Development of a mobile application integrating GIS to strengthen agriculture extension services: Special reference to paddy cultivation in Athuruliya Divisional Secretariat Division in Sri Lanka

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Abstract

Farmers in developing countries face immense difficulties in obtaining agriculture extension services effectively and efficiently for their decision-making to achieve the highest potential yield. In this context, applications run on mobile devices offer several advantages over traditional forms of delivering extension service information efficiently. The main aim of this study was to develop a mobile app with integrating Geographic Information Systems (GIS) as a pivotal tool in enhancing agricultural extension services tailored for paddy farmers in the Athuraliya Divisional Secretariat Division (DSD). Initially, a field survey was carried out to identify problems and challenges faced by paddy farmers through a comprehensive field survey method, ensuring that the specific information needed to be incorporated into the mobile application to optimise their paddy production. The mobile app was developed by integrating GIS using AppyBuilder software by incorporating a wealth of information pertinent to paddy cultivation. The system is connected to a centralized database which has important information for farming operations and to tackle problems faced by farmers during the paddy cultivation process. The integration of GIS technology allowed for the creation of detailed maps that are accessible to farmers via their mobile devices. It features detailed data on various paddy varieties, land preparation guidelines, pest and disease management, weather conditions etc. Additionally, the app provides contact information for extension officers and details of their programs, which are crucial for ongoing farmer support. Locations of paddy seed sale points are also mapped out, facilitating easier access for farmers. It is a user-friendly app for farmers developed using the local language. This mobile GIS application is expected to significantly strengthen agricultural extension services in Athuraliya DSD to enhance productivity and sustainability in paddy cultivation. This study highlights the potential of mobile GIS technology

to revolutionize agricultural practices and improve the livelihoods of farmers in rural communities in Sri Lanka.

Keywords: Agriculture extension, mobile applications, integration of GIS, paddy cultivation, rural communities

Introduction

Rice is life, for most people living in Asia. Rice has shaped the cultures, diets, and economies of thousands of millions of people for more than half of humanity rice is life (FAO, 2004). Considering its important position, the United Nations designated the year 2004 as the International Year of Rice. Devoting a year to a commodity was unprecedented in United Nations history. However, the 57th session of the United Nations General Assembly noted that rice is the staple food of more than half the world's population, affirmed the need to heighten the awareness of the role of rice in alleviating poverty and malnutrition and reaffirmed the need to focus world attention on the role rice can play in providing food security and eradicating poverty and declared the year 2004 as the International Year of Rice (Gnanamanickam, 2002). Rice is a staple for the majority of the 1.7 billion South Asian and Sri Lankan population and a source of livelihood for more than 50 million households (Mohanty, 2014). Similar to other countries in Asia, rice is the staple food in Sri Lanka and is deeply embedded in its economy, traditions, and culture. Rice is grown on the entire island which is characterized by variable climate and geography. There are two major paddy cultivation Zones in Sri Lanka. It is estimated that nearly 34 % (0.77 million ha) of the total cultivated areas in Sri Lanka have been used for rice cultivation from which over 95 % of the domestic requirement is fulfilled (DOASL, 2015). Both rain fed and irrigated rice paddies are common in Sri Lanka which is characterized by three distinct climatic zones known as the wet, intermediate, and dry zones. The wet zone receives over 2500 mm of annual rainfall while the dry zone receives about 1000 mm of annual rain. The intermediate zone with about 1500 mm of annual rain is located in between wet and dry zones (Domros, 1979). Monsoonal rainfalls from the northeast (NE) and southwest (SW) of the island control the spatial variability of the climate of 1 Sri Lanka. The wet zone rice cultivation is mainly rain fed, but due to scarcity of water, cascading systems of

reservoirs and canal irrigations are used for paddy cultivation in the intermediate and dry zone regions (Diyabalanage et al., 2016). Sri Lanka's rice sector alone contributes 10.8 percent to the agricultural GDP which accounts for 1.6 Percent of GDP in the year 2013 (CBSL, 2014). The value of annual rice production is approximately 4.62 million metric tons at present which is an increasing trend (CBSL, 2014). There are 879,000 farm families which comprise 20 percent of the total population. Thirty-two percent of the total labor force is directly engaged in the rice sector (DOASL, 2008). Sri Lanka has 730,000 ha of prepared lands suitable for paddy cultivation at present. Out of this an average of 560,000 ha are being cultivated during the Maha1 season which represents a seasonal cropping intensity of 76.7 and 310.000 ha in the Yala season which equals to seasonal cropping intensity of 42.4 percent. During the Maha Season, 752,442 acres were under major irrigation, 393,293 acres were under minor irrigation and 443,908 acres were under rain fed, and during the Yala season 465824 acres were under major irrigation, 182,354 acres were under minor irrigation, and 186,065 acres under rain-fed, are cultivated and harvested in the year 2009 (DCSSL, 2012). Therefore, paddy cultivation is helpful for the country's economy. According to the Central Bank of Sri Lanka (CBSL) in 2018 the contribution of the agriculture sector to the economy was 7.5% of GDP and accounted for 27% of direct employment. 72 percent of the population is indirectly involved in agriculture-related activities for their livelihood (Gunasena, 2008). Approximately 4.1 percent of the total population have incomes under the official poverty line with 4.3% of the rural population and 8.8% of those working on agricultural estates being the most vulnerable communities in the agricultural sector (CBSL, 2018). Although the rice export sector is minor in Sri Lanka, compared with domestic consumption, it has shown its potential for economic returns. At the moment, Sri Lanka exports mainly specialty rice varieties such as red and organic rice to niche markets abroad. In 2023, Sri Lanka earned about USD 30 million from rice exports, with demand gradually rising from the United States, Canada, and the European 2 Union. These exports not only bring in much-needed foreign exchange but also ensure very good prices for the local farmers because high-quality rice varieties command a premium in the export market. Rice exports promote the diversification of Sri Lanka's narrow agricultural export base, traditionally dependent on tea, rubber, and coconut. Sri Lanka traditional ma vee, heenaty vee most like foreigners. Foreigners buy these rice at higher prices. Therefore it affects the country's economy. This will increase rice production and quality with the help of modern farming techniques, besides sustainable farming practices that could help the government to further increase export revenues in the future (CBSL, 2023). The term extension may be

examined by looking at several statements that have been written about it. Extension is an informal educational process directed toward the rural population. Extension is a term that is open to a wide variety of interpretations. Each extension agent probably has his understanding of what extension is. This understanding will be based on experience and the particular type of extension service in which the agent is working. In other words, there is no single definition of extension that is universally accepted or that applies to all situations. Furthermore, extension is a dynamic concept in the sense that the interpretation of it is always changing. Extension, therefore, is not a term that can be precisely defined, but one which describes a continual and changing process in rural areas (Forbang, 2019). There are many factors in paddy cultivation. They are Soil, nutritional quality, weather, and water resources for successful paddy cultivation, attention should be paid to the selection of varieties, land preparation, water management, use of agro-chemicals, minimizing post-harvest losses, and extension services. Among the above activities, extension services are crucial for the success of all these farming operations for optimum rice production (Chandrasena et al., 2017). There are so many inefficiencies. Paddy cultivation in Sri Lanka faces several inefficiencies, significantly affecting productivity and sustainability. One of the primary issues is the reliance on traditional farming methods, which often results in lower yields compared to modern techniques. The lack of adequate irrigation facilities and the inefficient use of water resources further exacerbate this problem, especially 3 during dry seasons. Additionally, the limited access to high-quality seeds and fertilizers contributes to suboptimal crop performance. The fragmented landholdings, which are common in rural areas, also lead to inefficiencies in mechanization and resource use. Furthermore, the dependency on chemical inputs without proper knowledge of their application often leads to soil degradation and reduced long-term fertility. These inefficiencies, coupled with challenges in market access and the fluctuating prices of paddy, hinder the overall development of the sector. Extension services are useful in solving inefficiencies (Silva & Perera, 2010). Extension services offer advice and information to help them solve their problems. Extension also aims to increase the efficiency of the family farm, increase production, and generally increase the standard of living of the farm family. The objective of the extension is to change farmers' outlook toward their difficulties. Extension is concerned not just with physical and economic achievements but also with the development of the rural people themselves. Extension agents, therefore, discuss matters with the rural people, help them to gain a clearer insight into their problems, and also to decide how to overcome these problems. Extension is a process of working with rural people to improve their livelihoods.

This involves helping farmers improve the productivity of their agriculture and also developing their abilities to direct their future development (FAO, 2014). The importance of extension services in the paddy sector in Sri Lanka is beyond doubt for the betterment of paddy cultivation. Although several studies have been conducted on various factors that influence paddy yield and related aspects, they have not alluded to all dimensions of extension services. Quite apparently, a knowledge gap still exists; some areas have been emphasized, while others have been neglected. The exact gap forms the focus of the present study, elaborating how the application of GIS can be used for the strengthening of the extension services in the paddy sector, focusing on the identified Athuraliya Divisional Secretariat Division. In fact, this explains the importance of the study and its contribution toward betterment with respect to providing extension services in paddy cultivation. The objectives of this article are to develop and evaluate a mobile application that integrates GIS technology to enhance the effectiveness of agricultural extension services, specifically targeting paddy cultivation in the Athuruliya Divisional Secretariat Division of Sri Lanka.

Literature Review

Integration of GIS, in this context, has become one of the most significant innovations in modern agriculture and has changed the perspective of farming activities regarding their planning, monitoring, and optimization. Precision and efficiency are important factors in paddy cultivation in the context of contributing toward sustainable agricultural development. The Athuraliya Divisional Secretariat Division is a typical example of how GIS could facilitate the enhancement of agricultural extension services within the paddy sector. Having an active agricultural community of which paddy farming is an integral part, it is well depicted in the case of the Athuraliya DSD that one of the advantages lies in addressing the issues with the help of GIS. The role of GIS in enhancing agricultural extension services within the paddy sector at Athuraliya is discussed here after, showing how spatial data, mapping, and analysis can help toward better decision-making, productivity, and resilience in the agricultural practices of the region.

The study conducted by Haydock in 2021 depicted the history of paddy cultivation and how the evolution of rice is related to human history. As far as rice production is concerned, there exists an inseparable relationship between natural elements and cultivation techniques. Rice originated in Asia several thousand years ago; through continued natural evolution and human

agricultural practices, the rice underwent a sea of change. This has given rise to many rice varieties, each having its unique character. Rice being a staple crop has really shaped human societies and civilizations in their formative stages. Rice, as a plant, has adjusted itself to the changing environmental conditions and human interventions through the passage of time. To understand how it came about, one should trace its history as a biological entity, starting with the times of its reproduction and genetic mutations, leading to new variants. It is quite a complicated history of paddy cultivation in India, which was influenced by major sociopolitical and economic changes imposed by the British colonial period, to the transformation brought about by the Green Revolution, an era that ushered in new farm technologies and methods for increased production.

In the study "Global Significance of Rice," Westlake explored in 2019 the global importance of rice. The research highlighted that rice, though this is just a cereal grain, it is a monocot forming a nutritional foundation for a large percentage of the global population. This crop is mainly dominated by two species, namely African rice and Asian rice. It is a key source of livelihood for millions who depend on rice cultivation as a source of primary income. Rice is categorized as a cereal grain and a monocot-a plant that contains seeds with one embryonic leaf. This is an annual plant that grows 90 to 150 cm tall, thriving best in warm, tropical, and aquatic conditions including flood plains, wetlands, and ponds. Although plants are cultivated worldwide, production is strongly centered in developing Asian countries where a high level of infrastructure is required in order to properly manage disease and pests.

Rice is a very labor-intensive crop, requiring approximately 200 days to complete one cycle of cultivation. Harvesting, drying, threshing, and milling are done entirely by hand. Collected rice is processed in various ways, with parboiling, polishing, or puffing methods making the different types of rice available in the market. While some of the nutrients are destroyed in refining, rice remains a universal and vital source of complex carbohydrates for energy, along with fiber, protein, vitamin B, iron, and manganese. In addition to being a staple food crop, rice also has ceremonial and religious significance for a lot of cultures-from throwing rice at weddings to actually worshiping rice gods like Dewi Sri. The entire rice plant is of high utility; it is converted to cooking fuel or cattle fodder, the husk being reused either for fuel, bedding, construction material, or in producing paper. The medicinal uses of rice include treating skin and stomach-related problems while cosmetic applications are its use in giving luster to hair.

Davis et al., (2019) conducted research on organizational capacities and management of agricultural extension services in Nigeria: current status. This study has stipulated 30 that the assessment of organizational capacity and management in the context of the Nigerian extension system has underlined primacy for these elements in the assurance of efficiency in the services offered. Through a multi-method approach, including document and artefact content analysis, semi-structured in-depth interviews with key informants, and site visits that will help to delve into nuances of the individual, organizational, and system-level capacities, important aspects of the extension landscape will be illuminated. To date, it is significant that the current ratio for the number of extension agents stands at 1:5000 and 1:10,000, and the workforce of approximately 7000 public agents. The N-Power programme is indeed a game changing initiative that will fill this gap by deploying 100,000 youth graduates in extension roles. Of course, the financial challenge remains huge, with state government funding paying only salaries, hence leaving very meager operational budgets for key components such as travel, communication, training, and field programs. Therefore, recruiting and incentivizing staff may be more difficult by the states, and donor-funded projects or federal funds become common options when underpinning continuing education or incentives is considered. Despite all the difficulties, a strong support for policies and strategies; together with collaboration with research, education, and donor programs bolsters the extension system. This present study has established it categorically that capacity and management issues rank among the pressing for any extension system to work properly highlighting attention on various levels of the different elements continuing education, incentive, coordination as well as operating budgets Besides.

Kumar, (2019) conducted research on Effect of communication-based extension services on the adoption behavior of farmers. Agriculture in this research is stated to have long been the backbone of the Indian economy, a source of livelihood to millions of farmers. In that context, an effective communication and knowledge dissemination between the research institution-farmer are vital. Extension services have a significant bridging role between the research stations and field for the transfer of vital information. Mobile phones are among the most powerful means of information dissemination and provision to farmers on agricultural practices within a short period of technology. The present study has been conducted with the definite objective of studying the impact of mobile phone-based extension services in inducing adoption behavior among farmers in the Patna district of Bihar. The long timeline of agriculture in India underlines its still-existence. The sector has undergone total revolutions since the

traditional tillage period of farming to the present technological status of farmers.

Methodology

When creating an app, a lot of practical factors must be taken into account. Choosing the platform(s), defining the functionality and overall design, and completing the concept are some of the first things to take into account. Other things to think about are the intended clientele's technical proficiency, the cost, and the time required for development and testing. The development team should assess administrative time and legal agreement costs early on. Last but not least, there will always be maintenance, content review, and ongoing hosting expenses.

The methodology for developing a mobile application that integrates Geographic Information Systems (GIS) to strengthen agriculture extension services in paddy cultivation within the Athuraliya Divisional Secretariat Division involves a structured and systematic approach. This section outlines the key stages, from the initial planning and design to the development, testing, and deployment of the mobile application, with an emphasis on addressing the specific needs of farmers and extension officers. The first step in the methodology was conducting a comprehensive needs assessment to identify the key challenges faced by farmers and extension officers in Athuraliya DSD. This involved field visits, interviews, and surveys with stakeholders, including farmers, extension officers, and relevant government officials. The needs assessment focused on understanding the current communication gaps, the accessibility of extension services, and the specific agricultural practices used in paddy cultivation. The information gathered was crucial in defining the functional and non-functional requirements of the mobile application. The design and development of the Mobile Application; Based on the requirements identified, the design phase focused on creating a user-friendly interface that would be easily accessible to both farmers and extension officers. The application was designed to integrate GIS technology, allowing users to access and visualize spatial data related to paddy fields, soil moisture levels, and other relevant agricultural information. The development of the application involved using open-source platforms and tools, ensuring cost-effectiveness and flexibility. The application was developed using a modular approach, allowing for future updates and scalability. A critical aspect of the development process was the integration of GIS with a robust database system. The GIS component was designed to provide real-time spatial data visualization, helping farmers make informed decisions regarding land preparation,

planting, and fertilization. The database was structured to store various data types, including farmer profiles, extension service records, and spatial data. The integration was achieved using RESTful APIs, which allowed seamless communication between the mobile application, GIS servers, and the database. This integration ensured that users could access up-to-date information, enhancing the overall effectiveness of the extension services. The testing phase was conducted in two stages: internal testing by the development team and field testing with a selected group of farmers and extension officers in Athuraliya DSD. Internal testing focused on ensuring the application's functionality, usability, and performance under different conditions. The field testing phase involved real-world use cases where farmers and extension officers used the application in their daily activities. Feedback from these users was collected and analyzed to identify any issues or areas for improvement. This iterative testing process was critical in refining the application before its full deployment. To ensure the successful adoption of the mobile application, a series of training sessions were organized for farmers and extension officers. These sessions covered the basic features of the application, how to interpret GIS data, and how to use the application to improve agricultural practices. Capacity building was also extended to include the technical staff of the Govijana department, who were trained to manage and update the application and its associated database. The final phase involved the full-scale deployment of the mobile application across the Athuraliya DSD. A monitoring framework was established to track the application's usage, its impact on agricultural practices, and the overall satisfaction of users. This framework included regular feedback mechanisms, allowing for continuous improvement of the application based on user experiences and evolving needs. Additionally, data analytics tools were integrated into the application to monitor the effectiveness of the extension services, providing valuable insights for future development. This comprehensive methodology ensured that the mobile application was not only technically sound but also effectively met the needs of its users, contributing to the overall goal of strengthening agriculture extension services in paddy cultivation within the Athuraliya Divisional Secretariat Division. Athuraliya Divisional Secretariat Division lies within Matara District of Southern Province. The Divisional Secretariat Division is placed in the Southern part of Sri Lanka. Tropical climate which is best suited to paddy growing which is predominant agriculture in the region also distinguishes the region. The division is bordered by natural features which are important for irrigation, such as rivers and smaller canals. With two separate growing seasons—Maha (October to March) and Yala (April to September)—the region has a tropical monsoon climate. One major factor affecting paddy

production is the distribution of rainfall, with the Maha season usually receiving more rain. The temperature range of 24°C to 30°C and the average annual rainfall of about 2,000 mm create an ideal climate for rice farming.

Athuraliya DSD still practices traditional paddy cultivation, despite a minor advancement in modern technology and equipment. Most crops grown in paddy fields during Rabi season are maize, which makes up over 60% of the crops. Paddy farming is mostly rain-fed. While methods for protecting against insects and diseases, applying fertilizer, and preparing the land differ, all methods involve using organic compost to the fullest extent possible to ensure the health of the soil.

The population of Athuraliya DSD primarily depends on agriculture, particularly paddy cultivation, for their livelihood. The area consists of a mix of smallholder farms, where the average landholding size is relatively small. The division is home to a close-knit community with a rich tradition of farming passed down through generations. The socio-economic status of the farmers is modest, with limited access to advanced agricultural technologies and extension services. Athuraliya DSD has a basic infrastructure that supports agricultural activities. However, the communication between farmers and agricultural extension officers.

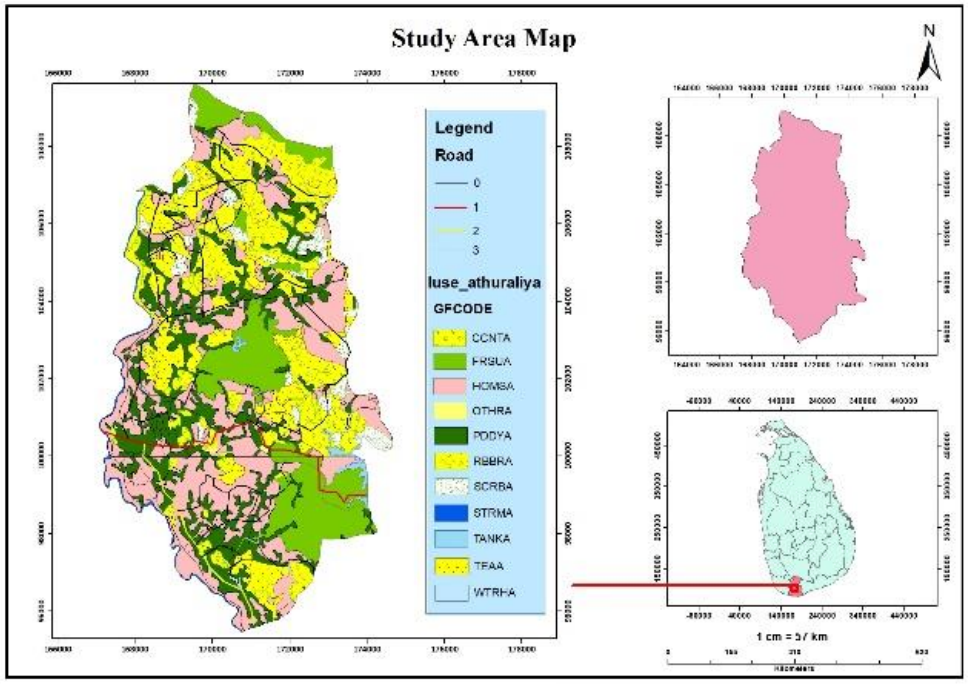


Figure 1: Study Area Map

AppyBuilder is one of the more user-friendly development environments that has easily enabled creating Android applications with minimum extensive codings. It is designed for less-experienced developers and features a drag-and-drop visual interface that makes creation of an application more user-friendly. AppyBuilder presents them with an opportunity to bring their ideas into reality through a set of built-in components and custom features. It can be used in the creation of various types of applications, which range from simple utilities to other more complex ones.

This app you are developing on AppyBuilder will extend the services by creating an all-encompassing digital platform that would result in increased communication between service providers and their clients. Most especially, extension services in agriculture, education, and healthcare depend on the effective flow of information. This application closes this gap in

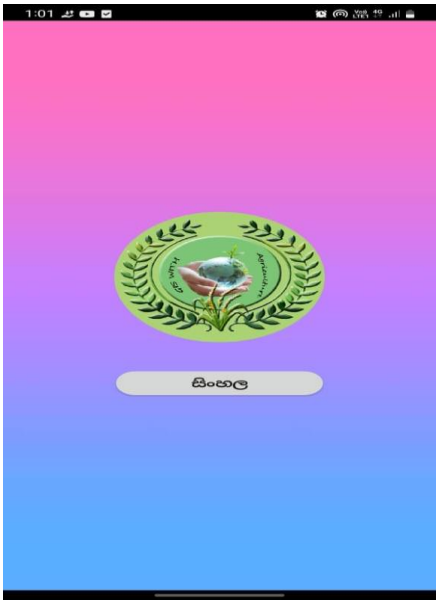


Figure 2 : App Appear page

Figure 3: Services

communication by updating users in real time with personalized advice, thereby adopting interactive tools that connect the users with service providers. The app will assist users in making informed decisions by facilitating access to critical resources and sharing best practices, hence improving the efficiency of the extension services.

This application is conceptualized to enhance these services through the provision of timely and accurate information, real-time updating, and personalized advice. By using the flexibility of AppyBuilder, it should provide access to key resources and help in making better decisions.

Eventually, this will go a long way in furthering the efficiency and scope of extension services, especially in agricultural sectors.

Mobile GIS allows data collection and analysis for timely and accurate recommendations by extension officers to the farmers. This technology will enable farmers to find the field conditions necessary for information that affects paddy cultivation. The application of this technology in extension services at Athuraliya will, therefore, enable farmers to make informed decisions, optimize resources, and improve crop yields for better food security with increased economic returns within the region. The various extension services that are required by farmers at every farming extension are enumerated below.

Poor communication among agricultural stakeholders, particularly farmers, is the widespread case observed in the Athuraliya DSD, which creates a crucial bottleneck in effecting proper information transmission. This occurs for numerous reasons that pertain to the inability to access modern communication technologies, issues of language incompatibility, and poorly organized farmer education programs. Besides, traditional forms of communication, such as word of mouth, have remained the only means of relaying information among many farmers in this region, which may result in further delays or distortions in the information being relayed. This has become especially problematic when time-sensitive information, like weather forecasts or pest outbreaks, needs to be inquired about as soon as possible to prevent crop losses. Moreover, it is compounded by the limited literacy level among some farming communities, who can hardly interpret any technical information or government directives that are usually disseminated through written means. When information reaches farmers, lack of follow-up or support on the part of agricultural extension officers means they may not understand or implement the advice given. This will in turn precipitate less than optimal farming practices, reduced yields, and impact overall agricultural productivity in Athuraliya DSD. Such inefficiencies in communication can only be addressed with multilayered strategies-from better and increased access to mobile technology to the improvement of farmers' education and extension services for easier and broader accessibility by all farmers in the region. The Govijana Sewa Centre in the Athuraliya Divisional Secretariat Division similarly plays a crucial role in sustaining agricultural activities within the area. It is entrusted with providing services like the provision of various farming requirements to farmers in 25 Grama Niladhari Divisions coming under the Athuraliya DSD. Because these GNDs are spread

over a large area and are far away from each other, communication gaps have become a prominent problem. Farmers from more remote areas may also be disadvantaged where information, advice, and resources may reach them in a much later stage, perhaps leading to lower agricultural productivity and a general livelihood.

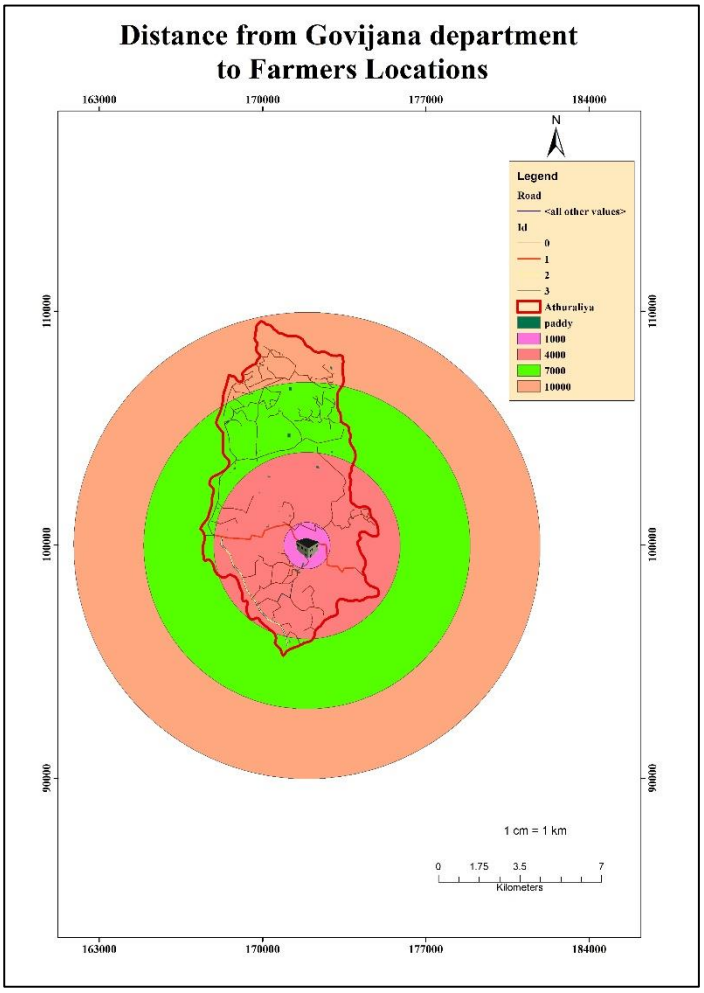
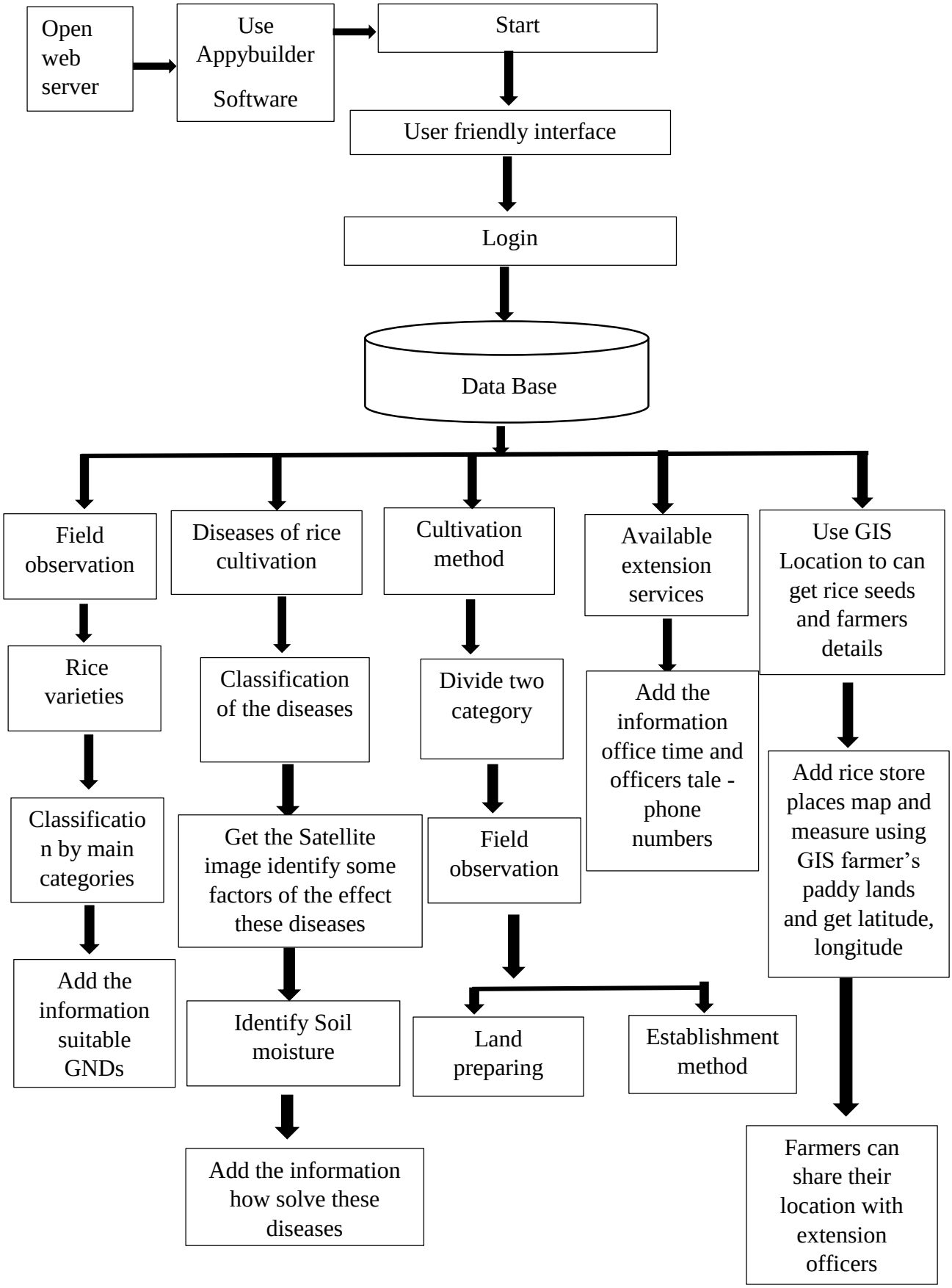


Figure 4 : Buffer Zone Map of Distance Area


Open web server
Use Appybuilder Software
Start
User friendly interface
Login
Data Base
Field observation
Diseases of rice cultivation
Cultivation method
Available extension services
Use GIS Location to can get rice seeds and farmers details
Rice varieties
Classification of the diseases
Divide two category
Add the information office time and officers tale - phone numbers
Add rice store places map and measure using GIS farmer's paddy lands and get latitude, longitude
Classification by main categories
Get the Satellite image identify some factors of the effect these diseases
Field observation
Add the information suitable GNDs
Identify Soil moisture
Land preparing
Establishment method
Add the information how solve these diseases
Farmers can share their location with extension officers

conclusion

The study demonstrates the pivotal role of mobile GIS technology in enhancing agricultural extension services for paddy cultivation in the Athuraliya Divisional Secretariat Division (DSD). The primary challenge facing extension services is the communication barrier between officers and farmers due to geographical distances. The mobile GIS solution developed in this research addresses these gaps by improving communication, information flow, and real-time guidance. This solution provides timely, location-specific advisory services to farmers, facilitating informed decision-making and improving agricultural outcomes. The Athuraliya DSD consists of 25 GNDs, each with unique agricultural needs, but the Govijana department manages these with only two officers. The mobile GIS application bridges this gap by offering a digital tool that reduces reliance on physical visits and enhances service delivery, thus overcoming the challenge of limited staff and distance. The mobile GIS platform proved effective in mapping farmers' locations, enabling better resource allocation and identifying communication bottlenecks. Extension officers can now provide real-time advice, monitor progress, and ensure timely support throughout the paddy cultivation cycle. This model showcases how mobile GIS technology can be replicated in other regions facing similar challenges. The study recommends further investment in training both officers and farmers on the use of mobile GIS and increasing the number of staff to enhance service delivery further. The integration of this technology supports more sustainable and productive farming in the region.

Recommendation

Provide for Offline Functionality: The mobile GIS application should be developed to work well in offline mode to ensure continuous services even in areas with very poor or no internet connectivity.

Provide Security and Privacy to Data: These data security protocols will protect farmers' personal and agricultural data, which gets captured through the mobile GIS application.

Localize the Content and Language: The mobile GIS application must be customized with local dialects and relevant content to the culture to ensure better accessibility and user engagement amongst farmers.

Integrate Indigenous Agricultural Knowledge: The introduction of mobile GIS technology together with indigenous farming practices will make advisory services even more holistic and context-specific. Conduct Pilot Projects: Small-scale piloting of the utility of this mobile GIS application should be conducted for further fine-tuning before scaling up.

Enhancing Farmer Awareness on the Selection of Optimal Paddy Seed Varieties: Farmers should be educated on the selection of the most appropriate paddy seed varieties to suit the local environment and soil conditions. Awareness programs conducted at regular periods will give the farmers the necessary knowledge to choose high-yielding and disease-resistant paddy varieties like AT 362, BG 366, and LD 368, suitable for areas such as Athuraliya DSD. Such programs should aim at the benefits accruing from the choice of appropriate varieties that ensure better productivity, low incidence of pests and diseases, and resilience to climate variability, therefore, assuring the farming community of better performance of crops and increased profitability.

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