COMPUTER MODEL BY A LINEAR PROGRAM AND VIA INTERNET TO SELECT AGRICULTURAL MECHANIZED SYSTEMS BASED ON THE SMALLEST OPERATIONAL COST

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ABSTRACT

Computer programs have been used to help the farmers on the fleet selection. However, these computing models are based on the previous choice of the mechanized system made by the user. On this context, the purpose of this work was to develop a free computer model by a linear program and via internet to select agricultural mechanized systems based on the smallest operational cost, bringing the machinery selection process more agility and confidence according to a farm needs. The software can be accessed over the internet where the user can select an agricultural machine within a vast machinery list which contains its technical specification, as well as can help the farmer informing him automatically about the system with the smallest cost. The huge advantage of this program is that it is free and can be easily kept by the developer, once the data base is installed on a computer server and it is not needed to be installed on the user computer.

Keywords: computer modeling, linear program, machinery selection.

INTRODUCTION

One of the most important phases during the agricultural productive process is the moment to select a mechanized system. Generally, the farmer selects an equipment with an operational capacity ($ha.h^{-1}$) much higher than his needs (Gimenez and Milan, 2007). Lopez et al. (1995) developed a computer based software to select an agricultural mechanized system based on the smallest operational cost. The purpose of this work was to develop a free computer model by a linear program and via internet to select agricultural mechanized systems based on the smallest operational cost

MATERIAL AND METHODS

The application was developed with the aid of the software Borland Delphi for PHP. It was hosted in a Dell® PowerEdge server and free available to the agricultural public trough the internet, and with a specific DNS inside the University net. All specifications were gotten from the machinery factories folders. The operational field capacity was calculated from the specs information and from the field efficiencies of the operations. All costs were split in fix and

variable costs. The machinery price and financial information must be informed by the user, once it varies from a region to another. The user can calculate the operational cost from an existing fleet, inserting the information from his machinery fleet, or select a new simulation and let the application suggests a best option, based on the answer from the linear programming code inside the PHP page code. The mathematical model to select the mechanized system was based in linear programming language and summarizes the best option according to the smallest operational cost. The minimal hour cost was used to calculate the operational cost ($\$.ha^{-1}$) and showed to the user as report forms.

RESULTS

All process done by the application was summarized within six basic steps: 1) farm characteristic, financial and inputs price insertion; 2) available mechanized fleet insertion (Figure 1); 3) mechanized operation used by each crop insertion; 4) association between the mechanized operations related to the agricultural machine; 5) simulations; 6) reports. The Web PHP application allowed the calculus of the actual farmer operational cost and the optimization of the farmer fleet. The application allows several simulations, which can be compared, showing to be an efficient planning tool.

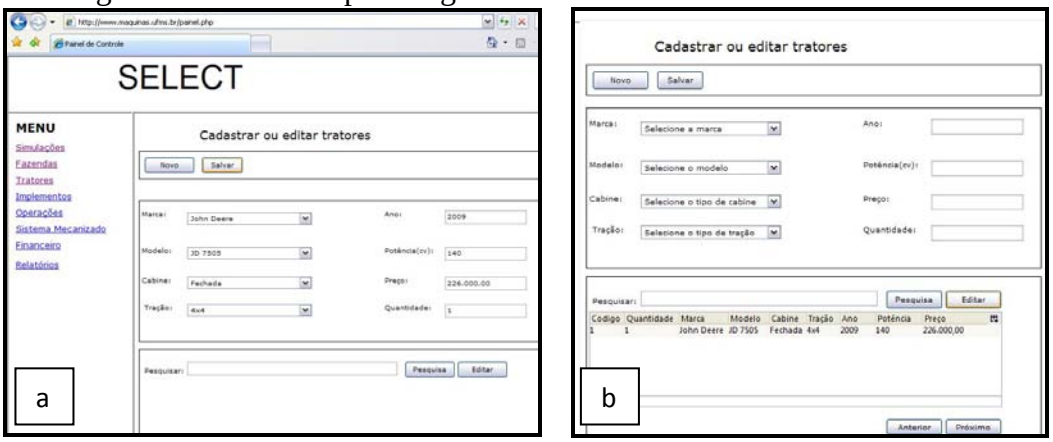

Fig. 1. Tractor information register: (a) selecting the tractor from the application data base; (b) tractor information on the farmer/user data base.

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