Web-based Agricultural Machinery Rental Business Management System

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Purpose: This study was conducted to develop a web-based business management system to ensure the efficient operation and transparent management of government-subsidized agricultural machinery rental businesses. Methods: An MS SQL2000 database management system (DBMS) solution was utilized in the system for high system compatibility and integrated management. This system was targeted to be compatible with Internet Explorer 6.0 or later and to ensure security and seamless web operations. The system administrator is able to manage a fleet of agricultural machinery, including various inventory codes, release and return, fleet registry, and business performance. Users (farmers) may search the database of rental machinery and reserve them. Results: With respect to rental reservations, the system administrator can manage the fleet by setting the rental status to Approved, Released, or Returned. Through the web, the administrator can also create a database that includes machinery specifications, features, and rental rates. In addition, business performance data can be analyzed using a diverse array of tools to streamline the rental business. Without having to go to the rental office, users can save time and money by searching for and renting agricultural machinery through the information available on the website, including availability, specifications, and rental fees. After deploying the system, the time required to analyze monthly performance and create reports was dramatically reduced from 20 days per person to one day per person. Conclusions: Since 2014, AMRB has been installed and is operating in agricultural machinery rental businesses in 31 cities and counties in South Korea. This study recommends continued expansion and dissemination of AMRB for the systematic and efficient management of agricultural machinery rental businesses.

Keywords: Agricultural machinery, Management system, Release and return, Rental business, Rental fee

Introduction

Since 2003, the South Korean government has been pushing for an agricultural machinery rental business through the Agricultural Technology Center to ease farmers' burden from purchasing agricultural machinery and to promote the mechanization of farming. The agricultural machinery rental business is being operated with a focus on one- to three-day short-term rentals of machinery, such as seeders, sowers, and reapers, for sectors with inadequate mechanization of operations.

Starting in 2014, government-subsidized agricultural machinery rental businesses are being operated autonomously throughout 140 counties and townships, with an average inventory of 200 agricultural machines. The number of farmers renting agricultural machinery has continuously increased year by year, and by collectively using such machinery, farmers have been able to dramatically reduce the cost of operating farms.

However, expansion in the scale of agricultural machinery rental businesses has significantly increased the burden on business operators and administrative duties, such as fleet, reservation, and performance management, have become difficult to handle. As such, deployment of a web-based agricultural machinery rental business is essential...
for systematic management and transparency in the agricultural machinery rental business.

As examples of web-based construction or government-owned land information systems, Jung (2011) developed a management system capable of verifying basic information, planning, and process history for the efficient maintenance of small public research facilities. Shim et al. (2008) developed a program for managing government-owned land information through image searches, data linking, and lease management functionalities by building a database utilizing the Geographic Information System.

This study was conducted to develop a web-based agricultural machinery rental business (AMRB) management system to ensure the efficient operation and transparent management of government-subsidized agricultural machinery rental businesses.

**Materials and Methods**

**AMRB development environment**

An MS_SQL2000 DBMS solution was utilized to develop AMRB for high system compatibility and integrated management. ASP, JavaScript, and ActiveX were used in the development because they are suitable for Windows NT. Additionally, compatibility with Internet Explorer 6.0 or later was targeted to ensure security and seamless web operations.

**Composition of process**

AMRB consists of two distinct environments for general users (farmers) and administrators depending on user permission. The interface for the administrator mode allows for systematic management of the fleet, machinery images, specifications, and rental rates. General users (farmers) are able to search for rental procedures, machinery specifications, and rental rates, and may request reservations. Agricultural machinery data are entered through the process described in Figure 1, and then stored as final data for subsequent queries.

**Composition of system menu**

**Administrator mode**

As seen in Figure 2, the administrator menu consists of code management, rental application management, fleet operations, data output, and rental fee calculations.

Agricultural machinery identification codes have been implemented to systematically manage fleet registry, release/return status, and performance analysis. Using model category index numbers from the “Agricultural Machinery Price Book” (Korea Agricultural Machinery Industry Cooperative) as a reference, agricultural machinery is coded using a three-digit number for the model, a two-digit...