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# PREDICTING CLIMATE CONFLICTS AMONG AGRICULTURAL COMMUNITIES IN THE NORTH CENTRAL PROVINCE OF SRI LANKA

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## **ABSTRACT**

The role of Climate Change in catalyzing conflicts is an emerging theme related to security studies, especially in South Asia. Changes in weather patterns significantly impact conflict dynamics within communities who are forced to compete for resources while being increasingly more dependent on interactions with broader communities and government services. In Sri Lanka, Climate Change could intensify both floods in the wet zone and droughts in the dry zone. The study attempts to make a preliminary prediction of climate conflict in agrarian communities of the North Central Province which is vulnerable to droughts and water scarcity. The methodology used is a systematic review with semi-structured interviews. Findings suggest that climate-driven water scarcity in the NCP catalyzes multiple forms of horizontal and vertical inequalities in individuals, families, and communities while simultaneously violating multiple tiers of Human Security. This leads to the accumulation of grievances in a community coping with multiple pre-existing grievances. Given the frequency, prevalence and nature of identity politics and structural violence in Sri Lanka's history, the accumulation of grievances due to water scarcity could manifest into social conflicts between religious and racial groups. The propensity for climate conflicts must hence be predicted and addressed in policies relevant to climate-adaptation and preventing violent

extremism. Overall, in terms of predicting climate conflicts through a qualitative approach, the study suggests that violations of Human Security and ineffective water governance could increase incentives for farmers to engage in conflict in the instance of climate-driven water scarcity.

## **INTRODUCTION**

Climate Change has proven itself to be a crisis affecting all living organisms without making any exceptions. Climate Change, which at first appeared to be a mere environmental threat, is now considered as serious as war, given its ability to disrupt political, social, and economic systems (Das, 2005) and global security (Dolsak and Prakash, 2018). Climate Change leads to changes in patterns of rainfall and hence, changes in the quantity and seasons of rainfall. It leads to either excessive rain causing floods, or high evaporation rates of groundwater into the atmosphere leading to water scarcity (Simelton et al., 2013). A series of conflicts in countries such as Syria (Gleick, 2014), suggest that failing to manage rainfall successfully could lead to conflicts, especially in water-dependent farming communities (Coventry and Dalglesh, 2013; Cosgrove and Loucks, 2015; Prasanna, 2018). Therefore, given the complexities of Climate Change, Climate Change mitigation and adaptation demands crucial governance reforms and

action by all nations (Coventry and Dalgleish, 2013).

Climate action is classified into two categories.

a) Climate mitigation; describes the acts of international and national initiatives to reduce or prevent the emission of greenhouse gases to fight rising average temperatures.

b) Climate adaptation; when countries anticipate the adverse effects of Climate Change and take action to prevent or minimize its consequences (Feitelson and Tubi, 2017).

The focus of this paper is climate adaptation in Sri Lanka. Sri Lanka suffers the consequences of Climate Change more than it contributes to the emission of Green House Gasses (Dolsak and Prakash, 2018). Furthermore, Sri Lanka has up to 80% of its landmass vulnerable to water scarcity (Gunatilaka, 2008). There is well-documented evidence of grievances experienced by the farming community in the NCP concerning the impacts of Climate Change on livelihoods, migration and on disaster risk reduction, but very little academic inference on how the accumulation of grievances could create incentives to instigate conflict. The paper is thus addresses a gap in Sri Lankan literature by reviewing the incentives which drive farmers to engage in conflict in the event of water scarcity and deduce which groups will most likely engage in climate conflict. In Sri Lanka, the government leads climate adaptation strategies and water governance across the country (Prasanna, 2018). Improvised water governance strategies is identified as one of the most crucial steps essential for adaptation because water sustains agriculture; the main livelihood in Sri Lanka (Kopke et al., 2018). In 2014, the Intergovernmental Panel on Climate Change published a report describing the multiplier effects of Climate Change on Human Security (Adam et al., 2018; Abel,

2019). Climate Change, especially in developing countries with poor economic growth, leads populations to compete for the limited resources. The limited resources lead to human security violations hence being driving factor of conflicts (Themnér and Wallenstein, 2014).

Incidentally, Sri Lanka has a long history of civil conflict over resource distribution. These conflicts include anti-colonial riots in the 1800s and a 30-year civil conflict which was largely inter-ethnic in nature. Such conflicts crippled the economy and sabotaged the aspirations of millions. Furthermore, conflict prediction in highly water-dependent agrarian economies such as Sri Lanka is important, because 28.2% of its population is engaged in agriculture (Central Bank of Sri Lanka, 2015).

Thus, studying the risks of mismanaging water resources is crucial to avoid potential conflicts arising in countries vulnerable to Climate Change, such as Sri Lanka.

### **Research questions**

A descriptive research approach was used to study the following questions with regard to farmers in the North Central province.

1. What might an analysis of the impact of climate-driven water scarcity reveal about the status of human insecurity in this community?
2. Do current water governance practices of the state increase human insecurity in this community?
3. Is there preliminary evidence to suggest this community would rise in conflict against the state?

The Horizontal and Vertical Inequalities theory of Frances Stewart will be used to deduce if the human insecurities identified in question 1 and the water governance practices of the government of

Sri Lanka identified in question 2 generate incentives for farmers to rise in conflict against the state.

## ***LITERATURE REVIEW***

Defining Water scarcity in the event of Climate Change

“Climate Change” is defined by the United Nations Framework Convention on Climate Change as “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods” (UNFCCC, 1992) including extreme variations in hydrological patterns lead to, either unpredictable floods or water scarcity (Brouwer and Hofkes, 2008). The definition of water scarcity used in this study is based on the context of water use in the NCP of Sri Lanka, in which 90% of the water used is that which is collected during the seasonal monsoonal rainfall (Prasanna, 2018). Water is collected in tanks and distributed for use based on different seasons of the agricultural cycle. Thus, water use depends on temporal availability (being available at the time it is needed eg: farming season) and spatial availability (based on where water is stored/ how it is distributed such as by tanks). Ji et al (2012) define water scarcity as, “stresses caused by temporal and spatial variations in water allocation in agrarian communities”, which is a suitable description of how water scarcity affects the agrarian community in Sri Lanka.

The availability of water from monsoons is a crucial determinant of how livelihoods are carried out across the country (Abeysekera and Punyawardena, 2016). 81% of the country lives in a rural setting (WorldBank.org., 2019) with up to

40% engaged in agriculture, mainly rice, rubber, tea and coconut. The Climate Change Risk index has added Sri Lanka to the list of the world’s top 10 most vulnerable countries to Climate Change since 2017 (Germanwatch.org., 2020), as changes in weather patterns have severely affected drought and flood conditions in recent years. Historically, the economy of the NCP (dry zone) has been centred around paddy cultivation under the patronage of ancient kings, who built over 10,000 large and small reservoirs (tanks) to collect rainwater to be utilized in the dry season. Without these tanks, agriculture would be impossible in the dry zone (Dissanayke, 2005). 95% of the province lives in a rural setting, with 49% of its 1.6 million citizens engaged in agriculture (Gunawardene, 2017).

### **Water scarcity in NCP**

- Spatial availability of water

Extended droughts have reduced the availability of water for agrarian livelihoods and households, as 80% of these tanks are vulnerable to rapid evaporation (Malmgren et al., 2003). The air temperature, which impacts the rate of evaporation of tank and groundwater levels, has increased by 0.450C over 2 decades (Punyawardne, 2010). This is a crucial challenge in the context of storing water, as up to 90% of the province’s land depends on tank systems for water, while just 10% depends on rainfall (Dilrukshi and Maddanayke, 2015).

- Temporal distribution of water

The agrarian cycle is timed according to the four seasons of rainfall (Camisani, 2018). Weather patterns in Sri Lanka which were consistent over centuries have changed as a consequence of anthropogenic Climate Change (Camisani, 2018). Crops are grown based on two seasons named Yala (April–August, the drier season) and Maha

(October–January, the period with heavy rainfall). When rainfall in the Maha season reduces below the usual volume, it reduces the water available for agriculture, until the next cycle of rain during the Yala season (Mimura, 2013), thus reducing the paddy output of both seasons (Burchfield and Gilligan, 2016). As paddy cultivation requires fields to be submerged, it requires an abundance of water (Burchfield and Gilligan, 2016). The Maha season drought in 2014 affected approximately one million Sri Lankans with 58% of the country having insufficient water for cultivation.

### **Defining “conflict” in Sri Lanka’s agrarian context**

Conflicts due to water scarcity in the context of Climate Change have primarily been either violent conflicts or social conflicts (Barnet and Adger, 2007; Raleigh and Urdal, 2007; Ide, 2017). A violent conflict is defined as “a contested incompatibility that concerns government and/or territory where the use of armed force between two parties, of which at least one is the government of a state, results in at least 25 battle-related deaths” (Gleditsch et al., 2002). A social conflict is defined as “a violent political event which is a single altercation where often force is used by one or more groups for a political end” (Raleigh et al., 2010). This study assumes that a conflict instigated by the agrarian community, within the context of water scarcity due to Climate Change in NCP, would be a social conflict due to the following reasons:

The farming community of NCP seeks a political solution (De Silva et al., 2017) as opposed to a territorial one, therefore based on the above definition by Raleigh et al. (2010), a social conflict would seem more likely. Furthermore, it could be assumed that the farming peasantry would not attempt to overpower the government through a violent conflict. The Sri Lankan government is increasingly considered an

emerging model of neoliberal authoritarianism (Goonewardene, 2020). Such regimes are capable of quelling and solving non-violent conflict regarding water allocation more stringently than democracies (Bernauer and Siegfried, 2012) as they impose their proposed solutions and suppress opposition, unlike democracies which allow “free speech and political space” to express grievances and negotiate the conditions of proposed solutions (Peceny and Butler, 2004). The government is also known across the country for its military supremacy (Abeysekera and Punyawardena, 2016).

### **Climate change as an intermediary variable of conflict**

Interms of the specific role played by Climate Change in conflict, academics predominantly believe that it acts as an intermediate variable which exacerbates existing conflicts. Variables such as economics and political factors are proposed as other intermediate variables which further enable and catalyse conflicts in the context of scarcity (Gizelis and Wooden, 2010). However, just the presence of intermediate factors does not guarantee the manifestation of conflict, especially in the case of water scarcity (Feitelson and Tubi, 2017). It is dependent upon how the factors interact, such as the role of institutions in governing water sources. Further, Feitelson and Tubi (2017) found that it is not the lack of water that creates a conflict between a populace and the institutions, but how the existing water supply is distributed. This paper adopts the dominant discourse in literature which emphasizes on significant need for effective water governance practices to prevent climate conflict in relation to water scarcity.

The role of institutions and water governance on climate-driven water conflict

In times of water scarcity, a key role of institutions in water management is to

ensure adaptive capacity, which is defined as the ability of a society to adjust to drastic changes (such as due to Climate Change) and recover from its effects (Homer-Dixon, 1999). As adaptive capacity increases, vulnerability to adverse effects due to scarcity decreases (Dinar, 2009). State-led adaptation activities include teaching farmers alternative livelihood strategies, introducing exit plans from agriculture to other livelihoods, supporting the transition to less water-intensive crops etc. (Altomonte, 2009). In an interview with a consultant vocational trainer for youth in Sri Lanka's agrarian community, it was found that the agrarian community being studied is considered socially vulnerable because of their inability to build resilience without external support such as, from the government NGOs etc. He identified the following factors as barriers to successful adaptation:

1. Low skills/technical know-how which makes it difficult to diversify into other sectors
2. Lack of disposable income to invest in ventures of their own (Dilrukshi and Muddannayke, 2015)
3. Lack of opportunity to migrate to other parts of the country

The lack of effective adaptation strategies to counter water scarcity could lead to conflicts over resources in a farming community (Wilhite and Buchnan-Smith, 2005, p.344). Responsive governments are more likely to resolve disputes at an earlier stage of unrest over access to water (Gizelis and Wooden, 2010). The adaptive capacity of a community could be compromised due to factors including economic structure, dependence on climate-sensitive resources, power relations between state institutions, internal power struggles within institutions and power relations between various groups within a

community and geo-political settings (Adger et al., 2014).

Adaptation measures by GoSL

In terms of adaptation measures, the Sri Lankan government has initiated projects to build resilience in farmers through multiple approaches, some of which are stated below.

### **1. Central control of water availability**

Given the changes in rainfall patterns, a series of tanks were controlled by a "water management panel" of representatives from different institutions including the Ceylon Electricity Board, the Department of Agriculture and the Irrigation Department. These individuals controlled the water rotation cycles, and the dates and volumes of water being released from big tanks to farms (Manthritilake and Liyanagama, 2012). Farmers interviewed as a part of this study complained that the limited representation in these boards means they have no say in determining the temporal or spatial availability of water. An interview with a farmer from Anuradhapura (Kekirawa Divisional Secretariat) and a farmer from Polonnaruwa (Medirigiriya Divisional Secretariat,) suggested that farmers remain sceptical of government intentions.

"Now that the seasons can't be predicted we have to depend on the government releasing water. They don't release water at the specific time that we need. The water is usually released in November but when it is needed in October, the government does not oblige. We need water to sow seeds and harvest before the next rains come. If the water gets late and we sow late, the harvest will get washed off in the next rain. The seasons are changing but the government is not changing their ways. If the harvest is lost, the government will not take the blame. Villagers have no one to complain

to, there is no way to get compensation, and we have to just bear the cost. The government is not giving any compensation for these losses because they think it's a small loss. They will only compensate for a severe natural disaster”

– a resident of Kekirawa Divisional Secretariat, Anuradhapura

Farmers from Nochchiyagama Divisional Secretariat (Anuradhapura) and Nelumbewa Divisional Secretariat (Polonnaruwa), who are in the same districts as the farmers mentioned above (all within NCP), do not face such delays. This highlights the subnational variations in access to water (Kummu et al., 2016).

## **2. Crop diversification projects**

The Ministry of Environment and Ministry of Agrarian Services and Wildlife, funded by the “Adaptation Fund” of the UN Framework Convention on Climate Change, carries out crop diversification projects. The projects focus on supporting farmers and households to diversify the range of crops being grown throughout the year, by promoting less water-intensive crops like paddy (Mimura, 2013). A survey of 200 paddy farming households found that 87% of them also received income from off-farm activities (mainly a combination of salaried jobs, wage labour, and self-employment; renting and pension also generated some income). They also included foreign remittances (while less than 5% of households received them, but those that did, received large sums) and “cash and goods in kind” (over 25% of households received them but in very small values) (Jayasinghe et al., 2017).

## **3. Tank restoration**

Tank renovations are an effective approach to improving water storage. However, it requires significant funding. Since the government cannot afford such renovations, international donor agencies

provide technical and monetary support for renovations (Bello, 2017). However, a common challenge in international development is the lack of funding post-project period, to ensure the sustainability of initiatives (Bui et al., 2016; Usha and Devakumar, 2019).

The interview confirms the findings of the literature review which states that the key factor leading to water scarcity is not the unavailability of water, but poor water governance. Thus, the Sri Lankan water governance system requires improvements to ensure that the climate adaptation does not lead farmers into new forms of insecurity by creating a state of worsening water scarcity in their farmlands, despite there being sufficient water quantities in the tanks.

Development policy, climate adaptation and structural violence

The following section explores institutional factors which influence water governance practices. These institutional factors can incentivize agrarian communities in the NCP to engage in conflict over scarce water resources. Since Climate Change could lead to conflict, institutions must be equipped to prevent any failure of adaptive strategies in water governance and avoid fueling incentives for conflict (Altomonte, 2009). Zografos et al. (2014) claim that certain government actions taken in the name of development could be interpreted as structural violence against vulnerable communities (such as daily wage-earning farmers). Structural violence is defined by Galtung (1969, p.170) as “violence that is built into the structure (of society) and showing up as unequal power and consequently as unequal life chances”. Galtung (1964) in Fink (2010, p.127) further describes structural violence as “violence imposed by non-violent means” (e.g.: discriminatory governmental policies), thus it is also called indirect or institutional violence. Violence is defined as “the intentional use of force against another to

cause harm, injury or death, intended with a goal and purpose”. Weigert (2008) in Fink (2010, p.126), describes structural violence as the unequal distribution of resources causing preventable harm or damage to persons (and even things).

Zografos et al. (2014) claim that structural violence could be integrated into the climate adaptation process of a government. Development projects and initiatives could thus create human insecurity, even though it attempts to create security. When Climate Change becomes an added variable in a governing system, inequalities are further exacerbated, leading vulnerable communities (those subject to structural violence) to a state of human insecurity. Therefore, in an instance where development policies are rooted in structural violence, the climate adaptation process could lead to perpetuating social inequalities such as in the spheres of health, housing, economic opportunities etc. and the violation of human rights in a group of vulnerable farmers (Charoenratana and Shinohara, 2018). The Human Security framework is referred to contextualized the impacts of water scarcity on agrarian communities

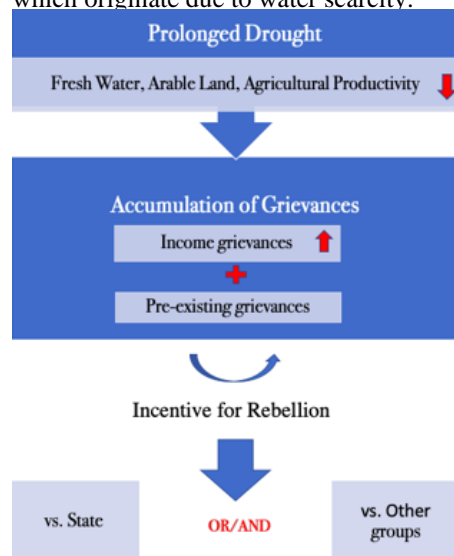
The impact of climate-driven water scarcity on Human Security

Human Security is a concept which expands the understanding of the term “security” beyond the traditional notion of state security, to focus on the security of the individual (Alkire, 2003). Human Security describes the need to protect the core elements of an individual, family or community that reflect “human life” (Scheffran and Brauch, 2012, p.3). It recognizes the role of various external factors which can be catastrophic, in threatening people and communities (Alkire, 2003). In 1994, the UNDP recognized 7 threats to Human Security as below;

1. Economic security (Persistent poverty, unemployment),
  2. Food Security (Hunger, famine),
  3. Health Security (Deadly infectious diseases, unsafe food, malnutrition, poor access to basic healthcare),
  4. Environmental Security (Environmental degradation, resource depletion, natural disasters, pollution),
  5. Personal Security (Physical violence, crime, terrorism, domestic violence, child labour),
  6. Community Security (Inter-ethnic, religious and other identity-based tensions),
  7. Political Security (Political repression, human rights abuses).
- Inequalities lead to violation of Human Security and is a factor which fuels conflict over resources, political representation etc. (Barnett and Adger, 2007).

### ***THEORETICAL FRAMEWORK***

The framework by Uexkull (2014) as illustrated below, is the primary framework used in this paper as it describes how factors such as Climate Change, water scarcity and Human Security interact in an agrarian community. It contextualizes the way different grievances lead to conflicts which originate due to water scarcity.





## **Description of framework components**

The framework by Uexkull (2014) describes two forms of grievances which arise due to water scarcity: income grievances and pre-existing grievances. These grievances will be further contextualized using the Human Security framework.

### **1. Prolonged drought**

The effects of climate change are broadly categorized into two scenarios in Sri Lanka. By 2050, the wet zone would receive up to 38% excess rain, making it prone to floods and landslides, while the dry zone would get 34% less rain, increasing the possibility of droughts (Punyawardena et al., 2013). This percentage decline in rainfall is similar to Darfur, where a decline of rain by 30% over a period of 80 years was a determinant of the civil conflict over famine and water scarcity (Das, 2015).

### **2. Accumulation of grievances due to prolonged drought**

The effects of prolonged drought include physiological changes to the environment, which affect the ability to grow crops and thus, reduce the output of harvest. This will be primarily assessed by documenting data on changing environmental conditions in the NCP.

- Income grievances

Income grievances are assessed through the lens of economic security because it refers to the financial stability of livelihoods. Economic security requires that a basic income is earned through productive work, or at least receiving finances from a public finance program (UNDP 1994, 24). Deteriorating farming

conditions lead to a loss of harvest, a loss of alternative sources of livelihood in the area and thus ultimately, a loss of income for farmers. This destabilization could lead to conflict as citizens, try to regain stability by forcefully demanding that needs be met (Adzawla et al., 2020). Gough (2002, p.154), proposed that Human Security collapses in communities where it would be more profitable to rebel.

- Pre-existing grievances

Studies show that income grievances alone do not trigger the expression of conflict (Collier, 2000; Homer-Dixon, (1999). Income grievances catalyze conflict in the presence of pre-existing grievances. Furthermore, when conflict conditions are more lucrative than the state of unaddressed grievances, the “accumulation of grievances” could become an incentive for conflict (Collier and Hoeffler, 2004). Health Security and Environmental Security will be used to identify and conceptualize pre-existing grievances in the NCP.

### **3. Incentive for Rebellion**

When income grievances and pre-existing grievances increase, it is called an “accumulation of grievances” (Uexkull, 2014; Heurlin, 2019; Mikulewicz, 2019). Uexkull describes how the accumulation of grievances in a situation with compromised adaptive capacity, creates an incentive for rebellion. This could be either be against another group (e.g.: ethnic/caste) or the state.

Predicting the nature of groups prone to conflict in Sri Lanka

The theory of horizontal and vertical inequalities by Frances Stewart has been used to explain how inequalities could lead different groups into conflict.

1. Horizontal inequalities take place between groups. People self-identify with groups often based on legal factors and

have a reduced ability to move between groups. A key feature is that the identity associated with being part of this group leads to being treated differently by others eg: caste, race, nationality, religion etc. (Stewart, Brown and Mancini, 2005, p.3).

2. Vertical inequalities are the grouping of people according to inequalities in income, wealth and the social consequences of this type of inequality (MacNaughton, 2017). The definition also extends to inequalities in access to healthcare, education, housing, and political power. Similarly in Sri Lanka, the lack of laws for social protection from vertical inequalities has gained recognition by civil society (CEPA, 2013).

The NCP has a large Sinhala community who makes up 90% of the provincial population. The second most significant ethnic group is the Muslim community; their livelihood is prominently business-oriented (Sarjoon et al., 2016). Other group identities such as caste have not been considered a threat to resource allocation in the NCP, as it is not so commonly thought about, as it has been, in the past (De Silva, 2007). Therefore, the inequalities faced are mostly vertical inequalities commonly shared by the agrarian community, as they are a less diverse community.

## **METHODOLOGY**

### Data collection

- Systematic review approach

Due to travel restrictions caused by COVID-19, field research could not be carried out in Sri Lanka. Therefore, data were collected by a desk-based systematic review of existing literature and via phone interviews with a cross-section of relevant stakeholders. The systematic literature review was initially conducted using two databases with peer-reviewed journal

articles (Elsevier and Taylor and Francis). The databases generated sufficient literature on international case studies and journals but had a limited collection of relevant academic writing on Sri Lanka. Google Scholar was then used to collect supplementary peer-reviewed publications. Furthermore, grey literature including reports, conference proceedings and interviews from the UN, iNGOs, and websites of relevant Sri Lankan government ministries and think tanks were referred, to collect supplementary information.

### **Limitations of the systematic review approach**

- The theories and frameworks used in the study were initially derived from data from other countries/continents e.g.: the framework by Uexkull (2014) is derived from data on Sub-Saharan Africa.

- Sri Lanka has not yet published quantitative measurements of racism in communities and thus, there are no quantitative records on the prevalence of racism within the NCP community. However, information on farmer perceptions and sentiments was deduced from the interviewees.

- Interviews

Qualitative interviews with experts in the field of Climate Change, agrarian systems and conflict in Sri Lanka were a key source of data.

17 interviews were conducted via phone conversations. The sampling technique was a mix of strategic sampling and snowball sampling, where contacts in the government and non-government sectors were first approached, after which they introduced more professionals from academia, grassroots organizations, and farmers from the NCP. The ethics of ensuring both anonymity and informed consent were stringently upheld in the

interview process. The following representations were also considered

**Geographical representation:** Almost half of the interviewees (8 out of the 17), were respondents from the community being studied, which increased the internal validity of the respondents. **Gender representation:** There were 5 female and 12 male interviewees, with a majority (3 of the 5) females representing the NCP. **Ethnic representation:** There were 11 Sinhalese, 3 Muslim and 3 Tamil respondents. The ethnic breakdown in Sri Lanka is approximately 70% Sinhalese, 20% Tamil, 9% Muslim and 1% other. Similarly, 91% of the NCP is Sinhalese, while 8% is Muslim, and 1% is other. Therefore, the sample represents the ethnic composition of the province. The reliability and representativeness of responses from the Muslim and Tamil communities are lower than that of the Sinhalese, given the low numbers.

#### Limitations of the interview method

- Interviews with farmers indicated a sense of intense competition for water between farmers and the industrial/tourism sector. A limitation of this interview panel was the lack of representation of these “competing” stakeholders from the private sector.

- A further limitation was the low representation of direct victims of water scarcity i.e.: grassroots communities who engage in agriculture (representing the lower-income groups). The 6 interviews with residents of the NCP do not represent the views of 800,000 farmers in the province. Engaging with such groups at a time when they are struggling due to the challenges of COVID-19 could be considered unethical. Therefore, with respect for their time and the understanding that they would not have any direct or immediate benefit from this paper, seeking interviews with direct victims was avoided. Instead, the narration of professionals and a few selected

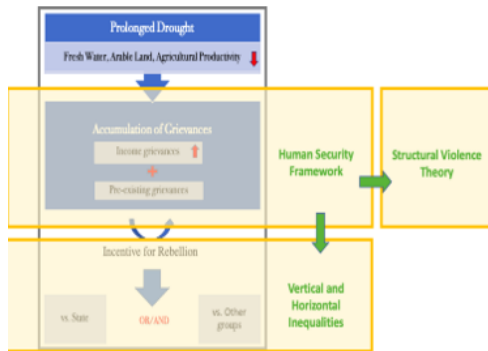
villagers with sound grass-roots experience were relied upon, for the representation of the realities of these vulnerable groups.

#### Validity and limitations of research

The statements made by the interviewees were confirmed by a triangulation approach. Quantitative data was not generated to support correlations between the variables, given the vast number of variables which come into play before a community engages in violence. Such variables include ethnicity (Murphy, 2013), a history of conflict in the region (Gilmore et al., 2018), geographical distribution and distance from water sources (Barbier, 2003), political settlements with local political leaders (Batisani and Yarnal, 2010) etc. Furthermore, there was difficulty in collecting data without conducting a field study. Therefore, although conclusive evidence cannot be generated through the findings of this paper, the study serves as written evidence, documenting the need for rigorous studies on this topic, in the future.

## **RESULTS AND ANALYSIS**

The “accumulation of grievances” was evaluated using the Human Security framework to identify human insecurities in the farming community in the NCP. The role of the state in creating these insecurities was assessed using the structural violence theory. The insecurities were then analyzed using the vertical/horizontal inequalities theory to identify incentives for conflict (either against the state or against other groups).



Research Question 1: What might an analysis of the impact of climate-driven water scarcity reveal about the status of human insecurity in the NCP?

### Income grievance

- Economic Insecurity  
Loss of income due to low harvest

In December 2016, a drought severely affected access to drinking water, the size of land farmers were able to seed, and the percentage of rice seeded that was ultimately harvested. Water storage fell below one-third of the capacity in Anuradhapura and below half of the capacity in Polonnaruwa (Department of Irrigation, 2017). The drought was one of the worst in recent history, as precipitation dropped by more than 50%, destroying 137,017 hectares of agricultural land (Gunatilaka, 2017). Production in the 2016/17 season was less than half the 10-year seasonal average (310,000 metric tons versus 690,000 on average) (FAO, 2017). More than 50% of those affected lost over one-third of their expected income (WFP, 2017). Although farmers from Anuradhapura and Polonnaruwa had relatively lower crop damage than other districts, they had a relatively higher loss of livelihood because of their inability to diversify from paddy cultivation. Some districts which had high crop damage such as Mannar did not lose their livelihood, as they had access to the sea, and were able

to diversify their livelihood into fishing (FAO, 2017). The loss of income from agriculture forces farmers to take loans (Prasanna, 2018). Over 60% of those who suffered from the drought in 2016 had obtained loans. Microcredit loans are a popular choice because their loan interest rates and payment schedules appear favourable to farmers (Sivatharshika and Thayaparan, 2019). However, unforeseen environmental conditions reduce the harvest and hence the income, further affecting payment plans. As a result, farmers seek microcredit facilities. These institutions are unregulated and exploit farmers with loans at high interest rates and unrealistic payback dates, resulting in a growing number of farmer suicides in SL (Cuong, 2008). Often, those affected by one drought are exposed to another drought as well. Repeated exposure to such shocks could undermine the resilience to such income losses due to CC (Uexkull, 2014).

### Pre-existing grievances

- Health Insecurity

For over 20 years the farmers of the NCP have been suffering from Chronic Kidney Disease, classified to be of “Unknown aetiology” (CKDu). It is mysteriously unique only to the NCP. Middle-aged, economically active men between the ages of 40-60, from the farming community, are the most vulnerable (Ranasinghe et al., 2019). The number of CKDu patients doubles every 5 years (Wimalawansa, 2015). Currently, there are up to 30,500 patients in the province (Ranasinghe et al., 2019) and 15% of households have lost at least one member to CKDu (Kafle et al., 2019). There is no specific treatment for the disease (Rajapakse et al., 2016). There is growing frustration due to the lack of measures taken by the government to address this issue (Wimalawansa, 2015).

- **Environmental security**

The Sri Lankan government owns 82% of the total land in Sri Lanka. 85% of the land allocated for agriculture is leased to farmers under varying tenure agreements with the state, while 15% of farming land is owned privately (Zappacosta and Hollema, 2017). PARL has documented instances in Anuradhapura, where the state reclaimed farming land from families after 99 years, based on the legal grounds that the lands were not owned but only leased by farmers on a long-term government lease (PARL, 2018).

Farmers who have invested decades in developing their lands find themselves relocated to lands which require that they start over. This is recognized as unlawful land grabbing by some, who recognize this as a violation of their right to land (Ratnayeke and Hapugoda, 2016). In closing, the finding for the first research question is that climate driven water scarcity impacts human insecurity of communities in the NCP. It is, therefore, crucial that the government provides adequate adaptive capacity, to ensure that insecurities are not further exacerbated in the event of water scarcity.

Research Question 2: Does the current water governance practices of the Sri Lankan government increase human insecurity?

### **Economic security and structural violence**

A study on 35 countries across the Mediterranean and Sub-Saharan Africa, found that conflict over water is increasingly likely when the agricultural sector competes with the private sector for water (Bohmelt (2014); Gizelis and Wooden, 2010). This finding is also seen in the NCP. A farmer from Hingurakgoda, Polonnaruwa, who volunteers as an activist for fair water distribution, was interviewed as part of this study. The farmer accused the government of giving

priority to the industrial elites when distributing water. The farmer perceives there is persistent structural violence against them, in this instance. It is important to note that it is the farmers' perception of water scarcity that potentially leads to conflict, regardless of the actual availability of water (Rao et al., 2010, Simelton et al., 2013) as these perceptions are ultimately shaped by their economic performance (Bryan et al., 2009, Thomas et al., 2007). This farmer's view is validated by the results of a study by the Center for International Development at Harvard University (O' Brian, T., 2018) which revealed that the economic activities of the province is rapidly moving into the service sector i.e., tourism and depending less on farming.

### **Health security and structural violence**

Many studies by both local and foreign institutions have surmised the root cause as drinking groundwater contaminated with fertilizers, pesticides etc. (Kafle et al., 2019). The government is accused of not officially disclosing the root cause of the disease yet. Some authors believe there is pressure from the agrochemical industry to silence accusations against the suspected brands of pesticides, which are imported from politically aligned countries and given at subsidized rates by the government (Wanigasuriya et al., 2011; Jayatileke et al., 2013; Jayasumana et al., 2014). The government is accused of structural violence, as they continue to give patronage to high-yielding fertilizers as opposed to organic farming by overlooking the health costs and aspirations of poor farmers (Chandrajith et al., 2011). Anthropologists describe such dilemmas as instances of structural violence in agrarian communities because farmers are expected to accept suffering as part of their everyday life (Scheper-Hughes, 1993), with no regard given to their right to health (Scheper-Hughes, 1993).

## **Environmental security and structural violence**

PARL (2020) identified a neo-liberal economic strategy of the Sri Lankan government, which allows the state to correct market failures by allowing competition and prioritizing private sector innovation (Acemoglu and Akcigit, 2012). This principle leads the government to acquire large areas of rural land for industrialization, with the belief that the labour force would originate from the natives in the area (Hoekstra and Chapagain, 2006). The government does not focus on traditional sectors; instead, they prioritize innovation and private sector markets (Tyce, 2020). This economic strategy of the government is increasingly perceived as a grievance by farmers, who continue to feel disadvantaged by the development policies of the state. Further, the government policy which justifies forced evictions of poor farmers by disregarding their right to land is described as a form of structural violence in the grey literature (PARL, 2020). The above analysis exposes how the government of Sri Lanka is accused of structural violence from academics, activists and grassroots communities alike. Ironically, structural violence against the farming community is hidden within development policy. These policies often introduce new insecurities or exacerbate existing insecurities, as opposed to eliminating them. This leads to an increasing accumulation of grievances, which will be aggravated by Climate Change unless these policies are significantly revamped.

Research Question 3: Is there preliminary evidence suggesting this community would rise in conflict against the state?

Based on the findings for questions 1 and 2, it is evident that there is a rising human insecurity in the NCP. The framework by Uexkull (2014) suggests a

corresponding emergence of incentives for conflict. The way human insecurities give rise to such incentives will be analyzed using the vertical and horizontal inequalities theory by Frances Stewart. When the theory was first proposed, conflicts were linked to both vertical and horizontal inequalities. However, studies have found that there is higher conflict potential in the case of horizontal inequalities (Ostby, 2013). There is little empirical evidence to support a link between vertical inequalities and conflicts (e.g., conflicts along income inequality where the poor mobilize against the rich), but significant correlation between horizontal inequalities and conflict (e.g., conflicts along group identity) (Ostby, 2013). The reason being that financing conflicts along group identities is more certain, as the group would include those who are capable of providing funding for the cause, as well as those who are motivated by financial incentives (Zartman, 2011).

## **Risk of conflict along vertical inequalities**

The difficulty for farmers in the NCP to organize themselves was confirmed in the interview with the water activist from Polonnaruwa. He was of the view that farmers are not united enough to create a change, especially as they are daily wage earners. Farmers who invest time in activism and communal activities are subject to a loss of income due to the time expended away from the field (Heurlin, 2019).

In another interview, a farmer described the government's presence at the grassroots level. It is perceived that most village-level farmer organizations are funded by the government. Vocal/active village farmers are appointed as middlemen between the government and the other farmers, their loyalty to the government suppresses the possibility of rebellion. Even when tensions arise

between farmers, they do not collectively organize themselves to rebel against the government. The mechanism of setting up farmer collectives was explained by a government employee at the National Community Water Board in Anuradhapura. When the government provides a reverse osmosis water filter for the village, they also support the community to set up a community-based organization (CBO) that is mandated to manage how water is distributed amongst the villagers. She confirmed that while there are no issues between different groups within the community over water (caste/ethnic groups), there are arguments between the farmers who are selected as officials of the CBO and farmers who depend on these officials for representation. This observation was also shared by another government employee, whose family are farmers engaged in the Mahaweli Agricultural Scheme (the largest such scheme in Sri Lanka). She said communal conflicts only emerged between farmers as they competed for water, but not against the government. This confirms literature findings which suggest that organizing conflicts in the instance of vertical inequalities is a challenge.

### **Risk of conflict along horizontal inequalities**

In Sri Lanka the strongest group identity is along ethnic/ religious lines (Korf, 2006). In an attempt to gain a preliminary understanding of horizontal inequalities along ethnic lines, interviews with both Muslims and Sinhalese from the NCP were conducted. They agreed that water distribution for both domestic and agricultural was not affected by racial discrimination of government employees. In 2019, radical Buddhist monks incited anti-Muslim rhetoric across the country, which also seeped into the NCP. Both Buddhist and Muslim interviewees expressed that anti-Muslim sentiments

well under control at the time data was collected for this paper in mid-2020. However, despite Sinhalese and Muslim farmers reportedly living in harmony during the research period, there are political and historical factors which could allow these communities to see water scarcity as a form of horizontal inequality.

An understanding of political settlements would further shed light on the possibility of inter-ethnic conflict over water. Political settlements are understood to be informal agreements and arrangements made between elites, which drive organizational agendas (Khan and Sundaram in Kilby, 2001). Political settlements in developing countries differ from those in developed countries based on the role of finances as a source of power. Formal institutions in developing countries are smaller and are, therefore, less able to generate and distribute wealth to the smaller segments of a community. Thus, institutional power is not determined by finances but by informal agreements. Therefore, the distribution of benefits to the public is not determined just by formal structures but by the informal political dynamics which play within the institution (Stewart, 2019).

Tensions between the Sinhalese majority and Tamil/Muslim minority ethnic groups emerged during colonial rule. The Sinhalese were known to be “a majority with a minority complex”, as colonial rulers provided English education and favoured minorities for important positions in government, excluding the Sinhalese from positions of power and opportunities (Jayawardena, 2012). In 1948, following independence, the new government introduced a first-past-the-post electoral system. Sinhalese parliamentarians used ethnopoltics to secure a majority vote and diverted resources for the development and welfare of the rural Sinhalese peasantry (mainly farmers), intending to maintain political loyalty. The previously overlooked

Sinhalese farmers were elevated to “elite” status (Sivanadan, 1984). At present, the government continues to assure Sinhalese farmers that the political settlements still exist today, however, the farmers are increasingly questioning this notion. This is because the resources diverted to farmers have reduced over time. Furthermore, Sinhalese have been farmers in the NCP for over 2 millennia while minority farmers and settlements emerged in NCP more recently and so they have a strong sense of ownership of these lands.

An interview with the director of the National Peace Council of Sri Lanka uncovered that water scarcity could drive the Sinhalese to feel a sense of rightful inheritance of the functional ancient water tanks in the NCP. Ethno-politics, which is a significant political tactic of leaders across all ethnic groups, could manipulate the grievances of water scarcity into being a competition between races. The above-mentioned interviews and recent studies on vertical inequalities indicate that farmers are unable to mobilize themselves against the state despite experiencing common vertical inequalities. Therefore, a risk of conflict could potentially emerge if farmers blame their insecurities on horizontal inequalities. A thorough analysis of the varying factors which could lead to ethnic conflict over water resources was not conducted as part of this paper, as it is beyond the scope of the intended study. However, the results of the paper strongly suggest that climate-driven conflicts along horizontal inequalities are an area for further research, especially in a country with a long history of inter-communal violence.

## ***RECOMMENDATIONS***

- Amendments to existing policies

Sri Lanka ratified the United Nations Framework Convention on Climate Change (UNFCCC) & Kyoto Protocol in 2002 (Climate Change Secretariat, 2012).

Sri Lanka’s Climate Change policy was launched in 2012 (Climate Change Secretariat, 2012, p.6), The general objective of the policy is to “enhance knowledge on the multifaceted issues related to Climate Change in the society and build their capacity to make prudent choices in decision making”. The key areas were identified for intervention in the Climate Change policy: vulnerability, adaptation, mitigation, sustainable consumption, production, and knowledge management. Despite the many international examples of the link between Climate Change and conflict, there is no mention of the vulnerability to social conflicts and inequalities, which may arise in the event of water scarcity in this document. This is an important amendment that needs to be added to the policy. Furthermore, this study also reveals the need for policy makers to ensure that development policies are designed to take a more holistic approach when addressing the needs of a community. This can be done by ensuring better knowledge sharing and corporation among ministries e.g.: the Climate Change secretariat could include conflict prediction in its policy, while the ministry for reconciliation could include the need to mitigate future climate conflict in its National Reconciliation policy.

- Expanding the scope of civil society

Since the end of the civil war in 2010, Sri Lanka’s civil society has launched multiple peacebuilding campaigns to prevent the recurrence of conflict. The findings of this study reveal that civil society should strategically engage in conflict prevention, in areas where there is potential for high incidences of human insecurity due to climate change. Vulnerable communities are unaware of the potential for conflict emerging due to water scarcity. Civil society could build inter-religious and inter-ethnic cohesion



between communities by promoting the acceptance of resource sharing and encouraging mutually beneficial climate adaptation initiatives in the dry zone. The need to share water could be used as an opportunity to promote cooperation. A rare example comes from the water-stressed Jordan River basin, where the need to share water sources with Israel catalyzed cooperation between Jordan and Israel, as rivers are running across the two neighbouring nations. The countries were historically antagonistic towards each other; however, they chose peace over conflict to resolve the issue of sharing water resources.

## **CONCLUSION**

The data collected through this study affirms that Climate Change imposes a threat on Human Security of farmers in NCP. Climate Change exacerbates existing grievances and intensifies human insecurity, where its consequences are not limited to communities at large, but also impact the Human Security of individuals. However, it appears that the state has not recognized the potential for conflict when climate adaptation policies exacerbate human insecurities in vulnerable communities. Variables such as institutional governance practices could potentially catalyze climate- conflicts in Sri Lanka, as it does in other regions as well. The persistent structural violence against a community that is increasingly challenged by the threat of losing their livelihoods to Climate Change, reflects the need for civil society and the general public to keep the relevant officials accountable. The government of Sri Lanka could contribute significantly to the emergence of a potential conflict if left unchecked.

The nature of ethnopolitics in the country makes Sri Lanka vulnerable to the politicization of water resources, especially in areas such as the NCP. Here,

frustrated farmers could potentially turn against another group, hoping it would reinstate their sense of security. Despite the limitations of the study, it demonstrates that Sri Lanka is facing circumstances that are theoretically proven to be precursors of conflict (e.g.: human insecurity, history of conflicts, political settlements). The study highlights a progression of how grievances could turn into insecurities and potentially lead to conflict within an agrarian setting. Overall, the study provides a preliminary understanding of the current and upcoming realities of human insecurity in agrarian communities, and the potential for conflict in the province which is home to the largest population of farmers in the country. Based on the results of the systematic review conducted before writing this paper, it is likely that this study is the first of its kind, in terms of studying conflict prediction in Sri Lanka's agrarian community. Thus, the paper could serve as a platform upon which further studies on climate-conflict prediction could launch in Sri Lanka.

## **REFERENCES**

- Abel, G. J., Brotrager, M., Crespo Cuaresma, J., & Muttarak, R. (2019). *Climate, Conflict and Forced Migration. Global Environmental Change, 54*, 239–249.  
<https://doi.org/10.1016/j.gloenvcha.2018.12.003>
- Abeysekera, A., & Punyawardena, B. (2016). *Potential and Constraints of Climate for Groundwater Management in the Dry Zone of Sri Lanka. Groundwater Availability and Use in the Dry Zone of Sri Lanka, 1(1)*.
- Acemoglu, D., & Akcigit, U. (2011). *Intellectual Property Rights Policy, Competition And Innovation. Journal of the European Economic Association, 10(1)*, 1–42.  
<https://doi.org/10.1111/j.1542-4774.2011.01053.x>

- Adams, C., Ide, T., Barnett, J., & Detges, A. (2018). Sampling Bias in Climate–Conflict Research. *Nature Climate Change*, 8(3), 200–203. <https://doi.org/10.1038/s41558-018-0068-2>
- Adger, A., Pulhim, J., & Barnett, A. (2014). Human security. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects, Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. In IPCC (pp. 755–791).
- Alkire, S. (2003). A Conceptual Framework for Human Security. *Queen Elizabeth House, University of Oxford: Centre for Research on Inequality, Human Security and Ethnicity*.
- Altomonte, S. (2009). Climate Change and Architecture: Mitigation and Adaptation Strategies for a Sustainable Development. *Journal of Sustainable Development*, 1(1).<https://doi.org/10.5539/jsd.v1n1p97>
- Adzawla, W., Baumüller, H. & Renata Serra (2020) Effects of climate change and livelihood diversification on the gendered productivity gap in Northern Ghana. *Climate and Development*, 12:8, 743-755, DOI: 10.1080/17565529.2019.1689093
- Barbier, E. B. (2003). Upstream Dams and Downstream Water Allocation: The Case of the Hadejia-Jama'are Floodplain, Northern Nigeria. *Water Resources Research*, 39(11). <https://doi.org/10.1029/2003wr002249>
- Barnett, J., & Adger, W. N. (2007). Climate Change, Human Security and Violent Conflict. *Political Geography*, 26(6), 639-655. <https://doi.org/10.1016/j.polgeo.2007.03.003>
- Batisani, N., & Yarnal, B. (2010). Rainfall Variability and Trends in Semi-Arid Botswana: Implications for Climate Change Adaptation Policy. *Applied Geography*, 30(4), 483–489. <https://doi.org/10.1016/j.apgeog.2009.10.007>
- Bello, L. D. (2017). Could Restoring Ancient Water Tanks help Build Peace in Sri Lanka? *The Guardian*. Retrieved from <https://www.theguardian.com/global-development-professionals-network/2017/feb/07/water-security-sri-lanka-war-peace-climate-change>
- Bernauer, T., & Siegfried, T. (2012). Climate Change and International Water Conflict in Central Asia. *Journal of Peace Research*, 49(1), 227–239. <https://doi.org/10.1177/0022343311425843>
- Böhmelt, T., Bernauer, T., Buhaug, H., Gleditsch, N. P., Tribaldos, T., & Wischnath, G. (2014). Demand, supply, and restraint: Determinants of domestic water conflict and cooperation. *Global Environmental Change*, 29, 337–348. <https://doi.org/10.1016/j.gloenvcha.2013.11.018>
- Brouwer, R., & Hofkes, M. (2008). Integrated Hydro-Economic Modelling: Approaches, Key Issues and Future Research Directions. *Ecological Economics*, 66(1), 16–22. <https://doi.org/10.1016/j.ecolecon.2008.02.009>
- Bryan, E., Deressa, T. T., Gbetibouo, G. A., & Ringler, C. (2009). Adaptation to Climate Change in Ethiopia and South Africa: Options and Constraints. *Environmental Science & Policy*, 12(4), 413–426. <https://doi.org/10.1016/j.envsci.2008.11.002>
- Bui, S., Cardona, A., Lamine, C., & Cerf, M. (2016). Sustainability Transitions: Insights on Processes of Niche-Regime Interaction and Regime Reconfiguration in Agri-Food Systems. *Journal of Rural Studies*, 48, 92–103. <https://doi.org/10.1016/j.jrurstud.2016.10.003>
- Burchfield, E. K., & Gilligan, J. (2016). Agricultural Adaptation to Drought in the Sri Lankan Dry Zone. *Applied Geography*, 77, 92–100. <https://doi.org/10.1016/j.apgeog.2016.10.003>

- Camisani, P. B. (2018). Sri Lanka: a Political Ecology of Socio-Environmental Conflicts and Development Projects. *Sustainability Science*, 13(3), 693–707. <https://doi.org/10.1007/s11625-018-0544-7>
- Chandrajith, R., Nanayakkara, S., Itai, K., Aturaliya, T. N. C., Dissanayake, C. B., Abeysekera, T., ... Koizumi, A. (2010). Chronic kidney diseases of uncertain etiology (CKDue) in Sri Lanka: geographic distribution and environmental implications. *Environmental Geochemistry and Health*, 33(3), 267–278. <https://doi.org/10.1007/s10653-010-9339-1>
- Charoenratana, S., & Shinohara, C. (2018). Rural Farmers in an Unequal World: Land Rights and Food Security for Sustainable Well-Being. *Land Use Policy*, 78, 185–194. <https://doi.org/10.1016/j.landusepol.2018.06.042>
- Climate Change Secretariat (Ministry of Mahaweli Development and Environment). (2016). *National Adaptation Plan for Climate Change Impacts in Sri Lanka* (pp. 1–20). Colombo, Sri Lanka.
- Collier, P., & Hoeffler, A. (1998). On economic causes of civil war. *Oxford Economic Papers*, 50(4), 563–573. <https://doi.org/10.1093/oenp/50.4.563>
- Collier, P., & Hoeffler, A. (2004). Greed and grievance in civil war. *Oxford Economic Papers*, 56(4), 563–595. <https://doi.org/10.1093/oenp/gpf064>
- Cosgrove, W. J., & Loucks, D. P. (2015). Water Management: Current and Future Challenges and Research Directions. *Water Resources Research*, 51(6), 4823–4839. <https://doi.org/10.1002/2014wr016869>
- Coventry, W. L., & Dalgleish, L. I. (2013). Farmers' Accuracy Interpreting Seasonal Climate Forecast Probability. *International Journal of Climatology*, 34(6), 2097–2107. <https://doi.org/10.1002/joc.3825>
- Dilrukshi, W. P. T., & Muddannayake, I. (2015). A Study On Agriculture Information Generation And Dissemination At The Department Of Agriculture (DOA) in Sri Lanka. *Journal of the University Librarians Association of Sri Lanka*, 18(1), 72. <https://doi.org/10.4038/jula.v18i1.7862>
- Dissanayake, C. B. (2005). Water Quality in the Dry Zone of Sri Lanka - Some Interesting Health Aspects. *Journal of the National Science Foundation of Sri Lanka*, 33(3), 161.
- Dolšak, N., & Prakash, A. (2018). The Politics of Climate Change Adaptation. *Annual Review of Environment and Resources*, 43(1), 317–341. <https://doi.org/10.1146/annurev-environ-102017-025739>
- De Silva, M. W. A., Albert, S. M., & Jayasekara, J. M. K. B. (2017). Structural Violence and Chronic Kidney Disease of Unknown Etiology in Sri Lanka. *Social Science & Medicine*, 178, 184–195. <https://doi.org/10.1016/j.socscimed.2017.02.016>
- FAO. (2018). Mahaweli Authority of Sri Lanka Act 1979 (No. 23 of 1979). Retrieved August 26, 2020, from [www.fao.org website: http://www.fao.org/faolex/results/details/en/c/LEX-FAOC014531/](http://www.fao.org/website:http://www.fao.org/faolex/results/details/en/c/LEX-FAOC014531/)
- Feitelson, E & Tubi, A (2017) A main driver or an intermediate variable? Climate change, water and security in the Middle East. *Global Environmental Change Volume 44*, May 2017, Pages 39-48
- Fink, G. (2010). *Stress of War, Conflict and Disaster*. Amsterdam ; Boston: Academic Press.
- Galtung, J. (1969). Violence, Peace, and Peace Research. *Journal of Peace Research*, 6(3), 167–191. <https://doi.org/10.1177/002234336900600301>
- Gilmore, E. A., Herzer Risi, L., Tennant, E., & Buhaug, H. (2018). Bridging Research and Policy on Climate Change and Conflict. *Current Climate Change Reports*, 4(4), 313–

319. <https://doi.org/10.1007/s40641-018-0119-9>
- Gizelis, T., & Wooden, A. (2010). *Water Resources, Institutions, & Intrastate Conflict*. *Political Geography*, 29, 444.
- Gleditsch, N., Wallensteen, P., Eriksson, M., Sollenberg, M., & Strand, H. (2002). *Armed Conflict 1946-2001: A New Dataset*. *Journal of Peace Research*, 39(5), 615–637. <https://doi.org/10.1177/0022343302039005007>
- Gleick, P. H. (2014). *Water, Drought, Climate Change, and Conflict in Syria*. *Weather, Climate, and Society*, 6(3), 331–340. <https://doi.org/10.1175/wcas-d-13-00059.1>
- Global Climate Risk Index. (n.d.). Retrieved August 24, 2020, from [germanwatch.org](http://germanwatch.org) website:<https://germanwatch.org/en/crisi>
- Goonewardena, K. (2020). *Populism, Nationalism and Marxism in Sri Lanka: from Anti-Colonial Struggle to Authoritarian Neoliberalism*. *Geografiska Annaler: Series B, Human Geography*, 102(3), 289–304. <https://doi.org/10.1080/04353684.2020.1780146>
- Gunatilaka, A. (2008) *Water security and related issues in Sri Lanka : the need for integrated water resource management* (IWRM). *J.Natn.Sci.Foundation Sri Lanka* 2008 36 Special Issue 3-13
- Gunawardhana, L. (2017). *Exploring Socio-Economic Vulnerability of Drought: A case in the North Central Province, Sri Lanka*. *Environmental Economics : Sri Lanka Economics Research Conference 2017*. Rajarata University of Sri Lanka, Mihintale, Sri Lanka.
- Heurlin, C. (2019). *Fighting for Every Inch of Land: Greed and Grievance in Petition Mobilization in Zhejiang*. *Modern China*, 009770041985959. <https://doi.org/10.1177/0097700419859591>
- Hoekstra, A. Y., & Chapagain, A. K. (2006). *Water Footprints of Nations: Water Use by People as a Function of Their Consumption Pattern*. *Water Resources Management*, 21(1), 35–48. <https://doi.org/10.1007/s11269-006-9039-x>
- Homer-Dixon, T. F. (1999). *Environment, Scarcity, And Violence*. Princeton, N.J.; Oxford, England: Princeton University Press.
- Ide, T. (2017). *Research Methods For Exploring The Links Between Climate Change And Conflict*. *Wiley Interdisciplinary Reviews: Climate Change*, 8(3), e456. <https://doi.org/10.1002/wcc.456>
- Jayasinghe, U., Rambodagedara, M., & Perera, S. (2017). *Income Diversification of Paddy Farming Households in Anuradhapura District*. Colombo, Sri Lanka: Hector Kobbekaduwa Agrarian Research and Training Institute.
- Jayawardena, R. (2012). *The Concretization of Sinhalese into the Ethnic Identity by Buddhist Pilgrimages: A Historical Investigation*. *Sri Lanka Journal of Advanced Social Studies*, 1(2). <https://doi.org/10.4038/sljass.v1i2.4857>
- Ji, Y., Chen, L., & Sun, R. (2012). *Temporal and Spatial Variability of Water Supply Stress in the Haihe River Basin, Northern China*. *JAWRA Journal of the American Water Resources Association*, 48(5), 999–1007. <https://doi.org/10.1111/j.1752-1688.2012.00671.x>
- Jürgen Scheffran, & Brauch, H. (2012). *Climate Change, Human Security and Violent Conflict : Challenges for Societal Stability* (pp. 3–20). Heidelberg: Springer.
- Köpke, S., Withanachchi, S. S., Pathiranage, R., Withanachchi, C. R., & Ploeger, A. (2018). *Social–Ecological Dynamics In Irrigated Agriculture In Dry Zone Sri Lanka: A Political Ecology*. *Sustainable Water Resources Management*, 5(2), 629–637. <https://doi.org/10.1007/s40899-018-0220-1>
- Korf, B. (2005). *Rethinking the Greed–Grievance Nexus: Property Rights and the Political Economy of War in*

- Sri Lanka. *Journal of Peace Research*, 42(2), 201–217. <https://doi.org/10.1177/0022343305050691>
- Korf, B., & Engel, S. (2006). *On the Incentives of Violence*. *South Asia Economic Journal*, 7(1), 99–116.
- Kummu, M., Guillaume, J. H. A., de Moel, H., Eisner, S., Flörke, M., Porkka, M., ... Ward, P. J. (2016). *The World's Road To Water Scarcity: Shortage And Stress In The 20th Century And Pathways Towards Sustainability*. *Scientific Reports*, 6(1). <https://doi.org/10.1038/srep38495>
- MacNaughton, G. (2017). *Vertical Inequalities: Are The Sdgs And Human Rights Up To The Challenges?* *The International Journal of Human Rights*, 21(8), 1050–1072. <https://doi.org/10.1080/13642987.2017.1348697>
- Malmgren, B. A., Hulugalla, R., Hayashi, Y., & Mikami, T. (2003). *Precipitation Trends In Sri Lanka Since The 1870s And Relationships To El Niño-Southern Oscillation*. *International Journal Of Climatology*, 23(10), 1235–1252. <https://doi.org/10.1002/joc.921>
- Manthrithilake, H., & Liyanagama, B. S. (2012). *Simulation Model For Participatory Decision Making: Water Allocation Policy Implementation In Sri Lanka*. *Water International*, 37(4), 478–491. <https://doi.org/10.1080/02508060.2012.708602>
- Mikulewicz, M. (2019). *Thwarting Adaptation's Potential? A Critique Of Resilience And Climate-Resilient Development*. *Geoforum*, 104, 267–282. <https://doi.org/10.1016/j.geoforum.2019.05.010>
- Mimura, A. (2013). *Addressing Climate Change Impacts on Marginalized Agricultural Communities Living in the Mahaweli River Basin of Sri Lanka*. Retrieved September 1, 2020, from *Adaptation Fund website*: <https://www.adaptation-fund.org/project/addressing-climate-change-impacts-on-marginalized-agricultural-communities-living-in-the-mahaweli-river-basin-of-sri-lanka/>
- Murphy, M. (2013). *Climate Change and the Color Line*. *Class Race Corporate Power*, 1(1). <https://doi.org/10.25148/crcp.1.1.16092145>
- Nirmin.gov.lk. (2017). *Ministry of National Integration & Reconciliation - National Reconciliation Policy*. Retrieved from nirmin.gov.lk website: [http://nirmin.gov.lk/index.php?option=com\\_content&view=article&id=43&Itemid=216&lang=en](http://nirmin.gov.lk/index.php?option=com_content&view=article&id=43&Itemid=216&lang=en)
- O'Brien, T., 2018. *Sri Lanka's North Central Province: A Growth Diagnostic*. Copy at <http://www.tinyurl.com/y7dldssw>
- People's Alliance for Right to Land (2020). *Our Lanka Our Right (Peoples Land Commission Report)* <https://drive.google.com/drive/folders/19CGinDt1mr21sBWSouJTQhxPGKw3-Yw>
- Prasanna, R. (2018). *Economic Cost of Drought and Farmers' Adaptation Strategies: Evidence from Sri Lanka*. *Sri Lanka Journal of Economic Research*, 5(2).
- Punyawardena, B., Mehmood, A., Hettiarachchi, S., & Iqbal, I. (2013). *Future Climate of Sri Lanka: An Approach Through Dynamic Downscaling of ECHAM4 General Circulation Model*. *Tropical Agriculturist*, 161.
- Rajapakse, S., Shivanthan, M. C., & Selvarajah, M. (2016). *Chronic Kidney Disease of Unknown Etiology in Sri Lanka*. *International Journal of Occupational and Environmental Health*, 22(3), 259–264. <https://doi.org/10.1080/10773525.2016.1203097>
- Raleigh, C., Linke, A., & O'Loughlin, J. (2014). *Extreme Temperatures and Violence*. *Nature Climate Change*, 4(2), 77. <https://doi.org/10.1038/nclimate2101>
- Ranasinghe, A. V., Kumara, G. W. G. P., Karunaratna, R. H., De Silva, A. P., Sachintani, K. G. D., Gunawardena, J. M. C., ... De Silva, M. V. C. (2019). *The Incidence, Prevalence and Trends of Chronic Kidney Disease*

- and Chronic Kidney Disease of Uncertain Aetiology (CKDu) in the North Central Province of Sri Lanka: an Analysis of 30,566 Patients. *BMC Nephrology*, 20(1). <https://doi.org/10.1186/s12882-019-1501-0>
- RAO, K. P. C., NDEGWA, W. G., KIZITO, K., & OYOO, A. (2011). Climate Variability and Change: Farmer Perceptions And Understanding Of Intra-Seasonal Variability In Rainfall And Associated Risk In Semi-Arid Kenya. *Experimental Agriculture*, 47(2), 267–291. <https://doi.org/10.1017/s0014479710000918>
- Ratnayake, I., & Hapugoda, M. (2016). Tourism Under Military: A Critique on Land Utilization and Tourism in Postwar Sri Lanka. *Sabaragamuwa University Journal*, 15(1), 18. <https://doi.org/10.4038/suslj.v15i1.7705>
- Sarjoon, A., Yusoff, M., & Hussin, N. (2016). Anti-Muslim Sentiments and Violence: A Major Threat to Ethnic Reconciliation and Ethnic Harmony in Post-War Sri Lanka. *Religions*, 7(10), 125. <https://doi.org/10.3390/rel7100125>
- Simelton, E., Quinn, C. H., Batisani, N., Dougill, A. J., Dyer, J. C., Fraser, E. D. G., Stringer, L. C. (2013). Is Rainfall Really Changing? Farmers' Perceptions, Meteorological Data, And Policy Implications. *Climate and Development*, 5(2), 123–138. <https://doi.org/10.1080/17565529.2012.751893>
- Sivanandan, A. (1984). Sri Lanka: Racism And The Politics Of Underdevelopment. *Race & Class*, 26(1), 1–37. <https://doi.org/10.1177/030639688402600102>
- Stewart, F., Brown, G., & Mancini, L. (2005). Why Horizontal Inequalities are Important for a Shared Society (Vol. 57, pp. 3–5). <https://doi.org/10.1057/dev.2014.30>
- Stewart, J. (2019). Anti-Muslim Hate Speech and Displacement Narratives: Case Studies from Sri Lanka and Australia. *Australian Journal of Social Issues*, 54(4), 418–435. <https://doi.org/10.1002/ajs4.83>
- Themnér, L., & Wallensteen, P. (2014). Armed conflicts, 1946–2013. *Journal of Peace Research*, 51(4), 541–554. <https://doi.org/10.1177/0022343314542076>
- Tyce, M. (2020). Beyond the Neoliberal-Statist Divide on the Drivers of Innovation: A Political Settlements Reading of Kenya's M-Pesa Success Story. *World Development*, 125, 104621. <https://doi.org/10.1016/j.worlddev.2019.104621>
- UNDP. (2016). *Engaged Societies, Responsive States: The Social Contract in Situations of Conflict and Fragility*. New York: United Nations Development Program.
- UNFCCC. (1992). *United Nations Framework Convention On Climate Change*. UN.org.
- Usha, N., & Devakumar, G. (2019). Modelling Business Sustainability in Agri Engineering Manufacturing Companies: Effect of Innovation, Technology and Business Model. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3508579>
- WFP. (2017). *Joint Assessment of Drought Impact on Food Security and Livelihoods*. United Nations World Food Programme.
- Wilhite, B., & Buchanan-Smith, M. (2005). *Drought and Water Crisis : Science, Technology, and Management issues*. S.L.: CRC Press.
- Wimalawansa, S. (2015). Agrochemicals and Chronic Kidney Disease of Multi-Factorial Origin: Environmentally Induced Occupational Exposure An Occupational Exposure Disease. *International Journal of Nephrology and Kidney Failure* ( ISSN 2380-5498 ), 1(3). <https://doi.org/10.16966/2380-5498.111>
- World Bank. (2019). Rural population (% of total population) - Sri Lanka | Data. Retrieved August 28, 2020, from [data.worldbank.org website: https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS?locations=LK](https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS?locations=LK)
- Zappacosta, M., & Hollema, S. (2017). *FAO/WFP Crop And Food Security*

*Assessment Mission To Sri Lanka.*  
Rome: Food and Agriculture  
Organization.

Zartman, I. W. (2011). *Greed and Grievance: Methodological and Epistemological Underpinnings of the Debate.* *Studies in Ethnicity and Nationalism*, 11(2), 298–307.  
<https://doi.org/10.1111/j.1399-6576.2011.01120.x>

Zografos, C., Goulden, M. C., & Kallis, G. (2014). *Sources of human insecurity in the face of hydro-climatic change.* *Global Environmental Change*, 29, 327–336.  
<https://doi.org/10.1016/j.gloenvcha.2013.11>.