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Who's carrying capacity ?

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Key words : carrying capacity , double contract policy , stocking rate , arid and semiarid rangeland , Inner Mongolia

Introduction In arid and semi-arid rangeland of Inner Mongolia , carrying capacity (CC) management at household rangeland scale has been implemented forcibly by the government since the 1980s when (livestock and grassland) Double Contract policy was initiated . The stocking rate for each household was indicated in the contract that was signed between the government and each herder household (Li et al , 2007) . Nevertheless , CC management has never been accepted by herders , and they never think it's their CC . So often , the government complains that herders don't follow the contract to control the number of their livestock within the required stocking rate , and it has thus been deduced that current rangeland degradation resulted from failure of CC control . What does CC mean to herders ? If it's not their carrying capacity , whose carrying capacity it is ?

Methodology The aim of this paper is to answer the above questions by analyzing who needs a carrying capacity from a political perspective , how it's be calculated ecologically , and why it is not accepted by herders .

Analysis and results Governments always intend to simplify and standardize management of nature and people , from so called "scientific forestry" (Scott , 1998) to intensive livestock breeding and herder settlement in arid and semi-arid rangeland . In this way , politically they feel safe and administratively they can save cost . CC management is proposed in the same ideology by governments . They believe deeply that grassland degradation trend could be converted through technological means , and those technicians could calculate the exact stocking rate for each household rangeland . If the number of livestock in each household rangeland was controlled under the calculated CC , it would be easy to manage and utilize the pasture in a sustainable way . But for pastoralists , instead of adjusting the number of animals , they tend to adjust time , season and area of use to manage stocking rate . So it is the government's carrying capacity , while not the herders .

The stocking rate is calculated through measuring above-ground biomass under guidance of ecologists . They fail to consider that it is doubtful that carrying capacity is a meaningful concept for the non-equilibrium systems of arid and semi-arid Africa (Ellis and Swift , 1988) , that it can rarely be accurately measured (de Leeuw and tothill , 1993) . For herders , it's the ecologists carrying capacity .

Moreover , the opportunity cost will be higher for herders to follow a fixed or conservative stocking rate than adopting flexible strategy , which is one of the root reasons why carrying capacity management can't be accepted by herders . If a fixed stocking rate was adopted , in rainfall abundant years the rich forage can not be fully utilized , while in drought years overstocking still couldn't be avoided (Behnke and Scoones , 1993) . The more rainfall , the higher the opportunity cost if a fixed stocking rate is adopted .

Conclusions It's the government's CC and the ecologists' CC rather than the herders' . The stocking recommendations so derived can't be implemented by herders due to the high opportunity cost . Finally , we have to realize that technical solutions and scientific management may not only be not useful to local development , but they may be harmful to herder subsistence in arid and semiarid rangeland .

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