

# **Economic Food Exchanger Web Application**

Project in Computer Science

CSU5320

Computer Science

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## Introduction

Agriculture is a vital industry spread all over the world, evolving from traditional methods to more profitable practices. Profitable agriculture now integrates plantation management technology and harvest distribution technology, necessitating tools to approach the agricultural market effectively. While Sri Lanka is an agriculture-based country, the majority of its agricultural practices remain traditional. The current agricultural market lacks proper tools to engage with the online market effectively. The Economic Food Exchanger is introduced to fill this gap, providing a modern solution to enhance agricultural profitability and efficiency.

Sri Lanka primarily grows food and vegetables, distributing the harvest not only to local markets but also through an extensive market chain. The country hosts a variety of markets, including cinnamon markets, vegetable and fruit markets, rice markets, and export markets. Among these, the agricultural industry, which focuses primarily on fruits and vegetables, plays a crucial role in the country's economy. However, the current distribution process is complex and involves multiple layers, each adding to the cost of the final product. Here's a typical flow of fruits and vegetables from farm to consumer:

- Farmers harvest their crops.
- Harvest collectors load the produce onto their trucks.
- Collectors transport the produce to economic centers.
- Shop owners and wholesalers purchase the produce from these centers.
- Wholesalers then transport the produce to different cities.
- Retailers buy the produce from wholesalers and sell it to consumers.

This process involves several intermediaries: farmers, harvest collectors, wholesalers, retail sellers, and finally, the consumers. Each layer adds a markup to the price, ultimately leading to higher costs for consumers. This complexity also affects the profitability for farmers, as they receive a lower share of the final selling price.

The project aims to streamline this distribution process by removing unnecessary intermediaries. By doing so, it intends to offer farmers better prices for their produce and provide consumers with high-quality fruits and vegetables at more reasonable prices.

Additionally, sellers will have the opportunity to enhance their profits by selling quality products directly to consumers.

The main target audience for this project includes farmers, wholesale sellers, and retail seller customers who purchase larger quantities of food items than general consumers. The sellers are two types have permanent retail sellers and the buyers who can selling the product when needed. By focusing on these groups, the project aims to create a more equitable and efficient food distribution system in Sri Lanka.

## **Aim of the project**

The aim of the Economic Food Exchanger Web Application is to streamline the supply chain for vegetables and fruits in Sri Lanka by reducing intermediaries, ensuring fair pricing for consumers, empowering farmers with better profits, and providing fresh, high-quality products to customers.

## **Objectives**

The objectives of the Economic Food Exchanger Web Application project are as follows:

**Analyze the Supply Chain:** Analyze and understand the supply chain of vegetables and fruits in Sri Lanka to identify inefficiencies and key areas for improvement.

**Identify Requirements:** Gather and document the requirements for the proposed system by engaging with farmers, consumers, and other stakeholders to ensure the system meets their needs.

**Design the System:** Create a comprehensive design for the web-based system, focusing on functionality, user experience, and scalability.

**Develop a User-Friendly and Secure System:** Build a web application that is easy to navigate, well-secured to protect user data, and capable of facilitating direct transactions between farmers and consumers.

By achieving these objectives, the project aims to create a more efficient, transparent, and equitable marketplace for vegetables and fruits in Sri Lanka, benefiting both farmers and consumers.

## **Background and Motivation**

The vegetable and fruit marketplace is crucial to Sri Lanka's economy, particularly in agricultural regions. However, the traditional market structure has significant inefficiencies and inequities. Farmers, especially small-scale ones, struggle to earn fair profits due to multiple intermediaries who reduce their earnings. These middlemen take substantial profits, leaving farmers with minimal financial returns. Consequently, farmers face financial instability and cannot invest in better farming practices.

Consumers, on the other hand, deal with high prices for vegetables and fruits due to intermediary markups. The lengthy supply chain compromises product quality and freshness. This disconnect between farmers and consumers leads to dissatisfaction on both sides.

Currently, several mobile applications and websites address related issues but have limitations. The Cargills Food City app sells supermarket items, including vegetables and food, to retail customers but does not cater to the wholesale needs of farmers. Ikman.lk lists items for sale and purchase, including a request feature, but lacks specialized features for agricultural products. Alibaba serves as a global wholesale marketplace but is not focused on food items. Many Sri Lankans use social media platforms like Facebook Marketplace to list and buy vegetables and fruit items, yet these platforms are not tailored to address the unique challenges in the agricultural sector of Sri Lanka. However Economic Food Exchanger has more features [5] than these applications for reducing the problems when using these applications.

While some of these platforms focus on either the farmers' side or the customers' side, the Economic Food Exchanger Web Application distinguishes itself by targeting farmers, wholesale sellers, and retail seller customers who purchase larger quantities of food items. It aims to provide features that cater to all these groups, including advanced search and filtering options, bulk order discounts, and a rating and review system.

The Economic Food Exchanger Web Application aims to streamline the supply chain by reducing intermediaries, connecting farmers directly with consumers, and ensuring fair pricing and fresh products. This platform will empower farmers, provide consumers with better prices, and create a more efficient and transparent marketplace. By addressing the gaps in existing solutions, the Economic Food Exchanger Web Application seeks to solve the problems faced by both farmers and consumers in Sri Lanka.

**Problem:**

The main problem in the vegetable and fruit marketplace in Sri Lanka is that the maximum retail price (MRP) is very high, while the value received by farmers is low. This discrepancy is primarily due to multiple intermediaries adding significant markups at each stage of the supply chain, inflating the final cost for consumers. As a result, consumers face high prices and often struggle to access fresh, high-quality products. Conversely, farmers receive minimal financial returns, leaving them unable to invest in better farming practices or expand their operations. This inefficient and inequitable market structure also lacks transparency and quality control, further exacerbating the disconnect between farmers and consumers.

**Methodology Adapted:**

The development of the Economic Food Exchanger Web Application will follow a structured, iterative, and incremental methodology to ensure continuous improvement and adaptation. Key techniques for gathering information and designing the system include:

**Interviews with Farmers:** Conduct interviews with farmers to gather detailed information about the challenges they face, particularly regarding profit margins, market access, and the logistics of transferring their harvest to the market.

**Interviews with Sellers:** Engage with sellers to understand the reasons behind high retail prices and the factors that prevent them from reducing the prices of vegetables and fruits.

**Market Observation:** Observe the flow of the market to understand how food is handled, stored, and transferred at different stages of the supply chain. This will help identify inefficiencies and potential areas for improvement.

**Requirement Analysis:** Based on the information gathered from interviews and observations, identify the key requirements for the proposed system. This includes understanding the needs of farmers, consumers, and other stakeholders.

**System Design:** Design a comprehensive web-based system that addresses the identified requirements. The design will focus on creating a user-friendly interface, ensuring robust security, and providing essential features such as product listings, direct contact details, and a rating system.

**Iterative Development:** Develop the system incrementally, allowing for regular evaluation and refinement of each module. This approach ensures that the final product effectively meets the users' needs.

**User Testing and Feedback:** Conduct user testing sessions to gather feedback from farmers, sellers, and consumers. Use this feedback to make necessary adjustments and improvements to the system.

**Continuous Improvement:** Regularly update and improve the system based on user feedback and changing market conditions, ensuring the platform remains relevant and effective.

By following this methodology, the project aims to create an efficient, transparent, and user-centric platform that bridges the gap between farmers and consumers, ultimately leading to fair pricing and improved market dynamics for vegetables and fruits in Sri Lanka.

## **Proposed Approach:**

### **Customer-Seller Interaction**

The platform will facilitate direct contact between buyers and sellers across the country. Buyers can search for and access detailed listings of products from various sellers, including farmers. Each listing will include contact details, allowing buyers to reach out directly to sellers to negotiate prices and arrange transactions. This direct interaction reduces the need for intermediaries, ensuring fresher products for consumers and better profits for farmers.

By implementing these bellow modules and features, the Economic Food Exchanger Web Application will create a more equitable, efficient, and transparent marketplace, connecting farmers directly with consumers and addressing the inefficiencies of the traditional supply chain.

The system is divided into six main modules:

1. System User Management module

This module manages user accounts and privileges, including functionalities for registration, login, and profile management. It ensures appropriate access levels for farmers, consumers, and administrators.

2. Privilege Management module

This module defines and controls user access levels, ensuring users can only access features relevant to their roles. This enhances security and operational efficiency.

### 3. The Product Management module

This module allows sellers to add, edit, and delete product listings. It categorizes products for easier navigation and search, includes inventory management for real-time product data, and manages both wholesale and retail markets. The module features:

**Listing Items:** Sellers can list their products for sale, whether for mass quantity or household use.

**Daily Price Updates:** Prices are updated daily according to the central bank's daily price report.

**Promotions:** Sellers can add promotions, displayed on a promotional wall to attract users.

**Filtering Options:** Advanced search and filtering options help users easily find specific products or sellers based on various criteria such as location, price, and product type..

### 4. The Analytics and Reporting module

This module generates reports and provides analytical insights. It helps farmers with sales performance, market trends, and product demand while aiding consumers with data on product availability and pricing trends. The module features:

**Price Trends Chart:** A chart displaying price changes and trends for various products, supporting decision-making for both sellers and buyers.

**Product Trends Chart:** A chart displaying Product changes and trends for various periods, supporting decision-making for sellers and buyers.

**Daily price update:** Ensures accuracy of the market price according to the daily price report of the issues by central bank of Sri Lanka.

**Reporting Options:** Detailed reports on sales performance, market trends, and product demand.

### 5. The Marketing and Promotions module

This module enables the creation and management of promotional activities. It supports discounts, special offers, and loyalty programs, increasing user engagement and driving sales.

## 6. The Feedback and Review module

This module allows consumers to provide ratings and reviews, fostering transparency and trust within the platform. It helps sellers improve their offerings based on consumer feedback.

### Resource Requirements:

Hardware	Software
Processor: i3 6 <sup>th</sup> gen or E1-6010 with Radeon dual-core processor Memory: 1GB HDD/SSD Space:10GB Monitor	Browser Java MySQL Os(windows 10 or latest ) Intellij Idea MySQL Workbench

Table 1 Hardware and Software Requirements

### Time Schedule

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Gathering and analyzing Info									
planning project structure									
User Management									
Privilege Management									
Product Management									
Communication									
Feedback and Review									
Marketing and Promotions									
Analytics and Reporting									
Prepare Documentation									

Figure 1 Gantt Chart