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## Letter from the Editors

It is our pleasure to welcome you to the eighth volume of *Mapping Politics*. We are grateful to have had the opportunity to contribute to the journal, the Political Science Department, and to the University. The students and faculty members of Memorial University have added great value to our lives during our own studies, and editing this journal has allowed us to give something back.

The eighth volume once again highlights the incredible scholarship of the students. This volume's articles cover a diverse range of topics and issues, but more importantly are presented from a diverse set of viewpoints. The papers cover a wide range of contemporary topics and contribute to important conversations. The high quality of research and writing published in this volume once again reflects the high quality of Memorial University's students.

This has been a busy and significant year for the journal. We are pleased to be publishing 15 articles, book reviews and conference papers over three issues. This is the largest volume of work that the journal has published since it began in 2009. The first is our annual issue with a focus on political science and cognate fields of research. The second issue presents interdisciplinary work on the topic of food and is presented as a thematic special issue to celebrate HSS on Food, a year-long focus within the Faculty of Humanities and Social Science at Memorial during the 2016-2017 academic year. Finally, we are pleased to publish the proceedings of the Changing Political Landscapes conference organized by students in the Department of Political Science, Memorial University on April 7, 2017. The special issue on food and the conference proceedings will be published in late 2017 or early 2018.

*Mapping Politics* has also changed its governing structure this year to include an Editorial Board which provides oversight and accountability to the journal. Under a new constitution, this group of volunteers will select the Co-Editors for future volumes and is responsible for approving changes to the journal's policies. We are grateful to the Board members for volunteering their time to support the journal.

We would also like to thank the incredible team members that have contributed to the eighth volume. Each article published in this journal is subject to a double-blind peer review, a process which requires considerable time and effort from the reviewers. Our reviewers provided valuable feedback and insight to both the authors and to us editors, and deserve a great deal of the praise for this publication. This volume was also helped largely by a team of copy-editors, proofreaders, and a layout editor who are responsible for this final product.

Finally, we would like to thank the members of the Department of Political Science for continuing to support and contribute to *Mapping Politics*. Our thanks to Dr. Mehmet Caman for allowing us to use his peer-review template. Also, Dr. Russell Williams, the journal's faculty advisor, who supported the work of the journal over the year including many conversations about the reforms to the journal. And to all the other faculty members who contributed by encouraging students to submit their work or by providing feedback and advice our thanks as well.

MYLES EVANS & JASON D. WATERS

## Introduction to the Special Issue

It is my pleasure to welcome you to *Mapping Politics*' inaugural special issue. This collection of interdisciplinary scholarship celebrates the focus placed on food research and teaching by the Faculty of Humanities and Social Sciences, Memorial University during the 2016-2017 academic year. This diverse area of scholarship has grown in the past decades as an academic community, as reflected by the formation of the Food Advocacy Research at Memorial (F.A.R.M.) and larger associations nationally and internationally. The HSS on Food series of events and courses allowed students to engage with the scholarly community and explore ways to study the many aspects of food. We are proud to share a sample of that scholarship.

This small but important set of scholarship represents work in political science, public health and political economy. This is a different approach for a political science journal but it reflects the challenge of studying many complex subjects from a single, disciplinary lens. Making room for different traditions and foci enhances our understanding of these topics. We were privileged to have an interdisciplinary team of reviewers provide feedback on all of the peer-reviewed articles in volume 8. Graduate and undergraduate students studying history, anthropology, political economy and political science supported their colleagues by providing honest and thoughtful feedback on the initial submissions. This has resulted in the strong work that we present in this issue.

I hope that special issues become a periodic occurrence for *Mapping Politics*. The extra work involved places additional pressure on the review and editorial teams; however, they are a unique opportunity to engage with important topics across a set of scholarship that we do not often see in a regular open issue. There are many more important issues which face our communities and scholars which might benefit from a more focused issue in this way.

Many thanks have been offered in the Letter from the Editors but I wish to extend an additional word of thanks to those instructors who have put effort into developing topical course offerings at Memorial University on the topic of food. This is a topic close to my own heart as a student and scholar and I have benefitted from many of these fine scholars.

JASON D. WATERS

## About the Journal

*Mapping Politics* accepts submissions in all areas of political science and related fields from undergraduate and master's students at universities throughout Canada. This student led journal is hosted by the Department of Political Science at Memorial University of Newfoundland in St. John's, Newfoundland and Labrador.

### **Volume 8**

#### **Co-Editors**

MYLES EVANS completed a B.A. in political science and a B.Comm. with a concentration in accounting at Memorial University. He is a Chartered Professional Accountant with KPMG in St. John's. His research interests include climate change policy and federal-provincial relations.

JASON D. WATERS is a graduate student the Department of Political Science, Memorial University. His research is focused the political economy of food, with a particular interest in how alterative food economies strengthen community food security. Jason is also interested in food policy and municipal/regional governance. He is a past contributor to *Mapping Politics* and holds a B.A. (Hons) in political science from Memorial University.

#### **Review Panel**

AMY FRIEL is a writer and graduate of Memorial University with a B.A. in political science. Her work has been featured in both local and national newspapers, and has spanned subjects ranging from health and fitness to public policy and governance. She is currently working as a staff writer for iRun, a Toronto-based specialty running magazine.

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LAURA O'BRIEN is a graduate student in the Department of Political Science at Memorial University. Her research is interested in labour and applies feminist theories of care to childcare and waste management policies in search of emancipatory policy futures. Laura is also interested in community development, particularly through poverty reduction and the empowerment of marginalized communities.

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### **Faculty Advisor**

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# Starving Out the Enemy

## Withholding Food Aid as a Tactic of War in South Sudan

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**Abstract.** South Sudan has been at the heart of a relentless civil war for more than 30 years, but its ongoing violence has recently reached a level of unprecedented severity. As armed insurgents continue to clash with the government's military forces, thousands of civilians have lost their lives and millions remain displaced. Earlier this year, the country experienced a devastating and widespread famine that threatened to starve more than 100,000 people. Even now, as the country recovers, more than 5 million remain critically food insecure. Food shortages are to be expected in cases of prolonged war – however, the situation in South Sudan is considered to be “man-made”. This paper seeks to examine how access to food is obstructed during cases of protracted conflict and discusses the role of corruption in this process. This paper concludes that wealthy elites are strategically profiting from South Sudan's ongoing violence, and are, therefore, reluctant to negotiate a peace that will cost them their affluence. Withholding food aid is a tactic of war used to sustain conflict and must be recognized as a potential warning sign for future genocidal attacks.

### Introduction

The violent conflict in South Sudan that has come to define the nation, has recently reached an unprecedented level of severity. Since its secession from Sudan in July 2011, ethnic divisions, political instability, and the mismanagement of natural resources have created the perfect storm for civil war within the southern state (Al Jazeera, 2017; Freccia and Pelton, 2014). Since violence resumed after a short ceasefire in July 2016, armed insurgents continue to clash with government military forces (Al Jazeera, 2017; Roach, 2016). Thousands of civilians have lost their lives and millions remain displaced, which has posed severe cross border challenges for regional and neighboring countries. The majority of official deaths have typically been linked to organized violent attacks; however, a silent killer has recently emerged from beneath the smoking guns. South Sudan is currently recovering from a devastating famine that has crippled the nation since the beginning of this year; and even now, more than two million civilians remain severely malnourished and food insecure (France 24, 2017).

Conflict zones like South Sudan are known to be particularly vulnerable to fluctuating global market prices and shortages of both homegrown and imported foods. However, the present situation in South Sudan has been exacerbated by grand corruption, and its current food crisis is considered to be “man-made” (BBC, 2017a; Lynch 2017; Nichols, 2017c). There is enough food available to feed the South Sudanese, but it is being unlawfully withheld from civilians as a tactic

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of war. This paper examines how access to food is leveraged for military gains in cases of protracted conflict, and provides insight into the strategic benefits behind this modern war scheme. Using the political economy of conflict framework to analyze my findings, this paper concludes that a state's level of corruption significantly contributes to the longevity of its civil war. Therefore, higher levels of corruption tend to result in longer wars – and longer wars result in higher profits for political and military elites. As a result, the withholding of food aid is increasingly used by corrupt regimes as a low-cost, low-risk strategy to deliberately sustain violence (Wennmann, 2007, 2009).

### **Protracted Conflict and Food Security**

South Sudan is six years old, but it has been at war for decades with its neighbors in northern Sudan. Christians in the South were often victims of ethnically targeted attacks, and Sudan's government developed policies that frequently favored the North (Freccia and Pelton, 2014). This resulted in the South's tireless fight for equality within Sudan, and soon after became the driving force behind its desire for independence (Freccia and Pelton, 2014; Roach, 2016).

Oil was discovered in Sudan during the 1980s, which could have been used to unite the state in prosperity and development. Instead, it only fueled a deadly civil war. The country's two factions were no longer fighting over ethnic disparities, alone; but now each sought control over resource-rich land (Al Jazeera, 2017). A peace agreement was signed in 2005, which entitled the South to a share of crude oil and allowed the region to secede (Freccia and Pelton, 2014; Young, 2005). Upon independence, South Sudan established its own government and a strong official opposition, with members of both prominent ethnicities holding executive positions in government. This led some experts to believe that the new country could become a model for the development of post-conflict democracy, while others warned that underlying issues of state development had not been addressed, and a return to conflict was inevitable (Freccia and Pelton, 2014; Roach, 2016; Young, 2005).

On 15 December 2013, violence erupted in the capital city of Juba – and once again South Sudan found itself at war (Freccia and Pelton, 2014). In 2015, a peace agreement was signed, but its ceasefire was short lived as brutal violence returned months later, in July 2016 (Al Jazeera, 2017; Roach, 2016). Since then, the country has been in a constant state of turmoil; villages have been burned to the ground, livelihoods destroyed, and heads of households murdered (BBC, 2017a; BBC, 2017b). South Sudan's women and girls have been victims of systematic rape, and many young children have suffered and/or died from hunger (Lynch, 2017a; Pendle, 2014). The pattern of warfare that has occurred in this once promising state is a prime example of the complex nature in which protracted conflict occurs.

*Protracted conflict* refers to persistent warfare that continues to recur in the same geographical region over an extended period of time (Maxwell et al., 2012). It is seemingly irreparable, as a myriad of intersectional issues contribute to cyclical violence; bringing with it a set of long-term consequences, both in times of peace and war. Even after ceasefires and third-party mediations, regions experiencing protracted conflict often relapse back into periods of intense violence and resolutions are hard to achieve (Maxwell et al., 2012; Wennmann, 2007). Therefore, protracted conflict differs in nature and cause from other contentious events, which typically have a well-defined beginning and end. South Sudan's complex war fits well within this framework, which helps to establish a better understanding of its barriers to peace.

*Food security* is another term that should be defined, as its absence has been detrimental for many South Sudanese. The Food and Agricultural Organization of the United Nations (FAO) states that, “Food security exists when all people at all times have physical and economic access, to sufficient [amounts] of safe and nutritious food” (2006:1). It is not enough to simply eat and no longer feel hungry. Individuals must have access to dietary alternatives and culturally appropriate food. When individuals, families, or entire populations do not fit this criteria, they are deemed *food insecure*, and at risk of suffering long-term consequences to their health (FAO, 2006). Many of the world’s poorest states, such as those in Sub-Saharan Africa, experience chronic food insecurity as a result of inadequate production and distribution systems (Duffield, 1990; Loewenberg, 2015).

Protracted conflict positively correlates with widespread food shortages; as daily activities are interrupted by organized violence. In conflict zones, food production falls, prices rise, and distribution systems are halted; because food cannot be grown if farmers have fled to fight, nor can it be distributed if infrastructure is inaccessible or has been destroyed (Konviser, 2016; SSHP, 2016). Not only does the presence of war result in vulnerable food systems, they often occur in regions that were *already* vulnerable to begin with. Food insecurity during conflict has been recorded in several poor Sub-Saharan states, including; Angola, Zimbabwe, Uganda, and Somalia (Macrae and Zwi, 1992; Maxwell et al., 2012; Wennmann, 2009). South Sudan has an abundance of fertile land that has traditionally been used by subsistence farmers to feed their families. Livestock holdings have provided income for many average households, and village markets were widely used for cash crop sale or supplementary purchases (Duffield, 1990). As a result of the ongoing conflict, these food systems have deteriorated, leaving civilians without the means to provide for themselves (BBC, 2017b; Lynch, 2017a; Maxwell et al., 2012).

The ongoing war has negatively effected South Sudan’s level of food security in three distinct ways. First: since 2013 more than 3.5 million civilians have been displaced, which has forced many farmers to abandon their crops, leaving their livelihoods behind (BBC, 2017a). Second: fields of cash crops have been deliberately destroyed during the raiding of entire villages, and livestock holdings have been stolen en mass. Markets no longer exist in conflict zones, and the constant mobility of civilians has made subsistence farming impossible (Konviser, 2016; Loewenberg, 2015). Finally: local food systems typically rely on the collective work of its members, but the mass murder of villagers and the unpredictable pattern of war has left human resources depleted. Survivors cannot reconstruct these intricate systems alone, and have therefore fallen victim to widespread famine (Duffield, 1990).

*Famine* occurs when a population experiences severe food insecurity for an extended period of time, and they fight to survive by eating unhealthy or dangerous foods. Large-scale famines are declared emergency situations by the United Nations due to the imminent risk of mass starvation (BBC, 2017b). Earlier this year, South Sudan experienced a severe famine, where thousands of displaced civilians reportedly hid from armed soldiers near the Sudd swamp; eating water lilies, tree roots, and leaves. Other civilians had reportedly not eaten in days (Freccia and Pelton, 2014; Green, 2013; Mednick, 2017). Although the country’s famine is temporarily mitigated due to an increase in emergency humanitarian assistance, its level of food insecurity remains extremely high. This delicate environment leaves little space for the impact of potential economic or political shocks, which could easily send the state into crisis, once again (Nichols, 2017; WFP, 2017; Winter, 1991).

## The Political Economy of Conflict and Corruption

Protracted conflict is increasingly common in contemporary civil wars; which Achim Wennmann argues, are commonly pursued for purely financial gains (2007, 2009). In reality, civil wars often occur in underdeveloped states that also have an abundance of natural resources. Previous research has shown that civil wars are four times more likely to occur in states that rely on oil, diamonds, or timber as their primary source of export revenue (Wennmann, 2007). South Sudan's oil industry provides 97 per cent of the country's income, making it a highly contentious commodity that can easily be exploited by the state's corrupt regime (SSHP, 2016; Wennmann, 2009).

In his piece, *The Political Economy of Conflict and the Mediated State*, Wennmann outlines several sub-frameworks that exist under the umbrella of political economy. Of most importance was his discussion on the "economic agendas" of actors in cases of civil war, as their end-game motives provide significant insight into the strategies they utilize during war (2009). Wennmann argues that when analysing an actor's economic agenda, it is important to question whether economic gains are an "ends" or a "means" of warfare; therefore, is it in the economic interest of factions to end a war and receive settlement benefits, or to simply collect benefits from the ongoing conflict (Wennmann, 2009)? Using this theory in our analysis of the civil war in South Sudan, it is easily determined that government elites are profiting from persistent violence, and that continued fighting provides more "means" to personal profit than an "end" to violence ever will. Therefore, it is in the best interest of war wagers to prolong their fight and continue to collect high economic rewards (Malaquias, 2001).

According to the South Sudan Humanitarian Project, the country was entirely debt-free upon secession, and also had the privilege of reaping lucrative rewards from existing oil reserves (SSHP, 2016). Scholars who believed, at the time, that the post-conflict state would survive, saw great potential in the country's ability to invest in social programs like healthcare and education (SSHP, 2016). However, since the civil conflict resumed, South Sudan's market economy has plummeted.

Oil production has been cut in half; leading to a significant decline in state-earned revenue (BBC, 2017a; Mednick, 2017; Roach, 2016), and inflation has increased food prices by more than 800 per cent. This has made it difficult, for those even in stable regions of the country, to access affordable goods (BBC, 2017a; Roach, 2016). In addition to the country's internal struggles in resource management, South Sudan's economy was ill prepared for the global decline in market value that the world experienced in 2015. The significant drop in oil prices over the past two years has had economic repercussions worldwide, but countries in conflict like South Sudan were driven into financial ruin. By the end of this year, South Sudan expects to declare a deficit of more than \$1.1 billion USD (SSHP, 2016).

The economic crisis that South Sudan is currently experiencing would lead many to falsely believe that government dollars are now being carefully spent. However, the opposite is true, as exorbitant amounts of public funds are being privately looted, or used to purchase weapons of war (Al Jazeera, 2017; SSHP, 2016). Several reports have recently been released that tie the country's executive leaders and top military personnel to instances of fraud and embezzlement (Channel 90seconds Newscom, 2016; Malo, 2017). Through the analysis of financial records, legal documents, and movement monitoring, a private investigation by The Sentry has exposed President Salva Kiir's many conflicts of interest. Evidence shows that Kiir holds financial shares in more than 20 private sector companies pertaining to oil, mining, and construction (Channel

90seconds Newscom, 2016). These claims have been refuted by the South Sudanese government, but further evidence shows that the country's top officials – and their family members – all own luxurious estates, both in Africa and the United States (Channel 90seconds Newscom, 2016; Malo, 2017; PBS NewsHour, 2016). Such lifestyles exist in stark contrast to the suffering that their own citizens have endured; and only reinforces the notion that those in positions of power can profit from protracted warfare.

More than half of South Sudan's population has been affected by famine, displacement, and a lack of social services. Yet, the United Nations (UN) has reported that millions of government dollars have recently been spent on acquiring arms (Malo, 2017; Nichols, 2017). Last year, oil sales from the country earned \$243 million USD, but the UN believes that “substantially more than half” of this money has been used to strengthen the state's military forces (Malo, 2017: 1; Nichols, 2017: 1). State representatives have denied these accusations, and claim that the country has not purchased any weapons in the last 2-3 years (Malo, 2017: 1; Nichols, 2017: 1). This sentiment holds little weight against other financial reports, showing that billions of dollars in revenue have gone unaccounted for (PBS NewsHour, 2017; SSHP, 2016;).

Developing nations that have experienced extreme poverty are prone to political instability and corruption, because the basic foundations for state cohesion and transparency have not been well-established. Therefore, it is easier for disparities in public funds to go unnoticed, and the additional responsibility of managing lucrative resources poses a problem for greedy regimes. More often than not, government elites who have experienced a kind of poverty themselves, are tempted to exploit public funds to enjoy their own luxurious lifestyles (SSHP, 2016; Young, 2005). Financial gains are a “means” of war that are enjoyed as long as conflict prevails. Therefore, an end to South Sudan's prolonged civil war would result in the end of private embezzlement, and would not be in the economic interests of government or military leaders (Wennmann, 2009).

The political economy of conflict framework focuses on the nexus of internal state actors and their connection to global markets, and ultimately shows the deeply rooted role that corruption plays in prolonged, resource-based war (Wennmann, 2007, 2009). Without a financial motive for faction leaders to establish peace, civil conflict will inevitably rage on.

### **Withholding Food Aid as a Tactic of War**

When famine occurs in conflict zones, emergency intervention is needed, and civilians often rely on foreign food aid to survive. Humanitarian agencies with workers on the ground are often the only means of support that states experiencing famine can rely on. Therefore, their presence and resources are crucial to helping those who are most vulnerable survive (Maxwell et al., 2012). South Sudan's government has recognized the importance of foreign aid, but has deliberately chosen to withhold food packages from rebel-held areas, and have actively pursued a campaign that prevents third-party agencies from providing life-sustaining measures to their enemy (Nichols, 2017b; Nichols, 2017c).

Since 2013, 82 aid workers have been violently killed by military forces in an attempt to stop them from delivering food aid to conflict zones. This year alone, 15 workers have been killed, which has prompted some agencies to withdraw their staff from the ground (Bacchi, 2017; Dumo, 2017). Heightened security risks have been deliberate, because government forces know that severe violence will discourage foreigners from intruding on domestic affairs. The UN has been forced to cancel ground missions in some regions, due to security risks and are alternatively focusing on airlift operations to deliver food aid to isolated regions (Bacchi, 2017; Dumo, 2017).

A UN representative confirmed that this alternative method is nearly ten times more expensive than traditional ground delivery, and if blockades continue, agency funds are expected to deplete quickly (Bacchi, 2017).

Other obstacles have been put in place by South Sudan's government in an attempt to deter aid workers from coming into the country. Earlier this year, President Salva Kiir proposed a hike in work permit fees from \$100 USD to \$10,000 USD, per person (Reuters Staff, 2017). The proposed hike would have made it virtually impossible for agencies to afford work visas for their staff, and it would have ultimately reduced the amount of food aid delivered throughout the country. Due to extensive backlash from the international community, this decision was recently revoked. However, hostilities towards foreign aid workers still remain (Reuters Staff, 2017).

Withholding food aid as a tactic of war is a brutal strategy, but none the less, a cunning and effective one. Wennmann argues that financial stress on conflict economies influences the tactics used, and says that limited sources of financing may force armed factions to adopt low-cost strategies (Wennmann, 2009). Indeed, isolating rebel-held regions and blocking their access to food allows the government to steal, use, or sell donated foreign aid while simultaneously starving out their enemy (Wennmann, 2007). Road blocks and security measures that control borders and state operations are already under the government's jurisdiction, and therefore merely require enough military troops to carry out ground searches and violent blockades. In essence, this slow but effective strategy has the same outcome of large-scale attacks, yet does not require the same need for conventional weapons (Konviser, 2016).

Although in breach of international law and considered a formal war crime, withholding food aid is a low-risk strategy, in addition to being low-cost (Reeves, 2011). Instead of initiating conflict along armed enemy lines – losing soldiers and weapons in the process – this tactic takes control of an existing resource base. By declaring war on humanitarian aid, factions have been able to seize food supplies meant for civilians in order to feed their own troops (Duffield, 1990). Peaceful aid agencies are vulnerable to violence and easily deterred from conflict zones. By posing a threat to agency staff, forces can insure that food will not be delivered to areas under their control. In this way, factions are able to set themselves up for simpler victories (Bacchi, 2017).

Although South Sudan is the most recent state to use such a tactic, food has been used as a weapon of war for decades. It is typically used as a means of pressuring the enemy into surrender with the ultimate goal of capturing contentious land or forcing civilians out of a particular area (Konviser, 2016; Macrae and Zwi, 1992). However, the case in South Sudan is unique. Starving out the enemy applies a multifaceted approach, and ultimately seeks to wipe out entire ethnic tribes (Muhumuza, 2017). Not only does it allow the government to exploit external resources and better finance its own violent campaign, this tactic acts as an opportunity for Dinka-majority leaders to commit acts of genocide (Muhumuza, 2017; PBS NewsHour, 2017).

Withholding food aid is an effective way of killing ethnically homogenous groups, due to the fact that tribes often travel and live together. Therefore, it is easy for armed forces to identify rebel-held areas, where their civilian supporters reside (Nichols, 2017b). Once territory is re-captured, ethnic groups are easy to isolate, and armed forces can exercise complete control over their access to food (BBC, 2017b; Nichols, 2017b; Reeves, 2011). Withholding food aid is a long-term tactic that prolongs the death of enemy factions, and is therefore used as an ideal strategy for those who wish to wage a lasting war.

## Conclusion

Using the political economy of conflict framework to examine the financial benefits of war, this paper has analyzed the role of corruption in cases of protracted conflict. It has argued that a state's level of corruption significantly contributes to the longevity of war, and concludes that financial benefits offer a "means", rather than an "end" to violence. Without economic incentives for leaders to negotiate peace, protracted conflict in resource-rich states will likely resume (Wennmann, 2009). Through the analysis of academic literature and current media reports, this paper has examined the case of civil war in South Sudan; particularly emphasizing the country's economic volatility and its low level of food security. Over the past six months, the country has experienced a severe and widespread famine that was deliberately orchestrated by corrupt government leaders as a long-term strategy of war (Reeves, 2011; Nichols, 2017b). Cutting off access to food and obstructing the work of humanitarian aid agencies has proved to be a low-cost, low-risk strategy for prolonging violence. It has also been an efficient way of targeting ethnically homogenous groups.

For now, the famine in South Sudan has been temporarily mitigated, but millions remain displaced and food insecure. Nuer minority tribes remain at risk for future genocidal attacks and no significant progress has been achieved in sustaining peace (France 24, 2017). Going forward, the role of grand corruption should not only be examined in the analysis of resource-based wars – but it should be recognized as a warning sign for future war crimes and genocidal attacks. In cases of protracted conflict, corrupt regimes pose a threat to state food supply, and should therefore, be closely monitored by the international community. Until the underlying issue of corruption among state leaders is addressed, consequences of South Sudan's civil war will likely continue until its money, bullets, and people have all been spent.

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# The Dog Ate My Homework

## An Examination of Food and Nutrition Literacy in Newfoundland and Labrador with Policy Recommendations

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**Abstract.** To achieve individual and population health goals in Newfoundland and Labrador, people must have the capacity to take an active role in their nutritional health and wellbeing and to advocate for social, cultural, environmental, economic and political changes that promote nutritional health and wellbeing in their own lives and for others. This capacity is dependent on food and nutrition literacy. This article defines food and nutrition literacy and examines the need for education initiatives to better promote these literacies in Newfoundland and Labrador. It argues that current initiatives do not address all attributes of these literacies and are therefore unable to effectively achieve health promotion outcomes. It is recommended that cross-curricular food and nutrition education, developed by registered dietitians, be introduced into primary and secondary school curricula to correct for this gap in health promotion.

### Introduction

Food and nutrition literacy are key determinants of nutritional health and wellbeing, and their promotion is necessary to achieve population health outcomes. Despite their importance, food and nutrition literacy have only recently been defined. These definitions have exposed a weakness in current food and nutrition education initiatives. While most education initiatives aim to improve food and nutrition literacy focus on functional literacy, they neglect interactive and critical literacy. These latter attributes are necessary for individuals and groups to take an active role in their personal nutritional health and wellbeing and to advocate for social, cultural, environmental, economic and political change that promotes nutritional health and wellbeing in their own, and others', lives. This paper examines these new definitions and the need for improved education initiatives to promote all attributes of food and nutrition literacy. It is recommended to integrate food and nutrition education throughout primary and secondary curricula, and that this integration is led by experts in food and nutrition to promote nutritional health and wellbeing through education in Newfoundland and Labrador.

### Definitions

Food literacy is “the ability of an individual to understand food in a way that they develop a positive relationship with it, including food skills and practices across the lifespan in order to navigate, engage, and participate within a complex food system” (Cullen et al., 2015: 143). It combines knowledge concerning the effect of food on personal health and wellbeing, the food system from production to access to waste, and the broad context of the food system including social, cultural, environmental, economic and political factors. This conceptual knowledge is combined with procedural knowledge (skills) required to make decisions and take actions that support the achievement of personal health and a sustainable food system while considering these

factors. Being food literate thus allows individuals to not only access, select and prepare foods that promote their health and wellbeing, but to also become active participants in the food system.

In addition to the conceptual and procedural knowledge regarding food, food literacy includes the opportunities and motivation to apply or use this knowledge (Block et al., 2011). Food literacy, therefore, is influenced by cognitive, socioeconomic and environmental factors which can either promote or deter the ability – and desire – to act. This suggests that there are two sides to food literacy: the knowledge and skills of the individual; and the ability for social, cultural, environmental, economic and political factors to facilitate the individual's decisions and actions based on knowledge and skills. Suppose an individual was diagnosed with Type 2 diabetes and set a goal to improve meal balance by eating more whole vegetables and fruits. Food access, for example, could either deter or promote the achievement of this goal. If whole vegetables and fruits were not affordable or the quality was unacceptable, this could discourage the individual from acting on their motivation despite their knowledge of the importance of meal balance and of how to purchase and prepare these foods. In this case, food literacy is reduced. On the other hand, a program to improve access to whole vegetables and fruits could improve food literacy by increasing access to, and opportunity for choosing these foods.

Like food literacy, nutrition literacy is also dually influenced by individual and contextual factors. Nutrition literacy is defined as “the ability to access, understand, evaluate and communicate [nutrition-related] information as a way to promote, maintain and improve health in a variety of settings across the life-course” (Rootman and Gordon-El-Bihbety, 2008). It comprises three levels of knowledge and skills: functional, interactive, and critical (Nutbeam, 2000). Functional nutrition literacy is basic nutrition knowledge and skills, such as how to read a nutrition facts table on a food product. Interactive nutrition literacy is the personal skills necessary for independent decision-making, goal-setting, and applying functional nutrition literacy in life contexts. Critical nutrition literacy is understanding the social determinants of nutritional health and advocating for change in these determinants.

There is little difference between food literacy and nutrition literacy. Both involve conceptual and procedural knowledge regarding food and skills required to apply this knowledge in life contexts. Additionally, both literacies include a broader understanding of – and the skills needed to advocate for change in – food systems and the determinants of nutritional health. While food literacy relates to food and food systems, nutrition literacy relates to the impact of food on health more specifically. However, nutrition literacy relies on food literacy to facilitate positive nutrition outcomes. Thus, these are not separate concepts but rather attributes of each other.

The Key Attributes of Food Literacy released in 2017 by Public Health Ontario's Locally Driven Collaborative Project (LDCP) for Measuring Food Literacy in Public Health (Table 1) (LDCP Healthy Eating Team, 2017) reflects the interconnectedness of food and nutrition literacy. Note that the attributes comprise the conceptual and procedural knowledge specific to both food and nutrition literacy, and the interactive and critical attributes that are common to both literacies.

TABLE 1	
KEY ATTRIBUTES OF FOOD LITERACY	
Food Literacy Attribute	Description
Food knowledge	To know the variety of foods within all food groups. To know where food comes from and what is in it. To make an informed decision on food choices including what is available locally.
Nutrition knowledge	To understand the nutrients in food and how these can affect health and wellbeing.
Food and nutrition language	To understand commonly used words to describe characteristics of nutrition in food and preparation of food.
Food skills	To be able to prepare meals throughout the life span using basic skills like chopping, measuring, reading recipes, and being food safe.
Nutrition literacy	To be able to distinguish between credible and false nutrition information. Knowing how to find reliable nutrition information and how to make sense of it.
Food and nutrition self-efficacy	To believe in one's ability to apply food and nutrition-related knowledge to make healthy choices in a complex food environment.
Cooking self-efficacy	To have confidence in one's ability to use cooking equipment and prepare tasty meals with available food.
Food attitude	To understand one's attitude towards food and trying new foods. Having the desire to choose and prepare healthy and safe foods to enjoy at all times.
Food and other systems	To have an understanding of how the broader food system and society as a whole impacts an individual's decisions about food and how an individual's food choices impact the broader food system.
Social determinants of health	To understand the social and environmental conditions that can result in inequities in health status which can impact the capacity to make decisions about food and cooking.
Dietary behaviour	To be able to apply knowledge and skills to make healthy food choices.

Collaborative Project Healthy Eating Team. 2017. *Key Attributes of Food Literacy*. Toronto: Public Health Ontario.

### **The Newfoundland and Labrador Context**

Food- and nutrition-related health problems are a concern in Newfoundland and Labrador (NL). Data from the 2015 Canadian Community Health Survey (CCHS) reveals that 10.5 percent and 24.6 percent of the adult population have diabetes and hypertension, respectively (Statistics Canada, 2017). These rates are considerably higher than the Canadian average of 6.9 percent and 16.9 percent, respectively. Food and nutrition have a key role in both the prevention and management of these chronic diseases (Bacon et al., 2016; Dworatzek et al., 2013). For example, consuming a diet high in whole vegetable and fruits is effective at both preventing and managing

these diseases (Bazzano and Israel, 2005). However, only 24.6 percent of the NL population consumes five or more servings of vegetables and fruit a day (Statistics Canada, 2017). Food and nutrition literacy, therefore, have a clear role in improving health outcomes through diet. Not only can food and nutrition literacy increase the knowledge, skills, and motivation needed to plan and prepare a healthy diet, but the interactive and critical attributes can help the population to address contextual factors that may be limiting the opportunities to follow a healthy diet.

In the last decade, Newfoundland and Labrador has developed several wellness strategies which support and fund the development and expansion of food and nutrition initiatives in the province, the broadest of which is the Provincial Wellness Plan. Introduced in 2006, this plan guides most other initiatives which address wellness in the province – including the promotion of healthy eating (Government of NL, 2006a). Among the members of the Provincial Wellness Advisory Council that developed the plan are representatives from the Departments of Education and Early Childhood Development (DEECD) and of Seniors, Wellness and Social Development, and the provincial school districts and the teachers' associations. One of the plan's goals is to improve both food access and residents' nutrition knowledge and skills by developing partnerships, encouraging collaboration, and strengthening existing wellness initiatives. Partnerships, such as the Regional Wellness Coalitions, can develop initiatives that are appropriate for regions and their communities. Also, by providing funding for both existing and proposed healthy eating initiatives, such programs can continue to improve food access, nutrition knowledge and skills and, ultimately, promote healthy eating.

As part of the Wellness Plan, the Provincial Food and Nutrition Framework and Action Plan was created to develop and expand wellness initiatives that specifically promote healthy eating (Government of NL, 2006b). The purpose of the Food and Nutrition Framework is similar to that of the Wellness Plan, except that it focuses solely on healthy eating as opposed to wellness as a whole. The Provincial Wellness Advisory Council was also responsible for the development of this framework, but with greater representation from registered dietitians in the regional health authorities. Like the Wellness Plan, one of the strategies of this framework is encouraging the development and expansion of nutrition education and skill-development programs. The plan identifies three priority groups for any supported initiatives: school-aged children, preschool-aged children, and seniors. Among the proposed actions targeting school-aged children is to work with the DEECD and the regional school districts to ensure that students are offered food and nutrition education, including practical training in addition to food and nutrition theory. Thus, the Wellness Advisory Council believes in the importance of food and nutrition education and is interested in establishing a curriculum in schools. However, many of the Council's actions have focused more specifically on equitable access to food, as opposed to food and nutrition education (Department of Seniors, Wellness, and Social Development, 2014).

In the fall of 2016, the provincial government released its vision for sustainability and growth in *The Way Forward* (Government of NL, 2016). This policy-guiding document steps back from the strategies and fixed-outcomes that guided the development of the Provincial Wellness Plan and the Provincial Food and Nutrition Framework and Action Plan. The previous strategy system was fragmented, with government departments working in silos and attempting to achieve outcomes for complex problems – such as population health – without the collaboration and sharing of diverse perspectives, expertise, and resources. Health, however, is a wicked problem – that is, it is interconnected with other problems, such as employment, education and food access (which themselves are interconnected with other problems) – and therefore requires a team with diverse perspectives and resources to solve. Thus, despite actions funded and led by the provincial

government and guided by these now-defunct strategies, the anticipated outcomes are yet to be achieved.

The Way Forward instead guides policy by encouraging collaboration and horizontal decision-making to tackle wicked problems (Government of NL, 2016). Of note is the commitment that the Government of NL has made to adopt a Health-in-All-Policies (HiAP) approach (action 1.29) which would widen the focus to the social determinants of health to improve health outcomes. The Government of NL has also committed to engaging schools to create settings that support healthy living and learning by supporting the use of the Healthy School Planner tool (action 2.16). Schools will be encouraged to assess their current school health and wellness environment using this tool, and can receive provincial funding to action initiatives identified through the assessment. The Healthy School Planner tool helps each school assemble a team of relevant stakeholders to explore healthy eating (among other topics) in the school and develop a plan to address any identified gaps (Pan-Canadian Joint Consortium for School Health, 2017). Each school has discretion in developing its plan based on identified gaps and evidence-based strategies to address those gaps, and would be supported by the provincial government to carry through. Depending on the gaps identified, actions could occur not just within individual schools but at the school district level – particularly if multiple schools identified similar gaps. With the implementation of The Way Forward, the Government of NL, school districts and schools are in a position to implement strategies to promote healthy eating in the province. Given the burden of food- and nutrition-related health problems in NL, such strategies are highly in demand.

### **The Need for Food and Nutrition Literacy Education**

A HiAP approach encourages policy developers, irrespective of their sector of governance, to consider health outcomes when developing, implementing, and evaluating policies. If the Government of NL does adopt this approach, policies surrounding the development and implementation of school curricula should consider the health outcomes of students. The origins of HiAP are found in the fundamental principles of health promotion. The Public Health Agency of Canada and the World Health Organization (WHO) define health promotion as enabling people to take control over their health through individual behaviour change, social contexts, and environmental interventions (WHO, 1986). Both healthy public policies and health literacy are outcomes of health promotion activities, which include social mobilization, advocacy, and education (Nutbeam, 2000). It should, therefore, be inferred that food and nutrition education initiatives can promote food and nutrition literacy as well as food- and nutrition-related healthy public policy. Moreover, food and nutrition literacy can further promote healthy public policy, given that these literacies include social mobilization and advocacy skills – two actions which, in addition to education, lead to health promotion outcomes. Thus, food and nutrition education should be priorities of the Government of NL to promote their HiAP approach and achieve health outcomes.

Nutrition education is “any combination of educational strategies, accompanied by environmental supports, designed to facilitate voluntary adoption of food choices and other food- and nutrition-related behaviours conducive to health and wellbeing and delivered through multiple venues, involving activities at the individual, institutional, community and policy levels” (Contento, 2011: 14). However, many nutrition education programs place their focus squarely on individual behaviour change and, as a result, see limited success (Eyles and Mhurchu, 2012; Nutbeam, 2000; Wood and Gillis, 2015). If nutrition education is to promote health in

Newfoundland and Labrador successfully, it must address social and environmental factors in addition to individual behaviours. Educating the public to be self-motivated to seek nutrition information, evaluate it appropriately, and independently work toward nutrition goals, as well as empowering Canadians to initiate social change to address the social determinants of nutritional health, is crucial to health promotion.

As discussed, the definitions of food and nutrition literacy are relatively new, and there are few assessment tools which accurately capture the full scope of the concepts. Thus, there is minimal evidence of the level of food and nutrition literacy among Canadians, let alone the NL population. One estimate suggests that 60 percent of Canadian adults have poor health literacy based on the Adult Literacy and Life Skills (ALLS) survey (Rootman and Gordon-El-Bihbety, 2008). The survey measures prose literacy, document literacy, numeracy, and problem-solving based on the respondent's ability to read and use printed health information (Canadian Council on Learning, 2008). Despite the similarities between health and nutrition literacy (the main difference being that latter focuses specifically on *nutrition*-related health information), it is unclear whether a similar proportion of Canadians would have similar rates of *nutrition* literacy. Moreover, the ALLS survey only captures functional health literacy, omitting the interactive and critical attributes that are integral to overall nutrition literacy and its subsequent health outcomes. Most assessment tools are limited in this way and, although new tools have been developed to measure health and nutrition literacy more comprehensively, these tools are not well validated and their use in research is limited (Chinn and McCarthy, 2013; Diamond, 2007; Ishikawa et al., 2008).

Like nutrition literacy, food literacy research is limited and tends to focus on single attributes rather than the complete concept. For example, several studies have explored cooking skills – one of the key attributes of food literacy – and the evidence suggests that Canadians lack the cooking skills necessary to promote their nutritional health and wellbeing (Murray et al., 2016; Simmons, 2002; Slater and Mudryj, 2016). Data from the Rapid Response on Food Skills component of the 2013 Canadian Community Health Survey estimates that 63 percent of Canadians are comfortable preparing meals from basic ingredients (Slater and Mudryj, 2016). There is no indication, however, whether these meals fit within a healthy (that is, adequate, moderate, balanced, and varied) diet. It is possible that these cooking skills are limited to preparing less nutritious, energy-dense foods. Another study which explored the cooking practices of university students reported that students are knowledgeable about what their eating habits should be in terms of nutrition, but are unable to follow through due to lack of resources (for example, money and kitchen facilities) and appropriate cooking skills (Murray et al., 2016). There appears to be a shift toward learning only a limited variety of cooking skills, which is indicative of poor food literacy and further evidenced by several key informant interviews with adolescents and their families in British Columbia (Simmons, 2002). This study determined that adolescents learn skills by passively observing their parents, whereas adults take a self-directed learning approach – especially when circumstances dictate, such as moving out for the first time. Evidently, cooking skills are not formally taught and there is no guarantee that the skills they are learning – either passively or through necessity – enable healthy eating.

Other studies which have investigated cooking skills similarly suggest that a lack of cooking skills is a common barrier to healthy eating. Surveys of self-reported cooking skills based on confidence in performing specific cooking methods (for example, grilling), preparing specific foods (for example, pulses) and preparing dishes varying in degree of complexity (for example, spaghetti using sauce from a jar versus preparing sauce from scratch) are common. Overall, people tend to be confident in a few (for example, microwaving, grilling) but not all cooking methods and

confidence tends to decrease as complexity increases (Adams et al., 2015; Byrd-Bredbenner, 2004; Caraher et al., 1999; Vanderkooy, 2010). When respondents are stratified by age, it becomes evident that younger respondents report less confidence in their cooking skills (Adams et al., 2015; Byrd-Bredbenner, 2004; Vanderkooy, 2010; Winkler and Turrell, 2010). While younger generations may be in the process of learning cooking skills while gaining their independence from their families, this may also suggest that cooking is no longer a priority skill to learn. In 2010, only 30 percent of Manitoban adolescents enrolled in food and nutrition education courses and, while this number is increasing, there is evidence to suggest that the curriculum for these courses is not adapting to the rapidly changing foodscape because educators undervalue these programs (Slater, 2013).

While food and nutrition literacy are not well researched, there is evidence suggesting that there is a gap between the literacy of the NL population and the level needed for the province to achieve health outcomes. Action must, therefore, be taken to ensure that the population receives the education to become food and nutrition literate. Moreover, this education must combine the functional, interactive, and critical attributes of these literacies, as functional literacy is not enough to achieve health outcomes (Heijmans et al., 2015).

The following sections offer two recommendations to promote food and nutrition literacy in NL. They address the functional, interactive, and critical literacies required by the public to achieve personal health outcomes and take part in a bottom-up approach to affect change in social, cultural, environmental, economic and political determinants of health as they relate to food and nutrition.

### **Recommendation 1: Revise primary and secondary school curriculum to include cross-curricular food and nutrition education**

Currently, the NL curriculum for Kindergarten to Grade 12, developed by the DEECD, offers formal food and nutrition education through the intermediate Home Economics course. This course allots 18 hours of food and nutrition education to achieve three learning objectives: “To understand the importance of a nutritious diet in health and development”; “To learn basic safety and sanitation practices related to food preparation”; and “To apply appropriate organizational skills and food preparation techniques in preparing recipes from the four food groups” (DEECD, 2002: 217). While these objectives are essential for functional food and nutrition literacy, they neglect to promote either interactive or, in particular, critical literacy. For this course to promote all attributes of food and nutrition literacy, the course content would need significant revisions. To inform these changes, curriculum developers could reference the school health education curricula used by other provinces, as many of these curricula do include a focus on interactive and critical *health* literacy (Lu and McLean, 2011). Developing such a course, however, would require considerable time and resources to bring all stakeholders to the table. Moreover, the revised course should be mandatory for all, thereby reaching all students in NL.

If a revised food and nutrition module was to be developed, effectively promoting all of the knowledge and skills necessary to become food and nutrition literate will require further measures. The key attributes of these concepts cannot be mastered through 18 hours of education. It is therefore recommended that food and nutrition literacy attributes be taught through cross-curricular education at all grade levels. Cross-curricular teaching involves “a curriculum approach that consciously applies methodology and language from more than one discipline to examine a central theme, issue, problem, topic, or experience” (Jacobs, 1989: 8). By this definition, cross-

curricular food and nutrition education could, for example, be taught in geography while discussing rural and urban communities. Food access could be used to illustrate differences between communities while also raising the topic of the social determinants of nutritional health and be an opportunity to discuss ways to advocate for health equity. Such cross-curricular food and nutrition education has been shown to positively influence health outcomes, such as vegetable and fruit consumption among primary students, suggesting the effectiveness of this approach to educate and facilitate behaviour change (Dudley et al., 2015). By integrating food and nutrition education into established courses, all attributes of food and nutrition literacy may be promoted and ultimately lead to improved health outcomes.

**Recommendation 2: Have registered dietitians be involved in the development of cross-curricular food and nutrition education**

Registered dietitians (RDs) are regulated professionals who must complete an undergraduate degree in a nutrition program accredited by Dietitians of Canada (DC) as well as a practice-based internship in the field of dietetics. The term “dietitian” is protected in Canada and may only be used by those who have met these requirements and have registered with a provincial governing body. The national RD scope of practice states that “the practice of dietetics and nutrition means the translation and application of the scientific knowledge of foods and human nutrition towards the attainment, maintenance, and promotion of the health of individuals, groups, and the community” (DC, 2000: 1). RDs specialize in addressing the nutritional needs of people with complex health problems as well as the promotion of healthy eating behaviours among individuals and groups to promote overall health. Therefore, not only do RDs practice in patient care settings, they work in community, organizational and political settings to promote healthy eating behaviours through education and by advocating for social, cultural, environmental, economic and political change. RDs are the experts in food and nutrition, and it is within their scope of practice to use this expertise to promote health outcomes, such as through cross-curricular food and nutrition education. Therefore, RDs should be keenly involved in the development of a revised curriculum to ensure that current evidence provides the foundation for this curriculum to effectively promote food and nutrition literacy.

**Conclusion**

Revising the current primary and secondary curricula in NL to include cross-curricular food and nutrition education is recommended to promote nutritional health and wellbeing through food and nutrition literacy. All attributes of food and nutrition literacy are necessary to enable and motivate the population to make healthy behaviour changes. RDs are the experts in food and nutrition and how best to promote behaviour change that leads to nutritional health and wellbeing in populations through a consideration of social, cultural, environmental, economic and political factors. Given this comprehensive expertise, RDs should be involved in the development of a curriculum that effectively promotes all attributes of food and nutrition literacy. By providing all students in NL with the opportunity to gain the knowledge and skills necessary to be food and nutrition literate, students will be better able to take an active role in their personal nutritional health and wellbeing and to advocate for social, cultural, environmental, economic and political change that promotes nutritional health and wellbeing in their own lives and for others.

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# Biofuels, A Sustainable Alternative to Fossil Fuels?

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**Abstract.** Finding a sustainable alternative to fossil fuels is important for mitigating climate change. Currently, there is no sustainable alternative to fossil fuels that is affordable, accessible, and manageable on a global scale. A commonly proposed alternative to fossil fuels is biofuels, which are fuels composed of plant-based materials (e.g. maize and sugarcane). In this article, I will explore whether biofuels are a sustainable alternative to fossil fuels. I argue that the use of biofuels should not increase as an alternative to fossil fuels because of the negative implications biofuels have on environmental sustainability, food security, and poverty levels. Using the contentious political economy framework posed by Neville (2015), I show that the negative implications associated with biofuels often intersect with each other. This work contributes to the field of political economy, and to green energy policy. In finding that biofuels are not a sustainable alternative to fossil fuels, investments in new technologies will help find an alternative that is affordable, accessible, and manageable.

## Introduction

Finding a sustainable alternative to fossil fuels is an area of importance for political actors that recognize the severity of climate change. In 2014, 79 per cent of greenhouse gas emissions in the United States were the burning of fossil fuels, and Americans were responsible for consuming 19.05 million barrels of oil per day (Environmental and Energy Study Institute, 2017). Ending fossil fuel dependency is difficult because there is currently no sustainable alternative that is globally affordable, accessible, and manageable. The Environmental and Energy Study Institute (2017) cite hydrogen fuel cells, wind energy, and geothermal technologies as possible alternatives to fossil fuels. For states that can afford these technologies, they have potential to be an alternative to fossil fuels, but finding a sustainable alternative to fossil fuels should account for the global south. In the global south, these technologies are not affordable, accessible, or manageable, and would take significant investments and time to develop. To address this problem, the Environmental and Energy Study Institute (2017) list biofuels as an alternative to fossil fuels, and argue that since every region has access to feedstocks, it can be an alternative. There are also theoretical explanations that highlight the potential benefits of biofuels (for example, de Gorter & Just, 2010; Rist et al., 2009). However, food is a limited resource, and biofuel production poses challenges for poverty reduction and food security in the global south.

Poverty is prevalent internationally, and it is estimated that over three billion people live under \$2.50 USD per day (Shah, 2013). Food security is also an important global issue with 795

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million people undernourished, and 780 million people classified as hungry (World Hunger Education Service, 2016). Given these challenges, it is important to recognize that biofuel development impacts various regions differently. This poses the question: are biofuels a sustainable alternative to fossil fuels? This article will argue biofuels are not a sustainable alternative to fossil fuels because of their negative implications on environmental sustainability, food security, and poverty. Despite the inherent appeal of a plant-based fuel, the negative implications of biofuel development often intersect in the global south, harming the world's most vulnerable people. The research conducted will support the central argument by analyzing the negative impacts of biofuel development (i.e. environmental sustainability, food security, and poverty) independently, and will then apply the contentious political economy framework, posed by Neville (2015), to show how these negative implications often intersect.

To develop the argument, there will first be a brief overview of what biofuels are and how they are produced. After this, there will be an analysis of the environmental impacts of biofuels, which include increased land grabbing, deforestation, and the debate on whether biofuels actually mitigate the impacts of climate change. There will also be a discussion on how increasing biofuel production impacts food security, focusing on the food vs. fuel debate derived from the 2007-08 global food crisis. To highlight how negative implications of biofuels intersect, the case of the Tana River in Kenya, using Neville's contentious political economy framework, will be analyzed. The last part of this article will provide a brief critique to confront some of the popular arguments supporting increased biofuel production. Before analyzing the negative impacts of biofuels, it is important to briefly address what biofuels are, and why they became part of the discourse on sustainable alternatives to fossil fuels.

## **What are Biofuels?**

### ***The Production and Use of Biofuels***

Biofuels are produced in several ways, have certain uses that make them appealing, and some states have made it law to have a specific quantity of biofuels mixed with fossil fuels. In its most basic definition, biofuels are a renewable source of energy derived from select plant-based materials, and are primarily used for fuelling transportation. Currently, most liquid biofuels are ethanol and biodiesel; ethanol is primarily made out of sugar or starch based crops, such as sugarcane and maize (Scragg, 2009: VI). Some states view biofuels as a positive investment to reduce their carbon footprint; the European Union requires that its member states ensure 10 per cent of energy consumed is biofuel energy by 2020 (Lane, 2015). Although biofuel use is increasing, biofuels account for only 1 per cent of transportation fuels consumed, and 0.2 per cent of energy used worldwide (Food and Agriculture Organization of the United Nations, 2008: 22). Reflecting on this small percentage, the production of biofuels would have to increase by approximately 500 per cent to meet the global energy demand.

### ***Why Biofuels? Explaining the Push for Increased Biofuel Production***

The push for increased biofuel production began in the 1970's, and was not because of the innovative possibilities of biofuels, or the opportunity to mitigate climate change, but primarily because of increased oil costs during the 1973 Oil Crisis. The Oil Crisis was a revelation of the global dependence on fossil fuels; Organization of the Petroleum Exporting Countries (OPEC) implemented a trade embargo on fossil fuels as a result of the United States supporting Israel in

the Israeli-Arab War (Scragg, 2009: 107). States were forced to quickly mitigate this sudden oil shortage, and some immediately turned to biofuels. For example, Brazil implemented a program called ‘Prolacool’ to increase the production of ethanol from sugarcane, and the United States pushed for an increase in biofuel production using maize (Scragg, 2009: 107). It is clear through analyzing the Oil Crisis that the foundations for biofuel production were not based on mitigating climate change, but instead, on reducing the political and economic impacts of an oil shortage. Unfortunately, biofuels are not an environmentally sustainable alternative to fossil fuels because they do not mitigate climate change, they warrant increased land grabbing, and lead to increased deforestation.

## **Biofuels and the Environment**

### ***The Climate Change Fallacy***

Climate change is an issue that impacts all people, and has a variety of noticeable impacts due to increased carbon dioxide emissions (CO<sub>2</sub>) in the earth’s atmosphere. For example, sea levels have risen by 17 centimeters in the last century, the global average temperature has risen by one degree, and glaciers are receding at an alarming rate (North American Space Agency, 2017). Although these problems impact all people, climate change also has particular implications for small-scale farmers. In a warming climate, farmer production capacity is significantly reduced (Clapp, 2016: 3). While climate change reflects the need to find a sustainable alternative to fossil fuels, it is important to address why biofuels are not this alternative.

Biofuels are not environmentally friendly in their production because they emit CO<sub>2</sub>, the primary contributor to climate change (Timilsina and Mevel, 2014: 121). La Via Campesina, an organization that advocates for food sovereignty among small-scale farmers, also speaks to the negative impact biofuels have on climate change. For La Via Campesina, biofuels are not a reliable alternative to fossil fuels because the CO<sub>2</sub> emitted in their production will contribute to global warming, and since biofuels can only be produced in certain places, the CO<sub>2</sub> emissions to transport them globally would be high (La Via Campesina, 2007). As the global demand for fossil fuel is higher than ever before, the demand for the alternative will be high as well. Increasing biofuel production would require more land, creating necessity for land grabbing and deforestation, each with have significant environmental impacts.

### ***Land Grabbing and Deforestation***

Land grabbing is the process of taking land against the will of a specific party, usually farmers and communities as a whole (Oxfam, 2017). Land grabbing is necessary to increase biofuel production, negatively impacting small-scale farmers. As a result of land grabbing, over 81 million hectares of land has been taken from small-scale farmers globally. Instead of this land benefiting farmers and communities, over 60 per cent of it is used to grow export crops, which include crops used to make biofuel (Oxfam, 2017). Land grabbing also has severe environmental impacts, which is seen in the case of Tanzania.

Tanzania has experienced land grabbing for biofuel production, which has negative impacts on the environment. First, there has been high water consumption for biofuel crop irrigation (Haaland & Havnevik, 2011: 119). Water is a scarce resource in states throughout the global south, and increased land development for biofuel crops requires water for crop irrigation, depriving it from human consumption. Second, biodiversity is jeopardized when land grabbing

occurs for biofuel production. In Tanzania, most wildlife was destroyed because of aggressive land clearing and development needed for biofuel production (Haaland & Havnevik, 2011: 119).

Deforestation is another environmental problem associated with increased biofuel production, which is seen in the case of Indonesia. Forests are an important resource for mitigating climate change because they act as a carbon sink, but deforestation is occurring globally at a rate equivalent to 48 football fields per minute (World Wildlife Fund, 2017). Land for biofuel production plays a role in select deforestation cases, and this role would increase if more biofuels were produced to meet the global energy demand. In a quantitative analysis of biofuels and deforestation, it was found that 4.8 million hectares of land have already been deforested for increased biofuel production globally (Mevel & Timilsina, 2014: 119).

Deforestation is associated with biofuels made from palm oil in Indonesia. Although palm oil biofuels are viewed as carbon friendly and innovative, new biofuel plantations have destroyed some of the world's most pristine forests throughout Indonesia (Human Rights Watch, 2013). The environmental impacts of biofuels are clear, but it is also important to recognize how food security is risked by the increased production of biofuels, which is seen in the 2007-08 food crisis.

## **Food Security, Poverty and Farmer Competition**

### ***What Happened in the Food Crisis?***

The 2007-08 food crisis revealed the negative impacts of biofuels, and it is important to understand what happened in this crisis before discussing how it has impacted farmers, and deprived people of food security in the global south. The 2007-08 food crisis occurred when there was a sudden, and drastic increase in global food prices, which resulted in food becoming inaccessible to millions of people, causing riots in several countries (United Nations, 2011: 62). There is still no consensus on what caused this sudden increase, but secret World Bank documents obtained by the Huffington Post reveal biofuels to be the primary factor responsible for the increase in food costs. In this report, it was discovered that biofuel production forced food prices to increase by 75 per cent, and pushed approximately 100 million people beneath the poverty line, statistics previously denied by governments across the United States and European Union (Huffington Post, 2008). Although it is still unclear what caused the food crisis, biofuels were involved and had negative impacts both during, and after the crisis. The negative impacts of biofuels that started in the food crisis are seen globally, in particular three of these impacts warrant further discussion.

### ***Impacts of Biofuels Since the Food Crisis***

Three key impacts of increased biofuel production derived from the 2007-08 food crisis are increased poverty, the debate between food or fuel, and the limited market for small-scale farmers to sell their produce because of high food costs. Poverty and the food vs. fuel debate are issues that relate to the absence of food security, which in general terms, refers to the inability for people to access food. First, as noted above, the increased cost of food derived from the global food crisis caused over 100 million people to sink beneath the poverty line (Huffington Post, 2008). By 2020, increased biofuel production will cause an additional 5.8 million people to go beneath the poverty line, and up to 42 million people will earn beneath \$2.50 USD per day (Cororaton & Timilsina, 2014: 88). Although people that live in urban centers may benefit from employment opportunities created through biofuel production, food producers and the rural poor are likely to be deprived of these opportunities.

Second, the food vs. fuel debate derived from the food crisis presents arguments for and against biofuel production, and this debate still persists. The food vs. fuel debate is an argument between whether biofuels are a positive, or negative, venture in relation to food security. For biofuel supporters, biofuels give an opportunity for farmers in the global south to expand their agricultural capabilities while providing increased employment. In contrast, opposition to increased biofuel production recognize how decreasing food supply increases food costs, making food unaffordable for impoverished people (Koizumi, 2015: 832). Biofuels are increasing the cost of food, and if biofuel production were to meet the global energy demand, it would significantly raise the cost of food for people that already cannot afford it.

The last key impact to discuss is connected to increasing food costs, which relates to the heightened farmer competition to sell produce in a market that is inaccessible to a large number of people. As food prices increase, less people can purchase food, forcing small-scale farmers to compete. There are approximately 500 million small farms around the world that provide 70 per cent of food, yet these small-scale farmers only have access to 30 per cent of resources in the global food market (Clapp, 2016: 3). With rising food costs, it is difficult for farmers to sell their produce with less buyers and resources, which is yet another problem for increased biofuel production.

Throughout this article, there have been examples of negative biofuel implications, developing the idea that biofuels are not a sustainable alternative to fossil fuels. Although it is important to recognize biofuel's impacts independently, these negative implications often intersect, enhancing their impacts in the global south. To show this, there will be an overview of the intersectionality of biofuel impacts in Kenya's Tana River region.

## **The Tana River Case**

### ***Overview of the Case***

Negative biofuel impacts have intersected in the Tana River. In 2010, a series of court cases were filed against the National Environment Management Authority (NEMA), the Tana and Athi River Development Authority (TARDA), and a private company called Mumias Sugar. These court cases were a result of the plan to turn 20,000 hectares of land in the Tana River region into plantations for increased development of sugarcane biofuels. It was decided in 2013 after an intense court battle that any land development in the Tana region was to be approved by the community, which was a victory for farmers and inhabitants in the region. (Neville, 2015: 21-22). This East African case was able to gain worldwide attention because of the debate over biofuels (Neville, 2015: 22-23). To explain the foundations of this case, Kate Neville (2015) applied the theoretical framework of contentious political economy, combining ideas from contentious politics, political economy, and political ecology.

Biofuels are naturally a contentious issue because any decision made regarding whether to increase or decrease biofuel production will infringe on a party's interests. A key mechanism in contentious politics is diffusion, which occurs when contentious issues spread to a place of relatability (Tilly and Tarrow, 2007: 215). The negative impacts of biofuels are relatable to people because issues such as land grabbing, climate change, and high food costs are global problems, which impact people in different countries. This is important for connecting various sites where biofuels are an issue, helping people take collective action against biofuel development. If biofuels were addressed at a local level, instead of a global issue, it would make collective action that raises

global awareness difficult. Relatable to multiple biofuel cases, there was an intersection of various biofuel related impacts in the Tana case, making these negative implications more severe.

### ***The Intersectionality of Biofuel Impacts***

Land grabbing, increased farmer competition, and heightened food costs because of biofuel production are observed in the Tana River region. The original issue, in this case, was over land grabbing in order to develop sugarcane biofuel plantations (Neville, 2015: 21). In Africa, there is a high quantity of land that is not being used, leaving it open to grabbing by state and corporate actors (Havnevik, 2011: 24-25). The Tana River area was important to people living and farming in the area, but this did not stop attempted land grabbing from occurring. When biofuels first started gaining popularity, there was optimism in the agricultural possibilities they created, but this optimism quickly faded with the increased presence of land grabbing and the food vs. fuel debate (Neville, 2015: 26). This leads into the next biofuel impact observed in the Tana case: increased farmer competition.

As highlighted by Neville, even prior to the presence of biofuels, there was heavy ethnic competition between people living in the Tana region, and this is typical for most East African countries (2015: 27). In 2012, ethnic clashes between different groups in the Tana region resulted in serious injuries, and 160 deaths. These clashes can be attributed to scarce resources, including limited land and water (Neville, 2015: 29). As previously mentioned, biofuel production requires increased land and water resources, and in a country with a very dry climate, increasing biofuel production causes less resources for farmers to compete over, inherently making conflict resolution less likely. Furthermore, an increase in biofuel production would result in increased food costs, making food inaccessible to more people.

The Tana River case highlights the intersections between the negative implications of biofuel production; impacts on the environment, food security, and poverty levels are often not independent, and frequently occur simultaneously. These findings can be applied to any case involving biofuel where land grabbing occurs, there is farmer competition, and there are high food costs. Before concluding, there will be a brief critique of the claims that argue biofuels are a sustainable alternative to fossil fuels.

### **Critique: Supporting Increased Biofuels**

The argument made in this article refutes the claim that biofuels are a sustainable alternative to fossil fuels. While Biofuels are innovative, and to an extent, can reduce the impacts of fossil fuels, there is a certain threshold where biofuels become bad for the environment, food security, and poverty levels. It is a popular claim that biofuels mitigate climate change (Environmental and Energy Study Institute, 2017), but the level of CO<sub>2</sub> emitted in producing and transporting biofuels is high. It is also a popular argument that biofuels enhance agricultural capabilities (Sobczyk, 2007), which is true, but this comes at an increased cost to small-scale farmers that cannot sell their produce because food prices are too high, or the majority of the rural poor that do not benefit from employment biofuels provide. Climate change is a problem for everyone, but biofuels are not the solution, and cannot be a sustainable alternative to fossil fuels. An aforementioned statistic showed that in order for biofuels to meet the global demand for energy, production would have to increase by over 500 per cent. With the negative impacts of biofuels

already revealed at a comparably lower rate of production, it is difficult to see how biofuels could be considered a sustainable alternative to fossil fuels at greater levels.

## Conclusion

Biofuels are not a sustainable alternative to fossil fuels, and this was observed through the various findings made throughout this article. The push for biofuels into the discourse on an alternative for fossil fuels began during the oil crisis, when a trade embargo on oil caused multiple states to scramble to find an alternative. The first set of observations relating to biofuels and the environment revealed that increased biofuel production does not mitigate climate change; land grabbing, and deforestation for biofuel production have had a negative impact on the environment. The second set of observations relating to food security and poverty revealed that increased cost of food, and farmer competition have negatively impacted farmers and communities in the global south. It is important to recognize that these negative impacts can intersect, occurring simultaneously in a single case, which was revealed in the Tana River region. Although there are some potential benefits for biofuels in reducing the impacts of climate change, significantly increasing their production would magnify the negative impacts already observed when biofuels are produced at a comparably lower rate. This work contributes to the field of political economy and to green energy policy. In finding that biofuels are, in actuality, not a sustainable alternative to fossil fuels, investments in new technologies will help the global community find an alternative that is affordable, accessible, and manageable.

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