

SUSTAINABLE DEVELOPMENT APPROACHES FOR LOCAL SOCIO-ECONOMIC TRANSFORMATION IN SUB-NATIONAL RURAL CONTEXT: AN ANALYSIS OF PRACTICES, STRATEGIES, AND POLICY IMPLICATIONS

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Abstract: Sustainable development has become a critical strategy for addressing socio-economic and environmental challenges in rural regions, particularly in developing countries. This study examines potential sustainable development approaches that can support local socio-economic transformation in the Millavitiya Grama Niladhari Division in Sri Lanka. The primary objective of the research is to identify appropriate development practices and strategic approaches that can enhance sustainable growth while considering local environmental, economic, and social conditions. The study employs a qualitative analytical framework based on background analysis and SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis to assess the existing development context of the area. Primary data were obtained through interviews with local administrative officers, while secondary data were collected from official reports, resource profiles, and related literature. The findings reveal that Millavitiya possesses significant socio-economic and environmental potential, including agricultural resources, natural forests, mineral deposits, and active community organizations. However, the area also faces several challenges, such as environmental degradation, limited economic infrastructure, dependence on primary economic activities, and insufficient access to reliable development data. Based on the analysis, the study identifies several multidimensional sustainable development approaches that could strengthen the local development process. These include the promotion of green economy initiatives, green agriculture practices, participatory development mechanisms, sustainable data management systems, green digital economy initiatives, green mineral economy practices, green energy utilization, green culture and technology, and sustainable tourism development. The study concludes that integrating multiple sustainable development approaches rather than relying on a single strategy is essential for achieving balanced rural development. The proposed framework highlights the importance of community participation, environmental conservation, technological integration, and evidence-based policymaking. These findings offer practical policy implications for local governance institutions, development planners, and policymakers aiming to promote sustainable socio-economic transformation at the grassroots level.

Keyword: Sustainable development approaches, rural development, SWOT analysis, green economy, local socio-economic development

INTRODUCTION

The world moves fast. In such a challenging geopolitical environment, the difficulties facing a developing country like Sri Lanka are likely to grow more extensive and intense. With geopolitical tensions and economic challenges, developing countries are at a critical moment (Baranets et al., 2024). Yet any country can strategically address these common challenges through a specific and planned process (Afinogenov et al., 2019). Establishing that process requires locating a precise theoretical and conceptual position.

The development theories are important to align with the practical realities (Lapinskienė, 2025). In studying the potential sustainable development approaches and practices for the development of Millavitiya

Grama Niladhari Division, the most appropriate strategies, methods, approaches, and practices must be selected in accordance with the realities on the ground. This depends on the temporal and spatial behaviour as well as the universal definition of sustainable development. Therefore, the process involves three steps: first, understanding the theoretical background; second, understanding the reality on the ground; and third, selecting the appropriate sustainable development approaches.

It is also important to maintain a clear and precise theoretical and conceptual position when focusing on a village or town at ground level. Discussing the development of a village and the related sustainable development approaches requires understanding the theoretical background associated with it. That is the most academic way to approach the actual topic. Accordingly, the next part analyses this theoretical background through more organised and concisely framed concepts.

LITERATURE REVIEW

2.1 Development

The word 'development' is commonly used to refer to a specific improvement or advancement (Cambridge University, 2024). It can also describe a new and advanced idea or product, or indicate a new phase under changing circumstances. Development can refer to various things, such as economic development or software development. In software development, it encompasses the process of creating and maintaining applications, frameworks, or other software components, including tasks such as coding, testing, debugging, and documenting. The development discussed here is entirely different in context. A definition can carry plural meanings, yet the concept of development can be examined more deeply within the field of development studies, focusing on the overall development of a country or region.

The concept of development has moved in many directions and has changed over time. The United Nations, in the first paragraph of the Agenda for Development (A/RES/51/240), stated the following (United Nations, 2024):

"Development is one of the main priorities of the United Nations. Development is a multidimensional responsibility to achieve a high standard of living for all people. Economic development, Social development and environmental protection are interdependent and mutually reinforcing components of sustainable development."

As defined by the United Nations, development informs the idea of a multidimensional and equitable society as understood in the middle of the twenty-first century. It also emphasises that development is a powerful factor leading to sustainability. The socio-economic development of this study area is defined within this UN sustainable development framework.

2.2 Regional and Rural Development

As Barenholdt points out, regional development is the label given to efforts to develop certain areas of a country. He further notes that regional development should generally be understood in socio-economic terms (Baerenholdt, 2009). The Organisation for Economic Co-operation and Development (OECD) defines regional development as a concept and approach, and regional development policy as a place-based policy. Since Millavitiya is limited to a rural area, its related development falls under regional development. The OECD's primary objective for regional development is to reduce regional disparities by supporting economic activities in all regions (OECD, n.d.).

Bebbington offers a more detailed definition of rural development. He notes that rural development refers to the expansion of capitalism in rural areas, but is also understood as policy and project interventions aimed at fostering socio-economic change and human development in rural areas (Bebbington, 2001). Linking the concept of regional development with that of rural development ensures sustainable and equitable development. OECD (2019) developed a handbook for policymakers about the decentralisation of the government. In that, they discuss the decentralized sub-national context important in policy making. When focusing on the development of Millavitiya village, it is a decentralized rural context that requires both concepts to be defined spatially as both a regional and a rural space.

2.3 Sustainable Development

The interpretation still used today stems from the simple yet comprehensive statement given to sustainable development by the Brundtland Commission of 1987, themed "Our Common Future" (United Nations Brundtland Commission, 1987). Accordingly, sustainable development is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (United Nations Brundtland Commission, 1987).

Sustainable development calls for collective efforts to build an integrated, sustainable, and resilient future for people and the planet. The defining principle of the 2030 Agenda for Sustainable Development is a commitment by all countries to work together to secure the rights and well-being of all who live on a healthy, prosperous planet. Yet the world faces the danger of not fulfilling that promise by 2030. The Sustainable Development Goals are receding, as are the hopes and rights of current and future generations. A fundamental shift in commitment, cooperation, financing, and swift action is needed to set the world on a better path (United Nations, 2023). In this context, the use of sustainable development approaches and practices for regional and rural development has become more important than ever.

2.4 Sustainable Development Approaches and Practices

The underlying core intent of sustainable development is to create resilient and equitable development. Through sustainable development approaches and practices, the primary objective is to push a specific geographic space towards full sustainable development. Any approach or practice used to achieve sustainable development can be identified as a sustainable development approach or practice. Vornholz's development approach consists of setting goals and strategies to address emerging global environmental and development problems (Vornholz, 1994). In this sense, sustainable development approaches and practices are scientific tools that lead to sustainable development by proposing answers to existing challenges.

To realize sustainable development and its practices, have to critically identify the concept. Dernbach & Cheever (2015) state the sustainable development and its further discontents, including current critiques. In simple terms, critiques can be summarized as "too boring" to command public attention, "too vague" to provide guidance, and "too late" to address the world's problems. Divrik (2022) raises practical and critical counterarguments for sustainable development and approaches. He urges the developed countries' hypocrisy and so-called approaches that, on the surface, are green and sustainable, but in reality, they force the disruption of sustainability in the world.

Dashoor (2025) reviews the evolution of the sustainability concept and identifies key models of the sustainability models, including the Triple Circles Model, the Capital Stock Model, the Prism Model, the Sustainability Egg Model, and Atkisson's Pyramid Model. In these models, he explains the interconnected nature of sustainability within the various dimensions, like economic, social, environmental, and cultural.

The models themselves have limitations and criticisms, and Dashoor (2025) concludes that the single model fails to be effective and that a collective approach may be more effective. Lindfors et al. (2025) studied the multiple perspectives of sustainability and its practical uses and suggest that the multi-disciplinary approach for sustainability is most practical. Therefore, a single approach is not sufficient for a single entity to overcome its complex issues. The present study suggests multiple approaches to address each potential and the challenges of the village.

The number of studies focuses on the various types of sustainable approaches. The scholars study sustainable approaches in various contexts. Mayer et al. (2016) consider the role of the entrepreneurs in linking peripheries and centers and linkages of rural and urban areas for sustainable regional development. They investigated and suggested the linking of entrepreneurs between rural and urban areas, contributing to sustainable economic growth. Hopwood et al. (2005) map the sustainable development approaches, and they state the requirement of the principles of the social and environmental to human equity in sustainability. Oberč & Arroyo Schnell (2020) explore the sustainable approaches in agriculture and try to emphasize the pathways to future farming. West et al. (2024) discuss the relational approaches in sustainability. They explore the five main intersecting 'relationalities' in their work. However, each scholar has examined several approaches in practice, and the limitations and potentials of the approaches have been distinguished. The present study reviews the existing sustainability approaches and identifies the practical and appropriate approaches to the study area, considering specific results of SWOT analysis.

Using these concepts in a balanced way, the most appropriate, innovative, and technical sustainable development approaches required for the development of the Millavitiya Grama Niladhari Division should be identified. Sustainable development approaches and practices can be applied in different ways to achieve the common goal of development. Since the spatial boundary is used as a grama niladhari division, which is the smallest administrative unit in Sri Lanka, locally carried-out development takes on a specialised character. Moreover, Millavitiya village is a rural area within the Kuruwita Divisional Secretariat, making the concept of rural development directly applicable. Sustainable development approaches and practices are used here as strategic development tools to achieve development in a more sustainable manner. The theoretical background can therefore be framed in a more interrelated manner. Accordingly, the next parts study the sustainable development approaches used to create sustainable development in the Millavitiya rural area.

METHODOLOGY

3.1 Data Framework

The methodology rests on two basic segments under the objectives of the study. First, a background analysis is conducted to identify the geographical, economic, and social background of the Millavitiya Grama Niladhari Division. Second, the SWOT analysis method is applied to the background study to uncover appropriate sustainable development approaches and practices. This combination was chosen for its ability to support a more comprehensive and balanced analysis. Finally, the study suggests applying sustainable development approaches to enhance strengths and opportunities, and to manage weaknesses and threats.

The qualitative approach was employed for the research methodology of the study. The data collected for this study falls under two categories: primary and secondary. Both primary and secondary data were analyzed by thematic qualitative analysis. Main themes were selected, and around those main themes, the discussion was conducted. Two interviews were selected among the key officials of the village who play a crucial role in the data and socio-economic landscape of the village. The data framework is classified as follows.

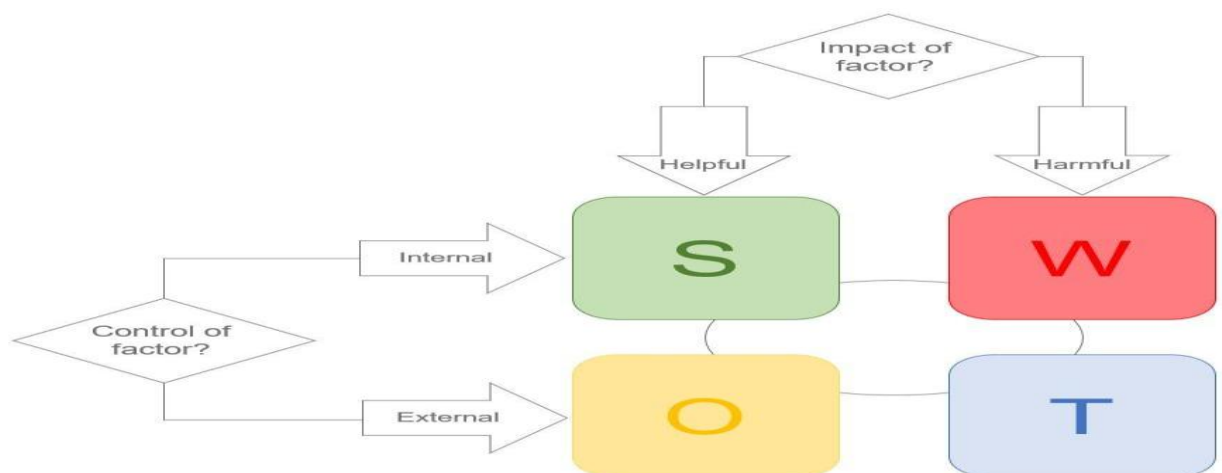
Table 1

Data Frame			
Data type	sources		
Primary data	Interviews	Village Officer	
		Divisional Officer	Secretariat Data
Secondary data	Resource profile (Sampath Pethikada)		
	Village Officer Reports		
	Other literature		

SWOT analysis was utilized to identify the potentials and challenges of the study area, and it serves as a framework for the study to classify the strengths and the limitations, and contributes to suggesting further applicable sustainable development approaches. SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis is a widely accepted strategic planning tool used to assess the internal and external factors affecting the performance and competitive position of an organisation, area, or process (Hill & Westbrook, 1997). It provides valuable insights for local authorities to make informed decisions and develop effective strategies. SWOT analysis serves as a framework for identifying and evaluating an area's internal strengths and weaknesses as well as external opportunities and threats (Weihrich, 1982). To illustrate the analysis, Sarsby has drawn this relationship in one diagram (Sarsby, 2016).

Figure 1

SWOT analysis Matrix (Sarsby, 2016)



The primary purpose of conducting a SWOT analysis is to gain a comprehensive understanding of the current state of an area, assess its competitive position, and support informed strategic decision-making. Analysing these four dimensions helps a region develop sustainable development strategies that capitalise on its strengths, address weaknesses, leverage opportunities, and mitigate threats.

RESULTS & DISCUSSION

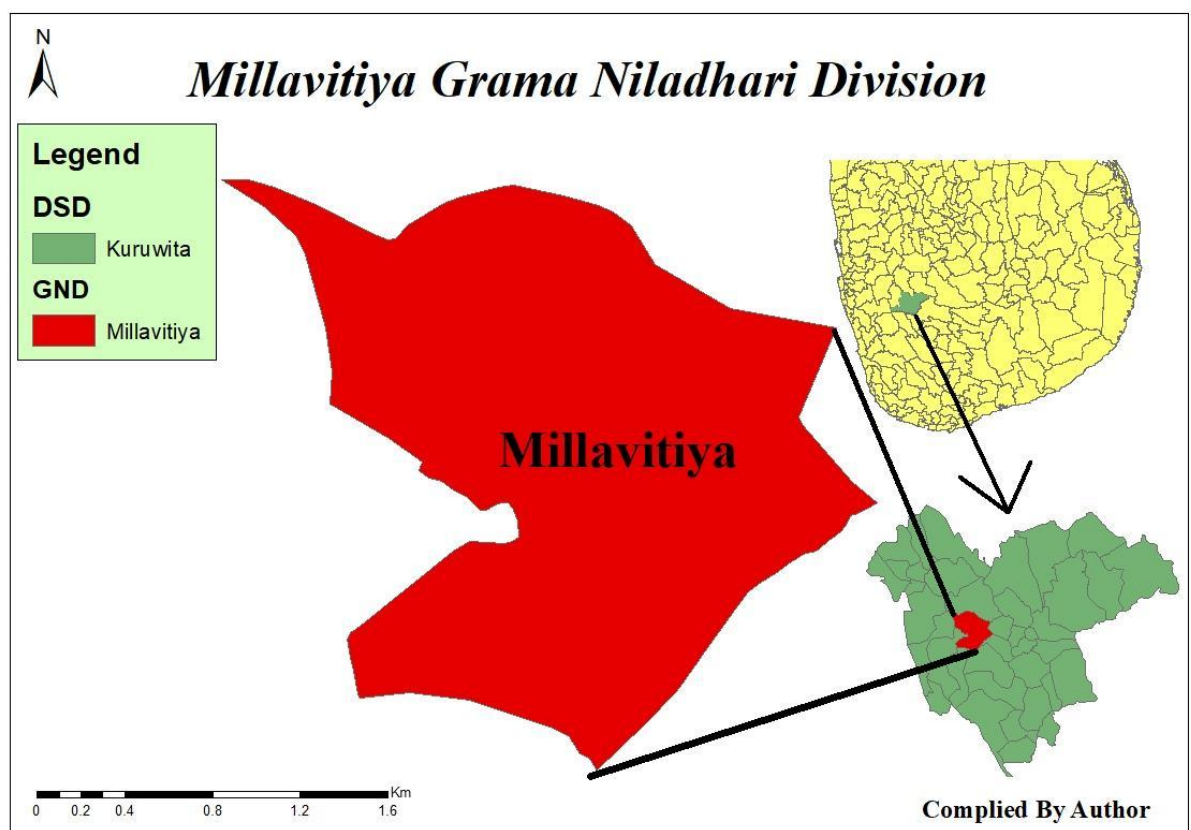
Theoretical background alone is not sufficient for a complete analysis. A study must identify its specific temporal and spatial geographic environment. Within that background, it becomes possible to derive the possibilities, weaknesses, opportunities, and threats present in the study area. This part identifies what that geographical, temporal, and spatial arrangement has generated.

4.1 Background Analysis

Millavitiya Grama Niladhari Division is located in Sabaragamuwa Province, in Ratnapura District. Kuruwita is a grama niladhari division under the Divisional Secretariat Division. A grama niladhari division is the smallest unit in Sri Lanka's administrative hierarchy. The map below attempts to show the Millavitiya Grama Niladhari Division along with its peripheral administrative units (Figure 2).

Figure 2

Millavitiya Grama Niladhari Division



Millavitiya Grama Niladhari is one of 39 divisions in the Kuruwita Divisional Secretariat (Divisional Secretariat, 2021). In terms of geographical information, the division covers 5.36 square kilometres and includes two small villages (Table 2).

Table 2

Millavitiya Grama Niladhari Domain

Sub no	Grama Nildhari Domain	Village Officer Domain	Types size (K.m.)	Villages belonging to
20	158A	Millavitiya	5.36	02

Regarding the administrative structure of the division, this village official division belongs to a regional secretariat, a farmer centre (Govi Kendrayan), and a health medical office. The classification of these administrative structures is as follows (Table 3).

Table 3

Administrative structures Classification

Number of Villages	Number of Farming Centres	Number of Local Authorities			Police jurisdiction	Offices of Medical Officers' of Health
		Municipal councils/City councils	Local councils	Sub-offices of Pradiyasabha		
3	1	0	1	0	a Kuruvit	1

Millavitiya can be examined through its socio-economic activities. Many characteristics are common to other rural areas in Sri Lanka, but the village also has various unique features. Although the economic pattern has largely centred on agriculture, a shift of people towards jobs in the service and industrial sectors can be observed as a result of free education and new economic movements. Land use in the Grama Niladhari Division has been directed primarily towards the production of export crops such as tea, coconut, and rubber. The following classification, prepared from Development Officer reports, confirms this point (Table 4) (Divisional Secretariat, 2021).

Table 4

Land use by crops

Land Use by Crops (Acres)								
Tea	Rubber	coconut	Mixed cropping (Tea/Coconut/ rubber)	Minor export crops - Cinnamon	Minor export crops – Pepper	Minor export crops - cardamom	Paddy	fruit
Heck .	75	12	7	4	3	-	-	-

A traditional drum manufacturing industry in the Millavitiya Grama Niladhari Division has been preserved as a heritage industry. Animal husbandry also takes place, including cattle, poultry, and goat rearing. This husbandry is aimed at meeting the requirements for milk and eggs. Animals for the meat trade are very rare in this division (Table 5).

Table 5

Animal husbandry

Domain	Cattle husbandry		Chicken husbandry		Goat husbandry		Pigs husbandry	
	Number of Farms	Number of cattles	Number of Farms	Number	Number of Farms	Number	Number of Farms	Number
158AMillavitiya	05	102	06	70	01	05	-	-

In terms of infrastructure, the division benefits from strong urban connectivity due to its location alongside the Colombo-Ratnapura main road. The village road system includes A, B, C, and D type roads as well as provincial roads. Of these, provincial and B type roads cover most of the road network (Table 6) (Divisional Secretariat, 2021).

Table 6

Road classification

roads type					
A Grade (K.m.)	B Grade (K.m.)	C Grade (K.m.)	D Grade (K.m.)	provinces roads	Estate roads (K.Mr)
02	06	04	04	10	-

Regarding social infrastructure, the division includes three community halls, a cemetery, and a playground under the village officer's domain. A network of social capital has also emerged through registered farmers', youth, and women's unions. Several factors can be summarised and analysed based on the social, economic, geographical, and environmental information presented above. These facts are then formulated into a SWOT analysis.

4.2 SWOT analysis

The basic analytical method used to select the sustainable development approaches and practices for the Millavitiya Grama Niladhari Division is the feasibility analysis as indicated above. Information discovered through the background analysis of Millavitiya village is classified into strengths, weaknesses, opportunities, and threats.

Table 7

SWOT Analysis

SWOT	Findings
Strengths	<ul style="list-style-type: none"> • Agriculture based on animal husbandry and export crops • 49 acres of natural forest resource available • Alugollahena Deniya water source • Gems and commercial sand mineral resources • Survival of traditional industries(drum industry) • Multi-organised network of registered social organisations(Women, Youth, Sports and Farmers Societies) • InternetAvailability of associated infrastructure
Weaknesses	<ul style="list-style-type: none"> • Dependence on primary resources • Deforestation • Soil degradation due to mineral mining, sand dumping • Degradation of water sources • Lack of economic infrastructure (Financial Institution Systems, Energy Facilities)
Opportunities	<ul style="list-style-type: none"> • High accident rate (In other domains to relatively) • Proximity to the road network with Ratnapura-Colombo urban connectivity. • Impact of human resource development due to being in the middle of two national schools(within 10km / 13km distance limit) • Being a village at the center of a tourist ring (Bopat Falls, Dodam Falls, Delgamuwa Rajamaha Temple, Sri Nagabodhi Temple)
Threats	<ul style="list-style-type: none"> • Exposure to capital investment inequalities by higher control units • Dependence on the capital city economic center (Service Economy) • Direct economic and social pressure from the capital city economic center • Availability of market information in closed urban economies

These four criteria can now be analysed in turn. Under each, existing development data related to the Millavitiya Grama Niladhari Domain is used. The selection of approaches and development practices is made using this analysis data, and through what the analysis provides, further policymaking can be developed across various stages of the sustainable process.

4.3 Sustainable Approaches and Practices

Through background analysis and SWOT analysis, a broad picture of Millavitiya village can be created. From there, both the existing problems and the development potential of the village are brought into sharper focus. Based on that analysis, a number of sustainable development approaches and practices that

can be used for the sustainable development of the village can be identified. The most effective and realistic approaches and practices should be selected based on the financial and resource profile. Green concepts and sustainable development objectives form the basis for selecting these approaches.

4.3.1 Green Economy

The green economy concept seeks an economic system that respects and protects the environment while promoting material prosperity. It is built on renewable energy, resource efficiency, and circular economic principles. Circular economic fundamentals mean reducing waste to the environment and using resources more sustainably in a circular manner, without harming the external environment in the process. This concept is important for the development of Millavitiya village. Two basic principles that mainly emphasise a green economy can be identified here.

Sustainable finance:

Sustainable finance focuses on investing in projects and businesses that contribute to environmental and social well-being while generating financial returns. One of the most fundamental weaknesses revealed through the SWOT analysis is the lack of financial space in the village. Financial circulation in rural economies is often linked to the city, which creates a heavy dependence on urban centres. This leads to negative economic outputs such as high transportation costs and associated carbon emissions. Developing the rural financial sector more sustainably can therefore be identified as a major green economic factor. In particular, the expansion of digital currency-related services can bring positive green economic features, such as cutting transportation costs and improving time efficiency.

Green Jobs:

Green jobs contribute to the transition towards a more sustainable economy and include employment in renewable energy, energy efficiency, sustainable agriculture, and environmental restoration. As the background study indicates, a workforce from all three sectors, namely agriculture, industry, and services, resides in Millavitiya. There are several key issues that can be identified across this workforce.

1. Agricultural labour contributes mainly to the degradation of forest and water sources.
2. Industrial labour has been limited to garment work, with little diversification.
3. The service economy is highly dependent on cities, with high transportation costs and time consumption due to the distance to urban centres.

The following solutions can be proposed under the concept of sustainable jobs.

1. Farmers and farmer organisations should be informed about sustainable agricultural practices. The promotion of green agricultural practices is discussed further in the next section.
2. Human resources should be trained for skilled industrial jobs outside the garment sector. Educational facilities and social infrastructure must be built to support that. Sumanatissa Vidyalaya is currently the only school within the Grama Niladhari jurisdiction that offers education up to the Ordinary Level. Addressing pressing problems such as a shortage of technical teachers and a lack of computer labs will deliver rapid results.
3. Rural people who maintain the service economy travel approximately 60 to 80 kilometres between the capital and the village each day, spending roughly six hours in transit in addition to their eight working hours. This creates not only economic but also a range of social problems. The rural service economy is drawn towards the capital because of existing capacity problems within the rural economy. This reveals the need for a new sustainable investment programme to directly integrate this workforce into the rural economy.

Addressing these various components of the green economy will help find answers to the chronic problems of Millavitiya village and accelerate the activation of existing economic potential through external investments. Large disparities appear in state intervention in capital formation. The table below exposes the disparities in public investment in the economy. According to the Grama Niladhari domain data, only six projects received capital funding in 2021 (Divisional Secretariat, 2021).

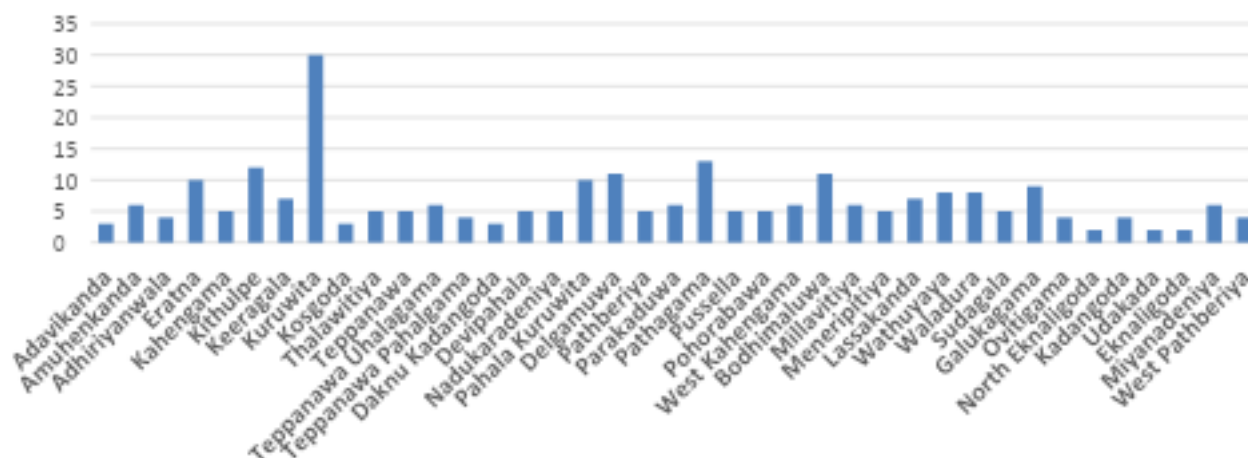
Table 8

State Capital Investments

Number of projects implemented	The cost is Rs.	Number of Beneficiaries
6	1,600,000.00	1170

Figure 3

State capital project in Divisional Secretariate



Promoting private investment and creating a sustainable project mechanism in rural areas through sustainable economic methods is therefore essential. There is high potential to reduce not only inefficiency in the economy and overuse of resources, but also the degradation of existing village resources through the intervention of the sustainable green economy.

4.3.2 Green Agriculture

As discussed in the preceding section, most land in Millavitiya village is used for agricultural purposes, primarily tea, coconut, and rubber. A number of environmental problems have arisen as a result. Chemicals have accumulated in water sources. The Kuruwita Divisional Secretariat has only 28 water sources, one of which is Alugollahena Deniya in Millavitiya, within the official domain. This resource has been inherited by the community, but it is currently being degraded and the quality of the water is declining

due to daily agricultural inputs. Destruction of forest cover due to agriculture and other human activities is also a serious problem. Unauthorised and unproductive agriculture has led to the rapid shrinking of forest cover, including the Devala Jungle and Kurugaga Reserves. Even the areas designated as a reserve by the government, covering 49 acres in total, have been affected by this situation (Divisional Secretariat, 2021).

Table 9

Forest Cover

Name of Reserve	Land size (Acres)
Temple Forest	42
Kurugaga Reserve	09

Green agriculture is the most appropriate sustainable practice and approach to address this environmental crisis in the Millavitiya Grama Niladhari Division. Green agriculture is an ecological philosophy that can be defined as sustainable farming based on principles and practices that prevent ecosystem degradation. This approach goes beyond the traditional agrarian mentality aimed at food security alone. It is a concept that focuses on environmental sustainability while also addressing food security, population growth, hunger, and food price inflation, and does so while protecting nature's ecosystem and managing biodiversity (Nwachukwu, 2023). Through this approach, agriculture in Millavitiya can be protected from degradation while also increasing food safety.

Sustainable agriculture means that a farm can produce food indefinitely without causing severe or irreversible damage to ecosystem health, as noted by the TNAU Agri Tech Portal. The two main secured structures are the socio-economic and biophysical components (TNAU Agritech Portal, n.d.). The socio-economic component provides the long-term ability to access inputs and manage resources such as labour through green agriculture. The biophysical component addresses the long-term effects of different practices on soil properties and processes essential for crop productivity.

Millavitiya village has the potential to benefit from all types of green agricultural practices. There is further potential to industrialise primary cultivation activities and to accelerate sustainable growth through digital methods. The role of the agricultural advisor, who is currently a largely passive figure in the village, holds particular potential to be updated with new and current agricultural approaches.

4.3.3 Participatory Development Approach

The OECD defines participatory development as a process of involving the general public in an active and influential decision-making process (OECD, 1995). This bottom-up approach is carried out not by politicians and policy makers, but by public officials who take the people as the primary drivers of the development process, seek their opinions, and implement projects according to those views.

This approach is very appropriate for Millavitiya village. The primary reason is that the village shows strong levels of multiple organised associations and external integration. Millavitiya can be identified as an active area for all types of rural civil society organisations, including women's societies, farmers' societies, sports and youth organisations, and rural development organisations.

For example: Millavitiya Village Development Society, Millavitiya Farmers Organisation, Samagi Farmers Organisation, Diriya Women's Work Organisation, Proud Women's Task Force, Arunodaya Youth Club, and Paramount Sports Club (Divisional Secretariat, 2021).

Likewise, the socio-physical capital is in good condition as shown by the SWOT analysis. For example: Malindu Community Hall, Udayapura Community Hall, Shanthagara Community Hall, Udalagama Cemetery, and Lellagoda College Playground (Divisional Secretariat, 2021).

With so many village organisations, social capital structures, and an active population, it is easier to create a participatory or bottom-up approach to development. When there is an active social capital relationship with an engaged population, the basic principles of implementing the participatory development approach can be recognised without conflict. Understanding the problems in Millavitiya village at the grassroots level becomes easier, and implementing solutions more effectively through these social capital networks becomes more feasible. By adopting a sustainable participatory approach rather than the dominant Western-centric development model, the development of Millavitiya village has a high potential to proceed in a fairer and more balanced way.

4.3.4 Green Mineral Economy

A green mineral economy is a green economy that balances the demand for mineral resources with their sustainable consumption. A green economy aims to decouple unsustainable resource use from economic growth. As an extension of the green economy approach discussed above, the concept of a green mineral economy is important because of the presence of mineral-related industries in Millavitiya village.

Green mining is a concept that incorporates practices leading to more sustainable mining, increasing the ability of countries to reap the economic benefits of their geological resources. Millavitiya Grama Niladhari Division produces gems and commercial sand as its main mining industries. The damage to the natural environment, however, is extremely high. According to the resource profile of the Divisional Secretariat, there is only one licensed sand trader and eight gem licence holders. Illegal mining, though, has become rampant. This approach therefore proposes a more formalised and monitored sustainable method for creating a green minerals sector, alongside stronger law enforcement.

Recommended practices include the use of low-impact and less water-intensive techniques in Millavitiya village, the reduction, recycling, and reuse of mining waste, the rehabilitation of mining sites, minimising resource depletion, and the multifaceted function of improved regulation under state supervision (Johnson-Woods, 2023).

Minerals for the Green Economy, a 2019 publication of the Geological Survey of Norway, identifies Norway as a major contender in the mineral resources sector (International Energy Agency, 2022). It provides basic information on the importance of critical minerals in the green economy and outlines Norway's resource deposits. A similar potential exists for Millavitiya village.

4.3.5 Sustainable Data Management

Sustainable data management means creating processes that ensure data is stored, processed, and accessed in a resilient and cost-effective manner while minimising environmental impact (Bhaumik, 2023). In the context of Millavitiya Grama Niladhari Division, this approach addresses an existing problem. The SWOT analysis identifies the proliferation of market information in advanced and adjacent urban economies

as a primary threat. The availability of market information has increased economic efficiency in urban areas. However, very little information about Millavitiya village is available. Specific problems include:

1. Lack of a digital data system
2. Existing data not updated (information available in the Regional Secretariat belongs to 2021)
3. Limited access to data
4. Existing data classifications are limited and lack accuracy

A sustainable digital system to address these information-related problems would allow the Grama Sevaka officer to use annually collected data for sustainable purposes. Sustainable data management minimises the environmental impact of data management practices by reducing energy consumption and optimising resource use. It also aims to maintain a systematic data system to protect the environment. Sustainable data management focuses on ensuring that data is used in a socially responsible and ethical manner (Srinivas, 2023). The environmental and development impact on Millavitiya village is therefore considerable.

Table 10

Computer and Internet Usage

Number of families used		Number of families use the internet	
Desktop computers	Laptop computers	wiring with	wiring without
630	245	45	880

As shown in the table above, the village domain has a very high rate of computer usage. Millavitiya has become the village in the divisional secretariat with the highest availability of desktop computers (Table 10) (Divisional Secretariat, 2021). This further increases the potential for implementing this approach. A sustainable data system opens the way for rapid implementation of all the development approaches discussed above, including the green economy, green agriculture, and participatory development. Planning processes built on easy and accurate sustainability data will make the path to sustainable development considerably more straightforward.

4.3.6 Green Digital Economy

The concepts of the green digital economy and sustainability are closely linked with the above concept. The digital economy is characterised by technologies that help reduce carbon emissions and promote circular economies, thereby supporting sustainability (Alberico Travassos & Rosario Joana Carmo Dias, 2023). Digital sustainability is the process of applying social, economic, and environmental principles to digital products, services, and data. It is a long-term process of creating, storing, and managing digital resources to minimise resource consumption and waste. This approach can be seen as a further stage of the sustainable data management concept described above, indicating a higher level of utilisation for socio-economic activities in Millavitiya village.

4.3.7 Green culture and technology

Indigenous knowledge and traditional practices of communities provide valuable insights for sustainable livelihoods and environmental management. This approach aims to innovate the traditional industries of Millavitiya village through green culture and technology. Nature-based thinking recognises the interconnectedness of humans and nature, instils a deep respect and concern for the environment, and uses science and technology to harmonise ecology, art, and local practice. The drum industry, which currently operates as a small-scale industry using leather and wood, can be brought up to date with greener technology. Through the green cultural approach, local culture can contribute more meaningfully to the modern economic structure. This is how local industrialisation can add modern value, which emerges as a strength in the SWOT analysis.

4.3.8 Green Energy

Green energy is energy from renewable sources that are naturally replenished over a human timescale. It is also known as clean, sustainable, or renewable energy (Inspire Clean Energy, n.d.). Looking at Millavitiya village, despite its potential for hydro-based green energy production, this space has not yet been utilised. It is worth noting that adjacent village official domains such as Patberiya, Devipahala, Soodagala, and Lassakanda already use this approach. The failure to adopt it in Millavitiya is a missed opportunity. Joining forces with the Sri Lanka Sustainable Energy Authority (SLSEA) to pursue green energy production would bring both environmental and economic benefits to the village.

4.4 Sustainability Tourism

Also known as ecotourism or responsible tourism, sustainable tourism is a type of tourism that aims to minimise the negative impact of tourism on the environment, culture, and society while also benefiting local communities. For Millavitiya village, this approach can be pursued by taking advantage of its location within a tourist ring and along the Colombo-Ratnapura Road. The village already has small-scale hotel facilities in place, which represents an existing foundation for sustainable tourism (Table 11). There is potential for further expansion of this small-scale tourism industry.

Table 11

Hotel and Accommodation

Name of the hotel	Type of hotel	Number of rooms	Accommodation Number
Sajeevya Hotel	-	02	08
Hotel Priyansa	-	06	12

The sustainable tourism industry can be developed by retaining visitors who are drawn to the natural beauty and tourist ring of the area. Doing so will further develop the five important elements of a tourism system in Millavitiya: attraction, accessibility, accommodation, facilities, and activities. Rural sustainable development will advance alongside it.

CONCLUSION

The first part of this study developed a broad theoretical understanding of development, regional development, rural development, sustainable development, and sustainable development approaches and practices by examining their conceptual and theoretical backgrounds. Based on that understanding, two appropriate analysis methods were selected to analyse the Millavitiya Grama Niladhari Division. The background analysis method identified the social, economic, and geographical space of the village. Building on that identification, the SWOT analysis revealed both the positive and negative conditions in the village as well as potential threats. The following part then proposed sustainable development approaches and practices that improve and utilise identified strengths and opportunities while mitigating and addressing weaknesses and threats.

Nine sustainable development approaches and practices were the primary focus. Some are concurrent; others are widely divergent in their orientation. Yet the ultimate goal of all these approaches is the same: to achieve sustainable rural development. The most appropriate approaches and practices that can be used to address the problems and improve the points identified through the background analysis and SWOT analysis were selected.

A clear correlation between approaches and practices can be observed. The results of one approach feed into another. For example, the green economy approach directly contributes to improvements in green agriculture. Though less directly linked, sustainable data management connects the rural economy to market information and supports the green economy. From this, it is clear that these sustainability approaches are interrelated and mutually dependent.

A multidisciplinary sustainable development approach means pursuing sustainable development by integrating different approaches rather than relying on one. For Millavitiya village, the outstanding conclusion is that using multiple sustainable development approaches together is more appropriate and more effective than using any single approach alone.

The nine integrated sustainable development approaches and practices (selected based on the SWOT analysis and addressing its requirements) cover not only the economic, social, and environmental fields, but also the cultural and moral dimensions of development in Millavitiya village. This confirms the contribution of multiple sustainable development approaches to a fuller conception of sustainable development. The multifaceted approaches and practices discussed here can do immeasurable work in uplifting the five-square-kilometre Millavitiya Grama Niladhari Division towards sustainability. By practising these multiple sustainable development approaches, Millavitiya village has the definite potential to achieve rapid and balanced development through increased productivity, well-managed resource diversity, and up-to-date technology.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

This study is subject to several limitations that should be acknowledged when interpreting its findings. First, the geographical scope is confined to a single Grama Niladhari Division, Millavitiya, which restricts the generalisability of the proposed sustainable development approaches to broader regional or national contexts. Second, the primary data collection relied on interviews with only two key administrative officials, which may not fully capture the diverse perspectives of the wider community, particularly those of marginalised groups, women, and youth. Third, the secondary data used, primarily from the 2021 Divisional Secretariat Resource Profile, reflects a specific point in time, and the socio-economic conditions of the village may have evolved since then, limiting the currency of some findings. Fourth, the SWOT analysis, while a

widely used strategic planning tool, is inherently subjective in nature, and its results depend on the quality and completeness of the available background data. The absence of comprehensive, digitised, and updated local data further constrained the depth of the analysis. Fifth, the study does not include quantitative measurement of the proposed approaches' potential impacts, which limits its scope to descriptive and analytical levels rather than predictive or prescriptive ones.

In terms of future research directions, longitudinal studies tracking the implementation and outcomes of the proposed sustainable development approaches in Millavitiya village over time would significantly contribute to the evidence base for rural development policy. Future research could also apply participatory action research methods to directly involve community members in identifying challenges and co-designing solutions, thereby strengthening the bottom-up development paradigm proposed in this study. Comparative studies examining similar Grama Niladhari Divisions across Sabaragamuwa Province or other rural districts in Sri Lanka could yield broader policy implications. Additionally, quantitative studies measuring the socio-economic and environmental impact of green economy, green agriculture, and sustainable tourism initiatives would complement the qualitative framework developed here. Research specifically exploring the role of digital transformation and sustainable data management in rural Sri Lankan governance would also be a timely and productive area of inquiry, given the increasing policy emphasis on e-governance and digital inclusion.

NOTES

No additional notes are associated with this manuscript.

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DISCLOSURE STATEMENT

The author declares that there is no potential conflict of interest with respect to the research, authorship, or publication of this article.

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