Feasibility Study of Anticipatory Action Project

Country: Sri Lanka

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List of Abbreviations

AA	Anticipatory Actions
APP	Asian Preparedness Partnership
CBO	Community Based Organization
CSO	Civil Society Organization
DPR	Disaster Preparedness and Response
DRR	Disaster Risk Reduction
DRM	Disaster Risk Management
DMC	Disaster Management Center
DS	District Secretary
DSD	Divisional Secretariat Division
EOC	Emergency Operation Centre
GN	Grama Niladhari
GND	Grama Niladhari Division
GoSL	Government of Sri Lanka
IFRC	International Federation of Red Cross & Red Crescent
INGO	International Non-Government Organization
NGO	Non-Government Organization
NCDM	National Council for Disaster Management
NDMCC	National Disaster Management Coordinating Committee
NDMP	National Disaster Management Plan
NERP	National Emergency Operations Plan
NDRSC	National Disaster Relief Services
CenterNGO	Non-Government Organization
OSM	Open Street Map
SLPP	Sri Lanka Preparedness Partnership
SOP	Standards Operation Procedures
UNDRR	United Nations Office for Disaster Risk Reduction
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
WV	World Vision
WVL	World Vision Sri Lanka

Executive   Summary

This feasibility study report intends to provide a summary of findings on the possibility, difficulties, challenges etc. in implementing an Anticipatory Action (AA) project in the context of Sri Lanka. The WVL's current pilot AA project is a pioneering initiative to introduce the concept of anticipated actions in disaster management in the country. The project strategically aims at building the capacity of vulnerable population including women, children and people with disability, in selected high risk locations in Nuwara Eliya District to undertake anticipatory actions in a timely manner to reduce forecasted impacts.

One of the primary tasks of the study was to determine the most frequent high impact hazard types in Nuwara Eliya district, since the intention of AA is to reduce forecasted impacts of potential priority hazards. The historical records show that floods and landslides as the most frequent hazards capable of creating devastating impacts to population, within all mountain districts including Nuwara Eliya. Both are weather induced hazards and triggered due to excessive precipitation events, which occur often during monsoon periods and to a lesser extent during inter-monsoon periods.

Currently the Irrigation Department (ID) and National Building Research Organization (NBRO) as mandated agencies responsible for floods and landslide hazard risk management tasks respectively, are engaged in hazard zonation mapping, risk assessment, forecasting and early warning (EW) in addition to improving the community preparedness and risk mitigation. Several institutions engaged in monitoring rainfall, using a rain gauge network located in different parts to determine the amount of precipitation over time intervals. Among them Department of Meteorology (DoM) provides general information related to weather including rainfall. NBRO operates a network of around 300 automated rain gauges throughout the landslide prone areas to monitor real time precipitation and receives supplementary information from DoM and others such as plantation companies.

NBRO provides landslide EW based on real time rainfall forecasts with reasonable accuracy and reliability based on area specific thresholds established by them through analytical studies of historical data. The NBRO uses Divisional Secretariat Divisions (DSDs) as the unit of spatial coverage for landslide EW. At the meantime, Irrigation Department provides flood early warning based on the river water levels. However, such flood early warning is limited to identified critical locations in major rivers.

The DMC, as the authorized agency for EW dissemination, use print media, broadcast media, and various digital channels and also the civil administration, local government agencies, police etc. In addition, recently there was an attempt to use social media, internet, and SMS alert service also for EW dissemination. However, there are number of challenges associated with the last mile EW dissemination and often the community response to warning massages found to be weak. Since both landslides and frequently experienced flash floods in mountain areas are rapid onset disasters, it is essential to have higher focus on the last mile dissemination so that communities at risk could take appropriate actions in time. In addition, there is a need for disseminating real time forecasts, using smaller administrative units for improving the accuracy of warnings. The AA project has a potential for addressing such unmet needs as well as developing a methodology for improving last mile dissemination.

A technical committee has been established by WVL, comprised of all important the Government agencies and other stakeholders within Nuwara Eliya district, for obtaining inputs during implementation of the AA pilot and for dissemination of outcome. Successful execution of the same by WVL, will help in demonstrating effectiveness of AA, which are being undertaken with a protective intent, implemented before the main impacts of a disaster, with pre-agreed and risk-informed triggers. At the meantime discussions are underway with DMC for exploring the possibility of presenting the pilot interventions at a national platform or to a national level response and preparedness working group.

Through ongoing efforts, if the national stakeholders could be convinced about the potential for AA, it will create an opportunity for scaling-up of experiences of AA pilot to National level. Through the review of country's disaster management related legal framework, it is seen that there is a window of opportunity exist for introducing a National AA Framework and incorporating the approach into the National Disaster Management Plan (NDMP), which is the overall guiding document covering planned disaster risk management interventions. Since the NDMP 2023-2030is being drafted currently, if DMC, and other stakeholders could be persuaded, the possibility exists for mainstreaming the AA approach under the scope of preparedness, and emergency response in the near future.

1. Introduction

1.1 Background

The ASEAN Framework on Anticipatory Action in Disaster Management defines Anticipatory Action (AA) as:

"a set of interventions that are carried out when a hazard poses imminent danger based on a forecast, early warning or pre-disaster risk analysis. Anticipatory action is taken by an individual or organization before an anticipated disaster to mitigate its impact on people, assets and infrastructure that are likely to be affected."

Asia Anticipatory Action for Disaster Mitigation one of the undertakings of the WV and implemented in six countries namely: Bangladesh, Indonesia, Mongolia, the Philippines, Myanmar and Sri Lanka. It is expected to establish anticipatory action protocols for selected disaster-exposed area programs in order to enhance the level of readiness and pre-disaster action capacity at community level. WV Regional Office of East Asia (EAS) and South Asia Pacific (SAP) will support the AA project implemented in six countries including Sri Lanka.

WVL is one of the organizations which works on the DRR sector and giving more emphasize to educate the communities on the DRR perspectives through its programmes. The Sri Lanka Anticipatory Action for Disaster Mitigation Project is one of the undertakings of the WVL and expected to implement with the goal of "Selected High-Impact Natural- or human-made risks are reduced from negatively affecting populations through coordinated anticipated actions". This project strategically aims to target population in selected vulnerable locations and to build the community capacity to conduct anticipatory action in a timely manner and to improve collaboration mechanism for Anticipatory Action in the project areas.

Based on the Most Vulnerable Children (MVCs) analysis findings of World Vision (WV), Nuwara Eliya and Ambagamuwa Divisional Secretariat areas in the Nuwa Eliya District have been identified as target areas for implementation of the pilot project. This project targets the most vulnerable population exposed and likely to be affected in two selected DSDs by the anticipated disasters. The most vulnerable refer to poor families, female headed-households, pregnant women, elderly, people with disabilities, children headed-households and hard to reach communities.

1.2 Major outcomes expected under the pilot initiative

Major outcomes expected under the pilot initiatives planned through this Project are:

- **Outcome 01:** Target Population in selected communities are effectively protected from the full, negative effect of the hazard due to anticipatory action being timely implemented in their community.
- **Outcome 02:** Coordination mechanisms are receiving quality inputs from WV at Field Offices through Anticipatory Platforms or bilateral coordination with other actors, Regional Anticipation Frameworks and Globally at the Anticipation Hub.

The feasibility study is undertaken for verifying the possibility of implementing a project of this nature as Anticipatory Action intervention is an emerging concept which is fast, economical, inclusive, and resilient approach for responding to forecasted disaster events, complementing traditional humanitarian responses.

1.3 Objectives of the of the assignment

As per the ToR of the assignment the objectives of the feasibility study are:

- Review country's disaster management related legal framework
- Conduct community level discussions to identify grassroots level gaps related to anticipatory action, to identify hazards, risks
- Identify possible locations for Anticipatory Action
- Study the feasibility for undertaking anticipatory actions to act in advance, based on the prediction of incoming hazards to protect the affected people against the impact

1.4 Literature survey

The literature survey was carried out as the 1st step during the feasibility study and it has provided some useful experiences of a few key international agencies in undertaking anticipatory actions. United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) and International Federation of Red Cross (IFRC) are two pioneering institutions that have contributed a lot in conceptualizing the initiatives related to anticipatory actions prior to the forecasted disaster events. Such disaster impacts are known as projected shocks to communities.

It seems that since 2020, OCHA has initiated anticipatory action interventions, in over a dozen of countries and has developed an anticipatory action framework based on their past experience. This has been used by respective countries and the Centre for Humanitarian Data, has been

supporting their initiatives. Their work is focused on developing the trigger mechanisms, which has provided a threshold identifying when to take action ahead of a projected shock and when to release funds and other resources. The OCHA's past experience show the importance of studying the feasibility of the anticipatory action pilots before launching any of such projects by any of the disaster affected countries.

Building on decades of experience in disaster preparedness the IFRC and many other National Societies have pioneered the development of the anticipatory action approaches such as Forecast-based Financing (FbF) since 2014. In 2018, IFRC launched forecast-based action (FbA) by the Disaster Response Emergency Fund, the first of which provides reliable and predictable financing for National Societies to implement anticipatory action. In 2019, IFRC joined the Risk-informed Early Action Partnership (REAP) with the goal of making 1 billion more people safer from disasters, in addition to being promoted in several UN Resolutions and relevant international policy processes. FbF and anticipatory action have been embedded in relevant policies at IFRC. One of the goals in the IFRC Strategy 2030 is to support people to anticipate, respond to and quickly recover from crises.

To manage the global challenge of evolving disasters and crises, the strategy calls for the use of technology and innovation to anticipate risks and disasters and provide proactive early action and predictable financing. For the same it is essential to collect data that could predict a potential crisis situation, such as climate events, disease outbreaks etc. As the trend for such phenomena is likely to continue, their assumption is that such phenomena may drive and exacerbate a myriad of related humanitarian needs in future. OCHA, IFRC and other stakeholders feel that it is feasible to use the anticipatory action framework to predict and act ahead of a potential shock. Therefore, in preparing this feasibility report for the Sri Lanka Anticipatory Action for Disaster Mitigation Project pilot of WVL, the approach adapted by the International Federation of Red cross (IFRC) and other international agencies was used as a guide.

1.5 Methodology used

Subsequent interventions undertaken by the consultant during the feasibility study are reviewing the country's disaster management related legal framework, analysis of disasters reported in Nuwara Eliya district, study of existing hazard Early warning adapted in improving the preparedness including hazard specific thresholds established by technical institutions, Assessment of Vulnerability of population within selected DSDs, actions taken for selection of sites for piloting the Anticipatory Action Project. At the end summery of conclusions and recommendations are provided.

For study of disaster management related legal framework two approaches were used. The study of documents such as Disaster management Act, national disaster management plan etc. and key Informant Interviews with national level stakeholders such as DMC, National Emergency Operations Centre, NBRO, department of Meteorology, National Disaster Relief Services Centre(NDRSC), The discussions were focused on general aspects such as disaster management programs implemented by the institutions, hazard zonation mapping, issue of EW and reported disaster events within Nuwara Elia district, etc. In addition, the discussions also were carried out to get information related to Anticipatory Action projects programs already implemented by them in the past and also to see the possibility of integrating the subject in the National Disaster management Plan (NDMP) in future.

Different methods are used in the humanitarian sector to assess the level of impacts due to various hazards and shocks, including conflicts. The anticipatory action framework adopted by the Philippines (targeting typhoons), Bangladesh (floods), Somalia/Ethiopia (drought) rely on hazard risk classification in identifying target areas as a primary intervention. Such input models could predict the potential events and probabilities of such event happening in a selected area in future and that can be used for prioritising the type/s of hazards to be considered for the pilot interventions. In this case the analysis of disasters reported in Nuwara Eliya district was carried out using the study of available reports and data with technical institutions and using the DesInventar database. The study helped in narrow downing the DSDs which have a high probability of disasters, socio-economic impacts and also to identify most prominent types of disasters affecting the population.

For the study of existing hazard early warning adapted by technical agencies in improving the preparedness of population in the target areas, was carried out through discussions with DMC as they are responsible for dissemination of EW. The other institutions that had provided valuable information are Department of Meteorology (DoM), National Building Research Organization (NBRO) and Irrigation department (ID). During feasibility study a detail classification of recorded precipitation events during last 04 years was carried out based on monsoon periods to identify duration of precipitation clusters, peak rainfall, attainment of different thresholds etc. Since NBRO has developed precipitation thresholds for landslide occurrence the study was based on the attainment of NBRO thresholds.

In the absence of baseline data, with the agreement of WVL, vulnerability assessment covering various aspects of vulnerability was carried out using census data produced by the Department of Census & Statistics.The vulnerability assessment has provided some guidance on the type of

community vulnerabilities prevailing in GN divisions within two selected DSDs namely Ambagamuwa DSD and Nuwara Eliya DSD which are found to be the most hazard prone within Nuwara Eliya district.

In addition, it was decided to collect data from selected highly vulnerable communities covering estate divisions within the two target DSDs to select finally target communities for AA pilot project. It was decided to collect data using focus group discussions with communities and other stakeholders such as plantation companies, local level government officials (Garam Niladhari and others), WVL district office etc. A set of volunteers were trained to be enumerators, involved in data collected guided by the consultant and WVL project staff. The WVL's active community level presence was used effectively to collect field data using focus group discussions, conducted through structured and semi-structed interviews etc. with community and other stakeholders.

The selection of target area for Anticipatory Action can be based on a number of criteria:

i. Areas that have been subjected to climate associated disasters and/or in extreme weather events, where communities were subjected to higher socio-economic impacts and where community vulnerability is high.

ii. Possibility of collection of data easily from databases maintained by nationally mandated technical institutions or through interviews with communities. They had accumulated wealth of experience and collected technical information which can be a good source of information for project related work. For example: the National Building Research Organization (NBRO) as the mandated agency for landslide risk management is conducting a landslide hazard zonation mapping program. They have already carried out mapping in Nuwara Eliya district and provide hazard maps covering the GNDs within the target DSDs. The NBRO is also maintaining a database of landslide events and areas susceptible to landslide risk. The institutional memory backed up with such data will be more accurate;

iii. Areas have been already affected by climate associated disasters such as floods, landslides etc. and/or extreme weather events, so there is an interest/rationale for avoiding losses through anticipatory action;

iv. The availability of Early Warning System which forecast accuracy is valuable/trusted enough to be used for AA activation

v. Sectors which are vital to the economy and play a critical role are affected by climate associated disasters and/or in extreme weather events. It can be seen through their production losses and therefore such areas are of High priority for anticipatory action.

vi. There is already interest by CBOs, NGOs working in some areas where there is sufficient working experience on responding to emergencies. They might be interested in using

impact-based forecasts, where it can be further augmented through analysis and lessons learned. For instance the WVL has previous experience in working with communities in Nuwara Eliya District and has considerable working experience in working with disaster vulnerable communities.

Since the technical committee established by WV in Nuwara Eliya district, comprised of representatives of various institutions dealing with the subject of disaster risk management such as DMC, NBRO, Irrigation department, Meteorological department etc. it is anticipated that the historical data will be made available for the project. The feasibility study outcome will be presented to the technical working group for validation and obtaining technical advice for improving the outcome of the study.

2. Legal Framework for Disaster Management in Sri Lanka

2.1 Provisions of the Sri Lanka Disaster Management Act

Sri Lanka Disaster Management Act No 13 of 2005, enacted by the Parliament on 13th May 2005 addresses the disaster management related subjects holistically and provides the legal framework for disaster management in Sri Lanka. The Act provides for the establishment of National Council for Disaster Management (Council) and Disaster Management Centre (DMC) as the implementing arm of the Council. The Act mandated the Council and DMC to prepare the National Policy on Disaster Management, National Disaster Management Plan, and National Emergency Operation Plan and coordinate the disaster management activities of all agencies. The Act provided for the President to declare state of disasters and all government organizations to develop a Disaster Management Plan for the institutions to respond to disasters or pending disasters. The Act lists 21 types of natural, human induced and technological hazards affecting Sri Lanka. The Act is being amended in order to strengthen the legislative framework for disaster management further.

2.2 Other legal arrangements that have provisions for dealing with risk management aspects

2.2.1 Standard By-laws on Disaster Management in Central Province

Central province has developed and approved Standard By-Laws on Disaster Management to be adopted by Local Authorities to empower them to take action to manage disaster risk in the local authority areas. Central Provincial Council has approved and gazetted a Standard By-law for Regularizing, supervision and control of disaster Management in Local Authorities in the central province. Once adopted by the Local Authorities, as in the case of Kandy Municipal Council, it has powers to regularize, supervise and control the construction of buildings including houses in areas prone to hazards within the Kandy Municipal council. It is assumed that other Provincial Councils also could adapt a similar approach but unfortunately since elected councils are not functioning now, this might not happen in the near future.

2.2.2   National Policy on physical planning and mandate provided to Local Governments under the same

The policy recognizes the Local authority (LA) as the planning authority of the area under their jurisdiction and require them to consider all hazard parameters in local planning process to preserve the physical environment. Policy also provide for obtaining guidance from related technical authorities, identify disaster prone areas and formulate comprehensive plan to address

disaster risk in the area.

2.2.3 Regulatory functions of Urban Development Authority (UDA) over urban local governments

All Municipal and Urban Councils are declared under the UDA Act and require any developer to get the approval from the Mayor or Chairman of the respective local authority to construct houses or undertake any development activity within the jurisdiction of the Local Authority. The power to control development has been delegated to Mayor/Chairman by the UDA. UDA has declared more than 200 urban centers in Pradeshiya Saba areas under UDA act and approval from the chairmen is required to construct houses or undertake development activities within declared areas.

2.2.4 Housing and Town Improvement (H&TI) Ordinance

The H&TI ordinance will apply to Municipal Councils, Urban Councils and Town Councils. The Mayor or Chairman has to enforce the provisions of the Ordinance. Chairman has to approve plans for construction of houses within the limits of the council. However, there was no provision to regularize or control the construction of houses in village council area. Pradeshiya Saba Act enacted in 1987 amalgamated town council and village councils and created Pradeshiya Saba. Even today there no legal provision requiring the pradeshiya Saba to control the construction of houses in remote villages.

2.3 Institutional Framework for Disaster Management

National Council for Disaster Management: Sri Lanka Disaster Management Act No 13 of 2005 provides for the establishment of National Council for Disaster Management (The Council) as an apex body chaired by the President of Sri Lanka and guiding and coordinating disaster management activities in the country. The other members of the council are Ministers in charge of 21 subjects, Prime Minister, Leader of Opposition, Chief Ministers of nine provinces and five members of opposition. The Act mandated the Council to prepare the National Policy on Disaster Management, National Disaster Management Plan (NDMP), and National Emergency Operation Plan (NEOP) and monitor the implementation of said plans. The Council also can designate any state sector agency as appropriate organization to perform any duties assigned by the council. The Council can advise the President to declare state of disaster if the magnitude of disaster exceeds the coping capacity of the country. The council requires to meet on quarterly basis and monitor the progress of programs implemented by DMC and address issues relating to coordination and implementation of disaster management programs by other ministries. In the event of declaration of state of disaster, the Council could appoint appropriate authorities to respond to disasters.

Ministry of Disaster Management: Currently Ministry of Disaster Management is function as a State Ministry under the Ministry of Defence. Ministry of Disaster Management is responsible for supervision and monitoring of activities of Disaster Management Center (DMC), Department of Meteorology (DoM), National Building Research Organization (NBRO) and National Disaster Relief Services Center (NDRSC) placed under the Ministry of Disaster Management. Functions assigned the Ministry are:

- Formulation of policies, programs and projects, monitoring and evaluation in regards to the subject of disaster management.
- Coordination and management of activities in relation to mitigation, response, recovery, and relief
- Formulation of National Disaster Management Plan, National Emergency Operation Plans,
- Initiation and coordination of foreign aided projects for disaster management
- Liaison with ministries, government institutes and agencies, private institutes, Local and international non-governmental organizations,
- Promoting housing construction with technological standards, to withstand environmental hazards,
- Encouraging research and development into appropriate technology for housing and construction sector
- Meteorological surveys and research
- Forecasting of natural disasters and sensitizing relevant sectors regarding them,
- Co-ordination of awareness programs on natural and manmade disasters
- Implementation of measures for rescue operations,
- Coordination of international humanitarian relief services

Disaster Management Centre (DMC): The Act provides for the establishment of DMC to implement decisions taken by the council and functions listed in the Act under the Council. As the implementing arm of the Council. DMC is responsible for preparing national disaster management plan and national emergency operation plan, Coordinate the development of hazard maps and risk profiles, coordinating and conducting awareness programs, assisting to prepare disaster management plan for national and sub national level agencies and public sector institutions, dissemination of early warning messages, coordinating emergency response and relief, establishing emergency communication systems, promoting mitigation activities, mainstreaming DRR in to development and reporting to the Council on regular basis. District Disaster Management Unit of DMC headed by Assistant Director and five assistants support District

Secretary to manage pre and post disaster activities

Department of Meteorology (DoM) is the main provider of weather and climate related services and maintain sub offices at regional level and airports.

Irrigation Department (DoI) is responsible for flood risk management, managing floods within the flood prone areas through water storage using large number of reservoirs, diverting water to users such as farmers through irrigation systems and irrigation infrastructure, flood level monitoring, land use planning, promoting safer built environment and technical services for flood Risk Reduction. It has a very well-established network of Irrigation offices throughout the country and coordinated by its head office located in Colombo.

National Building Research Organization (NBRO) responsible for promoting research, safer built environment and technical services for Disaster Risk Reduction has established offices in 10 districts prone landslides. The following cabinet decisions have provided authority to NBRO for undertaking various tasks for the purpose of risk management and reducing the landslide impacts.

Table 1 Cabinet decisions

	Cabinet Paper No. & Date	Description
a.	07/0435/343/0 02 No. 116 dated 16.06.1986	About landslide investigations, reporting and hazard zonation mapping
b.	03/1372/111/061 on joint Memorandum dated 17.07.2003	Development of Risk-Free Sustainable Human Settlements by Implementing Recommendations of National Building Research Organization (NBRO) through the Development Planning Process
c.	Decision PPL/03/CM/30/93 dated 07.10.1993 on Cabinet Paper 93/340/173 dated 29th Sep. 1993	Establishment of NBRO under ICTAD
d.	07/0435/343/002 dated13.03.2007	Re-structuring on National Building Research Organization – Placing NBRO under the purview of Ministry of Disaster Management and Human Rights
e.	10/3053/548/002 dated 23.12.2010	Procuring Services of National Building Research Organization (NBRO) – One part on procuring NBRO services and the other part on authorizing NBRO to issue Landslide Risk Assessment Reports for construction and development projects in landslide – prone areas
f.	Cabinet Decision on CP No. 10/1053/414/004 dated 02.06.2010	Instructing Leal Draftsman to prepare necessary legislation to grant legal status to NBRO
g.	13/1829/548/012-1 dated 25.06.2014	Comprehensive Disaster Management Plan of Sri Lanka(2014-2018) - Implementation of CDMP by relevant Ministries / Government Institutions

National Disaster Relief Services Centre (NDRSC) provides relief to disaster victims, assist in early recovery process, facilitate the release of housing assistance to rehabilitate damaged houses, conduct public awareness program, and strengthening the information communication system. NDRSC has an officer working at Divisional Secretary Officer to assist Divisional Secretary in relief distribution and recovery activities.

2.4 National Plan for Disaster Risk Management and Emergency Response Management

Disaster Management Act require the preparation of National Disaster Management Plan (NDMP) and national Emergency Operation Plan (NEOP) for managing disaster risk and responding to disasters. DMC had prepared NDMP 2013-2017 and obtain the approval from the Cabinet of Ministers. In approving the Plan Cabinet directed the Ministry to prepare an Action plan to implement strategies identified in the NDMP 2013-2017. Accordingly, the Sri Lanka Comprehensive Disaster Management Plan 2014-2018 was prepared and implemented to

minimize the disaster risk of the country. DMC is in the process of developing the next 05-year NDMP for the period 2018-2022 and an action plan in line with the SFDRR targets and priority actions to manage disaster risk incorporating build Back Better principles. All stakeholder agencies in the government sector are require to prepare Institutional Disaster Management Plan based on the National Plan to respond to potential disaster. National Emergency Operation plan has been submitted to Cabinet for approval. Once approved DMC will have to operationalize the plan by conducting regular exercises to identify gaps and take corrective actions.

Ministry of Disaster management is in the process of amending the Disaster Management Act to address the emerging needs and the enhancing the authority of the agencies to improve the effectiveness. Coordination with stakeholder agencies in state sector, NGOs, Private organizations, media, academia donor agencies including UN agencies are important requirement to minimize duplication of efforts and mobilize resources for ensuring emergency response.

National Disaster Management Coordinating Committee (NDMCC) was established in 2007 as the National Platform for coordinating activities implemented by large number of stakeholder agencies. NDMCC is chaired by the Secretary of the Ministry of Disaster Management and was to meet monthly. Disaster Management Centre provided the secretarial services. NDMCC has not been meeting regularly during the last few years and as a result severe gaps have been observed in the coordination mechanism. This need was evident during the floods and landslide events in 2016 and 2017.

At District level, District Secretary chair the coordination meetings, where all the stakeholder agencies including NGOs working at district level participate actively for monitoring of the programs implemented.

2.5 Sri Lanka Comprehensive Disaster Management Program 2014-2018

The Ministry of Disaster Management has introduced "Sri Lanka Comprehensive Disaster Management Programme 2014-2018" as the strategic framework towards building a Safer Sri Lanka. The strategy emphasizes ensuring community resilience through long term disaster risk reduction, incorporated into the development planning process at all levels. The Community Resilience Framework introduced by DMC subsequently proposes a risk sensitive development incorporating past lessons, current practices and looking at futuristic development gains in line with national and international strategies on building resilience.

2.6 Functions of Stakeholder Institutions involved in various aspects of disaster risk management

Below-given functions related to disaster risk management comes under the preview of different agencies

Table 2 Agency functions related to disaster risk management

Agency	Current mandates, roles, and functions
Disaster Management Center(DMC)	• Preparation of the National Disaster Management Plan and theNational Emergency Operation Plan • Responsible for the implementation of the National DisasterManagement Plan and the National Emergency Operation Plan, • Upon declaration of a state of disaster to direct and coordinatethe implementation of the National Emergency Operation Plan; • Estimation of disaster losses and reporting • Preparing and implementing programs and plans for disaster preparedness, mitigation, prevention, relief, rehabilitation and reconstruction activities • Coordination of implementation of disaster management programs and plans and obtain financial assistance from theTreasury for such activities • Promoting research and development programs in relation todisaster management • Setting up and maintaining a database on disasters • Issue EW messages • Appointment of Technical Advisory Committees on various subjects • Creating disaster awareness
Department of Meteorology	• Provide weather and climatological services as the nationalauthority. • Weather forecasting services and issue early warnings andadvisories on weather-related events • Undertake studies and research on meteorology, climatology,climate change and allied subjects • Organize public awareness programs on above mentionedthematic areas. • Maintenance of climatological and weather-related databases • Organize educational and training programs on mandatedthematic areas.
National Disaster Relief ServicesCentre	• Assistance in implementation of the National Emergency Operation Plan, • Coordination of response activities at national level • Coordination of distribution of relief and early recovery assistance after landslides
Irrigation Department	• Preparation of Master Plan for development of the different river basins for the optimum utilization of land and waterresources giving priority to the environmental factors.

Agency	Current mandates, roles, and functions
	• Collection, development and management of historical data base for water resources and flood management of the country. • Project formulation and detailed designs of irrigation, hydro-power, flood control and reclamation Projects. • Construction of irrigation and settlement projects for the conservation, diversion and distribution of water • Construction of drainage, flood protection and salt water extrusion projects for the protection of cultivable land to enable the cultivation of such lands with rainfall for food crop production with minimized risk. • Providing drainage and flood protection facilities to minimize or mitigate the damages caused by floods. • Operation, maintenance, improvements, rehabilitation and water management of medium and major irrigation schemes. Drainage and flood protection scheme and salt water extrusion schemes for optimum productivity ensuring the participation of beneficiaries. • Maintaining and upgrading the water infrastructure including dams and head works of the system • Issuing Irrigation Department clearance, whenever necessary for the projects handled by the other government institutes and private sector such as highways, Mini hydro power, industrial and land filling, hotel resort and drinking water projects, etc.
National Building Research Organization (NBRO)	• landslide studies & services • Landslide hazard mapping, • Landslide Investigations, hazard assessment • Applied research on risk mapping, cost effective landslide risk reduction measures, construction technologies, etc. • Undertaking design and execution of geoengineering mitigation measures for hazard-prone areas, • human settlement, socio-economic studies, etc. in landslide prone areas, • analysis of precipitation levels and issue of EW, • Setting up precipitation thresholds and implementation of community-based EW mechanism for communities at risk • Studies on suitability of land for building, construction and execution of development projects and provide recommendations, • Capacity building and awareness creation
Divisional secretaries	• Coordination of response activities in disaster affected areas • Assistance in relief distribution • Coordination in setting up temporary shelter and camp management • Assist in disaster loss estimation • Coordination of recovery and resettlement programs Rehabilitation and reconstruction assistance to bring normalcy to the disaster affected communities

Agency	Current mandates, roles, and functions
Urban Development Authority	• Formulation of land use planning regulations for urban local authorities • Development of city level zoning plans and assist in integration of risk reduction features • Formulation of risk sensitive planning and construction guidelines for urban local authorities • Granting approvals for construction and development projects for UDA declared urban local authorities
Land use Policy Planning Department	• Preparation of land use plans based on the Lessons Learnt and Reconciliation Commission (LLRC) recommendations. • Preparation of land use plans at rural level for sustainable land use • Land Use Mapping • Identification of land use and other socio-economic problems in the village. • Awareness Creation
National Physical Planning Department (NPPD)	• Formulation of the national physical policies, plans and strategies • Ensure and monitor the implementation of such national policies and plans through regional and local plans with the object of promoting and regulating integrated planning of economic, social, physical and environmental aspects of land and territorial waters of Sri Lanka • Preparation of the National Physical Plan integrating the risk reduction strategies in hazard prone areas • Assist Provincial Councils in the preparation of Regional Physical Plans. • Make recommendations to the Inter-Ministerial Coordinating Committee on Physical Plans
Plantation Human Development Trust (PHDT)	• Promote the Well-Being of the Plantation Community by Improving the Habitat, Living Condition and Socio-Economic Facilities. • Conduct many infrastructure and social development programmes in the Plantation sector, including core activities of Housing & Infrastructure, Water & Sanitation, Health & Nutrition, Child Care & Development, Estate Worker Housing Cooperative Societies, Training & Development and Sports & Welfare. • Develop close collaboration with the relevant Government Ministries, Trade Unions, Regional Plantation Companies, INGO's, NGO's and the Public/Private Sector Organizations in undertaking programs
Universities	• Undertake professional development programs & post graduate programs integrating landslide and other hazard risk reduction disciplines. • Assist in site investigations in landslide affected areas • Applied research on risk mapping, cost effective landslide risk reduction measures, construction technologies, etc.

Agency	Current mandates, roles, and functions
	• Serve on technical advisory committees
Local governments	• Execution of safer land use regulations to reduce impacts of landslides and other disasters • Granting approval for land subdivision plans, construction of building and development control
INGOs, NOGOs	• Extending assistance to DMC and other related Government agencies in providing post-disaster relief, in strengthening pre-disaster preparedness and undertaking mitigation through capacity building, public awareness campaigns, mock exercises, workshops, conferences, etc. • Providing humanitarian assistance to disaster-affected people during severe disasters • Collaborate with corporate entities in Public-Private Partnership(PPP) projects and Corporate Social Responsibility (CSR) initiatives in the field of DM at National, Provincial, District and Sub-district levels

2.7 Key findings related to AA related interventions and prospects for future

During the study of legal frameworks for disaster management it was revealed that so far, no agencies in Sri Lanka have implemented or involved in Anticipatory action related projects in the past. They are all involved in traditional or conventional set of response and preparedness related interventions. The pilot initiative by WVL through Sri Lanka Anticipatory Action for Disaster Mitigation Project is a pioneering effort in Sri Lanka.

The Act mandates the National Council and DMC to prepare the National Policy on Disaster Management, National Disaster Management Plan, and National Emergency Operation Plan and coordinate the disaster management activities of all agencies. Hence, there is a window of opportunity exist for introducing a National AA Framework and incorporating the approach into the National Disaster Management Plan (NDMP), which is the overall guiding document covering planned disaster risk management interventions. Since the NDMP 2023-2030 is being drafted currently, if DMC, and other stakeholders could be persuaded, the possibility exists for mainstreaming the AA approach under the scope of preparedness, and emergency response in the near future.

In the discharge of functions under the act, the Disaster management Center (DMC) shall be assisted by number of Technical advisory Committees consisting of professionals and experts having expertise in relation to respective functions. Therefore, using such provisions, a technical advisory committee can be appointed for advising the DMC for developing an AA National

Framework and implementation of other related interventions.

A technical committee which has been established by WVL, comprised of all important the Government agencies and other stakeholders within Nuwara Eliya district, for obtaining inputs

during implementation of the AA pilot and for dissemination of outcome. Successful execution of the same by WVL, will help in demonstrating effectiveness of AA, which are being undertaken with a protective intent, implemented before the main impacts of a disaster, with pre-agreed and risk-informed triggers. This can be a model that could be followed in establishing a national level technical advisory committee on AA.

There are various national level platforms such as Sri Lanka preparedness partnership which can be used as a vehicle for dissemination of project outcomes and also to promote the concept of Anticipatory Actions and to improve the collaboration between government agencies and other disaster management stakeholders for Anticipatory Action.

3. Brief historical overview of disaster impacts

3.1 Disaster vulnerability of Sri Lanka

(Extracts from the Climate Change Knowledge Portal by WB group https://climateknowledgeportal.worldbank.org/country/sri-lanka/vulnerability)

Overall risks from climate-related impacts are evaluated based on the interaction of climate-related hazards (including hazardous events and trends) with the vulnerability of communities (susceptibility to harm and lack of capacity to adapt), and exposure of human and natural systems. Changes in both the climate system and socioeconomic processes -including adaptation and mitigation actions- are drivers of hazards, exposure, and vulnerability (IPCC Fifth Assessment Report, 2014).

The most frequent natural hazards that impact Sri Lanka are droughts, floods, landslides, cyclones, and coastal erosion. A rise in extreme events and natural disasters as a result of climate change is expected to pose considerable threat to Sri Lanka's economy and human health.

The below given presentation provides a summary of key natural hazards and their associated socioeconomic impacts in the country. It allows for a quick assessment of most frequent natural hazard and their implications on development, socio-economic situation, livelihoods, natural systems and built environment.
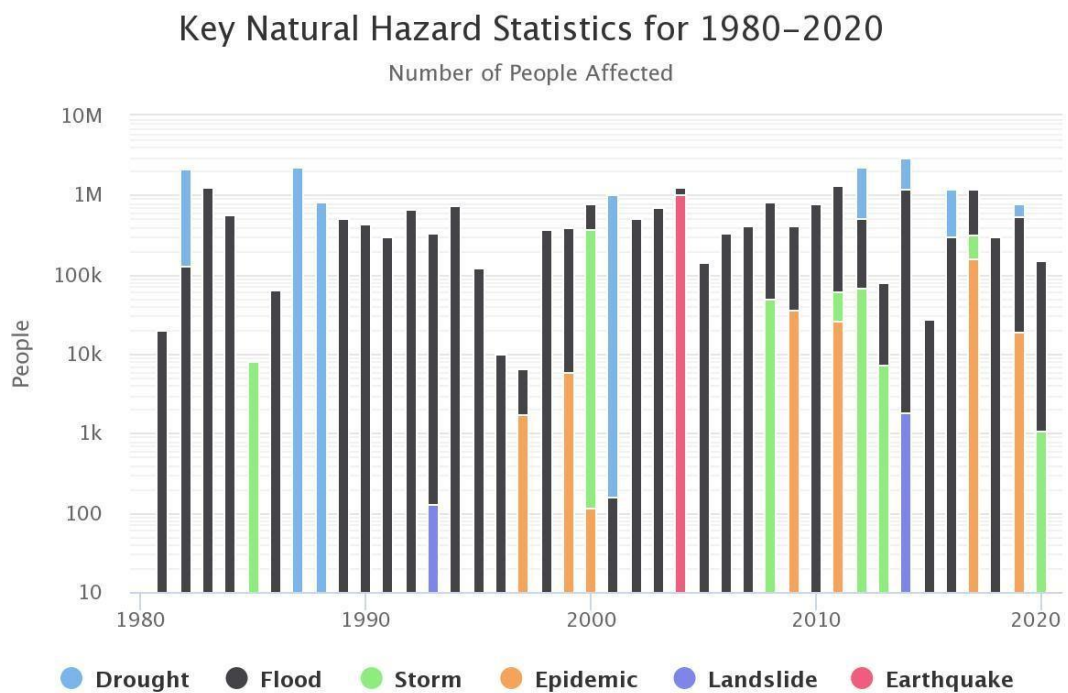
Figure 1 Key natural hazards

Average Annual Natural Hazard Occurrence for 1980–2020
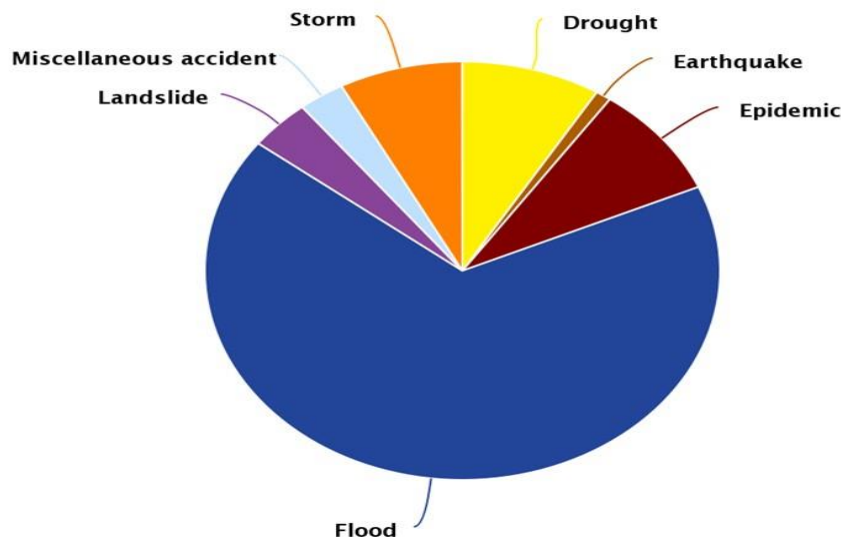
Figure 2 Annual natural hazard occurrence

3.2 Implications on the national scale

- Historical records from 1974-2004 indicate that flood and droughts are increasing. The southwest monsoons (May to September) cause severe flooding in the western and southwestern provinces; the northeast monsoons (December to February) cause flooding in the eastern, northern, and north-central provinces; a large part of the island is drought-prone from February to April.

- During the last two decades, the severity of landslides has increased in the highland regions through a combination of heavy rains, geological changes in the hill country, and deforestation. Landslides are common in the districts of Badulla, Nuwara Eliya, Ratnapura, Kegalle, Kalutara, Kandy, and Matale.

- Sea level rise, storm surges, and coastal erosion are greatest in the west, southwest, and southern coastal belt where about 50% of Sri Lanka's population lives.

- Cyclones often impact the northern region of the country, especially in the months of November and December. Though historically their severity has been moderate, projected changes could result in increased frequency and magnitude of cyclones and other climate-related disasters.

3.3 Disaster impacts reported in Nuwara Eliya district

The Disaster Management Act of 2005 recognizes the potential for occurrence of 21 types of natural and man-made hazard types in Sri Lanka. Over the past 22 years, there were several high-impact hazard events witnessed and most devastating among them was the Indian Ocean tsunami in 2004. In addition, the country witnessed frequent climate-induced events such as floods, landslides, drought etc., and among them there were a few higher impact events witnessed in the recent past. A general observed fact is that such events are increasing in number, frequency, and magnitude.

Both monsoons southwest (May to September), as well as northeast (December to February), are responsible for causing flooding in most parts of the island, including Nuwara Eliya district. A large part of the country, suffer due to insufficient rainfall for agriculture, domestic water supply, etc. and such conditions usually can be observed during February to April. Cyclones often impact the north and eastern districts. Though the severity of cyclones in recent years has been moderate, much more devastating events are projected to occur due to global climate change. The slow onset events such as sea level rise, coastal erosion, salinity intrusion etc. have more influence in the coastal areas of western, south-eastern and southern districts. However, landslides are common in most hill country districts such as Badulla, Nuwara Eliya, Rathnapura, Kegalle, Kandy, Mathale etc. Mostly severity of landslide occurrence is observed due to heavy precipitation events, unfavorable geological conditions and escalation of human interventions.

Nuwara Eliya district is one of the most disaster-prone districts which consists of 05 Divisional Secretariat divisions and 491 Grama Niladhari divisions. Among them leading types of disaster events reported are floods and landslides. The table 3 below indicates the aggregated statistics related to disaster occurrences during last 50 years for Nuwara Eliya District using the information in Desinventar database.

Table 3 Disaster-related impacts during 1974-2022

Event	Deaths	Injured	Missing	Houses Destroyed	Houses Damaged	Affected
Accident	161	383	0	0	0	541
Animal Attack	122	164	0	9	1572	10225
Boat Capsize	1	0	1	0	0	2
Collapse Of Building	0	0	0	0	1	5
Cutting Failure	28	58	1	86	1436	15562
Cyclone	30	0	0	0	50	250
Drought	0	0	0	0	0	489591
Drowning	49	4	10	0	0	61
Earth Slip	6	9	7	50	161	2982
Electrocution	7	0	0	0	0	7
Epidemic	22	0	0	0	0	102787

Explosion	0	0	0	0	1	4
Fire	18	59	0	673	396	5711
Flash Flood	4	2	0	61	700	5985
Flood	28	61	3	667	3620	99366
Forest Fire	0	0	0	0	2	11
Frost	0	0	0	0	0	0
Gale	4	13	1	29	778	4004
Ground Vibration	0	0	0	0	1	4
Hailstorm	0	0	0	0	0	0
Heavy Rains	6	165	0	147	2682	19106
Land Subsidence	11	3	0	56	1485	8498
Landslide	208	140	8	766	3681	57323
Leak Or Spill	0	3	0	1	1	3
Lightning	45	54	0	0	71	447
Plague	0	0	0	0	0	20
Retaining WF	0	0	0	0	4	24
Rock Fall	0	6	0	6	65	658
Sedimentation	0	0	0	0	0	0
Snake Bite	8	0	0	0	0	5
Storm	0	0	0	1	0	0
Strong Wind	50	84	1	219	8550	39974
Structure	2	18	0	0	0	0
Tornado	0	0	0	0	5	21
Tree Fallen	1	0	0	2	78	297
Urban Flood	0	0	0	0	0	0
Wall Collapse	3	1	0	0	17	77
Total	814	1227	32	2773	25357	863551

The Desinventar database also provide a detail assessment of disaster impacts of the Nuwara Eliya district and it conforms the fact that landslides and floods are the most prominent disaster types that have had considerable impact on population in the past.

As per the statistics provided in the below table 4 it is seen that Nuwara Eliya and Ambagamuwa DSDs are the most vulnerable DSDs within the Nuwara Eliya District and during the period 2010-2020 both DSDs have recorded highest number of flood and landslide events. They may have taken minor local level disaster events also in to consideration in preparing the table and hence it shows higher number of events during the last 10 years.

Table 4 Disasters reported during the 10 years (2010-2020)

District and DS Division	Type of the Disaster															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Nuwara Eliya District	65	204	198	139	25	31	77	14	105	89	13	66	57	8	5	104
Kothmale	1	17	16	21	1	2	11	-	5	6	-	10	5	-	2	40
Hanguranketha	-	33	17	27	2	-	7	-	-	-	-	5	-	-	-	56
Walapane	4	45	76	48	7	27	33	14	73	41	7	33	34	3	1	5
Nuwara Eliya	41	61	71	32	13	2	11	-	26	40	6	17	17	5	2	-
Ambagamuwa	19	48	18	11	2	-	15	-	1	2	-	1	1	-	-	3

Type of the Disaster

1. Floods
2. Landslides
3. Candle crashes
4. Storms/hurricanes
5. Lightning struck
6. Drought
7. Rolling stones
8. Damage caused by wild elephants
9. Damage caused by other wild animals
10. Fires
11. Canal over flooding
12. Sinking/building cracks/earthquakes
13. Drying of water springs
14. Noise pollution/Air pollution/Water pollution due to industrial/project implementation
15. Other
16. No Disaster

(Source; DCS-Grama Niladhari division statistics
http://www.statistics.gov.lk/Population/StaticalInformation/GND_Reports/2020/NuwaraEliya)

A detail list of flood and landslide events recorded during the last 05 years and impacts in terms of deaths, injuries, houses destroyed, houses damaged, population affected is provided in the attachment 1- Flood impact during 2017-2022 in Nuwara Eliya District, and Landslide impact during 2017-2022 in Nuwara Eliya District.

4. Hazard early warning for improving the preparedness and hazard specific thresholds established by technical institutions

4.1 Concepts adapted in developing hazard early warning system (EWS)

An early warning system (EWS) is described as an end-to-end if it connects the technical (upstream) and societal (downstream) components of warning through identified set of institutions responsible for dissemination. The effectiveness of an early warning system will depend on the detection technology, as well as socioeconomic factors that dictate the manner in which people at the local level can understand and react to disaster events.

The system can have two sub-components such as technical and societal

Technical sub-component:

The technical components of EWS are:

- The Risk knowledge - creating understanding through mapping of potential hazards, exposure and vulnerabilities (risk mapping);
- Detection, monitoring and forecasting of impending events

One of the essential components of comprehensive early warning system is its capability for predicting and detecting hazards. Detection of hazards may need the collection of various types of data.

In case of weather-related hazards such as floods, landslides, droughts etc. the trigger of the hazard by monitoring and recording rainfall using rain gauges showing the amount of precipitation over time intervals, and by constantly monitoring whether the rainfall reaches the precipitation threshold alerts established by mandated institution/s of the government.

Figure 3 People Centric Early Warning System (UNISDR, 2006)

Early and accurate detection as well as response to warning by at risk communities, require an efficient communication system in order to have appropriate decision making, because the lead-time for early warning (for example, the time between the detection of a potential hazard event after reaching given precipitation threshold until decision making for evacuation of at-risk families from the area) is limited: may be merely a few hours/minutes.

Societal components:

The societal components are:

- Processing and disseminating understandable and actionable warnings to political authorities and the population at-risk (dissemination);
- Undertaking appropriate and timely actions to prepare communities for responding to warnings (providing knowledge and procedure for preparedness to act). This will be initiated in advance by identifying and describing the flow of information from the detection of hazard by instrumentation/observation or reaching the precipitation threshold, distribution of the alert to the relevant authorities, identifying communities who are exposed to potential hazard event, and preparing action plans for evacuation and response, conduct of routine evacuation drills, and emergency response actions.

A model for a People Centric Early Warning System (UNISDR, 2006) is provided above in Figure 3 and it shows the importance of risk knowledge as well as the need for issue of warning after monitoring the forecasted information and its sequential developments, communicating the warning message to the communities at risk so that they will have a good understanding of the consequences to the extent that they respond to it adequately.

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Therefore, it should be understood that the failure or a success of a hazard EW system will depend on many factors not only on the forecasts. Functioning system of hazard EW should be capable of providing communities with timely risk information, enabling them to prepare for anticipated hazard event to minimize the impact on lives, livelihoods and property or assets. This communication should be convincing and timely, transmitted utilizing reliable and trustworthy media channels quickly as possible and reach at risk communities so that they will be able to individualize it, and causes them to react appropriately to a potential disaster event. Active community participation in the formation of the effective early warning messages, its transmission and in various response mechanisms can improve the EW process. There also important to have a community feedback mechanism so that every time the system add more value-added features to make it more effective.

4.2 Institutional set up for hazard EW

Comprehensive EWS should have an "end-to-end" approach, addressing all stages of early warning from initial hazard detection, warning dissemination to community-level and appropriate decision to respond to warning messages. Essentially, it should address multi-hazards. For example, there can be instances when it is necessary to address number of weather events simultaneously. In a situation of low-pressure system development that occur in upper levels of the troposphere there can be occurrence of several critical hazards such as cyclones, floods, landslides, etc. within the area of concern. It is an ideal situation when responsibility for hazard EW dissemination lies with a single authority (national or regional) but the hazard warning originates from different technical agencies. In case of Sri Lanka 03 organizations are responsible for the hazard warning of each hazard type. For example, the Disaster Management Centre is the authority responsible in Sri Lanka for disseminating Early Warnings. Usually Department of Meteorology (DoM) provides general information related to weather including rainfall. In addition, there are specific agencies that issue warnings with their specific technical capacity and as such National Building Research Organization (NBRO) provides area specific EW for landslides, Irrigation department monitor situation with floods and provide specific flood EW to respective river basins. The system that is currently adapted in Multi-hazard EW is provided below under 4.
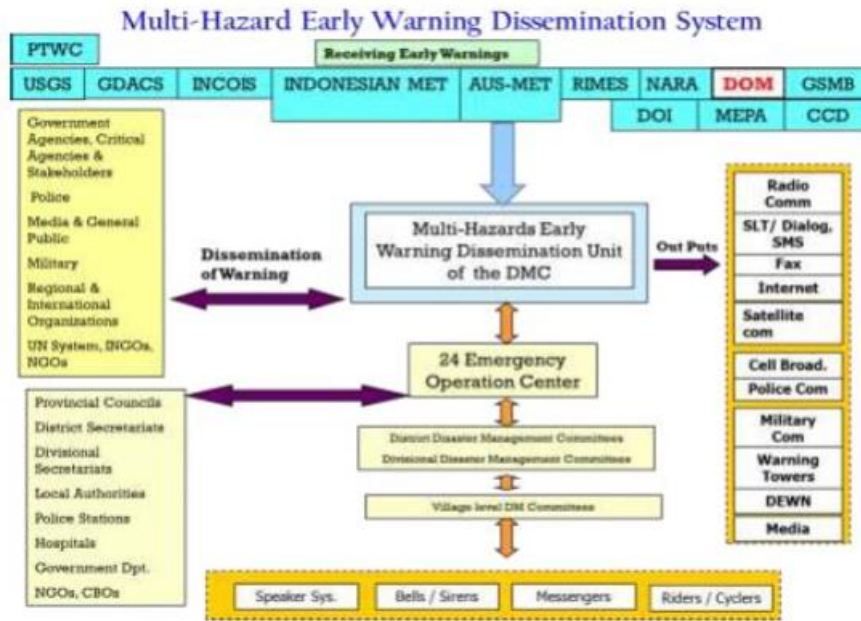
Figure 4 Multi Hazard Early Warning dissemination system in Sri Lanka

In case of landslide EW generation NBRO use real time precipitation measurements for developing forecasts as they get information from a network of around 300 automated rain gauges. They monitor rainfall measurements in a 24/7 arrangement and usually provide accurate and reliable warning. However, since their unit of coverage is a DSD, within the such a big area there can be differences in the actual rainfall. Although NBRO use measurements from a few rain gauges located in the neighbourhood of a particular DSD, due to the distance factor and changes in atmospheric condition the degree of accuracy of warning can be different. In the meantime, range of causative factors of landslide, natural as well as manmade can have contributions for initiation of landslides to a different degree. All such factors can have impact on the accuracy of landslide warning. The ID uses river gauge monitoring system for generating flood EW. Due to practical reasons including cost implications such river level monitoring stations are currently located only in major rivers and therefore flood EW is provided only for certain urban areas and critical locations of the country.

Next, the hazard warning should disseminate quickly to the population at risk. In order to make sure the warning is successful, the message should be easily understood and delivered on time. A

good communication network/system is vital in disseminating warning messages on time, especially for a disaster that has a low lead-time like landslides, flash floods etc. The DMC is responsible for EW dissemination and use print media, broadcast media, and various digital channels and also the civil administration, local government agencies, police etc. In addition, recently there was an attempt to use social media, internet, and SMS alert service also for EW dissemination. A Multi Hazard Early Warning dissemination system in Sri Lanka is shown in Fig 4.2.

However, there are number of challenges associated with the last mile EW dissemination and often the community response to warning massages found to be weak. Since both landslides and frequently experienced flash floods in mountain areas are rapid onset disasters, it is essential to have higher focus on the last mile dissemination so that communities at risk could take appropriate actions in time. In addition, there is a need for disseminating real time forecasts, using smaller administrative units for improving the accuracy of warnings. It is also effective to set up community level rain gauge or river gauging stations and use local community for monitoring the local level precipitation, water levels etc. and use indigenous practices for EW dissemination such as drums, fire crackers, loudspeakers, sirens etc. They also could establish community level mechanism for monitoring the slopes or river water level increases and that kind of community level EW mechanisms can be more effective. The AA project has a potential for addressing such unmet needs related to hazard EW as well as developing a methodology for improving last mile dissemination.

Evacuation is the organized movement of people from an area of risk to a safer location. Evacuation is better precautionary rather than post-impact. The responsibility for evacuation lies with respective communities but supported by the DMC – Assistant Director in the districts, NDRSCOfficers at Divisional Level, Divisional and District Secretaries and their staff including Grama Niladhari and Police. Many International and national NGOs, CBOs etc. are providing local level assistance for maintaining evacuation centres, provide relief assistance and activities related to early recovery along with the National Disaster Relief Services Centre operating with the DMC at local level.

4.3 Hazard specific thresholds developed by technical institutions.

As the mandated agency for landslide risk management, NBRO maintains a network of around 300 automated rain gauge stations all throughout the 14 landslide prone districts (Covering twelve landslide-prone districts, for instance the total area of Mathale, Kandy, Nuwara-Eliya, Kegalle, Ratnapura, Kalutara, Badulla, districts and some areas of Matara, Galle, Hambantota, Monaragala, and Kurunegala districts).

Depending on the past experience they have analyzed the rainfall trigger and came out with the following thresholds;

Table 5 NBRO LEW threshold limits and alert levels

#	Threshold rainfall for 24 hours (mm)	Color code	Attention
1	75 mm	Yellow	Be on alert for the possibility of landslides, rock falls, subsidence and cut slope failure if the rainfall exceeds 75mm and prevailing bad weather conditions continue within next 24 hours.
2	100 mm	Amber	If the rainfall exceeds 100mm and continues within next 24 hours, danger of landslides and cut slope failures exist.
3	150 mm	Red	If the rainfall exceeds 150mm and continues within next 24hours or if the rainfall exceeds 75mm within an hour, evacuate to a safe place.

Warning level 1: Color Code: අදියර 1 : වර්ණ කේතය: எச்சரிக்கை மட்டம் 1: வர்ண குறியீடு:	Watch Yellow විමසිලිමත් කහ அவதானிப்பு மஞ்சள்	Since the rainfall within the past 24 hours has exceeded 75mm, if the rain continues, be watchful on the possibility of landslides, slope failures, rock falls, cutting failures and ground subsidence. පසු ගිය පැය 24 තුල වර්ෂාපතනය 75mm ඉක්මවා ඇති බැවින්, වර්ෂාව තවදුරටත් පවතී නම් නායයෑමේ, බෑවුම් කඩා වැටීමේ, ගල් පෙරළීමේ, පස් කැණීම් කඩා වැටීමේ සහ පොළොව ගිලා බැසීමේ අවදානම පිළිබඳව විමසිලිමත් වන්න. குறந்த 24 மணித்தியாலங்களில் மழைவீழ்ச்சி 75 மி.மீ களை மேவியுள்ளதனால்- மழை தொடருமாயின் மன்சரிவு, சாய்வு இடிந்து விழுகை, பாறை விழுகை, நிலவெட்டுசாய்வு இடிந்து விழுகை மற்றும் தரை உள்ளிறக்கம் என்பவற்றின் சாத்தியங்களுக்கான அவதானிப்புடன் இருக்கவும்.
Warning level 2: Color Code: අදියර 2 : වර්ණ කේතය: எச்சரிக்கை மட்டம் 2: வர்ண குறியீடு:	Alert Amber අවධාන ඇම්බර් எச்சரிக்கை செம்மஞ்சள்	Since the rainfall within the past 24 hours has exceeded 100 mm, if the rains continue, be on alert on the possibility of landslides, slope failures, rock falls, cut failures and ground subsidence, being ready to evacuate to a safe location if the need arises. පසුගිය පැය 24 තුල, වර්ෂාපතනය 100 mm ඉක්මවා ඇති බැවින්, වර්ෂාව තවදුරටත් පවතී නම් නායයෑම්, බෑවුම් කඩා වැටීම්, ගල් පෙරළීම්, පොළොව ගිලා බැසීමේ සහ පස් කැණීම් කඩා වැටීම් අවධානම පිළිබඳ අවධානයෙන් සිට අවශ්‍ය වුවහොත් ආරක්ෂාකාරී තැනකට යාමට සුදානම් වන්න. குறந்த 24 மணித்தியாலங்களில் மழைவீழ்ச்சி 100 மி.மீ களை மேவியுள்ளதனால்- மழை தொடருமாயின் மன்சரிவு, சாய்வு இடிந்து-விழுகை, பாறை-விழுகை, நிலவெட்டுசாய்வு இடிந்து-விழுகை மற்றும் தரை-உள்ளிறக்கம் என்பவற்றின் சாத்தியங்களையிட்டு எச்சரிக்கையுடன்- தேவையேற்படின் பாதுகாப்பான இடங்களுக்கு வெளியேறும் தயார் நிலையில் இருக்கவும்.
Warning level 3: Color Code: අදියර 3 : වර්ණ කේතය: எச்சரிக்கை மட்டம் 3: வர்ண குறியீடு:	Evacuation Red ඉවත්වීම රතු வெளியேறுகை சிவப்பு	Since the rainfall within the past 24 hours has exceeded 150 mm, if the rains continue, evacuate to a safe location to avoid the risk of landslides, slope failures, rock falls, cutting failures and ground subsidence. පසුගිය පැය 24 තුල, වර්ෂාපතනය 150mm ඉක්මවා ඇති බැවින්, වර්ෂාව තවදුරටත් පවතී නම් නායයෑම්, බෑවුම් කඩා වැටීම්, ගල් පෙරළීම්, පොළොව ගිලා බැසීම් සහ පස් කැණීම් කඩා වැටීමේ අනතුරු වලින් වැලකීමට ආරක්ෂිත ස්ථානයකට යන්න. குறந்த 24 மணித்தியாலங்களில் மழைவீழ்ச்சி 150 மி.மீ களை மேவியுள்ளதனால்- மழை தொடருமாயின் மன்சரிவு, சாய்வு இடிந்து விழுகை, பாறை விழுகை, நிலவெட்டுசாய்வு இடிந்து விழுகை மற்றும் தரை உள்ளிறக்கம் என்பவற்றின் அபாயங்களை தவிர்ப்பதற்காக பாதுகாப்பான பகுதிகளுக்கு வெளியேறவும்.

Figure 5 NBRO LEW threshold limits and alert levels

Basic understanding is that the prediction based on forecasts and LEW using above mentioned thresholds could provide warning in advance to at risk communities for taking timely action to respond to Landslide EW. That will help for avoidance of community exposure to potential weather induced landslide events for reducing the disaster impacts. Currently the rain gauge system in place collects and transmits rainfall data every 30 minutes to a single base station at the NBRO headquarters. Based on the data obtained through the above network of rain gauge stations, NBRO use to issue 03 types of alerts or landslide early warnings for vulnerable DSDs in above-mentioned districts. The alerts are provided for respective DSDs soon after analysis indicates the likelihood of reaching different levels and colour corded spatial information is provided automatically by NBRO to DMC and other agencies including media.

This is a well-established system and most community members are familiar with above given (please refer table 5) specific threshold mentioned above and DMC used to issue warning notice in three grades (using three specific colours) to all print media, broadcast media, and various digital channels and electronic media networks daily during the monsoon periods.

4.4 Analysis of rainfall data

There are several rain gauge stations maintained by NBRO and Department of Meteorology (DoM) within the two target DSDs namely Ambagamuwa and Nuwara Eliya DSDs within the Nuwara Eliya district.

Analysis of rainfall data from stations maintained by Meteorological Department, NBRO, Plantation companies etc. indicate that through a careful study of past rainfall records, it is possible to use already established precipitation thresholds for occurrence of landslides by NBRO as hazard thresholds for interventions planned under pilot AA by WVL. Hence during the feasibility study an attempt was made to study the attainment of the rainfall threshold for occurrence of landslides using the rain gauge stations available within Nuwara Eliya district. The study was confined to recorded rainfall during monsoon periods of 2019,2020,2021 and 2022 up to mid of NE monsoon (full data sheet is provided as Attachment 1). The results are summarized below in table 6 and 7 - Analysis of records of precipitation from 2019 to-date in Nuwara Eliya DSD and Ambagamuwa DSD respectively and Fig 6 and Fig 8- Attainment of Precipitation thresholds in rain gauge stations located in Nuwara Eliya DSD and Ambagamuwa DSD.

It also shows the effectiveness and usefulness of dissemination of EW when respective rainfall threshold is reached so that community at risk can take appropriate actions to minimize the exposure. Currently NBRO provides warning through DMC using the established thresholds for landslide occurrence. However, Irrigation Department provides flood early warning based on the river water levels and such flood early warning dissemination is limited to identified locations in some major rivers. In addition, peak rainfall recorded in each station during NE and SW monsoons during the period 2019 to date is provided below in Table 6 and 7 as well as Fig 7 and Fig 8.

Table 6 Analysis of records of precipitation from 2019 to-date from Nuwara Eliya DSD

Considering Southwest-monsoon Season (May - September) and Northeast-monsoon Season (December - February)

Rain gauge Station	Peak RF	Above 75	Above 100	Above 150
Udaradella	140.5	16	5	0
Kotagala Rosita	208	20	11	4
Watawala	206.4	39	24	13
NuwaraEliya	106.8	3	1	0
Great Western	124	6	4	0
Holbrook	130	3	3	0
Meepilimana	85.5	3	0	0
Nanu Oya	128.5	2	1	0

Source: http://www.meteo.gov.lk/index.php?option=com_content&view=article&id=94&Itemid=310&lang=en&lang=en
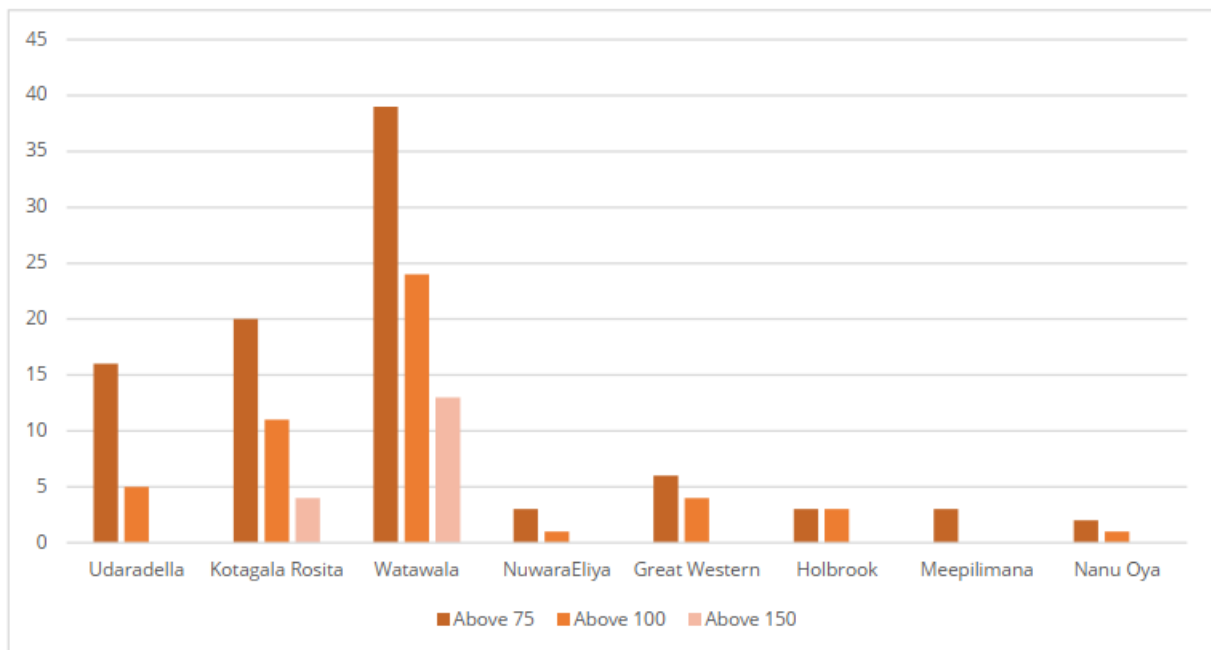
Figure 6 Attainment of Precipitation thresholds from 2019 to date in rain gauge stations at Nuwara Eliya DSD
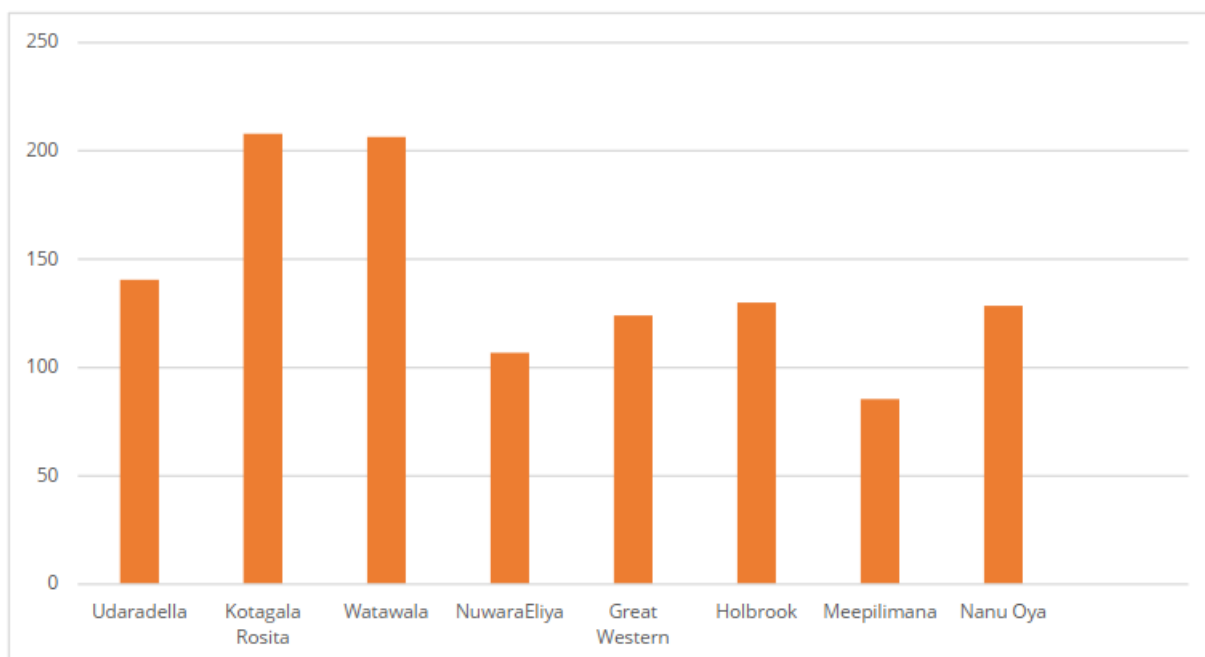
Figure 7 Peak RF recorded from 2019 to date within rain gauge stations at Nuwara Elia DSD

Table 7 Analysis of records of precipitation from 2019 to-date from Ambagamuwa DSD

Rain gauge Station	Peak RF	Above 40	Above 75	Above 100	Above 150
Bogawanthalawa Tea Estate	116.5	23	5	1	0
Brunswick Tea Estate	164	42	10	3	1
Gauravila Tea Estate	134	29	6	3	0
Kalugala	225	78	23	14	5
Lethenty Tea Estate	177.5	60	23	9	3
Minna Tamil Vidayalaya	118	29	5	3	0
Mocha Tea Estate	69.5	4	0	0	0
NIPM Morar	81	23	9	1	0
Norwood	156	60	11	5	1
Annadale Division	180.5	18	5	3	2
Upcot	149	50	19	4	0
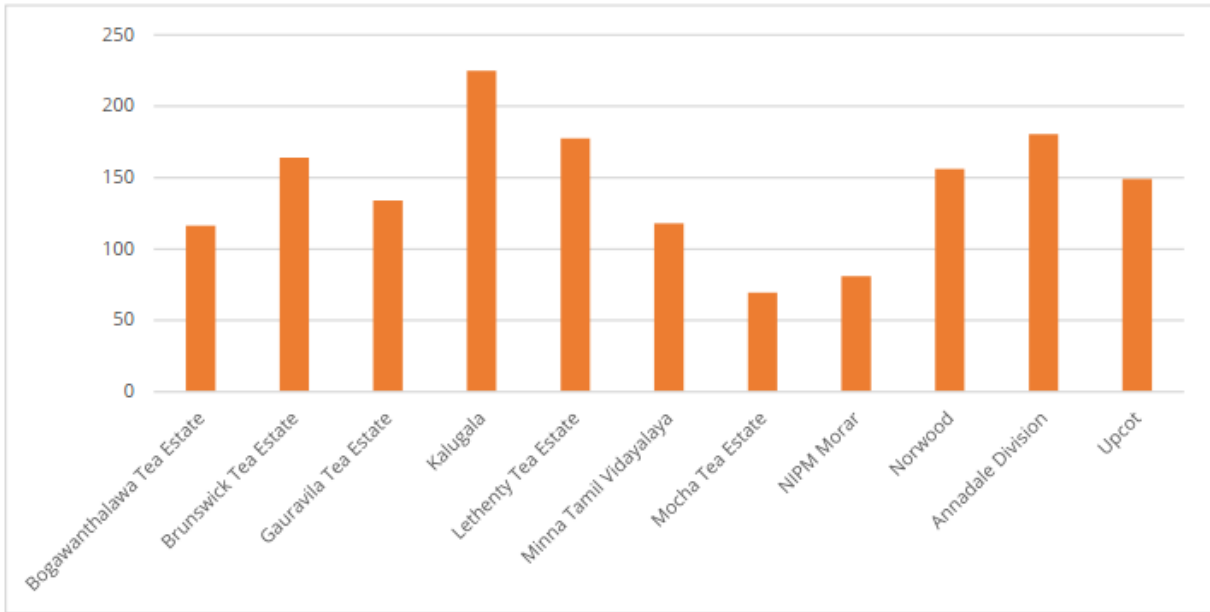
Figure 8 Peak RF recorded from 2019 to date within rain gauge stations at Ambagamuwa DSD
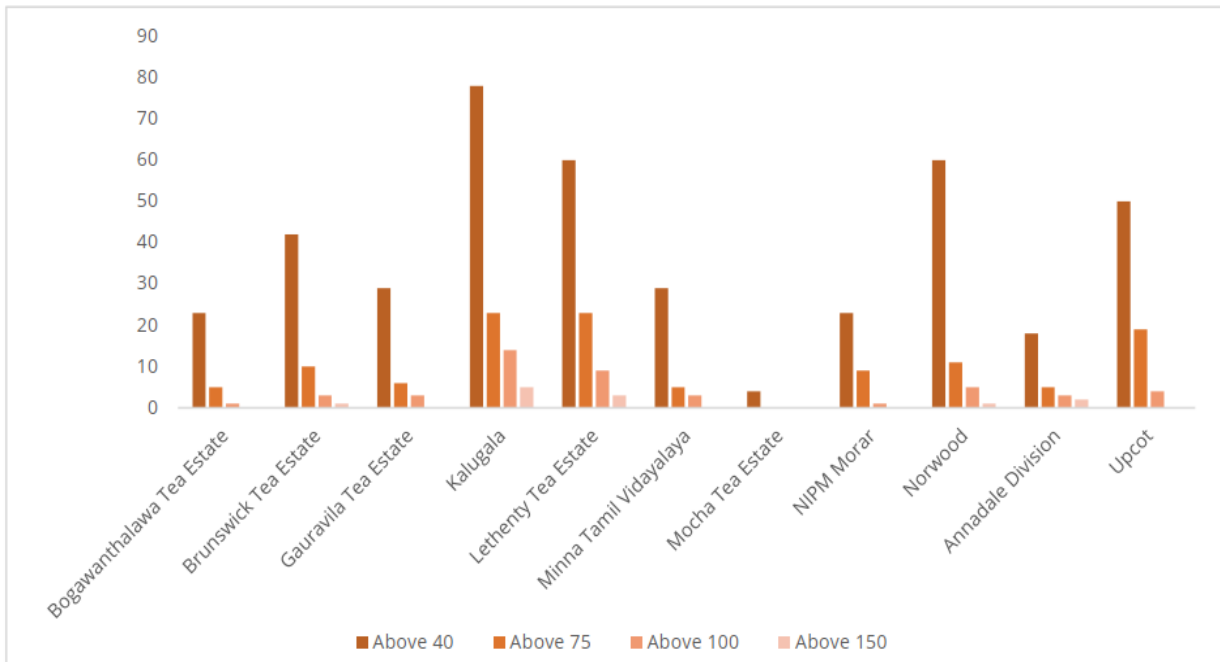
Figure 9 Attainment of precipitation thresholds - from 2019 to date in rain gauge stations at Ambagamuwa DSD

4.5 Distance between Grama Niladari divisions planned to be included in the AA project to Rain gauge stations

During the Feasibility study an Analysis of distance between Grama Niladari divisions planned to be included in the project and d Rain gauge stations located within Nuwara Eliya and Ambagamuwa DSDs also was carried out. This will be useful for application of precipitation thresholds for activation of Anticipated Action protocols and it is provided below under Table 8.

Table 8 Analysis of Distance between Grama Niladari divisions -planned to be included in the AAproject to Rain gauge stations located within Nuwara Eliya and Ambagamuwa DSDs.

DSD	#	Area	Closest Automated Rain gauge stations	Distance(km)
Nuwara Eliya DSD	1	Kuduoya GND (475A)	Great Western	8.27
	2	Yulefield GND (475Y)	Great Western	6.10
	3	Kotagala GND (475)	Great Western	7.11
	4	Dayagama East GND (476S)	Holbrook	7.43
	5	Bambarakele GND (535K)	Nanu Oya	3.98
	6	Thangakele GND (476M)	Nanu Oya	3.68
	7	Dayagama West (475L)	Holbrook	5.68
AmbagamuwaDSD	8	Watawala GND (320F)	Lethenty Tea Estate	5.62
	9	Bagawanthalawa South GND (319F)	Bogawanthalawa Tea Estate	0.64
	10	Kotiyagala GND (319P)	Bogawanthalawa Tea Estate	2.42
	11	Loinon GND (319O)	Bogawanthalawa Tea Estate	3.89
	12	Welioya GND (320P)	Lethenty Tea Estate	1.84
	13	Panmur GND (320R)	Lethenty Tea Estate	3.22
	14	Ruwanpura GND (320G)	Lethenty Tea Estate	3.96
	15	Rosella GND (320E)	Lethenty Tea Estate	2.56

4.6 Analysis of the duration of each precipitation cluster

The study was extended to see the duration of each precipitation cluster during the period from 2019 to date. It is seen from the analysis that usually the rainfall clusters are less than 5 days duration but at some instances it can extend up to 10 days or even up to 15 days. But rainfall clusters exceeding 15 days are very rare.

Table 9 Duration of precipitation clusters that are associated with the attainment of thresholds during the period from 2019 to date

Remarks: Considering only the rainfall duration over 40 mm for the two monsoons

Nuwara Eliya DSD

Rain gauge station	Less than 5 days	5-10 days	10-15 days	More than 15 days
Great Western	13	0	0	0
Holbrook	21	0	0	0
Meepilimana	5	1	0	0
Nanu Oya	3	0	0	0

Ambagamuwa DSD

Rain gauge station	Less than 5 days	5-10 days	10-15 days	More than 15 days
Bogawanthalawa Tea Estate	12	1	0	0
Brunswick Tea Estate	18	3	0	0
Gauravila Tea Estate	17	2	0	0
Kalugala	18	9	1	0
Lethenty Tea Estate	15	5	2	0
Minna Tamil Vidayalaya	8	1	2	0
Mocha Tea Estate	3	0	0	0
NIPM Morar	13	0	0	0
Norwood	27	4	2	0
Annadale Division	6	1	0	0
Upcott	11	3	2	1

5. Assessment of vulnerability of population within selected DSDs based on the census data

5.1 Background

Vulnerability is usually defined as the state of being prone to or potential susceptibility to create losses and damages to various elements located within a specific area. The vulnerability should determine the level of community's ability to cope up with or rebound from a given hazard event. The extent of the damage due to floods or landslides depend on the characteristics of the event. For example, flood water or landslide debris can flow but level of damage depend on its flow velocity, potential inundation area, depth. However, the withstanding capacity of different exposed elements at risk can alter the damage potential due to such lateral forces.

Thus, the Vulnerability assessment, of which the results are compiled and reported through this chapter, is expected to produce valuable inputs that needed to be considered during implementation of the Anticipatory Action project. Primarily vulnerability assessment is important for the decision making in selection of specific target GNs within two selected DSDs for the pilot project. Subsequently such assessment has to be used as the basis for planning of hazard risk mitigation measures and to increase the preparedness of people who has the potential for exposure to consequences of different hazard events.

In the absence of baseline data, the vulnerability assessment analysis reported under this chapter is based on the census data covering selected GN divisions within Nuwara Eliya and Ambagamuwa DSDs, published by the Department of Census and Statistics. It provides Grama Niladari division level vulnerability analysis with regard to socio-economic factors of communities as well as physical characteristics of other elements at risk. Nuwara Eliya consists of 05 Divisional Secretariat divisions and 491 Grama Niladhari divisions. Since a pilot project cannot be implemented targeting such a vast area, selection of the target area was done considering the previous working experience of WVL.

The World Vision has carried out recently a Most Vulnerable Children (MVCs) analysis and has identified vulnerable factors for children in Nuwara Eliya and Ambagamuwa Divisional Secretariat areas. Hence it was decided to implement the Anticipatory Action Pilot project based on the Nuwara Eliya and Ambagamuwa Divisional Secretariat areas in the Nuwara Eliya District. The WV has already carried out a Child Centred DRR project in above two Divisional secretariat divisions and some of the villages have a conceptual understanding on Community-

Based Disaster Risk Management. During the project the at-risk communities were actively engaged in the identification, analysis, treatment, monitoring and evaluation of disaster risks in order to reduce their vulnerabilities and enhance capacities. This project has paid importance in empowering the most vulnerable, children and youth, community members and families to create an understanding of their own risks, the role and responsibilities of the members of the community in building up resilience to disasters. The project activities helped in increasing the community awareness and building ownership of disaster risk reduction initiatives. However, the communities yet to undertake activities which will provide impact-based forecasts for anticipatory action. Based on the working experience possessed by WV already, the Sri Lanka Anticipatory Action for Disaster Mitigation Project expects to target the most vulnerable population exposed and likely to be affected by the anticipated disasters within the Nuwara Eliya and Ambagamuwa Divisional Secretariat area.

In the absence of base line information, the project had to devise a method to see the level of vulnerability of the Grama Niladhari Divisions, WV has had previous experience in implementing Community Based Disaster Risk management projects including the Child Centered DRR project. It was decided to use Census data produced by the Department of Census and Statistics after the national census conducted in 2012. Different parameters were used in the analysis and provided in this chapter uses physical, social and economic dimensions of vulnerability of the target GND areas. The social aspects of vulnerability can be expressed using the parameters such as population related characteristics, whereas the economic aspects can be reflected from indicators such as livelihoods, earning capacity etc. Physical dimension of vulnerability represents the capacity of physical elements (such as housing stock) to withstand hazard events prevailing in the area.

5.2 Target DN Divisions

The vulnerability assessment was carried out based on the following Grama Niladhari Divisions within Nuwara Eliya and Ambagamuwa DSDs.

Table 10 List of Grama Niladhari Divisions within Nuwara Eliya and Ambagamuwa DSDs

#	GN Divisions
	Nuwara Eliya DSD
1	Kuduoya GND (475A)
2	Yulefield GND (475Y)
3	Kotagala GND (475)
4	Dayagama East GND (476S)
5	Bambarakele GND (535K)
6	Thangakele GND (476M)
7	Dayagama West (475L)

	Ambagamuwa DSD
8	Watawala GND (320F)
9	Bagawanthalawa South GND (319F)
10	Kotiyagala GND (319P)
11	Loinon GND (319O)
12	Welioya GND (320P)
13	Panmur GND (320R)
14	Ruwanpura GND (320G)
15	Rosella GND (320E)

Results of the analysis carried out based of GNDs within Nuwara Eliya and Ambagamuwa Divisional Secretariat area under Social, economic, Physical dimensions of vulnerability are presented below. Depending on the success of assessment it was decided to move forward and carry out data collection at community level.

5.3 Findings of the vulnerability assessment carried out at GND level

In summery the findings of the above vulnerability are provided below. It has provided not only the level of vulnerability under different dimensions, but also has given an indication about what factors to be considered in field level study to devise the level of vulnerability of communities.

5.3.1 Status of the % of the general population

Table 11 Status of general population

#	Area	Both sexes	Male	Male as a % of total	Female	Female as a % of total
	Nuwara Eliyah DSD	**212,094**	**102,338**	**48%**	**109,756**	**52%**
1	Kuduoya GND (475A)	4,609	2,228	48%	2,381	52%
2	Yulefield GND (475Y)	4,065	1,902	47%	2,163	53%
3	Kotagala GND (475)	5,044	2,349	47%	2,695	53%
4	Dayagama East GND (476S)	3,842	1,847	48%	1,995	52%
5	Bambarakele GND (535K)	3,143	1,508	48%	1,635	52%
6	Thangakele GND (476M)	2,419	1,142	47%	1,277	53%
7	Dayagama West (475L)	3,059	1,495	49%	1,564	51%
	Ambagamuwa DSD	**205,723**	**97,448**	**47%**	**108,275**	**53%**
8	Watawala GND (320F)	5,690	2,674	47%	3,016	53%
9	Bagawanthalawa South GND (319F)	6,248	3,006	48%	3,242	52%
10	Kotiyagala GND (319P)	3,033	1,491	49%	1,542	51%
11	Loinon GND (319O)	6,996	3,343	48%	3,653	52%
12	Welioya GND (320P)	4,977	2,362	47%	2,615	53%
13	Panmur GND (320R)	2,235	1,105	49%	1,130	51%
14	Ruwanpura GND (320G)	2,288	1,126	49%	1,162	51%
15	Rosella GND (320E)	3,598	1,701	47%	1,897	53%
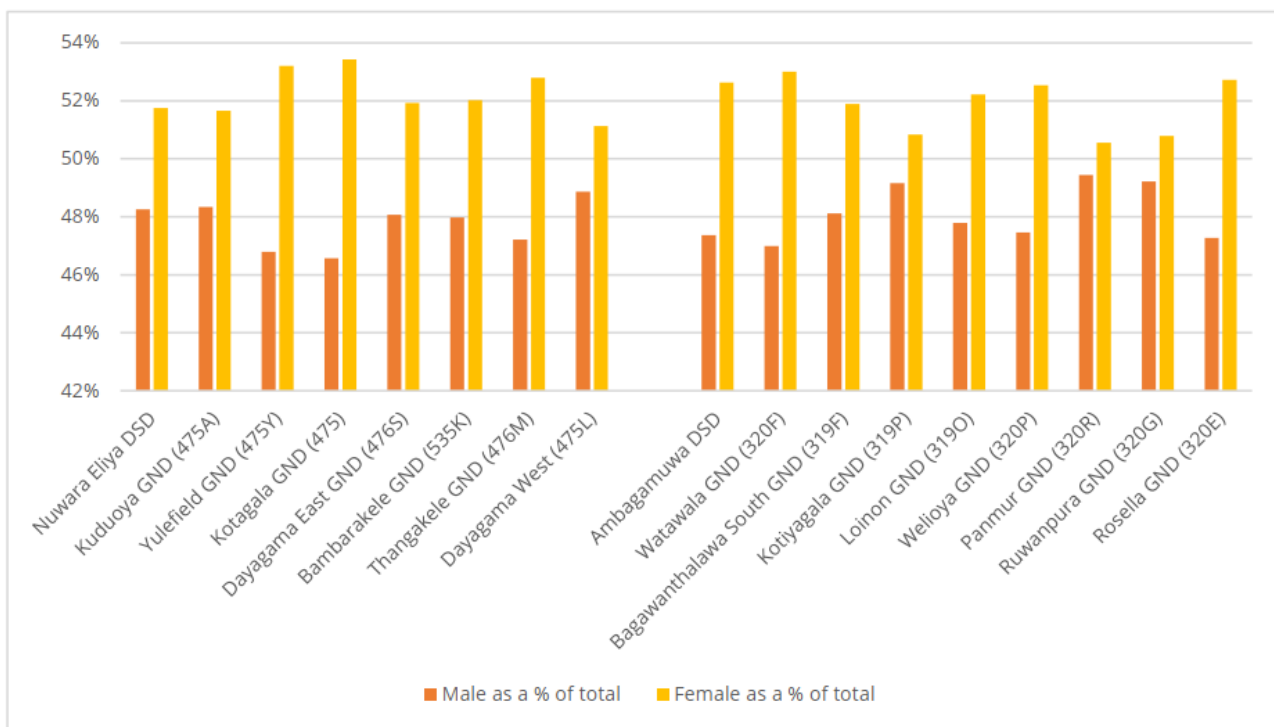
Figure 10 Population by GN division and sex 2012

Both Nuwara Eliya and Ambagamuwa DSD have 200,000 plus population but in numbers both are similar. The population size differs significantly within the GNDs within the two DSDs and in a few GNDs it is around 2,000 but majority has a population around 3,000-4,000. Lowest number of populations is found in Tangakele GND in Nuwara Eliya DSD and Panmur GND in Ambagamuwa GND. Highest population is at Bagawanthalawa South GND, which is around 7,000.Interstingly male female ratio in all most all found to be around 48% to 52%. Female population found to be higher in all GNDs.

5.3.2 Economic vulnerability reflecting gainful employment
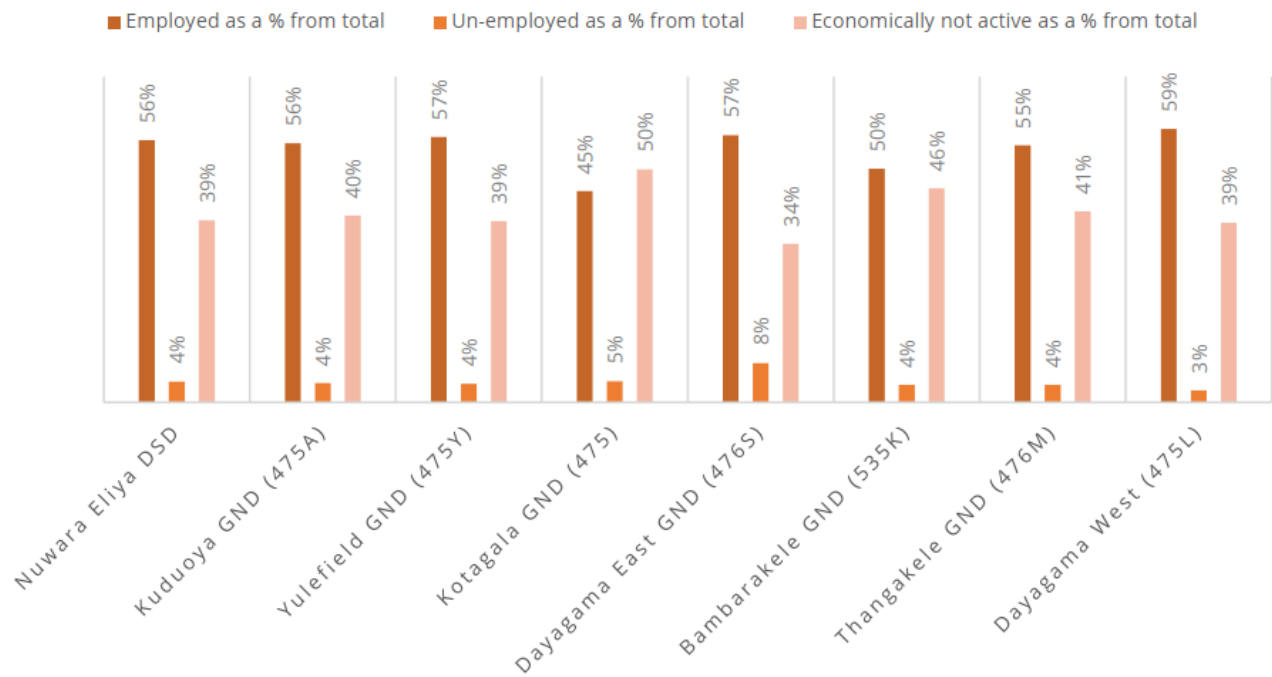
Figure 11 Economic vulnerability reflecting status of gainful employment - Nuwara Eliya DSD
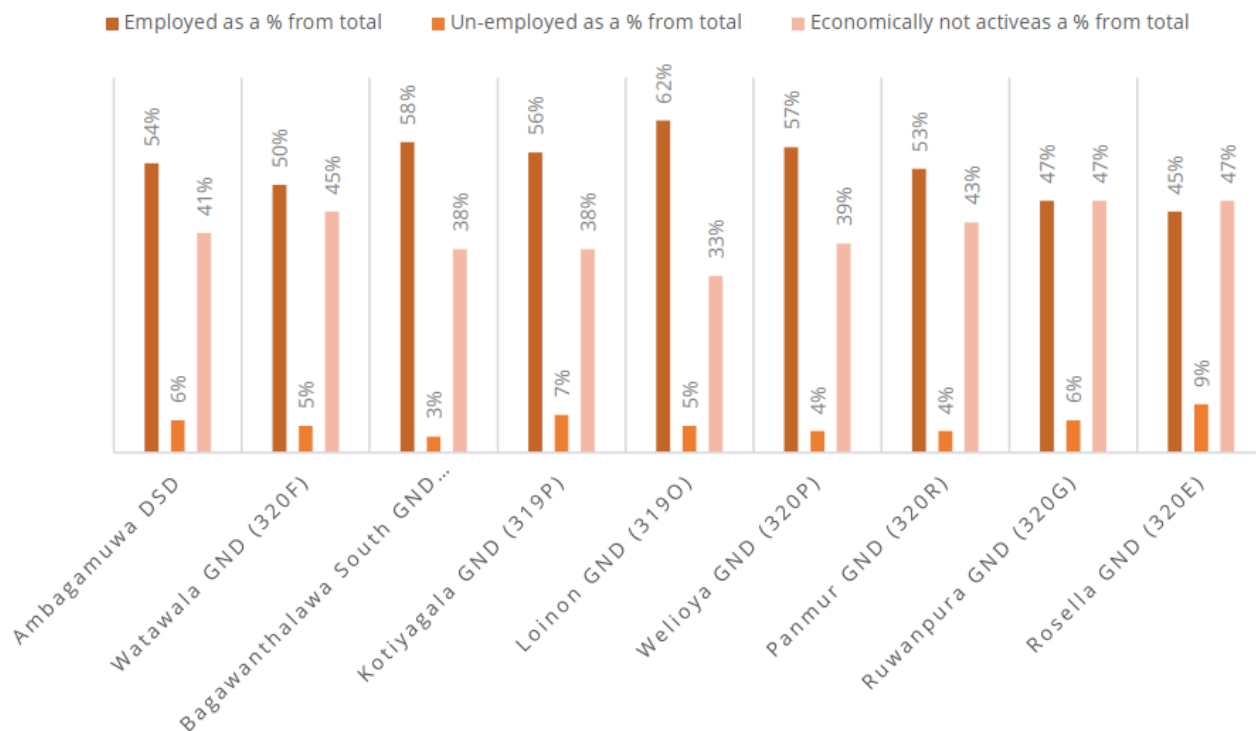
Figure 12 Economic vulnerability reflecting status of gainful employment - Ambagamuwa DSD

In both DSDs around 55% found to be employed. In average in both DSDs 4-6 % are unemployed and 39-41 % economically not active. There are exemptions such as employed percentage is around 62 in Loinon GND. Whereas in Rosella GND unemployed is around 9%.In general around 40% of population found to be economically not active. This is one of the major factors contributing to economic vulnerability.

5.3.3 Social vulnerability – elderly population over 60 years of age
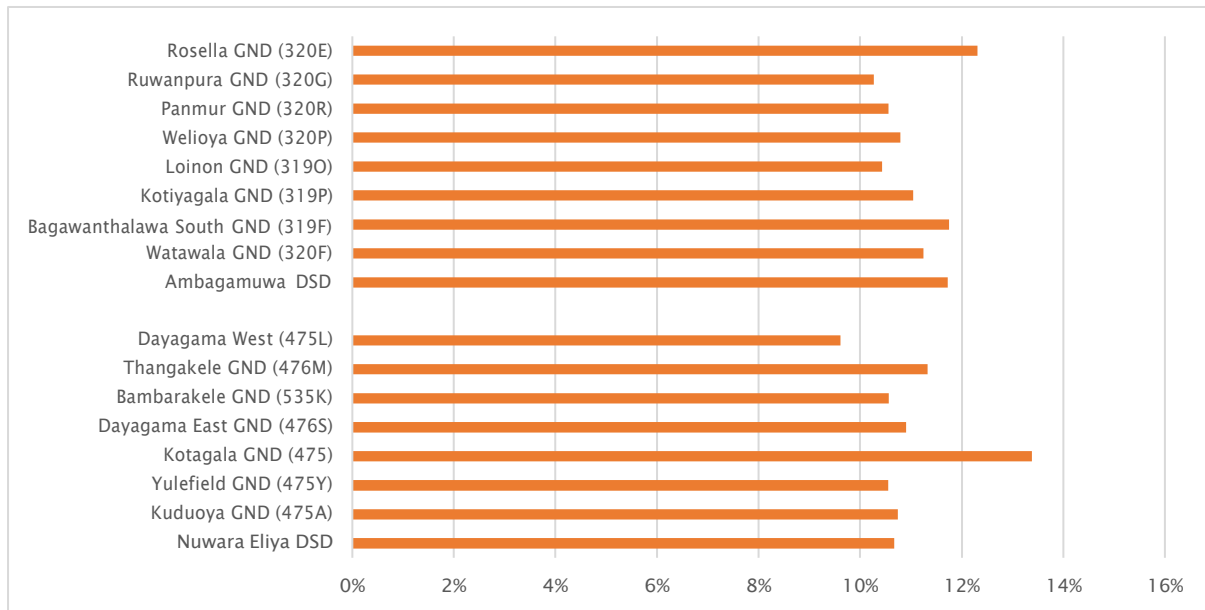
Figure 13 Social vulnerability reflecting total elderly Population above 60 years of age for DSD level and for each GND

In both DSDs elderly population (age is above 60 years or more) is around 11%. Same percentage is seen in almost all GNDs except in Kotagala GND, where elderly population is around 13% to the total population.

5.3.4 Social vulnerability reflecting the status of the level of education of communities

Under this several factors were considered such as:

- Population that completed secondary education as a % from total is around 37 % in both DSDs. However, at GN level it seen that at Dayagama East GND it drops down to 31 %, whereas at Rosella GND it goes up to 40%. In other GNDs it fluctuates between the two.

- Population that completed high school level education as a % from total is 18-19 % as an average in both Nuwara Eliya and Ambagamuwa DSDs. However, this level fluctuates significantly and highest is seen in Kotagala GND as 38%. But in Dayagama East GND (476S) it goes down to 6% and several GNDs such as Loinon GND (319O, Welioya GND (320P), the figure is lower than 10%.

- Population with no formal education as a % of total is an average is 8% in both DSDs. But it is high as 15 in Dayagama East GND and Loinon GND.

- Population that completed high school level education as a % from total is 18-19 % as an average in both Nuwara Eliya and Ambagamuwa DSDs. However, this level fluctuates significantly and highest is seen in Kotagala GND as 38%. But in Dayagama East GND (476S) it

goes down to 6% and several GNDs such as Loinon GND (319O, Welioya GND (320P), the figure is lower than 10%.
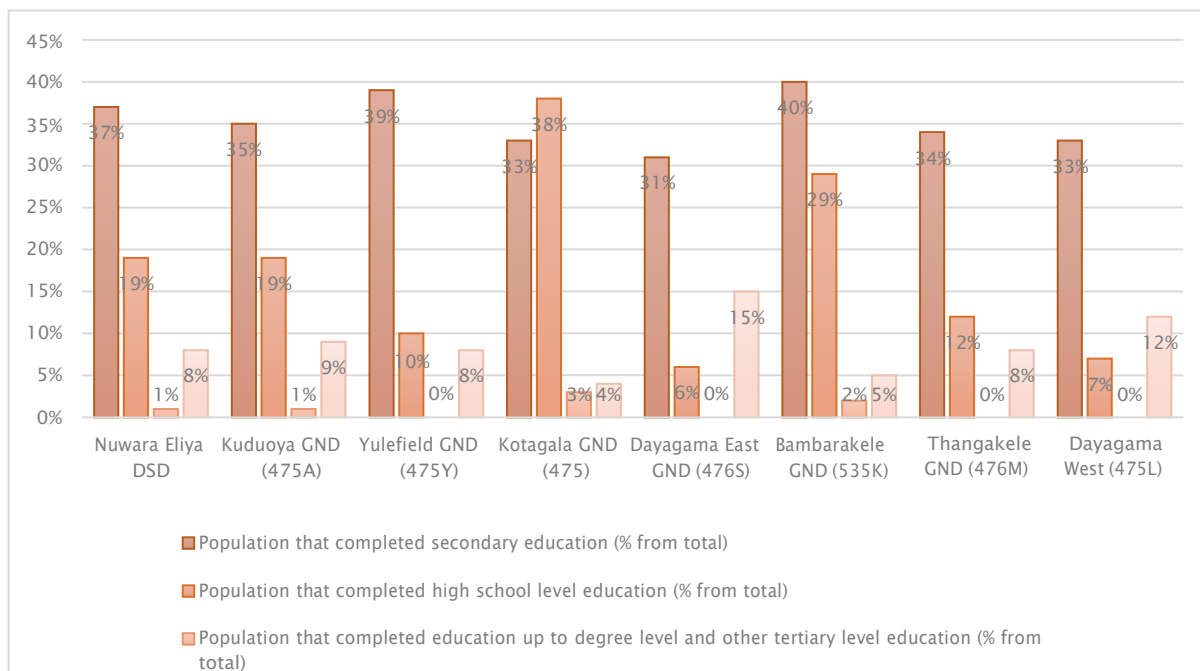
Figure 14 Status of education - Nuwara Eliya DSD
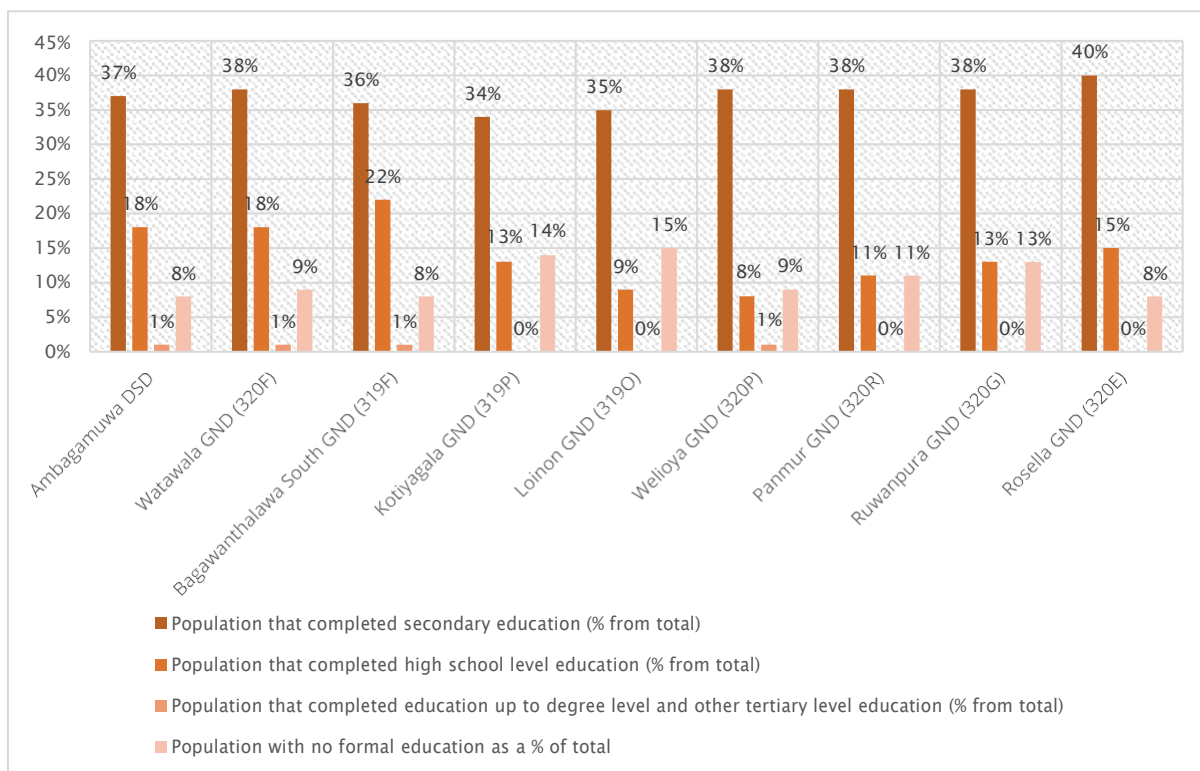
Figure 15 Status of education - Ambagamuwa DSD

Population that completed education up to degree and tertiary level is only around 1% in bothDSDs.

50

5.3.5 Fire hazard risk

Fire hazard risk is a common problem in most communities and the risk is associated with source of energy used for cooking and lighting of houses. The level of vulnerability has been assessed in GNDs considering above two aspects.

The fire hazard when assessed considering the source of energy used for preparing food seems to be moderate as they depend on firewood, kerosene and LP gas as the source of energy. Many are getting converted in to LP gas usage due to the shortage of firewood and also difficulty in getting firewood.
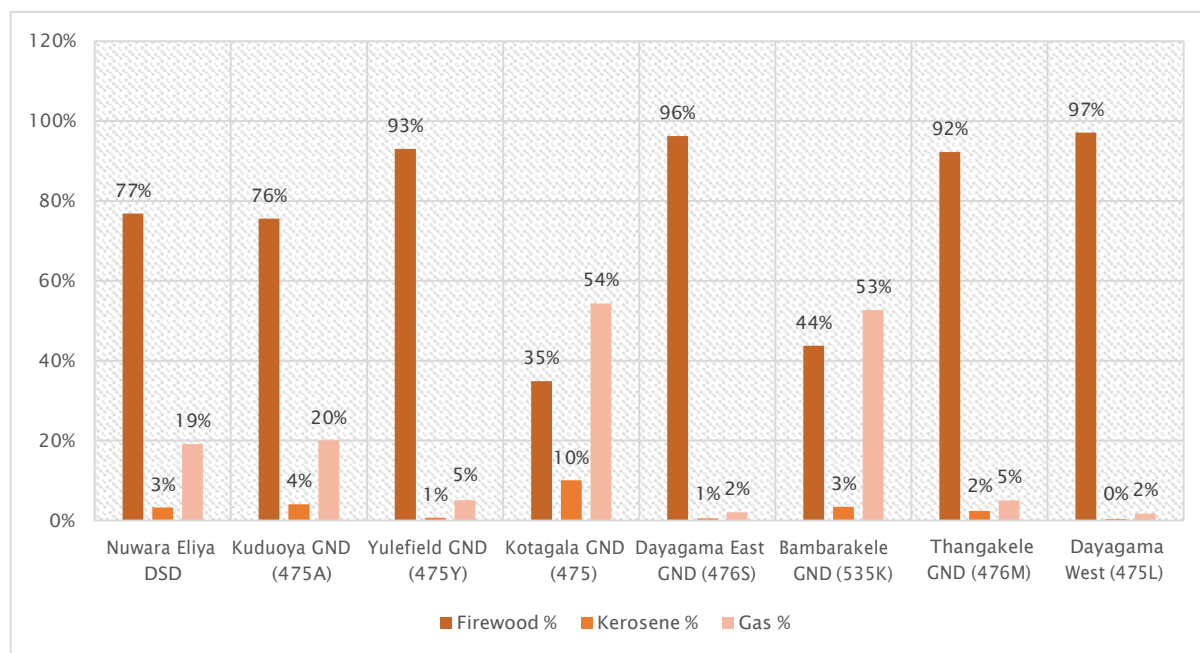
Figure 16 Principal type of cooking fuel used - Nuwara Eliya DSD
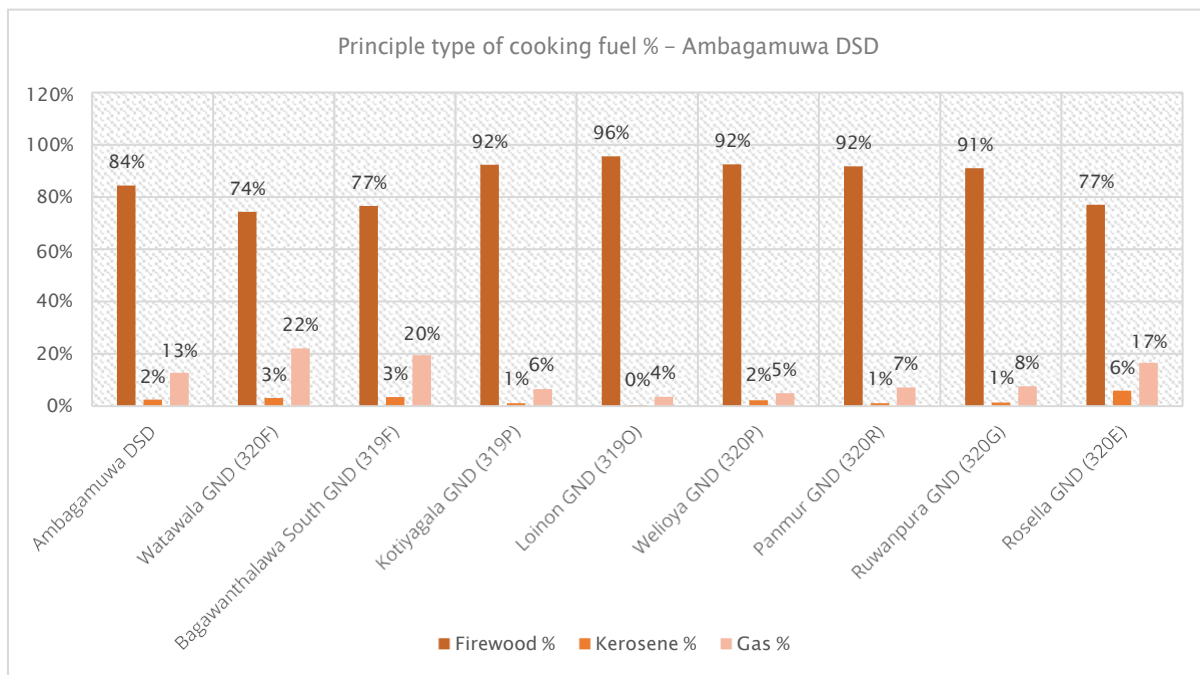
Figure 17 Principal type of cooking fuel used - Ambagamuwa DSD

Electricity using LED and other types of bulbs and kerosene lamps are the main sources of energy for lighting the homes. Fire hazard risk considering the type of house lighting seems to be very low as many depend on the Electricity provided through the national electricity network.
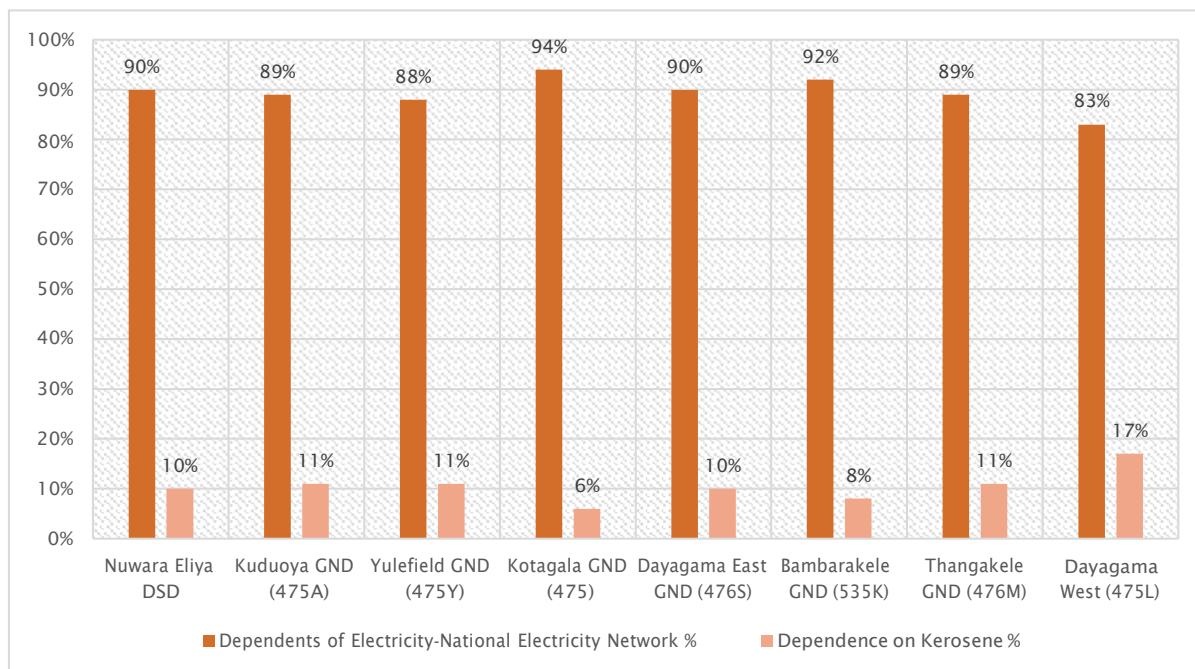
Figure 18 Energy source used for house lighting - Nuwara Eliya DSD
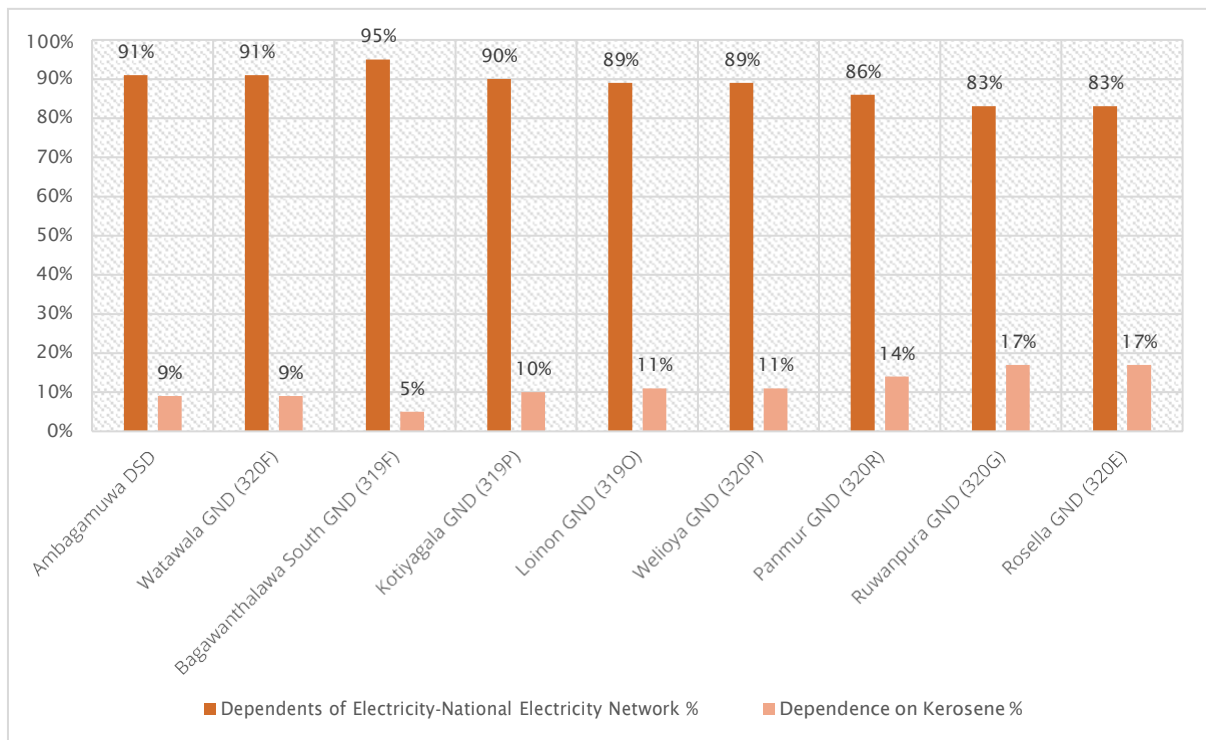
Figure 19 Energy source used for House lighting - Ambagamuwa DSD

5.3.6 Physical vulnerability

Physical vulnerability of households has been assessed using several indicators.

Physical vulnerability - households by tenure or dependency for accommodation

Households by tenure or dependency for accommodation and living to show ownership categories as a % to the total.

In an average when considered the Dependency for accommodation and living in an average in both DSDs around 37% houses seem to be owned by a household member. But the figure fluctuates significantly where there are 81% ownerships is seen in Bambarakele GND (535K), whereas Yulefield GND, Dayagama East GND, Welioya GND and Panmur GND the figure is low as 1-2 %. Many falls in to the category of rent-free occupied category as many are living in houses provided by the plantation companies. In an average it is around 50-53%. The above mentioned such as the figure goes to around 90%. Meaning most of them live in accommodation provided by plantation companies.
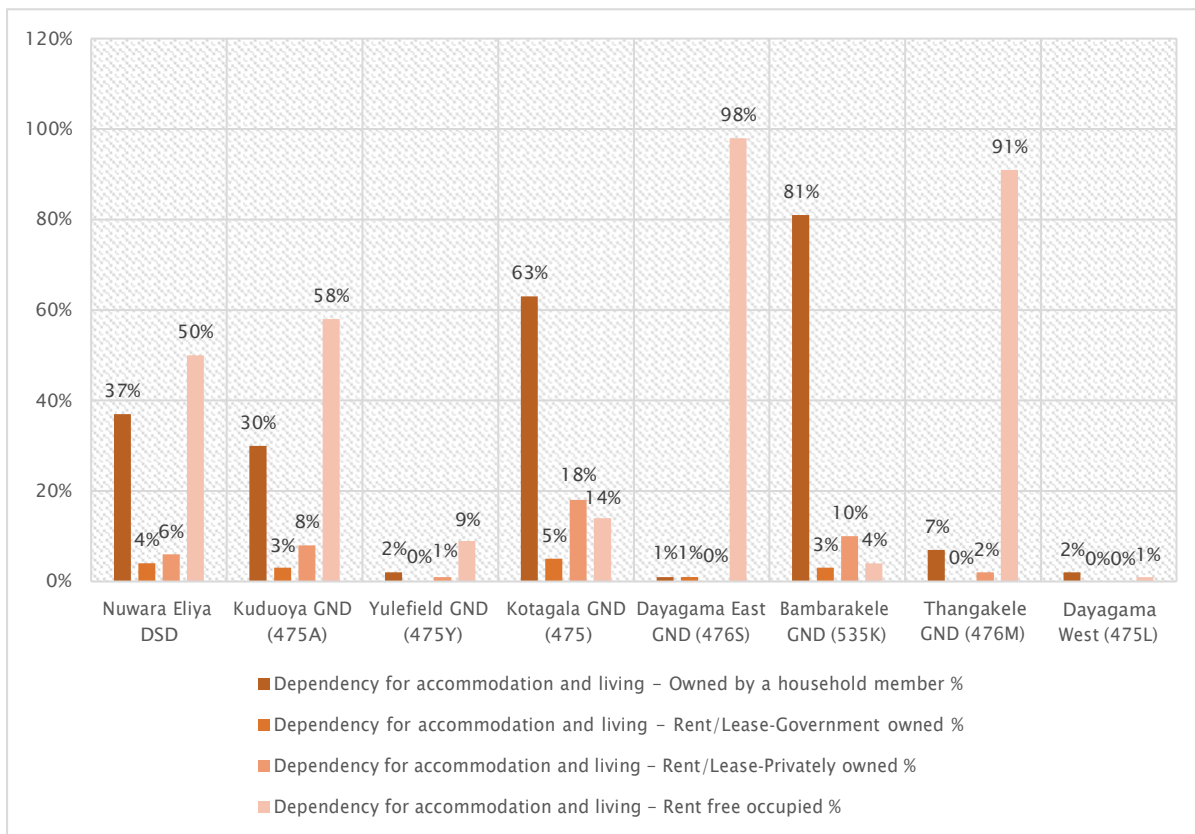
Figure 20 Type of tenure - Nuwara Eliya DSD
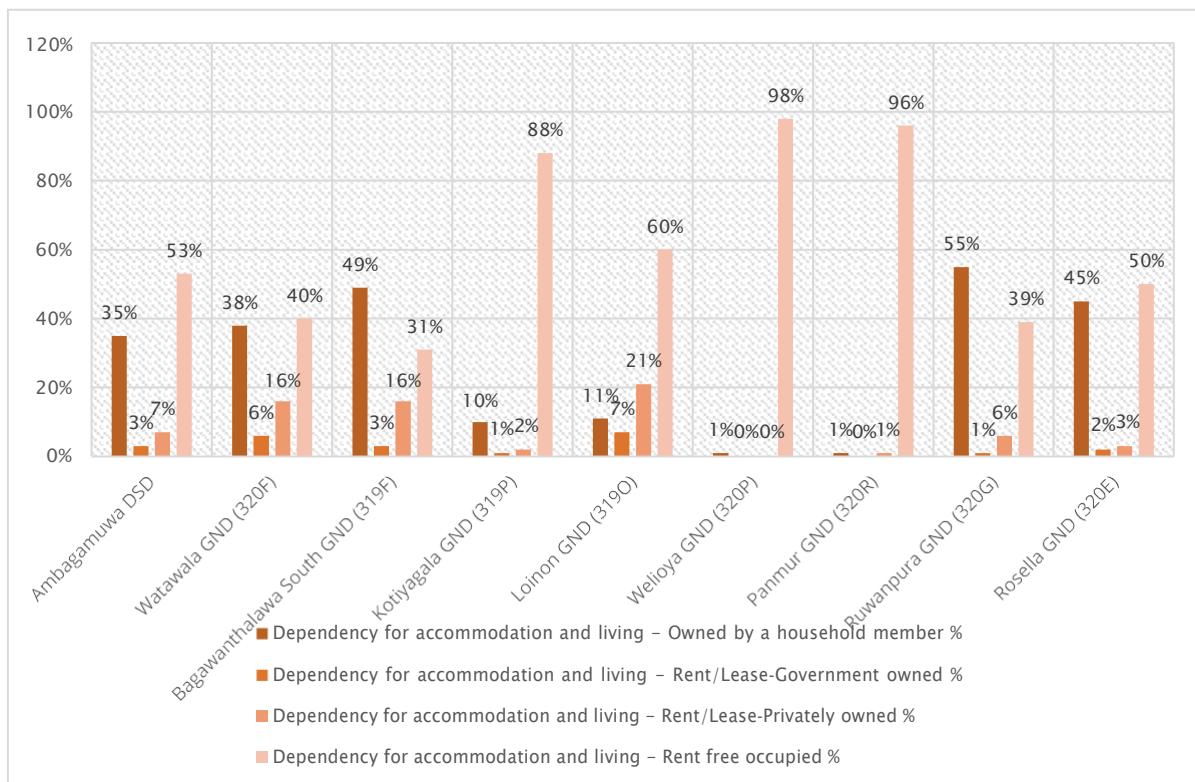
Figure 21 Type of tenure - Ambagamuwa DSD

Physical vulnerability - material used for the floor

When considering the Physical vulnerability, the principal material used for the floor also used as a factor. It is seen that in an average majority use Cement, tile or concrete for the floor. It is high as 90% as an average. However around 7-10 % still use Mud, wood or sand for the floor of the house.
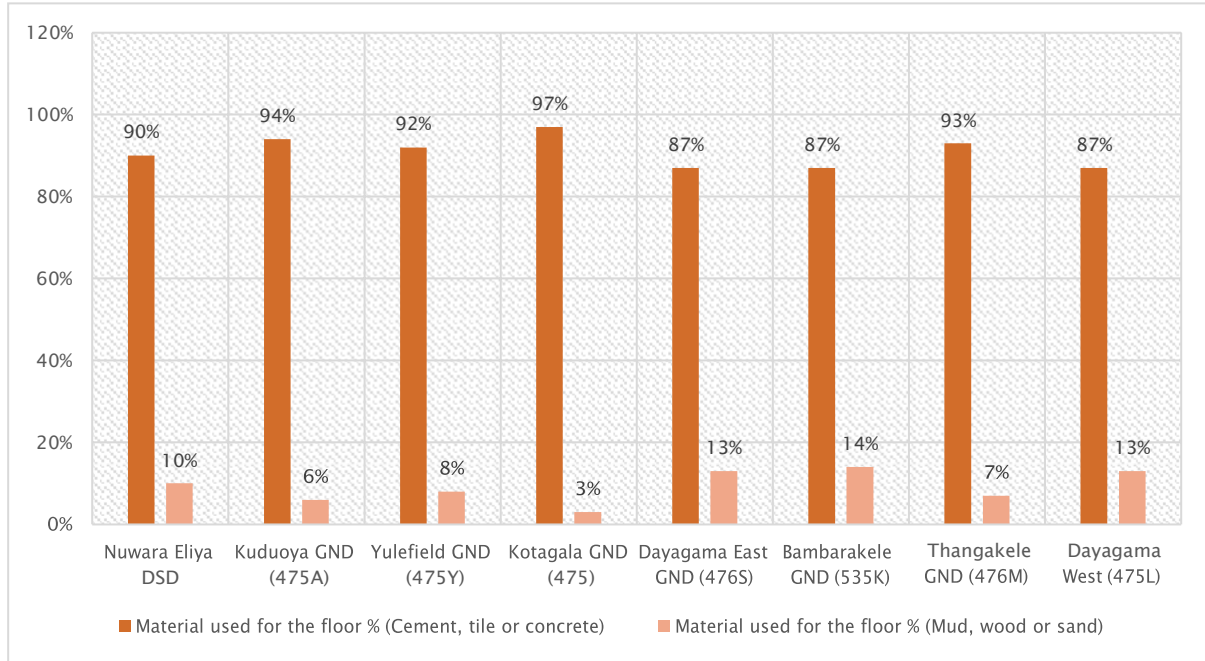
Figure 22 Type of material used for construction of floor of houses - Nuwara Eliya DSD
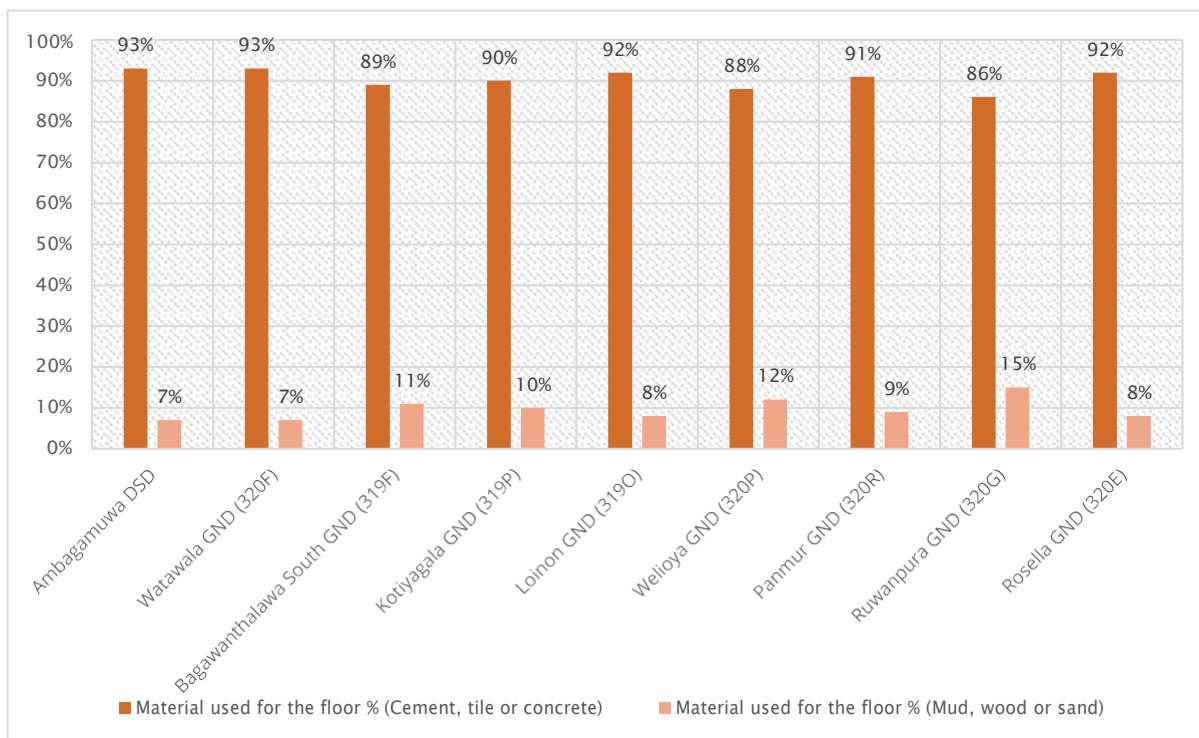
Figure 23 Type of material used for construction of floor - Ambagamuwa DSD

Physical vulnerability - Principle material used for the walls

The principal material used for the walls also considered to assess the physical vulnerability. It is seen that around 93% households use Brick or cemented as the material for wall construction. But around 7% use Soil-bricks, mud for wall construction.
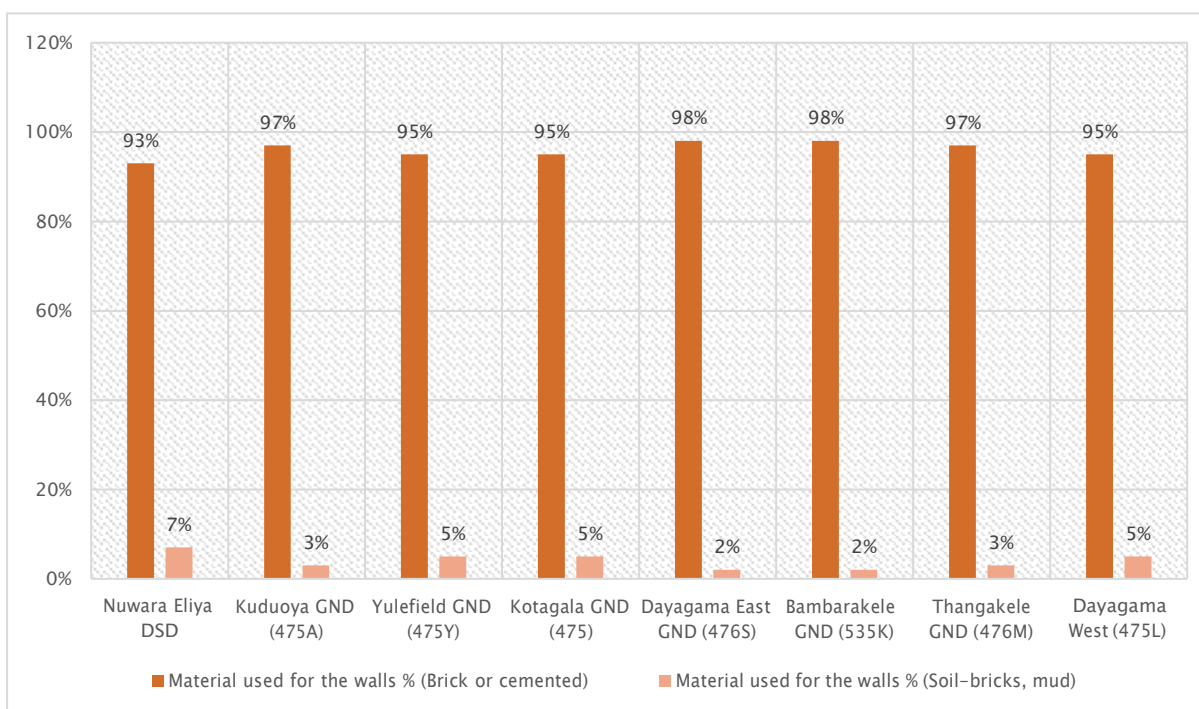
Figure 24 Construction material used for the walls - Nuwara Eliya DSD
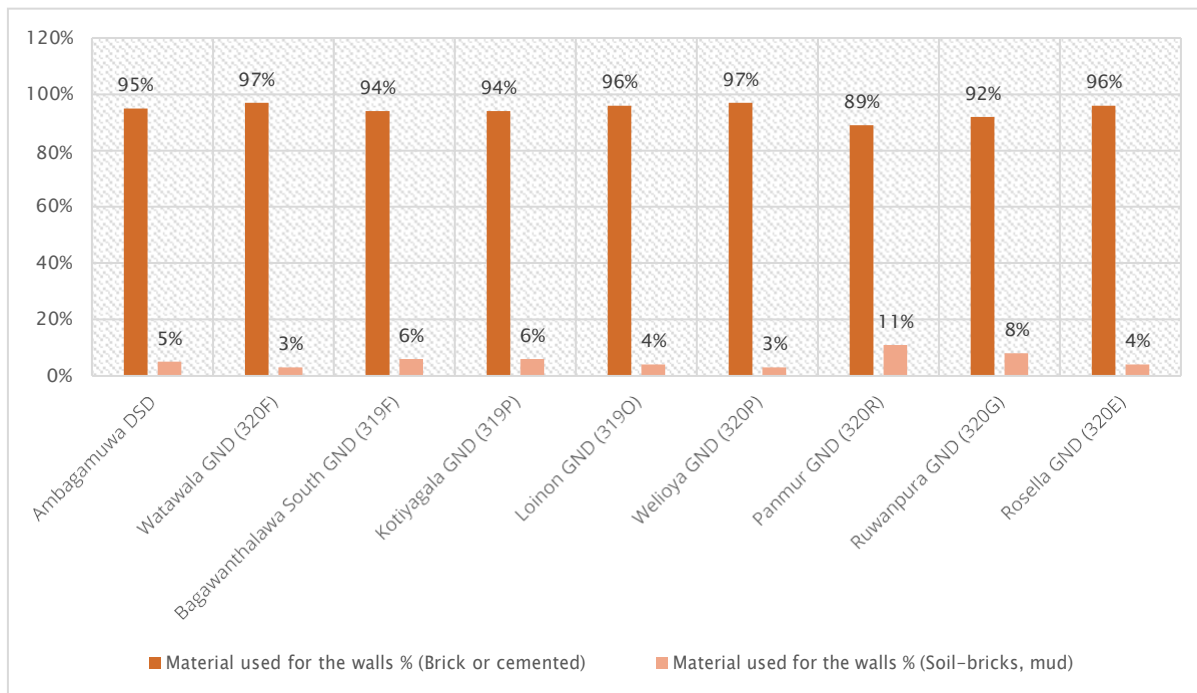
Figure 25 Construction material used for the walls - Ambagamuwa DSD

When Physical vulnerability is assessed using the structure type, it is seen that around 42% live in single story houses. But majority around 39-43 % live in line houses. When it comes to some GNDs Dayagama West, Thangakele GND, Dayagama East, Yulefield GND, Welioya GND (,Welioya GND more than 60 % live in line houses.
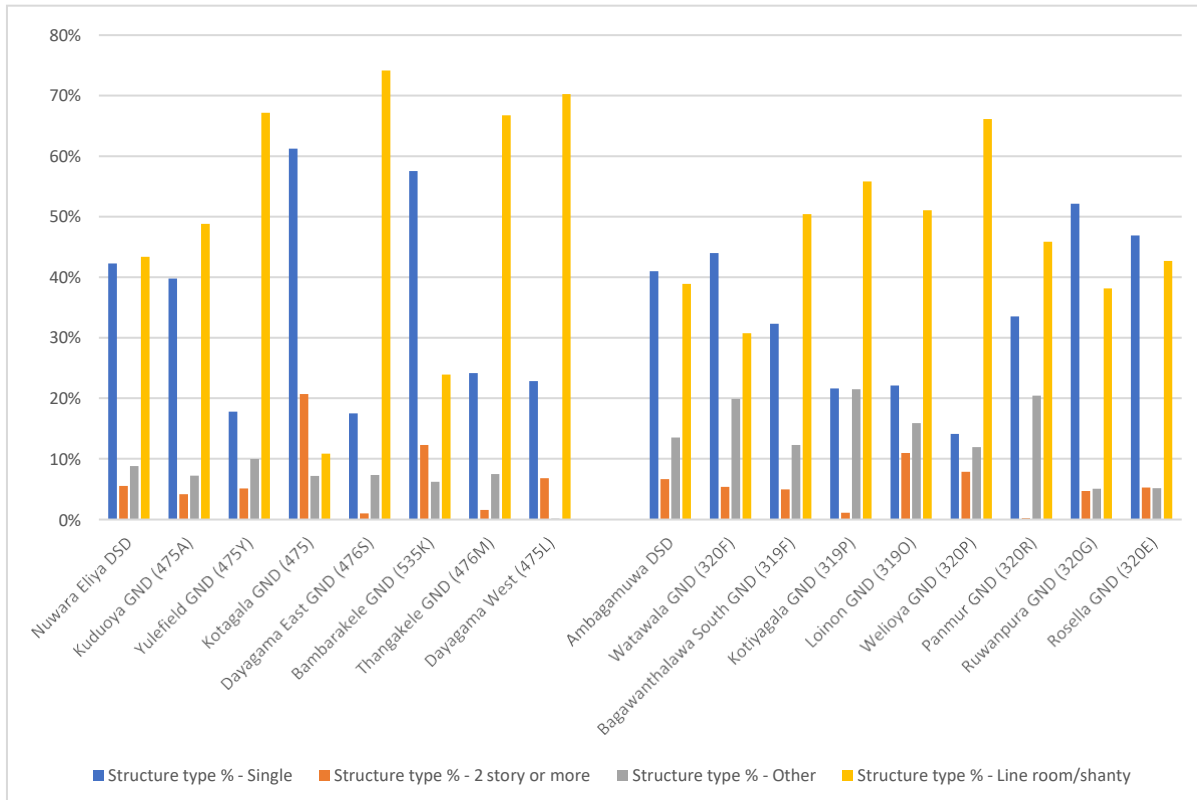
Figure 26 Structure type

While the Physical vulnerability is assessed using the status of the housing units. It is seen in an average around 60-70% live in semi-permanent houses. In Yulefield GND, Dayagama East GND, Thangakele GND, Dayagama West, Bagawanthalawa South, Loinon GND, Welioya GND the percentage is high as 70- 80%.However percentage of people living in Improvised housing is very law and only about 2%.

While the Physical vulnerability is assessed using the status of the housing units. It is seen in an average around 60-70% live in semi-permanent houses. In Yulefield GND, Dayagama East GND, Thangakele GND, Dayagama West, Bagawanthalawa South, Loinon GND, Welioya GND the percentage is high as 70- 80%. However, percentage of people living in Improvised housing is verylaw and only about 2%.
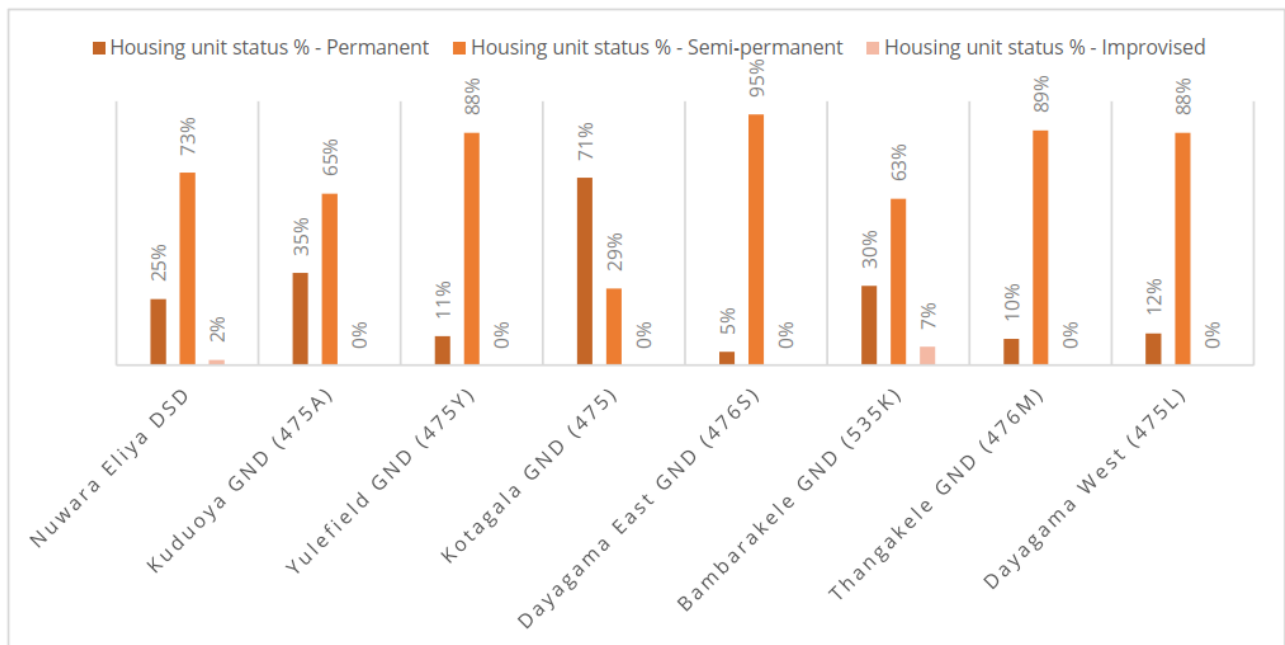
Figure 27 Housing unit status - Nuwara Eliya DSD
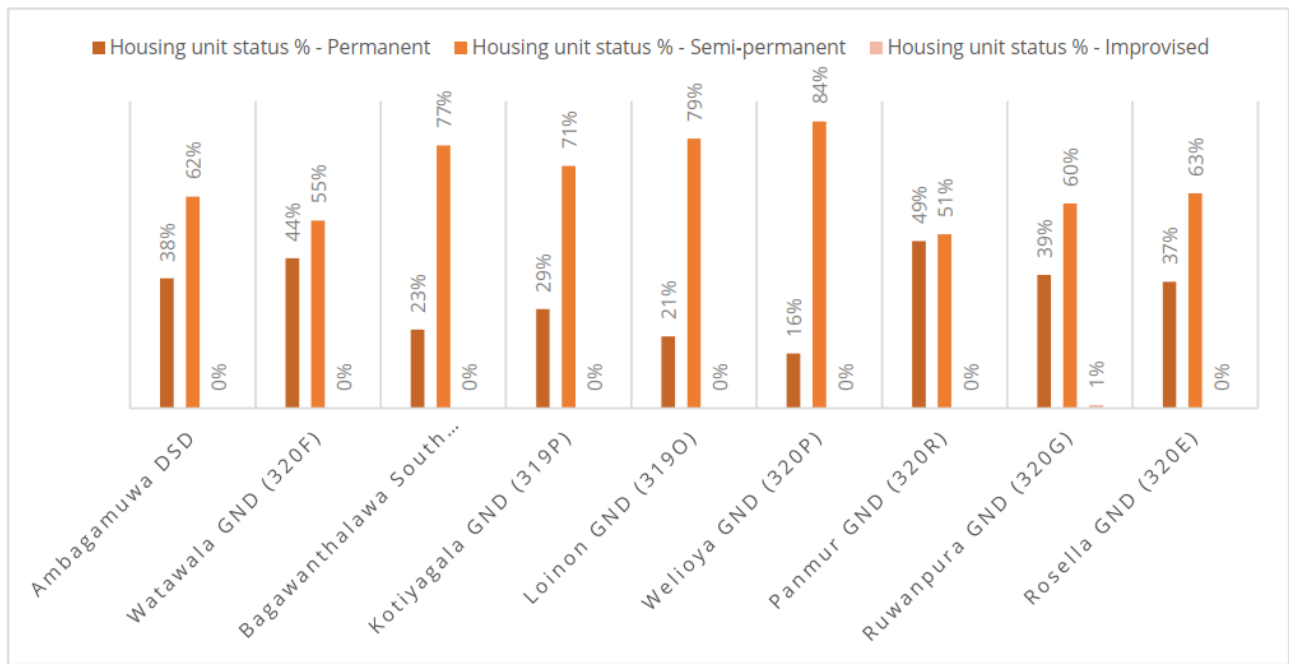
Figure 28 Housing unit status - Ambagamuwa DSD

6. Selection of sites for piloting the Anticipatory Action Project

6.1 Estate divisions selected for field data collection

Based on the experience in working within Nuwara Eliya district and based on the level of vulnerability the WVL has selected following estate Divisions within the set of GN divisions that were subjected to the Vulnerability assessment under Chapter 5 of the report. Those selected estate divisions are:

Table 12 Estate Divisions selected for data collection

#	AP	Estate	GN Division	Estate Division where DRR plan proposed	# Population
1	Bogowanthalawa	Bogawana	Bogawanthalawa GN	Bridwell	504
2		Kotiyagala	Kotiyagala GN	Kottiyagala Lower	355
3		Kotiyagala	Bogawanthalawa GN	Chapelton New Colony	76
4		Campion	Loinorn GN	Campion Lower	240
5		Fetteresso	Loinorn GN	Fetteresso	246
6		Loinorn	Loinorn GN	Loinorn	227
7		Fetteresso	Loinorn GN	Friedland	113
8		Bogawana	Bogawanthalawa GN	Bogawana	164
9		Loinorn	Loinorn GN	Northcove	217
10	Watawala	Vellaioya	Vellaioya GN	Vellai Oya - UDK	365
11		Vellaioya	Vellaioya GN	Vellai Oya - LDK	248
12		Carolina	Watawala GN	Carolina	260
13		St Aubins	Vellaioya GN	St Aubins	224
14		Strathdon	Panmoor GN	Fruit hill	186
15		Strathdon	Ruwanpura GN	Eastern	210
16		Carolina	Rozella GN	Binnoya	147
17		Shannon	Panmoor GN	KM	128
18	Nuwaraeliya	Dayagama East	Dayagama East	1st	168
19		Dayagama West	Dayagama	1st	107
20		Dayagama West	Dayagama	2nd	184
21		Dayagama West	Dayagama	5th	283
22		Bambarakelle	Bambarakelle	Dell	65
23		Bambarakelle	Bambarakelle	Middle	59
24		Thangakelle	Thangakelle	Lower	163
25		Ouvakelle	Thangakelle	Ouvakelle - No 3	73
26	Patana	Mayfield	Kudaoya	Chalmers	287
27		Mayfield	Kudaoya	Lockhiel	240
28		Chrtlesfarm	Yullifield	Chrtlesfarm	475
29		Harrington	Kotagala	Harrington A	110
30		Harrington	Kotagala	Harrington B	98

Field data collection was done using a set of volunteer enumerators and they were given a training on conducting community level focus group discussions (FDGs) for data collection.

6.1.1 Salient features of the Field data collection format

A data collection format has been developed considering following dimensions of vulnerability.

   i.   **Population (above 18 years) within the community cluster** (to segregate them in

tocategories such as male, female, Children below 18 years etc.

ii.   **Social vulnerability within the cluster** - Social vulnerability refers to the potential susceptibility of social groups to the adverse impacts of natural hazards, including disproportionate death, injury, loss, or disruption of livelihoods.

  a.   Percentage of Vulnerable groups (such as Elderly population age 60 years or more, Single parent families, Disable or differently able population, Pregnant and lactating mothers, Minors who are less than 5 years of age etc.) from the total population of the community cluster

  b.   Population without any kind of education or Completed only up to Primary education until grade 5.

  c.   Households with 04 members or more.

  d.   Households with disabilities

iii.   **Economic vulnerability**

  a.   Monthly Income level of family - population with income of less than Rs. 25,000 per month.

  b.   Expenditure on domestic food needs (% of population whose weekly affordable expenditure on food is less than Rs.7,500)

  c.   Asserts (% of population with general basic household items plus gas or electric cooker, radio etc.).

iv.   **Livelihood**

  % of population Employed as a labor or any other in the daily wage-earning category (casual not permanent) plus or % of population Employed as a labor permanent cadre but still depend on daily wages.

v.   **Food security & nutrition**

  a.   Majority of household in the cluster Take only 01 meal a day

  b.   Majority of household in the cluster Take 02 normal meals a day

  c.   Majority of household in the cluster Take 03 normal meals a day

  d.   Majority of household in the cluster Take 03 normal meals a day and Consume extra items such as eggs or meat once a week at least, cow milk daily.

vi.   **Physical vulnerability**

  a.   % of buildings with different age categories considering the age of majority of buildings in the

cluster(100 years or older, buildings are between 80-100 year old, buildings are between 60-80- year old, buildings are between 40-60 year old, buildings are 40 years or younger)

b. Type of house construction material used for walls considering the majority of buildings in the cluster (majority of houses in the cluster constructed using Concrete blocks with cement mortar, majority of houses in the cluster constructed using Brick with cement mortar, majority of houses in the cluster constructed using Brick with clayey mortar,majority of houses in the cluster constructed using Tin sheets, majority of houses in the cluster constructed using Mud or adobe.)

c. Type of house construction material used for roof (Asbestos, Clay tiles, Corrugated Tin sheets,Cadjan or decaying material etc.) considering the majority of buildings in the cluster

d. Ownership of house(House shared with a family member, Line house owned by tea plantation company, rented house, single story house owned by residents, two story houses owned by residents)

vii. **Disaster Risk Assessment**

a. Potential Disaster risk considering the location of majority of houses in the cluster (House located not very far from the slope, behind a cut slope, A rock fall area is located not very far behind the house, House situated on high sloping ground but no cut slopes, House situated near a stream which has a potential to create floods, No visible threat due to floods or landslides, No visible threat due to heavy wind as roof is anchored or weight is put on the roof to prevent any wind action.)

b. Disaster history - Considering past experience and the situation of majority of houses in the cluster(Some Shelter in the cluster got affected due to flood previously/ Some Shelter in the cluster got affected by landslide or slope failure or notice has been issued by NBRO on the high risk potential/ Some Shelter in the cluster got affected by high wind situation or cyclone previously/ Access road affected by flood previously/ Access road affected by landslide or slope failure previously/ Access road was blocked due to falling trees during high wind, Previously/ Access road was never affected by any disaster situation),

c. Fire hazard potential - Considering the source of energy used by majority of houses in the cluster for cooking (LG gas/Firewood/ Kerosene/Electricity/Rice husk or any other)

viii. **EW related awareness**

a. No. of people listen or concerned with EW issued by media (Do not receive any warning/ Not interested in EW due to poor knowledge on preparedness/ No idea about warning/ No

confidence on EW messages/ Daily listen to radio or TV to get weather forecast/ Have subscribe to SMS service to receive warning messages.)

b. How do you get warning about floods, cyclones, landslides(Mobile phone through SMS/ Internet alerts through usage of some apps/ From radio or TV but not regularly/ Land phone but not regularly/ From family members but occasionally/ From tea plantation staff but occasionally/ From friends but occasionally/From Government office but occasionally/ Never get any warning about disasters)

c. Knowledge about symptoms of hazard occurrences (Knowledge about High water level during rain which could create floods/ Knowledge about Unusual cracks appear on house walls or flow(or as a symptom of landslide/ Knowledge about Cracks on slopes might be a landslide symptom/ Knowledge about the possibility of Continuous rain, which might cause slope failure or flooding/ Do not have any confidence about the connection between any symptoms and occurrence of disaster events/ No knowledge on any symptoms and connection between any symptoms and occurrence of disaster events)

ix. **Disaster Preparedness planning related knowledge & awareness**

a. Disaster Preparedness knowledge(% of population who has attended community risk assessment and know the high-risk areas within their community)

b. Participation in preparedness planning(% of population who has Participated in Preparedness planning work within the community)

c. Knowledge about a place for evacuation during disasters(% of population with Knowledge about a place for evacuation and Know how to reach the evacuation centre designated for the community cluster)

d. Having a designated place for meeting during disasters for family members(% of population who has discussed about a designated meeting place for family members)

e. Becoming a member of Community DM committee(% of population who has become a Member of a community DM committee)

f. Participation in community vigilant group to observe symptoms or any hazard specific happenings (% of population who has Participated in a vigilance group to inspect the neighbourhood and take action)

g. Participation in community preparedness drills (% of population who has attended community preparedness drills)

The Survey Instrument used for data collection through Focus Group Discussions (FDGs) conducted in estate divisions/communities (mentioned in table 6.1 above) is provided as Attachment 3. The scores given for each category is explained in the Survey Instrument.

Before conducting community level data collection all enumerators were provided with a training and explained the best ways of obtaining answers. At the training sessions they were briefed about the scoring that are assigned to different categories of questions and the method of assigning scores. Following the same all enumerators were assigned to different community clusters/estate divisions and one round of Focus Group discussions carried out by the enumerators was supervised by the consultant and the WV coordinators. Subsequently a detail discussion was held to discuss the challenges and difficulties and ways of overcoming them. During the data collection the WV coordinators provided further assistance in sorting out issues and all of them worked under the direct supervision of WV coordinators.

Subsequently they have prepared a summery scoring sheet and results obtained as provided below:

6.1.2 Summary of Assessment Results

6.1.2.1. Selection of sites in Nuwara Eliya District – fled assessment summary Ambagamuwa DSD

Table 13 Summary of Assessment Results - Ambagamuwa DSD

#	Name of Estate	Name of the Estate Division	GN Division	Population of the cluster	Male %	Female %	Children below 18 years %	Component 1 – Social vulnerability within the cluster	Component 2- Economic vulnerability	Component 3 - Livelihood factor	Component 4 - Food security & nutrition factor	Component 5 – Physical vulnerability	Component 6 – Disaster Risk assessment	Component 7; EW related awareness	Component 8 Preparedness planning related knowledge &	Total
1	Bogawana	Bridwell	Bogawanthalawa GN	1200	40	60	20	20	12	5	3	14	7	7	35	**103**
2	Kotiyagala	Kottiyagala Lower	Kotiyagala GN	1300	53	47	13	20	12	2	3	16	11	7	34	**105**
3	Kotiyagala	Chapelton New Colony	Bogawanthalawa GN	340	55	45	11	14	2	3	3	16	12	9	31	90
4	Campion	Campion Lower	Loinorn GN	1120	53	47	18	28	15	4	4	13	13	7	25	**109**
5	Fetteresso	Fetteresso	Loinorn GN	350	54	46	11	19	13	4	4	13	14	10	17	94

6	Loinorn	Loinorn	Loinorn GN	1200	52	48	16	20	14	5	4	12	13	10	29	**107**
7	Fetteresso	Friedland	Loinorn GN	950	51	49	16	21	6	4	3	14	14	10	31	**103**
8	Bogawana	Bogawana	Bogawanthalawa GN	1850	45	55	30	19	3	1	3	14	12	8	31	91
9	Loinorn	Northcove	Loinorn GN	1400	55	45	23	22	15	4	4	14	13	7	14	93
10	Vellaioya	Vellai Oya - UDK	Vellaioya GN	505	52	48	10	28	6	2	3	17	10	9	29	**104**
11	Vellaioya	Vellai Oya - LDK	Vellaioya GN	350	54	46	12	25	12	4	3	16	12	11	19	**102**
12	Carolina	Carolina	Watawala GN	950	51	49	11	16	15	5	5	17	14	7	9	88
13	St Aubins	St Aubins	Vellaioya GN	495	51	49	19	21	12	5	4	18	13	12	29	**114**
14	Strathdon	Fruit hill	Panmoor GN	618	51	49	11	19	11	4	4	13	14	12	11	88
15	Strathdon	Eastern	Ruwanpura GN	376	54	46	13	24	11	2	3	15	8	7	29	99
16	Carolina	Binnoya	Rozella GN	600	53	47	12	15	14	2	4	16	11	10	34	**106**
17	Shannon	KM	Panmoor GN	306	52	48	13	16	11	5	4	16	14	11	35	**112**

Highlighted under the column total in the above table are the selected estate divisions for piloting the AA project in Ambagamuwa DSD.

6.1.2.2. Selection of sites in Nuwara Eliya District - fled assessment summary NuwaraEliya DSD

Feasibility Study results for implementing Anticipatory Action (AA) Project in Nuwaraeliya District - Nuwara Eliya DSD - Summary of Assessment Results

Table 14 Summary of Assessment Results - Nuwara Eliya DSD

#	Name of Estate	Name of the Estate Division	GN Division	Population of the cluster	Male %	Female %	Children below 18 years %	Component 1 – Social vulnerability within the cluster	Component 2 - Economic vulnerability	Component 3 - Livelihood factor	Component 4 - Food security & nutrition factor	Component 5 – Physical vulnerability	Component 6 – Disaster Risk assessment	Component 7; EW related awareness	Component 8 Preparedness planning related knowledge &	Total
1	Bambarakelle	Dell	Rahanwatta GN	304	46	54	24	27	15	5	5	18	13	11	32	**126**
2	Dayagama East	1st	Dayagama East GN	672	48	52	23	22	12	3	5	16	11	12	33	**114**
3	Dayagama West	1st	Dayagama West GN	428	47	53	22	20	13	2	5	15	13	11	30	109
4	Dayagama West	2nd	Dayagama West GN	736	49	51	24	21	12	2	5	16	14	12	33	**115**
5	Dayagama West	5th	Dayagama West GN	1132	48	52	23	22	11	5	5	16	15	13	31	**118**
6	Thangakelle	Lower	Thangakelle GN	652	47	53	21	26	13	3	4	17	10	12	28	113
7	Ouvakelle	No.3	Thangakelle GN	463	47	53	30	27	12	5	4	15	13	12	34	**122**
8	Bambarakelle	Middle	Rahanwatta GN	262	48	52	24	17	15	5	3	17	11	12	30	110
9	Mayfield	Chalmers	Kudaoya GN	1225	49	51	25	29	12	5	3	14	13	13	30	**119**
10	Mayfield	Lockhiel	Kudaoya GN	960	48	52	23	21	15	5	3	17	12	11	31	**115**
11	Mountvernon	Dimbulla Lower	Bogahawatta GN	1250	49	51	32	23	13	5	4	18	11	12	33	**119**
12	Christlersfarm	Christlers farm Group 3	Yullifield GN	1598	46	54	33	23	11	5	3	18	14	12	35	**121**
13	Harrington	A	Kotagala GN	463	47	53	31	28	15	5	4	16	13	12	33	**126**
14	Harrington	B	Kotagala GN	370	48	52	22	17	15	2	4	18	13	9	33	111

Highlighted under the column total in the above table are the selected estate divisions for piloting the AA project in Nuwara Eliya DSD.

7. Conclusions

A summary of conclusions that could be derived from the feasibility study is provided below:

1. The Sri Lanka Disaster Management Act No 13 of 2005 enacted in Parliament on 13th May 2005, mandates the National Council and DMC to prepare the National Policy on Disaster Management, National Disaster Management Plan, and National Emergency Operation Plan and coordinate disaster management activities of all agencies. Hence, there is a window of opportunity exist for introducing a National AA Framework and incorporating the approach into the National Disaster Management Plan (NDMP), which is the overall guiding document covering planned disaster risk management interventions. Since the NDMP 2023-2030 is being drafted currently, if DMC, and other stakeholders could be persuaded, the possibility exists for mainstreaming the AA approach under the scope of preparedness, and emergency response in the near future.

2. In the discharge of functions under the act, the Disaster management Center (DMC) shall be assisted by number of Technical advisory Committees consisting of professionals and experts having expertise in relation to respective functions. Therefore, using such provisions, a technical advisory committee can be appointed for advising the DMC for developing an AA National Framework and implementation of other related interventions.

    A technical committee which has been established by WVL, comprised of all important the Government agencies and other stakeholders within Nuwara Eliya district, for obtaining inputs during implementation of the AA pilot and for dissemination of outcome can be a model that could be followed in establishing a national level technical advisory committee on AA.

3. The Act lists out 21 types of natural, human induced and technological hazards affecting Sri Lanka. There are number of specific technical institutions that have been recognized as mandated agencies for undertaking disaster risk management interventions covering major hazard types. Respective mandated institutions are undertaking hazard studies, research work, hazard zonation mapping and activities covering all phases of disaster management cycle (response, preparedness, mitigation and recovery) with the purpose of reducing the disaster impacts to vulnerable population. However, there are some unmet needs which could be addressed through anticipated action programs. Anticipatory Action carried out to reduce the impact of disasters are complementary to traditional humanitarian responses but

could become a more innovative approach for minimization of disaster impacts.

4. Nuwara Eliya District consists of 05 Divisional Secretariat divisions and 491 Grama Niladhari divisions. According to records maintained by UNDRR - DesInventar database the most frequent and leading types of disaster events reported in Nuwara Eliya District are floods and landslides. Therefore, AA project activities could be designed for flood and landslide risk management primarily, but other residual hazards such as fire, storm, etc. also could be taken in to consideration in an appropriate way. According to publication "DCS-Grama Niladhari division statistics", Nuwara Eliya district is one of the most disaster-prone districts which consists of 05 Divisional Secretariat divisions and 491 Grama Niladhari divisions. Among them Ambagamuwa and Nuwara Eliya DSDs are the most vulnerable DSDs to floods and landslides. Therefore AA project activities could be undertaken based on the Ambagamuwa and Nuwara Eliya DSDs. However to avoid practical difficulties and avoid budget constraints, it can be implemented in selected estate divisions.

5. Analysis of rainfall data from gauging stations maintained by Meteorological Department, NBRO, Plantation companies etc. indicate that through a careful study of past rainfall records, it is possible to use precipitation thresholds used for landslide EW for establishing thresholds for initiating AA protocols.

6. The study was extended to see the duration of each precipitation cluster during the period from 2019 to date. It is seen from the analysis that usually the rainfall clusters are less than 5 days duration but at some instances it can extend up to 10 days or even up to 15 days. But rainfall clusters exceeding 15 days are very rare. This is an important information which can be factored during AA protocol development.

7. Since both landslides and frequently experienced flash floods in mountain areas are rapid onset disasters, it is essential to have higher focus on the last mile dissemination so that communities at risk could take appropriate actions in time. In addition, there is a need for disseminating real time forecasts, using smaller administrative units for improving the accuracy of warnings. It is also effective to set up community level rain gauge or river gauging stations and use local community for monitoring the local level precipitation, water levels etc. and use indigenous practices for EW dissemination such as drums, fire crackers, loudspeakers, sirens etc. They also could establish community level mechanism for monitoring the vulnerable slopes or river water level increases and that kind of community level EW mechanisms can be more effective as community ownership could be enhanced

due to such actions. The AA project has a potential for addressing such unmet needs related to hazard EW as well as developing a methodology for improving last mile dissemination.

8. Currently the Irrigation department which is the mandated organization for flood risk management provide flood early warning based on the flood levels observed in major rivers. It is not so practical or cost effective to maintain such river gauging stations for all water ways. However, it is desirable to have similar thresholds developed for flood occurrence for smaller streams within the project target areas or use the available precipitation thresholds for developing flood related action protocols. World Vision also might be able to develop community level monitoring mechanisms targeting the smaller streams that can generate flood events with target GN divisions under the AA project.

9. In the absence of baseline data, during the feasibility study an attempt was made to use census data (based on the national Census of 2012, carried out by the Department of Census and Statistics) to evaluate the status of different dimensions of vulnerability within 15 selected GN divisions of Ambagamuwa and Nuwara Eliya DSDs. Although data presented are a bit old(as related census data cover only up to 2012), the study shows trends related to vulnerability covering different dimensions related to social , economic, physical vulnerabilities as well as fire risk are still relevant. This was found to be a useful exercise and results were effectively used in designing the instruments for field level data collection and selecting most vulnerable state divisions for AA pilot project implementation.

10. The field data collection was carried out utilizing community level focus group discussions. A set of trained volunteers were used as enumerators during data collection. The focus group discussions were held using a set of structured questions aiming at collecting necessary information related to different dimensions of vulnerability(such as social, economic, physical, livelihood etc.) and knowledge on disaster management functions, risk levels, EW dissemination etc. The instrument developed for data collection was found to be useful, effective and user-friendly. Hence it could be used for such exercises even in future.

11. The World Vision Lanka has carried out recently a Most Vulnerable Children (MVCs) analysis and has identified vulnerable factors for children in Nuwara Eliya and Ambagamuwa Divisional Secretariat areas. Hence it was decided to implement the Anticipatory Action Pilot project based on the Nuwara Eliya and Ambagamuwa Divisional Secretariat areas in the Nuwara Eliya District. The appropriateness of selecting the Nuwara Eliya district is endorsed well from the vulnerability assessment findings.

12. Since WV has already carried out a Child Cantered DRR project in above two Divisional secretariat divisions some of the villages understand the concepts of Community-Based Disaster Risk Management (CBDRM). However, it was revealed during community consultations that majority of them do not possess the basic understanding of CBDRM process and need more capacity building during project implementation.

13. It was also revealed during community consultations that last mile dissemination of EW is not at a desired level and many do not receive the warning or no interest in applying them to ensure their own safety. This is also an area that needs attention during AA project implementation.

14. On the basis of analysis of data collected from the field, WVL has selected 10 most vulnerable estate divisions within Nuwara Elia DSD and 10 estate divisions in Ambagamuwa DSD to proceed with AA project interventions.

15. During the feasibility study a literature survey was carried out but no previous work under AA projects could be discovered. Since AA is an evolving approach in Sri Lanka, it is better if WVL could start some dialog or wider networking with donors, private sector Government and non- government institutions involved in disaster response and humanitarian assistance. It might be possible to promote such a dialogue using an available platform and Sri Lanka Preparedness Partnership might be one option. This would help experience sharing as well as in enhancing the possibilities for the potential pre-arranged finance avenues.

8. Recommendations for scaling up of Anticipatory Actions for Disaster Risk Mitigation

UNDRR views anticipatory action as a smart way to respond to potential crises situations or emergencies when it is possible to forecast in advance. Many of the disasters are common and routine events except the extreme events which are rare. Evidence shows that anticipatory action can be fast, economical, inclusive, dignified, and resilient, and most importantly complementary to traditional humanitarian responses. UNDRR supports anticipatory action as a way to bridge the gap between longer-term disaster risk reduction efforts and humanitarian crisis response. It is a well-understood fact that if pre-emptive humanitarian interventions are undertaken based on forecasts, such actions can save lives and livelihoods. With interventions for understanding the risk, forecasting the potential occurrences, EW, etc., it is also essential to build networks between national governments and the other stakeholders to promote anticipatory actions to respond to potential emergencies.

The interventions that will be undertaken by World Vision as Anticipatory Action pilots in the two most vulnerable DSDs in Nuwara Eliya District, shall have a strategy for scaling up to the national level, if pilots can be implemented successfully. That will require building partnerships with national agencies such as DMC, NBRO, Department of Meteorology, Irrigation Department, and other government and non-government agencies in the DRR sector. It is highly desirable for WVL to start a dialog or wider consultation early with donors, private sector, Government and non- government institutions involved in disaster response and humanitarian assistance for promoting the concept of AA. It might be possible to have such a dialogue using an available platform and Sri Lanka Preparedness Partnership might be one option. This would help experience sharing as well as in enhancing the possibilities for the potential pre-arranged finance avenues for future AA projects.

This feasibility study looks at the possibility of undertaking a pilot project on Anticipatory Action for Disaster Risk Mitigation in the context of Sri Lanka as it is useful to identify limitations, difficulties, challenges, etc. before substantial resources are committed. The feasibility study also intended to suggest an operational framework for undertaking Anticipatory Actions to benefit the target population in selected communities to get effectively protected from the negative effects of potential hazards prevailing, through timely implementation of anticipatory actions. The study also makes an attempt to provide some useful recommendations for Anticipatory Action collaborations at National and sub-national levels and for scaling up efforts

to improve national disaster risk reduction and management systems, policies, national and local DRR strategies, for ensuring availability of risk data, and strengthening social protection systems, among others.

As revealed through this feasibility study, some of the recommendations that will be useful for scaling up Anticipatory Action for Disaster Risk Mitigation are provided below:

National level:

- The current Disaster Management Policy pays more attention to Disaster risk reduction aiming at reducing existing disaster risk and managing the residual risk, all of which are supposed to be contributing to strengthening resilience. However, trends observed currently, show continuity in an escalation of risk, and even elevated levels of vulnerabilities due to various reasons including non-compliance with regulations. It is observed that the focus on risk escalation is limited, and trends that are reshaping the risk landscape and their influencing factors are not sufficiently addressed. The AA related interventions can support alleviation of the situation associated with the trends of risk escalation that are responsible for reshaping the risk landscape. Therefore it is necessary to promote the concept of AA for obtaining wider support of stakeholders involved in response and humanitarian assistance.
- National Disaster Management Plan (NDMP) is the overall guiding document covering planned activities under different phases of mitigation, preparedness, emergency response, and post disasters recovery activities, such as relief, recovery, and reconstruction. Since the NDMP 2021-2030 is being drafted, a National Anticipatory Action (AA) Framework could be prepared and incorporated into the NDMP at this stage, for mainstreaming such actions under the scope of preparedness, and emergency response.
- On the other hand, the National Emergency Operations Plan (NEOP) is a plan describing the management arrangements; relationships; Operations Procedure; the mechanism for ensuring effective response to emergency situations, when they occur. MEOP can be a good entry point for National level Anticipatory Actions and hence it is appropriate if national guidelines could be developed to make it an integral part of the NEOP.
- There are number of UN agencies such as UNDRR, International agencies such as ADPC, IFRC, WFP, etc., International and national level NGOs who are implementing Anticipatory Action projects currently at regional and national levels. it is important to build networks with them to share experience and to learn from each other as AA is yet an emerging discipline. There are opportunities to build partnerships through networks such as SLPP, Red Cross and UNDP/UN initiated platforms. Additionally, this would enhance the possibilities and potential for pre-arranged finance avenues. Since the GOSL is facing financial difficulties currently, it is important

to explore such opportunities for extending assistance during future emergencies.

Sub-national levels:

- The National Disaster Management Coordinating Committee (NDMCC) is designated by the DM act of the country to summon key DM actors to one platform to share, coordinate, and for creation of awareness of all agencies involved on the concept of Anticipatory Actions. It can become a successful mechanism if such Coordinating Committees could also be initiated at Divisional and District levels with similar purposes and make it a sub-national level AA platform at respective levels and empower them. Then the stakeholders will be able to contribute, extend technical assistance, support through pre-arranged finance, if and when required.

- There is an essential need for the formation and strengthening of Village level Disaster Management Committees in every disaster-prone area (village/ GN division). Enhancing the capacity of such committees through imparting necessary skills and knowledge, providing equipment, and meeting other vital capacity needs have been recognized as a critical prerequisite by many. This is an essential act considering the need for building the local level capacity for effective emergency response.

- The current hazard and risk assessment provided by the technical institutions mandated with specific hazard risk management is in regional scales (of 1:100,000, 1:50,000, 1; 10,000, etc.)

  and useful for large-scale development interventions. But it is well known that many institutions undertake local-level hazard and risk assessments mostly under project-specific assignments. It is useful to have a mechanism to share such data for every potential hazard area among stakeholders including communities at risk. It is useful to utilize common data sharing tools for sharing such hazard data (floods, landslides, cyclones, etc.) I.e. OpenStreetMap (OSM) which is a free, open geographic database updated and maintained by a community of volunteers.

- During the discussions held at the community level it was revealed that still there is no or limited ways in existence for the community at risk to get reliable forecast and nowcast data, warning messages related to rainfall, and other triggers. There is a need for improving the last- mile dissemination of Early Warning to ensure that EW messages reach every person at risk. It is useful to consider introducing appropriate/ effective Early Warning dissemination mechanisms (utilizing multiple modalities) i.e.: Community level dissemination through coordinated efforts by community members or networks, dissemination using mobile applications, social media, etc.

- There is also a need to develop and activate common Anticipatory Action Protocols for major hazards for the potential disaster-prone areas (GN divisions). It is useful to have a compilation of impact-based forecast developed for divisional, and district levels as well as common Anticipatory Action protocols for application by stakeholder agencies.

- It is very useful in making routine execution of community preparedness exercises/ Disaster

simulation exercises mandatory for all potential hazard areas (village/ GN divisions). This will help in increasing the community-level readiness for responding to disaster events.

Annexure 1 - DesInventar Data of Flood and Landslide Events

Table 15 Nuwara Eliya District Flood impact during 2017-2022 Source; DesInventar database

Event	Province	District	Division	Date	Deaths	Injured	Missing	Houses Destroyed	Houses Damaged	Victims	Affected
Flood	Central	Nuwara Eliya	Ambagamuwakorale	5/26/2017					8		549
Flood	Central	Matale	Yatawatta	5/24/2017				1			3
Flood	Central	Kandy	Ganga Ihala Korale	7/29/2017					9		37
Flood	Central	Kandy	Udunuwara	4/3/2018					6		21
Flood	Central	Kandy	Delthota	5/3/2018					1		3
Flood	Central	Nuwara Eliya	Nuwara Eliya	5/21/2018				6	39		356
Flood	Central	Nuwara Eliya	Ambagamuwakorale	5/24/2018							28
Flood	Central	Nuwara Eliya	Kothmale	5/20/2018				1	3		18
Flood	Central	Kandy	Akurana	9/29/2018							83
Flood	Central	Kandy	Poojapitiya	9/29/2018					1		10
Flood	Central	Kandy	Harispattuwa	9/29/2018					2		15
Flood	Central	Kandy	Udapalatha	10/7/2018					8		55
Flood	Central	Kandy	Akurana	10/6/2018					4		21
Flood	Central	Kandy	Pasbage Korale	10/17/2018							6
Flood	Central	Kandy	Medadumbara	10/21/2018					28		118
Flood	Central	Nuwara Eliya	Nuwara Eliya	10/22/2018							55
Flood	Central	Kandy	Udunuwara	11/9/2018		2			1		4
Flood	Central	Matale	Dambulla	11/22/2018				3	10		42
Flood	Central	Matale	Wilgamuwa	11/22/2018				1	73		298
Flood	Central	Kandy	Udadumbara	11/23/2018					1		4
Flood	Central	Kandy	Minipe	11/23/2018					1		25
Flood	Central	Kandy	Kandy Four Gravets & Gangawata	12/22/2018					1		850
Flood	Central	Kandy	Akurana	12/22/2018							30

Event	Province	District	Division	Date	Deaths	Injured	Missing	Houses Destroyed	Houses Damaged	Victims	Affected
Flood	Central	Kandy	Thumpane	12/22/2018					1		11
Flood	Central	Kandy	Medadumbara	12/22/2018					2		7
Flood	Central	Kandy	Pathahewaheta	6/22/2019					2		7
Flood	Central	Nuwara Eliya	Ambagamuwakorale	7/18/2019							298
Flood	Central	Nuwara Eliya	Nuwara Eliya	7/18/2019	2				73		596
Flood	Central	Nuwara Eliya	Nuwara Eliya	7/19/2019					11		57
Flood	Central	Nuwara Eliya	Nuwara Eliya	8/13/2019					3		15
Flood	Central	Nuwara Eliya	Ambagamuwakorale	8/13/2019					18		74
Flood	Central	Kandy	Pasbage Korale	8/13/2019							257
Flood	Central	Nuwara Eliya	Ambagamuwakorale	8/22/2019					1		4
Flood	Central	Kandy	Udapalatha	9/11/2019					3		6
Flood	Central	Kandy	Delthota	9/1/2019					2		9
Flood	Central	Nuwara Eliya	Nuwara Eliya	9/22/2019							22
Flood	Central	Nuwara Eliya	Ambagamuwakorale	10/3/2019					38		182
Flood	Central	Nuwara Eliya	Nuwara Eliya	11/30/2019					9		214
Flood	Central	Nuwara Eliya	Ambagamuwakorale	11/30/2019					1		237
Flood	Central	Nuwara Eliya	Nuwara Eliya	12/3/2019							13
Flood	Central	Nuwara Eliya	Ambagamuwakorale	11/30/2019					1		237
Flood	Central	Nuwara Eliya	Nuwara Eliya	12/20/2019							11
Flood	Central	Kandy	Pathadumbara	5/9/2020					2		8
Flood	Central	Kandy	Pasbage Korale	5/19/2020							443
Flood	Central	Nuwara Eliya	Nuwara Eliya	5/19/2020					177		903

Flood	Central	Nuwara Eliya	Ambagamuwakorale	5/19/2020						98	662
Flood	Central	Kandy	Doluwa	10/14/2020						1	7
Flood	Central	Kandy		10/26/2019	1	1					2
Flood	Central	Kandy	Harispattuwa	1/9/2021						3	13
Flood	Central	Nuwara Eliya	Ambagamuwakorale	5/25/2021							168
Flood	Central	Nuwara Eliya	Ambagamuwakorale	7/10/2021							401
Flood	Central	Kandy	Pasbage Korale	7/10/2021							1104
Flood	Central	Nuwara Eliya	Nuwara Eliya	6/3/2021		1				1	301
Flood	Central	Nuwara Eliya	Ambagamuwakorale	8/12/2021							229
Flood	Central	Kandy	Pasbage Korale	8/12/2021						17	1962
Flood	Central	Kandy	Ganga Ihala Korale	8/12/2021						31	180
Flood	Central	Kandy	Pasbage Korale	8/13/2021							
Flood	Central	Nuwara Eliya	Nuwara Eliya	11/3/2021						1	13
Flood	Central	Matale	Ukuwela	11/3/2021							13
Flood	Central	Matale	Matale	11/3/2021							111
Flood	Central	Matale	Naula	6/6/2021							
Flood	Central	Kandy	Pasbage Korale	7/3/2022						3	95
Flood	Central	Nuwara Eliya	Kothmale	8/1/2022				3		3	27
Flood	Central	Nuwara Eliya	Kothmale	8/2/2022						3	9
Flood	Central	Nuwara Eliya	Ambagamuwakorale	8/1/2022	2					41	375
Flood	Central	Nuwara Eliya	Ambagamuwakorale	8/3/2022						4	202
Flood	Central	Nuwara Eliya	Nuwara Eliya	8/1/2022						159	657
Flood	Central	Nuwara Eliya	Nuwara Eliya	8/2/2022						2	12

Event	Province	District	Division	Date	Deaths	Injured	Missing	Houses Destroyed	Houses Damaged	Victims	Affected
Flood	Central	Kandy	Pasbage Korale	8/1/2022	1			15	9		3955
Flood	Central	Kandy	Pasbage Korale	8/11/2022					10		50
Flood	Central	Matale	Laggala-Pallegama	9/6/2022					1		6
Flood	Central	Kandy	Kandy Four Gravets & Gangawata	11/5/2022		1			3		14
Flood	Central	Nuwara Eliya	Nuwara Eliya	10/30/2022							23

Table 16 Nuwara Eliya District Landslide impact during 2017-2022 Source: DesInventar database

Event	Province	District	Division	Date	Deaths	Injured	Missing	Houses Destroyed	Houses Damaged	Affected
Landslide	Central	Nuwara Eliya	Nuwara Eliya	5/28/2017					1	245
Landslide	Central	Nuwara Eliya	Kothmale	5/28/2017					15	63
Landslide	Central	Nuwara Eliya	Ambagamuwakorale	4/25/2018		1				4
Landslide	Central	Kandy	Pathadumbara	5/21/2018					6	22
Landslide	Central	Kandy	Udunuwara	5/21/2018				1	12	49
Landslide	Central	Kandy	Kandy Four Gravets & Gangawata	5/21/2018					3	16
Landslide	Central	Kandy	Pasbage Korale	5/21/2018	3			2	33	1180
Landslide	Central	Nuwara Eliya	Ambagamuwakorale	10/15/2018				5		35
Landslide	Central	Nuwara Eliya	Nuwara Eliya	10/22/2018					7	14
Landslide	Central	Nuwara Eliya	Nuwara Eliya	11/8/2018					2	7
Landslide	Central	Nuwara Eliya	Nuwara Eliya	6/22/2019						6
Landslide	Central	Nuwara Eliya	Ambagamuwakorale	7/19/2019						14
Landslide	Central	Nuwara Eliya	Nuwara Eliya	7/18/2019					4	9
Landslide	Central	Nuwara	Nuwara Eliya	7/19/2019					2	14

		Eliya								
Landslide	Central	Nuwara Eliya	Nuwara Eliya	8/13/2019						42
Landslide	Central	Nuwara Eliya	Kothmale	8/13/2019						142
Landslide	Central	Nuwara Eliya	Ambagamuwakorale	9/18/2019						33
Landslide	Central	Nuwara Eliya	Nuwara Eliya	10/9/2019						18
Landslide	Central	Nuwara Eliya	Nuwara Eliya	10/8/2019						3
Landslide	Central	Kandy	Udunuwara	10/20/2019					1	3
Landslide	Central	Kandy	Udunuwara	12/17/2019					1	4
Landslide	Central	Kandy	Udadumbara	12/20/2019	1			1	3	62
Landslide	Central	Nuwara Eliya	Nuwara Eliya	11/30/2019					5	59
Landslide	Central	Nuwara Eliya	Walapane	11/30/2019	3		1	1		75
Landslide	Central	Nuwara Eliya	Nuwara Eliya	12/4/2019					1	102
Landslide	Central	Nuwara Eliya	Nuwara Eliya	12/19/2019				1		5

Event	Province	District	Division	Date	Deaths	Injured	Missing	Houses Destroyed	Houses Damaged	Affected
Landslide	Central	Kandy	Udadumbara	12/1/2019				2	1	8
Landslide	Central	Kandy	Udadumbara	12/5/2019				7		22
Landslide	Central	Kandy	Minipe	12/4/2019				1		4
Landslide	Central	Nuwara Eliya	Nuwara Eliya	4/16/2020						5
Landslide	Central	Kandy	Kandy Four Gravets & Gangawata	9/20/2020	3	2		2	3	23
Landslide	Central	Kandy	Yatinuwara	10/12/2020					1	3
Landslide	Central	Kandy	Yatinuwara	10/12/2020					1	3
Landslide	Central	Nuwara Eliya	Ambagamuwakorale	8/14/2019						59
Landslide	Central	Kandy	Ganga Ihala Korale	1/5/2021					2	7
Landslide	Central	Kandy	Udadumbara	1/10/2021					1	4
Landslide	Central	Matale	Yatawatta	3/5/2020	1					1
Landslide	Central	Kandy	Kundasale	7/14/2020	1	1				2
Landslide	Central	Nuwara Eliya	Ambagamuwakorale	8/12/2021				2	2	49
Landslide	Central	Nuwara Eliya	Nuwara Eliya	10/1/2021						1
Landslide	Central	Nuwara Eliya	Nuwara Eliya	10/29/2021						28
Landslide	Central	Nuwara Eliya	Kothmale	11/9/2021					3	54
Landslide	Central	Nuwara Eliya	Nuwara Eliya	11/9/2021					1	5
Landslide	Central	Nuwara Eliya	Kothmale	11/9/2021						54
Landslide	Central	Nuwara Eliya	Nuwara Eliya	11/9/2021				3	13	5
Landslide	Central	Kandy	Kandy Four Gravets & Gangawata	4/23/2022	1					1
Landslide	Central	Nuwara Eliya	Kothmale	8/1/2022					5	25
Landslide	Central	Nuwara Eliya	Ambagamuwakorale	8/5/2022					1	5
Landslide	Central	Nuwara Eliya	Nuwara Eliya	8/1/2022					2	10
Landslide	Central	Nuwara Eliya	Nuwara Eliya	8/2/2022					3	18
Landslide	Central	Nuwara Eliya	Nuwara Eliya	8/4/2022					12	68

Landslide	Central	Nuwara Eliya	Nuwara Eliya	8/6/2022						1	5
Landslide	Central	Nuwara Eliya	Nuwara Eliya	10/21/2022						5	26
Landslide	Central	Nuwara Eliya	Kothmale	10/21/2022						1	2
Landslide	Central	Nuwara Eliya	Ambagamuwakorale	10/21/2022						2	8
Landslide	Central	Nuwara Eliya	Nuwara Eliya	10/30/2022						1	3

Annexure 2 - Summery of Rainfall records

Table 17 Analysis of records of precipitation during 2019 to-date

Considered Southwest-monsoon Season (May – September) and Northeast-monsoon Season(December - February)
Source: *http://www.meteo.gov.lk/index.php?option=com_content&view=article&id=94&Itemid=310&lang=en&l ang=en*

Monsoon/ Year	Description	Locations of rain Gauge stations at Nuwara-Eliya DSD and recorded data			
		Udaradella	**Kotagala Rosita**	**Watawala**	**Nuwara Eliya**
SWM2019	Peak RF	120	198.8	174.7	106.8
	above 75	1	3	8	1
	above 100	1	3	4	1
	above 150	0	1	3	0
NEM2019	Peak RF	30	24.3	90.5	45.4
	above 75	0	0	01	0
	above 100	0	0	0	0
	above 150	0	0	0	0
SWM2020	Peak RF	97.0	121.8	172.3	62.0
	above 75	4	4	8	0
	above 100	0	1	4	0
	above 150	0	0	2	0
NEM2020	Peak RF	89.8	57.8	63.4	53.2
	above 75	1	0	0	0
	above 100	0	0	0	0
	above 150	0	0	0	0
SWM2021	Peak RF	130.3	124.5	204.7	91.9

	above 75	5	3	12	2
	above 100	2	1	7	0
	above 150	0	0	3	0
NEM2021	Peak RF	20	31	60.3	18.6
	above 75	0	0	0	0
	above 100	0	0	0	0
	above 150	0	0	0	0
SWM2022	Peak RF	140.5	208	206.4	71.7
	above 75	5	10	10	0
	above 100	2	6	9	0
	above 150	0	3	5	0

Monsoon/ Year	Description	Locations of rain Gauge stations at Ambagamuwa DSD and recorded data					
		Castlereigh	Norton	Maussakele	Canyon	Laksapana	Bogawanthalawa
SWm2019	Peak RF	202	246.7	164.3	248.5	187.5	89.2
	above 75	5	8	3	7	6	2
	above 100	2	3	2	3	3	0
	above 150	1	2	1	2	2	0
NEM2019	Peak RF	43.4	56	64	50.5	42.4	45.2
	above 75	0	0	0	0	0	0
	above 100	0	0	0	0	0	0

	above 150	0	0	0	0	0	0
SWm2020	Peak RF	173.0	202.7	182.0	211.0	207.0	90.8
	above 75	8	13	7	8	15	2
	above 100	2	9	3	4	9	0
	above 150	1	3	1	1	4	0
NEM2020	Peak RF	65.5	62	52	64	64.1	48
	above 75	0	0	0	0	0	0
	above 100	0	0	0	0	0	0
	above 150	0	0	0	0	0	0
SWm2021	Peak RF	173.0	202.7	182.0	211.0	207.0	125.5
	above 75	9	14	8	9	16	5
	above 100	2	9	3	4	9	2
	above 150	1	3	1	1	4	0
NEM2021	Peak RF	65.5	50.2	38	64	58	39.1
	above 75	0	0	0	0	0	0
	above 100	0	0	0	0	0	0
	above 150	0	0	0	0	0	0
SWm2022	Peak RF	184.5	242.2	153	212	224.4	87
	above 75	7	13	8	14	12	4
	above 100	5	7	3	7	7	0
	above 150	3	4	2	3	4	0

Monsoon/Year	Description	Nuwaraeliya DSD (N/A - Data not available)			
		Great Western	**Holbrook**	**Meepilimana**	**Nanu Oya**
SWm2019	*Peak RF*	124	130	N/A	N/A
	above 40	8	5	N/A	N/A
	above 75	4	2	N/A	N/A
	above 100	2	2	N/A	N/A
	above 150	0	0	N/A	N/A
NEm2019	*Peak RF*	66	58.5	N/A	N/A
	above 40	1	3	N/A	N/A
	above 75	0	0	N/A	N/A
	above 100	0	0	N/A	N/A
	above 150	0	0	N/A	N/A
SWm2020	*Peak RF*	70	73	N/A	3.5
	above 40	1	7	N/A	0
	above 75	0	0	N/A	0
	above 100	0	0	N/A	0
	above 150	0	0	N/A	0
NEm2020	*Peak RF*	7.5	50.5	36.5	N/A
	above 40	0	2	0	N/A
	above 75	0	0	0	N/A
	above 100	0	0	0	N/A
	above 150	0	0	0	N/A
SWm2021	*Peak RF*	102	120	41	89
	above 40	10	9	1	4

	above 75	2	1	0	1
	above 100	2	1	0	0
	above 150	0	0	0	0
NEm2021	Peak RF	31	45.5	34.5	2.5
	above 40	0	2	0	0
	above 75	0	0	0	0
	above 100	0	0	0	0
	above 150	0	0	0	0
SWm2022	Peak RF	18	68	85.5	128.5
	above 40	0	7	10	1
	above 75	0	0	3	1
	above 100	0	0	0	1
	above 150	0	0	0	0
NWm2022	Peak RF	4	31.5	22.5	33.5
	above 40	0	0	0	0
	above 75	0	0	0	0
	above 100	0	0	0	0
	above 150	0	0	0	0

Monsoon/ Year	Description	Ambagamuwa DSD (N/A - Data not available)										
		Bogawant halawa Tea Estate	Brunswick Tea Estate	Gauravila Tea Estate	Kalugala	Lethenty Tea Estate	Minna Tamil Viday alaya	Mocha Tea Estate	NIPM Morar	Norwo od	Annadale Division	Upcott
SWm2019	Peak RF	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	131	N/A	136.5
	above 40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12	N/A	9
	above 75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5	N/A	5
	above 100	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	N/A	1
	above 150	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0
NEm2019	Peak RF	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	50.5	N/A	77.5
	above 40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5	N/A	5
	above 75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	1
	above 100	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0
	above 150	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0
SWm2020	Peak RF	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	103.5	N/A	111.5
	above 40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	17	N/A	8
	above 75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3	N/A	4
	above 100	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	N/A	2
	above 150	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	0
NEm2020	Peak RF	46.5	51.5	39	0.5	77.5	35	45.5	25	60	40.5	29
	above 40	1	2	0	0	2	0	1	0	4	1	0
	above 75	0	0	0	0	1	0	0	0	0	0	0
	above 100	0	0	0	0	0	0	0	0	0	0	0
	above 150	0	0	0	0	0	0	0	0	0	0	0

SWm2021	Peak RF	116.5	164	117.5	212.5	177.5	118	69.5	81	156	180.5	149
	above 40	14	19	14	40	27	13	2	7	20	13	13
	above 75	3	7	3	13	14	2	0	1	4		5
	above 100	1	1	2	9	4	2	0	0	2		2
	above 150	0	0	0	1	2	0	0	0	1		0
NEm2021	Peak RF	81.5	74.5	62.5	66.5	50.5	35.5	65	72	92.5	70	32
	above 40	3	2	8	4	5	0	2	2	4	2	0
	above 75	2	0	0	0	0	0	0	0	2	0	0
	above 100	0	0	0	0	0	0	0	0	0	0	0
	above 150	0	0	0	0	0	0	0	0	0	0	0
SWm 2022	Peak RF	56	135.5	134	225	159	108	0.5	77.5	109.5	3	115.5
	above 40	2	17	13	30	24	14	0	8	13	0	15
	above 75	0	3	3	8	8	3	0	1	2	0	4
	above 100	0	2	1	5	5	1	0	0	2	0	1
	above 150	0	0	0	4	1	0	0	0	0	0	0
NWm 2022	Peak RF	53.5	71.5	41	85.5	64.5	42	7	49.5	55.5	46	35.5
	above 40	3	2	2	4	2	2	0	6	2	2	0
	above 75	0	0	0	2	0	0	0	0	0	0	0
	above 100	0	0	0	0	0	0	0	0	0	0	0
	above 150	0	0	0	0	0	0	0	0	0	0	0

Annexure 3 - Census data at GND level for Nuwara Eliya DSDand for Ambagamuwa DSDs

(Source: Department of census and Statistics)
This was used for Vulnerability assessment provided in Chapter 5 Ref: **5.3.2 Economic vulnerability reflecting gainful employment**

#	Area	Total	Employed	Employed as a % from total	Unemployed	Un-employed as a % from total	Economically not active	Economically not active as a % from total
	Nuwara Eliya DSD	150,947	85,096	56%	6,760	4%	59,091	39%
1	Kuduoya GND (475A)	3,191	1,778	56%	132	4%	1,281	40%
2	Yulefield GND (475Y)	2,791	1,592	57%	111	4%	1,088	39%
3	Kotagala GND (475)	3,729	1,692	45%	170	5%	1,867	50%
4	Dayagama East GND (476S)	2,568	1,475	57%	217	8%	876	34%
5	Bambarakele GND (535K)	2,295	1,152	50%	87	4%	1,056	46%
6	Thangakele GND (476M)	1,621	895	55%	61	4%	665	41%
7	Dayagama West (475L)	2,023	1,189	59%	53	3%	781	39%
#	Area	Total	Employed	Employed as a % from total	Unemployed	Un-employed as a % from total	Economically not active	Economically not active as a % from total
	Ambagamuwa DSD	146,432	78,507	54%	8,496	6%	59,429	41%
1	Watawala GND (320F)	3,966	1,983	50%	183	5%	1,800	45%
2	Bagawanthalawa South GND (319F)	4,525	2,645	58%	138	3%	1,742	38%
3	Kotiyagala GND (319P)	2,079	1,155	56%	143	7%	781	38%
4	Loinon GND (319O)	4,874	3,042	62%	225	5%	1,607	33%

5	Welioya GND (320P)	3,367	1,922	57%	133	4%	1,312	39%
6	Panmur GND (320R)	1,611	853	53%	64	4%	694	43%
7	Ruwanpura GND (320G)	1,580	740	47%	92	6%	748	47%
8	Rosella GND (320E)	2,551	1,137	45%	218	9%	1,196	47%

Ref: **5.3.4 Social vulnerability reflecting the status of the level of education of communities**

Educational Attainment	Nuwara Eliya DSD	1 Kuduoya GND (475A)	2 Yulefield GND (475Y)	3 Kotagala GND (475)	4 Dayagama East GND(476S)	5 Bambarakele GND(535K)	6 Thangakele GND (476M)	7 Dayagama West(475L)
Total	191,433	4,126	3,650	4,625	3,389	2,898	2,159	2,670
Primary	67,623	1,437	1,550	1,011	1,593	710	976	1,289
Secondary	70,176	1,459	1,439	1,509	1,066	1,152	730	885
Population that completed secondary education (% from total)	37%	35%	39%	33%	31%	40%	34%	33%
G.C.E. (O/L)	24,189	531	291	1,027	135	502	197	139
G.C.E. (A/L)	12,237	268	71	738	73	331	72	40
Population that completed high school level education (% from total)	19%	19%	10%	38%	6%	29%	12%	7%
Degree and above	2,036	57	12	138	6	64	10	8
Population that completed education up to degree level and other tertiary level education(% from total)	1%	1%	0%	3%	0%	2%	0%	0%
No schooling	15,172	374	287	202	516	139	174	309
Population with no formal education as a % of total	8%	9%	8%	4%	15%	5%	8%	12%

Educational Attainment	Ambagamuwa DSD	1 Watawala GND (320F)	2 Bagawanthalawa South GND (319F)	3 Kotiyagala GND (319P)	4 Loinon GND (319O)	5 Welioya GND (320P)	6 Panmur GND (320R)	7 Ruwanpura GND (320G)	8 Rosella GND (320E)
Total	185,566	5,051	5,706	2,692	6,291	4,393	2,017	2,020	3,216
Primary	66,000	1,741	1,842	1,069	2,584	1,962	790	722	1,200
Secondary	68,589	1,911	2,067	910	2,172	1,674	772	775	1,280
Population that completed secondary education (% from total)	37%	38%	36%	34%	35%	38%	38%	38%	40%
G.C.E. (O/L)	23,342	627	800	252	439	261	177	181	328
G.C.E. (A/L)	10,820	263	464	86	127	85	48	77	148
Population that completed high school level education (% from total)	18%	18%	22%	13%	9%	8%	11%	13%	15%
Degree and above	1,660	47	79	9	19	26	2	8	14
Population that completed educationup to degree level and other tertiary level education (% from total)	1%	1%	1%	0%	0%	1%	0%	0%	0%
No schooling	15,155	462	454	366	950	385	228	257	246
Population with no formal education as a % of total	8%	9%	8%	14%	15%	9%	11%	13%	8%

Ref: **5.3.6 Fire hazard risk**

Principal type of cooking fuel	Nuwara Eliya DSD	1 Kuduoya GND (475A)	2 Yulefield GND(475Y)	3 Kotagala GND (475)	4 Dayagama East GND (476S)	5 Bambarakele GND(535K)	6 Thangakele GND(476M)	7 Dayagama West(475L)
Total	52,142	1,079	960	1,254	954	787	579	758
Firewood	40,064	815	893	437	918	344	534	736
Firewood %	77%	76%	93%	35%	96%	44%	92%	97%
Kerosene	1,685	44	7	126	5	27	14	3
Kerosene %	3%	4%	1%	10%	1%	3%	2%	0%
Gas	9,998	216	49	681	20	415	29	13
Gas %	19%	20%	5%	54%	2%	53%	5%	2%
Electricity	289	2	8	2	11	-	2	6
Saw dust/Paddy husk	60	2	3	6	-	-	-	-
Other	46	-	-	2	-	1	-	-
Fire hazard risk %l (cooking fuel use)	99%	99%	99%	99%	100%	100%	99%	99%

Principal type of cooking fuel	Ambagamuwa DSD	1 Watawala GND(320F)	2 Bagawanthalawa South GND (319F)	3 Kotiyagala GND (319P)	4 Loinon GND (319O)	5 Welioya GND (320P)	6 Panmur GND (320R)	7 Ruwanpura GND(320G)	8 Rosella GND (320E)
Total	50,811	1,379	1,439	758	1,674	1,194	521	579	901
Firewood	42,860	1,025	1,102	700	1,600	1,104	478	527	694
Firewood %	84%	74%	77%	92%	96%	92%	92%	91%	77%
Kerosene	1,252	42	49	8	7	26	6	8	53
Kerosene %	2%	3%	3%	1%	0%	2%	1%	1%	6%
Gas	6,468	304	281	49	59	58	37	44	149
Gas %	13%	22%	20%	6%	4%	5%	7%	8%	17%
Electricity	158	-	5	-	8	5	-	-	3

		1	2	3	4	5	6	7
Saw dust/Paddy husk	33	1	-	1	-	1	-	-	1
Other	40	7	2	-	-	-	-	-	1
Fire hazard risk %l (cooking fuel use)	100%	99%	100%	100%	100%	99%	100%	100%	99%

Fire hazard risk considering the type of house lighting

Principal type of lighting	Nuwara Eliya DSD	1 Kuduoya GND (475A)	2 Yulefield GND(475Y)	3 Kotagala GND(475)	4 Dayagama EastGND (476S)	5 Bambarake leGND (535K)	6 Thangakele GND (476M)	7 Dayagama West(475L)
Total	52,142	1,079	960	1,254	954	787	579	758
Electricity-National Electricity Network	46,940	957	848	1,182	858	721	518	626
Dependents of Electricity-National Electricity Network %	90%	89%	88%	94%	90%	92%	89%	83%
Electricity-Rural Hydro Electricity Projects	-	-	-	-	-	-	-	-
Kerosene	5,065	121	110	70	96	65	61	130
Dependence on Kerosene %	10%	11%	11%	6%	10%	8%	11%	17%
Solar power	89	1	2	-	-	-	-	2
Bio Gas	3	-	-	-	-	-	-	-
Other	45	-	-	2	-	1	-	-

Principal type of lighting	Ambagamuwa DSD	1 Watawala GND (320F)	2 Bagawanthal awa South GND (319F)	3 Kotiyagala GND(319P)	4 Loinon GND (319O)	5 Welioya GND (320P)	6 Panmur GND (320R)	7 Ruwanpura GND(320G)	8 Rosella GND (320E)
Total	50,811	1,379	1,439	758	1,674	1,194	521	579	901
Electricity-National Electricity Network	46,054	1,251	1,367	680	1,483	1,059	446	480	744
Dependents of Electricity-National Electricity Network %	91%	91%	95%	90%	89%	89%	86%	83%	83%
Electricity-Rural Hydro Electricity Projects	-	-	-	-	-	-	-	-	-
Kerosene	4,716	128	72	78	190	135	75	99	156
Dependence on Kerosene %	9%	9%	5%	10%	11%	11%	14%	17%	17%
Solar power	14	-	-	-	-	-	-	-	1
Bio Gas	1	-	-	-	1	-	-	-	-
Other	26	-	-	-	-	-	-	-	-

Ref: 5.3.6 Physical vulnerability

Physical vulnerability - Households by tenure or dependency for accommodation and living

Tenure	Nuwara Eliya DSD	1 Kuduoya GND (475A)	2 Yulefield GND(475Y)	3 Kotagala GND (475)	4 Dayagama East GND (476S)	5 Bambarakele GND (535K)	6 Thangakele GND(476M)	7 Dayagama West(475L)
Total	**52,142**	1,079	960	1,254	954	787	579	758
Owned by a household member	**19,343**	322	15	788	8	635	39	12
Dependency for accommodation and living - Owned by a household member %	**37%**	30%	2%	63%	1%	81%	7%	2%
Rent/Lease -Government owned	**1,986**	37	3	60	6	27	1	3
Dependency for accommodation and living - Rent/Lease -Government owned %	**4%**	3%	0%	5%	1%	3%	0%	0%
Rent/Lease -Privately owned	**2,992**	85	13	225	4	75	11	2
Dependency for accommodation and living - Rent/Lease -Privately owned %	**6%**	8%	1%	18%	0%	10%	2%	0%
Rent free occupied	**26,029**	625	91	177	935	30	528	7
Dependency for accommodation and living - Rent free occupied %	**50%**	58%	9%	14%	98%	4%	91%	1%
Encroached	**510**	7	15	1	1	10	-	-
Other	**1,282**	3	3	3	-	10	-	734

Tenure	Ambagamuwa DSD	1 Watawala GND(320F)	2 Bagawanthalawa	3 Kotiyagala GND	4 Loinon GND	5 Welioya GND	6 Panmur GND(320R)	7 Ruwanpura GND(320G)	8 Rosella GND (320E)
Total	50,811	1,379	1,439	758	1,674	1,194	521	579	901
Owned by a household member	18,036	526	712	73	182	11	6	316	405
Dependency for accommodation and living - Owned by a household member %	35%	38%	49%	10%	11%	1%	1%	55%	45%
Rent/Lease-Government owned	1,335	82	42	5	123	2	1	5	20
Dependency for accommodation and living - Rent/Lease-Government owned %	3%	6%	3%	1%	7%	0%	0%	1%	2%
Rent/Lease-Privately owned	3,348	215	237	16	358	2	7	34	23
Dependency for accommodation and living - Rent/Lease-Privately owned %	7%	16%	16%	2%	21%	0%	1%	6%	3%
Rent free occupied	26,715	545	444	664	1,007	1,167	501	223	452
Dependency for accommodation and living - Rent free occupied %	53%	40%	31%	88%	60%	98%	96%	39%	50%
Encroached	938	3	3	-	4	12	-	1	1
Other	439	8	1	-	-	-	6	-	-

Physical vulnerability - Material used for the floor.

	Principal materials of construction of Floor	Nuwara Eliya DSD	1 Kuduoya GND (475A)	2 Yulefield GND(475Y)	3 Kotagala GND (475)	4 Dayagama East GND (476S)	5 Bambarake leGND (535K)	6 Thangakele GND(476M)	7 Dayagama West(475L)
	Total	51,238	1,055	945	1,241	929	773	574	752
Cement, tile or concrete	Cement	43,877	946	865	1,099	806	605	497	621
	Tile/Granite/Terrazo	1,110	33	4	97	2	53	1	6
	Concrete	489	2	-	7	1	9	-	-
	Other	454	11	1	1	-	2	34	30
Material used for the floor % (Cement, tile or concrete)		90%	94%	92%	97%	87%	87%	93%	87%
Mud, wood or sand	Mud	5,053	62	73	35	117	53	41	87
	Wood	98	-	1	-	-	11	1	1
	Sand	157	1	1	2	3	40	-	7
Material used for the floor % (Mud, wood or sand)		10%	6%	8%	3%	13%	14%	7%	13%

	Principal materials of construction of Floor	Ambagamuwa DSD	1 Watawala GND (320F)	2 Bagawanthalawa South GND (319F)	3 Kotiyagala GND (319P)	4 Loinon GND (319O)	5 Welioya GND (320P)	6 Panmur GND (320R)	7 Ruwanpura GND	8 Rosella GND (320E)
	Total	50,244	1,363	1,422	753	1,656	1,159	519	577	895
Cement, tile or concrete	Cement	44,871	1,203	1,236	674	1,517	1,011	468	477	798
	Tile/Granite/Terrazo	1,462	61	35	6	9	3	2	6	18
	Concrete	326	-	1	-	-	-	-	8	4
	Other	197	4	-	-	3	4	3	3	2
Material used for the floor % (Cement, tile or concrete)		93%	93%	89%	90%	92%	88%	91%	86%	92%
Mud, wood or sand	Mud	3,148	93	124	72	126	141	46	83	72
	Wood	77	-	8	1	-	-	-	-	1
	Sand	163	2	18	-	1	-	-	-	-
Material used for the floor % (Mud, wood or sand)		7%	7%	11%	10%	8%	12%	9%	15%	8%

Physical vulnerability - Construction material used for the walls

	Principal materials ofconstruction of Walls	Nuwara Eliya DSD	1 Kuduoya GND (475A)	2 Yulefield GND (475Y)	3 Kotagala GND (475)	4 Dayagama EastGND (476S)	5 Bambarak eleGND (535K)	6 Thangakele GND(476M)	7 Dayagama West(475L)
	Total	**51,238**	1,055	945	1,241	929	773	574	752
Brick or cemented	**Brick**	**4,421**	23	24	37	20	61	26	6
	Cement block/Stone	**40,286**	983	865	1,138	889	560	516	696
	Plank/Metal Sheet	**2,396**	4	5	9	1	136	1	-
	Other	**379**	13	3	1	-	2	14	11
Material used for the walls % (Brick or cemented)		93%	97%	95%	95%	98%	98%	97%	95%
Soil-bricks, mud	**Cabook**	**495**	2	33	2	2	2	1	1
	Soil bricks	**1,167**	-	8	6	-	6	2	2
	Mud	**2,081**	30	5	48	17	6	14	36
	Cadjan/Palmyrah	**13**	-	2	-	-	-	-	-
Material used for the walls % (Soil-bricks, mud)		7%	3%	5%	5%	2%	2%	3%	5%

Principal materials ofconstruction of Walls		Ambagamuwa DSD	1 Watawala GND(320F) (3190)	2 Baganwanthalawa South GND (320K)	3 Kotiyagala GND (319P)	4 Loinon GND	5 Welioya GND(320P)	6 Panmur GND	7 Ruwanpura GND(320G)	8 Rosella GND (320E)
	Total	50,244	1,363	1,422	753	1,656	1,159	519	577	895
Brick or cemented	Brick	995	27	27	6	17	12	6	6	13
	Cement block/Stone	45,778	1,286	1,308	698	1,575	1,105	453	508	845
	Plank/Metal Sheet	609	12	2	1	2	5	-	12	5
	Other	216	1	-	-	-	2	1	2	-
Material used for the walls % (Brick or cemented)		95%	97%	94%	94%	96%	97%	89%	92%	96%
Soil-bricks, mud	Cabook	293	3	3	-	3	4	6	1	10
	Soil bricks	720	17	9	-	5	-	6	-	9
	Mud	1,621	17	72	48	54	31	46	48	13
	Cadjan/Palmyrah	12	-	1	-	-	-	1	-	-
Material used for the walls % (Soil-bricks, mud)		5%	3%	6%	6%	4%	3%	11%	8%	4%

Physical vulnerability - Housing unit status

Type of unit	Nuwara Eliya DSD	1 Kuduoya GND (475A)	GND (535K)	2 Yulefield GND (475Y)	3 Kotagala GND (475)	4 Dayagama East GND (476S)	5 Bambarakele	6 Thangakele GND (476M)	7 Dayagama West (475L)
Total	51,238	1,055	945	1,241	929	773	574	752	
Permanent	12,989	370	107	883	48	231	58	88	
Housing unit status % - Permanent	25%	35%	11%	71%	5%	30%	10%	12%	
Semi-permanent	37,285	683	835	357	881	486	509	663	
Housing unit status % - Semi-permanent	73%	65%	88%	29%	95%	63%	89%	88%	
Improvised	921	1	3	1	-	56	-	-	
Housing unit status % - Improvised	2%	0%	0%	0%	0%	7%	0%	0%	
Un-classified	43	1	-	-	-	-	7	1	

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Type of unit	Ambagamuwa DSD	1 Watawala GND(320F)	2 Bagawanthalawa South GND (319F)	3 Kotiyagala GND(319P)	4 Loinon GND (319O)	5 Welioya GND (320P)	6 Panmur GND (320R)	7 Ruwanpura GND(320G)	8 Rosella GND (320E)
Total	50,244	1,363	1,422	753	1,656	1,159	519	577	895
Permanent	19,056	605	332	221	355	182	252	227	329
Housing unit status % - Permanent	38%	44%	23%	29%	21%	16%	49%	39%	37%
Semi-permanent	31,015	752	1,089	532	1,301	975	267	346	565
Housing unit status % - Semi-permanent	62%	55%	77%	71%	79%	84%	51%	60%	63%
Improvised	157	6	1	-	-	2	-	4	1
Housing unit status % - Improvised	0%	0%	0%	0%	0%	0%	0%	1%	0%
Un-classified	16	-	-	-	-	-	-	-	-

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Annexure 4 - Survey format used for field data collection

Name of the Estate:
Name of the Estate Division:
Name of the AP:
Name of the GN division:
Date:
Details of the participants of the FGD: Male - Female -

Elderly: Differently able: Pregnant ladies: Single mothers:

Population factor (above 18 years) within the community cluster

        Total   -
        Male   %
        Female %
   Children below 18 years %
    People with disabilities %

Field data collection for assessing community vulnerability.

Component 1 – Social vulnerability within the cluster

1.1. Vulnerable groups % from total population living in the community cluster

Percentage within the cluster	Less than 2 %	2-3 %	3-4 %	4-5 %	More than 5%
Score	1	2	3	4	5
% of Elderly population age 60 years or more					5
% of Single parent families			3		
% of Disability or differently able population				2	
% of Pregnant and lactating mothers					
% of Minor(less than 5 years)					5
Total score					

1.2. Population factor(school going children) within the community cluster

Percentage within the cluster	Less than 2 %	2-3 %	3-4 %	4-5 %	More than 5%
Score	1	2	3	4	5
% among school going children or attending school regularly					

1.3. Family size of population within the community cluster
No of total families living in the cluster

Percentage within the cluster	Less than 2 %	2-4 %	4-6 %	6-8 %	More than 10%
Score	1	2	3	4	5
% Households with 04 members or more					

1.4. Education/employability factor of population

Percentage within the cluster	Less than 2 %	2-4 %	4-6 %	6-8 %	More than 10%
Score	1	2	3	4	5
% of population without any kindof education or completed only up to Primary education until grade 5					

Total score for Component 1 – Social vulnerability within the cluster	1.1	1.2	1.3	1.4	Total score

Component 2 - Economic vulnerability

2.1. Monthly Income level of family

Percentage within the cluster	Less than 2 %	2-4 %	4-6 %	6-8 %	More than 10%
Score	1	2	3	4	5
% of population with income of less than Rs.25,000 per month					

2.2. Expenditure on domestic food needs

Percentage within the cluster	Less than 2 %	2-4 %	4-6 %	6-8 %	More than 10%
Score	1	2	3	4	5
% of population whose weekly affordable expenditure on food is less than Rs.7,500					

2.3. Asserts
- % of population without any assets other than general household items -
- % of population with general household items plus gas or electric cooker, radio -
- % of population with general household items plus gas or electric cooker, radio, TV
- % of population with general household items plus gas or electric cooker, radio, TV, Sewing machine
- % of population with general household items plus gas or electric cooker, radio, TV, Sewing machine and expensive asserts such as Motor bicycle, three wheelers, Motor car etc.

Percentage within the cluster	Less than 10%	10-15 %	15-20 %	20-25 %	More than 25%
Score	1	2	3	4	5
% of population with general household items plus gas or electric cooker, radio					

Total score for Component 2 – -	2.1	2.2	2.3	Total
Economic vulnerability				

Component 3 - Livelihood factor

- % of population Employed as a labor but daily wage earning category(casual not permanent) plus and % of population Employed as a labor permanent cadre but depend on daily wages -
- % of population Employed as a permanent monthly earning category(office/factory worker) and % of population employed as an Office worker/Teacher/Nurse -
- % of population employed as Artisan or skilled worker and related engagement(skill worker such as mason) -
- % of population self-employed (farming, Raise animals for living, tailor, barber etc.)-
- % of population employed as a Businessman-

Percentage within the cluster	Less than 10%	10-15 %	15-20 %	20-25 %	More than 25%
Score	1	2	3	4	5
% of population Employed as a labor but daily wage earning category(casual not permanent) plus and % of population Employed as a labor permanent cadre but dependon daily wages					

Total score for Component 3 – Livelihood factor	

Component 4 - Food security & nutrition factor

	Score
Majority of household in the cluster Take only 01 meal a day	5
Majority of household in the cluster Take 02 normal meals a day	4
Majority of household in the cluster Take 03 normal meals a day	3
Majority of household in the cluster Take 03 normal meals a day and Consume eggs or meat once a week at least and cow milk daily	1

Total score for Component 4 – Food security factor	

Component 5 - Physical vulnerability

5.1. Shelter (age of the building)

	Majority of buildings are 100 years or older	Majority of buildings are between 80-100 year old	Majority of buildings are between 60-80- year old	Majority of buildings are between 40-60 year old	Majority of buildings are 40 yeas or younger
Score	5	4	3	2	1
% of buildings with different age categories Considering majority of buildings located in the cluster					

5.2. Type of house construction material used for walls considering the majority of buildings in the cluster

Considering the majority of houses in the cluster	Score (provide a score only for the category with greatest representation among all categories)
majority of houses in the cluster constructed using Concrete blocks with cement mortar	1
majority of houses in the cluster constructed using Brick with cement mortar	2
majority of houses in the cluster constructed using Brick with clayey mortar	3
majority of houses in the cluster constructed using Tin sheets	4
majority of houses in the cluster constructed using Mud or adobe	5

5.3. Type of house construction material used for roof considering the majority of buildings in the cluster

Considering the majority of houses in the cluster use roofing material such as	Score(provide a score only for the category with greatest representation among all categories)
Asbestos	1
Clay tiles	3
Corrugated Tin sheets	4
Cadjan or decaying material	5

5.4. Ownership of house

Considering the majority of houses in the cluster	Score (provide a score only for the category with greatest representation among all categories)
House shared with a family member(no ownership but live with parents)	5
Line house owned by tea plantation	4
Rented house	3
Single story house owned by residents	2
Two story houses owned by residents	1

Total score for Component 5 – Physical vulnerability	5.1	5.2	5.3	5.4	Total

Component 6 - Disaster Risk assessment

6.1. Disaster risk factor (consider the location of majority of houses in the cluster)

	Score(provide a score only for the category with greatest representation among all categories)
House located not very far from the slope, behind a cut slope	5
A rock fall area is located not very far behind the house	4
House situated on high sloping ground but no cut slopes	3
House situated near a stream which has a potential to create floods	4
No visible threat due to floods or landslides	1
No visible threat due to heavy wind as roof is anchored or weight is put on the roof to prevent any wind action	1

6.2. Disaster history- Considering past experience and the situation of majority of houses in the cluster

	Score(provide a score only for the category with greatest representation among all categories)
Some Shelter in the cluster got affected due to flood previously	5
Some Shelter in the cluster got affected by landslide or slopefailure or notice has been issued by NBRO on the high risk potential	5
Some Shelter in the cluster got affected by high wind situation or cyclone previously	4
Access road affected by flood previously	3
Access road affected by landslide or slope failure previously	3
Access road was blocked due to falling trees during high wind, Previously	2
Access road was never affected by any disaster situation	1

6.3. Fire hazard potential (considering the source of energy used by majority of houses in the cluster for cooking)

	Score (provide a score only for the category with greatest representation among all categories)
LP gas	5
Firewood	4
Kerosene	3
Electricity	1
Rice husk	2

Total score for Component 6 – Disaster Risk assessment	6.1	6.2	6.3	total

Component 7 - EW related awareness

7.1. No. of people listen or concerned with EW issued by media

	Score (provide a score only for the category with greatest representation among all categories)
Do not receive any warning	4
Not interested in EW due to poor knowledge on preparedness	4
No idea about warning	4
No confidence on EW messages	3
Daily listen to radio or TV to get weather forecast	1
Have subscribe to SMS service to receive warning messages	2

7.2. How do you get warning about floods, cyclones, landslides?

	Score(provide a score only for the category with greatest representation among all categories)
Mobile phone through SMS	1
Internet alerts through usage of some apps	1
Social media user through EW posts but not regularly	2
From radio/TV but not regularly	2
Land phone but not regularly	2
From family members but occasionally	3
From tea plantation staff but occasionally	3
From friends but occasionally	3
From Government office but occasionally	3
Never get any warning about disasters	4

7.3. Knowledge about symptoms of hazard occurrences

	Score(provide a score only for the category with greatest representation among all categories)
Knowledge about High water level during rain which could create floods	1
Knowledge about Unusual cracks appear on house walls or floor as a symptom of landslide	1
Knowledge about Cracks on slopes might be a landslide symptom	1
Knowledge about the possibility of Continuous rain, which might cause slope failure or flooding	3
Do not have any confidence about the connection between any symptoms and occurrence of disaster events	4

No knowledge on any symptoms and connection between any symptoms and occurrence of disaster events	4

Total score for Component 7 – EW related awareness	7.1	7.2	7.3	Total

Component 8 - Disaster Preparedness planning related knowledge & awareness

8.1. Disaster Preparedness knowledge
(Provide a score only for the category with greatest representation among all categories)

Percentage within the cluster	Less than 2 %	2-4 %	4-6 %	6-8 %	More than 10%
Score	1	2	3	4	5
% of population who has attended community risk assessment and know the high risk areas within their community					

8.2. Participation in preparedness planning(provide a score only for the category with greatest representation among all categories)

Percentage within the cluster	Less than 2 %	2-4 %	4-6 %	6-8 %	More than 10%
Score	1	2	3	4	5
% of population who has Participated in Preparedness planning work within the community					

8.3. Knowledge about a place for evacuation during disasters (provide a score only for the category with greatest representation among all categories)

Percentage within the cluster	Less than 2 %	2-4 %	4-6 %	6-8 %	More than 10%
Score	1	2	3	4	5
% of population with Knowledge about a place for evacuation and Know how toreach the evacuation center designated for the community cluster					

8.4. Designated place for meeting during disasters for family members (provide a score only for the category with greatest representation among all categories)

Percentage within the cluster	Less than 2 %	2-4 %	4-6 %	6-8 %	More than 10%
Score	1	2	3	4	5
% of population who has discussed about a designated meeting place for family members					

8.5. Becoming a member of Community DM committee (provide a score only for the category with greatest representation among all categories)

Percentage within the cluster	Less than 2 %	2-4 %	4-6 %	6-8 %	More than 10%
Score	1	2	3	4	5
% of population who has become a Member of a community DM committee					

8.6. Participation in vigilant group to observe symptoms or any hazard specific happenings (provide a score only for the category with greatest representation among all categories)

Percentage within the cluster	Less than 2 %	2-4 %	4-6 %	6-8 %	More than 10%
Score	1	2	3	4	5
% of population who has Participated in a vigilance group to inspect the neighborhood and take action					

8.7. Participation in community preparedness drills (provide a score only for the category with greatest representation among all categories)

Percentage within the cluster	Less than 2 %	2-4 %	4-6 %	6-8 %	More than 10%
Score	1	2	3	4	5
% of population who has attended community preparedness drills					

Total score for Component 8 - Preparedness planning related knowledge & awareness	8.1	8.2	8.3	8.4	8.5	8.6	8.7	Total

Results - Summary for the housing cluster

Total population of the cluster	Male:
	female
	Children below 18 years
	Total score for each component
Component 1 – Social vulnerability within the cluster	
Component 2- Economic vulnerability	
Component 3 - Livelihood factor	
Component 4 - Food security & nutrition factor	
Component 5 –Physical vulnerability	
Component 6 – Disaster Risk assessment	
Component 7; EW related awareness	
Component 8 - Preparedness planning related knowledge & awareness	
Total for cluster	

Asia Anticipatory Action for Disaster Mitigation Project

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