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Problems Faced by the Agricultural Sector and Solutions for the Impending Food Crisis in Sri Lanka

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ABSTRACT

The purpose of this research was to pinpoint the challenges faced by sri lankan farmers as a result of the financial crisis, as the country's government failed to boost domestic production of organic pesticides and fertilizers or offer farmers subsidies to purchase them. Crop yields were destroyed by the unexpected policy change. Average yields of rice, a staple food in sri lanka that was previously produced successfully and even exported, were reduced by about 30%. The department of census and statistics' agriculture and environment statistics division gathers, analyzes, and disseminates data pertaining to this crisis. The division compiles statistics on the extent and production of paddy as well as other temporary and seasonal crops, livestock, and production costs. The main goal of this study is to provide solutions to the problems that sri lankan farmers face, such as those related to production, marketing, and finances. The "agropro" website, which we have implemented, is one of the best solution providers in sri lanka for the aforementioned crisis. The purpose of this website is providing solutions and sample techniques, after investigating the goal, primary data which was gathered from the farmers. Findings: to learn about the farmers' experiences with production, marketing, and financial issues. This study aids in boosting agricultural productivity and encourages farmers to produce more goods. Originality and value. Extreme care was taken to provide pertinent explanations in vernacular to enable the respondents to respond as precisely and confidently as possible.

Keywords-- Agricultural, Economy, Farmer, Financing, Problem

I. INTRODUCTION

Sri Lanka is an agricultural nation. Farming and its associated activities are the primary source of income for more than 80% of Sri Lanka's rural population. It gives work through 52% of the work. Its commitment to gross domestic product (GDP) is between 14 and 15% [1]. According to the statement, the term "farmer" will refer to a person who is actively involved in the financial or potential commercial movement of developing harvests and delivering other essential agricultural wares and will incorporate all agricultural operational holders, cultivators, agricultural workers, and tenant farmers.

Sri Lanka is relied upon to accomplish the driven objective of developing agricultural sector by 2022, because of increased interest in agricultural framework, for example, water system offices, warehousing, and cold stockpiling. The agribusiness sector in Sri Lanka is expected to produce more force in the coming years. Besides, the developing utilization of hereditarily altered harvests will probably improve the yield for Sri Lankan farmers. Sri Lanka is expected to act naturally adequate in heartbeats in the coming many years as a result of researchers' deliberate effort to get early developing assortments of heartbeats and the expansion at the least help cost. During the last one and a half-decade, a few difficulties have surfaced in Sri Lankan agribusiness, which is getting increasingly more extreme with the progression of time. This is identified with the production of yield, skill, value, and manageability. The rate of development has been lower for agri-business growth, which shows that capital pay in agriculture falls. This is regarded as the primary reason for a wide range of rural pain and a large number of self-destructive actions by farmers in various parts of the country. Another great test is to guarantee the practical utilization of common assets. While it is obvious that agricultural development must be accelerated, the nation's typical asset base is shrinking.

There are also indications of land corruption and over-exploitation of water in the country. The situation calls for improving the intensity of Sri Lankan farming, which requires improvement in effectiveness in agricultural creation, advertising, transport, and so on. There is a solid inclination in the nation that mediation in the food market has profited just agriculturally reformist areas. The downpour

was taken care of, and dry land agribusiness locales have been disregarded. There is likewise genuine worry about the practicality and eventual fate of more modest-sized possessions, which comprise the greater part of the farmers in the nation. There are a few factors/reasons that have contributed to the current situation where horticulture has an unfavorable reputation in the country. The premier has been absent from a clear approach to agribusiness for quite a while. The country did not alter its institutional instruments or administrative structure in order to create a climate conducive to agricultural development, which was expected to adapt to changes in domestic and global climate. This relates specially to supporting private areas in yield markets and seed markets. The subsequent explanation is the disregard of the foundation and the redirection of assets to egalitarian measures [2]. A third explanation is a log jam in innovation arriving at a possible district and debilitating the expansion framework for dispersal of innovation.

Some of the major drawbacks identified by similar existing systems on guiding people to overcome agricultural problems include inaccurate surveys, a lack of problem identification, insufficient solutions or methods for problems, and a lack of precise information. As the “AgroPro” solution providers website has clearly corrected in problem identification, having discussions with stakeholders such as farmers, traders, agricultural experts, and consumer representatives by providing information on new agricultural techniques, organic fertilizer production, good agricultural practices, agricultural innovations, and product exportation.

Agricultural improvement is fundamental not exclusively to accomplish independence in food grains at the state level, but in addition to guaranteeing family food security and to acquiring value dissemination of pay and abundance, bringing about an extreme decrease in the destitution level Indeed, high financial development will have no significance for the majority of individuals living in country zones, except if horticulture is renewed.

During the research process, the following research methods were used: table research, which focused on the impending agricultural crisis and what needed to be done to overcome the current situation. The information gathered has been classified into six major issues: economic problem, fertilizer issue, inability to cultivate, lack of knowledge in agricultural techniques, lack of agricultural innovations, and no proper methods for exporting the harvest, with solutions such as the proposed solution for the fertilizer issue, agricultural methods and techniques, agricultural innovations, and proper methods for exporting the harvest.

When looking into the sections of the research paper, introduction of the research paper introduces the scope of the project with detailed emphasis on the background of the problem. Digitalization in the agricultural sector provides a general prospective of how technology is being used currently in the Agricultural sector to overcome the crisis. AgroPro website provides a high-level view on the user that the project is developed for. This section provides the background study of the users. Problem Statement defines all the major issues that the user faces. The section provides a detailed description of the background of the problems the user faces with reasoning on why the set of the problems require a solution set. The scope of the research paper defines the features and characteristics of the intended solution. It describes on what features or services that are offered to the users and how the solution work to solve the problems.

Requirement analysis addresses the main question of ‘What needs to be built?’. Using Requirement Elicitation methods such as Observation, Prioritization and Classification, gathering and analyzing of requirements were done. As Requirement Specification, an analysis of functional requirements and other requirements were set down. Design addresses two main questions, how the system should meet user requirements and how the system could be made effective, efficient and reliable. System is visualized, specified and constructed. Methodology consists and describes the static structure of the system using objects, classes and relationships. Implementation addresses the creation, assembling and molding of the system using the design model and technology and tools. This section states how technology was infused to construct or design the intended output that catered the requirements of the user. Testing addresses the question of whether the system that has been built correctly. System is not 100% bug free therefore testing allows minimization of errors and ensures necessary steps were maintained to achieve the output.

Conclusion discusses the project as a whole taking into account, the realizations of the project’s objectives, limitations and weaknesses of the approach taken to develop the project with appropriate solutions. References states and lists all the sources that were used during the course of the project and also for writing the research paper.

II. LITERATURE REVIEW

This paper argues how the economic crisis affects people through the food crisis and food inflammation. The AgroPro System offers solutions to the challenges caused by the food crisis facing the people of Sri Lanka.

There are systems that address the food crisis, and in that work, the author elaborates on the lack of access to farming lands, land grabbing, unfair trade rules, and the "financialization" of food. Lack of Access to Farming Lands and Land Grabbing are some issues, like in the other work [6], but after conducting research, we found that they are not the central feature of the current Sri Lankan scenario. Our investigation revealed that the primary contributor to the

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current food crisis is the prohibition on agrochemicals and fertilizers for farmers. Farmers consequently suffered greatly as a result of the fertilizer prohibition because their produce was lost. The AgroPro system is used to suggest several methods for producing home fertilizers. Even if it takes some time, we contend that it's one of the best options for all farmers. Therefore, the system demonstrates how to make fertilizer on your own.

Similar to other works, Unfair Trade Rules had some influence on the current food crisis. Small-scale farmers are regularly mistreated by large corporations and underpaid for the value of their labor and output. While more resourceful farmers may be given contracts for the supply of food, small-scale farmers usually work as contract labor on farms. This is relevant to our work because, as we discovered via study, small-scale farmers also experience this issue. The AgroPro system offers guidance on how to transition to large-scale farming step by step and gives help in identifying farming failures.

Our analysis revealed that the economy's food issue is exacerbated by the lack of innovative technologies. We can ease the food issue if there are more agricultural breakthroughs. So, using the AgroPro system, we offer answers by sharing knowledge about how to implement advances.

III. METHODOLOGY

A. Tools and Technology

The creation, assembly, and molding of the system using the design model, technology, and tools is addressed by implementation. This section describes how technology was used to build or design the intended output that met the client's needs. MEARN Stack (Front End Development with React.js, Back End Framework with Express.js, Backend Language with Node.js, Database Management with MongoDB, and Version Controlling System with Git, GitHub) is the proposed development technology.

MERN is one of several MERN stack (MongoDB Express Node) variants in which the traditional frontend framework is replaced with React.js. MERN (MongoDB, Express, React, Node) is another option, as is any frontend JavaScript framework.

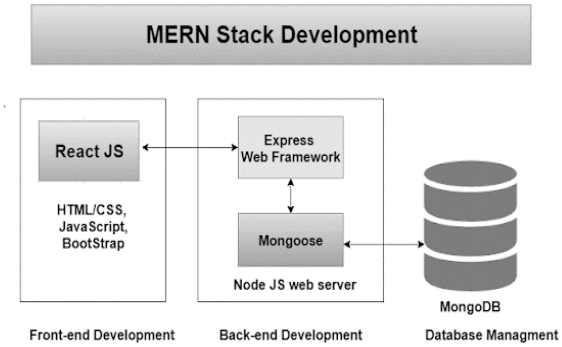

Figure 1: High-level Architecture Diagram.

The top tier of the MERN stack is React.js, a declarative JavaScript framework for developing dynamic client-side HTML applications. By connecting simple Components to data on your backend server and rendering them as HTML, React allows you to create complex interfaces.

The next level down is the Express.js server-side framework, which runs inside a Node.js server.Express.js bills itself as a "fast, unopinionated, minimalist Node.js web framework," and that is exactly what it is. XML HTTP Requests can be powered the application by connecting to express.js functions.

If the application stores data (user profiles, content, comments, uploads, events, and so on), we'll need a database that's as simple to use as React, Express, and Node. That's where MongoDB comes in: JSON documents generated by your React.js front end can be sent to the Express.js server, where they can be processed and (if valid) stored directly in MongoDB for later retrieval.

B. Hardware Requirements

The proposed system requires;

- CPU: Core i3 or more
- RAM: 4 GB or more
- Graphic: Intel HD Graphics or more
- Display Resolution: 1024×768 is minimum.
- Disk Space: 10GB

C. Back-end Process Related to the Main Functions/Features of the Proposed System

For the development, a serverless approach was chosen. MongoDB was chosen as the backend, and Mongo-database as the database. MongoDB is a Google cloud-hosted database that is positioned as Backend-as-a-Service (BaaS). It is a NoSQL database that stores data as key-value pairs. If the application stores data (user profiles, content, comments, uploads, events, and so on), we'll need a database that's as simple to use as React, Express, and Node. MongoDB comes into play here: JSON documents created in your React.js front end can be sent to the Express.js server, where they can

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be processed and stored directly in MongoDB for later retrieval.

React was chosen as the front-end technology. The main reason for choosing.

React was that it allowed developers to create large web applications that could change data without having to reload the page.

React's Key Characteristics:

- Possess an excellent developer's toolkit
- Faster rendering than other web frameworks
- No need for separate markup and logic files

D. Designing

The solution for developing a new web application is system design. The detailed implementation of the feasible system is the focus of this phase. It focuses on design translation. The development of a system is divided into two stages.

- Physical Design
- Logical Design

During the logical design phase, the analyst describes inputs (sources), outputs (destinations), databases (data sores), and procedures (data flows) in a user-friendly format. The analyst also specifies the user's needs at a level that determines the information flow in and out of the system as well as the data resources. Data flow diagrams and database design are used to create the logical design. By defining the design specifications, which specify exactly what the candidate system must do, physical design creates the working system. The team members perform the necessary software implementations that accept user/customer input, achieve necessary processing on accepted data, and create the required report on hard copy or electronic media.

Finally, code testing is critical in this system. Static application security testing allows developers to take control of code security (SAST). SonarQube is hardened for the organization's stability and robust performance, and it improves the workflow. It is an open-source platform developed by Sonar-Source for continuous code quality inspection. Static code analysis is performed by Sonar, which generates a detailed report of bugs, code smells, vulnerabilities, and code duplications.

IV. PROPOSED SYSTEM

A. System Overview

When the main functions of the proposed system are taken into account, user management, service management, shopping cart, checkout, advertisements, and offers are taken into consideration.

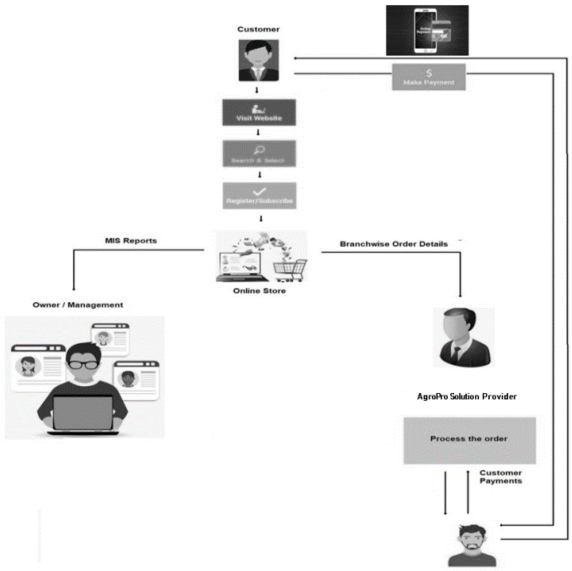

Figure 2: System Overview

Users and admin are the two types of users in AgroPro. To begin, all users must register with the system and provide the necessary information. Users can also view the website without registering with the system. The admins and the users both have separate logins to the web application and use the system as needed. They can update their account details and, they can delete the account if needed. Reports of the current customers registered to the system can be generated with their subscriptions.

Admin adds items to the web application providing details about the item with relevant pricings. Admin can update price and details of a product. Also, admin update the details of the items entered and can delete those from the system accordingly. Reports of the items in the system can be generated.

The user can add items to their shopping cart, remove items from their shopping cart, and increase the quantity of each item. The products you've chosen will be displayed in a list. The estimated total price of selected products is displayed when you select the generate bill option in the shopping cart. A report will be generated taking into account the percentage of each product added to the shopping cart, allowing the most popular products among customers to be identified and prioritized when promoting.

Admin can add new advertisements, promotions, and discounts. Also, admin can update details and delete advertisements, advertisements, and promotions. Finally, weekly and monthly reports are generated displaying advertisement details

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B. Class Diagram

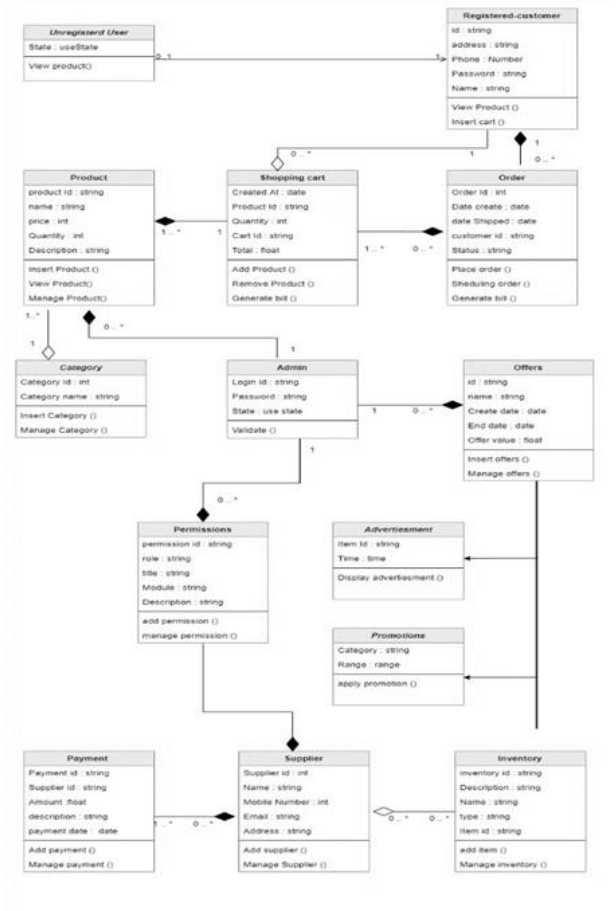

Figure 3: Class Diagram.

V. DISCUSSION

Based on the principles of sustainable development, Sri Lanka's agricultural development strategy includes establishing an environment that will support the improvement of competitiveness in the agricultural sector, increase production of high-quality goods, ensure food safety and security, and contribute to the resolution of an impending crisis.

The agriculture sector accounts for approximately 7.4 percent of national GDP, with the fisheries sector accounting for approximately 1.3 percent and the livestock sector accounting for 0.9 percent. The agricultural sector employs more than 30% of Sri Lankans [3]. Although Sri Lanka is a fertile tropical country with the potential for crop cultivation and processing, issues such as profitability and productivity limit the sector's growth.

Each individual would contribute to the agricultural sector with the help of the solutions that will be provided to the people through this research paper, and the country would face the impending crisis in a much better way.

When discussing key findings on the proposed AgroPro website, the problems and solutions listed below can be taken into account.

V.1.1 Problems

V.1.1.1 Economic Problem

The economic unrest in Sri Lanka has escalated into a severe political crisis and humanitarian crisis. For the first time in its history, the government went into default on its debt in May. This was the result of years of economic mismanagement that left the public purse empty and a limited number of leaders richer.

Food shortages have been the main cause of people's problems. Sri Lanka is unable to import the food it requires. Importing food has been challenging due to the difficulty of bringing in many necessary items from abroad due to record low foreign exchange reserves. As a result, costs have risen; last month, food inflation reached 90%. The cost of basic foods like rice and veggies has risen.

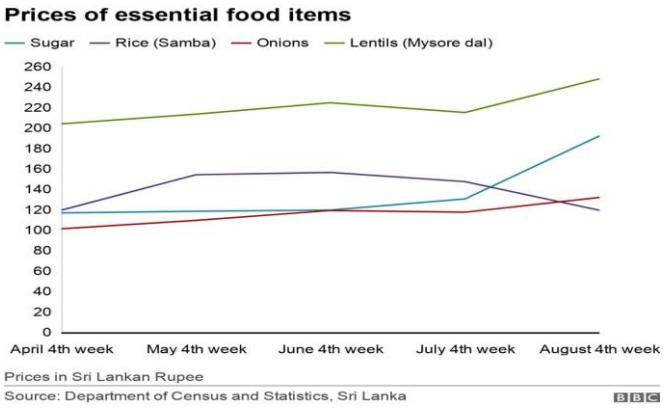

Figure 4: Fluctuations in the prices of essential food items in the year 2022

The cost and scarcity of cooking gas cylinders make it challenging for many people to maintain kitchen fires. Another enormous challenge is making huge pots of rice and curries in community kitchens for hundreds of people. Although Colombo makes it difficult to obtain sufficient stores, many must cook with fires. In Sri Lanka, an island with a teardrop shape south of India, there are growing concerns about a famine catastrophe. There are frequent shortages of goods like milk powder and flour.

According to data from August, the World Food Program estimates that [9],

- Food inflation is already at more than 90% year-over-year, and that out of a community of 22 million people, 6.7 million Sri Lankans are not eating enough. The population's ability to provide enough

wholesome food for their families has been severely hampered by rapidly rising food prices.

- The majority of surveyed households (61%) consistently utilize food-based coping mechanisms including eating less favored and less nutritious meals or consuming less food overall. Two out of every five households do not eat enough food.
- In the estate sector, where even more over half of families' experience food insecurity, the situation is severe. These households consistently perform worse than urban and rural populations across the board when it comes to measures of food insecurity and coping mechanisms. Estate communities are already using credit to buy food and other needs, while urban people are currently emptying savings to get by.
- According to estimates, 200,000 households are utilizing emergency livelihood coping mechanisms, which will most likely have a negative medium- to long-term impact on their ability to engage in income-generating activities. As the crisis worsens, WFP expects that even more individuals will use these coping mechanisms.
- The most severely affected sectors are those related to food security, agriculture, livelihoods, and health.

Prices shot up as much as 200%

Table 1: Cost of essentials on March 23, 2022 and March 23,2021 in Sri Lanka Rs

	2022	2021
Tomato	320	120
Dal	420	180
Coconut	110	50
Egg	30.5	15
Coconut oil	852	486
Potato (Local)	280	160
Brinjal	240	140
Sugar	188	112
Carrot	240	160
Rice	185	128
Big Onion	170	120

*The price for coconut oil is for a liter and for eggs that of one piece. For all others, costs are for a kg.
Source: Central Bank of Sri Lanka

V.1.1.2 Fertilizer Issue

However, Sri Lanka's food security has suffered as a result of government efforts to make the nation the first in the world to fully adopt organic agriculture by banning all synthetic agrochemicals, including fertilizers and pesticides. The ban was enacted overnight in May of 2022 in an effort to improve soil health and combat a mysterious kidney illness that affects farmers and may be caused by exposure to excessive nitrate levels.

And the issue was made worse last year when the government abruptly ordered a conversion to organic farming, which reduced local harvests by nearly 50%. Since then, the prohibition on artificial fertilizers has been lifted, but the shortages have made food even more scarce.

The government has been compelled to buy rice from India and Myanmar due to the lack of fertilizer application. The costs have escalated by more than doubling due to the shortage and impending food crisis. The island nation's staple meal is rice. A shipment of organic fertilizer that Sri Lanka imported from China was rejected by Sri Lankan authorities because the supply did not adhere to the necessary specifications. Later, the government imported nitrogen fertilizer from India, but farmers refused to use it because of its offensive odor and poor agricultural quality. Due to the lack of fertilizer, all of these acts caused farmers to face significant losses as their harvests shrank. Until present, however, little has been done to help these farmers.

V.1.1.3 Inability to Cultivate

Many farmers have completely avoided rice planting this season due to prohibitive prices. Because of that millions of people in Sri Lanka are suffering severe food shortages, which is escalating the country's economic catastrophe into a humanitarian disaster. So people with resources have begun storing supplies in response to the World Food Program's warning that ending hunger will be one of Sri Lanka's toughest problems in the coming months. Nearly a fifth of the population, according to the UN, already needs food aid.

The farmers, who own paddy and other cultivations, made the decision that they no longer had enough income to run a farm after a government ban on chemical fertilizers reduced their rice production in half during the March harvest. Thus, it results in a failure in cultivation.

V.1.1.4 Lack of Knowledge in Agricultural Techniques

Technology should to change agriculture, boost output, and advance the cause of agriculture. Farmers understandably worry that they can choose the wrong technology for their operation and end up with a costly system that quickly becomes useless. The number of emergency pesticide authorizations that are still being issued in Member States to extend their use to a specific crop or pest where a regular authorization is not available and this to prevent crop losses serves as an example of how difficult it is to find effective alternative methods. Alternative measures must also be made known to farmers when they are available.

V.1.1.5 Lack of Innovations Related to Agriculture

One of the slogans reads, "Innovation is the motor of progress." This idea certainly holds true in the industrialized

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world, where innovation efforts are becoming more and more important. We require concepts and strategies that boost the competitiveness of domestic agriculture and the national economy in order to improve the existing situation. Hungary must raise its standards in research, innovation, technical development, and education if it wants to comply with EU regulations.

Innovation efforts in agricultural production are currently far less robust than they were in the 1970s, when innovation in the production of raw materials exceeded that in the processing and distribution of food. A persistent lack of innovation could lead to the current situation throughout the entire sector, but this widespread decline may instead be laying the framework for a prospective revival.

V.1.1.6 No Proper Methods to Export the Harvest

Without sufficient planning, the strategy failed. The whole Sri Lankan agriculture chain, which employs about a third of the workforce and accounts for 8% of the country's GDP, experienced interruptions. Tea export revenue, a significant source of income, decreased.

V.1.2 Proposed Solutions

The primary goal of this research was to find the ideal response to the impending food shortage brought on by Sri Lanka's economic crisis. The best way to address the agricultural sector's problems in all of their aspects is for each and every citizen of our nation to grow some of the food they need on a daily basis. In order to best serve our own interests, that is where we get involved in this crisis to aid the people. In order to prepare people for the impending food shortage, we will provide them with instructions, solutions for implementing new techniques, alternative cultivation solutions, and product inventions.

As most people have access to the internet and we live in a global village, we made the decision to develop a web application that assists every citizen of the nation in meeting their daily food needs to some extent by providing instructions, solutions for implementing new techniques, alternative cultivation solutions, and product inventions through articles so that we can effectively deal with the impending food shortage.

V.1.2.1 The Proposed Solution for the Fertilizer Issue Arose as a Result of the Economic Crisis

The lack of fertilizer imports and domestic production is the root of this massive agricultural failure. The absence of imported fertilizers won't have an impact if the appropriate methods and techniques are used to produce them domestically. As we all know, Sri Lanka is rich in natural resources that can be used to produce a wide range of efficient fertilizers and fertilization techniques.

It is a substance that is added to the soil or sprayed on crops aboveground in order to provide nutrients, boost crop yields, and enhance the quality of the final product. NPK fertilizer, compound fertilizer, micro-element fertilizer, etc. are examples of direct fertilizers that provide crops with essential nutrients. By enhancing the physical and chemical characteristics of the soil, indirect fertilizers, such as lime, gypsum, and bacterial fertilizers, improve the growth conditions of crops. In addition to having many different classification schemes and types, fertilizer also comes in a wide range of ingredients and chemical properties.

The majority of the world's food is produced with the help of synthetic fertilizers, which are crucial in developing nations. That will make moving away from them difficult, according to experts. However, there are many initiatives to establish a more sustainable method of food production. According to the UN's COMTRADE database on global trade, Sri Lanka imported fertilizers worth US$169.37 million in 2021 [4]. A nation like Sri Lanka, which has all the necessary raw materials to produce common fertilizer, ought to be able to address the resource shortage. Consequently, our nation will suffer greatly as a result of spending this much foreign currency on importing these fertilizers.

- Introducing different types of techniques on producing homemade compost easily and their appliances.
- Introducing methods on increase the NH3 (ammonia) content on soil for better growth
- Introducing on homemade production of fertilizers with different states and guidance on how to use them on plantation
- Livestock manure
- Agricultural Waste

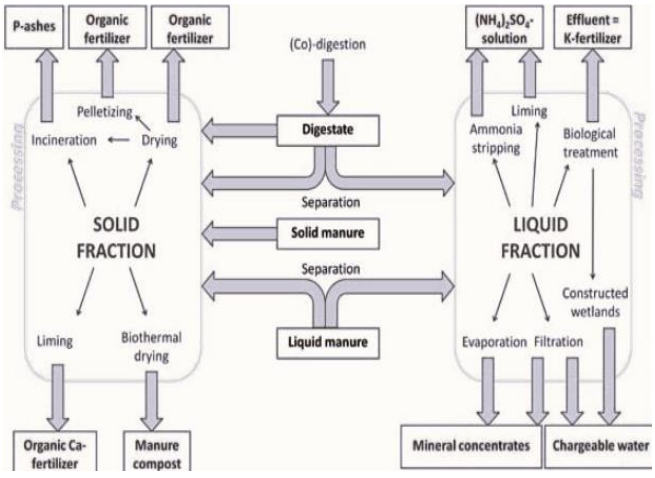

Figure 5: Manure to valuable end products

These are some of the techniques that can be used as domestic fertilizers, and we will provide extensive knowledge in producing various types of domestic fertilizers in addition to the points mentioned above.

V.1.2.2 Agricultural Methods and Techniques

Farming is a particularly difficult profession. Farmers have had to devise novel solutions to farming problems due to a wide range of environmental challenges. As a result, they must become extremely adaptable individuals over time. Furthermore, new challenges have emerged in recent years as a result of challenges in weather conditions and the global economy. Farmers' low level of education and lack of communication have frequently resulted in a general lack of awareness regarding modern agricultural research and inventions.

Agriculture can be broadly classified into the following points:

- knowing the type and strength of their farmland soil
- obtaining the appropriate seeds
- Sowing in the appropriate time
- Water supply/monsoon and
- Harvesting at the appropriate time

Any flaw found in any of these steps will have an impact on crop yield. The major farming problems caused by a lack of knowledge about agricultural techniques, as well as potential solutions, are discussed below [11];

- Inadequate agricultural land
- Lack of good quality seeds
- Scarcity of resources
- Lack of mechanization
- Inadequate water supply or irrigation

When it comes to solving the problems listed above, invention is more important than ever in modern agriculture. The industry as a whole is confronted with formidable obstacles, such as rising labor and supply costs and shifting consumer preferences for sustainability and transparency. We have introduced new techniques through this research, such as,

- Indoor vertical farming
- Automation and robotics
- Livestock technology
- Modern greenhouse practices
- Precision agriculture and artificial intelligence\ Blockchain

For a variety of reasons, farm productivity is essential. A more effective allocation of resources is referred to as increased agricultural productivity. A crucial component of productive farming is learning how to increase output. Farmers can now increase production while also ensuring the long-term viability of their farms thanks to new methods and techniques. The following are some techniques that can be used to improve cultivation for better results,

- Implementation of land reforms
- Interplanting
- Planting more densely
- Planting many crops
- Raised beds
- Smart water management
- Heat Tolerant Varieties
- Use nitrogen, etc.

V.1.2.3 Agricultural Innovations and Proper Methods for Exporting the Harvest

Agriculture has changed significantly over time as a result of technological advancements. Humans have invented new techniques to increase farming productivity and yields, from the invention of the plow to GPS-driven precision farming machinery. We are constantly trying to develop new irrigation techniques or develop more disease-resistant plant varieties. The ability to feed the growing global population while preserving the freshwater supply depends on these iterations. Innovation in modern agriculture is more important than ever. The industry as a whole is confronted with formidable obstacles, including rising supply costs, a labor shortage, and shifting consumer preferences for transparency and sustainability.

- Bee Vectoring Technologies
- Precision Agriculture
- Indoor Vertical Farming
- Animal Farming Technology
- Scarecrows with lasers
- Farm Automation

Sri Lankan honey bees are very valuable when it comes to Sri Lankan crop production. Since bees are crucial to human survival, agricultural equipment is becoming more innovative to help protect bees and maximize their pollination abilities. By replacing chemical pesticides with an environmentally friendly crop protection system, BVT uses commercially raised bees to deliver targeted crop control through pollination.

In order to help farmers, improve and raise soil quality and productivity, precision agriculture is a method of managing agricultural resources that gathers, analyzes, and evaluates data. With the help of this advancement in agricultural technology, which uses big data to support management choices, farmers are now able to control crop yield variables like moisture content, soil quality, and microclimates to maximize output. In order to increase crop productivity and optimize agricultural resources, it makes use of robotics, automation, drones, and remote sensing systems.

When using indoor vertical farming, farmers are not constrained by this issue. This farm products are grown indoors in vertical stacks in a secure, controlled environment. In order to increase crop yield in confined spaces, technology uses growing shelves that are mounted vertically. Frequently, the shelves don't need soil because they are either hydroponic or aeroponic. Growing plants in water and nutrient solutions is known as hydroponics. In aeroponics, plant roots are

suspended in the air and periodically sprayed with water and nutrients by emitters.

In new livestock technologies give farmers data-driven insights that help them organize their operations, take better care of their animals, and increase productivity. Without human assistance, automated dairy installations milk cows, and the milk sensors also assist farmers in keeping an eye on the milk quality. Waste is removed by automated cleaning systems, creating healthier environments free of disease.

With the help of these agricultural innovations and new techniques, product exportation also should be considered. In addition to producing a wide range of other crops and goods for export, Sri Lanka also produces Ceylon tea, rubber, fruits, vegetables, and Ceylon spices. This includes products like areca nuts, cocoa, vanilla, and betel leaves. The vast majority of these unconventional organic products are made by small farmers.

The farmers' traditional knowledge fits with contemporary green ideas and has little effect on the environment. Growing a variety of organic products is now possible due to Sri Lanka's current economic issues, and factors like the availability of local resources and skilled labor, flexible business practices, and compliance with international standards all help to make this industry sustainable and lucrative over the long term.

VI. CONCLUSION

In conclusion, accelerating the technology transfer studies should be the first step in resolving the issues facing farmers. Many research studies are sitting on the shelves, ready to be shared with the farmers. While structural flaws in farms and agricultural institutions should be fixed, extension should receive special attention.

There is no doubt that any advertisement includes a benefit-focused rationale, but at the same time, the promotion must be based on particular qualities, standards, and ways of thinking, such as providing fair and reasonable prices to farmers who put in a lot of effort to make a living. A controlled market framework will help to streamline and strengthen agricultural promotion by implementing fundamental changes along with the proper value revelation components. The promotion of horticulture can be strengthened if producers, mediators, experts, and chairmen combine their party and incorporation efforts. It's time to introduce innovative and critical agricultural advertising methodologies along with creative approaches to get work products to farmers.

The "AgroPro" website, which we implemented, is one of the best solution providers for the aforementioned crisis in Sri Lanka. The project was a good cognitive style for the entire team because it provided exposure to a real-world scenario and helped to solve a problem that existed in the chosen target. The AgroPro website plays an important role in assisting users in overcoming the impending crisis.

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