Sri Lanka Red Cross Society's journey towards building community resilience

"Achieving climate resilience through ground water recharging"

STAKEHOLDER DIALOGUE AND THE LESSONS LEARNED WORKSHOP REPORT

June 2023
Mandarina Colombo
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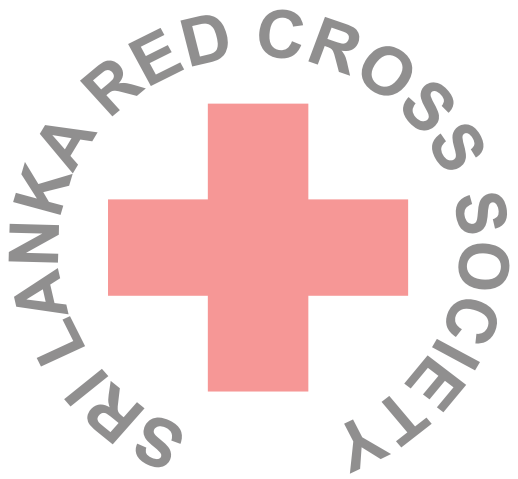

STAKEHOLDER DIALOGUE AND THE LESSONS LEARNED WORKSHOP REPORT

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OVERVIEW

Sri Lanka Red Cross Society (SLRCS) recognizes the importance of taking urgent actions to address the impacts of climate change and work towards reducing the current and future humanitarian impacts of climate and environmental crises. SLRCS is supporting the most vulnerable people in Sri Lanka to adapt to climate change and build resilient communities to face current and future climate extremes.

SLRCS will specifically look in to addressing the drivers and root causes of vulnerability focusing on the Disaster Risk Reduction (DRR) including disaster preparedness, agriculture and livelihoods, food insecurity, health, and climate-related displacement. SLRCS will work together with Government agencies, Universities and scientists, UN agencies, Civil Society Organizations and International Non-Governmental Organizations (INGOs) to strengthen community resilience through climate action. SLRCS will further increase our consideration on protection, gender and inclusion to ensure that we focus on the people most affected by climate and environmental crisis.

BACKGROUND

Groundwater acts as a natural storage reservoir, holding vast amounts of freshwater underground. As climate change leads to increased variability in rainfall patterns and more frequent droughts, groundwater recharging becomes essential for maintaining water availability during dry periods. Groundwater serves as a buffer against climate-related shocks by providing a reliable water source for agriculture, drinking water supplies, and ecosystem sustenance during periods of low precipitation or surface water scarcity. By replenishing groundwater through recharge methods, we can enhance the resilience of water resources to climate change impacts, ensuring a more sustainable and reliable water supply in the long term.

Groundwater recharging helps replenish depleted aquifers and restore water levels, combating water scarcity issues in regions where surface water sources are limited or overexploited. It promotes the sustainability of water resources by maintaining a balance between groundwater extraction and recharge rates. Without proper recharge, excessive groundwater pumping can lead to long-term depletion and saltwater intrusion in coastal areas. Groundwater recharging methods such as rainwater harvesting, infiltration trenches, and percolation pits provide additional water sources, particularly in arid and semi-arid regions where rainfall is scarce but sporadic. This reduces reliance on surface water and increases water availability for various uses.

Groundwater recharging helps maintain base flow in rivers and streams, especially during dry seasons, supporting aquatic ecosystems, wetlands, and riparian vegetation. Recharged groundwater supports the sustenance of groundwater-dependent ecosystems, including springs, lakes, and marshes, which serve as important habitats for biodiversity.

Groundwater recharging can enhance community resilience by providing a decentralized and localized water source. It reduces dependence on centralized water supply systems and decreases vulnerability to water shortages during emergencies or disruptions in surface water delivery. Community-based groundwater recharge initiatives can empower local communities, foster water stewardship, and encourage active participation in water resource management.

In summary, Ground Water Recharging (GWR) is vital for climate change adaptation, ensuring water security, and addressing water scarcity challenges. By replenishing aquifers, it supports the availability of water during dry periods, maintains ecological balance, and enhances community resilience to climate-related risks.

GROUND WATER RECHARGING FOR DISASTER PREPAREDNESS PROJECT (GWRDPP)

SLRCS implemented GWRDPP in Kurunegala district as a pilot project with financial assistance from Empress Shoken Fund through the International Federation of Red Cross and Red Crescent Societies (IFRC).

The project contributed to the National Adaptation Plan (NAP) of Sri Lanka 2016-2025 (in line with Paris Agreement commitment and the implementation of Nationally Determined Contributions (NDCs)), under priority actions in the Water Resources sector of the NAP.

Moreover, the project contributed to the Government of Sri Lanka efforts to reach Sustainable Development Goals (SDGs) and implement Sendai Framework for DRR.

The project strategy was to implement Groundwater Recharging activities as an integral part of DRR and Climate Change Adaptation (CCA). The project was implemented by the SLRCS in collaboration with the IFRC and aimed to enhance ground water recharging practices to facilitate ground water retention while ensuring a continuous base flow of natural water drains carrying water into minor reservoirs even during a prolonged drought.

Apart from the government agencies such as National Water Supply and Drainage Board (NWSDB) and local authorities, academics of three State Universities were involved from the inception of the project in order to facilitate a dialogue among academia and practitioners about practicability and achievement of the ground level implementation, Furthermore, project was implemented through activities at various levels, which included a community and school levels programmes as well.

STAKEHOLDER DIALOGUE AND THE LESSONS LEARNED WORKSHOP

Realizing the importance of sharing the lessons learned from the project as well as creating a platform for key stakeholders to come together and share their experiences and knowledge, SLRCS organized a stakeholder dialogue and a lessons learned workshop in June 2023.

Objective of the workshop

Experience sharing on groundwater recharging concepts, strategies, operational standards and practical experiences particularly looking at SLRCS implemented "Ground Water
Recharging for Disaster Risk Reduction and Climate Change Adaptation" project in the Kurunegala district.

(Please refer to the annex 1 for the agenda)

A message from the Director General

Dr. Mahesh Gunasekara – Director General, SLRCS stated that as a humanitarian organizations LRCS plays a significant role in addressing the climate crisis particularly the humanitarian impacts of climate change through its' projects and prgrammes across the country. The SLRCS has a permanent presence in the country with 25 district branches and the National Head Quarters in Colombo. SLRCS is supported by the Red Cross Red Crescent Movement including the three Movement components, the IFRC, ICRC and other National Societies in the world.

The Ground Water Recharging project implemented in the Kurunegala as a CCA and DRR strategy, is a major step towards addressing the climate crisis and strengthen community resilience to face future climate extremes such as drought.

Components of the Red Cross and Red Crescent Movement and it's Logos

ICRC

International Committee Of Red Cross (ICRC)

National Red Cross Society of the Country

IFRC

International Federation of Red Cross Red Crescent Societies (IFRC)

Overview of SLRCS DRR and CCA actions

Ms. Udari Samarakoon – Project Manager (DRR & CCA unit), of the SLRCS provided an overview of SLRCS experience on DRR and CCA including the SLRCS preparedness and response actions for climate and weather extreme events such as floods, droughts, landslides and cyclones. A summary of the presentation is as follows;

- Economic losses and damages due to weather & climate disasters in Sri Lanka: Sri Lanka's annual loss & damage is around LKR 32 billion due to floods, Cyclones and high winds cause 11 billion in losses & damages annually, Droughts cause 5.2 billion and Landslides 1.8 billion. The estimated recovery costs were at LKR 257.4 billion from 2015-2021

- SLRCS initiatives in Climate Change Vulnerable Sectors include Food security & agriculture, Livestock and fisheries, Water resources, Coastal and marine sector, Health, Human settlements and infrastructure, Ecosystems and biodiversity

- SLRCS takes actions to minimize Losses & Damages due to climate change

- Other Climate Change Adaptation and Mitigation programs implemented by SLRCS

Ground Water Recharging as a DRR and CCA strategy to Build Community Resilience- Key note speech

Dr. Wasantha Gunathilaka – Senior Lecturer, Faculty of Agriculture & Plantation Management, Wayamba University of Sri Lanka took the participants through various technical and institutional aspects of ground water recharging including some recommendations for considerations by implementing agencies. The key highlights of the presentation included the following:

- Change in the rainfall distribution pattern in Sri Lanka during last decade (high intense rainfall) and how does it affect the dry zone farming.
- Impact of Low Infiltration Rate on Floods: When rain water flow away from a given area within a short time period during high intense rain and leading to frequent floods; the result is low opportunity to recharge aquifers leading to droughts in the onset of dry season.
- Groundwater; The Unseen Part of the Water Cycle
- Groundwater Recharging System and effects of over pumping
- Water balance in a catchment (watershed); relationship between recharge, storage and discharge within a watershed.
- Key role of recharge as the input component of the water balance and issues on water availability
- Sector-wise total estimated water demand in Sri Lanka
- Decline of per capita water availability during last 50 years
- Problems Associated with Groundwater Exploitation within aquifers; Continuous lowering of water table
- Artificial Ground Water Recharging Structures; planning and implementation
- Ground Water Monitoring Procedures
- Benefits of Ground Water Recharging

Key highlights during the follow up discussions included:

- How to measure infiltration rate: Double ring infiltrometer method can be used to measure the infiltration rate parallel with the records of pan evaporimeter for evaporation rate of a given land block
- How many treatments were used in one-acre land? Depends on the soil type of the land. Same soil type we can use one treatment.

Suggested practical approach for Ground Water Recharging

- Identify the users and their land use pattern and water abstraction potential
- Estimate the water income (volume of water receiving per land lot per season; land area into rainfall height)
- Estimate the Water use –
  - irrigation –crop water requirement (impact of crop selection for sustainable water use) -93%
  - utility water & drinking water -7%
- Record the water table fluctuation during pre, post and during monsoonal period
- Identify the ground water qualitative parameters
- Conduct research studies on:
  - Monitoring ground water abstraction
  - Success or failure level of recharge mechanisms
  - Impact of climate on recharge groundwater resources (Quality and Quantity)

Proposed Ground Water Monitoring Procedures

Key Steps: Literature Survey, Awareness Programs, Map preparation, Identification of monitoring points, Groundwater table monitoring, Flow direction mapping, Water quality monitoring by sampling (Shallow aquifer and deep aquifer) and Monitoring network establishment

The way forward

Making aware the importance of GWR initiate with national backbone;
Education system– Include groundwater aspects into curriculum, **Formation of a common body** between institutions involved in ground water handling and management. I.e. Ministry of irrigation, Mahaweli development Authority, Department of Agriculture, Ministry of Environment, Department of Agrarian Development, Universities, Ceylon Electricity Board, International Water Management Institute (IWMI), National water Supply and Drainage Board etc.

SLRCS GROUND WATER RECHARGING PROJECT

The presentation on practical experience of the Ground Water Recharging Project was led by **Mr. Tharindu Prasad** – The Field Coordinator supported by following officers and community members from the local level:

1. **Mr. Asanka Thilakaratna** (Hydrologist, Ground water recharging section of North Central Province, Anuradhapura),
2. **Ms. K.S. Wanasekara & Ms. H.G.I.K. Wanniarachchi** (Under-graduate Students) - Department of Agricultural Economics & Business Management, Faculty of Agriculture, University of Peradeniya
3. **Ms. A.M. Damayanthi** – a community member of Ihala Palukandewa village, Galgamuwa
4. **Ms. P.M. Thusharika** – a community member of Ihala Digana village, Ehetuwewa
5. **Mr. B.M. Bandaranayaka** - a teacher from Dimbulagala School, Ehetuwewa

Key highlights of the presentation

- The project is funded by Empress Shôken Fund and started in June 2022 at Ehetuwewa and Galgamuwa Divisional Secretariat divisions in the Kurunegala district targeting 50 families, 200 individuals, two schools with 500 students, three Universities with the involvement of 75 students and 10 academics.
- Technical aspects presented included: the different method of ground water recharging, importance of monitoring the recharging, impact assessment of GWR, the quality and quantity of water that use for recharging, impacts of ground water recharging such as, chemical precipitation, saltation and siltation.
- Direct benefits of the project: Increase cropping intensity, utilize abandoned lands, decrease water salinity, increase crop durability, increase crop yield, open other income sources
- Indirect benefits of the project: Stabilize the water levels of main reservoirs, ecosystem rehabilitation, providing resilience during droughts, water quality increase through natural infiltration, replenishing aquifers




Research study on Farmer Attitude and Adaptation to Climate Change

Two research studies were conducted by two students of the University of Peradeniya, while one was presented at the workshop. The researched study investigated how smallholder farmers in the Ihalapalukandewa Grama Niladhari division, adapt to climate change. Primary data was collected and analyzed using a multivariate probit model. To measure the attitude of farmers, a Likert scale was used to obtain an average score and a deviation from the average to measure attitude. To identify constraints, a Likert scale was used to construct a Problem Confrontation Index where ranking was done.

According to the results, some adaptation strategies (using organic fertilizer and rainwater harvesting) are interdependent. The use of organic fertilizer and rainwater harvesting allows farmers to increase productivity while building resilience to climate change. The likelihood of farmers' adaption of climate change resilient approaches depends on the education of farmers, land size, access to extension services, and credit services, and membership in farmer organizations. Although most of the farmers have a favorable attitude towards climate change and resilient approaches, lack of water availability, shortage of farm inputs, lack of credit or money, and inadequate extension officers are the major problems in adapting to resilient strategies. Therefore, according to the findings of this study, governments should concentrate on supporting relevant infrastructure development, empowering access to extension services, and enable cost effective access to agricultural supplies either directly or through credit market interventions.

(Please refer to the annex 2 for the abstract)

Experience from the Community and School

- Most of the people are farmers in the village. They mainly cultivate in the rainy season and drought conditions affect the cultivation.
- The community face different issues at village level related to daily livelihood and agriculture activities. Water scarcity is one of the issues, that affect the daily routine and agriculture activities.
- There is low or no water in wells during the dry periods. Cultivation of crops is dependent upon the rainy season.
- The project introduced the ground water recharging method around the village such as, ground water recharging pit, drains, small runoff tanks and large-scale runoff tanks. The project also introduced new technologies like seed production, nursery management, home gardening management.
- During the project, different activities were implemented in the village. Specially in the catchment area of the village tank. It has positively impacted the productivity of land with increasing yield and possibility of year-round cultivation. The project also Introduced the integrated fish farming with large scale runoff tank.
- These interventions enabled communities year-round cultivation on the village and helped the communities become a self-sustain.
- The parents of the students in the school are aware about the GWR project and the schools engaged in the tree planting activities in the school and the village. GWR project activities are integrated with other activities like minimize human elephant conflict when construct drains and soil bunds around the electric fence.

Presentation by National Water Supply & Drainage Board

Mr. Upul Wickramarathna – Manger (Ground Water Section), North Western Provincial Office, National Water Supply & Drainage Board shared the experiences from the projects implemented by the National Water Supply & Drainage Board. The key highlights of the presentation are as follows:

- The project was implemented by the Groundwater Recharge Unit of North Western Provincial office, Wariyapola.
- The project identified the main Groundwater problems and adopted a scientific approach to address the issue.
- Advantages of artificial recharge: No large storage structures needed to store water, Structures required are small and cost-effective, Negligible losses as compared to losses in surface storages, Improved water quality due to dilution of hardness, harmful chemicals and salts
- Benefits to rural community: Improved Soil Moisture of their home garden, Improved ground water level, groundwater quantity & quality (quality improvement of the dug wells) and cultivating short term crops even during the dry period
- Analyzed the water quality of surrounding wells
- Isotope analysis of rainwater

Follow up discussions

- What is the relationship between traditional agriculture & GWR? - traditional agriculture combines with GWR, specially to control soil erosion, mulching and minimum land preparation.
- Climate change and sustainability of the GWR method? - better to recharge the Ground water in Maha season and then can be used in Yala and Inter mediate seasons.

- Some climate scientists predict that wet areas getting wetter while dry areas getting more dryer in Sri Lanka due to climate change. However, according to researchers conducted by Prof. N S Abeysinghe, Head of The Department, Department of Agriculture Engineering and Soil Science, Faculty of Agriculture, Rajarata University of Sri Lanka, regions like North Western, North Central and Eastern areas of Sri Lanka are experiencing more extremerainfall compared to the historical rainfall data in the region. The Maha season in particular experiences extreme rain fall events.
- There is uncertainty involved in the forecasts and more researches need to be done to improve the climate modeling for more accurate forecasts.

- Science and traditional knowledge should be combined to analyze the conditions to inform the feasibility to implement GWR techniques. There should be multi stakeholder approach to plan and design GWR project including government originations, Privet sector and NGOs.
- How do the agro wells contribute to ground water recharging? It is depending on the structure and designs of the well. Some agro wells are constructed with cement and other building materials which does not help ground water recharging.
- How to design a GWR unit when impermeable layer is present? Firstly, find the geology of the area, depending on the presence of the impermeable layer, recharge points should be decided (recharge in to the aquifer). Need to identify the nature of geology before recharging the water, there are six factors we consider in the GWR.

- How do we assess the impacts of the project at field level? This is important and required because we measure the impact during and after the project. Measure the water level of the wells and analysis the water quality. Capacity building of community engagement with school children should also be factored in the impacts.

Panel discussion: Opportunities for scaling up Ground Water Recharging in Sri Lanka

Following panelists participated and contributed to the he panel discussion:

1. **Mr. Sumudu Silva** - Institutional Officer, Global Green Growth Institute (GGGI)
2. **Mr. Mahinda Premathilake** - Assistant General Manager (Ground Water), National Water Supply & Drainage Board
3. **Prof. N.S.Abeysinghe** – Head of the Department, Department of Agricultural Engineering and Soil Science, Faculty of Agriculture, Rajarata University of Sri Lanka
4. **Dr. Mahesh Gunasekara** – Director General, Sri Lanka Red Cross Society
5. **Dr. Wasantha Gunathilaka** - Senior Lecturer, Faculty of Agriculture and Plantation Management, Wayamba University of Sri Lanka

Mr. Sumudu Silva from the GGGI highlighted the following:

- There is an opportunity to scale up GWR as an adaptation strategy through the National Adaptation plan (NAP) 2016-2025 of Sri Lanka. The NAP revision is currently ongoing to make Sri Lanka ready for the next decade to face climate change disasters and impacts by enabling planning at national level across 09 vulnerable sectors.
- There are nine vulnerable sectors identified in the NAP document
  - Food Security (Agriculture, Livestock & Fisheries)
  - Water Resources
  - Coastal and Marine Sector
  - Health
  - Human Settlements and Infrastructure
  - Ecosystems and Biodiversity
  - Tourism and Recreation
  - Export Agriculture Sector
  - Industry, Energy and Transportation (E-I-T)
- Given complexity of previous clustering of Food Security and E-I-T sectors, an assessment is underway to seek possibility of segregation of sub-sectors into unique technical sectors.
- The GWR for resilience building is considered under the water resources sector.
- Further attempts are made to build climate change resilience at grassroots level by working with all 09 Provincial Councils to develop their Provincial Adaptation Plans (PAP). These will be strengthened by establishing institutional structures (Provincial Climate Committees - PCC and Units – PCU) to complement decision making and climate actions.

Prof. Abeysinghe from the University of Rajarata highlighted the following:

- Groundwater recharge is a good strategy for climate adaptation and there is a need to establish a National Water Management Team and a body.
- In Sri Lankan context, adaptation is more important than mitigation as Sri Lanka's Green House Gas emission is negligible compared with developed counties and more developing countries. However, Sri Lanka is more vulnerable to the impacts of climate change and people need to adapt to the changing climate.
- Research studies on rainfall trend, variability and extreme events and impacts of climate change on crop production are available in Sri Lanka, and Rajarata University has published several research papers as well. According to these researches, there is a high variability of seasonal weather patterns and extreme nature of rainfall has increased in the dry zone and mostly these extreme events are wet

events and there is higher probability of occurring the same pattern in near future. It is shown the increases of total annual rainfall particularly in North, North Central and Eastern regions of Sri Lanka during the recent past. Rain reaching from North East Monsoon has increased though the variability of rainfall has increased. However, high rainfall events have contributed to the increases of total annual rainfall in the country particularly in the dry zone and as a result there is a high superficial runoff and increases of rainfall erosivity. Increased rainfall erosivity causes soil erosion and eroded surface soil layers and high superficial runoff doesn't allow natural groundwater recharging. Therefore, rainwater harvesting and groundwater recharging are main adaptation options to this rainfall variability and change in the dry zone areas. However, it is shown that the temperature of the country has also increased and if rainwater is collected over the surface water bodies, there is a higher chance of evaporating them back to the atmosphere with the increases of the temperature. Therefore, one of the main strategies that can be followed is artificial groundwater rechanging as an adaptation option to these climate change and variability.

- Moreover, seasonal drought can also occur though total annual rainfall has increased and shown the increases of the drought during the ***Yala*** seasons in association with the ENSO and IOD. Therefore, groundwater is only reliable source of water during the drought time and groundwater rechanging is a must during wet/flood events. Hence, Prof. Abeysinghe highly appreciated the project team for their excellent work and expect future work in collaboration with the students of RUSL.
- Social acceptance on these kinds of technical interventions is important when these projects are implemented at ground level. Furthermore, Geographic Information System (GIS) and remote sensing technologies can be used to plan effective ground water recharging and implementations including spatial analysis and planning capabilities. These technologies will enable better monitoring and assessment of availability of water and existing ground water levels which will enhance the overall sustainability of the ground water recharging initiatives.

Mr. Mahinda Premathilaka of NWSDB highlighted the following:

- Groundwater recharging is the use of surface water for storage between rocks and soils within the Earth's interior. Ground water recharging has both positive and negative results. If this is not done properly, there will be adverse effects. Example: is affects the growth of plants
- Discussions about groundwater recharging started almost four years ago. The impact of GWR is not seen as it was invisible.
- There are several ongoing projects on GWR in Sri Lanka and some projects are in the pipeline. These include:

    1. Water Resources Assessment: Mahaweli Authority and Water Resources Board, Funded by the World Bank

2. Climate Resilient Integrated Water Management Project (CRIWMP): Implemented by ministry of Irrigation and UNDP with Green Climate Fund (GCF) Funding. There are opportunities to scale up GWR through the CRIWMP project
3. Narammala Water Scheme: UNICEF and NWSDB
4. Five other schemes of NWSDB
5. Improve implementation of GWR at CBO level in association with Department of National Community Water Supply (DNCWS)

- Scaling up through existing projects and initiatives through Ground Water sections of NWSDB, Ground water development projects by NWSDB
- Highlighted both positive and negative impacts of ground water recharging and emphasized the necessity of scientific research procedures and feasibility studies before initiating the ground water recharging projects.

Dr. Mahesh Gunasekara, Director General of the SLRCS highlighted the following:

- The Red Cross Society has a large network and all 25 districts have a Red Cross district branch office. Hence, the SLRCS can play an important role in disseminating knowledge on GWR, and the key messages about GWR can be shared with large number of people.
- SLRCS is currently looking into scaling up GWR and it was decided to implement this project as a first step.
- knowledge of GWR should be imparted to the next generation. Therefore, it was decided to involve school children and university students in this project. University of Rajarata, University of Wayamba, and University of Peradeniya were involved in the project.
- SLRCS will play an important role in transferring knowledge of ground water recharging to the next generation and will continue to advocate to mainstream GWR recharging in to school curriculum and various other development projects.
- There is a need to establish a national level forum to promote ground water recharging bringing all the stakeholders together. SLRCS is willing to facilitate and convene the initial meetings.

Dr. Wasantha Gunathilaka, Wayamba University of Sri Lanka highlighted the following:

- Highlighted the matters regarding how the concept of "Ground Water Recharging" has been included in the syllabus of schools and curriculum of universities. There was an initiative already has taken in the Wayamba University and there is a significant potential to upscale.
- Over the past few years, several research projects on water management in major irrigation systems and minor irrigation systems were conducted. The results show that water is misused or used excessively. Therefore, people should be educated about the efficient way of water usage. Plans should be made for water use during recharge and a model should be developed in this regard.

THE WAY FORWARD- ESTABLISH A GWR FORUM

All the agencies present at the workshop agreed to set up a forum or an expert think tanks group under the broader umbrella of Climate Change Adaptation with a focus on Ground Water Recharging. By establishing such a think tank or expert group forum, Sri Lanka can bring together key stakeholders, foster collaboration, and promote groundwater recharge as a vital component of sustainable water management and climate change adaptation.

Representatives from key stakeholders, including government agencies - Water Resource Board, NWSDB, Universities and research institutions, UN agencies, NGOs/INGOs, Civil Society Organizations, Red Cross and water user associations should be invited to take part in the forum.

Possible objectives of such platform

- To facilitate knowledge sharing, collaboration, and coordination among stakeholders involved in groundwater recharge in Sri Lanka.
- To promote research, innovation, and best practices related to groundwater recharge techniques, hydrogeology, and water management.
- To provide evidence-based recommendations and policy guidance to relevant government agencies for sustainable groundwater management and climate change adaptation.

Suggested scope of the forum (for discussion)

Research and Knowledge Exchange: The forum will promote research on groundwater recharge by collaborating with universities, research institutions, and individual researchers. It will encourage the publication of research papers, case studies, and technical reports on groundwater recharge in Sri Lanka. The forum will organize conferences, seminars, and webinars to facilitate knowledge exchange and create opportunities for researchers to present their findings.

Policy and Advocacy: The forum will engage with government agencies, policymakers, and relevant stakeholders to advocate for the integration of groundwater recharge strategies into policies, regulations, and development plans. It will develop policy briefs, position papers, and recommendations based on research findings and best practices. The forum will actively participate in consultations and contribute to the development of national and regional strategies related to groundwater management and climate change adaptation.

Communication and Outreach: The forum may maintain a dedicated website to serve as a central hub for information on groundwater recharge, including publications, guidelines, and news updates. It may organize public awareness campaigns, workshops, and training programs to promote community participation and knowledge dissemination. The forum will establish partnerships with media organizations to raise awareness about the importance of groundwater recharge and sustainable water management.

Funding and Support: SLRCS may convene the forum at the initial stages and other organization can take over the leadership on rotational basis. The forum may seek financial support from government agencies, donor organizations, research grants, and private sector entities interested in groundwater management and climate change adaptation. It may also explore the possibility of collaborating with international organizations and accessing funding through regional or global initiatives related to water resources and climate change.

ANNEX 1- AGENDA OF THE WORKSHOP

Sri Lanka Red Cross Society's journey towards building community resilience

Achieving climate resilience through ground water recharging

AGENDA

TIME	AGENDA ITEM
08.30 am - 09.00 am	Registration of Participants
09.00 am - 09.10 am	Welcome address and objectives of the workshop *Dr. Mahesh Gunasekara – Director General, Sri Lanka Red Cross Society*
09.10 am - 09.30 am	SLRCS experience on Disaster Risk Reduction and Climate Change Adaptation. *Ms. Udari Samarakoon – Project Manager (DRR & CCA), Sri Lanka Red Cross Society*
09.30 am - 10.00 am	Group Photograph & Tea and Refreshments
10.00 am - 11.00 am	Introduction to Ground Water Recharging (keynote speech) *Dr. Wasantha Gunathilaka – Senior Lecturer, Faculty of Agriculture, Wayamba University of Sri Lanka*
11.00 am - 12.45 pm	Implementations by SLRCS under Ground Water Recharging Projects *Mr. Tharindu Prasad – Field Coordinator* *(Ground Water Recharging Project), Sri Lanka Red Cross Society*
	Presentations on university researches *Ms. K.S.Wanasekara & Ms. H.G.I.K. Wanniarachchi - Department of agricultural Economics & Business Management,* *Faculty of Agriculture, University of Peradeniya*
	Experience sharing by community
12.45 pm – 01.00 pm	Experience sharing by the Ground Water Section of National Water Supply and Drainage Board *Mr. Upul Wickramarathna – Manger (Ground Water Section), North Western Provincial Office, National Water Supply & Drainage Board*
01.00 pm - 02.00 pm	Lunch

02.00 pm - 03.30 pm	Panel Discussion: Opportunities for scaling up Ground Water Recharging in Sri Lanka Panelists: ***Mr. Mahinda Premathilake*** *- Assistant General Manager (Ground Water), National Water Supply & Drainage Board* ***Prof. N.S.Abeysinghe*** *– Head of the Department, Department of Agricultural Engineering and Soil Science, Faculty of Agriculture, Rajarata University of Sri Lanka* ***Dr. Mahesh Gunasekara*** *– Director General, Sri Lanka Red Cross Society* ***Dr. Wasantha Gunathilaka*** *- Senior Lecturer, Faculty of Agriculture, Wayamba University of Sri Lanka*
03.30 pm - 03.45 pm	Closing remarks & vote of thanks *Mr. Sarath Wickramasinghe - Project Manager (DRR & CCA), Sri Lanka Red Cross Society*
03.45 pm - 04.00 pm	Tea & Refreshments
04.00 pm	End of the program

ANNEX 2 – ABSTRACT OF THE RESEARCH

Farmer's Intention to Engage in Groundwater Recharging and Management Practices: A Case Study from the Mottapeththewa Cascade System

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The Mottapeththewa cascade system is located in the Galgamuwa area of the Kurunegala District. The depletion of vegetation cover, soil erosion, and the recession of the water table are some issues emblematic in many catchments including the Mottapeththewa cascade system. The objectives of this study are, to estimate the factors affecting the intention of farmers to engage in groundwater recharging and management practices, and to estimate the factors affecting farmers' engagement in groundwater recharging and management practices. A field survey was conducted using a questionnaire. The descriptive statistics indicate that more than half of the sample had training on groundwater recharging. The conceptual framework based on the Technology Acceptance Model consists of 7 constructs such as (i) result demonstrability, (ii) self-efficacy, (iii) perceived usefulness, (iv) perceived ease of use, (v) attitude, (vi) intention, and (vii) demographic factors. According to the results of the Structural Equation Model, result demonstrability and perceived usefulness have an indirect effect on intention ($P<0.05$) while attitude and perceived usefulness have a direct effect on intention ($P<0.05$). A multivariate probit model was conducted to find the factors affecting farmers' engagement in groundwater recharging practices. The results revealed that the practice of percolation pits is affected by education, farming experience, land area, training on groundwater recharging, annual and perennial crop types, and home gardening ($P<0.05$). Constructing percolation wells is affected by the farming experience, land area, training, vegetables, and field crops ($P<0.1$). The practice of lock and spill drain is affected by home gardening, perennials, and manual irrigation ($P<0.1$). Home gardening, field crops, and manual irrigation affect practicing runoff water harvesting trenches ($P<0.1$). The practice of organic mulching is affected by education, annuals, and vegetable crop type ($P<0.1$). The findings of the study imply that farmers' engagement in groundwater recharging practices is affected by different farm and demographic factors.

Keywords: Groundwater management practices, Groundwater recharging, Structural Equation Model, Technology Acceptance Model

[1]Groundwater Recharging for Disaster Preparedness Project, Sri Lanka Red Cross Society
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ANNEX 3 - LIST OF PARTICIPANTS AND CONTACT DETAILS

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