

Discussion on Remote Sensing Monitoring of Agrometeorological Disasters

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Abstract: The continuous development of modern society and economy puts forward higher requirements for agricultural production in China. Traditional monitoring technology can no longer meet the needs of agrometeorological disaster monitoring. Scientific application of remote sensing monitoring technology has extremely important value, which can effectively improve the detection effect, make it more accurate and real-time, and then promote China's modern agricultural production. This article analyzes the application value of remote sensing monitoring technology. Based on this, it comprehensively explores the specific situation of monitoring different disasters by remote sensing monitoring technology in the agricultural production process.

Keywords: Agricultural Production; Meteorological Disasters; Remote Sensing Monitoring

In the process of modern agricultural production in China, the reasonable application of remote sensing monitoring technology can ensure the real-time monitoring of meteorological disasters, strengthen the monitoring effect of disasters, ensure that agricultural production personnel can make clear the specific situation of disasters in time, prevent and scientifically deal with them in time, and promote the further development of modern agriculture in China.

1. The application value of remote sensing monitoring technology

First of all, there is a large amount of information. Usually, the scientific application of remote sensing technology can ensure the rapid acquisition of the required information. Based on electronic optical instruments and modern information technology, the transmission and reception of relevant information and scientific processing of it can not only greatly shorten the disaster

monitoring time, but also ensure the timely acquisition of relevant information, providing necessary conditions for the scientific construction of data models. Secondly, it can realize dynamic monitoring. In the process of monitoring natural disasters by using conventional monitoring means and remote sensing technology, remote sensing monitoring is of higher dynamic and real-time performance, so it has higher application value, can continuously monitor agricultural disasters, and make its disaster information data have higher accuracy and completeness. On this basis, it can scientifically predict strong hidden dangers and periodic disasters. At the same time, it can also track and monitor for a long time. The destructive power is large, involving a wide range of agricultural disasters. Through remote sensing technology, the final recovery situation can be tracked and monitored, and the disaster information can be grasped more timely and accurately. Thirdly, it has stronger adaptability. Usually, there is a great degree of uncertainty in the time when

disasters occur during crop growth. When disasters occur in some areas, there are harsh natural conditions, such as ice pests, blood disasters, and fires. At the same time, some snow disasters occur near cross-border lines, as well as common meteorological disasters including pests and diseases, freezing damage, floods and droughts. In the past disaster monitoring process, conventional monitoring methods can't ensure the details and accuracy of disaster data. The reasonable application of remote sensing technology can effectively solve the related problems in the routine monitoring process. Finally, it can realize the three-dimensional and large-scale disaster monitoring. Through the scientific application of remote sensing technology, agricultural development can be monitored in a large area, so that the agricultural monitoring direction can achieve a higher degree of three-dimensional. Based on aerial images, stereo images can be reasonably constructed, which can not only expand the work of related personnel, but also effectively expand the visual field obstacles and limitations of ground monitoring, so as to ensure that relevant personnel can further grasp the information of agricultural disasters. If the disaster situation is complex and changeable, and the area involved is wide, it is extremely important to rationally apply remote sensing technology. In the process of dynamic and large-scale monitoring, remote sensing monitoring technology has higher application value.

2. Remote sensing monitoring of agricultural disasters

2.1 Monitoring of flood disaster

After the rainstorm, the water level of the river system will rise to a certain extent, which will lead to the expansion of water body area. When monitoring flood disasters, the main monitoring methods are the existence time and the expansion range of water body area. During the whole period of flood control in China in 1998, the Academy of Sciences quickly identified the flood situation and its related dynamic information through scientific application of remote sensing data based on time series, completed more than 70 remote sensing monitoring figures and images and more than 50 disaster analysis reports, and quickly uploaded them to relevant national department. Remote sensing provided a certain degree of data support for the effective development of

flood control and disaster relief work. Usually, when detecting the inundation area, scientific and effective image classification based on relevant satellite data can extract water smoke information and water information scientifically. In this process, not only the methods of computer image classification and manual recognition can be applied, but also various new methods such as water discriminant function appear.

2.2 Monitoring of drought disaster

Under normal circumstances, drought can be divided into four categories: economic drought, agricultural drought, hydrological drought and meteorological drought. Agricultural drought specifically means that the soil water content can not meet the demand of crop growth due to untimely irrigation or insufficient precipitation during crop growth, which leads to crop yield reduction. In this process, drought season, crop yield, variety, local temperature, soil texture, soil water content and precipitation can reflect the drought degree to a certain extent. Crop water demand and soil water content are two key factors. In the process of drought monitoring by remote sensing technology, soil water content is the direct goal of related work, and there is a close relationship between soil water content and land thermal inertia. In this process, thermal inertia specifically refers to the main ability of energy exchange between matter and surrounding environment, and the soil water content is scientifically calculated by analyzing the temperature difference between day and night. This method is of high accuracy. But drought not only poses a great threat to the germination period of seeds, but also poses a great threat to the whole growth period of plants. In the specific monitoring work, accurately obtaining the water content of plants under plant cover is an important guarantee for the orderly development of related work. When winter wheat suffers from drought in winter and spring, EV can be reasonably introduced into the thermal inertia model to ensure soil moisture content, which has higher inversion accuracy. In adversity environment, leaves are one of the most vulnerable organs. The vegetation index can be collected by reasonable application of remote sensing technology, and scientifically compared with the data evaluated for many years, or the specific changes of vegetation index sequence during drought can directly monitor crop drought. Although remote sensing drought

monitoring has been studied for a long time in China at present, drought disasters may have adverse effects on all crops. Scientific application of remote sensing technology can accurately obtain soil water content, and a lot of work needs to be done in the specific process of drought monitoring methods.

2.3 Remote sensing monitoring of snow disaster

Snow disaster monitoring has been carried out in China since 1996. Through scientific application of various satellite sensors, the information related to the dynamic changes of snow can be effectively collected. At present, there are mainly three ways, which are image supervised classification based on multi-spectral image operation, brightness threshold method and snow cover index. Through scientific application, various snow cover monitoring systems have been developed by relevant institutions and organizations in the world. According to the specific situation of snow disasters in pastoral areas in China, domestic scholars have put forward a variety of methods to evaluate snow disasters, and reasonably evaluated the disaster grade standard based on the continuous snow days. Under normal circumstances, snow disasters in China mostly occur in winter, March and November, and snow disasters usually occur in areas with high altitude. When carrying out specific construction work, there are generally few monitoring indicators, which can realize the effective formation of unified monitoring indicators in a short time and have high promotion value.

2.4 Remote sensing monitoring of sandstorm

Usually, there are some differences in temperature and reflectivity between the top, clouds and the ground in sand area. At the same time, EOS series satellites and polar-orbiting meteorological satellites can scientifically detect the temperature and reflectivity channels of ground objects, and then through reasonable application of satellite telemetry technology, dust storms can be monitored in real time. According to relevant scholars, sandstorm risks include established risks and potential risks. Based on human factors and related factors that may affect sandstorm disasters, this article comprehensively analyzes three aspects of disaster-bearing environment, disaster-causing factors and disas-

ter-bearing bodies in sandstorm activities. Based on the regional disaster theory, the relevant scholars deeply analyzed the specific characteristics of sandstorm disaster by scientific application of GIS technology and remote sensing technology, scientifically constructed its evaluation index, and constructed the disaster evaluation model based on fuzzy comprehensive evaluation and analytic hierarchy process. In China, sandstorms usually occur in spring, which will expose the roots of related crops, blow away their seedlings and seeds, and cover the leaves with a thick layer of dust, greatly adversely affecting the normal photosynthesis of plants, and then leading to the reduction of production in related industries. At present, in the process of remote sensing monitoring of sandstorms in China, the research on sandstorm levels and their impacts on crops is deficient to a great extent, and workers at all levels must pay more attention to them.

2.5 Remote sensing monitoring of pests and diseases

In the process of crop production, compared with meteorological disasters, the research on pests and diseases has higher pertinence, and can study crop species and specific types of pests and diseases in detail. Usually, the reflection and absorption characteristics of crops will change in different degrees at different stages due to the infection of diseases and insect pests, which is called spectral response. By formalizing it, it can provide necessary information support for relevant personnel to monitor by optical remote sensing, and then ensure more scientific control of plant diseases and insect pests. By using remote sensing monitoring technology for cotton, rice, wheat and other crops, relevant scholars have made an in-depth analysis of the specific location and physiological mechanism of spectral response of diseases and insect pests, and based on this, realized the scientific construction of vegetation index, pest identification and discrimination algorithm. After the occurrence of diseases and insect pests, the visible light reflectance in the spectrum increased to a certain extent, while the near infrared reflectance decreased, and the red edge gradually moved to the short-wave direction. However, the types of diseases and insect pests in different crops were different to a great extent, resulting in different changes in protein water and pigment in objects, which would affect

the overall structure of plants to varying degrees. In order to effectively distinguish them, relevant personnel need to further improve the spectral resolution.

2.6 Monitoring of typhoon

Usually, typhoons may blow down crops, blow off branches and trunks, and even uproot whole trees, which has a great adverse effect on plant growth. In the past, when meteorological monitoring was carried out, it was generally through field investigation with the help of aerial photos. In the development of satellite remote sensing technology, by 1990s, relevant scholars in China had begun to use satellite images to evaluate the impact of typhoon. Experts and scholars analyzed the NDVI changes caused by typhoon to different species and different terrains by combining surface DTM data and spot images. Through investigation, it was found that the wind had a relatively great influence on windward slopes with higher altitude, so the NDVI of trees in this area decreased relatively. At the same time, for different species, the NDVI reduction of natural broad-leaved forest is obviously greater than that of artificial coniferous forest. In this process, some scholars scientifically calculated the changes of FRAR, LAI, NDII, EVI and NDVI before and after typhoon by using resolution imaging spectrometer, and analyzed the damage caused by typhoon to forest land. Through analysis, it was found that NDVI changes can show the damage degree more concretely. Generally speaking, crop lodging is the most common disaster situation after typhoon. Since the lodging disaster occurred in 2007, Shandong Agriculture Bureau has begun to study the remote sensing monitoring of

wheat lodging. Through the synchronous positioning experiments in 2007 and 2013, and the artificial simulated wheat lodging experiment in 2010, the photovoltaic curves before and after the occurrence of wheat lodging were analyzed in depth, and the specific change characteristics were made clear, and a set of perfect disaster extraction methods were constructed. Typhoon is a natural disaster caused by tropical wind rotation, and the wind direction is uncertain to a certain extent. At the same time, the high rotation of wind will lead to relatively poor homogeneity of natural disasters, which makes it difficult for relevant personnel to set up remote sensing research samples.

3. Conclusion

In the process of agricultural production, the scientific application of remote sensing monitoring technology has extremely important value. It can prevent various meteorological disasters in time, thus ensuring agricultural production, effectively promoting China's modern agricultural production and creating favorable conditions for the further development of China's modern social economy.

References

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