

Study on Economic Evaluation Model of Greenhouse Soil Information Collection Technology

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Abstract: In large greenhouses, the growth and yield of plants have a lot to do with the temperature and humidity of the soil environment. At present, the control of soil temperature and humidity is mainly caused by the accumulation of planting experience by the growers, and the manual control is carried out by means of flood irrigation and ventilation. This is very random, it is difficult to strictly control the temperature and humidity, and it is more difficult to control in time and effectively. This paper describes the greenhouse soil information collection and control system used in agricultural production. It first analyzes the background and status of the topic. Moreover, this paper introduces the principle of greenhouse soil information collection and understands the comparative analysis method of technical economic evaluation model.

Introduction

With the rapid development of economy and society, people's living standards are constantly improving, and people's demands for the variety and quality of various substances are getting higher and higher. In our daily lives, the demand for various anti-seasonal vegetables is increasing. The cultivation of off-season vegetables is mainly based on various greenhouses, because the greenhouse can provide a suitable temperature and humidity environment for the growth of vegetables. However, the investigation shows that the temperature and humidity control methods in many greenhouses in China are still very backward. Generally, the temperature and humidity are adjusted by a thermometer and a hygrometer. The higher temperature is generally used to open the greenhouse. The ventilation temperature is lower. Heating is used to adjust the temperature. The adjustment of soil moisture is mainly for watering.

Principles of Greenhouse Soil Information Collection

Background of greenhouse soil information collection.

Although the water on the earth is constantly circulating and changing, it is not inexhaustible. Although the surface area of the earth is covered by water, the total water volume is 1.386 billion cubic kilometers (1 cubic kilometer 200 million cubic meters), but most of them are sea water, accounting for 96.5% of the total water, and distributed on land. The fresh water volume is only about 48 million cubic kilometers, accounting for about 3.5% of the total water. Therefore, the fresh water resources available on the earth are extremely scarce. Due to economic development and population growth, China's water consumption is increasing, and sewage discharge is also increasing. Among the large amount of water used, agricultural irrigation water accounts for a large part, of which planting irrigation accounts for more than 90% of agricultural water consumption. Most of the current irrigation methods use large water flooding. This irrigation method is not only easy to cause soil compaction, but the greater disadvantage is that soil fertility is lost when flooding. Therefore, the development of water-saving agriculture and the promotion of water-saving irrigation are urgent tasks.

Status of greenhouse soil information collection technology.

With the increasing intensity of water resources and energy in the world, the use of water-saving and energy-saving irrigation methods has become the general trend of irrigation technology development around the world. Promoting water-saving irrigation will surely become an inevitable

choice to alleviate the water crisis and realize agricultural modernization.

Functional analysis of soil sample information collection system.

The soil sample information collection system is designed to quickly obtain information on soil samples collected by soil sampling vehicles. Its main functions include the information collection, monitoring, processing and sending functions of the intelligent vehicle soil sample information collection device and the information receiving, storage, query, modification and backup management of the upper computer management platform. The monitoring function of the information refers to the monitoring of the working state of the sampling head. Through the monitoring of the pressure of the hydraulic power source of the sampling head power driving unit, the working state of the drill bit can be obtained, and the position of the sampling vehicle can be monitored to ensure the accurate research of the soil data later; The information collection function mainly includes the collection of sampling time, ambient temperature and humidity, and sampling location information. Through the sampling and analysis of the ambient temperature and humidity, it can be concluded that the soil condition in the area is affected by the change of ambient temperature and humidity. The location information is the location coordinates of the soil sample.

Overall structure of soil sample information collection system.

The soil sample information collection system is an intelligent soil research system for agricultural application in comprehensive information collection, processing and management. It involves a wide range of technologies, many parameters, and a variety of peripherals, so it requires special hardware modules and professional software support. Currently, widely used embedded processors can be roughly classified into four types: embedded microcontrollers, embedded microprocessors, embedded DSP processors, and embedded system-on-chip. The basis of the embedded microprocessor is derived from the CPU in the personal computer, just to meet special purposes. On the basis of retaining the standard CPU function, the operating temperature, anti-interference and reliability have been enhanced. Therefore, embedded microprocessors often have excellent performance, small size, and good stability; Embedded microcontrollers, also known as single-chip microcomputers, integrate the entire computer system into a single chip, and the singular design makes its size greatly reduced. More importantly, power consumption and cost are reduced, and reliability is improved. Such a number of advantages determine that it will become the mainstream choice for embedded systems at present and in the future; The embedded DSP processor is a high-efficiency computing device that has been specially designed for system structure and instructions. It has fast calculation speed and high cost. Therefore, it is widely used in the fields of digital filtering, FFT, spectral analysis, real-time multimedia decompression and so on.

Comparative Analysis of Technical and Economic Evaluation Models

Generally speaking, economic evaluation workers have three types of methods in economic evaluation of greenhouse soil information collection techniques in practice. The first is to consider the cash flow method of the time value of funds, the second is to consider the uncertainty analysis method of risk level, and the third is to consider the scheme optimization method of scheme evaluation and comparison.

Cash flow method.

The cash flow method is a consideration of the various benefits and costs that occur throughout the life of an exploration project or development project. And the capital time value calculation method is used to convert the benefits and expenses at different points of time to the same time for comparison. Its biggest advantage is to consider the time value of money.

Uncertainty analysis.

Uncertainty refers to the basic data used in project economic evaluation such as investment, cost, product sales price, etc. Most of it comes from forecasts and estimates, so it is impossible to make a correct estimate. Uncertainty analysis is to solve the above-mentioned uncertainty problem and use a certain method to calculate the degree of risk caused by various specific uncertain factors on the economic benefits of investment projects, thus providing a more accurate basis for project decision-making. Uncertainty analysis in Methods and Parameters includes break-even analysis,

sensitivity analysis, and risk analysis.

Evaluation of uncertainty analysis content.

Break-even analysis is a method of analyzing the relationship between project cost and return balance through break-even point. The break-even point is usually calculated based on the product's production or sales volume, variable costs, fixed costs, product prices, sales taxes, and surcharges. The biggest advantage is that the calculation is simple, the profit and loss point can be obtained, and the business risk that the project can bear is examined. The breakeven chart is shown in Figure 1. Sensitivity analysis, sensitivity analysis is to analyze the impact of major uncertainties (fixed asset investment, output, price, price of major raw materials, etc.) on economic evaluation indicators, identify sensitive factors, and determine the degree of impact.

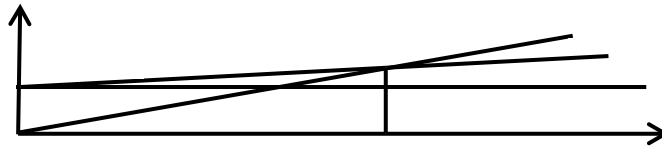


Figure. 1 Loss-profit Balance Chart

Economic Evaluation Model

Cash flow model.

The cash flow model is the most scientific and comprehensive method in Western economic evaluation. It divides all input-output economic factors of the evaluation object into two categories: cash inflow and cash outflow. The discount rate is selected according to the time value principle of funds, and a series of evaluation indicators are calculated to examine the profitability of the evaluation object.

RAGA-PPE Model.

The basic principle of the PPE model: The model constructed by solving the evaluation problem with the PP method is called the projection pursuit evaluation model. The basic idea of the PPE model to deal with economic evaluation problems is to directly use the decision matrix information of economic evaluation. Projecting multidimensional decision matrices with schemes and indicators into a low-dimensional subspace through some combination. For the projected configuration, the objective function of the projection index function is used to measure the probability of projection exposure of a certain decision structure. The function reaches the optimal projection value and ranks the decision plan set according to the projection value.

Specific evaluation steps.

Evaluation at the pre-exploration exploration stage. At this stage, it is mainly to initially evaluate investment opportunities. The main content of this stage is to combine the calculation results of the technical and economic evaluation indicators with the economic evaluation prediction data of the latter stage (evaluation exploration stage). Use the real option model to make a preliminary evaluation of each investment opportunity at this stage and delete infeasible investment opportunities; Evaluate the exploration stage evaluation. At this stage, the main goal is to optimize investment opportunities. The main content of this stage is to use the real option model to evaluate the economic evaluation of the stage based on the economic evaluation forecast data in the latter stage (development and production stage). And comprehensively evaluate the results of geological risks and comprehensive risks, make comprehensive evaluation and optimization of investment opportunities, and optimize the primary investment opportunities; Evaluation at the development and production stage. At this stage, the main goal is to develop investment opportunities.

Conclusion

With the continuous development of science and technology, computer technology, communication technology, and sensor technology have penetrated into every aspect of human life. As a fundamental problem in the development of people's livelihood, agricultural development has made significant progress under the impetus of science and technology. The analysis data of soil sample information not only has important experimental significance for soil research, but also has more practical significance for guiding agricultural production. Therefore, when time and cost permit, we can research and develop a networked information publishing platform for agricultural producers.

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