

New Developments in Livestock Systems based on Crop Residues in China

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Abstract

Since 1992, when livestock based on crop residues was included in the State Agriculture Comprehensive Development Project, significant progress has already been made.

A. A number of State-level demonstration 'counties' with cattle-raising based on crop residues have been established. By 1996, the number had reached 147 counties. Some concentrated and adjoining areas have already developed into demonstration 'prefectures'.

B. Demonstration projects expanded to include sheep-raising, also based on crop residues. Between 1995 and 1996, the State ratified 20 demonstration counties with sheep-raising based on crop residues.

C. Large scale extension campaigns have been carried out on the crop residue treatment technique. In 1995, crop residue silage (anaerobic fermented and preserved corn or sorghum straw without heads and ears) reached 75.1 million tons nationwide and ammoniated crop residues, 21.5 million tons. Together they saved about 19.8 million tons of feed grain. 7 million farming households adopted the ammoniated crop residue technique.

D. There has been a large increase in beef and mutton production. In 1995, beef production reached 4.1 million tons, an increase of 25.1% compared to 1994, fulfilling the Eighth Five Year Plan target by 275%, and becoming the most rapidly growing item in livestock products. For 1996, beef production is forecasted to exceed 5 million tons, and mutton

to reach 2.6 million tons, with a continuing high growth rate.

E. Livestock systems based on crop residues provide 1 billion tons of organic fertilizer, which can support 20 million hectares of farmland, not only lowering grain production costs, but also promoting the development of sustainable agriculture.

KEY WORDS: Crop residues, cattle, sheep, straw, urea, silage, manure, China

Historical Origin

In the last ten years, China's grain production increased by only about 1% annually, but the growth of animal production averaged about 10%. It is obvious that China's grain production can definitely not bear the rapid growth of livestock. The only option is to utilize feeds other than grain, and to establish a grain-saving livestock structure. In the mid 80's, the Ministry of Agriculture (MOA) began establishing demonstration sites for the utilization of crop residues as feed and, in 1987, FAO implemented the TCP project in China for the utilization of crop residues as feed. Both were successful.

In 1990, Guo Tingshuang and 13 other specialists submitted a statement to the Central government, proposing the development of livestock systems based on crop residues to ease the problem of insufficient grain supply in China, to greatly increase beef and mutton production and to partly replace pork. Previously pork made up 80% of consumer meat supply. Beef and mutton would also improve the meat supply structure of the population. This proposal received great attention and approval. In 1992, the State Council ratified the implementation of a demonstration project for cattle raising based on crop residues and 10 State-level demonstration counties were established. This undertaking developed rapidly. By 1996, the number of demonstration counties increased to 147 in 29 provinces.

In 1995, the State extended the successful experience with cattle rearing to the sheep sector. In the same year, the first batch of 6 State-level demonstration counties with sheep (or goat) rearing based on

crop residues were established and another 14 were set up this year. Thereafter, sheep production began to develop rapidly in cropping areas. A census showed that, in the first nine months of this year, the total production of mutton reached 1.2 million tons, 34.4% higher than for the same period last year. From now on, both cattle and sheep will be included in the project. In October 1996, the State Council has officially issued the National Development Programme for Livestock based on Crop Residues 1996-2000 and it is now not only the responsibility of the MOA but also an established national policy.

From 1992 onwards, the State Council entrusted the MOA to convene four national conferences to implement the work. 200 million yuan were allocated by central and local governments to be used for the project. At the same time, funds raised by farmers for the same purpose reached well over 10 billion yuan. Urea and polyethylene film were also provided to support this work. FAO and UNDP attached great importance to these projects and supported the work with experts and material resources. In 1993 and 1995, FAO (in cooperation with MOA) convened two International Conference on Increasing Animal Production from Local Resources in China and some FAO specialists and consultants were sent to China to give instruction (Rene Sansoucy, F. Dolberg, E. Orskov, J.C. Chirgwin, F. Sundstol and others). With the efforts of FAO and the Chinese Government, great progress has been made in China.

Major Accomplishments

A. Increase in Beef and Mutton Supply

Between 1992 and 1995, beef production increased by 27.8% annually. By 1995, beef production reached 4.1 million tons, over-fulfilling the Eighth Five Year Plan target by 275%. For the first nine months of 1996, beef production increased by 29.6% compared to the same period last year, and is forecasted to reach 5 million tons by the end of the year. By extending the same principle to sheep (and goat) rearing, China has also increased mutton production which was previously stagnant. The annual growth was 9.9% in 1993, 17% in 1994, and 22% in 1995. In the first nine months of this year, mutton production increased by 34.4% compared to the same period last year.

By developing livestock based on crop residues, vast cropping areas have already taken the place of pastures, and are rapidly developing into China's main base for ruminant production.

B. Economizing on Feed Grain

China produces about 570 million tons of crop residues annually, of which about 25% is used as feed. In 1995, 75 million tons (fresh weight) of crop residue silage (anaerobic fermented and preserved corn or sorghum straw without heads and ears) were produced, together with 21.5 million tons of ammoniated straw and stover (Table 1), thus saving nearly 20 million tons of feed grain (calculation of grain-saving is based on the so-called "oat feed unit": 1kg of dry straw equals to 0.2 unit; 1kg of ammoniated straw equals to 0.4 unit; 1kg of fresh straw silage equals to 0.15 unit).

Table 1: Number of farmers treating straw and quantities of treated straw

Year	Farmers (Million)	Treated Straw (Million tons)
1990	0.8	2.6
1991	1.2	3.7
1992	2.3	7.1
1993	3.8	11.7
1994	5.3	15.9
1995	7.1	21.5

C. Integration of Livestock with Grain Production

Rearing cattle in cropping areas can provide 1 billion tons of farmyard manure which can support 20 million hectares of farmland. The extensive use of farmyard manure can reduce the use of chemical fertilizer, thus not only lowering costs but also improving soil conditions and promoting agricultural production. Fuyang in Anhui Province and Zhoukou and Shangqiu in Henan Province are areas with well established systems of cattle rearing based on crop residues. In recent years, their agricultural

growth rate has been well above the national average. Formerly deficient in grain, they are now rapidly achieving grain surpluses.

D. Growth of Industry

The rapid development of cattle and sheep rearing has promoted the growth of the slaughter and meat processing industry, leather processing, and also bone, blood and viscera processing, giving impetus to the marketing of live animals and their processed products. The result has been to provide more jobs in the urban and rural areas, benefiting the farmers, increasing revenue to local governments and putting new vitality into the agricultural and village economy.

E. Disease Prevention and Reduction in Environmental Pollution

Many places along the Yangtze River are schistosomiasis endemic areas. Cattle grazing near the river (as well as lakes and water holes) become parasite hosts. Utilizing ammoniated crop residues to feed cattle, and moving from grazing to stall feeding, breaks the schistosome cycle and helps to control the spread of disease. Also, utilizing more crop residues helps to avoid atmospheric pollution from burning crop residue which is a problem in highly populated areas.

Development Prospects

Although the project of livestock based on crop residues has already achieved impressive results, from the point of view of the extent of resources and the vast market potential, the achievements gained can only be considered as a good beginning. Every year, 570 million tons of crop residues are produced. Up to now, only 25% has been used as feed. Last year, the per capita consumption of beef was only 3.42 kg and less than 2 kg for mutton. The aim is to speed up these developments. In October 1996, the State Council issued the National Development Programme for Livestock Based on Crop Residues 1996-2000 (Outline). Henceforth, the system of livestock based on crop residues became the responsibility not only of the agriculture institutions, but a basic national policy. We can forecast an even greater rate of development in the future.

There are now outline plans to establish 20 demonstration prefectures

nationwide, and 400 demonstration counties (250 for cattle and 150 for sheep and goats).

The Outline provides that, by the year 2000, China's beef production will reach 7 million tons, or hopefully 10 million tons. Mutton production will reach 3 million tons, aiming to reach as high as 4 million tons. By then, the proportion of beef and mutton within the total meat production of China will be raised to 20% or so from the present 12%.

By the year 2000, the proportion of crop residues utilized for feed will be raised from the present 25% to about 40% (or 240 million tons). Crop residue silage will reach 120 million tons and ammoniated crop residue 60 million tons, together saving about 40 million tons of feed grain. The ammoniation technique will be extended to 20 million farming households.

By the end of the century, the number of cattle at the year end will reach 167 million head, with 300 million head of sheep and goats. Cattle, sheep and goats would produce 2 billion tons of organic fertilizer annually, which can be used on 40 million hectares of farmland. With the use of large quantities of manure, soil will improve and large areas of stable high yielding farmland will emerge.

Main References

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