



## **ASPIRING FOR INCLUSION**

## ACCESSING WATER BY THE TEA ESTATE COMMUNITY IN BADULLA, SRI LANKA

## - OPPORTUNITIES AND CONSTRAINTS

SAKEENA ALIKHAN, MOHIDEEN MOHAMED ALIKHAN,

DANESH JAYATILAKA, ABDHULLAH AZAM

JANUARY 2024

WORKING PAPER VOLUME 3 ISSUE 1







© Centre for Migration Research and Development (CMRD) 27, Wickramaratne Avenue, Kohuwala, Sri Lanka

E-mail: <u>cmrd.lk@gmail.com</u> URL: www.cmrd.lk

ISSN 2706-0268

Printed by: Centre for Migration Research and Development

First published: 2024

Inclusive Urban Infrastructure (IUI) is a project funded by UK Research and Innovation through the Global Challenges Research Fund under the title 'Towards Trajectories of Inclusion: Making Infrastructure Work for the Most Marginalised' (grant reference number ES/T008067/1).

The CMRD Working Papers encourages the exchange of ideas that are in development. The series is designed to showcase findings of research studies that are in progress or recently completed. It makes new academic explorations publicly available prior to their publication in academic journals and books. Authorship is usually collective, but the principal writers are named. The papers are generally available in the English language with some in the Sinhala and Tamil languages.

Copyright of this publication belongs to the Centre for Migration Research and Development (CMRD). Any part of this book may be reproduced with due acknowledgement of the author and publisher. The interpretations and conclusions expressed in the study are those of the authors and do not necessarily reflect the views and policies of the CMRD or the donor. Advisory Board:

- Dr. Rajith W. D. Lakshman, Research Fellow, Institute of Development Studies (IDS), University of Sussex, United Kingdom
- Senior Professor Kopalapillai Amirthalingam, Professor in Economics, Department of Economics, University of Colombo, Sri Lanka
- Professor Sunethra J. Perera, Professor in Demography, Department of Demography, University of Colombo, Sri Lanka

Editor-in-Chief:

Dr. Danesh Jayatilaka, Chairman, Centre for Migration Research and Development, Sri Lanka

Front cover photograph: Garden tap, pot, and water tank in Sarnia by Sakeena Alikhan (July 2021)

### **Aspiring for Inclusion**

# Accessing water by the tea estate community in Badulla, Sri Lanka – opportunities and constraints

Sakeena Alikhan, Mohideen Mohamed Alikhan, Danesh Jayatilaka, Abdhullah Azam

**Sakeena Alikhan** is a Senior Assistant Librarian at the University of Colombo specializing in information visualization employing Geographic Information Systems (GIS). She is a consultant for the Centre for Migration Research and Development (CMRD). Ms. Alikhan holds an MSc in Environmental Science and an MLS in Library and Information Science, as well as a Bachelor's degree in Geography. She has worked as a visiting lecturer at the National Institute of Library and Information Science at the University of Colombo. She is currently pursuing a PhD in Library and Information Science at the University of Malaya, Malaysia. Ms. Alikhan's research interests include digital literacy, information visualization, and marginalized communities.

**Mohideen Mohamed Alikhan** is a Senior Lecturer at the Department of Geography, University of Peradeniya, Sri Lanka. He graduated from the University of Colombo and then did his MPhil at the Department of Geography, at the University of Peradeniya. Dr. Alikhan has recently completed his PhD on 'Conviviality, tension and everyday negotiations: Subaltern cosmopolitanism and governance dynamics of low-income neighbourhoods in Colombo, Sri Lanka' at the University of Sussex, United Kingdom. His research areas of interest include urban governance, housing, and migration with a special focus on displacement, relocations, and labour.

**Danesh Jayatilaka** is an economist working on forced migration issues. His research interests include disasters, migration and development and their intersections, with a special focus on displacement, relocation, and resettlement in urban and community settings. He is a Research Associate at the University of Sussex and has been Co-Investigator and lead researcher for projects with the GCRF, ESRC, IDRC, Brookings Institution, ILO, and World Bank. Dr. Jayatilaka co-founded and Chairs the Centre for Migration Research and Development (CMRD) and led the Inclusive Urban Infrastructure (IUI) project in Sri Lanka.

**Abdhullah Azam** is a Master's student in Economics at the University of Colombo. He holds a B.Sc in Business Management from the Wayamba University of Sri Lanka. His research interests include urban migration, infrastructure economics, poverty, and macroeconomic studies. Azam was previously a Research Assistant in the Migrants on the Margins research initiative and was the Project Manager for the Inclusive Urban Infrastructure (IUI) project at the Centre for Migration Research and Development (CMRD).

#### Acknowledgments

The authors express their gratitude to the Centre for Migration Research and Development (CMRD) for allocating them the working paper. They extend their appreciation to the Sarnia community for their generosity and open sharing of valuable opinions and experiences. They are especially grateful to Prof. Michael Collyer, the Principal Investigator, University of Sussex, and Dr. Rajith Lakshman, Research Fellow, Institute of Development Studies (IDS), for the support and advice provided during the research. Appreciations also go to Dr. Kate Bayliss, Research Associate, School of Oriental and African Studies (SOAS), for the inspiration and advice during the study period. Additionally, the authors express their gratitude to Mr. Udeni Chularathna, the Executive Director of the SEVANATHA Urban Resource Centre, and the entire SEVANATHA team for their frequent support both in Colombo and Badulla. Finally, they would like to extend their sincere appreciation to Mr. Kasun Samaradiwakara, the Sarnia Estate Manager, and the Field Assistant Elamaran Dharshini, for their invaluable backing and assistance during the course of the research.

The CMRD acknowledges the financial support provided by the Global Challenges Research Fund (GCRF) to conduct the IUI project.

## **Table of contents**

spiri	ing for Inclusion	
1.	Background	2
1	.1 Water resources in Sri Lanka	
1	.2 Water resource in the estate sector	
2.	Methodology	4
2	.1 Study area: Location and physical landscape	
2	.2 Data collection	5
3. F	indings	5
3	.1 Sarnia community	5
3	.2 Availability and distribution of water in Sarnia	7
4.	Existing water supply arrangements and their challenges	14
4	.1 Arrangements by Estate Management	
4	.2 The role of the Plantation Human Development Trust (PHDT)	
4	.3 Arrangements by the community	16
5. C	onclusion	19
Ref	erences	20

# List of Figures

Figure 1 Study sites	4
Figure 2 Clusters of settlements in Sarnia estate and their water resources	8
Figure 3 Main water sources for Mahatenna	9
Figure 4 Water sources for the ADB quarters	9
Figure 5 Cement tank at the New Housing Scheme	. 11
Figure 6 Water sources and uses for the Paniya Line	. 11
Figure 7 Water sources, pump house and water pump for Dotland	. 12
Figure 8 Water sources and bathing area for the Set Line	. 12
Figure 9 Individual open wells in Tavaranai	. 13
Figure 10 Dilapidated cement tank	. 14
Figure 11 Images of leaking pipeline	. 15
Figure 12 Newly constructed water tank at the Indian housing scheme	. 16

## List of tables

Table 1 Educational qualification of the head of the household	6
Table 2 Occupational types of the head of the household	6
Table 3 Way of getting water	7
Table 4 The daily water demand per person segmented by purpose	10
Table 5 Water requirement for the identified communities in Mahatenna	10
Table 6 Drinking water accessibility	13

### **Aspiring for Inclusion**

# Accessing water by the tea estate community in Badulla, Sri Lanka – opportunities and constraints

Sakeena Alikhan, Mohideen Mohamed Alikhan, Danesh Jayatilaka, Abdhullah Azam

#### Abstract

This study investigates the opportunities and constraints faced by the tea estate community in Badulla, Sri Lanka in accessing water resources. The central argument of this paper is that despite the availability of water in the area for everyone, there are sections of the community that struggle to obtain adequate water due to resource mismanagement. Through an analysis of socio-economic data on water access and consumption, this paper aims to emphasize the role of mismanagement, rather than physical scarcity, in hindering water availability. The findings highlight the need for improved water governance, infrastructure development, and community participation, to address sustainable and equal water access for the tea estate community in Badulla.

#### **Keywords:**

Water access, tea estate community, economic water scarcity, water management, Sri Lanka.

#### 1. Background

There are enough water resources in our area. There is enough water for people's needs in the estate surroundings. however, we don't have a proper mechanism to get and distribute water. [voice from a respondent (sl\_sar\_skii\_24072021\_fe5)]

World water consumption has grown approximately six-fold since 1900 because of an expanding world population and an economic shift toward more resource-intensive consumption patterns (Ritchie and Roser, 2018; United Nations, 2021). The proportion of the global population that has access to at least a basic drinking water service increased from 81% in 2000 to 89% in 2015. However, only one in every five nations with less than 95% coverage is on track to provide universal basic water services by 2030. Also, 844 million people still do not have access to even basic water services, and governments do not have the capacity to gradually improve the quality of services to the 2.1 billion people who do not have access to water that is accessible on premises, available when needed, and free of contamination (safely managed drinking water) (United Nations, 2018).

The usage of water can be defined into two main categories such as 'water for life' and 'water for livelihood' (Calow and Mason, 2014). 'Water for life,' is relatively small amounts of water used for the vital requirements of drinking, sanitation, and hygiene. Meanwhile, 'water for livelihoods' refers to the larger volumes required for productive and commercial activity. Water for life, usually less than 5% of total use, goes to meeting household needs, but there is a great disparity in access to clean water and sanitary facilities among households (United Nations Development Programme, 2006).

Water for life or domestic consumption differs from country to country or within the countries; for instance, China has the world's largest population; hence its domestic water consumption is the highest, at more than 70 billion m3 per year. India, the world's second-largest population, has the third-largest domestic water consumption (56 billion m<sup>3</sup> per year). Despite having a far lower population, the United States is the second greatest user due to a higher per capita water consumption (62 billion m<sup>3</sup> per year). Within the country, people in high-income areas of cities in Asia, Latin America, and Sub-Saharan Africa have access to several hundred litres of water per day given at low cost by public utilities. Meanwhile, slum dwellers and poor households in the same countries, cities, and rural areas have far less than the 20 litres of water per person needed to meet the most basic human needs. Women and young girls bear a double weight of disadvantage since they sacrifice their time and education to collect water (United Nations Development Programme, 2006). In Sri Lanka, domestic water consumption is 803 million m<sup>3</sup> per year (Ritchie and Roser, 2018).

Apart from differentiating water consumption, some countries are undergoing water scarcity (Rijsberman, 2006 – either physically or economically. Physical water scarcity refers to a shortage of water. This type of scarcity is common in arid environments. Economic water scarcity refers to the inability to adequately access and utilize water resources despite their abundance or availability. It is frequently related to poor infrastructure management and construction, as well as instances of unequal water distribution across socioeconomic classes (Oki and Quiocho, 2020). Even though everyone has the same rights and access to water, and everyone benefits from water consumption, some individuals, particularly the poor, are frequently left out (Calow and Mason, 2014).

#### 1.1 Water resources in Sri Lanka

According to Sri Lanka's overall water resource statistics, it is rather well-endowed with water resources. There are 103 separate river basins, 309 main irrigation reservoirs created by humans, and over 12,000 smaller irrigation reservoirs (Climate Change Secretariat, 2010). Due to these water resources, the predicted annual water supply per capita exceeds the international standard of 1700 cubic meters per person by approximately 2329 cubic meters. Annual freshwater withdrawal is only

approximately 25% of total resources, which is significantly less than the 40% threshold used by the United Nations to indicate water scarcity (Samad et al., 2016). Thus, as per the data, Sri Lanka will confront little or no physical or economic water scarcity at the aggregate level.

However, these aggregate data conceal the extremely different temporal and spatial characteristics of water scarcity in the country, mostly due to the bimodal distribution of rainfall and increasing extreme weather due to climate change (Climate Change Secretariat, 2010). The climate of Sri Lanka is tropical monsoon. Rainfall ranges from 800mm to approximately 5,500mm geographically. The current system of irrigation reservoirs in the zones (wet, dry, and intermediate) can only store 35% of the available water. The remaining is discharged into the ocean without being put to any beneficial use. It is anticipated that by the year 2025, the majority of dry zone areas will have significant seasonal or year-round absolute water shortages. This assessment is based on the current level of irrigation efficiency that exists today (Samad et al., 2016). Apart from that, inadequate dam safety procedures, antiquated hydro meteorological information systems, the absence of a coherent policy for the water sector, and inadequate institutional arrangements, are all identified as major concerns for water resources management (Imbulana, Wijesekara and Neupane, 2006: Fan, 2015).

Despite the fact that Sri Lanka has water-related challenges, the water supply and sanitation sector in the country has accomplished considerable progress during the past decade. The provision of drinking water and sanitation is a government priority, and periodic targets have been established for the proportion of the population that should have access to potable water and better sanitation services (Fan, 2015). However, the availability of domestic water consumption, namely potable water, varies between sectors. For instance, approximately 98% of the urban population has access to sufficient water for drinking, bathing, and washing, and approximately 40% of this urban water supply program provides 18 to 20 hours of uninterrupted service. The National Water Supply and Drainage Board (NWSDB) is primarily responsible for providing water to urban areas.

As of 2012, 90% of rural families had access to safe drinking water, primarily from protected drilled wells, and 87% had adequate water for washing and bathing (Department of Census and Statistics, 2012). However, these static values do not account for seasonal variation and year-round water sufficiency, or pockets where water is inadequately available. In contrast to urban areas, where piped water delivery is the standard, less than 15% of the rural population have access to piped water, while the remainder continues to endure the difficulties of getting water from dug wells in the yard or from a distance (ibid). Community-based organizations (CBOs) remain the primary water provider for the rural sector (Fan, 2015).

#### 1.2 Water resource in the estate sector

The estate community in Sri Lanka plays a vital role in the country's tea industry and contributes significantly to its economy. Tea is one of the main sources of foreign exchange for the country and accounts for around 4% of the national GDP. It employs directly or indirectly about 1 million people, of whom around 300,000 are estimated to be estate workers (Department of Census and Statistics, 2022). However, accessing water resources has been a persistent challenge for these estate people. 'Sarnia' is one such estate where some households have been facing challenges in accessing water for a long time. Compared to urban and rural sectors in the country, the estate sector is unique in terms of socioeconomic, political and historical perspectives. The one million people representing this sector are less than 5% of the country's population (Department of Census and Statistics, 2022). Even while circumstances in the estates have vastly improved over the past decade, access to clean water remains difficult for some people (Imbulana, Wijesekara and Neupane, 2006). Approximately 47% of the estate's population has access to safe drinking water, which is normally supplied via gravity-based pipes and is supplemented by wells and rainwater collection. The remainder continues to rely on open, unprotected water sources such as rivers, streams, irrigation tanks, and springs. Though some estates are connected to the main national water supply lines, there is limited data regarding the availability of piped water in the estate sector. The informal assessments indicate that only 2% of residences are connected, while comparatively, 92% of people in urban regions and 15% of those in rural areas have connections (World Bank, 2016). Historically, estate management, instead of the government, has provided services to the estate population (Martin, 2020). However, due to various policy and management reasons, the estate management is withdrawing from providing most of the services, including water.

In this background, this paper examines the long-standing water availability and accessibility-related issues faced by certain members of the Sarnia community. The paper argues that despite the presence of water resources, these community residents face significant barriers to accessing water.

#### 2. Methodology

#### 2.1 Study area: Location and physical landscape

Sarnia Estate, owned by the Malwatte Valley Plantation PLC, is located in the Soranathota Divisional Secretariat Division (DSD) of the Badulla District of Sri Lanka. It was established in 1885 by a Scottish company that brought labourers from India. The five divisions of the estate are Mahatenna, Dotland, Sarnia Upper Division, Pladier, and Keenakela. From among these, the Mahatenna and Dotland divisions were chosen for the case study. These two settlements are located close to each other and adjacent to tea estates (*see Figure 1*). Mahatenna is located at 7°0'42.66" North Latitude and 81°1'6.87" East Longitude. Dotland is located at 7°0'40.63" North Latitude and 81°1'18.62" East Longitude. These two divisions are divided into two Grama Niladhari Divisions (GND): Mahatenna is in the Kandegedara GND and Dotland is in the Kirioruwa GND. The two areas are located at an elevation of 950 to 1100 metres above sea level. They have an annual precipitation of 1723mm and an average temperature of 22.3C. Tea plants surround the Sarnia settlements, which are surrounded by valleys and mountains. It covers around 165 hectares of land and has a population density of 12.45 persons per hectare.



Figure 1 Study sites.

Source: Author's creation

#### 2.2 Data collection

The data for this study was obtained from the Inclusive Urban Infrastructure (IUI) project, which was initiated in September 2020. The IUI project utilised various methodologies to gather and interact with infrastructure data pertaining to water, sanitation, electricity, transportation, communication, and housing. This data collection and engagement process took place from September 2020 to September 2023.<sup>1</sup> The methods employed encompassed both quantitative and qualitative techniques, such as baseline household surveys, panel surveys, community profiles, focus group discussions, qualitative resident interviews, and key informant interviews. Additionally, the Systems of Provision (SoP) framework was utilised, along with other innovative and alternative approaches, including photovoice, comics, stakeholder workshops, and conferences, to actively engage the community and stakeholders. Nevertheless, this study mostly relied on data obtained from initial household surveys and qualitative interviews with residents and key informants in Sarnia pertaining to the water grid.

In this study, 60 in-depth face-to-face interviews were conducted with a purposefully selected sample. When selecting respondents from the two subdivisions, Mahatenna and Dotland of the Sarnia estate, various characteristics such as age, gender, occupation, and education were considered. The duration of the interviews averaged from thirty to forty-five minutes, although in instances where participants were eager to share their experiences, it exceeded an hour. The interviews were audio recorded with the participants' consent. All interviews were done in the preferred language of respondents which is in Tamil and those were transcribed and translated to English.

Furthermore, 400 randomly selected interviews were undertaken in Sarnia as part of a household survey throughout the months of July and August in the year 2021. While the questionnaire included various grids such as sanitation, electricity, transportation, communication, and housing, this study specifically focused on extracting information related to water, such as water sources, water usage, and water agents, as well as demographic details such as education and income sources of the head of the household.

Field observation was utilized as a supplementary technique to gain a more profound comprehension of the water-related challenges encountered by the community and the state of the existing water distribution infrastructure. The researchers conducted site visits to Sarnia from November 2020 to January 2023 to acquire a more comprehensive understanding of the infrastructure, administration, water distribution, and issues associated with economic water scarcity in the area. Collected data was analyzed using SPSS software for survey data and NVivo software for interviewed data. Summary table, graphs, and charts were created through survey data analysis and thematic analysis was used for the qualitative data. The results revealed various social, economic, political and cultural aspects, as well as differences associated with access, provision, consumption, and costs of water.

#### 3. Findings

#### 3.1 Sarnia community

This study focuses on two subdivisions of the Sarnia estate, namely Mahatenna and Dotland. The majority of the population comprises Indian Tamils, while the Sinhala and Muslim communities are minorities. The Plantation Human Development Trust (PHDT) estimates that the overall population of the Sarnia community in 2020 is 2061 persons. Male and female representation is 48% and 52%, respectively. Indian Tamils account for 98.7% of the total population. Sinhalese make up 0.9%, while

<sup>&</sup>lt;sup>1</sup> For more information on the launching of the project see:

https://www.inclusiveinfrastructure.org/news/cmrd-launches-inclusive-urban-infrastructure-research-projectin-sri-lanka-along-with-university-of-sussex-and-sevanatha/

Muslims and Christians make up 0.4%. There are 619 families in the community (Mahatenna and Dotland), with 253 families working as tea pickers or in the factory (at least one member of the family), while 363 families are not employed on the estate.

According to the IUI Baseline Survey 2021, the majority of the heads of households (HoH), comprising 50.75%, reported having completed primary education. Following primary education, 31.25% of individuals have attained a secondary level of education. Higher education was reported by 3% of the respondents. A smaller proportion, 2.25%, indicated uncertainty about their educational attainment, while 7.75% reported having no formal education (*see Table 1*). These educational qualifications reflect their diverse range of occupations. Due to the fact that the majority of heads of households have only had a primary education, the majority of them fell into the category of elementary occupations. The following section explains the diversity of occupations of the heads of the household

in Sarnia.

Educational qualification (HoH)	Frequency	Percent (%)
Preschool	20	5
Primary	203	50.75
Secondary	125	31.25
Higher	12	3
Don't know	9	2.25
None	31	7.75
Total	400	100

Table 1 Educational qualification of the head of the household

Source: IUI Baseline survey, 2021

According to the survey, the majority of respondents (Heads of household), constituting 44.7%, reported having no specific occupation. Among those with specified occupations, the most prevalent category is "Elementary occupations," representing 43.5% of the sample. Notably, managerial roles account for a mere 0.5%, while professionals and skilled workers in agriculture, forestry, and fisheries each make up a small fraction at 1.75% and 0.5%, respectively. Furthermore, "services and sales workers and elementary" and "craft and related trade work and elementary" each represented 0.25% of the respondents. Plant and machinery operators and assemblers, along with elementary occupations, accounted for 3.25% of the total (see Table 2).

Table 2 Occupational types of the head of the household

Type of work (HoH)	Frequency	Percent (%)
None	179	44.75
Managers	2	0.5
Professionals	7	1.75
Professionals, elementary	1	0.25
Services and sales workers	14	3.5
Services and sales workers and elementary	1	0.25
Skilled agriculture, forestry and fisheries	2	0.5
Craft and related trade work	6	1.5

Craft and related trade work and elementary	1	0.25
Plant and machinery operators and assemblers and elementary	13	3.25
Elementary occupations	174	43.5
Total	400	100

Source: IUI Baseline survey, 2021

Overall, the data provide insights into the occupational diversity of the heads of household, emphasizing the prevalence of elementary occupations and a negligible percentage that seem to be employed in white collar jobs. Since the majority of individuals work in elementary-related jobs, they do not receive a consistent fixed and stable income.

#### 3.2 Availability and distribution of water in Sarnia

The Mahatenna and Dotland divisions have several clusters of community settlements. Three settlement clusters make up Mahatenna's northern area: Ottu Line, ADB Quarters, and Indian Housing Scheme. The other four settlement clusters, namely Mettu Line, New Housing Scheme (NHS), Paniya Line, and Kovil Line, make up the northwestern portion of the Mahatenna area. On the other hand, the Dotland division starts in the Eluchchi Gramam and extends to the south-east. The Eluchchi Gramam, Set Line, Thavaranai, Panier Line, and Kovil Line are settlement clusters in Dotland (see Figure 2).

In the absence of a proper water supply system like in the urban areas, each cluster of these settlements has its own strategy for handling its water requirements, as the people rely on water for their daily needs, including drinking, cooking, bathing, cleaning utensils, and sanitation. According to the survey, natural springs emerged as the predominant water source, constituting 54.75% of the total households. In contrast, about 5.0% of households obtain water from private providers – Self-supply (own well), representing 25.25%. Neighborhood groups contribute 8.5%. lastly, other sources collectively contribute 6.5%. This distribution highlights the varied strategies employed by the community to meet its water needs (see Table 3). The subsequent section explains the availability and distribution of water among the community clusters of Sarnia settlements.

Water agent	Frequency	Percent (%)
Public utility (natural springs)	219	54.75
Private provider	20	5.0
Self-supply	101	25.25
Neighborhood group	34	8.5
Other sources	26	6.5

Table 3 Way of getting water

Source: IUI survey, 2021

Figure 2 Clusters of settlements in Sarnia estate and their water resources



Source: Author's creation

The main natural spring and water storage/distributing tank of the Mahatenna is located at a higher elevation and delivers water by natural gravity force to a ground-level storage tank, which is then distributed via tap lines to the Ottu Line, ADB Quarters, and Indian Housing Scheme, Mettu Line, and Kovil Line (*see Figure 3*). However, some of the clusters also use alternative water sources; for instance, about seventeen houses on the Ottu Line take water from the Kovil-Mahatenna well and the ADB quarters (roughly 20 families) use two sources of water: the natural spring and a stream.

Figure 3 Main water sources for Mahatenna



Source: Authors

When compared to other clusters, the ADB Quarters cluster is more vulnerable to water access issues due to its location and the socioeconomic background of the residents. Due to the insufficient water supply, people who reside in this cluster primarily bathe and wash their clothing in the natural springs and stream which can be accessed by walking about 100–150 metres (see Figure 4). This additional burden leads women in the neighborhood to spend a lot of time accessing water for household chores.

Figure 4 Water sources for the ADB quarters



Source: Authors

However, according to the SEVANATHA Urban Resource Centre's water yield test results, the area has sufficient water sources to supply the entire Mahatenna community if the catchment area is enhanced.<sup>2</sup> Currently, the water yield of one of the catchment areas is 28,800 litres per day. According

<sup>&</sup>lt;sup>2</sup> SEVANATHA was a co-partner for this project. For more information on the SEVANATHA Urban Resource Centre see: <u>http://www.sevanatha.org.lk/</u>

to the report, each individual needs 60 litres of water every day (*see Table 4*) and the total population of Mahatenna is 512, so the total water requirement is 30,720 litres per day (*see Table 5*).

Purpose	Quantity (litres per day)
Drinking	4.5
Cooking	7.5
Bathing	22.5
Washing utensils & house	10.5
Sanitation	15
Total	60

Table 4 The daily water demand per person segmented by purpose

Source: SEVANATHA (unpublished report)

Table 5 Water requirement for the identified communities in Mahatenna

	•			
No.	Name of the location	No. of Housing Units	Population (avg.)	Estimated water requirement per day (litres per day)
1	Ottu Line	33	132	7920
2	ADB Housing	20	80	4800
3	Mettu Line	32	128	7680
4	Staff Quarters	3	12	720
5	Marariyamman Kovil Temple	8	32	1920
6	Indian Housing Scheme	31	124	7440
7	Estate Bungalow	1	4	160
	Total	128	512	30,720

Source: SEVANATHA (unpublished paper)

• Water requirement

#### **Assumptions:**

- No. of members in a family = 4 per family
  - = 60 litres per person per day minimum

In addition, the SEVANATHA analysis revealed that a 20% enhancement of the water catchment is anticipated to increase water yield by 31,418 litres per day after accounting for a 10% loss. This would be sufficient to supply water to the entire Mahatenna community. On the other hand, the New Housing Scheme of Mahatenna obtains its water needs from a separate water source, a natural spring. It distributes the water via tap lines from a ground-level storage tank (*see Figure 5*) that it supplies using natural gravity.

Figure 5 Cement tank at the New Housing Scheme



Source: Authors

Similarly, some residents of Paniya Line in Mahatenna have private open wells as well as public bathhouses (with water flowing continuously 24/7, from a tube they call Peely) (see Figure 6), where water flows continuously and uninterruptedly throughout the year, even during the dry season. People from nearby settlement clusters can use this water to meet their water needs during the dry season. So, there is no water shortage here.





Source: Authors

Consequently, there is no major physical water scarcity at these locations but a problem in the usage of the resource. One of the respondents from the place indicated that,

...We cannot get enough water to fulfil our total need for water. However, adequate water resources to fulfil the total water requirements of our people exist naturally in our area. Even so, due to the lack of use of a proper system for water supply, we cannot get enough water... (FDG 1\_Female\_Sarnia).

Figure 7 Water sources, pump house and water pump for Dotland



Source: Authors

In the Dotland division on the other hand, the natural spring is located at a lower-level ground at the kovil; thus, water is pumped with the aid of a motor to the storage tank located at a higher elevation a few times a week, and from there it is provided to the Dotland community by tap line for a few hours on specific days. As a result, a certain amount of money is spent on electricity to provide water for the area. A person in charge of controlling water distribution through a water pump was recruited by the estate management for the position. The system serves as the primary source of water for the residents of the Dotland area. The settlement clusters, including Eluchchi Gramam, Paniya Line-Dotland, and Kovil Line accesses water from the particular spring and the pumped line system (see Figure 7).

On the contrary, the Set Line neighborhood includes a public well and a public bathing area (called Peely), where water is supplied continuously (24 hours a day, seven days a week), and it will not run out even in the dry season. Some Elluchi Gramam residents also take baths and wash their clothes in the public bathing area (see Figure 8).



Figure 8 Water sources and bathing area for the Set Line

Source: Authors

In addition to this, most of the houses in the Thavaranai area have individual open wells. These households have water even through the dry seasons due to the continued availability of and access to water. (*see Figure 9*).

Figure 9 Individual open wells in Tavaranai

Source: Authors

The settlers from Sarnia obtain drinking water from diverse sources by different means. Some of them have a direct connection via a tube that runs from the spring to their house. Some individuals have connections in their yard. In addition, there are standpipes, as well as protected and unprotected springs and wells. *Table 6* demonstrates the methods employed by the settlers to obtain drinking water from various water sources. The majority of respondents, constituting 33.25%, reported having piped water (from the spring) directly in their yard. Following closely, 25.75% of households rely on standpipes for their water supply. Piped water in the house was reported by 25.5% of participants. A smaller fraction, 8.5%, accessed water from protected wells, while protected springs accounted for 0.75%. Tube wells and unprotected springs were less common sources, with percentages of 0.5% and 2%, respectively. Unprotected wells were reported by 3.75% of respondents. Additionally, a minimal percentage of 0.5% cited other sources for their drinking water.

<u> </u>		
Drinking water	Frequency	Percent (%)
Piped into house	100	25.5
Standpipe	103	25.75
Piped into yard	133	33.25
Protected spring	3	0.75
Protected well	34	8.5
Tube well	2	0.5
Unprotected spring	8	2
Unprotected well	15	3.75
Other	2	0.5

Table 6 Drinking water accessibility

Source: IUI Baseline survey, 2021

Overall, every settlement in both Mahatenna and Dotland divisions has its unique natural water sources and usage systems. However, water does not flow perpetually 24 hours a day, seven days a week: consequently, due to unavailability of water and management-related issues some houses receive water only a few hours per week, while others receive no water at all. According to a number of respondents, Sarnia and its surroundings have sufficient water resources (from springs and groundwater) which is adequate to fulfil the water need of this community.

Generally, this water facility is good. Even if there is no water facility in close proximity to the place where the people live, there is usually a good water facility within a short distance. But the problem is still there in distributing it. (SL\_SAR\_QRI\_16072022\_F82).

Nevertheless, those resources are not utilized due to inadequate infrastructure, poor administration, and economic and other obstacles.

#### 4. Existing water supply arrangements and their challenges

Even though evidence indicates that water resources are available in Sarnia, the community of Sarnia continues to face obstacles in gaining access to potable water. The following section explores two main water supply arrangements and their challenges.

#### 4.1 Arrangements by Estate Management

During the pre-independence British period, people worked and lived on the plantations under a regimented system of labour management with restricted mobility. The management made itself responsible for their welfare, including health, education, infrastructure, and the supply of essential goods and services, which included the provision of water. Nonetheless, this system was subject to various adjustments following the nationalization of plantations by the government of Sri Lanka, and then the subsequent privatization of those estates, and the evolution of trade unions within the operating structure of the plantations (Chandrabose et al., 2011). Privatization, especially, led to a focus on profits, not the welfare of employees. Explaining the current welfare situation, the estate welfare officer pointed out the following:

...these (welfare and essential services) were carried out by the government as their responsibility. But, in the 1977s, after private companies took responsibility, services for people were gradually reduced as they operated by considering their profits (SL\_SAR\_SKII\_23072021\_M2).

Since the water supply in the discussed settlements in Sarnia is not part of the national water grid, the estate management is customarily responsible for ensuring that these residents of Sarnia have access to clean drinking water. However, due to inadequate resource management, the availability of water in the Sarnia community, namely in the Mahatenna cluster, poses a significant difficulty. The Samurdhi Development Officers made the following statement while addressing the seriousness of the water shortage in Mahatenna:

We were asked to get applications from people with water issues and I received 200 applications from the Mahathenna division. All these applications were requests for water supply (SL\_SAR\_SKII\_19032022\_F5).

The management has, as is customary, appointed a labourer as the 'water distributor' to maintain, clean, store, and distribute water, guaranteeing water supply from the catchment area, which is located on one of the hills. From these hills, water will travel through tubes into cement tanks, and from there it distributed to the respective houses. However, some of these cement tanks have broken down due to insufficient management.

Figure 10 Dilapidated cement tank



Source: Authors

For instance, In the Ottu line area settlement cluster of cement tank (*see Figure 10*) was constructed approximately 15 years ago, with the assistance of a local politician and the estate management. Water from a nearby natural spring was collected in the cement tank and then supplied directly to the houses via a plastic tube. A person selected by the estate management was responsible for water distribution management. But, as time passed, the water distribution gradually decreased until it ceased entirely due to inadequate management and maintenance, and the cement tank deteriorated over time.

Many of the residents dependent on this Ottu Line system are not happy with the person who is responsible for the water distribution and management, and his services, because they believe he gives special consideration to those who pay him

money. The respondents state that the person who distributes the water gives more water to the individuals who pay more money, and as a direct result, other people do not receive sufficient water to meet their day-to-day requirements. A 61-year-old retired estate labourer who constructed his own well due to the water-related problem said:

We have to go far away from here uphill in order to fetch water even to cook. There is plenty of water. But they (management) are not doing it properly. If we tell him (water distribution person) there is no water, he will say that it is only you without water; get lost, we will not supply you water. He would reply like that when he is drunk. Then, whoever is in that situation, will get angry (SL\_SAR\_QRI\_18032022\_M10).

On the other hand, the distributing person highlighted some other issues related to the lack of water supply. According to him, there is no proper system to clean and protect the catchment area or mechanism to increase the availability of water. Although the management paid proper attention to protecting and enhancing water sources, now it seems like a deviation from this responsibility. According to him, he has a limited amount of time to take care of water-related matters because he has to do some other tasks that management has instructed him to do. Furthermore, he mentioned that people are trying to get water by installing separate pipelines to the water storage tank and some other springs on the hill, reducing the daily stock of water that is available.

#### Figure 11 Images of leaking pipeline



Source: Authors

Field observations also indicated that many pipelines in the catchment area, the storage tank, and the main line have leakages. This leads to the loss and wastage of water that could have otherwise been used. In the photograph (see Figure 11), two research assistants who had climbed a hill with the

research team to investigate the storage tank and supply system are seen attempting to address the leakage problems.

#### 4.2 The role of the Plantation Human Development Trust (PHDT)

In addition to the estate management, the Plantation Human Development Trust (PHDT) established in 1992 provides welfare services for the estate community. The PHDT is a tripartite organisation consisting of employers, unions, and the government. It is funded by Regional Plantation Companies (RPCs) with the assistance of the government, which has agreed to channel support and donor funding to the plantation sector through this Trust. It is the primary obligation of RPCs to finance these services by contributing 10% of their profits to the Trust (Martin, 2020). However, it would appear that the PHDT is now being funded by the state as well as donor funding, with minimal financial contribution coming from RPCs at this time. The 32 houses constructed by the Indian Housing Scheme (IHS) in Mahatenna, next to the ADB quarters, with assistance from the Indian government (PHDT, 2019) is an example. However, at the time of the data collection, no residents have yet moved in, due to water shortages in the houses. Despite the initiation of PHDT's water project for the Indian houses, which included the construction of a sizable cement tank (10,000 litres) (*see Figure 12*) to store water from the natural spring in Mahatenna, there was no water in the tank as the construction of the pipeline supply system was not complete. The donor houses have remained unoccupied and unused for a number of years.

Figure 12 Newly constructed water tank at the Indian housing scheme



Source: Authors

Furthermore, after the enactment of the Citizenship Act for the plantation community in the year 1948 the representatives of the community were given the opportunity to serve as members of parliament. Occasionally, their support shifted from the opposition to the ruling party, claiming it to be a working agreement in pursuit of the general welfare of the plantation people. However, there is limited evidence that these representatives have used their influence with the ruling party to secure the liberties of their population (Chandrabose et al., 2011). Because of this attitude and changes, the welfare provisions made by the management to the estate workers also severely declined. A 51-yearold resident states that:

There was a welfare officer earlier. Welfare officers will come once a week and check the drainage, toilets, and other housing facilities. Now the welfare officer is not even coming to this side (SL\_SAR\_QRI\_18032022\_M8).

In the meantime, the government does not provide sufficient attention to the issues facing the estate community, leaving the responsibility to others, which leads to the exclusion of the community from many services.

#### 4.3 Arrangements by the community

Since the proper water supply system for sections of the community has collapsed, these residents have attempted alternative ways to get water, such as separate pipelines from the hill area -

collectively or individually, constructing private wells, and getting water from the kovil well. The installation of individual connections from the spring to each household or yard can lead to problems within the community. If someone connects to their dwellings, then another person removes that pipeline and connects it to their own houses. This leads to tension among them.

We now obtain fresh water from the nearby woods. There is an ample quantity of water. There is a significant abundance of pipes. Every individual has established their own pipelines. We visited the location and established a connection between our pipeline and the water source. Subsequently, water arrives. However, there are disruptions. Water flow abruptly ceases due to the intentional disconnection of our link from the source. This system lacks sufficient structure and regulation. Each individual goes to the location and connects their own pipeline after disconnecting others' pipelines according to their preference (SL\_SAR\_SKII\_30082022\_M6\_1).

If ten of us go and complain to the head supervisor, he will appoint a person temporarily for this issue. So, for one or two hours, we will get water and after that, it will stop, and other households will not get water. Then there will be fights among people. When one person gets water and others do not, they start to fight (SL\_SAR\_QRI\_18032022\_M8).

However, all the residents in the Mahatenna area cannot access water from the alternative sources mentioned. The financial standing of an individual is the main deciding factor that led to access to water from the first two alternative ways, including the geographical location of the household. Since the majority of individuals in Sarnia are employed in elementary occupations, their income is not steady, as indicated in Table 2. Consequently, they are unable to afford to construct individual wells, despite the presence of a water source below the surface. Some individuals choose to wait until they reach retirement age in order to receive their pension. They then use this pension to finance the construction of their own well. The accompanying case depicts the story of such a person and her accomplishments (*see box 1*).

#### Box 1

In those days, a typical day for me was really challenging. After waking up around 5.00 a.m. and soon after morning tea I looked for water near my house, typically from natural springs. Occasionally, it took longer than anticipated if there was no water near my home. After bringing water, I made breakfast and lunch (mostly <u>roti</u>) for family members before dropping the children at the creche with their meals. I was instructed to arrive to the tea plucking area at precisely 7.00 a.m., I worked there until 9.15 a.m., and one and a half hours was given for breast feeding for my child. I came back and started plucking again at 10:45 a.m. They wouldn't let me pluck the tea leaves if I were five minutes late. Sometimes, they would reduce my payment. There was a lunch break between 12:00 p.m. and 1:30 p.m., At that time, I had to take my children and feed them, and then I again join work at 1:30 p.m. till 4:00 p.m. After finishing my work I returned home with my kids. It would take me 30 to 60 minutes to get home. When I got home, I got to work on other household tasks (washing clothes, cleaning the house, as well as preparing dinner). I tried to collect firewood for the hearth during a break. If the kids became sick, I had to take them to the hospital. I did all those tasks alone, not with my husband. He would not assist or support me.

I often spent a lot of time going to get water. I used every available method to gather water. Initially, I obtained water from a tap which was near my house. The tank in the hill provided the tap water. A tube linked to the tank allowed water to flow through it. However, because of heavy rain or animal disturbance, the tube or tube connection frequently breaks or was damaged and the water supply would be cut off. Some other time, I looked for water sources and went to get some. I periodically bought water to fulfil my needs like drinking and cooking. For two water pots, Rs. 100 was paid. However, it wasn't enough to wash clothing and take a bath. I was therefore bathing my children at a nearby stream (1 kilometer from my home). Along with my other two children, I was carrying a child who had mobility problems. The stream-side path was difficult and unsuitable for walking. It was sludge. Leeches are abundant on both sides of the path during rainy seasons. The management of the creche made the decision to give water after realizing how difficult it was for me to get to the water. I enjoyed the water supply from the creche for about two years. I managed all the works from the creche water. But over time, neighbors in the area came up against the creche giving me water. Thus, that facility was cut off.

I ultimately made the decision to drill a tube well to address the water problem when I was sixtyfive years old. With the help of my older son and some money I received as part of my retirement, I chose to build the tube well in the backyard of my home, which I successfully completed in 2019. Even though I had to pay a large sum of money to get access to the water supply, I am now earning extra money by selling water to my neighbors (500 litres for Rs. 200). I am happy that I made that choice.

Meanwhile, cultural affiliation is a main deciding factor for getting water from the kovil well. In the community, two main caste groups are predominant – namely *Kudiyanavar, Kallar, Pallar, and Paraiyar. Kudiyanawar* is the highest caste and *Paraiyar* is the lowest caste. The kovil administration, would prefer that their own caste be given priority for water distribution. Ten to twelve years ago, the administration of the kovil was done by a *Kudiyanavar*, but it is now carried out by a *Paraiyar*, because the majority of residents in the Sarnia community are *Paraiyar*. A significant proportion of *Kudiyanawar's* educated people migrate to other areas, particularly towns.

However, the caste system still exists in Sarnia, and members of different castes refuse to cooperate with one another in any endeavour. Yet, in the instance that they obtain the water from the kovil tank, they use different motors in order to do so, rather than combining the two. The *Kudiyanavar* believe that if they become sick, it is due to *Paraiyar's* consumption of water from the kovil well from which they also drink. A respondent who is a Development Officer in Sarnia explained the caste system and that each group never believed the other.

...but they (Kudiyaanavar) are afraid. For example, if someone falls ill, they will immediately say, "Yes, we take water from the temple itself; there was something they would have done." Whether it's a kidney problem or an ordinary fever, that's what immediately comes to their mind. They (Paraiyar) are taking water from there too, so they (Kudiyaanavar) think that they (Paraiyar) are there to do something (SL\_SAR\_QRI\_16072022\_F82).

This lack of solidarity and sense of community leads to further accelerate water-related conflicts or shrink the space available for resolutions in the community when the formal system is malfunctioning. In fact, sometimes these are signs of quarrels among neighbors.

There is no solidarity here. People will not unite to do something. Whenever they need water, they go and get it for themselves, and they will not think about others (SL\_SAR\_QRI\_18032022\_M8).

Overall, the inadequate management of the water distribution system, financial constraints, and a lack of community solidarity all contribute to Sarnia's inequality and economic water scarcity. By focusing on effective management, infrastructure development and inclusive policies, stakeholders can alleviate the economic constraints and promote sustainable water access to these disadvantaged households and community clusters.

#### 5. Conclusion

This paper concludes by reinforcing the central argument that the marginalized tea estate community in Sri Lanka faces economic scarcity rather than physical scarcity when it comes to water access. Sarnia and the surrounding areas have an abundance of water resources. However, inappropriate water management, financial constraints, and lack of solidarity act as the causes of economic water scarcity in the area. On the one hand, the estate management steadily withdrew from being concerned about the well-being of the estate community by arguing that such duties were the responsibility of the government. In the meantime, the government does not address the problems that are confronting the estate community with the required attention, which results in certain members of this community being excluded from numerous services. Therefore, the ambiguity and insufficient interest that exists between the government and the estate management about the estate community is a primary factor that contributes to the difficulties that sections of the community of Sarnia face in relation to water. In the meantime, unmet promises made by local and national leaders as well as a lack of solidarity within the community are also key contributors to this issue. In spite of this, selected community-based interventions, in conjunction with targeted assistance from estate management and the government, might be able to assist in overcoming the economic water scarcity in Sarnia.

#### References

- Cook, K.E. 2008. Marginalized Populations in Given. L.M. (Ed.). The SAGE Encyclopedia of Qualitative Research Methods. SAGE Publications, Inc., California.
- Calow, R., & N. Mason. (2014, June 27). *The real water crisis: inequality in a fast-changing world*. ODI: Think Change. https://odi.org/en/publications/the-real-water-crisis-inequality-in-a-fast-changing-world/
- Chandrabose, A. S., P.P. Sivapragasam. (2011). *Red colour of tea: central issues that impact the tea plantation community in Sri Lanka*. Human Development Organization with the Patronage of Ccfd France.
- Chandrasekara, S. S. K., S.K. Chandrasekara, P.H.S Gamini, J. Obeysekera, H. Manthrithilake, H.H. Kwon & M. Vithanage. (2021). A review on water governance in Sri Lanka: the lessons learnt for future water policy formulation. *Water Policy*, 23(2). https://doi.org/10.2166/wp.2021.152
- Climate Change Secretariat. (2010). *Sector Vulnerability Profile: Water*. Climate Change Secretariat. <u>http://www.climatechange.lk/adaptation/Files/Water\_SVP\_Nov-16-2010.pdf</u>

Department of Census and Statistics. (2012). *Census of Population and Housing*. <u>http://www.statistics.gov.lk/PopHouSat/CPH2011/Pages/Activities/Reports/CPH\_2012\_5Per\_Rpt.pd</u> <u>f</u>

Department of Census and Statistics. (2022). *Statistical Pocket Book – 2022*. Department of Census and Statistics. http://www.statistics.gov.lk/Publication/PocketBook

Imbulana, K. A. U. S., N.T.S.Wijesekara & B.R. Neupane (eds.). (2006). *Sri Lanka National Water Development Report*. MAI&MD, UN-WWAP, UNESCO and University of Moratuwa. https://www.ncpcsrilanka.org/wp-content/uploads/2019/10/Sri-Lanka-National-Water-Development-Report.pdf

- Knott, E., A.H. Rao, K. Summers & C. Teeger. (2022). Interviews in the social sciences. *Nature Reviews Methods Primers*, 2(1), 1–15. https://doi.org/10.1038/s43586-022-00150-6
- Kvale, S. 2006. "Dominance through Interviews and Dialogues." Qualitative Inquiry. 12, 480–500.
- Martin, T. (2020). *Estate Workers in Sri Lanka: An Account of the Legal and Policy Framework*. Colombo, Sri Lanka: ICES.
- Melamed, C., & E. Samman. (2013). *Equity, inequality and human development in a post-2015 framework*. https://hdr.undp.org/content/equity-inequality-and-human-development-post-2015-framework
- Oki, T., & R.E. Quiocho. (2020). Economically challenged and water scarce: identification of global populations most vulnerable to water crises. *International Journal of Water Resources Development*, *36*(2-3), 416–428. https://doi.org/10.1080/07900627.2019.1698413

- Rijsberman, F. R. (2006). Water scarcity: Fact or fiction? *Agricultural Water Management*, *80*(1-3), 5–22. https://doi.org/10.1016/j.agwat.2005.07.001
- Ritchie, H., & M. Roser. (2018). Water Use and Stress. *Our World in Data*. <u>https://ourworldindata.org/water-use-stress#global-freshwater-use</u>
- Rwangika, A., C. Hettiarachchi & G. Aponsu. (2019). Analysis of 20 Years Rainfall Data from 1999 to 2018 in Badulla District: A Case Study. *International Journal of Scientific Research and Engineering Development-*, 2(5), 348–354.
  https://www.researchgate.net/publication/336252295\_Analysis\_of\_20\_Years\_Rainfall\_Data \_from\_1999\_to\_2018\_in\_Badulla\_District\_A\_Case\_Study-
- Plantation Human Development Trust (2019). Foundation stone laying ceremony at Sarnia Estate [online]. Plantation Human Development Trust. Available at: https://phdt.org/2017/index.php/news/foundation-stone-laid-at-sarnia-estate/ [Accessed 4 Apr. 2022].
- Samad, M., M. Aheeyar, J, Royo-Olid, & I. Arulingam. (2016). The political and institutional context of the water sector in Sri Lanka: An overview. European Union & IWMI. https://www.researchgate.net/publication/318876376\_THE\_POLITICAL\_AND\_INSTITUTIONA L\_CONTEXT\_OF\_THE\_WATER\_SECTOR\_IN\_SRI\_LANKA\_An\_overview
- Seckler, D., A. Upali, D. Molden, R, de Silva & R. Barker (1998). World Water Demand and Supply, 1990 to 2025: Scenarios and Issues. International Water Management Institute. https://www.researchgate.net/publication/254383595\_World\_water\_demand\_and\_supply \_1990\_to\_2025\_scenarios\_and\_issues
- UN Water, & United Nations. (2018). Sustainable Development Goal 6, Synthesis Report 2018 on water and sanitation. United Nations Publications. https://www.unwater.org/sites/default/files/app/uploads/2018/12/SDG6\_SynthesisReport2 018\_WaterandSanitation\_04122018.pdf
- United Nation. (2021). United Nations World Water Development Report 2021: valuing water. United Nations Educational, Scientific and Cultural Organisation. https://unesdoc.unesco.org/ark:/48223/pf0000375724
- United Nations Development Programme. (2006). *Human Development Report 2006: beyond capacity, power, poverty and the global war crisis*. Palgrave Macmillan. https://hdr.undp.org/system/files/documents//human-development-report-2006-english.human-development-report-2006-english
- World Bank. (2016). Toward Sustainable water and sanitation services in Sri Lanka: Beyond Sustainable Development Goals to supporting the national economic vision. World Bank. https://www.adb.org/sites/default/files/linked-documents/SRI-WSS-Joint.pdf