Implementation of ERP in Agriculture Industry in Sri Lanka

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DOI: https://dx.doi.org/10.47772/IJRISS.2025.90400311

Received: 03 April 2025; Accepted: 07 April 2025; Published: 13 May 2025

ABSTRACT

Sri Lanka is a country which is rich in fresh healthy soil and nutrients that may support any type of plant, even if it is tossed carelessly. Sri Lanka is currently undergoing a massive economic crisis that no one has ever seen before in its history. Lack of influence and a lack of attention to arable lands are two of the most important factors. Sri Lanka spends more US dollars per year on rice, dhal, and other staple foods. Nonetheless, Sri Lanka has sufficient resources as a nation to endure this circumstance. As students born in Sri Lanka, we have a responsibility to develop innovative approaches in which the Sri Lankan government may take the lead. Being able to study in Japan has offered ample motivation to boost agricultural productivity all around the world.

Japan, New Zealand and Canada are countries that employ technology to meet its manufacturing goals in a fraction of a second. They now have access to ICT expertise, which has resulted in increased efficiency in their agriculture industry. Yield optimization, addressing labor shortages, meat alternative research, real-time risk management along the supply chain, assurance of the quality of food with traceability, ensuring food security by locating and isolating disease outbreaks in animals and plants, waste reduction within the supply chain, biosecurity, conversion efficiency on farm linked to AI are all areas that are thought to benefit, if not transform, from the use of AI in agriculture.

If the appropriate effort is made, this new combination can be adapted to the Sri Lankan setting. The technical improvements in the agricultural fields were researched in this study by a rigorous review of the literature, interviews with farmers in ascending hierarchies, and field observations. Furthermore, agricultural firms that have adopted ERP will be chosen for the purpose of data collection to improve agricultural productivity. This information will be disseminating among Sri Lankan farmers and other responsible authorities in future.

Keywords: Agricultural productivity, Technology Integration, Economic Crisis

BACKGROUND

Sri Lanka is currently experiencing its worst economic crisis in more than 70 years, with its economy contracting by 1.6% in the first quarter of this year. The nation is in talks with the International Monetary Fund for a rescue after defaulting on its $51 billion in foreign debt (IMF). In 2021, inflation reached a record high of 45.3%, and this year, the rupee has lost more than 50% of its value versus the US dollar. The lack of foreign money needed to import fuel, fertilizer, and other necessities has severely hurt the nation's economy [8].

Sri Lanka's foreign currency reserves have virtually run dry, meaning it doesn't have enough funds available to buy goods from other countries. Sri Lanka now imports $3bn (£2.3bn) more than it exports every year, and that is why it has run out of foreign currency [6].

Gaps in production line within the country can be identified as one critical factor that may contribute significantly to Sri Lanka's economy losing ground quickly. Even though Sri Lanka has arable lands and a climate that may sustain abundant output, it is claimed that its production is poor since there aren't enough

driving forces there.

Early in 2021, when Sri Lanka's foreign currency shortages started to become a significant issue, the government tried to control them by forbidding the import of chemical fertilizer. Farmers were advised to substitute locally supplied organic fertilizers. Crop failure was widespread as a result. Sri Lanka had to import food to supplement its domestic supplies, which made the country's lack of foreign cash worse. According to a March 2018 IMF report, the prohibition on fertilizers (which will be lifted in November 2021) also harmed tea and rubber exports [6].

ERP systems are being used more often in Sri Lanka to improve operations and achieve a competitive edge. In compared to other more industrialized industries, ERP implementation in agriculture has frequently been low. To the best of knowledge, studies in this field in the context of Sri Lanka — a developing Asian nation – are notably few. This was the major reason for doing an ERP research in the first place [3]. There is a lot of opportunity for technology-based research in Sri Lanka, such as ERP systems. However, in the information communication technology, there are few studies on the impact of ERP systems on Sri Lankan firms.

LITERATURE REVIEW

Enterprise Resource Planning (ERP)

Most organizations are transitioning from being function-driven to being process-driven, and Enterprise Resource Planning (ERP) helps to integrate corporate processes (ERP). ERP refers to the method by which a corporation, usually a manufacturer, manages and integrates the various aspects of its operations. As a result, ERP systems are becoming increasingly popular among businesses both globally and domestically.

ERP systems were identified by Osnes et al., (2018) as standardized, off-the-shelf software products. As a vast number of firms use ERP software at various levels, many scholars have recently focused their attention on ERP installation. ERP adoption, on the other hand, is a difficult task due to its complicated configuration, adaption, and data conversion [1]. When it comes to installing an ERP system, the most important consideration is the company's size, which is determined by the number of people and revenue [2]. The majority of larger corporations use more ERP functionality than small businesses [2].

Over the years, the worldwide ERP market has risen tremendously. The global ERP market is predicted to reach $47 billion in sales between 2007 and 2022, according to ERP data (ERP Software Market, 2018). Industry verticals, installation, geographies, and applications are the four primary divisions of the ERP market. Manufacturing, Banking, Financial Services and Insurance, Entertainment, Healthcare, and Information Technology are among the industry verticals. Geographically, it spans three continents: North America, Europe, and Asia Pacific. Many organizations in the South Asian region, including those in Sri Lanka, are considering implementing ERP, and some have already done so. The industrial sector accounts for the majority of ERP implementations in Sri Lanka [2].

Agriculture industry in Sri Lanka

Since Sri Lanka was one of the world's leading agrarian societies throughout the ancient kingdoms, the country has a lengthy history in the agriculture sector. Paddy cultivation began to spread to Sri Lanka [3].

The country of Sri Lanka has access to sufficient natural resources to support its own production-based agriculture. Due to the country's three distinct climate zones—a "Wet Zone" in the South-Western region, a "Dry Zone" that primarily covers the Northern, North Central, Eastern, and South-Eastern plains, and a "Intermediate Zone" that skirts the central hills except in the North-West and the South—Sri Lanka has a greater potential for year-round agriculture. The Dry Zone experiences a distinct dry season from May to September, with mean annual rainfall of less than 1750 mm. While the Wet Zone experiences a longer and more pronounced dry season, the Intermediate Zone experiences mean annual rainfall between 1750 and 2500 mm. There are two primary seasons that coincide with agricultural cultivation: the "major rainy season," which lasts from November to January, and the "minor rainy season," which lasts from May to July [3, 4].

Agriculture is not solely made up of plantations and vegetation, despite what was just said. In Sri Lankan accounting, agriculture crops, fisheries, livestock, and forestry are all combined. The Sri Lankan economy used to strengthen by the agriculture sector's 7.8% GDP contribution and 30% of job opportunities.

Governments have historically provided significant support to the agricultural sector. The current economic crisis has made it impossible for governmental and non-governmental organizations to effectively boost the productivity of the agriculture sector. Many contend that the Sri Lankan agriculture sector has serious problems and difficulties and that its annual GDP contribution is declining. Due to non-payment on time and industry uncertainty, banks and other financial institutions are having a tough time collecting the credit facilities provided to these industries [7].

Agriculture industry in Japan

Agriculture is a significant industry in Japan, with modest growth over the previous few decades. From $12 billion in 1970 to $41 billion in 1985, Japan's agricultural output increased dramatically. According to the most recent figures, the Japanese agricultural sector was worth $58 billion in 2013, making it the world's ninth largest [2].

Urban agriculture plays a critical role in Japanese economy and has undergone a rebirth in recent years due to influence in information system. It is sometimes regarded as a sign of developmental failure, a nuisance, or plain nonsense. The agglomeration of social movements focused with providing community access to fresh, locally sourced foods has gained traction. Scientists are looking to urban ecosystems as providers of vital ecosystem services — such as food, heat-island control, and water management — that can boost local well-being and reduce cities' ecological footprints [8].

Urban planners are looking for innovative solutions to the social and environmental challenges posed by an urbanizing world, and scientists are looking to urban ecosystems as providers of vital ecosystem services — such as food, heat-island control, and water management — that can boost local well-being and reduce cities' ecological foot prints of cities. When it comes to urban agriculture, Japan is a one-of-a-kind case. Agricultural land usage is a typical aspect of the metropolitan landscape in cities across the country, despite the fact that it is a highly industrialized country. It may surprise you to learn that urban agriculture accounts for about a third of all agricultural output in the country.

Similarly, in Japan, urban farmers make almost 25% of farming households [1,2].

Furthermore, urban agriculture in Japan is more productive than rural agricultural. According to Ministry of Agriculture, Forestry, and Fisheries (MAFF) data from 2010, urban fields are the most productive type of agriculture in terms of economic value of production per area, 3 percent more productive than the national average [2].

Urban agriculture is two times more profitable than intermountain agriculture and roughly 10% more profitable than agriculture in rural plain areas in terms of revenue per farmer. Even in Tokyo, one of the world's largest and most congested cities, local agriculture produces enough vegetables to feed almost 700,000 city people among the intricate networks of railways, roads, buildings, and power lines [2].

METHODOLOGY

In achieving the main objective of this study, it is divided into four sections: literature review, theoretical framework construction, data collection via in-depth scheduled interviews with industry experts, and data analysis and evaluation. Unit of analysis of the study is firm level. A structured questionnaire was used to collect data from few agricultural companies in Japan who are using any type of ERP system. That data compared with Sri Lankans context by selecting companies that are listed in Colombo Stock Exchange and the total number of companies listed in manufacturing sector is 39 (https://www.cse.lk). The construction of a theoretical framework for analysis, which is a systematic classification of required components for ERP system deployment, is part of the second phase. Based on the theoretical framework, a questionnaire for semi-

structured in-depth interviews was created which includes three main sections as general information of the company, ERP usage and operational performance in the industry. Following that, a long list of ERP implementations in the Agriculture business was established based on the methods and techniques utilized by food processing firms, cooperatives, and sector organizations in comparison to the other fields.

ERP Implementation in Agriculture

Research Questions

1. How to disseminate the values, techniques and basic principles involved in ERP implemented agriculture industry among general public in Sri Lanka?
2. How developed countries have reached their success in agriculture industry as a result of ERP implementation?
3. Will there be a significant difference in Sri Lanka agricultural context if applied ERP in to practice?

Sri Lanka's Agriculture then and now

Sri Lanka is rich in fresh healthy soil and nutrients though it is currently suffering a tremendous economic crisis that no one has ever seen before in its history. Lack of influence and a lack of attention to arable lands are two of the most critical causes. For rice, dhal, and other staple commodities, Sri Lanka spends more US dollars annually. However, Sri Lanka as a country has enough resources to deal with this situation. We have a duty to create novel strategies in which the Sri Lankan government might take the lead as students who were born in that country. The opportunity to study in Japan has provided plenty of incentive to raise agricultural output throughout the world.

Sri Lanka's Economy then and now

Sri Lanka is frequently touted as an interesting example of a developing nation with social growth that has been quite high in comparison to the nation's per capita GDP level. The country's inability to meet early expectations and advance the reform process can be attributed to economic and political factors. Due in part to low foreign direct investment (FDI) inflows and a small export base, economic growth slowed to an average of about 5%. Additionally, the economy has continued to be susceptible to both internal and external shocks.

With the exception of a current account surplus in 1977, Sri Lanka's economy has been characterized from the 1970s to the present by overextended fiscal positions and weak trade deficits, which translate into an overall deficit position on the external current account. Public finance management was severely hampered by the welfare state's legacy, a history of populist public expenditure initiatives, the poor performance of state-owned enterprises (SOEs), and a sizable public sector. For successive post-independence governments, achieving the basic needs targets has come at a high financial cost.

Sri Lanka's economy has the conventional twin deficits. Twin deficits are common, which suggests serious economic imbalances. Twin deficits indicate that a country's production of tradable products and services is insufficient and that its national expenditures are more than its national revenues. These economies may be plagued by excessive debt levels, a reliance on capital inflows from abroad, a persistent devaluation of their currency, and high interest rates. With the exception of the nine years from 1992 to 2000, Sri Lanka has experienced balance of payments (BOP) crises on a regular basis.

Nevertheless, even if Sri Lanka's economy lagged behind predictions, the country's average annual growth rate of 5% from 1980 to 2016 was nevertheless close to the region's average of 6% during the same time period. Due to an aging population, Sri Lanka still has significant public expenditure demands in areas like health, education, and social safety nets. A fast-developing economy also requires infrastructure investment, which was long neglected during the three decades of conflict. There are reasons to be optimistic given the enhanced focus on fiscal consolidation placed under the IMF's most recent Extended Fund Facility (EFF) program, which placed a strong emphasis on revenue growth. The first step in debt stabilization must be toward a primary surplus. An essential first step in debt stabilization is the transition toward a primary surplus. In order

to stabilize the external sector and help create a buffer stock of official reserves, reforms that generate non-debt generating foreign

currency inflows must be implemented in tandem with fiscal policy efforts.

Context of ERP implementation in the field of agriculture

The usage of Enterprise resource planning (ERP) systems inside enterprises is becoming more widespread and prevalent as information technology advances. As a result, most firms are evolving from function-driven to process-driven entities, with ERP systems facilitating the integration of business processes [4], [1].

ERP, as a complete software solution for business operations, aims to integrate a wide range of business activities and functions in order to offer a holistic perspective of the company from a single source [2]. As a consequence, ERP systems make day-to-day processes easier, faster, and simpler for businesses, which saves a lot of resources at the organizational level and, as a result, boosts corporate performance [2].

In terms of current agricultural technology, it's important to recognize the significance of information and communication technology (ICT) as a decision-making tool for farmers. Farmers can remain up to date with all the latest information with the help of ICT. This includes information on weather, agriculture, and newer and more advanced methods of improving crop quality and yield [5].

ICTs have fundamentally changed how individuals, governments, and enterprises, large and small, operate in the modern world. Nearly 60% of the world's population has access to the internet, and mobile internet is currently the most extensively utilized mode of internet connection. The widespread use of ICTs has enabled greater communication and the supply of services and information to those who previously had no access [3].

How implementation have been affected Japans economy

Modern manufacturing practices based on the idea of continuous improvement are well known in Japan. The country's agriculture sector, in contrast, is characterized by an aging workforce and a heavy reliance on traditional methods. Industrial technology, however, is now assisting Japan's agriculture sector in modernizing and boosting exports.

Japan's total yearly exports of food, forestry, and agricultural products totaled JP 912.1 billion (US $8.79 billion) in 2019, setting a record high for the seventh year in a row. The agriculture sector in Japan, however, has even higher aspirations, with plans to hit export goals of JP 2 trillion (US$19.28 billion) by 2025 and JP 5 trillion (US$48.21 billion) by 2030. Even though these numbers are outstanding, traditional Japanese agricultural methods currently require a lot of labor, and the average age of farmworkers is over 67.

As a result, a variety of stakeholders are looking into ways to modernize farming methods and boost output. The necessity to switch from the prevalent "product-first" paradigm to a "customer-first" or "market-oriented agriculture" model is becoming more and more apparent to producers. The ability of producers to switch to this new type of agriculture is greatly aided by technology.

Bell Farm is a prime illustration of this synergy. It grows Academy tomatoes, a medium-sized fruit, and is situated in Kikugawa, Shizuoka Prefecture. This type, which is generally eaten raw in Japan, lends itself perfectly to use in meals like salads because it is sweet and flavorful. In terms of value, rice is Japan's greatest agricultural crop, followed by tomatoes. They were a perfect choice for Bell Farm because they are already a very well-known and well-liked dish in every country and are eaten both raw and in processed items like sauces and soups.

Japan has previously demonstrated that it is capable of achieving technological superiority through manufacturing innovation with the application of ERP systems. By realizing reliable, year-round production and reducing dependency on physical labor and environmental factors, these same capabilities could help elevate Japanese agricultural products to the next level on the global arena. Additionally, forward-thinking businesses like Bell Farm are enhancing their production based on strong marketing ideas that mirror current

global trends and getting international certifications to demonstrate that they offer safe, high-quality, and trustworthy products.

How implementation have been affected Canada's economy

Since the agricultural sector began experiencing a fundamental shift as a result of the adoption of technologies, ERP system and its application have emerged as the industry leaders.

ERP is dedicated to increasing digital farming's overall effectiveness and establishing "sustainable agriculture" as the new standard. Zero Hunger and Climate Change, two of the Sustainable Development Goals (SDGs) of the United Nations, are said to be the driving forces behind the agriculture sector's all-around expansion.

ERP has always worked to elevate the bar for food safety and sustainability as a result of being a proud member and Sustainable Platform.

A nation's economy depends heavily on agriculture. It makes a huge contribution to Canada's economic growth by providing food supplies, a crucial and indispensable resource. If done correctly, agriculture can make a country food self-sufficient. In order to guarantee good yields, high-quality products, and lower operational costs, individuals in the sector have always invested in and utilized cutting-edge technologies.

Implementing ERP in agriculture is one trend that is quickly gaining favor since it makes business operations more structured and streamlines key operations including the purchase of seeds, fertilizer, equipment, production, and distribution of agricultural products.

An effective and adaptable ERP system can aid in enhancing traceability, tracking accounting and finances effectively, facilitating correct inventory management, and other operations efficiency improvements.

Through numerous modules for procurement, accounting, finance and accounting, inventory, sales, etc., a comprehensive ERP for the agriculture industry may automate business processes and remove duplication.

Numerous tools, methods, pieces of machinery, cutting-edge software, and models are all readily available in Canada now thanks to the development of technology in agriculture.

All of these may be managed effectively and integrated using ERP software. ERP systems that are cloud-based centralize information from around the company, ensuring that every employee is informed.

Agriculture ERP software reduces confusion and errors while boosting sales and profitability. The program can aid agricultural enterprises in more effective product marketing. The ERP effectively manages tasks like as inventory management, order management, and procurement.

It makes it easier to achieve sector-specific objectives and needs by bringing them into line with contemporary technology.

A wide range of regulatory standards must be complied with in order to buy and sell agricultural goods.

Through monitoring announcements and releases from the relevant authorities, sending alert notices regarding changes, and automatically producing necessary documents, ERP software aids in ensuring compliance.

Additional ERP functionalities for the agriculture sector include:

- Manage several receipts and delivery in relation to a single order
- Taking care of several warehouses
- Profitability and batch-wise stock calculation.

Crop management also addresses the issues of what should be planted, when, when, and how. Even if there is only one sort of crop, it might become confusing when there are many.

The following processes can be automated using ERP:

Purchasing seeds through digital auction platforms' online tenders and keeping track of the types and amounts of fertilizers and pesticides streamlining watering, data collection, etc.

The right allocation and management of seasonal crops, supply chains, employee and equipment scheduling, and other factors are crucial for achieving efficiency in agricultural production, especially if the company owns numerous farms.

Your operational effectiveness increases at every stage of production with the correct ERP, and visibility of:

- Crops cultivated
- Information on costs Planting and sowing costs
- comparing actual results to yield projections
- Employee and task information

As all the information is accessible through a single database, agriculture ERP streamlines communication and makes managing land and plots simple.

The dashboards provide the following display options:

- Geolocation
- Information about the location and pastures for livestock Data about buying, renting, or leasing land
- Information on when and how often to water plants Information on which plants are planted where.

The modern consumer is much more informed and seeks assurance that the food they eat is pure and safe. To assure their safety and to prevent contamination, agriculturalists must trace the seeds and fertilizers, the fields where the crops were grown, how they move through the supply chain, and other factors.

Agriculture ERP aids in facilitating this traceability so that the food that eventually makes it to consumers' tables is secure and devoid of dangerous substances, pests, etc.

Farming has been simpler with the introduction of sophisticated machinery like tractors, harvesters, sprinklers, and more, which has also replaced manual or animal labor and increased productivity.

Sensors can gather data about equipment to offer insightful information.

These consist of:

- Number of operating hours
- Employees running the equipment
- Accounting data and amortization
- Location right now and mileage travelled

The tracking of employees to guarantee that their pay is made, as well as the provision of payment options for

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume IX Issue IV April 2025

taxes withdrawn and other worker-related charges, will be made easier with the use of an ERP solution that includes an HRMS module.

Farmworkers require access to food, drink, and restrooms because they spend their days working outside while travelling from field to field.

Agriculture ERP enables livestock farmers to keep track of each animal's lifecycle, including its birthdate, pedigree, food intake, healthy growth, vaccinations, prescriptions, and hormone injections, among other details.

Most fields today are graded flat to prevent water run-off, and ensure that it seeps down to the roots. It's likely that certain areas within a field are more fertile than others; this information comes in handy as the farmer can plant crops closer together in fertile zones, or apply more fertilizer in the less fertile ones, to get a balanced yield.

This data is recorded and made accessible by ERP software; it is used by farm equipment to notify tractors and other equipment to make the requisite adjustments during plowing, fertilizing, and planting, when going through fertile and less fertile zones.

These benefits are specific to agriculture ERP systems. Additionally, they also provide the following benefits:

- Boost in productivity – with efficient use and allocation of resources and technology, agriculture business can experience a big boost in productivity
- Cost reduction – optimal use of resources brings down overheads, thereby increasing profitability
- Minimal wastage – ERP implementation can ensure that resources, seeds, fertilizers, fields, warehouses, and equipment are not wasted or left idle; it can also help prevent spoilage and wastage of harvested crops.
- By recording all the operations and centralizing data from various departments, empowers the management to exercise better control, and to review and evaluate all processes and activities
- Records all financial data accurately and generates reports to facilitate the management of corporate finances.
- Automated payment reminders for both outstanding payments and receivables
- It helps to reduce the possibility of human error through automation of repetitive and cumbersome tasks. This mitigates risks and improves accuracy
- ERP ensures data safety as it is cloud-driven, and includes multiple security protocols, including controlled access to information
- It provides an all-inclusive view of the entire business operation, providing real-time information and enabling the management to make data-driven decisions
- Business analytics can help the farm owner see what strategies are working and where the bottlenecks are; they can measure KPIs against actuals, and take remedial action at the right time.
- Cloud-based ERP allows agriculturists to check their inventory, yields, sales, and any other factor even remotely.
- Free yourself and employees from monotonous paperwork to focus on more business-critical operations.
- You can easily plan your future purchase and sales quantities with ERP's planning tools and inventory

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume IX Issue IV April 2025

projections.

- Manage your supply chain more efficiently
- Gives you a competitive edge over others in terms of efficiency, productivity, and cost reduction, which gives you higher yields and more revenues

How implementation have been affected New Zealand's economy

About 11 percent of the world's surface area is dedicated to agriculture, which also consumes a large amount of freshwater and produces a substantial amount of greenhouse gas emissions. These reasons have been motivated New Zealand, a focus on how new technology, such as artificial intelligence (AI), might enable the creation of new business models, leading to the development of food systems that are more productive, sustainable, efficient, inclusive, transparent, and resilient.

It has been discovered that New Zealand Whether the land is irrigated or rainfed, farmers' yields used to be almost universally much lower than prospective (water-limited) yields. Around 80 to 85 percent of the theoretical maximum is produced by farmers in the world's most productive agricultural systems. A mix of yield-defining (varieties, seed quality, and growing season), limiting, and decreasing factors are to blame for these persistent production discrepancies. They also hold promise since they imply that productivity may be substantially boosted on already used agricultural regions, frequently without irrigation.

Robotics, crop and soil management and monitoring, automated irrigation, AI-guided drones, and predictive analytics are a few of the primary applications of AI in agriculture. Crop monitoring was the most prevalent solution type, according to research published in 201812; however, AI-guided drones are predicted to overtake them as the fastest-growing option. Large-scale technology firms are also increasingly entering the agricultural sector to offer scalable solutions. Examples include IBM, which offers weather, analytics, and cloud-based computing infrastructure, and Microsoft, which offers its Farm Beats product.

Software for crop monitoring promises to use AI's predictive capabilities to give farmers and agricultural suppliers precise instructions on how much fertilizer to apply, how many seeds to plant per acre, and which varieties and fields will most likely result in a positive return on investment from the use of fungicides. This will make these fields more profitable than ever before. Additionally, it seeks to offer a scalable and reliable solution.

Drones and other in-field technologies are becoming more widely available. Due to this tendency, innovators are now offering data analytics and producing insights to improve farm management systems. This eventually leads to improved farm business management tools.

Additionally, farmers are now able to examine real-time data on weather, temperature, soil moisture, plant health, and commodity pricing in the market thanks to AI technologies like machine learning, computer vision, and predictive analytics.

In many industries, production will increase and product quality will be improved thanks to a variety of general-purpose technologies, as explained. AI presents a chance for the New Zealand agriculture industry, which is no exception. However, a number of financial investments and operational adjustments will be required. To create novel goods and procedures and to direct the use of AI in the industry, further research is needed. More collaboration will be required in order to aggregate data and harness the potential of genuinely large data; this requires adopting the mentality of "data as infrastructure."

Since many of the most beneficial applications of AI in agriculture are found throughout the value chain in planning, logistics, and supply, there will also need to be an increased emphasis on areas outside the farm gate. Finally, given that the global market for agriculture is under a lot of pressure and competition, focus should be put on building a pipeline of AI talent in New Zealand. New Zealand's agriculture industry has a clear

opportunity to reap the rewards of AI with the assistance of a coordinated, overarching national AI policy and a commitment to act fast and bravely.

DISCUSSION AND LIMITATIONS

The ability of a farmer to foresee weather patterns and consumer demand drives the agricultural economy. Business technology has progressed in recent years to meet these people's requirements and attempt to remove uncertainty from agriculture. For many years, the agriculture sector has been characterized by intuition, presumptions, and weather forecasts. To keep up with the rapidly expanding population and the demand for more food supply, agriculture has started to evolve along with technology. How to lessen the impact of unforeseen events that could harm yields and profitability is one of the biggest challenges facing the agriculture sector in the future. Due to the industry's fierce competition, this is extremely crucial. ERP systems with a focus on enhancing the agricultural experience are particularly precise in their capabilities to streamline operations and boost output.

Small businesses should be able to automate their accounting procedures at the very least to cut down on errors and guarantee that all data is being accounted for. To make it simpler for farmers to concentrate on how to enhance their output rather than just the supplies they need, these ERP systems should be able to handle inventories related to agricultural processes, such as seeds, fertilizers, feed, etc.

Additionally, sales must be monitored to gauge the effectiveness of their offerings and make sure supply and demand are being balanced. In order to give farmers, the ability to concentrate on what is crucial, all this information can be stored in a single system. In order to make transactions simple, it can also make it easier to create a platform that is ready for payments.

The correct ERP system can automate all aspects of farm operations. From the time the seeds are shipped in until the produce is delivered to the store for sale, farmers are able to track their produce from beginning to end. Better processes are finally produced as a result, which increases yields and results in higher-quality food or products.

Technology and the capacity for multimodal communication may be necessary depending on the market and locations of activities. Many farming ERPs give users the option to connect their system to smart devices in order to automate tasks. This can include agribusiness-related software, drones, sensors, and agribots.

Multilingual capabilities are just another fantastic attribute of a successful farm ERP. Because agriculture is a worldwide industry, it is crucial that people from different linguistic backgrounds can communicate with one another without being hampered. The ability of an organization to grow should not be impacted by this element, hence a good farming ERP should be bilingual.

Agricultural processes and product quality can be improved, just like in any other industry, by using analytical information. Users of agricultural ERPs might receive specialized reports and dashboards that offer data-based insights.

With the help of this analytical software, farmers will have easier access to information to create more accurate yield estimates and spend less on upkeep. By identifying the precise manufacturing requirements and only allocating resources to those, these expenses are decreased.

The yield gap and how to sustainably feed 10 billion people by 2050 are major topics of discussion worldwide. With companies like Data Col, Precision farming, FarmIQ, GPSIt, Farmax, Greentech robotics, and Regen, to name a few, providing solutions for irrigation, water and effluent management, providing customized maps and GIS for land management, farm management platforms, and tools providing efficiencies and optimization gains for vegetable growers, New Zealand has the same focus on and opportunity for yield optimization and effective land management.

Farmers have historically been constrained by unpredictable weather and pest populations, but technological

advancements and artificial intelligence have made it possible for the agricultural sector to overcome these challenges.

These systems can evaluate weather conditions and produce more precise forecasts based on a collection of data to guarantee the success of crops. Artificial intelligence has even improved to the point where it can now help farmers prevent insect problems before they arise by detecting their presence.

Additionally, sensors can be used to gauge the moisture content of the soil and the demand for fertilizers or pesticides on particular plants or plots. This technology simplifies trends into a science, making it easier to allocate resources as needed. Evaluation identifies when and where plants require care, hence minimizing resource waste.

Utilizing satellite imagery analysis to more rapidly and effectively detect crop diseases, pest infestations, and nutritional deficits is the newest trend in agricultural ERP systems. Agriculture is becoming more productive and sustainable thanks to ERP systems because big agricultural data undoubtedly entails hazards and difficulties. Given the anticipated adoption of AI in the agricultural industry, there is a chance that the governance frameworks necessary to reduce any dangers associated with its use would go unnoticed. The development process for data science teams should be subject to standardized controls and tests that are regularly monitored by the company in which they are employed. Since AI tools frequently learn as they are used, control and testing procedures should be flexible and consistent. 71 1. The identification and correction of bias. Each AI tool's risk evaluation and impact analysis, together with management permission.

CONCLUSION AND SUGGESTIONS

An organization, frequently a factory, manages and combines the crucial elements of its business through the use of ERP. As a result, both locally and globally, among business organizations, ERP systems are growing in popularity. Manufacturing businesses in Sri Lanka are currently thinking about implementing ERP systems, but there is a dearth of research in this area, making it difficult to provide comprehensive information on the advantages of doing so.

The ideal ERP is created to track every step of operations to create reliable supply chains from seed to sale. Yield optimization, addressing labor shortages, meat alternative research, real-time risk management along the supply chain, assurance of the quality of food with traceability, ensuring food security by locating and isolating disease outbreaks in animals and plants, waste reduction within the supply chain, biosecurity, conversion efficiency on farm linked to AI are all areas that are thought to benefit, if not transform, from the use of AI in agriculture. Since recall situations can harm public health if not handled appropriately, traceability is essential to the industry.

The food industry and the agriculture sector overlap significantly. Farmers' success depends on a dynamic and flexible system that can track every step of the process due to the always shifting markets.

Scalable AI adoption in agriculture faces various inherent challenges, such as the high cost of state-of-the-art AI technology and obtaining accurate field data. A significant portion of the data currently put into precision systems may turn out to be very valuable "information pie" bits. To correlate actions to results, however, and to duplicate with any degree of regularity, there must be actual, ground truthed, geo-referenced points in the field.

Data farming business Jason Tatge, co-founder and CEO of Far mobile, listed the difficulties they have faced as suppliers of a platform that ingests, standardizes, views, and shares data, as well as the difficulties they have solved over the past five years.

- The main goal was to make it possible for farmers, regardless of the brand or model of machine they used, to gather and compare all of their data in one location.
- According to Far mobile’s research, farmers weren't using digital strategies on their farms because there wasn't a clear way to apply them, other than to send the data to an agronomist or seed dealer for

interpretation. For farmers' day-to-day activities, data was of no actual use.

- The absence of a standardized format has likely been the main problem with data in agriculture. When every machine and manufacturer effectively have its own data language, how are farmers and agronomists supposed to understand what is occurring on their fields? Why not make an apples-to-oranges comparison?

- There is a chance to align incentive systems such that they are based on results rather than the overall amount of fertilizer used. They also think that sharing practices will ensure that the proper amount of fertilizer is applied at the appropriate time, resulting in optimized, effective, and efficient results. THEY perceive a chance to align incentive systems so that they reward results rather than the total amount of fertilizer used.

Additionally, there is a lack of knowledge regarding AI in agriculture among end users. According to a recent study, more than 60% of small and medium-sized firms (SMBs) surveyed claimed that due to budgetary restrictions and a lack of experienced labor, meaningful AI implementation is not on the horizon for their business process. According to research of big data in smart farming, governance, including data ownership, privacy, and security, as well as commercial models, are crucial concerns that must be resolved in order to fully utilize AI in agricultural systems. Businesses must verify that the AI systems they employ yield accurate, precise, and trustworthy outcomes.

Algorithms must be devoid of bias and systematic errors to achieve this, such as those resulting from unfair population sampling or inaccurate estimating processes. In order for the decision-maker to comprehend the constraints, it is also necessary to communicate the uncertainty in prediction model outputs more clearly. It is clear that care must be taken to prevent farmers from feeling exploited or otherwise negatively affected by the use of data and AI so that decision-makers are aware of their limitations. It is clear that care must be taken to prevent farmers from feeling exploited or otherwise negatively affected by the use of data and AI.

The ideal agriculture-focused ERP will remove the obstacles that prevent performance in this highly variable business. In this manner it can be understood that implementing ERP in to agriculture industry will give productive results to Sri Lanka economy by earning foreign currency.

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