without any regulations and rules on their control from our country, and lack of environment-protection awareness from the farmers, and as a result of insufficient experience and measures against pollution-control, the pollution from husbandry has risen to the third largest pollution source, after industrial pollution and daily waste. Inappropriately handling with crop-straw is also exerting great harm on environment. Each year, the yield of crop-straw amounts to 650 million tons, the majority of which is burnt on the land. As the crop-straw is always under-burnt, large quantities of smoke is generated, increasing the amount of CO₂ and CO₁ in the air, to the effect of increasing the density of greenhouse gases. This does great harm to the air, as well as people's health.

4.2 Separation of husbandry from planting shortens the circulate route of energy-transforming in the rural ecological system

The traditional husbandry is based on the decentralized family-dependent mode. Therefore manure from poultry can be dealt properly through irrigating the land, forming a benign circle. This kind of

management mode contributes to a balanced ecological system in the rural areas. However, with the rapid development of husbandry, and the trend to expand to suburb areas, the farming and the husbandry come apart, and finally separates from each other. If the farmers refrain from cultivating the land, the manure from poultry can not be properly disposed and precious manure can not be made full use of. Besides, with easy access to fertilizer, farmers feel reluctant to spread manure. Therefore, the manure is left everywhere, causing damage to the local environment. In 2008, the number of raised pigs and raised cattle is respectively 1 billion and 100 million. It is estimated that, taking all the poultry like pigs, cattle, and sheep into consideration, the manure generated accounts to almost 3 billion tons. And COD generated accounts to 89 million tons, far surpassing the total amount of COD generated from industrial waste water and daily waste water (13.818 million tons). As a result of broken chain between planting and husbandry, the manure, organic waste water, pathogenic micro-organisms, pesticide residue and so on are directly discharged to rivers, lakes, or are dumped at will, bringing great harm to water resources, soil and the air.

4.3 Over-population breaks the balance of cash flow, energy flow and resources flow in rural ecological system.

To purchase production material and employ labour, the dealer is in-putting certain amount of materials, as well as cash. Energy and material flow go opposite with cash flow. Cash flow and resource flow, as well as energy flow can, through price adjustment, price allowance, and price refrain, be adjusted^[6]. When dealers produce something using resources out of their power, there is energy and material input, but no cash input. While dealers discharge wastes, there comes energy and material outflow, but no cash outflow. In cases of using environment and public resources, there is no cash outflow.

As far as rural ecological system is concerned, too much energy and material flow out of the system is flowing into the inner system, while too little material and energy flow in the system is flowing out of the system, causing a stagnancy in the system and the consequent environment problem. When the land is scarcely populated, people get product from ecological system, and the organic waste is put into use in the next ecological recycle. With the expansion of industrialization and urbanization, the cities become over-populated, and the organic waste is too much to be disposed fully in the ecological system. Biological fertilizer is under-invested in the land. Instead, chemical fertilizers are universally applied, causing the environment pollution.

All in all, various factors contribute to the environment problems in rural areas. Economically speaking, factors include but not limited to under-developed and inappropriate-developed economy; politically speaking, factors include but not limited to dual economic structure of urban and rural areas and inadequate government management; mentally speaking, factors include the "economy-priority" value of some farmers, weak awareness of environment protection and so on. In a nutshell, the ecological problems are essentially "a imbalance between human and nature". The biggest problem lies in the contradiction between population and land, which sparks a series of problems like vegetation degradation, soil and water loss, deforestation, lack of water resources, land and water pollution and etc.

5 Exploration on Environment Improvement in the New Socialist Countryside

From Figure 1, we can see the close relationship between different biological groups. For the organism in decomposing chain and decaying chain, on one hand, they receive nutrition from the decayed and the manure; on the other hand, they provide nutrition back to the primary producer or herbivore and carnivore by growing up. This shows that they are not only consumers but also producers, producers without consuming energy from outside. Obviously, this agrees with the building-up of new socialist countryside.

According to food chain of fine biology group, we should change the development model from resource-intensive one to a resource-conserved, environment-friendly one which combines the economical, social and ecological benefit together, so as to build a recycling model for agriculture. And we should also shift from high-consumption and high-pollution extensive model, namely "resources - product - pollution", to environment-friendly and society-harmonious model, namely "resources - product - renewable resources". That means we should promote the materials' inner-recycling to assure the clean production and healthy consumption, free of chemical residue, so as to achieve a sustainable development in the new socialist countryside.

5.1 Multi-level model of resources-using

The recycling agriculture holds that resources should be used in a multi-level, multi-function way.

The biological system centers around a bio-chain in the shape of chain and net, in which energy and resources flow and transform among various biology, to the effect of benefiting the farmers. Take the eagro-sylvo-pastoral system for example. The planting provides feed for husbandry and crop-straw; husbandry provides organic fertilizer for planting and forestry; forestry provides feed for husbandry, forming a benign circle for the ecology. (As shown in Figure 2) Planting supplies feed for husbandry; husbandry and planting supply fuels for methane tank; the methane water can feed the fish; methane residue and pond soil feed the land, also forming a benign circle for ecology. In both ways, we can achieve both economic benefit and ecological benefit without too much financial investment.

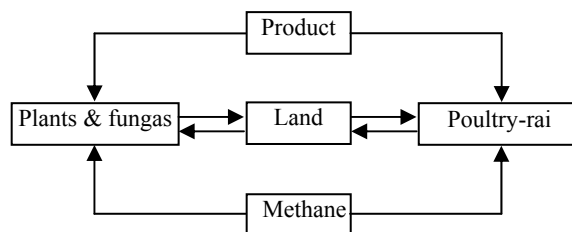


Figure 2 Multi-level Model of Resources-Using

5.2 Multi-function comprehensive recycling model

The multi-function comprehensive development is another recycling model, which makes full use of various factors and resources in both suburb and urban areas. For example, the satellite town in suburb areas functions not only as a production base for vegetables and fruits, but also an ideal place for industrial production, purification and living districts alike. However, with the development of both industry and population, “waste gas, waste water, industrial residue” are harming the rural environment greatly. Therefore, it is advised to build a recycling agriculture and to promote a multi-function comprehensive recycling model. In this model, the waste water and solid waste are processed to be used as agricultural resources. One way is to build a biological dissolving pool and purify the waste water for future use. The processed water can be used to raise hydrophyte. In this way, the hydrophyte can successfully dissolve and transform the waste in the metabolism, and the waste can finally serve to people’s needs, while the purified waste water can be irrigating the land.

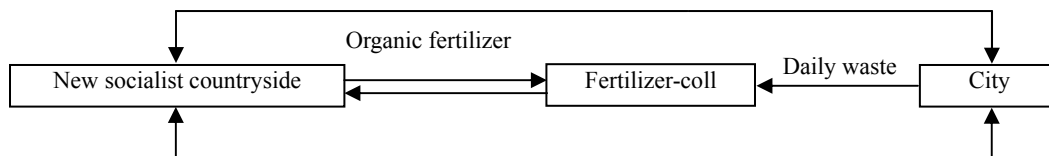


Figure 3 Multi-Function Comprehensive Recycling Model

5.3 bio-energy-based recycling model

Bio-energy greenhouse can keep its temperature to the needs of plants and animals, through the combined effects of organic biology with high C/O ratio like crop-straw, and of organic biology with low C/N ratio like excretion, and of the heat in the fermentation, and of the heat from the sun^[7]. For instance, after the glycolysis in the bio-energy greenhouse, biofuel is produced, serving as fine fertilizer for the agriculture. The biofuel works in an intensive and effective way to provide large quantities of micro-element to the benefit of crop-growing, as well as micro-biology to the good of nutrition. The biofuel boosts in its reputation as fine organic fertilizer, and during the fermentation, it can kill virus and weed seed in crop-straw and excretion. The biological-energy-greenhouse-based recycling agriculture model (As shown in Figure 4) is simple in structure, cheap in cost, and effective in reducing weed, virus, as well as environment pollution.

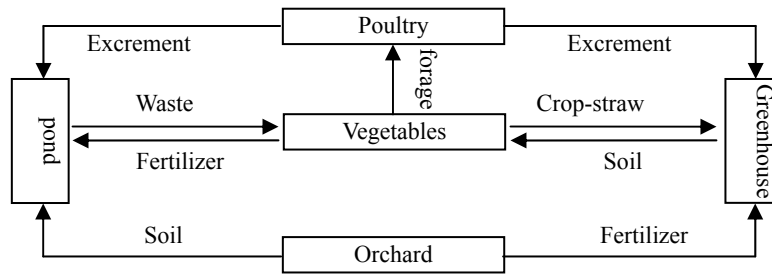


Figure 4 biological-energy-greenhouse-based recycling agriculture model

5.4 Ecological-courtyard-based tourist economy model

With the development of rural tourist, it is feasible to promote a resources-recycling model in new socialist countryside, combining planting, husbandry and methane tank. In this model, methane is in a key position to relate planting, husbandry and tourist. The value generated far surpasses that of the single combination of planting and husbandry. Besides, using pollution-free methane is helpful to avoid those potential pollutions from tourist. (Refer to Figure 5)

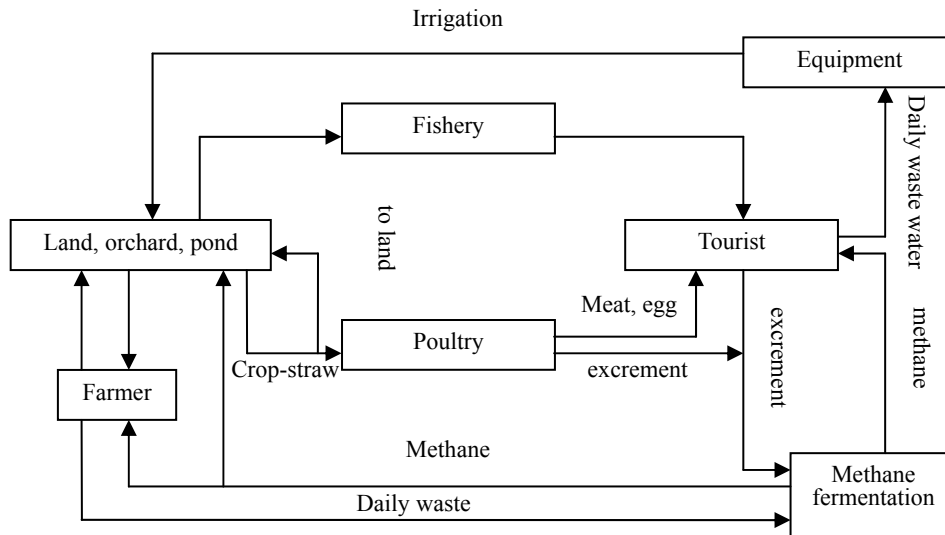


Figure 5 Ecological-Courtyard-Based Tourist Economy Model

It applies multi-level usage of biology, and lengthens the food chain by combining planting, husbandry and methane tank. In this model, all the biology rely on and makes use of each other so that resources can be used time after time, achieving a benign circle between production and economy. To be more specific, it works like this. Firstly, besides planting, we process agricultural product in a family-based business way, the heels of which will be fed as the fodder for poultry. Secondly, near the methane tank, we build pigsty and pheasantry, whose excrement will be partly feed the fish, and mostly flow to the methane tank. Thirdly, the methane will be applied to daily lighting and cooking, and will be used to light and heat pheasantry, while the methane residue will be feeding the land and the fish alike. In this way, sufficient organic fertilizer is produced, without any chemical fertilizer, and the production cost is effectively reduced and the land is well preserved.

6 Conclusion

Based on imitative biology group system, the recycling model of economical development in rural areas has been proved to exert a positive effect on increasing farmers' income, improving ecological environment, and promoting the sustainable development in rural areas. The model is an effective and indispensable way to "developed production, rich life and clean village". The importance should be attached to how to effectively implement the model. Considering the traditional model of development and the farmers' conservativeness, the government should play an active role, so as to engage the

farmers into the implementation of the new model, and to achieve a balanced and sustainable development in the rural areas.

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