

Carbon Labels Generation Method for Eggs

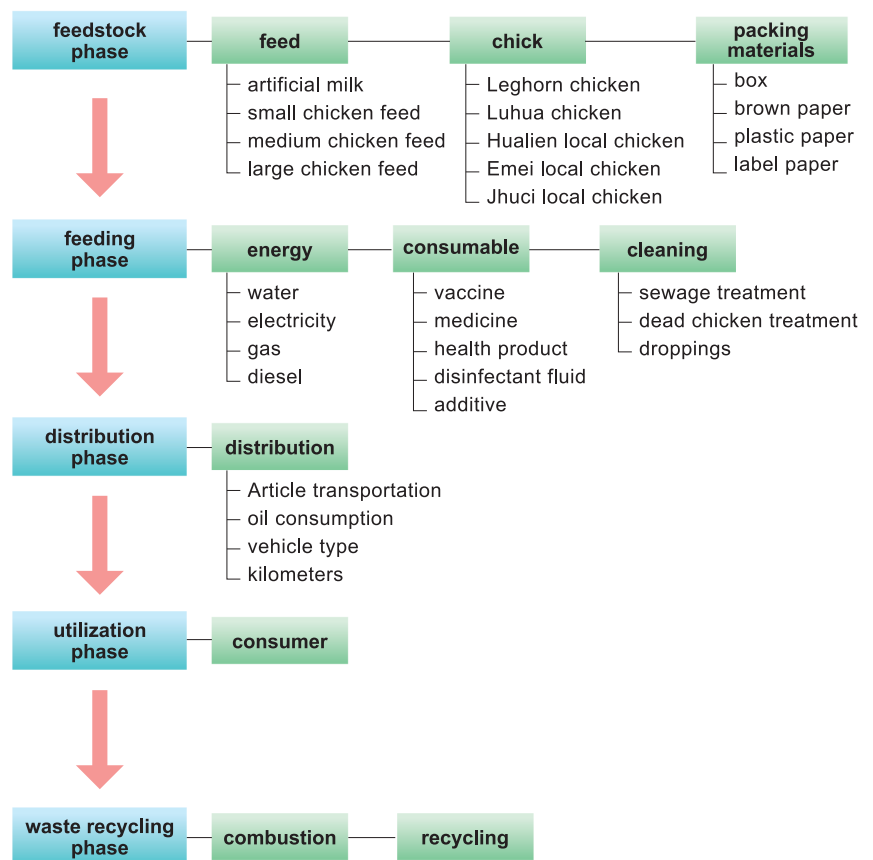
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1. Abstract

According to life cycle assessment (LCA) approach, there are 5 major phases for egg carbon labels, including feedstock, feeding, distribution, utilization, and waste recycling. The process for calculating types of energy used (oil, electricity, gas, and water) in various phases is complex, long, and time consuming. However, carbon emissions are calculated by means of Excel or Simapro software for most products with carbon labels in our nation. These kinds of software are inconvenient to use because related data and coefficient data have to be searched and entered manually. For domestic related documents and patent inventions, this study recognizes that carbon label systems are seldom studied by scholars. Therefore, we have developed an egg carbon label management system. With this system, carbon emissions can be calculated quickly and accurately, and carbon labels can be output for layer feeding practitioners to use. In addition, database technology is integrated such that immediate data and automatic updates are available and highly efficient.

2. Introduction

At present, throughput of eggs in Taiwan has reached 6.7 billion. Both cost and energy for the egg industry have grown accordingly. Throughout the process, from chick purchase to egg selling, the carbon emissions generated due to utilization of energy by various equipment has had an impact on the environment [1]. According to LCA approach, we went to layer farms at National Pingtung University of Science and Technology and Xinpi Township for deeper investigation of energy consumption in layer farms, as shown in Figure 1.



▲ **Figure 1.** Energy items for eggs

3. System architecture

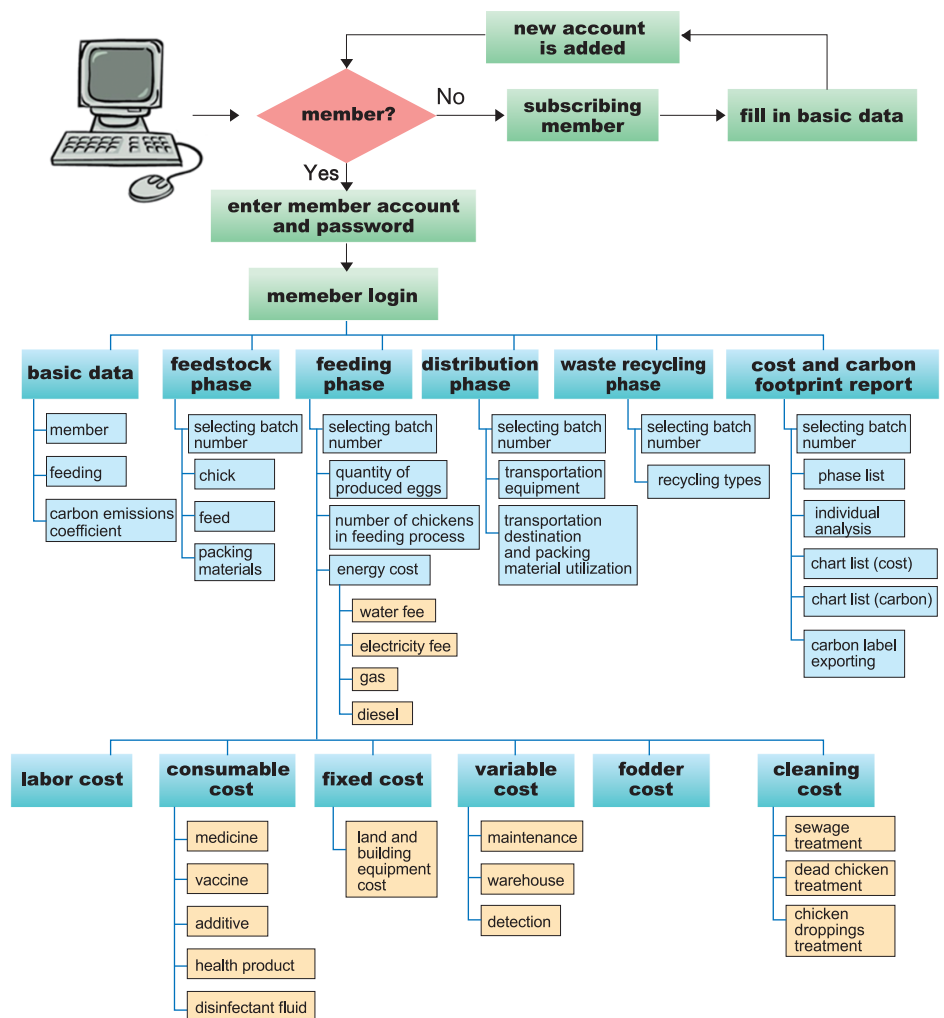
There are 6 major functions in this system structure, including basic data of members, input for the feedstock phase, input for the feeding phase, input for the distribution phase, input for the waste recycling phase, and the carbon footprint report. Details of these functions are as shown in Figure 2.

System operating flow and implementation

The major purpose of the user operating flow chart is for users to understand the functions available in the system and correct operating steps of the system prior to operating. These steps include entering the system interface, member login, writing basic feeding data; feedstock phase, feeding phase, distribution, and waste recycling phase data importing; graphic analysis for cost and carbon emissions; and finally, exporting carbon labels, as shown in Figures 3 and 4.

► **Figure 2.** System structure

▼ **Figure 3.** System operating flow



feeding owner ID

Step1 : recognizing member status

creating feeding data

Step2 : entering feeding basic data

input for feedstock phase

Step3 : entering feedstock data

input for feeding phase

Step4 : entering feeding cost data

input for distribution phase

Step5 : entering distribution data

utilization phase

waste recycling phase

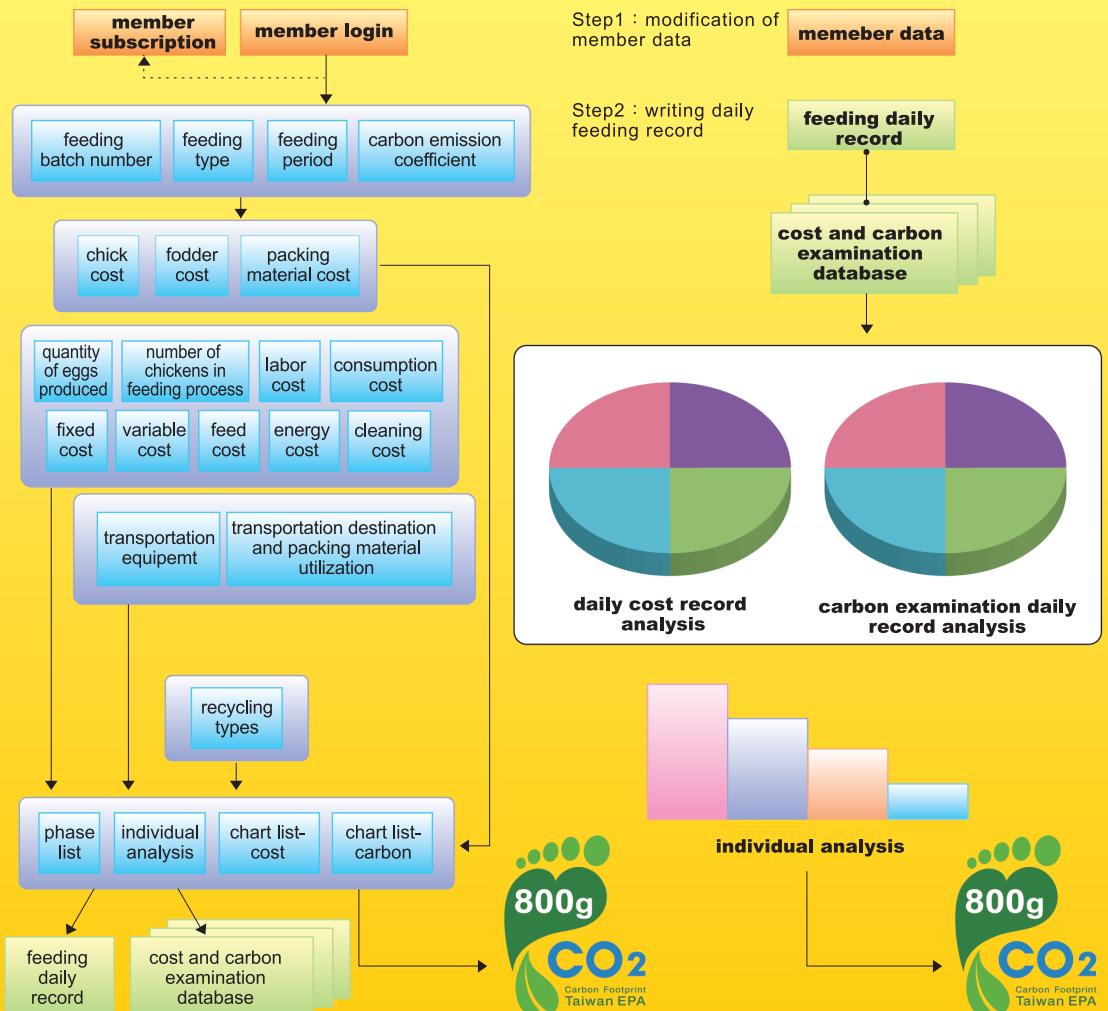
Step6 : entering waste recycling data

cost and carbon examination analysis

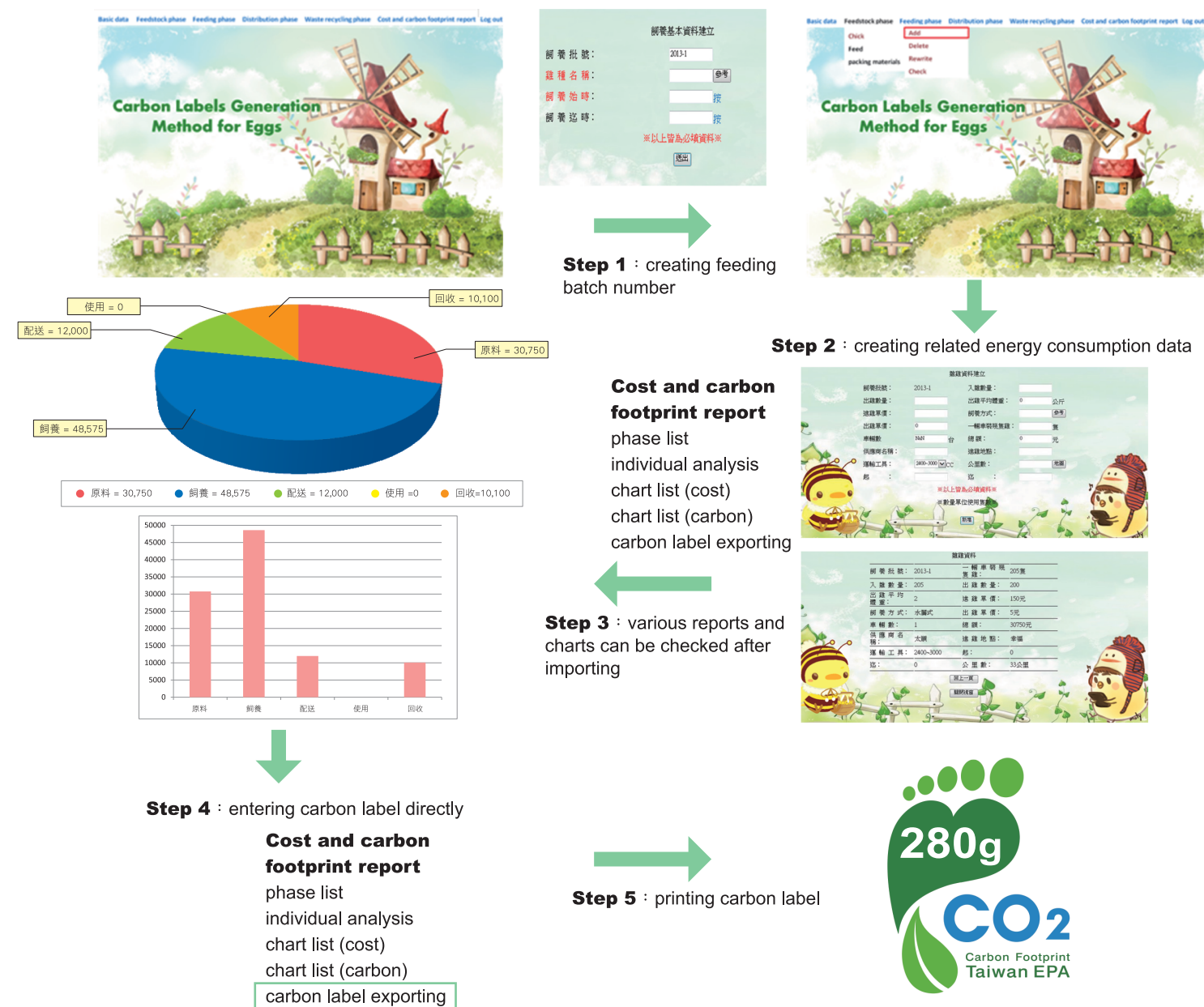
Step7 : checking cost and carbon emission in various phases

carbon label exporting

Step8 : quick carbon label exporting



▼ **Figure 4.** System operating steps



4. Conclusion

In the system, carbon examination is performed with the life cycle of egg production process, and carbon labels are made. An egg carbon label management system is developed in conjunction with Access database technology to facilitate layer feeding and industrial upgrading of egg producers, and to enhance competitiveness. It is essentially helpful for general traditional layer farms. The concrete results are as follows:

1. An egg carbon label management system in combination with energy examination is created. Moreover, a mathematical model of the energy utilization situation is constructed. A program is coded by means of JSP syntax and Eclipse software, and the mathematical model is embedded in the system to calculate the energy consumption situation for the life cycle in various production flows.

2. The system, integrate with Access database technology, records energy data for producing eggs in various life cycle phases. The system retrieves the data for calculation directly, and the data is immediate and can be updated automatically.
3. It allows administrators to analyze the energy consumption situation such that carbon emissions can be calculated quickly and accurately, and carbon labels can be exported as references for improving energy consumption in order to achieve the goal of carbon reduction.
4. Integrate with the layer feeding and production track record functions, the system features innovation, technological sophistication, and inventiveness, and a patent has been applied. In the future, this may be extended to other industrial applications, provide real aids for practitioners, and help establish the brand image of green products.