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Grassland resources in Liaoning province of China : problems and management strategies

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Key words : natural grasses , artificial grasses , Liaoning province , management , policy

Introduction Liaoning province is located in the transitional region between the Mongolia Plateau and the eastern coastal region of China . The area is characterized by mixture of agriculture and forage production . The province possesses a relatively large area of natural grassland and the climate and regional eco-environmental conditions are favorable for development of artificial grasslands as well . The quality and use of the grassland in Liaoning are , however , at low levels . This problem seriously prevents development of the livestock production . This presentation aims to suggest effective strategies for improving grassland economy on the basis of evaluating the grass resources distribution in Liaoning .

Distribution and conditions of the grassland resources The total area of natural grasslands in Liaoning is 3,389,000 hectares , occupying 23.2% of the total land area of Liaoning province . About 95% of the natural grassland resources are currently being used . As shown in Figure 1 , the areas of the grasslands with high productivity (Grades 1-3) are much smaller , and those with middle quality are bigger (Grades 4-6) . Recent investigations showed that there are near a thousand of grass species in Liaoning . More than 320 species have excellent characteristics , which include more than 120 species of leguminosae grasses and more than 100 gramineae plants (Du , 2006) . The grass resources in Liaoning are estimated to be able to provide feedstocks at most for 2.026×10^4 cattle years . There are , however , about 6×10^4 cattle years in Liaoning now . Serious overuse of the grassland has caused rapid degradation of the grassland quality . At present , about 90% of the grassland is degrading , to various degrees . The current production ability of the grasslands is only equivalent to 30% to 70% of that shown before 1982 . Thus far , about 13% of the grasslands in Liaoning have been desertified and/ or salinized (Zhuang , 2003) . The artificial grasslands in Liaoning mainly consist of agricultural herbaceous plants . On average , 157,000 hectares of artificial grassland were maintained annually during the period from 1996 to 2005 . In 1997 , the artificial grassland area increased to 191,000 hectares , followed by a decrease in the subsequent years until 2003 . In 2005 , there was about 181,000 hectares of artificial grassland . The artificial grasses are mainly planted in the western region of Liaoning which is mostly hilly and lacks forest , thereby appropriate for developing large area of grasslands . Artificial grasslands in Liaoning can be categorized into two types : forage grasses and non-forage grasses . Forage grasslands accounts for 45% of the artificial grasslands , and the remainder is non-forage grasslands . Forage grasses include forage corn and sorghum . Non-forage grasses are comprised of alfalfa (accounting for about 32% of the total area of the artificial grasslands) , Erect Milkvetch (11%) , Sweetclover (4%) , and others (8%) .

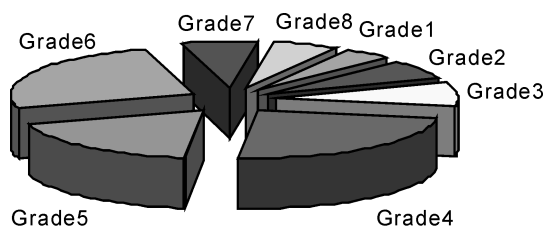


Figure 1 Grade distribution of natural grasslands in Liaoning province .

Management strategies Grassland management can be improved by implementing the following strategies . First , grass biological research should be strengthened to increase development and application of grass technology . The technology includes efficient seeding , disease control , land resources conservation , livestock development , animal breeding , and biomass processing . Second , grassland management should be driven by economic marketing . For instance , the eastern and southern regions of Liaoning , where economy is well developed , should increase artificial grassland area by adjusting the rural cropping structure , whereas the northwestern region , where the economy is poorly developed , should protect the existing natural grasslands and increase restoration of natural grasslands from croplands . All these adjustments should be centered on realization of concurrent improvement of regional ecological conditions and economic benefits . Last , grassland management policy should be further consummated . (clarify what is meant by consummated ? What grassland management policy is being referenced here ?)

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