Original Research Article

Extreme weather prevention and crisis management in Xinjiang pasture based on environmental monitoring

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Abstract: The environmental monitoring, extreme weather prevention and crisis management in Xinjiang pasture are discussed in depth. Due to its special geographical environment and climatic conditions, Xinjiang animal husbandry production is facing many challenges, especially the threat of extreme weather events. In order to ensure the sustainable development of animal husbandry and the safety of herdsmen, this paper proposes a series of targeted measures to improve the response of Xinjiang pastures to extreme weather, studies the environmental characteristics of Xinjiang pastures and the impact of extreme weather, and puts forward the corresponding monitoring methods and crisis management strategies.The research results show that the establishment of a perfect environmental monitoring system, formulating a scientific early warning mechanism, strengthening the infrastructure construction and improving the response capacity of herdsmen are the key measures.

Keywords: Xinjiang pasture; Environmental monitoring; Extreme weather; Crisis management and early warning mechanism

1. Introduction

Xinjiang is one of the important pastoral bases in China. Due to its unique geographical environment and climate conditions, animal husbandry production in the region faces many challenges, especially the impact of extreme weather events. In recent years, with the intensification of global climate change, the frequency and intensity of extreme weather events have been increasing, posing a serious threat to Xinjiang's animal husbandry production. It is of great significance to conduct environmental monitoring and crisis management research on Xinjiang pastures in order to ensure the sustainable development of animal husbandry and the safety of herdsmen's lives. This article studies the environmental characteristics of Xinjiang pastures and the impact of extreme weather through field investigations and data analysis, and proposes corresponding monitoring methods and crisis management strategies, in order to provide scientific basis for the stable development of Xinjiang's animal husbandry.

2. Analysis of environmental characteristics and impact of extreme weather

2.1. Environmental characteristics of Xinjiang pasture

The environmental characteristics of Xinjiang pasture are mainly reflected in the following aspects:

Complex and diverse:Xinjiang pastures are mostly distributed in the mountainous areas with high altitude and the flat and open grassland areas, such as the surrounding areas of the Tianshan Mountains, The Altai Mountains and the Kunlun Mountains.

Drought and less rain: most areas of Xinjiang have less annual precipitation, especially in the Tarim Basin and other areas, showing obvious drought characteristics. In these areas, water vapor is difficult to penetrate, coupled with strong solar radiation and dry air, making precipitation far below evaporation, forming an arid

desert and Gobi landscape.

The distribution of water resources is uneven. Due to the combined action of terrain, climate and other factors, the water resources are relatively abundant. Deserts and desert areas are facing the dilemma of extreme water shortage. Due to the dry climate, scarce precipitation, sparse surface vegetation, and poor soil water retention capacity, these areas lead to a serious shortage of water resources. Figure 1 shows the distribution map of the annual precipitation in the Xinjiang region.

Glaciers are an important water source in Xinjiang. Gial meltwater is an important water source for maintaining ecology and animal husbandry. As temperatures rise and seasons change, glaciers gradually melt, releasing a large amount of melt water, which passes through rivers, lakes and other water bodies, providing sufficient water supply for alpine pastures.

Vegetation types are diverse: Xinjiang is extremely rich in vegetation types, different types of vegetation form the unique ecosystem in the region. In alpine areas, alpine meadows are the main vegetation type, which are composed of cold-tolerant and drought-tolerant herbs, which provide high-quality grazing places for livestock in alpine areas. Diversified soil types: The soil types in Xinjiang also show the characteristics of diversification. Black soil is one of the more fertile soil types in Xinjiang, mainly distributed in river alluvial plains and intermountain basins.

Ecological fragility: Due to its unique geographical location and climate conditions, Xinjiang's ecological environment is relatively fragile. Drought and water shortage are one of the major problems facing the region. Overgrazing is one of the major threats, and overgrazing activities will lead to grassland vegetation destruction and bare soil exposure, which then leads to ecological problems such as land desertification and soil erosion. Biodiversity: The Xinjiang region has become an important area for biodiversity conservation.

Livestock types: Various kinds of livestock are raised in Xinjiang pasture, including sheep, cattle, horses, camels, etc., among which fine wool sheep and mutton sheep are the most famous.

In conclusion, the environmental characteristics of pasture land in Xinjiang include diverse terrain, strong continental climate, uneven distribution of water resources, rich vegetation but fragile ecology, and unique animal husbandry production mode.

2.2. The impact of extreme weather on Xinjiang pastures

The frequency and intensity of extreme weather events are influenced by global climate change and may increase with warming. These extreme weather events often have serious impacts on human society, ecosystems and economic development. In the Analysis of the Influence of Climate Conditions in Yili Valley on the Growth Period and Yield of Winter Wheat, the temperature and precipitation in the valley have different effects on winter wheat in different growth periods, so as to select the best sowing and harvest time. The following is a real case extracted from the "Tianshan Net";Urumqi, Dec. 23 (Xinhua) The weather process made the local winter pasture ice layer, and the snow thickness reached 20 centimeters. According to statistics, up to now, the tower area 400,000 thin livestock have been affected to varying degrees, small livestock abortion death more than 2000, abortion death 500.At the same time, from 19:30 on the 22nd, tasheng area Mayitas tuyere affected by the wind blocked traffic, tasheng highway section has sent 5 snow removal vehicles for rescue, has successfully rescued nearly 20 trapped people. Tacheng City is a famous facility agricultural base in Xinjiang. The local vegetables are mainly exported to Central Asia, accounting for more than half of the fruits and vegetables exported to Xinjiang in the Central Asian market.

3. Establishment of Xinjiang pasture environmental monitoring system

3.1. Monitoring content and method

Environmental monitoring of Xinjiang pasture should include meteorology, hydrology, soil, vegetation and other aspects. Through remote sensing technology, ground observation and unmanned aerial vehicles, the environmental data of pastures can be obtained in real time to provide support for early warning and decision-making. At the same time, the monitoring of diseases, insect pests and diseases should be strengthened to detect and deal with potential crises in time. The analysis and processing of monitoring data can use big data and artificial intelligence technology to improve the accuracy and timeliness of monitoring, and manage and optimize the abnormal situation in pastures.

3.2. Monitoring network construction

The establishment of a perfect monitoring network is the foundation of environmental monitoring. Through the construction of weather stations, hydrological stations and soil monitoring stations, a comprehensive monitoring of the pasture environment can be realized. At the same time, cooperation with relevant departments should be strengthened to share monitoring data and improve monitoring efficiency. The construction of the monitoring network should give full consideration to the particularity of Xinjiang region to ensure the accuracy and reliability of the data.

The main modules of the monitoring network platform are as follows:

(1)Data collection module: collects environmental data through various sensors such as gas humidity, light intensity, soil moisture, soil pH value, etc., and integrates environmental status.

(2) Main controller module: Summarize information from the data acquisition module and process and control it.

(3) Control module: According to the commands of the main controller, execute specific control operations such as irrigation, fertilization, ventilation, and pest control.

(4) Transmission module: transfers data to other modules or systems for further processing and analysis.

(5) Other modules include power module, display module, detection, data storage, data analysis, warning research, and cloud platform, forming a complete ecological monitoring and management system.

4. Extreme weather prevention and crisis management strategies

4.1. Precautions

Through the early warning system, alarms can be issued in advance to provide time for herdsmen to respond and reduce disaster losses. The early warning system should include functions such as disaster forecast, information release and emergency response.Optimizing pasture management is also an important measure to prevent extreme weather. Through rational planning of pasture utilization, the impact of disasters on animal husbandry production can be reduced.Strengthening the education and training of herders. Through the training, herdsmen can better understand the characteristics of extreme weather and coping methods, and improve the ability of self-rescue and mutual rescue.The government should provide necessary support and guidance to help herdsmen improve their ability to resist disasters.

4.2. Crisis management measures

Making contingency plans is the key to dealing with extreme weather.In the face of possible natural

disasters. In terms of disaster rescue, the emergency plan needs to clarify the responsibilities and tasks of each department. The government should promptly launch the emergency response mechanism, assess the disaster situation in a timely manner. The effective reserve and reasonable allocation of these materials can greatly reduce the pain of the people after the disaster and improve the overall efficiency of the rescue.In the post-disaster recovery work, the emergency plan should specify the reconstruction plan. The construction of flood control dikes and reservoirs can reduce the impact of flood disasters.The establishment of a comprehensive and effective risk assessment system plays a vital role in identifying, evaluating and preventing potential crises.

5. Case analysis-Take pastures in Xinjiang as an example

The experience of the ranch shows that scientific monitoring and prevention measures are important in dealing with extreme weather. Extreme weather events, such as heavy rains, high temperatures and droughts, pose serious threats to the safety of infrastructure and personnel. Through scientific monitoring, these extreme weather events can be warned in advance, so as to take the necessary preventive measures. At the same time, the accuracy of meteorological disaster risk estimation should be improved, and the tracking and analysis of extreme events should be strengthened.

6. Conclusion and recommendations

As an important base of animal husbandry in China, its environmental monitoring, extreme weather prevention and crisis management mechanism are the key to ensure the stability and safety of animal husbandry production. Xinjiang has a vast territory, complex and changeable natural conditions, and frequent extreme weather events, all of which pose a serious threat to the ecological environment of pastures and animal husbandry production. Therefore, the establishment of a comprehensive and efficient environmental monitoring system is crucial for discovering potential natural disaster risks in time, taking preventive measures and reducing disaster losses.In the process of constructing the monitoring system, modern scientific and technological means need to be used, such as satellite remote sensing, uav inspection, Internet of things sensors, etc., to realize the real-time monitoring of the pasture ecological environment, meteorological conditions and animal health status. The application of these technologies can not only improve the accuracy and timeliness of monitoring, but also provide a scientific basis for the subsequent early warning and crisis management[6,7].Developing a scientific early warning mechanism is an important part of preventing extreme weather disasters. This means giving early warning of possible extreme weather events based on historical meteorological data, current monitoring information and professional forecasting models. Early warning information should be issued in a timely and accurate manner, and every herdsman is covered through various channels (such as SMS, radio, television, social media, etc.), so that they can take timely measures, such as transferring livestock, strengthening enclosures, and storing forage.Strengthening infrastructure construction is the material basis for improving the disaster resistance ability of Xinjiang pasture. This includes building levees and drainage systems to combat floods, building shelter and snow facilities to protect livestock, and improving transportation networks to ensure that relief supplies and personnel can arrive quickly in case of disasters. So as to provide solid scientific and technological support for the sustainable development of animal husbandry.In the future, the environmental monitoring, extreme weather prevention and crisis management of Xinjiang pastures will pay more attention to intelligence, precision and humanization, so as to contribute to the construction of a modern animal husbandry system with harmonious coexistence between man and nature.

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