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WATER, ENERGY AND FOOD NEXUS INTERVENTIONS: IMPLICATIONS FOR THE ACHIEVEMENT OF THE SUSTAINABLE DEVELOPMENT GOALS IN MALAWI

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ABSTRACT

Malawi faces mounting challenges in meeting the growing demand for food, water, and energy to satisfy the needs of a rapidly growing population. Relying on secondary data, the paper argues that while the existing policy initiatives have increased food production to a certain extent, the demand for water and energy has also increased, leading to degradation of the resource base, and contributing to an increase in water-related diseases. Poor sectoral coordination and institutional fragmentation have triggered the unsustainable use of resources and threatened the long-term sustainability of food, water, and energy security in the country, posing challenges to achieving the Sustainable Development Goals (SDGs) in the country. Consequently, this paper substantiates that a nexus approach can enhance understanding of the interconnectedness of the sectors and strengthen coordination among them. However, it requires a major shift in the decision-making process towards taking a holistic view, and development of institutional mechanisms to coordinate the actions of diverse actors and strengthen complementarities and synergies among the three sectors. The framework for cross-sectoral coordination and managing the nexus challenges is also suggested.

Keywords: Climate Change; Malawi; Water; Energy; Food and Sustainable Development

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Water, Energy and Food Nexus Interventions: Implications for the Achievement of the Sustainable Development Goals in Malawi

1. INTRODUCTION

The Water, Energy and Food (WEF) nexus approach has the potential to help African countries meet Sustainable Development Goals (SDGs).[1] This can only happen if the approach is turned into actions, like policy development and implementation. For the policy to be effective one must take into account what infrastructure is available in a country and a region. This must also be backed up by proper data collection and institutions must be strengthened to overcome bottlenecks. Equally important is the fact that interventions must be designed with the involvement of all stakeholders, including consumers. One common factor is that investment in innovation and technical support is vital so that a range of solutions can be developed.[2] This paper demonstrates that Malawi, like many other African countries, has failed to develop the integrated policy and institutional mechanisms required to address the Water, Energy and Food (WEF) nexus challenge as one interlinked ecosystem.

Although Malawi has made remarkable progress in socio-economic development in recent years, challenges persist in ending hunger and poverty, and ensuring food and nutritional security, an adequate standard of living, access to modern energy, and healthy lives for the vast population. In most developing countries having similar socioeconomic characteristics as Malawi, water, energy and food are inextricably linked in a nexus, as actions in one sector influence the others. Food production requires water and energy; water extraction, treatment, and redistribution require energy; and energy production requires water. Food production and freshwater services depend on water, land, and other natural resources, in other words a range of ecosystem services.

Malawi is a typical agrarian socio-ecological system. The World Bank classifies Malawi as a low-income country with a per capita GDP (in purchasing power parity terms) of US$780 in 2013.[3] Over 53% of the population lives in poverty based on the US$1 per day poverty line.[4] Malawi's population is predominantly rural, with only 15% living in urban areas.[5] In 2013 more than 77% of households depended on agriculture for

1 Eloise M. Biggs and others, 'Sustainable Development and The Water–Energy–Food Nexus: A Perspective on Livelihoods' (2015) 54 Environmental Science and Policy <http://dx.doi.org/10.1016/j.envsci.2015.08.002> accessed 6 August 2021.

2 Agathe Maupin and Mercy M. Ojoyi, 'Africa needs to manage food, water and energy in a way that connects all three' (University of the Witwatersrand University of Johannesburg, January 2017) < https://www.wits.ac.za/news/latest-news/in-their-own-words/2017/2017-01/> accessed 4 August 2021.

3 World Bank. Country and Lending Groups. (2015) <http://data.worldbank.org/about/country-andlending-groups> accessed 15 December 2020.

4 C. I. A. 'The World Fact Book: Malawi' (2015) <https://www.cia.gov/library/publications/theworld-factbook/geos/mi.html> accessed 15 December 2020.

5 National Statistical Office, *Integrated Household Survey 2010-2011 – Household Socio-Economic Characteristics Report.* (Malawi National Statistical Office 2012)

their livelihood.[6] Farming takes place on fragmented small parcels of customary land.[7] The agricultural sector is the main source of economic growth and exports, representing about 37% of gross domestic product and 82.5% of foreign exchange earnings.[8] Furthermore, due to low agricultural productivity levels, Malawi remained classified as a low-income food-deficit country by the FAO in 2014.[9]

Malawi is heavily reliant on biomass energy, with 90% of the population using wood or charcoal as a primary source of energy.[10] Only 8% of the population is connected to the electricity grid, with huge disparities between urban (25%) and rural areas (1%).[11] Water infrastructure is generally poorly developed, especially in the rural areas, and modern irrigation systems are underdeveloped. Most agriculture is rain-fed. The overreliance on singular sources of food (maize) and energy (biomass) both make the country more vulnerable to climate change (droughts and flooding), while aggravating its effects, as the pressure on woodlands has led to deforestation in several parts of the country.[12]

With growing populations, declining agricultural land, increasing stress on water and energy resources, and climate variability and change, Malawi faces the challenge of how to produce more food with the same or less land, less water, and increased energy prices, while conserving resources and maintaining environmental sustainability. The sustainability of maize production is under threat because of its heavy reliance on water and energy, growing water stress and energy shortages, poor functioning of irrigation systems, and increased competition for water and energy. The Sustainable Development Goals (SDGs) by the global community are critically important for Malawi with respect to ensuring water, energy and food security in a way that does not undermine sustainability for future generations.[13]

<https://www.resakss.org/sites/default/files/Malawi%20NSO%202012%20Integrated%20Household%20Survey%202010%20-%202011%20-%20Household.pdf> accessed 11 April 2021.

6 AQUASTAT, Water report for Malawi (2015) <http://www.fao.org/countryprofiles/index/> accessed 15 December 2020.

7 G. E. T. Gamula, Liu Hui and Wuyuan Peng, 'An Overview of the Energy Sector in Malawi' (2013) 5 Energy and Power Engineering 8.

8 African Development Bank, 'Malawi Country Strategy paper (2014-2018)' (2013) <http://www.afdb.org/en/countries/southern-africa/malawi/malawi-economicoutlook/> accessed 15 December 2020.

9 Thea Nielsen and others, 'The Food-Energy-Water Security Nexus: Definitions, Policies, and Methods in an Application to Malawi and Mozambique' (IFPRI Discussion Paper 01480 November 2015) <http://ebrary.ifpri.org/utils/getfile/collection/p15738coll2/id/129808/filename/130019.pdf> accessed August 42021.

10 Gamula, Hui,Peng (n 7)

11 Renewable Energy and Energy Efficiency Partnership [REEEP]. *Policy DB Details: Malawi.* 2012. <http://www.reeep.org/index.php?id=9353&special=viewitem&cid=94> accessed 15 December 2020.

12 Patsani G Kumambala andAlan Ervine, 'Site selection for combine hydro, irrigation and water supply in Malawi: Assessment of water resource availability' (2009) 248 Desalination 537

13 Blake Robinson and Jeremy Wakeford, 'Oil Shock Vulnerabilities & Impacts: Case Study of Malawi' (Paper prepared for United Kingdom Department for International Development June 2013).

To feed its growing population, Malawi has pursued policies aimed at achieving national food self-sufficiency through production of staple crops. However, their objective relies on more intensive use of water, energy, and chemical inputs. These policies have contributed to increased food production,[14] although not necessarily a more nutritious diet, but at the cost of accelerated degradation of critical natural resources such as land, soil, and water, and serious environmental impacts including groundwater depletion, waterlogging, salinity of soil, water pollution, and biodiversity loss. Another example is the policy of subsidies which leads to overuse of water and energy and can even be counterproductive.[15] Though it is true that energy subsidies can promote social objectives (when judiciously used), especially in case of the absence of social welfare mechanism for supporting the poor. However, subsidies end up lowering end-user prices. This will result in increased energy use and reduce incentives for sustainable energy use leading to inefficient consumption path which is unsustainable.[16]

Negative environmental impacts can arise from intensive agriculture, e.g., waterlogging and salinization of soils and increased incidence of waterborne and water-related diseases. Because of the intensive energy use, food production has become increasingly vulnerable to changes in the energy availability and costs. The challenges of ensuring food, water, and energy security are further compounded by the potential impacts of climate change on water resources and on energy use, and by increasing competition for land and water for bioenergy and hydropower. Food choices and agricultural practices influence water and energy demand. Similarly, water, energy, and land demand are influenced by different policies, for example those relating to agriculture, energy, land-use, food, fiscal, credit, prices, and subsidies.[17] These relationships are dynamic.

However, policies in Malawi, as in many developing countries, are generally narrowly sectoral, with a disconnect between those for food, water, and energy. By ignoring the underlying interdependence of the three sectors, policies sometimes have the unintended consequence of shifting a crisis from one sector to another. Additionally, policies and actions which are taken in

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[14] Thea Nielsen and others (n 9)

[15] Golam Rasul, 'Managing the food, water, and energy nexus for achieving the Sustainable Development Goals in South Asia' (2016) Vol. 18 Environmental Development 14–25 <http://dx.doi.org/10.1016/j.envdev.2015.12.001> accessed 4 August 2021.

[16] Analysis of the Scope of Energy Subsidies and Suggestions for the G-20 Initiative: IEA, OPEC, OECD, World Bank Joint Report (prepared for submission to the G-20 Summit Meeting Toronto (Canada), 26-27 June 2010) <https://www.oecd.org/env/45575666.pdf> accessed 4 August 2021.

[17] Golam Rasul and Bikash Sharma 'The nexus approach to water–energy–food security: an option for adaptation to climate change' (2015) *Climate Policy*, <http://dx.doi.org/10.1080/14693062.2015.1029865> accessed 4 August2021; Golam Rasul, 'Food, water, and energy security in South Asia: A nexus perspective from the Hindu Kush Himalayan region' (2014) Vol. 39 *Environmental Science & Policy* 35-48 <http://dx.doi.org/10.1016/j.envsci.2014.01.010> accessed 4 August, 2021; Golam Rasul, 'Managing the food, water, and energy nexus for achieving the Sustainable Development Goals in South Asia' (2016) Vol. 18 *Environmental Development* 14–25 < http://dx.doi.org/10.1016/j.envdev.2015.12.001> accessed 4 August 2021.

isolation, without considering their impact on other sectors, can aggravate resource constraints.

With competing demand for resources and increasing environmental pressure, an important challenge facing Malawi is how to minimize conflicts among the three main sectors of food, water, and energy, and promote synergies in policies and instruments. At present, policies and instruments are developed without adequate consideration for the cross-sectoral consequences. The lack of connection between sectoral agencies has created an imbalance between the sectors in terms of demand and supply. Conducted cross-sectoral efforts have remained linear, such as taking into account water for food or energy for food. While the agricultural policy framework has contributed to an increase in food grain production, it imposes a huge pressure on water and energy resources, which in turn has weakened the sustainability of the agriculture.

The connections between macro-economic and sectoral policies and cross-sectoral impacts are not internalized into national policies. The cross-sectoral externalities have placed additional pressure on land, water, energy, and other scarce resources and undermined the long-term sustainability of water, energy and food security. The major challenge therefore facing Malawi (as other developing countries) is how to decouple food production from water and energy use intensity and environmental degradation to make it sustainable. The planned Sustainable Development Goals (SDGs) of zero poverty (SDG1), ending hunger and food insecurity (SDG 2), ensuring water security (SDG 6), access to modern energy (SDG 7), sustainable economic growth (SDG 8), sustainable consumption and production (SDG12), and conservation, protection, and sustainable use of marine and terrestrial resources and ecosystems (SDGs 14 and 15) are closely interlinked and success in achieving them will depend heavily on ensuring the sustainable use and management of water, energy, land (food), and other natural resources.[18] These factors are not only interdependent, they also both reinforce and impose constraints on one another.

The goals are interlinked in different ways. Achieving the goal of food security and ending hunger, for example, depends strongly on achieving the goal of water and energy security which is needed to ensure water and energy is available for food production. Similarly, the ability to achieve the goal of water and energy security will largely depend on the ways in which food is produced, processed, transported, and consumed. Enhancing the efficiency of water, energy, and land use can ease the trade-offs and resource conflicts. Ensuring resource use efficiency, however, will not be sufficient to sustain water, energy and food security in the long run unless natural resources and ecosystems are conserved and used sustainably. The natural resource base and health of the ecosystem set the conditions for sustainable

[18] Nina Weitz, Manns Nilsson and Marion Davis, 'A Nexus Approach to the Post-2015 Agenda: Formulating Integrated Water, Energy and Food SDGs' (2014) Vol. 34 (2) SAIS Review of International Affairs 37-50.

production. Finally, ensuring healthy lives cannot be achieved by achieving a particular goal; it depends on multiple goals ranging from ensuring food, water, and energy to inclusive growth, healthy ecosystems, and protection of the environment. Like the food, water, and energy nexus, the SDGs are closely interlinked. Thus water, energy and food security, and the SDGs need to be addressed in an integrated way in Malawi.

Despite the inherent interconnectedness of water, energy and food, little effort has been made in Malawi to recognize the interdependencies of resource use, policies, and institutional or regulatory arrangements. Thus the present research will specifically: (1) demonstrate how the SDGs 2, 6, and 7 with their respective targets are interconnected; (2) present a preliminary pilot platform to assess the impact of the water targets on the food and energy targets in Malawi; (3) explore possible trade-offs for implementing different levels of the proposed water, energy, and food national plans; (4) propose interventions within the three national plans (social, policy, technical), at different scales, which have the potential of reducing the existing competition and ensure a more sustainable resource allocation; (5) demonstrate how such interventions must be hinged on effective stakeholder mapping and capacity development in order to be effective.

2. CASE STUDY

Malawi has a primarily rural population, with only 16 percent of the population residing in urban areas. It also has a relatively youthful population; 44 percent of the population is under 15 years.[19] Malawi has benefited from decades of peace and political stability but is susceptible to climate shocks. The 2015–2016 growing season was negatively affected by El Niño, which caused late rains and prolonged dry spells.[20]

Malawi's economy is highly dependent on agriculture with 80 percent of the population being smallholder famers. Agriculture contributes about 30% to the GDP and accounts for 90% of total foreign exchange earnings Malawi's GDP growth rate is expected to improve if weather patterns continue to improve and remain favourable for agricultural production.[21] However, despite projected economic improvement, 66 percent of the

[19] Population Reference Bureau, '2017 World Population Data Sheet' (2017) <http://www.prb.org/pdf17/2017_World_Population.pdf> accessed 4 August 2021.

[20] Malawi Vulnerability Assessment Committee (MVAC), 'National Food and Nutrition Security Forecast, April 2016 to March 2017' (2016) <http://vam.wfp.org/CountryPage_assessments.aspx?iso3=mwi> accessed 15 December 2020.

[21] USAID, 'Food Assistance Fact Sheet – Malawi' (2017) <https://www.usaid.gov/malawi/food-assistance> accessed 15 December 2020; World Bank, 'Malawi Country Overview' (2017) <http://www.worldbank.org/en/country/malawi/overview> accessed 15 December 2020; Government of Malawi, *Malawi 2015 Floods Post Disaster Needs Assessment Report* (World Bank Group 2015) <https://reliefweb.int/report/malawi/malawi-2015-floods-post-disaster-needs-assessment-report> accessed 15 December 2020.

population continues to live on less than US$1.90 a day.[22] Currently, Malawi ranks 143 out of 157 countries in progress toward meeting the Sustainable Development Goals (SDGs).[23] According to the most recent DHS (2015–2016), 16 percent of female deaths are related to pregnancy or childbearing, and 1 in 16 children will die before the age of 5, with two-thirds of these deaths occurring during infancy.[24]

About 85% of Malawi's human population lives in rural areas where agriculture is the main source of livelihood.[25] Agriculture's contribution to foreign exchange and GDP has been driven primarily by tobacco, the country´s main cash crop and foreign exchange earner. Tea and sugar are the other important export crops. Domestically, maize is the predominant food crop, grown by nearly all smallholders throughout the country, and contributes to more than half of the national calorie uptake. Given the importance of the crop in the Malawian diet, maize production is vital to the general welfare of the population and is therefore an important social and political variable.[26]

Malawi is generally rich in both surface and ground water resources. Surface water resources comprise a network of rivers comprising North and South Rukuru and Songwe in the Northern Region, Linthipe, Bua, Dwangwa in the Central Region, and Shire and Ruo in the Southern Region. Groundwater resources are mainly found in two key aquifer systems: the extensive but low yielding Pre-Cambrian Basement Complex aquifer, and the high yielding alluvial aquifer along the shores of Lake Malawi and Lake Chilwa, and in the Upper and Lower Shire Valley. But despite the availability of abundant water resources in the country, only 2.3% of total arable land is irrigated, and the largest proportion (52%) is estate or plantation farms, mostly growing sugarcane and tea.[27] Smallholder irrigation, which comprises 48% of irrigated land, remains virtually under-developed. Shire River is the outlet of Lake Malawi and accounts for about 98% of the country's hydropower generating capacity, which makes the country's industrial development almost entirely dependent on the Shire River for its energy.[28] In this regard, reduced flows into Lake Malawi by the tributary rivers have a direct effect on flows in the Shire River, and a consequent bearing on reduced energy generation capacity. In recent years,

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22 Jeffrey Sachs and others, *SDG Index and Dashboards Report 2017* (Bertelsmann Stiftung and Sustainable Development Solutions Network 2017).

23 ibid 63.

24 National Statistical Office (NSO) [Malawi] and ICF, *Malawi Demographic and Health Survey 2015–16*. (2017) Zomba, Malawi, and Rockville, Maryland, USA: NSO and ICF.

25 ibid.

26 FEWS NET, 'Malawi Food Security Outlook Update' (2017) <https://reliefweb.int/sites/reliefweb.int/files/resources/MW_FSOU_2017_12_final.pdf> accessed 15 December 2020.

27 Global Water Partnership, 'National Consultations on Water, Food Security and Nutrition' (A Final report of National Consultation on Water, Food Security and Nutrition in Malawi, May 2016) < https://www.gwp.org/globalassets/global/activities/news/july-2016/gwp---malawi-country-report.pdf> accessed 15 December 2020.

28 ibid.

intermittent hydropower generation has been attributed mainly to droughts and floods episodes. Water flow disruptions in the Shire and its tributaries have been exacerbated by siltation caused by poor and unsustainable land husbandry practices and deforestation taking place in the catchment area, and the infestation of waterweeds, such as water hyacinth.[29]

Fish is the main source of animal protein in Malawi. About 70% of total human population derive their animal protein uptake from fish, most of which are harvested from Lake Malawi. A large percentage of the population of people living along the shores of Lake Malawi, Lake Chilwa and Lake Malombe depend on fish resources for the sustenance of their livelihoods.[30] For the past decade or so, droughts and floods have been the major climatic hazards affecting fisheries production and have contributed immensely towards the declining or even drying up of water bodies, resulting in low fish catches and loss of biodiversity. Floods have been responsible for the destruction of fish ponds, whilst droughts have led to low water levels in the main water bodies and reservoirs, or even the drying up of rivers and lakes. For example, the drying up of Lake Chilwa in 1995 resulted in total loss of fish stocks.[31]

The totality of the calamities highlighted above has led to extreme food shortages in Malawi, and it is against this background that the Government is committed to redress the resultant effects for the country to meet both its food security and nutrition as well as water needs for its rapidly growing population.

3. KEY CHALLENGES FOR MALAWI

3.1 Poor Catchment Conservation

At the moment, sedimentation is a serious problem that rivers and lakes in Malawi are experiencing. With increased catchment degradation, large volumes of sediments washed down from catchments get deposited in rivers and lakes, thereby clogging water treatment works for domestic water supply, irrigation canals, and hydropower generation infrastructure.[32] Malawi has more than 56 gravity fed water supply schemes and more than 750 small earth dams, four large dams; namely, Lunyangwa Dam in Mzuzu, Kamuzu Dams I and II in Lilongwe, and Mulunguzi Dam in Zomba. But due to excessive siltation, some of these gravities fed schemes and small earth dams have stopped functioning. Of late, water supply to Lilongwe City has tremendously declined due to the siltation of Kamuzu Dams I and II caused by destruction of Dzalanyama Forest Reserve, the main source of the rivers that feed into the two dams. The challenge of poor catchment conservation

[29] ibid/
[30] ibid.
[31] ibid.
[32] ibid.

has widely been acknowledged as causing food insecurity and water resource degradation and depletion.[33]

3.2 Food Insecurity

Food insecurity in Malawi (which is mainly an agrarian society), has been significant and some of the drivers of hunger are weather associated factors like flooding, drought and erosion.[34] For instance, in 2012/13 about 1,630,000 people relied on food relief while in 2013/14 about 1,154,000 people relied on food hand-outs.[35] In 2015/16 the figure rose to about 2.86 million people. In 2018, 3.3 million Malawians were food insecure, 1.8 million in 2019, and 2.6 million were anticipated in 2020.[36] According to the Second Round Agricultural Production Estimates Survey (APES) released by the Ministry of Agriculture, Irrigation and Water Development in March, the country's main staple food, maize registered a decline of 12.4 percent as compared to the 2014/15 final round estimate.[37]

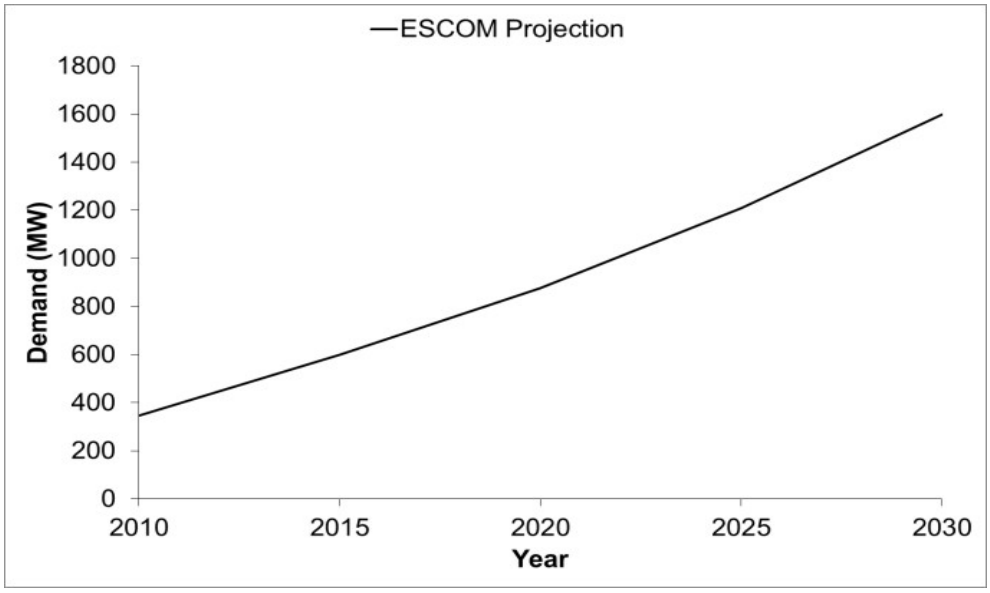

Figure 1: ESCOM Food Demand Projections for Malawi from 2010-2013

[33] ibid.

[34] Tilele Stevens and Kaveh Madani, 'Future climate impacts on maize farming and food security in Malawi' (2016) 6:36241 Scientific Reports, DOI: 10.1038/srep36241; Madhumita Paul, 'Some 2.64 Million Malawians Face Acute Food Insecurity Between January And March: Report' (12 January 2021) https://www.downtoearth.org.in/news/africa/some-2-64-million-malawians-face-acute-food-insecurity-between-january-and-march-report-75030 accessed 4 August, 2021; Global Water Partnership (n 27).

[35] Global Water Partnership (n 27).

[36] Blessings Botha, 'Amid maize bumper harvests in Malawi, food insecurity reigns' (October 2020) <https://blogs.worldbank.org/africacan/amid-maize-bumper-harvests-malawi-food-insecurity-reigns> accessed 4 August2021.

[37] FEWS (n 20).

3.3 Poor Irrigation Development

There is a growing national demand for water resources particularly during the dry season. This has resulted in calls for better Water Resources Management (WRM) and its development to ensure that water resources do not limit social and economic development and poverty reduction in the country. Over the years Malawi has been facing problems of water scarcity due to climate change, environmental degradation, and lack of storage and reservoirs.

The country is divided into 17 Water Resources Areas (WRAs), which are subdivided into 78 Water Resources Units (WRUs). There are two major drainage systems: The Lake Malawi system, which is part of the Zambezi River basin. The Shire River is the only outlet of the lake with an average flow of 400 m/s of water.[38] The government placed a high priority on irrigation and WRM development in order to ensure food and water security at household level, for example, through water harvesting, improved water catchment and management. The department of WRM in MoAIWD has constructed over 25 small to medium multipurpose dams in the 24 districts across the country to make water resources readily available for multiple uses.[39]

By 2010 the demand for water in Malawi was already greater than the supply in many WRAs with the situation predicted to worsen in the future.[40] In addition, data for 17 WRAs shows a deficit of 110 Ml/d in 2010 increasing to 170 Ml/d by the year 2020 and worsening to 956 by the year 2035.[41]

Notwithstanding the drought related decline in crop production, irrigation in Malawi is under-developed. According to the Irrigation Master Plan and Investment Framework (2015), Malawi has an irrigation potential of about 408,000 hectares. At present, however, only 104,463 hectares have been developed, representing 26% of potential irrigable land. Out of this, about 52,144 ha (49.8%) are under smallholder farmers while 52, 499 (50.2%) ha are under commercial estates.[42] The area under irrigation is low partly due to low levels of financing, high cost of irrigation investment, low levels of economic rate of return and unfavourable financing mechanisms prevailing in the country. On average, it costs about US$10,000 to develop one ha for irrigation. It also takes about 3 to 5 years for an investor to start realizing profits (economic rate of return) from irrigation investment.

3.4 Energy Insecurity

Given its relatively small landmass, large (and growing) population and heavy dependence on fuel wood, Malawi is an increasingly energy-stressed country. The National Energy Policy estimates that 93% of total energy demand is met by biomass energy. Households consume 84% of the total primary energy. A staggering 99% of household energy is supplied by

[38] FAO (n 25).
[39] MoAIWD (n 22).
[40] ibid.
[41] ibid.
[42] (AGWA, 2015).

biomass. This, with increasing population growth, is exerting significant pressure on the country's forest resources, leading to forest degradation and deforestation at a rate of 2.6% per year. 87% of the population uses firewood and 8% charcoal to satisfy their thermal energy needs. Less than 7% of the 14 million people are connected to the national grid.[43] The connected demand far exceeds the supply of 320 MW installed generation capacity. Thus, load shedding is frequent. Less than 2.3% of the total national energy demand is met by electricity, 3.5% by liquid fuels and gas, and 1% by coal.[44]

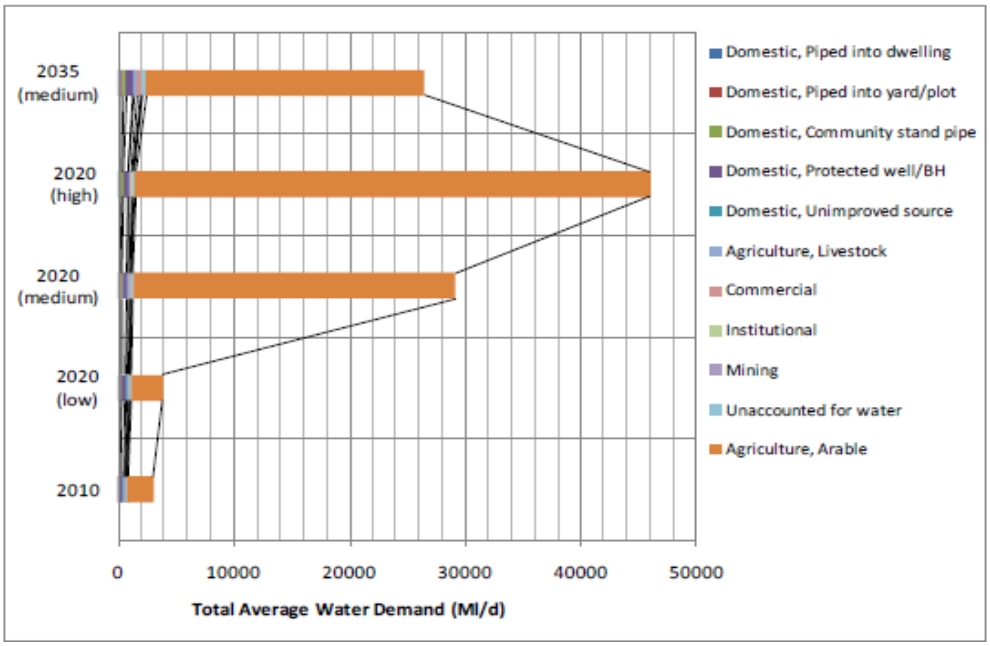

Figure 2: Projected increases in total average water demand (Ml/day) from 2010 baseline.[45]

Electricity and gas are only intermittently available and considered to be too expensive for cooking; for example, electricity tariffs were raised by 84% in 2013. Therefore, firewood and charcoal are the major cooking fuels, even in the urban areas.[46] Most of the charcoal is consumed in urban areas – representing 46% of total demand. Unlike in many neighbouring countries, firewood is still available in all four major cities of Malawi (Lilongwe, Blantyre, Zomba and

[43] Joseph Kalowekamo, 'Biomass energy strategy' (March 2013) <http://mbaula.org/index_htm_files/2%20-%20BEST%20Presentation.pdf> accessed 4 August 2021; Malawi Energy Situation, Energypedia <https://energypedia.info/wiki/Malawi_Energy_Situation > accessed 4 August 2021.

[44] Government of Malawi, *Malawi 2015 Floods Post Disaster Needs Assessment Report* (World Bank Group 2015) <https://reliefweb.int/report/malawi/malawi-2015-floods-post-disaster-needs-assessment-report> accessed 15 December 2020.

[45] Anthony Hurford, Steven Wade and J Winpenny, 'Malawi Case Study: Harnessing Hydropower' (A report submitted to Department for International Development (DFID), United Kingdom 2014).

[46] ESCOM, 2013.

Mzuzu) as well as in the district capitals. Firewood provides over 50% of the urban cooking fuel and nearly 100% in the rural areas.[47]

Even in urban areas, firewood is mainly used in open three-stone fires. Therefore, there is a potential to introduce convenient affordable portable firewood stoves in urban areas and shift eventually some parts of the cooking activities currently done with charcoal to a less primary-energy intensive fuel source, meaning un-carbonised firewood. Charcoal in Malawi is mostly unsustainably produced from live trees: over 60% of the charcoal is made from wood originating from protected Forest Reserves and National Parks; even firewood is unsustainably collected.[48]

The Maplecroft's Climate Change and Environment Risk Atlas shows that Malawi is increasingly vulnerable to the impacts of climate change. According to the new Climate Change Vulnerability Index (CCVI), there are 30 countries at 'extreme risk' worldwide. Malawi moved fast from position 15 in 2011 up to number 9 on this list.[49] This explains why the Ministry of Environment and Climate Change Management is supporting the initiative to promote energy efficient biomass appliances like cookstoves to reduce the quantity of solid biomass required for preparing a meal.[50]

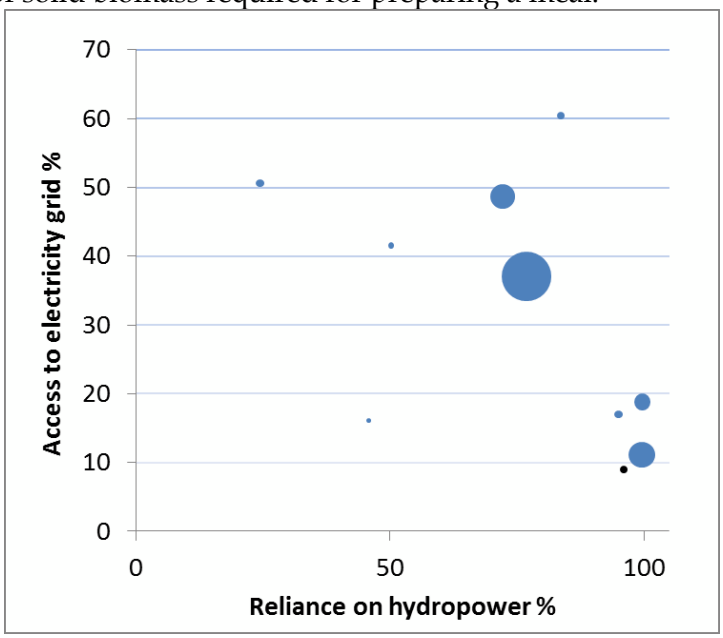

Figure 3: Reliance on hydropower and access to electricity with water availability per head represented by the size of the circles. The black circle represents Malawi.[51]

[47] A Bogdanski and C Roth, 'Integrated food-energy systems: Growing fuel wood on farm in Malawi' (2012) 26(2) Nature & Faune 57

[48] J Taulo et al., 'Energy Supply in Malawi: Options and Issues' (2015) 26(2) Journal of Energy in Southern Africa, 19.

[49] Bodanski and Roth (n 47).

[50] Charles Jumbe and Arild Angelsen, 'Modelling Choice of Fuelwood Source Among Rural Households In Malawi: A Multinomial Probit Analysis' (2011) 33(5) Energy Economics 732.

[51] World Bank, World Development Indicators (Washington, DC: 2013).

4. CURRENT CROSS SECTORAL POLICIES ON WATER, ENERGY AND FOOD IN MALAWI

This section assesses the trends and issues in food, water, and energy security in Malawi and their interconnected challenges. It begins by examining food security policies, followed by the sections showing how policy interventions in one sector have engendered knock-on negative externalities in others, and increased pressures on their sustainability.

4.1 Food Security Policies

In the attempt to harmonize policies, the government reviewed the various national development strategies and agricultural related legislation and policies and produced the Agricultural Policy Framework (APF). The APF summarizes the objectives of agricultural development, strategies and policies that will be pursued to achieve both stated and commonly perceived agricultural objectives.[52] The purpose of the APF was to increase agricultural productivity so as to ensure food security and sustainable agricultural growth and development.

The Malawi Agricultural Policy framework and the MGDs are consistent with the Comprehensive Africa Agriculture Development Programme (CAAPD) in terms of objectives of agricultural development and the key areas of focus in order to achieve sustainable development.[53] The Agricultural Sector Wide Approach process (ASWAp) is a path that Malawi has chosen to align its agricultural development agenda with the CAADP process. The ASWAp has five broad focus areas called priority pillars; namely, (i) Food security and risk reduction, (ii) Agribusiness and Market Development, (iii) Sustainable Land and Water Management, (iv) Research, Technology and Dissemination and (v) Institutional strengthening and capacity building.[54]

The ASWAp is an investment framework that will guide government and development partners in the implementation of result-oriented priority programmes in the agricultural sector. The ASWAp is also a programme approach to development that will broaden ownership by government over decision making on policy, strategy and spending, increase coherence between sectoral policies, reduce transaction costs through the use of government procedures and strengthen national institutions.[55]

Malawi needs substantial increases in its agricultural growth rate if it is to significantly reduce poverty and lay the foundation for any kind of structural transformation that will benefit a large portion of the population. The CAADP, which is a concept of the New Partnership for African Development (NEPAD), has set out the agricultural GDP growth rate target

[52] (MoAIWD) 2006.
[53] (MoAIWD, 2009).
[54] ibid.
[55] ibid.

of 6% per annum for African countries tasked to find ways to achieve this target. The ASWAp is therefore using a minimum target of 6% growth in the agricultural sector as recommended by the CAADP.

The GoM adopted a National Irrigation Policy and Development Strategy (NIPDS) in June 2000. The NIPDS, supported by an Irrigation Act passed in 2001, states that GoM will assume the role of facilitator of sustainable irrigation development in areas having potential, using a participatory approach, and will embark on developments only if the smallholder farmers in the area request such development and meet the criteria for sustainable development. The NIPDS aims to: (i) identify areas with irrigation potential; (ii) encourage private sector development of irrigated agriculture (estates and commercial farms); (iii) assist smallholders to develop and manage their own self-help irrigation schemes; (iv) transfer management of existing government schemes to their beneficiaries; (v) assist informal sector irrigation; (vi) enhance national capacities for irrigation development; (vii) conduct research in irrigation technology; and (viii) promote the use of both simple and advanced irrigation.[56]

Malawi's Farm Input Subsidy Program (FISP) has shaped the country's development and agricultural policy the most. This national program began in 2005 after the end of several maize input subsidy programs from the 1990s and severe droughts early in the following decade.[57] Since its inception, its expenditures have accounted for more than 60 percent of Malawi's agricultural budget. FISP aims to enhance food security through improving agricultural productivity by increasing maize production, promoting household food security, and increasing income[58] by decreasing the costs of fertilizer and improved maize seed for poor smallholder farmers.[59] The program targets almost half of all Malawian farmers. Targeting effectiveness in FISP and other programmes has been widely studied and discussed. Over the life of the programme, changes in area targeting have resulted in more equitable distribution of input vouchers per household, but there have been limited changes in targeting criteria and processes at beneficiary level. Broad beneficiary targeting criteria have allowed wide variations in their application at community level, resulting in biases against receipt of subsidized inputs by poorer people. Widespread and increasing redistribution and 'sharing' of coupons has reduced this bias but increased the likelihood of poorer recipients receiving fewer coupons than less-poor recipients. There have also in some years been gender biases against receipt

[56] ibid.

[57] (Dorward et al. 2008).

[58] Rodney Lunduka at al., 'What Are the Farm-Level Impacts of Malawi's Farm Input Support Program? A Critical Review' (2013) 44(6) Agricultural Economics 563.

[59] Channing Arndt at al., 'The Economywide Impacts and Risks of Malawi's Farm Input Subsidy Program' (Invited paper presented at the 4th International Conference of the African Association of Agricultural Economists, Hammamet, Tunisia. September 2013).

of coupons and access to subsidized fertilizers by female headed households.[60]

On the one hand, an increase in food production is likely to entail a higher demand for water. This decreases water availability indirectly as well as increase health risks and waterborne diseases.[61] On the other hand, given the definition of water security by UN-Water, which emphasizes "acceptable quality water" as a dimension of water security, fertilizer subsidies may directly influence water security.[62] Mineral and chemical fertilizer can be washed away by rain into rivers and lakes and cause eutrophication, which drastically increases algae. Moreover, extensive use of fertilizer can pollute ground and drinking water.[63] Therefore, FISP may have direct and indirect impacts on water security. A direct relationship between energy security and fertilizer exists as the production of ammonia and nitrogen fertilizer requires energy in the form of natural gas. Since Malawi is a net importer of fertilizer, the production of nitrogen does not directly affect energy security in Malawi; however, analysing the potential effects of FISP on energy security at the national level, one can find indirect linkages through higher agricultural output, potentially leading to economic growth and higher energy demand.

4.2 Water Security Policies

Despite its significant water resources, Malawi often experiences droughts with periods of unreliable and poorly distributed rainfall. This has severely affected crop production which often results in families running out of food by November each year. The vulnerable areas tend to be those with average rainfall amounts of less than 1000 mm.[64] In these areas, many of which are located in the South of the country, the variability of the rainfall is higher with actual useful amounts available to the crops being masked by the average figures.[65]

The Ministry of Agriculture and Water Development formulated the National Water Policy (2004) to strengthen and harmonize issues of water resources management and utilization to guide the country in the sustainable use of water. Among its strategies, the policy ensures that the relevant institutions are provided with the relevant information on floods and droughts; and formulation of mitigation measures to reduce the impact of climate change and variability as a means for disaster preparedness and management; but also promoting coordination with other institutions on disaster management. The Water Works Act (1995) and the Water Resources Act (1999) introduced the commercialization and decentralization of urban

[60] Nazaire Houssou and Manfred Zeller, 'To Target or Not to Target? The Costs, Benefits, and Impacts of Indicator Based Targeting' (2011) 36 (5) Food Policy 627 (Dorward et al. 2008).
[61] (UN Water 2013).
[62] Ibid.
[63] Edwin D. Ongley, 'Control of Water Pollution from Agriculture' (Irrigation and Drainage Paper 55. Rome: Food and Agriculture Organization of the United Nations. 1996).
[64] (World Bank, 2010).
[65] ibid.

and peri-urban water supply to parastatal bodies established under its provisions. The act made provisions for the control, conservation, apportionment and use of water resources of Malawi.[66]

With the acceleration of population growth and repeated droughts over the past decades, Malawi is expanding its support for irrigation.[67] In Malawi a total area of 104,000 hectares is irrigated.[68] Since 1994 the irrigated area has increased more than four times.[69] In several areas of Malawi, the irrigation boom is accompanied by the transfer of irrigation management from the government to farmers. Stakeholder participation in irrigation management is expected to encourage sustainable operations by inducing a sense of ownership and responsibility among farmers. Ideally, farmers would plan, build, maintain, and manage their community's irrigation scheme. This transfer of ownership and management from the government to farming communities, called Irrigation Management Transfer (IMT), is rife with challenges and has not yet been entirely successful.[70]

In 2010, Malawi began promoting the Green Belt Initiative (GBI), which is a large-scale irrigation policy for smallholders and commercial farmers to use Malawi's water resources, predominantly Lake Malawi. The Malawian government has offered investors agricultural land near the country's three biggest lakes and perennial rivers to install irrigated agriculture on 1 million hectares by relocating villages.[71] The initiative has been aimed at higher agricultural output of food and cash crops with the goals of increasing macro- and microlevel food security and decreasing poverty. Through subsequent increases in agricultural and nonagricultural growth, it has been found that greater diversification in the agricultural sector and the rest of the economy results in reductions in poverty as well as caloric and nutritional deficiencies. This implies that the GBI has a large potential to increase food security at the macro- and microlevels.

The initiative directly improves water security by increasing water access. Most irrigation schemes are located near Lake Malawi, which could decrease the lake's water levels and water flowing out of rivers, making it difficult to maintain sufficient water levels to produce hydro energy.

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66 (World Bank, 2011).

67 Bryson G. Nkhoma and Wapulumuka O. Mulwafu, 'The Experience of Irrigation Management Transfer in Two Irrigation Schemes in Malawi, 1960s-2002' (2004) 29 Journal of Physics and Chemistry of the Earth 1327.

68 Malawi, MoAIWD (Ministry of Agriculture, Irrigation and Water Development). *National Irrigation Master Plan and Investment Framework*, 2015 Lilongwe, Malawi, mediamanager/documents/Publications/Climate/sei-pb-2013-malawi-energy-access.pdf.

69 P. W. R. Kaluwa at al., 'The Country Situation Report on Water Resources in Malawi. Lilongwe UNDP/SADC Water Initiative.' In W. O. Mulwafu, and B. G. Nkhoma, 'The Use and Management of Water in the Likangala Irrigation Scheme Complex in Southern Malawi,' (2002) 27 Physics and Chemistry of the Earth 839.

70 Nkhoma and Mulwafu (n 67).

71 B Chinsinga and M Chasukwa, 'The Green Belt Initiative and Land Grabs in Malawi' (Future Agricultures Consortium, Policy Brief 55. Brighton, UK November 2012) <http://www.future-agricultures.org/> accessed 5 March 2020.

4.3 Energy Security Policies

The Government of Malawi has developed a number of strategies in the energy sector, including power sector reform, rural electrification, biomass energy and renewable energy.[72] The National Energy Policy (NEP) was approved in 2003 under the remit of Department of Energy Affairs (DoEA); as part of the NEP, a Renewable Energy Framework was launched, to bring more coherence to renewable energy developments.[73] The Power Sector Reform Strategy (PSRS) approved by the Government of Malawi in 2003, provided for the unbundling of Electricity Supply Corporation of Malawi (ESCOM) and private sector participation via long-term concessions in transmission and distribution and entry of Independent Power Producers (IPPs) for new generation capacity. Consistent with these strategies, a set of legislation was approved by the Parliament in 2004, including the Energy Regulation Act, an Electricity Act, a Liquid Fuels and Gas Act, and a Rural Electrification Act.

As part of the reform process, the Government announced that it intends to revise the electricity market structure and the role of ESCOM in the market (particularly the question of multiple licenses held by ESCOM) by revising the Electricity Laws. To this end, the Government will put in place two enabling policy instruments: (i) a Feed-in-Tariff policy, to cover small hydro, biomass and wind resources and (ii) a Standard Power Purchase Agreement framework, to provide clear guidelines on the scope, duration and operational conditions of an IPP contract. A review of the Malawi FIT policy revealed that there were fundamental challenges with the policy which made it rather difficult to attract independent power producers (IPP) thereby frustrating the policy initiative. The most notable challenge with the policy included its lack of stakeholders' participation during policy development. MERA was alleged to have hired a policy consultant who prepared the policy by copying and pasting the Kenyan FIT policy of 2010 without, making relevant modifications to suit the Malawi socio-economic condition. Other challenges with the policy include: Lack of technical expertise, Policy funding, Low end-user tariff being charged by ESCOM utility, Public willingness to pay, Political interference, Grid capacity and Low tariff.[74]

As part of the operationalization of the 2004 energy sector legislation, the Malawi Energy Regulatory Authority (MERA) was formed and the predecessor energy sector regulatory bodies, the National Electricity Council and the Petroleum Control Commission, were dissolved. MERA's role includes inter alia (i) reviewing tariff applications from ESCOM and

[72] (UNDP 2013).

[73] International Energy Agency, 'Tracking Clean Energy Progress 2013: IEA Input to the Clean Energy Ministerial' (International Energy Agency Paris. 2013).

[74] Isaac Chitedze, 'Analysing Feed-in Tariff Policy to Accelerate Renewable Energy Deployment and Electricity Access in Malawi' (Master Dissertation Submitted in partial fulfilment of the requirements for the Master degree in Energy Policy at Pan-African University Institute for Water and Energy Sciences, 2018).

recommending tariff changes to GoM; (ii) granting licenses for generation and distribution operators; and (iii) arbitrating commercial disputes that arise under the 2004 energy legislation.[75]

The government recognizes that the power sector is a key constraint to Malawi's economic growth. The objective of the MGDS was to reduce the number and duration of blackouts, increase access to reliable and affordable electricity in rural areas and other targeted areas, and improve coordination between the needs for energy for households and those of other high growth sectors such as tourism and mining.[76]

Malawi is heavily reliant on biomass for its cooking energy requirements, especially firewood and charcoal, which account for 95% of national energy requirements for cooking.[77] The growing demand for charcoal and wood fuel has been a primary factor in the widespread exhaustion of woodlots across Malawi and is thus an increasingly critical development issue in Malawi.[78] The impacts are multi-sectoral: deforestation is resulting in soil fertility degradation, erosion and river siltation, which in turn undermine subsistence livelihoods, increase flood risks and damage hydro-power infrastructure (World Bank, 2011).[79]

The second MGDS II for the period 2011- 2016 were announced in 2011. In an attempt to minimize the use of biomass fuels the government undertook a number of initiatives: the Program for Biomass Energy Conservation (ProBEC) which promoted the use of clay stoves to save fuel; the Promotion of Alternative Energy Sources Project (PAESP) in 2007 to promote non-traditional fuels for cooking and heating to reduce environmental degradation; and a National Sustainable and Renewable Energy Programme (NSREP) which promoted renewable energy technologies in Malawi.[80] The Malawi Rural Electrification Project (MAREP) has also been established with the primary aims of reducing the large unsustainable wood consumption and improving the dependability of imported oil and coal. The Rural Electrification Act of 2004 is the Malawian Act that provides for the promotion, funding, management and regulation of rural electrification in Malawi. It came into force in March 2004.[81]

5. ANALYSIS OF THE CURRENT W.E.F. NEXUS STRATEGIES IN MALAWI

In line with the UN-SDGs, the following long term (beyond 2020) measures have been proposed (among others) by the Government of Malawi

75 (ESCOM 2013).
76 (SEI 2011).
77 (World Bank, 2011).
78 ibid.
79 ibid.
80 ibid.
81 (Pemba 2013).

to address issues of water, energy and food insecurities holistically and in an integrated manner:[82]

1) Increasing agricultural productivity, thereby reducing pressure on forest resources and increasing energy access and associated economic development goals;
2) Ensure availability and sustainable management of water and sanitation for all;
3) Promoting climate smart agriculture;
4) Promoting soil and water conservation technologies;
5) Use of improved cook stoves and fuel-switching in the household energy sector. Also, high dependence on traditional biomass, hydropower and rain-fed agriculture increases vulnerability to climate change in Malawi
5) Improving access to water and the production of hydro energy
6) Establishing synergies between expanded biofuels production and reduction in traditional biomass use to promoting low-carbon pathways while also improving energy access and stimulating agricultural and rural development.

In addition, the Government of Malawi has welcomed the iSDG – a simulation model for the effective implementation of the UN-SDGs. The model demonstrates clear sectoral interlinkages and provides a platform for trade-offs and synergies in implementation of activities in Government Ministries, Departments and Agencies (MDAs). It is also an instrument for policy reviews and a framework or tool which could also facilitate effective alignment and coordination of donor support and interventions. To translate good simulation results to reality, it is important to ensure that an effective framework for operationalization exists.

Although existing policies have been able to increase food production, this has come with huge environmental, social, and economic costs and threatens the long-term sustainability of agriculture and food security as well as achieving the UN-SDGs in Malawi. For example, the Farm Input Subsidy Programme (FISP) in Malawi which was popular for its distribution of inputs (including fertilisers) to resource poor farmers,[83] was criticized for its adverse impact on water which could cause eutrophication.[84] The WEF nexus may have been inferred in the long-term goals of Malawi, but up till now, the strategies to achieve water, energy and food security are still from the platforms of 'silos' as the interdependencies are not given due attention. For instance, it is clear that water and energy have traditionally been interlinked in Malawi through hydropower plants and large multipurpose

[82] Government of Malawi (n 68).

[83] A typical FISP beneficiary package comprised four vouchers. Two were used to purchase fertiliser (basal and top dressing) and the other two were used to purchase seed (maize and legume).

[84] Thea Nielsen et al., The Food-Energy-Water Security Nexus: Definitions, Policies, and Methods in an Application to Malawi and Mozambique (IFPRI Discussion Paper 01480 November 2015) < http://ebrary.ifpri.org/utils/getfile/collection/p15738coll2/id/129808/filename/130019.pdf> accessed 4 August 2021.

dams. However, new interactions have emerged between water, energy and agriculture sectors that are yet to be properly understood and explored.[85] Crop production now increasingly relies on energy consuming groundwater pumps to meet irrigation needs; energy use in pumping and farm operations accounts for a significant source of energy consumption.[86] This link between energy, irrigation water and agriculture needs to be investigated with improved data collection and policy action. For systems that are expected to function for decades to come, the implications of water and of energy must be evaluated if future water supplies get affected due to climate change or face disruptions in flow across national boundaries. Managing each resource separately can lead to decisions that seemingly improve supply in one sector, but in reality, create problems in others. If the linkages are incorporated in policy evaluation, then unintended consequences may be avoided while multiple problems may simultaneously get addressed.[87]

The existing policies and regulatory frameworks were developed without considering the cross-sectoral consequences and advancement as agencies worked in isolation. The current resource utilization and management style is unsustainable because of the siloed approach used in the different sectors. [88] The lack of coordination and poor inter-sectoral collaborations in Malawi contributes to the unbalanced resource management history of the country. For example, the introduction of the cook-stove in Malawi which uses biomass energy source more efficiently and emits less greenhouse gas are not considered in the water and energy policies as each sector is ignorant of the advancement and challenges of other sectors.[89] The seeming disconnects between the water, energy and food sectors has resulted in the cross-sectoral externalities being ignored and a failure to take into account social, economic and environmental costs. However, strong engagement among the water-energy-food sectors can improve policy and consequently livelihood.

In light of the foregoing, a policy framework will be proposed for the effective operationalizing of the above long term (WEF) goals in Malawi, projecting that the nexus model will be the most optimized model not only for achieving the goals, but also, can set forth the journey for UN-SDGs.

The framework below represents the relationship between SDG Malawi Vision 2020 and the WEF Framework.

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85 (AGWA, 2015).

86 FEWS NET, 'Malawi Food Security Outlook Update' (2017) <https://reliefweb.int/sites/reliefweb.int/files/resources/MW_FSOU_2017_12_final.pdf> accessed 4 August 2021.

87 A Grobicki, 'Water, Food, Energy, Climate: Strengthening the Weak Links in the Nexus' in Felix Dodds & Jamie Bartram (eds.), *The Water, Food, Energy and Climate Nexus: Challenges and an Agenda for Action*. (Routledge 2016)126.

88 Tafadzwanashe Mabhaudhi, 'The Water–Energy–Food Nexus as a Tool to Transform Rural Livelihoods and Well-Being in Southern Africa' (2019) Vol.16(16) International Journal of Environmental Research and Public Health, 1-20 doi:10.3390/ijerph16162970.

89 IFPRI, 'The food-energy-water security nexus in Malawi' (26 October 2016) https://www.youtube.com/watch?v=CGVMWHXBoTY accessed 6 August 2021.

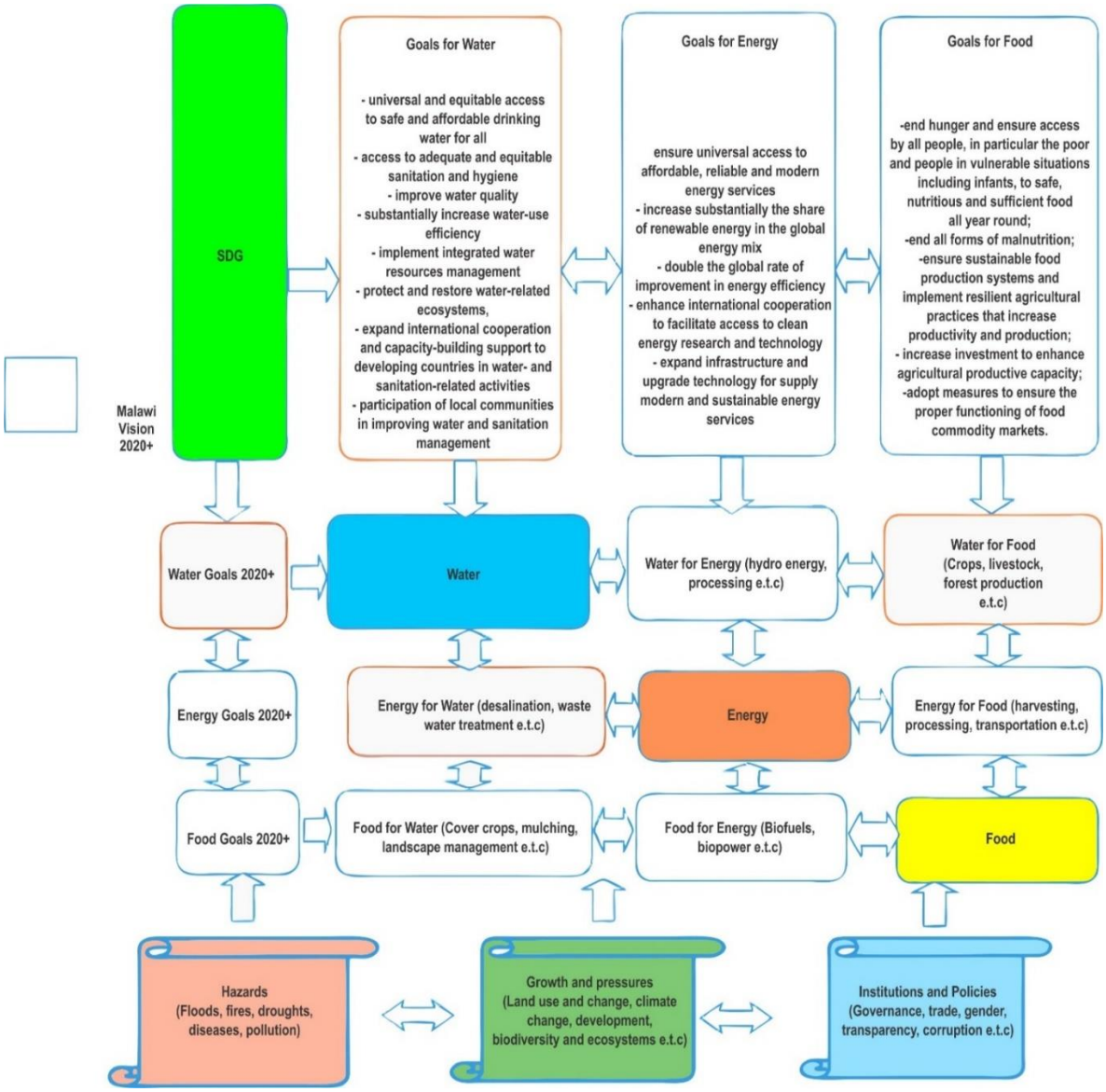

Figure 4: SDG-Malawi Vision 2020+ /WEF Framework

Enabling conditions for horizontal and vertical policy coherence of the WEF Nexus initiatives post 2020 in Malawi includes institutional capacity building, political will, change agents and awareness-raising. This can be realized if the nexus is addressed coherently across all scales through multi-level governance.

The framework above has been analysed in the context of "Risk Analysis", reckoned with. Thus, unless risk is not fully comprehended, the WEF linkages would poorly be understood hence policy making will miss

on the "wholeness". The risk analysis model has been conceptualized and popularized by IRENA.[90]

6. IMPLEMENTING THE NEXUS APPROACH: RECOMMENDATIONS

A review of selected published articles on the WEF nexus clearly indicates that opportunities exist to implement the nexus approach at different scales, that is, at national, regional, and local levels, provided there is recognition of the need, understanding of the extent of interconnections and their consequences, and willingness to reform sectoral policies and strategies toward more integrated and cost-effective planning, decision-making, implementation, monitoring, and evaluation. A nexus approach facilitates better understanding of the complex and dynamic interrelationships. Effective cross-sectoral consultation mechanisms are therefore needed to ensure the development of concerted efforts to address this WEF security issue, and to make sure that decisions are taken as part of an integrated, long-term, and multisectoral strategy. The following (adopted) areas of interventions are therefore recommended in order to promote the adoption of a nexus approach in planning and decision making in Malawi:

Involvement of stakeholders to build awareness of and capacity for the interconnected nature of the elements of the WEF nexus, share ways to minimize trade-offs, explore synergies, and suggest actions for changing behaviours with regard to the nexus and other actors whose well-being relies on services and products associated with elements of the nexus. This includes community-level empowerment using core resources to focus on more sustainable consumption.[91]

Improvement of policy development, coordination, and harmonization to account for trade-offs and build on the increased interconnectedness of WEF. Part of this process is promoting, identifying, and eliminating contradictory policies.[92] Despite the strong linkages among Water, Energy and Food, a continuity of approach in the developmental sector (Academia & Practitioners) over the decades, has always been in the "silos". To maximize WEF in its output from resource perspective, a mechanism of awareness on part of policy makers is very important. The re-evaluation of agricultural investments after a food crisis is reactionary, for the most part, but it is an impetus for thinking in the interconnectivity of resources and the complexity

[90] (International Renewable Energy Agency, 2015).

[91] Mitu Gulati et al., 'The Water-Energy-Food Security Nexus: Challenges and Opportunities for Food Security in South Africa' (2013) 1 Aquatic Procedia 150 <https://doi.org/10.1016/j.aqpro.2013.07.013> accessed 14 May 2019

[92] MituGulati et al., 'The Water-Energy-Food Security Nexus: Challenges and Opportunities for Food Security in South Africa' (2013) 1 Aquatic Procedia 150 <https://doi.org/10.1016/j.aqpro.2013.07.013> accessed 14 May, 2019; L Nhamo et al., 'The water-energy-food nexus: Climate risks and opportunities in southern Africa' (2018) 10 Water 18.

of linkages of food with energy, land and water. The SDGs will be the first litmus test for the nexus model and the resources linkages in Malawi.[93]

Governance, integrated and multi-stakeholder resource planning to promote cross-sectoral and cross-departmental approaches to planning and working with stakeholders at different levels to improve public-sector-led governance, planning, and information flows.[94]

Promoting innovation: to identify technological choices and investments that explore WEF synergies and could be implemented to achieve desired changes on the ground. As in many developing countries, policies in Malawi tilt towards '*Supply*', hardly considering conservation. Conservation can be the key to green economy in future and the resource sustainability can be assured, which is a national and global goal. With the advent of renewable technologies in the energy sector in Malawi as well as the technological adaptation mechanisms in the agriculture sector, such conservation policies can be useful tools in achieving the resources sustainability.[95]

Monitoring, evaluation, and feedback mechanism to appraise functioning of individual systems as per agreed policies and strategies, identify operational changes needed, and provide feedback to steps 2, 3, and 4.

Influencing policies on trade, investment in environment/climate by focusing on improving ecosystem management to increase resource productivity, thus contributing to poverty alleviation and green growth.

Trade, regional integration and foreign policy should be utilized to manage nexus trade-offs more effectively and contribute further to resilience at both state and global levels. This trade in energy will have long term effects on food and water.[96]

Curbing subsidies in all the resource sectors (Water, Energy and Food) will pave the way for their accessibility. Apart from the fact the subsidies are directly proportionate to the resource it often leads to unintended consequences for other sectors. Thus, a nexus approach is to review, identify and scrutinize the trade-offs in the context of "*At the cost of what?"*[97]

The above policies are imperative. But arguably, the first recommendation contains two key components that would determine the effective implementation of the Malawi WEF nexus: (a) the inclusivity of stakeholders and (b) capacity development.

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93 M Mapak and L Mbewe, *Renewables and Energy for Rural Development in Sub-Saharan Africa.* (Zed Books 2013).

94 T Mabhaudhi, 'Southern Africa's water–energy nexus: Towards regional integration and development' (2016) 8 Water 235.

95 (Chauvin, Mulangu & Proto, 2012); A. Grobicki (n 78).

96 J Faurès et al., 'Reinventing irrigation', in David Molden (ed.), *Water for food, water for life: A comprehensive assessment of water management in agriculture* (London, Earthscan 2007) 315; S. Naik, 'Water Crisis in Africa: Myth or Reality' (2017) 33 (2) International Journal of Water Resources Development 326; P. Rios, et al., 'Explaining Water Pricing Through a Water Security Lens' (2018) 10 Water 1173; (Dodds & Bartram, 2016).

97 S Naik, 'Water Crisis in Africa: Myth or Reality' (2017) 33 (2) International Journal of Water Resources Development 326; P. Rios, et al., 'Explaining Water Pricing Through a Water Security Lens' (2018) 10 Water 1173; (Friere, Lau and Leipziger, 2015).

An effective harmonization of WEF policies and institutions will be a function of deliberate stakeholder mapping and capacity development. Thus, the operationalizing of the Malawi WEF/SDG framework, represented in Figure 4, would depend largely on the strength of the stakeholder mapping and capacity development.

6.1 Inclusivity of Stakeholders

The discussion of the nexus can be reframed for more effective identification and deployment of solutions that address the associated challenges. Business as usual is no longer acceptable: it is necessary to engage new and current stakeholders in novel ways. The nexus challenge needs to be represented as an opportunity for innovation that will drive economic development, business expansion, ecosystem health and social well-being.

This is an opportunity to move stakeholders toward a 'can-do' mindset that provides win-win benefits for societies, economies and the environment. A shift in thinking is proposed to accomplish several goals, including:

- Broad stakeholder engagement in developing innovative solutions to address energy–water–food nexus challenges.
- Defining 'nexus innovation' in terms of technology, partnerships, funding/financing, and of business, consumption/production models.
- Framing a vision and strategy to effectively address the nexus challenges.
- Leveraging new governance modalities and exponential technologies to accelerate innovations towards achieving energy–water–food security for all.

Quantitative tools and models can provide a clear understanding of the interconnectedness of the nexus by identifying the trade-offs and the potential synergies involved. These tools and models also serve to identify the challenges and interconnectedness across multiple actors and sectors, for example, in assessing policy coherence, testing the potential of various policy mechanisms, identifying current and future challenges, and offering solutions pertaining to resources planning and implementing impacts of specific technologies and infrastructure at large scale.[98] The modelling framework provides the opportunity to engage key stakeholders, thereby offering a cross-sectoral understanding of associated challenges and opportunities. Stakeholder participation in the modelling processes contributes to local ownership of these tools. Similarly, decision makers can also be involved, because their interest is more focused on the outcomes, rather than applications, of the tools. Therefore, decision makers can play a

[98] R Mohtar and B Dahar, 'Water-Energy-Food Nexus Framework for Facilitating Multi-Stakeholder Dialogue' (2016) 41 (5) Water International 655 <https://doi.org/10.1080/02508060.2016.1149759> accessed 14 May 2019.

prominent role in co-creating model scenarios and interpreting model results.

The joint development and learning which derives from this process, contributes to strengthening dialogue and improving understanding of the issues faced by the various actors. Beyond sector-specific goals, it moves the focus towards the interdependence of resources and production of goods and services in the other sectors. This facilitates the dialogue and helps create a shared agenda, enabling the identification of options for its realization.

The challenges in modelling WEF nexus hotspots are not limited to technical ones. As discussed in the previous section, other challenges may include institutional fragmentation; disincentives within the regulatory, legal and policy frameworks that fail to incentivize cross-sectoral collaboration in planning and investment design; short-term planning horizons, driven, in many cases, by political cycles; lack of the data and short time frames for providing results; and lack of incentives that promote collaboration and identify synergies for improved planning and decision making. Other related challenges may include varying power relations between the different actor groups; the location of different actor groups at various levels (local to national); identifying a host institution for the stakeholder interaction process; and the time needed to follow implementation and policy processes in relation to a research project (which may only last a year or two).

Failing to involve stakeholders in the modelling process increases the likelihood that outputs will be neither relevant to nor demanded by the actors they are meant to benefit. Current experience with nexus modelling frameworks results in valuable exercises that begin to identify and illustrate not only the trade-offs that must be made but also the synergies that can be achieved, particularly in budget-constrained environments. These exercises have demonstrated the value of modelling to identify and quantify the trade-offs and synergies of collaboration. These are reflected in better planning frameworks and, more importantly, in understanding the financial gains from joint investment planning and design. Models can provide clear policy guidance to enable maximization of financial, economic, social and environmental benefits across sectors.

6.2 Capacity Development

This section seeks to emphasize the fact that capacity development and building awareness about the interconnected nature of all elements in the nexus, trade-offs in resource use, improved policy development, coordination, and overall governance of the nexus are some of the important elements needed to operationalize the nexus and gain benefit on a sustainable basis at all levels.

Capacity development entails the sustainable creation, utilization and retention of that capacity, in order to reduce poverty, enhance self-reliance, and improve people's lives. Capacity development builds on and harnesses

rather that replaces indigenous capacity. It is about promoting learning, boosting empowerment, building social capital, creating enabling environments, integrating cultures, and orienting personal and societal behaviour".[99]

Capacity development is committed to sustainable development for a long- rather than short-term perspective of continual learning and acquiring of skills and resources through individuals' participation and dedication toward enhancement of organizational and institutional strength in addressing development issues. This clearly indicates that capacity development involves something more than the strengthening of individual skills and abilities. Trained individuals need an appropriate environment, and a proper mix of opportunities and incentives to use their acquired knowledge. The implication is that the capacity development initiatives should be addressed in an integrated manner at three levels: the individual, the institution, and the enabling environment.

Formal education and training provide the basic foundation for knowledge building and capacity development. At the individual level, capacity development refers to the acquisition of knowledge, understanding, skills, and attitudes through formal education or other forms of learning. Although some of the necessary skills can typically be acquired on the job or through learning by doing, one needs to rely more on formal education and training for acquisition of knowledge, understanding, and attitudes. Training can be accomplished through apprenticeships and mentoring, seminars, workshops, classes, or through self-study. Ability to work in a team, capability to approach a complex challenge, and ambition and the drive to keep learning are some of the required skills and attributes the individuals must develop.

The institutional capacity at different levels of the organizations and the enabling environment should be adequate to adapt modern approaches in science, technology, and management, which are essential to deal with the complex challenges in the development sector. As individuals enter into professions, they nurture their knowledge and acquired skills in a collective manner in addressing the management issues within the institutional and organizational framework. Capacity building at the organizational level is therefore needed, focusing on infrastructure and institution building, the availability of resources, and the development of organizational processes that would lead to an efficient and sustainable use of resources. At the systems scale, capacity development seeks to enhance the consistency of sector policies and promote better coordination between organizations of different sectors with the objective of a common goal of sustainable development.

[99] Organization for Economic Cooperation and Development, 'Perspectives Note: The Enabling Environment for Capacity Development' January 2011; United Nations Development Programme (UNDP). *Capacity Development: A UNDP Primer*, (UNDP, New York 2009).

Organizations with the right capacity and procedures still need an enabling environment to implement legal and regulatory frameworks for development and management. Finally, knowledge and understanding at the society level is imperative through different means of awareness rising on the broader perspective of sustainable development.

Developing educational programs across disciplines is a challenging task. Providing a broader understanding across disciplines is desirable, and will produce graduates who understand issues, but not experts to carry out research and implement programs. To strike a balance between a broad overview of education and the specialization required, a nexus academic programme should comprise three components that provide the following: (i) a broad holistic viewpoint, through overview courses; (ii) a deep understanding of a particular field through specialized courses; and (iii) a set of courses to provide the skills needed to implement research, through competency courses. This should be followed by a field-scale research on specific problems. A new mode of transdisciplinary, problem-and-solution-oriented education and research is to be adopted on top of the traditional academic research that seeks the involvement of a wider set of institutions and types of researchers to work together on specific problems within specific contexts. Research should not be exclusively based in universities but should be conducted on site together with the implementing agencies, user communities, and professional bodies. The objective of this arrangement is to bring in the local knowledge and perception into the process and the whole exercise pursued in an interactive manner with active participation of all stakeholders. The field-scale research, in this sense, can be envisioned to seek solutions based on different models that link environment, society, and economy. A set of feasible solutions for a given problem is obtained through environmental analyses. A subset of those solutions is then identified which also satisfies economic constraints, and finally solutions that meet social acceptance are selected for implementation. The analysis of each structured case will enable policymakers, scientists, and community representatives to negotiate constraints and benefits while making a science-based selection.

7. CONCLUSION

Malawi is facing growing challenges in meeting the growing demand for food, water, and energy in the face of competing demand for resources and increasing environmental pressure. To increase cereal production, it has introduced many policy initiatives including providing incentives through subsiding water and energy and guaranteeing prices. While such incentives have helped increase cereal production, they have also increased the demand for water and energy, led to degradation of the resource base, and contributed to an increase in water-related disease. Although the food,

water, and energy sectors are inherently interconnected, the connection in terms of policy and implementation is weak.

The paper has proposed an integrated framework that would facilitate synergies and trade - offs while exploring the nexus approach in Malawi. The key elements of the framework are strengthening cross-sectoral coordination, harmonizing public policies, aligning cross-sectoral strategies and incentive structures, strengthening regulation, and facilitation of nexus smart investment and technologies. Critically, the research demonstrates that in addition to proper stakeholder mapping and consultation, capacity development and building awareness about the interconnected nature of all elements in the nexus, trade-offs needed in resource use, improved policy development, coordination, and overall governance of the nexus are some of the important elements needed to operationalize the nexus and gain benefit on a sustainable basis at all levels. Capacity development is committed to sustainable development of a long- rather than short-term perspective of continual learning and acquiring of skills and resources through individuals' participation and dedication toward enhancement of organizational and institutional strength in addressing development issues. Thus, a new mode of transdisciplinary, problem-and-solution-oriented education and research is to be adopted on top of the traditional academic research that seeks the involvement of a wider set of institutions and types of researchers to work together on specific problems within specific contexts.

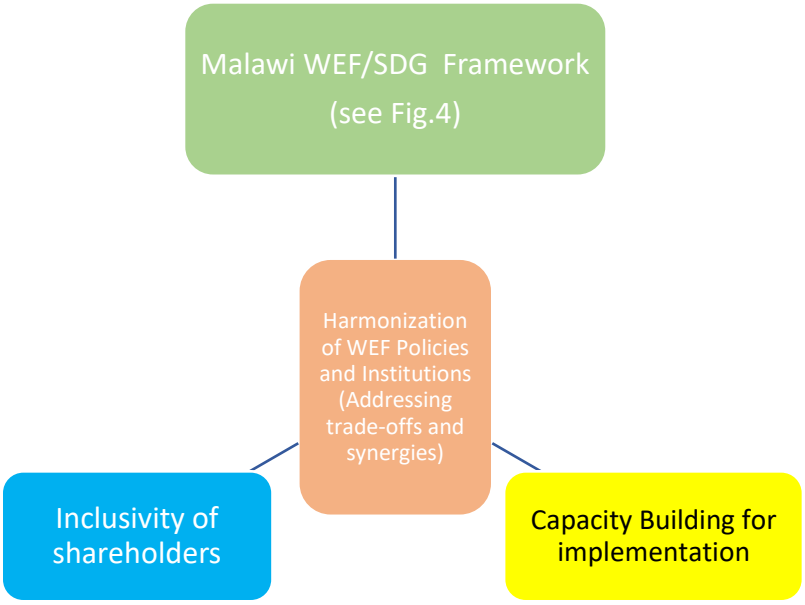

Figure 5: The Influence of Inclusivity and Capacity Development on the Malawi WEF/SDG Framework.

It is strongly recommended that the National Institutions of Higher Learning in Malawi collectively take initiative in developing a structured curriculum for postgraduate degree in sustainability science across

traditional disciplines of science and engineering. This endeavour is highly important as the county is in need of extending specialization in different disciplines. Field-scale research, indicated as an important component of transdisciplinary education and research, is to be conducted in a "shared vision planning and analysis" mode. Such mode shall incorporate tried-and-true planning principles, technical analysis, and public participation into a practical forum for making resource management decisions that will be capable of addressing the identified issues and concerns.

REFERENCES

African Development Bank, 'Malawi Country Strategy paper (2014-2018)' (2013) <http://www.afdb.org/en/countries/southern-africa/malawi/malawi-economicoutlook/> accessed 15 December 2020

AQUASTAT, Water report for Malawi (2015) http://www.fao.org/countryprofiles/index/ accessed 15 December 2020

Arndt, C. Pauw, K. and Thurlow, J. 'The Economywide Impacts and Risks of Malawi's Farm Input Subsidy Program' (Invited paper presented at the 4th International Conference of the African Association of Agricultural Economists, Hammamet, Tunisia. September 2013)

Bogdanski, A. and Roth, C. 'Integrated food-energy systems: Growing fuel wood on farm in Malawi' (2012) 26(2) Nature & Faune, 57

Chinsinga B. and Chasukwa, M. 'The Green Belt Initiative and Land Grabs in Malawi' (Future Agricultures Consortium, Policy Brief 55. Brighton, UK November 2012) <http://www.future-agricultures.org/> accessed 5 March 2020

CIA. 'The World Fact Book: Malawi' (2015) https://www.cia.gov/library/publications/theworld-factbook/geos/mi.html accessed 15 December 2020 accessed 15 December 2020

Dorward, A. et al., 'Modelling Pro-Poor Agricultural Growth Strategies in Malawi: Lessons for Policy and Analysis. African Development and Poverty Reduction: The Macro-Micro Linkage.' (Forum Paper, Somerset West, South Africa. October 2004)

FAO. 2015. ACQUASTAT website, Food and Agriculture Organisation of the United Nations (FAO) Website

Faurès, J. Svendsen, M. and Turral, T. 'Reinventing irrigation', in David Molden (ed.), *Water for food, water for life: A comprehensive assessment of water management in agriculture* (London, Earthscan 2007) 315

FEWS NET, 'Malawi Food Security Outlook Update' (2017) <https://reliefweb.int/sites/reliefweb.int/files/resources/MW_FSOU_2017_12_final.pdf>

Gamula, G. E. T., Hui,L., Peng, W. 'An Overview of the Energy Sector in Malawi' (2013) 5 Energy and Power Engineering 8

Government of Malawi, 'The Malawi Growth and Development Strategy (MGDs III): Building a Productive, Competitive and Resilient Nation' 2017 <https://malawi.un.org/>

Government of Malawi, *Malawi 2015 Floods Post Disaster Needs Assessment Report* (World Bank Group 2015) <https://reliefweb.int/report/malawi/malawi-2015-floods-post-disaster-needs-assessment-report> accessed 15 December 2020

Grobicki, A. 'Water, Food, Energy, Climate: Strengthening the Weak Links in the Nexus' in Felix Dodds and Jamie Bartram (eds.), *The Water, Food, Energy and Climate Nexus: Challenges and an Agenda for Action*. (Routledge 2016)126

Gulati, M. et al., 'The Water-Energy-Food Security Nexus: Challenges and Opportunities for Food Security in South Africa' (2013) 1 Aquatic Procedia 150 <https://doi.org/10.1016/j.aqpro.2013.07.013> accessed 14 May 2019

Houssou, N. and Zeller, M. 'To Target or Not to Target? The Costs, Benefits, and Impacts of Indicator Based Targeting' (2011) 36 (5) Food Policy 627.

Hurford, A. Wade, S. &Winpenny, J. 'Malawi Case Study: Harnessing Hydropower' (A report submitted to Department for International Development (DFID), United Kingdom 2014)

International Energy Agency, 'Tracking Clean Energy Progress 2013: IEA Input to the Clean Energy Ministerial' (International Energy Agency Paris. 2013)

Jumbe, C. B. L. and Angelsen, A. 'Modeling choice of fuelwood source among rural households in Malawi: A multinomial probit analysis' (2011) 33(5) Energy Economics 732

Kaluwa, P. W. R., Mtambo, F. M. and Fachi, R. 'The Country Situation Report on Water Resources in Malawi. Lilongwe UNDP/SADC Water Initiative.' In W. O. Mulwafu, and B. G. Nkhoma, 'The Use and Management of Water in the Likangala Irrigation Scheme Complex in Southern Malawi,' (2002) 27 Physics and Chemistry of the Earth 839

Kumambala, P. G. & Ervine, A. 'Site selection for combine hydro, irrigation and water supply in Malawi: Assessment of water resource availability' (2009) 248 Desalination 537

Lunduka, R. Ricker-Gilbert, J. and Fisher, M., 'What Are the Farm-Level Impacts of Malawi's Farm Input Support Program? A Critical Review' (2013) 44(6) Agricultural Economics 563.

Mabhaudhi, T. 'Southern Africa's water–energy nexus: Towards regional integration and development' (2016) 8 Water 235.

Malawi Vulnerability Assessment Committee (MVAC), 'National Food and Nutrition Security Forecast, April 2016 to March 2017' (2016)

<http://vam.wfp.org/CountryPage_assessments.aspx?iso3=mwi> accessed 15 December 2020

Malawi, MoAIWD (Ministry of Agriculture, Irrigation and Water Development). *National Irrigation Master Plan and Investment Framework*, 2015 Lilongwe, Malawi, www.mediamanager/documents/Publications/Climate/sei-pb-2013-malawi-energy-access.pdf.

Mapak, M. and Mbewe, L. *Renewables and Energy for Rural Development in Sub-Saharan Africa.* (Zed Books 2013)

Mohtar, R. and Dahar, B. 'Water-Energy-Food Nexus Framework for Facilitating Multi-Stakeholder Dialogue' (2016) 41 (5) *Water International* 655 <https://doi.org/10.1080/02508060.2016.1149759> accessed 14 May 2019

Naik, S. 'Water Crisis in Africa: Myth or Reality' (2017) 33 (2) *International Journal of Water Resources Development* 326

National Statistical Office (NSO) [Malawi] and ICF, *Malawi Demographic and Health Survey 2015–16*. (2017) Zomba, Malawi, and Rockville, Maryland, USA: NSO and ICF

National Statistical Office, *Integrated Household Survey 2010-2011 – Household Socio-Economic Characteristics Report.* (Malawi National Statistical Office 2012)

Nhamo, L. et al., 'The water-energy-food nexus: Climate risks and opportunities in southern Africa' (2018) 10 Water 18

Nielsen T, et al., 'The food-energy-water security nexus: Definitions, policies, and methods in an application to Malawi and Mozambique IFPRI' (International Food Policy Research Institute (IFPRI) Discussion Paper 1480 Washington, DC 2015)

Nkhoma, B. G. and Mulwafu, W. O. 'The Experience of Irrigation Management Transfer in Two Irrigation Schemes in Malawi, 1960s-2002' (2004) 29 Journal of Physics and Chemistry of the Earth 1327

Ongley, E. D. 'Control of Water Pollution from Agriculture' (Irrigation and Drainage Paper 55. Rome: Food and Agriculture Organization of the United Nations. 1996)

Organization for Economic Cooperation and Development, 'Perspectives Note: The Enabling Environment for Capacity Development' January 2011; United Nations Development Programme (UNDP). *Capacity Development: A UNDP Primer*, (UNDP, New York 2009)

Population Reference Bureau, '2017 World Population Data Sheet' (2017) <http://www.prb.org/pdf17/2017_World_Population.pdf> accessed 15 December 2020

Renewable Energy and Energy Efficiency Partnership [REEEP]. *Policy DB Details: Malawi.* 2012. <http://www.reeep.org/index.php?id=9353&special=viewitem&cid=94> accessed 15 December 2020

Rios, P. et al., 'Explaining Water Pricing Through a Water Security Lens' (2018) 10 Water 1173

Robinson, B. & Wakeford, J. Oil Shock Vulnerabilities & Impacts: Case Study of Malawi. (Paper prepared for United Kingdom Department for International Development June 2013)

Sachs, J. et al., *SDG Index and Dashboards Report 2017* (Bertelsmann Stiftung and Sustainable Development Solutions Network 2017)

Taulo, J. Gondwe, K. and Sebitosi, A. 'Energy Supply in Malawi: Options and Issues' (2015) 26(2) Journal of Energy in Southern Africa 19

USAID, 'Food Assistance Fact Sheet – Malawi' (2017) <https://www.usaid.gov/malawi/food-assistance> accessed 15 December 2020; World Bank, 'Malawi Country Overview' (2017) <http://www.worldbank.org/en/country/malawi/overview> accessed 15 December 2020

World Bank, World Development Indicators (Washington, DC: 2013)

World Bank. 'Country and Lending Groups'. (2015) [Online] http://data.worldbank.org/about/country-andlending-groups accessed 15 December 2020

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M – 00235 | Analytical Article

LEGAL SUPPORT TO THE PROTECTION OF LAND AND SOIL IN LIGHT OF NEW REGULATIONS OF UKRAINE

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ABSTRACT

In this article, regulations on land and soil protection are studied in a chronological sequence and in the historical and legal contexts. The main factors responsible for the deterioration of the quality of land resources and the soil environment are identified. The modern regulatory framework providing legal support to land and soil protection is analyzed. Among the current problems is the improper land-use triggered by inadequate legal regulation concerning pollution, depletion, degradation, and reduced fertility of soil. Appropriate legal protection to the ecological functions of the soil is absent. Further legal framework addressing rational use and protection of land resources (including soil) in Ukraine should be developed integrating environmental interests of society and ecological tenets of sustainable development.

Keywords: Legal protection of land; Soil fertility; Legal protection of soils; Land degradation; Soil erosion

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Legal Support to the Protection of Land and Soil in Light of New Regulations of Ukraine

1. INTRODUCTION

The total geographical area of Ukraine is 60,362,800 hectares. Of course, the lands of Ukraine, occupying such vast areas, are not homogeneous throughout the country. These lands have different functional purposes and varying legal regimes depending on the category of land they belong to.

The Constitution of Ukraine[1] recognizes land as the main national wealth, which is under special protection of the State. This legal framework indicates that the lands of Ukraine are the national treasure of the Ukrainian people. In lieu of using the land, the interests of society (public interests) are of paramount importance: they are ensured by establishing specific rules and guidelines for the rational and efficient land-use, and by establishing and regulating the norms for land protection. This primarily applies to agricultural lands meant for agricultural land-use, since it forms the basis for environmental and food security of the country. Therefore, legal support given to the protection of agricultural lands is extremely important for the society.

At the same time, the Law of Ukraine of 2019, No. 2697-VIII[2] "On the Basic Principles (Strategy) of the State Environmental Policy of Ukraine until 2030" pinpoints the inconsistency in the modern land-use conforming the rational nature management, and notes that the state of the land resources of Ukraine is close to critical. Thus, according to the State Institution "Derzhgruntokhorona",[3] in recent decades the quality of the land and soils has deteriorated significantly: huge areas are littered with municipal solid waste, contaminated with harmful chemicals. The degree of technogenic soil pollution has reached critical levels (radioactive pollution is spread over 461,700 hectares of agricultural land). Excessive plowing of soils (54% of the total area of the country) also has a negative effect on soil fertility, as the soil erosion is spreading rapidly causing the increase in area of disturbed lands. The erodibility of agricultural land is 40%, which means 15.9 million hectares of land, including 12.9 million hectares of arable land. While in some regions the degree of erodibility is catastrophically increasing, the nutrient content of the soil is constantly decreasing, and the annual losses of humus are 0.65 tons per hectare. The physical soil degradation has become widespread, covering almost all of the arable land in Ukraine. The area of degraded and low-fertility soils among lands of agricultural use reaches almost 20 million

[1] Constitution of Ukraine (1996) <https://zakon.rada.gov.ua/laws/show/254к/96-вр#Text> (1996) accessed 10 July 2021.

[2] Law of Ukraine 'On the Basic Principles (Strategy) of the State Environmental Policy of Ukraine for the period up to 2030' (2019) <https://zakon.rada.gov.ua/laws/show/2697-19#Text> accessed 10 July 2021.

[3] 'Mezhdunarodnoye Obshchestvo | Ínstitut Okhoroni Ġruntív Ukraĭni' (*Iogu.gov.ua*, 2021) <http://www.iogu.gov.ua/mijnarodna_diyalnist/> accessed 31 August 2021.

hectares. Soil degradation processes progress due to the application of an insufficient quantity of mineral fertilizers.[4]

The above-described circumstances need a study on the modern legal system ensuring land protection. The purpose of this article is to study the current state of the regulation addressing land and soil protection in Ukraine. The main objectives of the article are to conduct a critical analysis of the legislation from law making perspective, to study the current legislation of Ukraine in order to identify weaknesses in the legal support provided to land and soil protection, and to recommend a proposal for its further improvement and development.

2. DEVELOPMENT OF LEGAL SUPPORT TO THE PROTECTION OF LAND AND SOILS

The scientific and theoretical basis of legal support to the protection of land should be studied in its historical context. Studying the application of organizational and legal measures, aimed at land protection in chronological order, will allow in the future to correctly choose those legal forms that will be truly effective and provide with realistic protection to the land resources of Ukraine.

The first steps encompassing land relations and land protection were taken during the Trypillian era (VI–III millennium BC) when the primitive agrarian society realized first the importance of soil fertility and its potential to produce foods. At the early stage of the formation of modern Ukraine State, agriculture was considered one of the main avenues in the development of the nation. However, from the beginning of the development of humankind and up until the beginning of the 20th century AD, agriculture has developed extensively. This involves development of new land areas into cultivable or arable land. The use of natural resources existing on land surface was inevitable; hence, the forests were destroyed, steppes were plowed to ensure larger areas for agricultural cultivation. The Tsarist (Russian) government was considered ineffective in solving problems of nature protection. Therefore, pressure on *chernozem*[5] soils in agriculture was moderately intense: ameliorants, chemical fertilizers and other chemicals harmful to the soil were used in agriculture; irrigation and drainage of lands were not carried out; sown areas were sown mainly with

[4] 'Periodychna Dopovid` Pro Stan Gruntiv Na Zemlyax Silskogospodarskogo Pryznachennya Ukrayiny Za Rezultatamy X Turu Agroximichnogo Obstezhennya Zemel`' (Institute for the Protection of Soils of Ukraine 2020) <http://www.iogu.gov.ua/wp-content/uploads/2021/05/Періодична-доповідь2020_208-стор-№№-wecompress.com_.pdf> accessed 10 July 2021.

[5] *Chernozem* is a black-colored soil containing a high percentage of humus (4% to 16%) and high percentages of phosphoric acids, phosphorus, and ammonia. Chernozem is very fertile and can produce high agricultural yields with its high moisture storage capacity. Chernozems are also a Reference Soil Group of the World Reference Base for Soil Resources (https://www.isric.org/explore/wrb#:~:text=The%20World%20Reference%20Base%20(WRB,Unesco%2C%201971%2D1981).

cereals; mostly primitive and extensive methods of agriculture management were used. It should be noted that under such conditions of agricultural development the protection of soil and of increasing soil fertility were not taken into account at all until the beginning of the 20th century. Resultantly, historical sources until then do not contain any reference of the existence of a regulatory framework supporting soil conservation and land protection.

It was 1910s when the need for scientific development and legislative consolidation concerning the rational use of land and soil cover was felt for the first time. Evidently, the land reform was initiated by Russian Prime Minister Pyotr Stolypin in 1907. The reform was aimed at optimizing rural land-use addressing, in particular, the elimination of strip farming, incorrect land allotment configurations, industrial promotion, as well as increasing the production of agricultural goods for further export.

The "Stolypin" land reform was started with the Decree of November 9, 1906 "On Supplementing Certain Provisions of the Current Law on Peasant Land Tenure and Land-Use",[6] which came into force upon approval of the State Duma[7], the State Council and the Tsar on July 14, 1910. Other regulations were the Law "On Amendments to Certain Resolutions on Peasant Land Tenure" of June 14, 1910, the Law "On Land Management" of May 24, 1911, and "Provisions on Land Management" of May 29, 1911. These regulatory acts enshrined the main provisions of the reform, which consisted of:

1) implementation of the sale of land to peasants in private ownership through the Peasant Bank on preferential terms;
2) providing agro-economic assistance to peasants through implementation of progressive forms of agricultural production;
3) improving the farming standards in the countryside by organizing training courses; and
4) establishment of the institution of hereditary land tenure, etc.

It should be noted that the results of the "Stolypin" reform were characterized by a significant increase in agricultural production, an increase in the capacity of the domestic market, an increase in agricultural export, and the trade balance. As a result, it was possible not only to bring agriculture out of the crisis, but also to turn it into a dominant segment of the economic development of the country. The gross income from the agriculture in 1913 rose to 52.6% of the total gross income. The rate of profit by whole national economy, due to increased cost of agricultural products, had increased by 33.8%.[8] All this is an indicator of economic soil fertility, which had apparently

[6] Collection on the history of the Soviet state and government of the Ukrainian SSR (1954) 30, 31.

[7] The State Duma is the lower house of the Federal Assembly of Russia, while the upper house is the Council of the Federation. The Duma headquarters are located in central Moscow. Its members are referred to as deputies.

[8] Valerij Volkovynskyj and Yurij Khoptyar, 'Stolypins`ka agrarna reforma' Institute of History of Ukraine, National Academy of Sciences of Ukraine <http://www.history.org.ua/?termin=Stolypinska_reforma> accessed 11 July 2021.

increased. At the same time, training courses, aimed at developing the farming standards, contributed to the rational land-use, and, hence, to maintaining the proper quality of land and other natural resources.

Fundamentally, new approaches to the law making around land relations were introduced in 1917 when the "The Decree on Land"[9] was adopted. This Decree abolished private ownership of land and prohibited its sale, and declared that the land, as national property, should be given for free to the peasants for their use. An important principle of the Decree was also the provision on the division of powers between the central and local authorities. Thus, the centre and state organs decided on fundamental issues of land and land-use, and the local authorities, on the grounds of specific features and conditions of land-use, determined the procedure, form and conditions of land-use. This division of powers made it possible in the legislation of the Ukrainian SSR to take into account the peculiarities of natural conditions of land and economic activities in the republic while regulating the issues of legal protection of soil and of increasing soil fertility.

Some tenets and principles enshrined in "The Decree on Land" existed almost unchanged until 1991. In particular, this applies to the exclusive State form of land ownership, as well as on the prohibition on the sale of land. At the same time, the period from 1917 to 1991 is characterized by certain changes in the legal system of land relations. During these years, a widespread intensification and chemicalization of agriculture began to develop. This, first of all, involved intensive application of mineral fertilizers, herbicides, insecticides and pesticides. The use of such plant protection products provided a significant increase in the soil's economic and biological fertility. However, its natural and potential fertility was significantly reduced, along with the natural resources were negatively affected, and the natural environment was polluted.

It was only in the 1960s when an attention was first paid to the worse state of the environment. During this period, a number of legal and regulatory acts were adopted, the action of which was aimed at the protection of both the environment as a whole and its individual components. First of all, we should mention the Law "On Nature Protection of the Ukrainian SSR"[10], adopted on June 30, 1960 by the Supreme Soviet of the Ukrainian SSR and amended in 1964. This law regulated the relations concerning the protection and rational use of natural resources.

The principles laid down by this law were further embodied in regulations related to land protection and soil protection. In particular, they were reflected in the Resolutions of the Council of Ministers of the USSR "On

[9] 'The Decree on Land' (1917) <http://www.hist.msu.ru/ER/Etext/DEKRET/o_zemle.htm> accessed 22 August 2021.

[10] Valerij Smolij and others, *Encyclopedia of the History of Ukraine*: Vol. 3. (National Academy of Sciences of Ukraine, 2005) <http://www.history.org.ua/?termin=Zakon_URSR_Pro_okhoronu_pryrody_URSR_1960> accessed 11 July 2021.

Measures to Protect Soils and Protection Forest in the Ukrainian SSR"[11] of September 12, 1960, and "On the Organization of Soil Erosion Control in the USSR"[12] of April 30, 1960. An important novelty of the latter Resolution was the decision to conduct a full inventory of eroded lands and anti-erosion structures. In fact, the contents of this Resolution can be considered the first attempt to establish a land cadastre in the Ukraine republic, an important component of which is information on the quality of soils.

The relevant legal requirements were further developed in the Resolution of the Council of Ministers of the Ukrainian SSR "On Urgent Measures to Protect Soils from Wind and Water Erosion in the Ukrainian SSR"[13] of May 16, 1967. The Resolution established the directives for anti-erosion measures (terracing of slopes, building erosion control structures, creation of protection forests, afforestation of ravines, gullies, sands and other lands unsuitable for agricultural production, etc.), which were necessary to implement in derelict regions of Ukraine, taking into account the geographical and climatic features of each of them. This differentiated approach to addressing soil erosion certainly yielded positive results: first, economic indicators of soil fertility increased, and second, the erosion control led to increased resilience of natural environment at the local level.

Another direction in the arena of land protection legislation during 1960s was the regulations on administrative control over the use and protection of land. In particular, on September 19, 1962, the Resolution "On State Controllers for Soil Protection and Protection Forests on the Territory of the Ukrainian SSR"[14] came into force. This regulation, for the first time, at the legislative level defined the mechanism of activities performed especially by authorized State organs and officials to verify compliance with and implementation of the soil protection legislation. There was also a fairly wide range of powers of State controllers to monitor soil protection and take measures to increase soil fertility. However, the performance of State controllers' functions at that time was complicated by the fact that the legislation did not define the most important thing – the concept of soil fertility as an object of legal protection. And, without this, it was almost impossible to ensure the compliance by land users with the provisions of the legislation on land and soil protection.

An important feature of the soil protection legislation during the late 1960s and early 1990s was an increase in the regulation of land amelioration

[11] Resolution of the Council of Ministers of the USSR 'On measures for the protection of soils and protective forest plantations on the territory of the Ukrainian SSR' (1960) <https://zakon.rada.gov.ua/laws/show/1541-60-п#Text> accessed 11 July 2021.

[12] Legislation on Land (1972) <http://ek.nlu.edu.ua/cgi-bin/irbis64r_01/cgiirbis_64.exe> accessed 22 August 2021.

[13] Resolution of the Council of Ministers of the USSR 'On urgent measures to protect soils from wind and water erosion in the Ukrainian SSR' (1967) <https://zakon.rada.gov.ua/laws/show/320-67-п#Text> accessed 11 July 2021.

[14] Resolution of the Council of Ministers of the USSR 'About the Statement of the Situation on the State Controllers on Protection of Soils and Protective Forest Plantations in the Territory of the USSR' (1962) <https://zakon.rada.gov.ua/laws/show/1103-62-п#Text> accessed 11 July 2021.

relations. In this context, an attention was traditionally paid to the protection of lands of agricultural designation, as evidenced by a number of Resolutions of the government bodies. In particular, mentioned are the Resolutions of the Council of Ministers of the USSR: 1) "On the Broad-Scale Development of Land Amelioration for High and Sustainable Yields of Grain and Other Crops in the Ukrainian SSR"[15] of June 16, 1966; 2) "On Measures for the Further Development of Land Amelioration and Their Agricultural Development in 1971-1975"[16] of 16 April 1971; 3) "On the Plan of Land Amelioration for 1976 – 1980 and Measures to Improve the Use of the Reclaimed Land"[17] of July 15, 1976. With the enactment of these Resolutions, the area of irrigated and drained lands in the USSR has almost doubled (up to 27 million hectares). The number of such areas increased significantly in the Ukrainian SSR as well. During the implementation of the measures as envisaged by the programs of amelioration of lands of agricultural use, the goals set by the government of the former Soviet Union were achieved: artificial soil fertility increased significantly; the tasks of the Food Program[18] were fulfilled; and the country's economic development was ensured.

Simultaneously, scientists of the modern land law rightly note that the general intensification of agricultural management, which became especially noticeable in the second half of the 20th century, reduced the inherent biological stability and balance of the environment in general, and land in particular.[19] Tetyana Lisova also notes that an element of the ecosystem is not only agricultural land, but also all lands, regardless of their designation. Therefore, it would be extremely important in today's contexts to protect lands on the basis of an integrated approach to land as complex natural formations (ecosystems), taking into account their zonal and regional characteristics.[20] It is worth agreeing with such conclusions of the scientists, as the processes that took place in the agricultural field during the Soviet era led to a critical state of the soil quality, reducing their natural fertility and disturbing the ecological balance of the environment. After Ukraine getting independence, the lack of legal support to the protection of soil became particularly acute.

Some hopes for the solution of acute problems were perceived with the introduction of the land reform, which began with the adoption of the

[15] Legislation on Land (1972) <http://ek.nlu.edu.ua/cgi-bin/irbis64r_01/cgiirbis_64.exe> accessed 22 August 2021.

[16] ibid.

[17] ibid.

[18] The food program of the USSR was adopted in 1982 for the period up to 1990. The program identified the main problems in the development of agriculture, and within its framework a set of measures was proposed to overcome the crisis. The goal of the Food Program was to make the most of the country's economic potential, to ensure, as soon as possible, a reliable and sustainable supply of all types of food to the population, and to significantly improve the structure of the population's nutrition.

[19] Pavlo Kulinich 'Pravovi problemy oxorony i vykorystannya zemel` sil`s`kogospodars`kogo pryznachennya v Ukrayini': monohrafiya (Logos 2011).

[20] Tatiana Lisova 'Pravove zabezpechennya vidnovlennya zemel: teoretychni i praktychni problemy': monohrafiya (Jurayt 2020).

Resolution "On the Land Reform"[21] by The Supreme Soviet of the Ukrainian SSR on December 18, 1990. During the years of the implementation of the land reform program and additional regulatory acts aimed at accelerating its implementation, a new system of land relations originated. Thus, different forms of land ownership emerged; equal conditions for the existence of all forms of land ownership and management were created; market land commerce was introduced, and so on. In general, we can witness positive changes in the political, economic, social spheres of society. However, the land reform, unfortunately, overlooked the important issue of legal support to the protection of soil fertility. In Ukraine, since 1991, the implementation of programs to increase soil fertility was virtually stopped. As a result, the losses of humus on the fertile lands of Ukraine have recently increased; wind and water erosion have intensified; and the soil's economic and natural fertility has significantly decreased.

A significant event in the history of land relations was the adoption of the Land Code of Ukraine[22] by The Verkhovna Rada of Ukraine on October 25, 2001. The need for legal protection of lands (Articles 162 – 172) is featured prominently in this Code. The Code reveals, in detail, the concepts, tasks, content and procedure for land protection, addresses the use of technogenically contaminated lands, promotes the conservation of degraded and marginal lands, and ensures reclamation of disturbed lands. Important provisions in the field of land protection and reproduction of soil fertility are enshrined in Article 165, which governs the regulation concerning land protection and reproduction of soil fertility. Finally, Article 168 recognizes soil as an object of special protection.

After the adoption of the current Land Code of Ukraine, an extensive system of regulations was formed. It was constantly improved, detailed and outlined to accommodate new areas addressing legal support to protection of soil and fertility. On the basis of the Land Code of Ukraine, a number of regulations at various levels and legal forces were adopted. Special programs aimed at land and soil protection were developed. The two simultaneously adopted Laws of Ukraine: "On Land Protection"[23] and "On State Control over the Use and Protection of Land"[24] of 19 June 2003 are of particular importance. The former law contains basic concepts ensuring legal support to protection of land and soil and establishes other related core provisions. The latter law at the legislative level provides for the divisions of powers of the government agencies offering a legal support to the protection of land and soil. The implementation of the provisions of these laws led to

[21] Resolution of the Verkhovna Rada of Ukrainian SSR № N 563-XII 'On land reform' (1990) <https://zakon.rada.gov.ua/laws/show/563-12#Text> accessed 15 July 2021.

[22] The Land Code of Ukraine (2001) <https://zakon.rada.gov.ua/laws/show/2768-14#Text> accessed 15 July 2021.

[23] Law of Ukraine 'On Land Protection' (2003) <https://zakon.rada.gov.ua/laws/show/962-15#Text> accessed 15 July 2021.

[24] Law of Ukraine 'On State Control over the Use and Protection of Lands' (2003) <https://zakon.rada.gov.ua/laws/show/963-15#Text> accessed 15 July 2021.

the adoption of many other legal acts, in particular, the Resolution of the Cabinet of Ministers of Ukraine of May 26, 2004, No. 681 "On the Procedure for Natural and Agricultural, Ecological and Economic, Erosion-Preventive and Other Types of Zoning of Land"[25]; the order of the Ministry of Agrarian Policy and Food of Ukraine of February 26, 2004, No. 51 "On the Regulation on Soil Monitoring on Lands of Agricultural Designation"[26]; order of the Ministry of Agrarian Policy and Food of Ukraine of April 26, 2013, No. 283 "On the Procedure for Land Conservation"[27]; order of the Cabinet of Ministers of Ukraine of March 30, 2016, No. 271-r "On the National Action Plan of Land Degradation and Desertification Control"[28], etc.

As a result, the norms that should support the protection of soil fertility are scattered in many current regulations. The lack of a single legal or regulatory document, which would encompass the provisions of the legal support to the protection of soils and their fertility, complicates or even prevents the implementation of the legal measures aimed at solving the problem of interest.

3. THE MODERN REGULATION OF AGRARIAN RELATIONS AROUND LAND AND SOIL PROTECTION IN UKRAINE

Article 162 of the Land Code of Ukraine of October 25, 2001, No. 2768-III enshrined the legislative concept of land protection, in accordance with which it is a system of legal, organizational, economic and other measures aimed at rational land-use, preventing unreasonable extraction of lands of agricultural and forestry designation, protection against harmful anthropogenic influence, reproduction and increase of soil fertility, increasing the productivity of lands of forestry designation, supporting a special regime of the use of lands of environmental, health-improving, recreational and historical and cultural designation.

Definitely, the proper legal regulation aimed at protecting land and soil is a prerequisite for the further development of society. However, such regulation should both secure economic interests and contribute to the achievement of sustained nature management and protection of natural resources, including soils. In this respect, it is relevant to refer to the scientific

[25] Resolution of the Cabinet of Ministers of Ukraine 'About the statement of the Order of implementation of natural-agricultural, ecological-economic, anti-erosion and other types of zoning of the earths' (2004) <https://zakon.rada.gov.ua/laws/show/681-2004-п#Text> accessed 15 July 2021.

[26] Order of the Ministry of Agrarian Policy of Ukraine 'On approval of the Regulations on soil monitoring on agricultural lands' (2004) <https://zakon.rada.gov.ua/laws/show/z0383-04#Text> accessed 15 July 2021.

[27] Order of the Ministry of Agrarian Policy and Food of Ukraine 'About the statement of the Order of conservation of the earths' (2013) <https://zakon.rada.gov.ua/laws/show/z0810-13#Text> accessed 15 July 2021.

[28] Orders of the Cabinet of Ministers of Ukraine 'On approval of the National Action Plan to combat land degradation and desertification' (2016) <https://zakon.rada.gov.ua/laws/show/271-2016-p#Text> accessed 15 July 2021.

position expressed by Anatoliy Getman and Hanna Anisimova, that the basic characteristics of the ecological component of sustainable development, in accordance with the requirements of the EU, are environmental protection, supporting the environmental safety of the population and territories, reducing the anthropogenic pressure on it, mitigating climatic changes, ensuring quality of drinking water, minimizing the harmful effects of production process, bating domestic and other noises, protecting from radioactive contamination, waste management, etc.[29] So, the further regulations guiding rational use and protection of land resources (including soils) of Ukraine should be developed taking into account the combination of economic interests of society and environmental components of sustainable (balanced) development.

Unfortunately, the modern regulatory and legal framework does not contain a special legislative act, which would regulate the relations concerning soil protection, although the scientists at the National Academy of Agrarian Sciences of Ukraine made attempts to fix this legislative gap repeatedly. In 2013, the Draft of the Law of Ukraine "On Preservation of Soils and Protection of Their Fertility"[30] was developed and prepared as directed by the Ministry of Agrarian Policy and Food of Ukraine, No. 13-3/7 of April 8, 2013. This law had to determine the legal, economic, ecological and organizational bases of use and preservation of soil, protection and reproduction of its fertility, and to establish the basic principles of the state policy in this area, requirements for preserving the quality of soil cover, protecting it from negative natural and anthropogenic influences. The purpose of the Draft Law was to adopt a full-scale Act of framework type, which was to contain all necessary provisions and norms regulating legal relationships in this area.

On March 17, 2015, the Verkhovna Rada Committee on Agricultural Policy and Land Relations considered another draft law (No. 1798 of January 20, 2015). The Verkhovna Rada of Ukraine was advised to reject it on the grounds of duplication of some provisions already present in other legislative Acts. After the rejection of another draft law "On the Preservation of Soil and Protection of its Fertility" of 2017, the NAAS (National Academy of Agrarian Sciences) scientists drafted the Technical Law of Ukraine "On Amendments to Certain Legislative Acts on Mechanisms for Improving Soil Preservation and Economic Stimulation of Reproduction of its Fertility" which also had the same fate as the previous ones.

Thus, for almost a hundred years of public awareness of the need for legal support to the protection of soil and its fertility, the government authorities have not done a serious effort to solve this problem. Individual

[29] Anatolyi Getman A and Hanna Anisimova, 'Deyaki ekologo-pravovi aspekty zabezpechennya stalogo rozvytku Ukrayiny' (2017) Law and innovation 3 (19) <https://openarchive.nure.ua/bitstream/document/14660/1/doc1.pdf> accessed 16 July 2021.

[30] Draft Law of Ukraine 'About preservation of soils and protection of their fertility' (2013) <https://ips.ligazakon.net/document/NT0506> accessed 16 July 2021.

legal norms governing soil protection relations do exist in fragments in the form of variety of regulations. But this problem needs to be solved immediately by adopting a specialized consolidated legal instrument. Such a legal instrument can be the Law of Ukraine "On Protection of Soil and its Fertility".

4. CONCLUSION

A critical analysis of the former and current legislation of Ukraine allows us to conclude that the historical development of legal support to the protection of land and soil can be divided into two periods: 1) Soviet period (from the mid-1940s to 1990); 2) period of independent Ukraine (from 1990 to the present). The first period of the development of legal process on this issue is characterized by an aggressive increase in artificial and economic fertility of soils through the intensification of agricultural production, excessive chemicalization of agriculture, and agricultural land amelioration. Since Ukraine became an independent state, the second period of evolution of legislation giving support to the protection of land and soil is characterized by new directions of environmental and land protection.

However, the modern domestic legislation is lacking a clear scientifically grounded concept spelling the sustainable use and protection of land. In turn, the existing imperfect regulatory and legal framework cause inefficiency in the legal apparatus regulating the use and protection of soils of Ukraine. It is obvious that the further regulation addressing rational use and protection of land resources (including soils) of Ukraine should be developed while integrating the economic interests of society and contribute to the achievement of balanced nature management and protection of natural resources, including soils.

In order to optimize the legal support to the protection of land and soil, adopting a new Law of Ukraine "On Protection of Soil and Its Fertility" would be radically important legal framework. This proposed law should define and differentiate measures aimed at protection and improvement of the quality of soil fertility; should provide norms on ensuring ecologically balanced land-use and application of ecologically safe technologies of tillage; and should determine the ways of conducting economic activity while maintaining the productivity of agricultural lands, increasing their ecological sustainability and soil fertility.

REFERENCES

Draft Law of Ukraine 'About Preservation of Soils and Protection of their Fertility' (2013) <https://ips.ligazakon.net/document/NT0506> accessed 16 July 2021

Smolij V and others, Encyclopedia of the History of Ukraine: Vol. 3:, National Academy of Sciences of Ukraine

(2005) <http://www.history.org.ua/?termin=Zakon_URSR_Pro_okhoronu_pryrody_URSR_1960> accessed 11 July 2021

Getman A, and Anisimova H, 'Deyaki ekologo-pravovi aspekty zabezpechennya stalogo rozvytku Ukrayiny' (2017) Law and innovation 3 (19) <https://openarchive.nure.ua/bitstream/document/14660/1/doc1.pdf> accessed 16 July 2021

Kulinich P, 'Pravovi problemy oxorony i vykorystannya zemel` sil`s`kogospodars`kogo pryznachennya v Ukrayini': monohrafiya (Logos 2011)

Lisova T, 'Pravove zabezpechennya vidnovlennya zemel`: teoretychni i praktychni problemy': monohrafiya (Jurayt 2020)

'Periodychna Dopovid` Pro Stan Gruntiv Na Zemlyax Sislkogospodarskogo Pryznachennya Ukrayiny Za Rezultatamy X Turu Agroximichnogo Obstezhennya Zemel' (Institute for the Protection of Soils of Ukraine 2020) <http://www.iogu.gov.ua/wp-content/uploads/2021/05/Періодична-доповідь2020_208-стор-№№-wecompress.com_.pdf> accessed 10 July 2021

Volkovynskyj V, and Khoptyar Y, 'Stolypins`ka agrarna reforma' Institute of History of Ukraine, National Academy of Sciences of Ukraine, accessed 10 July 2021

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EXPLORING THE LESSONS OF THE KIMBERLEY PROCESS FOR CLIMATE CHANGE ACTION

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ABSTRACT

There has been a great deal of academic discourse about policy and governance choices embedded in the UNFCCC-based regimes for Climate Change action, and they point to the inefficiency and ineffectiveness of such regimes, which is often attributed to the fact that they hinge on the political authority of State actors and lack meaningful enforcement mechanisms. Against this backdrop, this paper argues that an alternative regime may be needed; and that for an effective regulatory framework for Climate Change action to emerge there needs to be a regulatory imperativeness similar to that upon which the Kimberley Process was created, where Non-State Actors play a leadership role. It also argues that in addition to regulatory imperativeness, the making and enforcement of the Kimberley Process provides helpful lessons towards crafting a more effective Climate Change remedial regime.

Keywords: Climate change; Hard law; Kimberley Process; Non-state actors; Soft law

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Exploring the Lessons of the Kimberley Process for Climate Change Action

1. INTRODUCTION

This article seeks to stimulate a discussion regarding a Non-State-Actor-centered soft law approach to governance of Climate Change by revisiting the Kimberley Process Certification Scheme (KPCS) - a global diamond industry's soft law regime that has had significant success in its application to the diamond industry because of its unique model for a legislative prescription. It examines the circumstances under which the KPCS was created, its key features, and its regulatory model. It emphasizes that "regulatory imperativeness" and "the involvement of Non-State Actors in the regulatory framework" are some of the key factors that distinguish the KPCS as a special soft law regime. It argues that, for an effective regulatory framework for Climate Change action to emerge, a similar regulatory imperativeness that created the KPCS must be awakened, and in which Non-State Actors have a more meaningful role to play. It further argues that, given the current regulatory style for Climate Change action based on the UN Framework Convention on Climate Change[1] (UNFCCC), which has been critiqued as being ineffective and inefficient because of its hard law approach hinging on the political authority of State actors, a better climate-change-remedial regime may be one, which is based on or co-opts some elements of a soft law governance model involving Non-State Actors. Essentially, this article acknowledges the important role that NGOs have played in the negotiation of the UNFCCC and its regimes[2] and which they continue to play in connection with their implementation,[3] but it takes the position that a new role or involvement of different Non-State Actors has become expedient, as in the KPCS example.

Without a doubt, one cannot imagine any environmental issue in our world today, which is as great a threat to mankind as Climate Change, sometimes referred to as global warming. The scourge of global warming

[1] The UNFCCC was adopted at the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992. It entered into force in 1994 following its ratification by 50 states. The UNFCCC was meant to provide the framework for stabilizing greenhouse gas concentrations in the atmosphere at a sustainable level and thus counteracting serious environmental consequences. See myclimate, "What are the Kyoto Protocol and the Paris Agreement?" (Accessed 2 June 2020), online: *myclimate* <https://www.myclimate.org/information/faq/faq-detail/what-are-the-kyoto-protocol-and-the-paris-agreement/>.

[2] See Chiara Giogette, 'The Role of Nongovernmental Organizations in the Climate Change Negotiations" (1998) 9 Colo J Intl Envtl L & Pol'y 115 at 126-136 (discussing the role of NGOs in the negotiation of the UNFCCC).

[3] See Chandra Lal Pandey, "Managing Climate Change: Shifting Roles for NGOs in the Climate Change Negotiations" (2015) 24 Envtl Values 799 at 807-811 (discussing the efforts of Greenpeace, Climate Action Network and 350.Org in mobilizing governments to take climate action serious). See also Julie Doyle, "Climate Action and Environmental Activism: The Role of Environmental NGOs and Grassroots Movements in the Global Politics of Climate Change" in Tammy Boyce & Justin Lewis, eds, *Climate Change and the Media* (New York: Peter Lang Publishing, 2009) 103 (discussing the activities of environmental NGOs in shaping public policy and opinion about Climate Change).

seems to be increasing by the day.[4] On the international front, the UNFCCC, and its Kyoto Protocol of 1997[5] (now obsolete), and the Paris Agreement of 2015,[6] form the core legal framework for global Climate Change action. The Kyoto Protocol required state parties to reduce emissions by complying with its set target.[7] The Paris Agreement formulates an overall Climate Change goal and calls on State parties to commit to this goal.[8] For instance, under Article 2, paragraph 2, and Article 4, paragraphs 2, 3, and 19 of the Paris Agreement, the State parties are to decide how and to what extent they can contribute to meeting the overall Climate Change goal based upon the principle of common but differentiated responsibility and respective capabilities, according to their different national circumstances.[9] In other words, State parties can decide what their goals are going to be – the so-called nationally determined contributions (NDCs).

There has been a great deal of academic discourse about policy and governance choices embedded in the UNFCCC-based regimes, and they point to the inefficiency and ineffectiveness of the regimes, which is attributed in part to the fact that the regimes, like a typical treaty, are unenforceable by any party, as they have no sanctions and no disincentives for non-compliance. The Paris Agreement in the whole of its 29 Articles, contains no provision concerning holding a State party accountable for non-compliance with its prescription, or for failing to fulfil its undertaking to cut down on its emissions level. Likewise, the Kyoto Protocol had no mandatory provision in all its 28 Articles. The two treaties may be likened to non-binding commitments or non-binding co-operation agreements.

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4 See NASA, GLOBAL CLIMATE CHANGE: Vital Signs of the Planet, "Facts" (accessed 2 May 2021), online: *NASA* <https://climate.nasa.gov/effects/>.

5 Kyoto Protocol to the United Nations Framework Convention on Climate Change, FCCC/CP/1997/L.7/Add.1 (10 December 1997) (Original English version), online: <https://unfccc.int/sites/default/files/resource/docs/cop3/l07a01.pdf>. The Kyoto Protocol was adopted on 11 December 1997, and it entered into force on 16 February 2005. See United Nations, "What is Kyoto Protocol?" (accessed 8 June 2021), online: *United Nations Climate Change* <https://unfccc.int/kyoto_protocol>.

6 The Paris Agreement was adopted on 12 December 2015, and it formally entered into force on 4 November 2016. See, United Nations, 'The Paris Agreement" (accessed 8 June 2021), online: *United Nations Climate Action* <https://www.un.org/en/climatechange/paris-agreement>. For a copy of the Paris Agreement, see United Nations, online: <https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf>.

7 The set target was 5% below the 1990 levels, particularly for Annex I countries only. See Kyoto Protocol, *supra* note 5, Article 3, para 1.

8 Charlotte Streck, Paul Keenlyside & Moritz von Unger, "The Paris Agreement: A New Beginning" (2016) 13 J Eur Envtl & Planning L 3 at 5.

9 The Paris Agreement, *supra* note 6. See also, Streck, Keenlyside & Unger, *supra* note 8. For more reviews on the Paris Agreement, see Annalisa Savaresi, "The Paris Agreement: a new beginning?" (2016) 34:1 J Energy & Nat Resources L 16; Daniel Bodansky, "The Legal Character of the Paris Agreement" (2016) 25:2 RECIEL 142; Lavanya Rajamani, "Ambition and Differentiation in the 2015 Paris Agreement: Interpretative Possibilities and Underlying Politics" (2016) 65 ICLQ 493; and Alexandra Lesnikowski et al., "What does the Paris Agreement mean for adaptation?" (2017) 17:7 Climate Policy 825.

In failing to live up to its expectations during its era of governance, the Kyoto Protocol was often referred to as being a "baby step" in reducing global carbon emissions[10] and was further described as "disappointing", essentially because as a hard law regime it depended on State-based political authority.[11] Jaye Ellis has suggested that an alternative initiative that creates an economic incentive for actors to meet higher standards for environmental protection may achieve more desirable results than the States could accomplish through the domestic or international hard law system.[12] The Paris Agreement has not been seen to be much better. Maintaining that nothing has changed under the Paris Agreement, Clive Spash opines that substantive impacts of global warming will continue instead of being avoided.[13] As he explains, the provisions for adaptation under the Agreement do not portend meaningful change, and the Agreement is silent on responsibility for forcing States to engage in adaptation approaches, as well as on liability and compensation.[14] Robert Falkner weighs in to argue that while the Paris Agreement creates a more realistic approach to international partnership on Climate Change mitigation, it is still not clear whether the treaty can meaningfully deliver on the pressing need to decarbonize the international economy.[15] But he notes that the framework, which the Agreement creates for States to make voluntary pledges, is fashioned with the hope that global commitment can be escalated through naming and shaming.[16]

Arguably, any naming and shaming activity based on the current regime, which lacks any economic detriment or disincentive to polluters, may not produce a desirable result. A "naming and shaming" strategy lacking civil society activism or consumer boycott is less likely to provide the bite that would compel a recalcitrant party to conform to a requisite standard of behaviour. Such is often achieved under Non-State-Actors-led governance initiatives as opposed to State-centric hard law systems. This indeed alludes to one of the tenets of soft law governance, and one of the reasons for examining the lessons of KPCS: the involvement of the civil society and the private sector in a way that makes the regulation a grassroots endeavour.[17] A soft law approach is also attractive because the heavily legalized and

[10] Reuven S. Avi-Yonah & David M. Uhlmann, "Combating Global Climate Change: Why a Carbon Tax Is Better Response to Global Warming Than Cape and Trade" (2009) 28:3 Stan Envtl LJ 3 at 18.

[11] Jaye Ellis, "Constitutionalization of Nongovernmental Certification Programs" (2013) 20:2 Ind J Global Leg Stu 1035 at 1036.

[12] *Ibid.*

[13] Clive L. Spash, "This Changes Nothing: The Paris Agreement to Ignore Reality" (2016) 13:6 Globalization 928 at 929.

[14] *Ibid.*

[15] Robert Falkner, "The Paris Agreement and the New Logic of International Climate Politics" (2016) 92:5 Intl Affs 1107 at 1108.

[16] *Ibid.*

[17] Martin-Joe Ezeudu, "From a Soft Law Process to Hard Law Obligations: The Kimberley Process and Contemporary International Legislative Process" (2014) 16:1 Eur J L Reform 104 at 111.

bureaucratically cumbersome hard law apparatus of a United Nations-led initiative is not nimble enough to respond promptly to pressing issues that proliferate in the international system. For instance, the Kyoto Protocol was adopted in 1997 and it took another seven to eight years to come into force, in 2005. And that was after a complex ratification process. Likewise, the Paris Agreement was adopted in 2015, but it took another year to come into force in 2016, being one of a few international agreements to come into force that early. In contrast, a soft law regime is created and implemented faster and requires none of the bureaucracy for ratification that normally accompanies, and sometimes stifles a traditional treaty.[18] While it is acknowledged that the Climate Change crisis demands an effective regulatory innovation, it is by no means suggested that a soft law alternative would be the silver bullet for addressing the crisis. However, considering the apparent inefficiencies of a hard law regime based on State-authority, an alternative soft law approach should be explored. Thus, the contribution to the literature that this paper makes is to expound on a possible soft law governance model for Climate Change by focusing on the lessons of the KPCS.

This paper consists of five parts, including this introduction, which is the first part. The second part explores the Canadian approach to Climate Change action to provide insight into the application of the Paris Agreement at a domestic level, including its shortcomings, thus reinforcing the argument for an alternative soft law solution. While the Paris Agreement is an international law instrument, its application is done at the domestic level (like other treaties), where its ineffectiveness is directly manifested. The Canadian example is representative of some of the key regulatory efforts taken domestically in several Global North countries to combat Climate Change, which commonly takes the form of carbon pricing, either by way of an emission trading system (cap-and-trade) or a carbon tax.[19] The third part explores the KPCS as an exemplary soft law model regime that has demonstrated swift response and regulatory success on a terrain where conventional hard law mechanisms based on the political authority of States have failed. It also discusses the rationale for focusing on the KPCS for possible lessons, as well as the nature of the lessons for Climate Change action. The fourth part examines how the lessons of the KPCS may be useful in developing a better regime for Climate Change action. The lessons, in a nutshell, are: (a) lessons in imperativeness - meaning that unless some adversity is created to deprive both the State authorities and corporate entities of the economic gains made from the current carbon pricing regime, nothing will change in the way Climate Change is being regulated at the

[18] *Ibid* at 107.

[19] For a comprehensive analysis on the cap-and-trade and carbon tax systems, see Paul Ekins & Terry Barker, "Carbon Taxes and Carbon Emissions Trading" (2001) 15:3 J Economic Surveys 325; Erik Haites, "Carbon Taxes and Greenhouse Gas Emissions Trading Systems: What Have We Learned?" (2018) 18:8 Climate Pol'y 955; and William D. Nordhaus, "To Tax or Not to Tax: Alternative Approaches to Slowing Global Warming" (2007) 1:1 Rev Envtl Econ & Pol'y 26.

moment; (b) leadership lesson - a strong global Non-State Actor or a coalition of Non-State Actors is all that is required to spearhead such a regime, an actor that mirrors the global diamond industry; and (c) the implementation lesson - the implementation of the KPCS came swiftly in a self-regulatory fashion that involves the industry commitment together with that of the State authorities. The fifth part concludes the paper.

2. CLIMATE ACTION IN CANADA: AN EXAMPLE OF UNFCCC-BASED REGIME

Canada has a federal system of government in which the legislative powers over the environment are shared among the federal parliament at Ottawa and legislatures in its ten provinces and three territories. This means that climate action regulation in Canada stems from two levels of government. More than two decades ago, Canada's federal government had initiated the idea of using an environmental assessment under the *Canadian Environmental Impact Assessment Act*, *2012*[20] (CEAA) to assess whether major projects are likely to cause significant adverse environmental effects due to greenhouse gas (GHG) emissions.[21] That was done even though the CEAA did not prescribe anything relating to Climate Change as an assessment criterion.[22] The CEAA was replaced in 2019 with the *Impact Assessment Act* (IAA),[23] which establishes a new process for considering the environmental, health, social and economic effects of projects subject to a federal impact assessment.[24] Among the factors that are considered under the IAA in the assessment process of any project is "the extent to which the effects of the designated project hinder or contribute to the Government of Canada's ability to meet its commitments in respect of Climate Change such as the *Paris Agreement*, Canada's 2030 target and the goal of Canada achieving net-zero emissions by 2050".[25] So far, under the environmental impact assessment law, not many assessments have been recorded statistically of projects based on GHG emissions standards.[26] However, the Climate Change commitment provision in section 63(e) of the IAA has been criticized as being a bare mandatory provision devoid of any meaningful elaboration by way

[20] First passed in 1992 as the *Canadian Environmental Assessment Act*, S.C. 1992, c. 37.

[21] See, Shi-Ling Hsu & Robin Elliot, "Regulating Greenhouse Gases in Canada: Constitutional and Policy Dimensions" (2009) 54 McGill L J 463 at 501.

[22] Robert B. Gibson, "Assessment Law is still too vague to achieve lasting green goals" (11 October 2019), online: *Policy Options: Politiques* <https://policyoptions.irpp.org/magazines/october-2019/assessment-law-is-still-too-vague-to-achieve-lasting-green-goals/>.

[23] S.C. 2019, c. 28, s. 1.

[24] Government of Canada, "Strategic Assessment of Climate Change Revised, October 2020" (accessed 27 April 2021), online: *Government of Canada* <https://www.canada.ca/en/services/environment/conservation/assessments/strategic-assessments/climate-change.html>.

[25] *Ibid* under the "Executive Summary".

[26] See, Hsu & Elliot, *supra* note 21 at 466-469 (The CEAA greenhouse gas-based assessment information is as of 2009).

of practical guidance.[27] Arguably, the inclusion of climate standards in environmental assessments is a step in the right direction, but whether it will achieve a desirable objective at the end of the day remains to be seen.

Concerning a formal response to the international Climate Change action, Canada ratified the Kyoto Protocol in 2002, and for political reasons, no meaningful effort to implement the Protocol in Canada happened until 2007 when the *Kyoto Protocol Implementation Act* (KPIA) was enacted.[28] The legislative purpose of the KPIA, which came into force in June 2007 was "to ensure that Canada takes adequate and timely action to meet its obligations under the Kyoto Protocol and help address the problem of global climate change".[29] Canada's obligations under the Kyoto Protocol were to reduce Canada's GHG emission level by an average of 6% below its 1990 emission levels during the protocol's time frame of 2008 to 2012, the first commitment period.[30] Thus, beginning from 2007 and up to 2013, the KPIA required the government of Canada to produce an annual Climate Change plan.[31] KPIA required that the plan must include a variety of remedial measures (for example, regulatory, market-based, and fiscal measures) and that the government must account for and report on the GHS emissions reductions expected or already achieved through each measure.[32] However, based on the annual Climate Change plans, Environment Canada surprisingly signalled that the government would not achieve its Kyoto target.[33] The approach that Environment Canada used for determining the expected reductions from the measures was to state them relative to a future scenario in which the measures do not exist, known as business-as-usual emission projections.[34] This contrasts sharply with the KPIA and the Kyoto Protocol that required reporting against historical emission levels.[35] In 2010, Canada repudiated the Kyoto Protocol. Peter Kent, Canada's Minister of the Environment then, stressed that for Canada "[t]o meet the targets under Kyoto for 2012 would be the equivalent of ... the transfer of $14bn (£8.7bn) from Canadian taxpayers to other countries – the equivalent of $1,600 from every Canadian family – with no impact on emissions or the environment."[36] Ultimately, the KPIA was repealed under an omnibus *Bill and Budget Act*,

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27 Gibson, *supra* note 22.

28 Office of the Auditor General of Canada, "2009 Spring Report of the Commissioner of the Environment: Chapter 2 – *Kyoto Protocol Implementation Act*" (accessed 29 April 2021) online: *Office of the Auditor General of Canada* <https://www.oag-bvg.gc.ca/internet/english/parl_cesd_200905_02_e_32512.html>.

29 *Ibid.*

30 *Ibid.*

31 *Ibid.*

32 *Ibid.*

33 *Ibid.*

34 *Ibid.*

35 *Ibid.*

36 Adam Vaughan, "What does Canada's withdrawal from Kyoto protocol mean?", *The Guardian* (13 December 2011), online: <https://www.theguardian.com/environment/2011/dec/13/canada-withdrawal-kyoto-protocol>.

called the *Jobs, Growth and Long-term Prosperity Act* (informally referred to as "Bill C-38"), which was passed in June 2012.[37]

On another front, Canada, under Stephen Harper's administration in 2009, signed the Copenhagen Accord, which is a non-binding agreement, unlike the Kyoto Protocol.[38] In the Copenhagen Accord, Canada agreed to reduce its GHG emissions by 17 percent from its 2005 levels by 2020.[39] A few years after signing the Copenhagen Accord, Environment Canada issued a report in 2014, stating that Canada would not meet its target and that its GHG emissions might actually increase by 2020.[40]

Currently, the Federal Government's efforts at curtailing the GHG emissions in Canada are based on initiatives taken under the *Greenhouse Gas Pollution Pricing Act*[41] (GGPPA), which immediately came into force upon receiving royal assent in June 2018. The GGPPA establishes a set of minimum national standards for GHG pricing to meet Canada's emission reduction targets under the Paris Agreement. The GGPPA essentially introduces a carbon tax across Canada with the implication that provinces and territories that do not have their own carbon tax or a cap-and-trade system that meets a federal standard will have the federal carbon tax applied to them.[42] The federal tax started as $20 per tonne and is to rise by $10 annually until it is $50 per tonne in 2022.[43] As of March 2021, the federal carbon tax applies in Alberta, Manitoba, New Brunswick, Ontario, Saskatchewan, Nunavut and Yukon.[44] The GGPPA has two main parts. Part 1, which is administered by the Canada Revenue Agency, applies a charge to 21 types of fuel and combustible waste (Fuel Charge), while part 2 is administered by Environment and Climate Change Canada, and introduces an output-based pricing system (OBPS) for large industrial emitters.[45]

The province of British Columbia (BC) provides an example of an alternative provincial regime that conforms to the federal standard. The

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37 Dominique Amyot-Bilodeau & Michel Gagné, "Omnibus Bill C-38 – A Major Reform of Federal Environmental Laws" (16 September 2012), online: *McCarthy Tetrault* <https://www.mccarthy.ca/en/insights/articles/omnibus-bill-c-38-major-reform-federal-environmental-laws>.

38 Vanessa Hrvatin, "A brief history of Canada's climate change agreements" (30 May 2016), online: *Canadian Geography* <https://www.canadiangeographic.ca/article/brief-history-canadas-climate-change-agreements>.

39 *Ibid.*

40 *Ibid.*

41 S.C. 2016, c. 12, s. 186.

42 Government of Canada, "Carbon pollution pricing systems across Canada" (accessed 20 July 2021), online: *Government of Canada* <https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work.html>.

43 Government of Canada, "Additional information on the federal carbon pollution pricing benchmark" (accessed 20 July 2021), online: *Government of Canada* <https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/carbon-pollution-pricing-federal-benchmark-information.html>.

44 Osler, "Canadian Government Carbon and Greenhouse Gas Legislation" (March 2021), online: *Osle*r <https://www.osler.com/PDFs/Resource/en-ca/Canadian-Government-Carbon-and-Greenhouse-Gas-Legi.pdf>.

45 *Ibid.*

province was ahead of Canada's federal government in introducing formal climate action legislation. In 2008, the province passed the *Carbon Tax Act*,[46] which places a tax on GHG beginning at $10 per tonne starting in 2008, a price that would increase up to $50 per tonne by 2022.[47] The carbon tax is hoped to help provide an incentive for sustainable choices that produce fewer emissions.[48] According to the government of BC, revenue generated above $30 per tonne of GHG level would be used to protect affordability, maintain industry competitiveness, and encourage new clean initiatives.[49] As of February 2021, BC has the highest carbon tax in Canada at $40 per tonne.[50] A year before enacting the *Carbon Tax Act*, BC passed the *Climate Change Accountability Act*,[51] establishing a Climate Change accountability framework, which includes an independent advisory committee and detailed annual reporting on actions taken to reduce emissions and manage Climate Change risks.[52] The province, thus, legislated the targets for reducing GHG emissions to 40% below 2007 levels by 2030, to 60% below by 2040, and 80% below by 2050.[53] The Province has also introduced an interim target of 16% below by 2025 and planned on setting sectoral targets by March 2021.[54]

The above narrative paints a picture of Canada's climate action initiatives, similar to what is being deployed in other industrialized countries, especially those in the G7, where carbon tax and cap-and-trade systems represent the centerpiece of the portfolio of policies for Climate Change action.[55] The efficacy of the Canadian initiatives is, however, questioned. The position as of 2009 was that Canada's GHG emissions continued to rise dramatically instead of falling.[56] A recent government of Canada report states that "[b]etween 1990 and 2019, emissions increased by 21.4% or 129 Mt CO_2 eq. Canada's emissions growth over this period was driven primarily by increased emissions from oil and gas extraction as well

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46 S.B.C. 2008, c. 40.

47 British Columbia, "Climate Action Legislation" (accessed 1 May 2021), online: *British Columbia* <https://www2.gov.bc.ca/gov/content/environment/climate-change/planning-and-action/legislation#:~:text=Carbon%20Tax%20Act%20(2008),choices%20that%20produce%20fewer%20emissions> [British Columbia].

48 *Ibid.*

49 *Ibid.*

50 Global News, "Is Canada's carbon tax working? Experts, advocacy groups weigh in" (18 February 2021), online: *Global News* <https://globalnews.ca/news/7646946/canada-carbon-tax-experts/> [Global News].

51 S.B.C. 2007, c. 42 (formerly titled *Greenhouse Gas Reduction Targets Act*).

52 British Columbia, *supra* note 47.

53 *Ibid.*

54 *Ibid.*

55 See David A. Weisbach, "Carbon Taxation in the EU: Expanding the EU Carbon Price" (2012) 24:2 J Envtl Law 183 (discussing a possible introduction of carbon tax amid the EU's carbon pricing system); Miroslav Hájek et al., "Analysis of Carbon Tax Efficiency in Energy Industries of Selected EU Countries" (2019) 134 Energy Pol'y 110955 (discussing the efficiency of the carbon tax in energy industries in Sweden, Finland, Denmark, Ireland and Slovenia).

56 Hsu & Elliot, *supra* note 21 at 463.

as transport".[57] Moreover, the Canadian Taxpayers Federation in another news report confirms that the carbon tax system in Canada is not working.[58] As Kris Sims aptly put it, "[t]he carbon tax isn't working, the emissions are going up, the only thing this is is a cash grab".[59] This underscores the argument that the UNFCCC-based regime has not lived up to expectations in containing the GHG emissions, thus warranting the suggestion for an alternative regime that co-opts a soft law system in which Non-State Actors are meaningfully involved. What makes the Canadian experience a near-fiasco, as in other countries where a carbon tax and or a cap-and-trade regime exists, is that nothing tangible can be pointed to as the use made of the revenue realized from the carbon tax in terms of infrastructure to support clean energy.[60] Essentially, the current system is a case of business as usual. However, fairly recently, Canada's Federal Government announced in December 2020, plans to expedite climate action.[61] The plan which is titled "*A Healthy Environment and a Healthy Economy*" involves an investment of $15 billion in climate action through 64 specific measures.[62] Three particularly essential elements of the plan are enhanced carbon pricing measures, investment in low-carbon and energy-efficient infrastructure, and investment in low and zero-emission vehicles (ZEVs).[63] The announcement of the plan is a step in the right direction, but implementation is the key.

Considering Canada's experience, it is logical to conclude that the current UNFCCC-based regime hinging only on States' political authority has not been effective. It creates no connection with civil society except to the extent that the civil society is at the receiving end of the incremental carbon tax regimes that enrich the government treasury. At the very best, States are kept busy with making Climate Change action a revenue strategy.[64] Against this backdrop, an alternative regulatory approach involving the Non-State

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57 Government of Canada, "Greenhouse Gas Emissions" (accessed 1 May 2021), online: *Government of Canada* < https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/greenhouse-gas-emissions.html>.

58 Global News, *supra* note 50.

59 *Ibid.* Kris Sims is the British Columbia Director of the Canadian Taxpayers Federation.

60 See Jeremy Carl & David Fedor, "Tracking Global Carbon Revenues: A Survey of Carbon Taxes Versus Cap-and-Trade in the Real World" (2016) 96 Energy Pol'y 50 (demonstrating that globally, only 27% of revenue generated each year from carbon revenue (from both the carbon tax and cap-and-trade systems) is used to subsidize green spending in energy efficiency or renewable energy; 26% go toward state general funds; and 36 % are returned to corporate or individual taxpayers through paired tax cuts or direct rebates).

61 Bennett Jones, "Canada Proposes New Plan to Invest $15 Billion in Climate Action, Raise Carbon Price to $170/Tonne" (15 December 2020), online: *JDSUPRA* < https://www.jdsupra.com/legalnews/canada-proposes-new-plan-to-invest-15-88238/>.

62 *Ibid.*

63 *Ibid.*

64 See Tracy Snoddon & Trevor Tombe, "Analysis of Carbon Tax Treatment in Canada's Equalization Program" 2019) 45:3 Canadian Pub Pol'y 377 at 381-382 (discussing Canada's carbon pricing as an increasing source of government revenue, but opine that carbon-pricing policies are market-based approach to incentivizing cost-effective reductions in GHG emissions).

Actor should be explored, one arising from similar regulatory imperativeness that produced the KPCS.

3. THE KIMBERLEY PROCESS: A MODEL SOFT LAW REGIME

The KPCS is a soft law regime, a child of necessity, born out of an alliance among the global diamond industry, international NGOs, key diamond producing and trading countries and the United Nations, to break the linkage between diamond mines and civil wars then ravaging Sub-Sahara African countries - Angola, Democratic Republic of Congo ("DRC"), and Sierra-Leone. The KPCS introduced a certification scheme, which authenticates diamonds from legitimate government-controlled sources, and provides for those diamonds access to international markets. Its hallmark is the adoption of a soft law mechanism to create an international law with a treaty-like binding effect. The unique nature of the KPCS-led model of governance recognizes some important but emerging principles. First, the private sector - the NGOs, industry and market-based stakeholders - is recognized as useful agents in the making and enforcement of international law. Second, a soft law initiative of the private sector can be a useful tool for establishing regulatory control that is almost like a hard law mechanism. Third, soft law normative prescriptions are easy to create and easy to implement. They can be adopted fast and require no bureaucratic ratification that normally accompanies and often stifles a traditional hard law model.

Apart from creating legal innovation, the KPCS has been critical in enhancing the capacity of weak governments in the African countries to exercise greater control over mining and trade in rough diamonds.[65] The success of KPCS as a ground-breaking model of governance has been acknowledged by scholars who now advocate for a replication of the same kind of regime in other industries. Rudy Salo[66] and Alexandra Harrington[67] have advocated for a similar certification system in the timber and gemstone industries respectively. Elsewhere a case was made for a global oil certification regime in the same vein as was done under the KPCS.[68] It was a case to use a certification system to trail the movement of crude oil from Nigeria's Niger Delta to legitimate destinations to solve oil theft from Nigeria. This paper does not argue for using a similar certification regime for

[65] Elizabeth J A Rodgers, "Conflict Diamonds: Certification and Corruption: A Case Study of Sierra Leone" (2006) 13:3 J Financial Crime 267 at 271.

[66] Rudy S. Salo, "When the Logs Roll Over: The Need for an International Convention Criminalizing Involvement in the Global Illegal Timber Trade" (2003-2004) 16 Geo Intl Envtl L Rev 127.

[67] Alexandra R. Harrington, "Faceting the Future: The Need for and Proposal of the Adoption of a Kimberley Process-Styled Legitimacy Certification System for the Global Gemstone Market" (2009) 18 Transnat'l L & Contemp Probs 353.

[68] Martin-Joe Ejikeme Ezeudu, Transnational Trade Regulation as a Model for Peace and Transparency: The Case of the Niger Delta and an Oil Certification Regime (Doctoral Dissertation, York University, 2012).

the Climate Change action, although a policy model along that line is a possibility; it is more focused on the regulatory imperativeness that created the KPCS and how it is required to craft a better climate action regime, which like the KPCS would involve Non-State Actors.

3.1 Emergence of the KPCS and Africa's Civil Wars Connection

The extraction of rough diamonds in Africa has demonstrated one of the most devastating relationships between the exploitation of natural resources and regional conflicts.[69] Being a primary commodity and one of the most concentrated forms of wealth susceptible to easy smuggling,[70] the diamonds received the attraction of insurgents and have facilitated some of Africa's most prolonged wars.[71] Today, the history of conflict diamonds cannot be understood without accounting for the events in Angola, Sierra Leone and DRC, three countries that suffered brutal wars because of their rich mineral deposits. While the checkered nature of these conflicts is documented in the literature,[72] what is worthy of note is that in Angola's case, the war was clearly fueled by two key mineral deposits in the country – the oil, which funded the government forces and diamonds, which funded the opposition forces.[73] It was estimated that between 1992 and 1998 alone, the opposition forces received nearly $4 billion in conflict diamonds revenue.[74] With respect to DRC, the rebels successfully seized control over many of the diamond-rich regions of the DRC.[75] A UN panel of experts that

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69 Elisa Gilgen, "The Case of Conflict Diamonds: An Analysis of Regime Theories and Regime Interaction" (NCCR Trade Regulation, Working Paper No. 2007/01, January 2007) at 12 (on file with the author).

70 Ingrid J. Tamm, "Diamonds in Peace and War: Serving the Conflict-Diamond Connection" (WPF Report 30: World Peace Foundation, WPF Program on Intrastate Conflict, CARR Centre for Human Rights Policy, Cambridge, Massachusetts, 2002) at 5, online: *Harvard Kennedy School: Belfer Centre for Science and International Affairs* <https://www.belfercenter.org/publication/diamonds-peace-and-war-severing-conflict-diamond-connection>.

71 See Christian Dietrich, "Hard Currency: The Criminalized Diamond Economy of Democratic Republic of the Congo and its Neighbours" (The Diamonds and Human Security Project, Occasional Paper #4, 2002) at 24, online: *reliefweb* <https://reliefweb.int/report/angola/hard-currency-criminalized-diamond-economy-democratic-republic-congo-and-its> [Dietrich, "Hard Currency"].

72 Seth A. Malamut, "A Band-Aid on a Machete Wound: The Failures of the Kimberley Process and Diamond-Caused Bloodshed in the Democratic Republic of the Congo" (2005-2006) 29 Suffolk Transnat'l L Rev 25 at 29-34.

73 Tracey Michelle Price, "The Kimberley Process: Conflict Diamonds, WTO Obligations, and the Universality Debate" (2003) 12 Minn J Global Trade 1 at 9.

74 Margo Kaplan, "Carats and Sticks: Pursuing War and Peace through the Diamond Trade" (2003) 35 N.Y.U.J. Int'l L. & Pol. 559 at 574. See also, J. Andrew Grant & Ian Taylor "Global Governance and Conflict Diamonds: The Kimberley Process and the Quest for Clean Gems" (2004) 93 The Round Table 385 at 387.

75 For details about the wars in DRC, see also, the following notable works: Thomas Turner, *The Congo Wars: Conflict, Myth & Reality* (London: Zed Books, 2007); Filip Reyntjens, *The Great African War: Congo and Regional Geopolitics, 1996-2006* (Cambridge: Cambridge University Press, 2009); Gérard Prunier, *Africa's World War: Congo, the Rwandan Genocide, and the Making of a Continental Catastrophe* (Oxford: Oxford University Press, 2009); Gérard Prunier,

investigated the conflict made a finding[76] that "there is a clear link between the continuation of the conflict and the exploitation of natural resources. It would not be wrong to say that one drives the other".[77] By Christian Dietrich's account, as much as $50 to $60 million worth of diamonds were extracted in the rebels controlled eastern and northern DRC and smuggled yearly out of the country in the course of the war.[78]

Despite the Angola and DRC wars, which were earlier in time and bigger in scale than the war in Sierra Leone, it was Sierra Leone's decade-long war that finally brought "conflict diamonds" to the international limelight.[79] The human rights violations committed by rebel forces - the Revolutionary United Front (RUF) - within its controlled regions, for the most part, drew the international community's attention to the war over control of diamond fields. RUF forcibly conscripted an estimated 12,000 children to fight as rebel soldiers and engaged in wanton abductions, rapes, and murder. Many of its victims had one or more of their limbs hacked off with a machete.[80] According to a report by Ian Smillie and his colleagues, about 75,000 lives were lost in the war, with over half of the country's then 4.5 million population displaced as refugees.[81] Sierra Leone's official diamond export virtually disappeared due to the rebel's control of the diamond fields and piracy.[82] RUF traded rough diamonds for arms and food during the war, generating figures ranging from $25 to $125 million in annual diamond sales. Ostensibly, that presented an incentive for the rebels to ignore any meaningful peace talks.[83]

From Genocide to Continental War: The 'Congolese' Conflict and the Crisis of Contemporary Africa (London: Hurst & Company, 2009).

76 Malamut, *supra* note 72 at 32.

77 *Addendum to the Report by the Panel of Experts on the Illegal Exploitation of Natural Resources and Other Forms of Wealth of the Democratic Republic of Congo*, U.N. SCOR, 56th Sess., U.N. Doc. S/2001/1072 (2001) at para. 147. See also, Kaplan, *supra* note 74 at 578.

78 Christian Dietrich, "Diamonds in the Central African Republic: Trading, Valuing and Laundering" (The Diamonds and Human Security Project, Partnership Africa Canada, January, 2003) at 5, online: reliefweb <https://reliefweb.int/report/central-african-republic/diamonds-central-african-republic-trading-valuing-and-laundering> [Dietrich, "Diamonds in the CAR"].

79 Price, *supra* note 73 at 12.

80 *Ibid*. See also, Kaplan, *supra* note 74 at 571, and Thomas W. Dunfee & Timothy L. Fort, "Corporate Hypergoals, Sustainable Peace, and the Adapted Firm" (2003) 36 Vand J Transnat'l L 563 at 614.

81 Ian Smillie, Lansana Gberie & Ralph Hazleton, "The Heart of the Matter: Sierra Leone, Diamonds & Human Security" (Partnership Africa Canada, January 2000) at 1, online: <https://cryptome.org/kimberly/kimberly-016.pdf>. See also, Greg Campbell, *Blood Diamonds: Tracing the Deadly Path of the World's Most Precious Stones* (Boulder, CO: Westview Press, 2002) at 213.

82 Price, *supra* note 73 at 15.

83 Malamut, *supra* note 72 at 31.

3.2 Imperative Corporation of the Diamond Industry Motivated by Adverse Campaigns

Despite the UN Security Council's sanctions, the scourge of conflict diamonds was not eradicated nor was the situation ameliorated. Under Resolution 864 of 1998, the Security Council imposed a mandatory embargo on the sale or supply of weapons or petroleum products to rebel forces in Angola.[84] Similar sanctions were also imposed on Sierra Leone in 1997, targeted against the RUF.[85] Resolution 1306 was adopted in July 2000, by which the Security Council imposed a worldwide ban on the importation of rough diamonds originating from Sierra Leone.[86] It further requested the government of Sierra Leone to ensure, as a matter of urgency, that an effective Certificate of Origin regime for trade in diamonds was in operation in Sierra Leone.[87] The resolution was particularly far-reaching in its scope, in that it additionally urged the international community to assist the government of Sierra Leone to establish a well-regulated diamond industry. But it failed to provide sanctions against the refusal by any government or group to provide such assistance.[88] Finally, Resolution 1343 adopted in 2001, imposed sanctions against Charles Taylor's government in Liberia, in connection with his involvement with Sierra Leone's rebel group.[89]

Overall, however, the sanctions failed to effectively limit the access of conflict diamonds to the legitimate market. The rebels in Angola, for instance, were reported to be able to exchange diamonds for cash and arms, notwithstanding the sanctions. It was reported that in 2000, $1 million worth of diamonds were smuggled from Angola daily, constituting $350 to $420 million annually in sales.[90] Even the global diamond industry admitted that it was buying conflict diamonds from rebel groups, as revealed by De Beers' CEO, who remarked that:

> One of the essential jobs that we De Beers [sic] carry out worldwide is to ensure that diamonds coming onto the markets do not threaten the overall price structure and therefore although we have no direct relationship with Unita, there is no doubt that we buy many of those

[84] U.N. SCOR, 46th Sess., 3277th Mtg., U.N. Doc. S/RES/864 (1993) at paras. 19-23.
[85] U.N. SCOR, 52nd Sess., 3822nd Mtg., U.N. Doc. S/RES/1132 (1997) at para. 5.
[86] U.N. SCOR, 55th Sess., 4168th Mtg., U.N. Doc. S/RES/1306 (2000) at paras. 1 & 6 [Resolution 1306].
[87] *Ibid* at para. 2.
[88] Laura Forest, "Sierra Leone and Conflict Diamonds: Establishing a Legal Diamond Trade and Ending Rebel Control over the Country's Diamond Resources" (2000-2001) 11 Ind Int'l & Comp L Rev 633 at 645.
[89] U.N SCOR, 56th Sess., 4287th Mtg., U.N. Doc. S/RES/1343 (2001) at para. 6.
[90] Price, *supra* note 73 at 27; Karen E. Woody, "Diamonds on the Souls of her Shoes: The Kimberly Process and the Morality Exception to WTO Restrictions" (2006-2007) 22 Conn J Intl L 335 at 339. See also, *Report of the Panel of Experts on Violations of Security Council Sanctions Against UNITA*, U.N. SCOR, 55th Sess., U.N. Doc. S/2000/203 (2000) at para. 77; *Supplementary Report of the Monitoring Mechanism on Sanctions Against UNITA*, U.N. SCOR 56th Sess., U.N. Doc. S/2001/966 (2001) at para. 141.

> diamonds that emanate from Unita-held areas in Angola…[91]

Thus, the diamond industry had no imperative for change. It benefitted from the prevailing situation, just like governments and corporate entities are benefitting from the current carbon pricing regime because it is a win-win for both sides as explained in the next section. It follows, therefore, as Tracey Price rightly argues, that the cooperation of the international diamond industry towards a global certification initiative was spurred by negative publicity against the diamond trade.[92] Global Witness, a London-based NGO, was the first organization to bring to the international spotlight, the bloody link between rough diamonds and the wars in Africa, by its publication of *A Rough Trade: The role of Companies and Governments in the Angolan Conflict* in 1998.[93] This publication thus gave rise to several campaigns against the diamond industry. In October 1999, Medico International of Germany, Intermon of Spain, the Netherlands Institute for Southern Africa, and Novib of the Netherlands, all reputable human rights groups, collaborated with Global Witness to launch a major campaign titled the "Fatal Transaction".[94] The campaign's focus according to Koyame, was on the right of consumers to know whether diamonds they purchased came from a source that financed the acquisition of weapons for rebel armies, thus contributing to countless deaths throughout Africa.[95]

The Partnership Africa Canada, a Canadian NGO, in January 2000, also increased the weight to the negative publicity by releasing another incisive report - *The Heart of the Matter: Sierra Leone, Diamonds and Human Security*.[96] Therefore, motivated by the fear that the kind of consumer boycotts and negative campaigns which had killed the fur trade might destroy their multi-billion diamond trade if nothing were done, the international diamond industry moved to work with diamond-producing countries and embraced the certification initiative.[97] In February 2000, De Beers announced that it would no longer buy diamonds from conflict-infested mines and that the industry would fully support a certification scheme.[98] In May of the same year, diamond-producing countries of Africa met in Kimberley, South

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91 Global Witness, "Conflict Diamonds: Possibilities for the Identification, Certification, and Control of Diamonds" (A Briefing Document by Global Witness, June 2000), online: Global Witness <https://reliefweb.int/sites/reliefweb.int/files/resources/83488766797D3C36C125690D0035BF37-conflictdiamonds.htm> [Global Witness, "Conflict Diamonds"]. See also, Woody, *supra* note 89 at 343, n. 61.

92 Price, *supra* note 73 at 32.

93 Global Witness, "A Rough Trade: The Role of Companies and Governments in the Angolan Conflict" (Global Witness, 1 December 1998) at 6, online: Global Witness <http://www.globalwitness.org/sites/default/files/pdfs/A_Rough_Trade.pdf> [Global Witness, "A Rough Trade"]. See also, Price, *supra* note 73 at 32.

94 Mungbalemwe Koyame, "United Nations Resolutions and the Struggle to Curb the Illicit Trade in Conflict Diamonds in Sub-Saharan Africa" (2005) 1 Afr J Leg Stud 80 at 95.

95 *Ibid* at 96.

96 Smillie, Gberie & Hazleton, *supra* note 80.

97 Price, *supra* note 73 at 32.

98 *Ibid.*

Africa, with the intent to devise a remedy to conflict diamonds. This was indeed the beginning of the so-called "Kimberley Process", named after the venue of its inaugural meeting.[99] Further, at the 29th World Diamond Congress in July 2000, the International Diamond Manufacturers' Association and the World Federation of Diamond Bourses issued a joint resolution by which they declared their commitment to a "zero tolerance" stance on conflict diamonds, and further established the World Diamond Council to represent the interests of every aspect of the diamond industry in the certification project.[100]

In December 2000, the KPCS initiative received the support of the UN General Assembly. The General Assembly unanimously adopted Resolution 55/56 sponsored by 48 members and welcomed the initiative by African diamond-producing countries to launch an inclusive consultation process of governments, industry and civil society, to deal with conflict diamonds and urged all member states to support it.[101]

3.3 The Regulatory Nature of the Kimberley Process

Assessed in its nature as a written agreement, the KPCS is couched in the language of a conventional treaty. Nevertheless, it detracts from using the traditional treaty terminology. Words such as "shall", "agree", "undertake", "right", "obligation", and "enter into force" are nowhere to be found in the agreement.[102] Rather, the agreement uses less imperative expressions such as "recommend", "encouraged", and "should ensure".[103] It contains no provision relating to ratification to come into force.[104] In addition to these features, it is worth mentioning that among the participants that negotiated the KPCS were NGOs and the diamond industry representatives who conventionally have no legislative authority.[105] Essentially, KPCS does not conceal its soft law nature, enhanced by the fact that it is a voluntary as opposed to an obligatory initiative.

State parties to the KPCS agreement referred to as participants, undertake to enact appropriate local legislation to implement and enforce the certification scheme and to maintain dissuasive and proportional

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99 Gilgen, *supra* note 69 at 13.

100 Ann C. Wallis, "Data Mining: Lessons from the Kimberley Process for the United Nations' Development of Human Rights Norms for Transnational Corporations" (2005) 4 Nw J Intl Hum Rts 388 at 393.

101 U.N. GAOR, 55th Sess., 79th Plen. Mtg., U.N. Doc. A/RES/55/56 (2001) at para. 2. See also, Price, *supra* note 73 at 34; Wallis, *supra* note 99 at 393; and Julie L. Fishman, "Is Diamond Smuggling Forever? The Kimberley Process Certification Scheme: The First Step Down the Long Road to Solving the Blood Diamond Trade Problem" (2004-2005) 13 U Miami Bus L Rev 217 at 224.

102 Frans Schram, "The Legal Aspects of the Kimberley Process" (International Peace Information Service, Antwerp, Belgium, January 2007) at 7, online: *Business & Human Rights Resource Centre* <http://archive.niza.nl/docs/200701171036348313.pdf>.

103 *Ibid.*

104 Daniel L Feldman, "Conflict Diamonds, International Trade Regulation, and the Nature of Law" (2003) 24:4 U Pa J Intl L 835 at 836.

105 Ezeudu, *supra* note 17 at 117.

penalties for infringement.[106] Although the encouragement of the participants to pass local laws to enforce the agreement at the home front is expressed to be based on "meeting internationally agreed minimum standards",[107] in reality, the minimum standards are not minimum standards at all but are instead pretty high standards. All participant countries must pass new legislation to enforce the KPCS at home.[108] While some scholars may argue that the KPCS may be appropriately referred to as a hybrid document as opposed to a pure soft law instrument, given that all participant countries must pass new laws to enforce it at home, however, such a nomenclature preference does not affect the main thesis of this paper.

The KPCS regime operates based on the admission and exclusion of members. The agreement provides that each participant should "ensure that no shipment of rough diamonds is imported from or exported to a non-participant".[109] This provision is one of the key elements of the regime that ensures its effectiveness and puts it on a pedestal even higher than many conventional treaties. Its obvious implication is that a country must first subscribe to the regime in order to participate legally in the global diamond trade.[110] This element is further reinforced by monitoring, which the KPCS monitoring committee conducts, and it is designed to ensure that participants are complying with its requirement.[111] Expulsion from the KPCS regime is often a dire consequence that accompanies any discovery of non-compliance following a monitoring review by a KPCS monitoring team. It shows that being already a member or participant is not sacrosanct. To continue the enjoyment of membership, a participant must continue to comply with the provisions of the agreement. There is however no definite provision in the agreement relating to the expulsion of a participant from the scheme. Rather, the agreement provides that dialogue should be resorted to through the Chair if concerns are raised regarding compliance or implementation of the certification scheme by a participant.[112] However, in practice, the regime began taking extra steps to expel defaulting participants from its membership.[113]

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106 Kimberley Process, "2013 KPCS Core Document Amended", KPCS Document, s. IV, para (d), online: *Kimberley Process* <https://www.kimberleyprocess.com/en/kpcs-core-document-version-2016-0> [*KPCS Document*].

107 *Ibid* at preamble, para 10.

108 Ezeudu, *supra* note 17 at 120, n 70.

109 *KPCS Document*, *supra* note 105 at s. III, para (c).

110 Ezeudu, *supra* note 17 at 123.

111 It is pertinent to note that the civil society, diamond industry and NGOs who participated in the meetings and negotiations that led to the creation of the certification scheme, were reduced to mere observer status in the agreement. Nonetheless, they are still obliged to participate in plenary meetings and ad hoc working groups particularly the peer review visits. *See* the *KPCS Document*, *supra* note 105 at s.1, & s. VI, paras. 1, 10, 13(b), 15.

112 *KPCS Document*, *supra* note 105 at s. VI, para 16.

113 Ian Smillie, "The Kimberley Process Certification Scheme for Rough Diamonds" (Partnership Africa Canada, Comparative Case Study 1, October 2005) at 4, online: *The Overseas Development Institute (ODI)* <https://www. odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/4470.pdf>.

Certification of diamonds under the KPCS requires miners, mining companies, or rough diamond buyers operating in diamond-producing countries who are KPCS participants, to export diamonds sealed in a tamper-resistant container accompanied by a valid KPCS certificate issued by a government authority.[114] At the importing country, the importer of the rough diamonds must provide Customs with a valid and authentic certificate issued and validated by the exporting government. The shipment is then subjected to a physical inspection to ensure that the contents match the description on the certificate.[115]

Everyone familiar with the making and operation of international law would realize that there is no better way of achieving an expeditious solution to an international problem than through the soft law option, especially one that involves the Non-State Actors in its governance scheme. Such an option allows for more political leeway and rapidity and offers a regulatory malleability that accommodates competing priorities and provides a framework for future adaptation.[116] Of course, that does not imply that there are no negative aspects of using soft law. First, a soft law regime may sometimes struggle with acceptance or legitimacy issues, especially when its creation process is not grassroots-orientated or lacks transparency or is without extensive consultation with key stakeholders. Second, as argued by Chinkin regarding the Code of Conduct for Transnational Corporations, the negotiation of a soft law instrument may sometimes be complex and lengthy as in the case of a treaty.[117] Third, where the initiation and implementation of a soft law regime depend on the strength and influence of a single strong Non-State Actor, then the collapse or demise of that entity portends the end of the regime. However, in the context of this paper, the benefits of a soft law regulatory approach outweigh its disadvantages.

To some extent, the KPCS shares similarities with the Montreal Protocol on Substances that Deplete the Ozone Layer, signed in September 1987 ("Montreal Protocol"), which has been described as the most significant international environmental agreement in history.[118] Just as a situation of imperativeness spurred the establishment of the KPCS, the negotiation and signing of the Montreal Protocol stemmed from an increased sense of urgency that atmospheric ozone depletion was a real danger to mankind and required global action.[119] Again, just as the KPCS restricted trade in diamonds with non-compliant countries, the Montreal Protocol also

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114 Ezeudu, *supra* note 17 at 125.

115 *Ibid.*

116 Schram, *supra* note 101 at 9.

117 C M Chinkin, "The Challenge of Soft Law: Development and Change in International Law" (1989) 38(4) ICLQ 850 at 860. See also, Maynard, "A Code of Conduct for Transnational Corporations" (1983) 4 The Company Lawyer 103.

118 Laura Thoms, "A Comparative Analysis of International Regimes on Ozone and Climate Change with Implications for Regime Design" (2003) 41:3 Colum J Transnat'l L 795 at 797.

119 *Ibid* at 801.

restricted trade in chlorofluorocarbons with non-parties to its agreement.[120] Furthermore, the KPCS recorded success in contributing to the ending of the conflict diamond problem, and similarly, the Montreal Protocol also recorded success in reducing by eighty-five percent, the production of those gases that damage the ozone layer most.[121] However, the two regimes differ because while the KPCS is a soft law regime, the Montreal Protocol is a hard law treaty. In any event, the Montreal Protocol supports the thesis of this paper to the extent that it demonstrates that a situation of urgency or imperativeness could instigate worldwide action for a regime change.

4. KIMBERLEY PROCESS LESSONS FOR CLIMATE CHANGE ACTION

Essentially, the lessons from the KPCS example for the current climate crisis are threefold – the imperative aspect, the leadership aspect, and the implementation aspect. All three aspects have a common denominator - they all affected the economic interests of key players whose cooperation proved critical for the establishment of the KPCS.

4.1 The Lesson in Imperativeness

No effective solution was crafted for the conflict diamonds until a situation of imperativeness was created, spurred by the NGOs' campaign against the global diamond industry. Individuals, as well as corporations, are often motivated to act or change a course of behaviour once their interests -pecuniary or otherwise, are threatened. The reaction of the global diamond industry to the adverse campaign sponsored against the industry by a coalition of NGOs created a new reality. As the negative publicity reached a crescendo, it triggered naming and shaming, resulting in a massive consumer boycott of diamonds. Referring to De Beers, the leader of the global diamond cartel, Tony Karon captured the situation in an important Time column that "[t]he gem giant, facing twin threats of dwindling market share and a boycott fuelled by human rights concerns, takes a new tack."[122]

The naming and shaming coupled with the consumer boycott, share a common semblance with the extant hard-law-based carbon taxing and cap-and-trade system, to the extent that they are all market-based governance approaches. But they have clear differences. The carbon tax, to entities required to reduce their emission, is treated like an ordinary expense, which can be absorbed in profit and loss accounting and is often passed onto the consumers. It has no meaningful economic bite on the regulated entities. Similarly, the cap-and-trade system is treated as a manufacturing inventory that can be traded off when excess is acquired, or more purchased when

[120] *Ibid* at 803.
[121] *Ibid* at 805.
[122] Tony Karon, "Why De Beers Wants You 'Blood Diamond'-Savvy: The gem giant, facing twin threats of dwindling market share and a boycott fuelled by human rights concerns, takes a new tack", *Time* (13 July 2000), online: <http://content.time.com/time/magazine/article/0,9171,49841,00.html>.

deficient quantity is in stock. Like the carbon tax, it can ultimately be absorbed in profit and loss accounting, and thus lacks meaningful economic bite. In contrast, a soft-law-based Non-State Actors' naming and shaming system with a boycott, creates an absolute loss of consumer patronage, meaning that targeted entities encounter dwindling revenue and profit. It comes with a meaningful economic bite, which is just enough to compel positive action. "Business as usual" is an apt expression for the current carbon tax and the cap-and-trade system. A regime change is imperative.

Essentially, until there is an adversely impactful campaign against the high emitters of GHGs, a campaign that portends serious economic consequences, an effort to contain global warming may not yield the desired result. The work must start with activist NGOs, just as in the case of conflict diamonds. There is a handful of organizations or groups that can escalate their work to a level of an adverse campaign. For instance, Climate Action Network Canada – *Réseau Action Climat Canada* (CAN-Rac Canada) has been championing Climate Change activism in Canada. It is Canada's representative of Climate Action Network International. This coalition of over 100 organizations across Canada has not only the potential but also stands in a position where it can galvanize the manner of activism required to spur a meaningful policy change. [123] In the spring of 2019, CAN-Rac Canada became a signatory and coordinating committee member of the Pact for a New Green Deal, which is a coalition of environmental NGOs and other social justice groups, who advocate among others for a clean energy economy.[124] The presence of the Climate Actions Network in several countries, including the US, makes it even better disposed to do a globally coordinated adverse campaign. 350.org is another international NGO, that is also championing the cause of Climate Change. It devotes its work largely to the ending of fossil fuel and advocates for conversion to renewable energy.[125] It can also drive negative publicity against the high carbon emitters. Indeed, the fall 2019 students' global rally on climate action is an indication that only a little nudging may be required to get the campaign to an adverse publicity status.[126]

One question that must be answered however is which emitters should be targeted in the negative publicity? Again, would the adverse campaign be directed also to countries with a high emission rate per capita? While these critical questions are raised to lay the groundwork for further research, it may be argued for the time being that the market-based nature of the soft

[123] Climate Action Network Canada - Réseau action climat, "About CAN-Rac" (accessed 30 July 2020) online: *Climate Action Network Canada* <https://climateactionnetwork.ca/about-can-rac/>.

[124] Climate Action Network Canada - Réseau action climat, "A Green New Deal for Canada" (accessed 30 July 2020) online: *Climate Action Network Canada* <https://climateactionnetwork.ca/a-green-new-deal-for-canada/>.

[125] 350.org, "Stop Fossil Fuels: Build 100% Renewables" (accessed 14 June 2021) online: *350.org* <https://350.org/>.

[126] Eric Stober, "Youth rally around the world in global climate strike" *Global News* (27 September 2019), online: < https://globalnews.ca/news/5962704/global-climate-strike-overview/>.

law system in which Non-State Actors are involved, suggests that an appropriate approach may be to target corporate-entity high emitters in different industries, especially those corporations dealing in fossil fuel. The reason is that high carbon emissions that contribute to global warming are attributed to the use of fossil fuels. Thus, with naming and shaming comes consumer boycott that may lead to low revenue. The consumer boycott would in turn affect governments because a low revenue for corporations means a low or no tax. Automakers may also be the focus of negative publicity. Hybrid cars with high efficiency, in terms of remarkably low fuel consumption, ought to have been the norm at the turn of the current decade, but as it appears, such cars are still produced as high-end cars for only buyers who could pay more.

4.2 Role in Leadership: The Instrumentality of the Diamond Industry

The establishment of the KPCS is a clear illustration that a Non-State Actor (the global diamond industry, in that case) could spearhead an effective global regime, both from the standpoint of implementation and enforcement. The NGOs' activism led to the exposure of the scourge of blood diamonds to the world, but the diamond industry, once impacted, took steps to regulate the diamond market. Thus, a meaningful leadership role did not emerge from the KPCS negotiation until the global diamond industry committed to ending the blood diamonds. That is another crucial lesson to take away from the KPCS. Concerning the Climate Change action, institutional investors to a reasonable extent, stand in a position to take the leadership role in climate action as the diamond industry did for the KPCS. Without discounting the power of private investors in driving sustainable investment, which has been acknowledged,[127] there is a strong indication that institutional investors can perform the leadership role based on popular policy analyses. Such a leadership role in the form of market pressure can take three forms, namely, institutional divestment from non-conforming corporations, lobbying for policy change towards a stronger market-related regulation, and coordinated public reporting for informed private investor/consumer actions.

For instance, Ken Silverstein, a senior column contributor at Forbes, discloses in a compelling column titled "*Institutional Investors Have More Power Than Governments To Shape Climate Future*" that while institutional investors have been using their financial influence to urge corporations to commit to a green economy, they are now focusing on demanding that the Congress should come up with policy change that would mandate the US Securities and Exchange Commission to ensure there is stronger

[127] David Uzsoki, *Sustanable Investing: Shaping the Future of Finance* (Winnipeg, MB: International Institute for Sustainable Development, February 2020) 8, online: <https://www.iisd.org/system/files/publications/sustainable-investing.pdf>.

transparency and consistency in corporate reporting risk.[128] The institutional investors take the position that businesses should be compelled to disclose their environmental, social and governance data to investors who require such information to make informed investment decisions.[129] As Silverstein writes, The Principles for Responsible Investment, a group of institutional investors who manage around $86 trillion assets, has emphasized that climate issues are the number one risk in their portfolios and they need to act now to avoid disruption.[130] With the globalization of policy trends, it is believed that the US example once successfully executed, may be copied in other G7 countries with a potential domino effect around the world.

The suitability of the institutional investors for the leadership role is informed by their economic strength and influence like the global diamond industry, and they are in a position to facilitate more easily a global coalition and strategy required for a widespread regime change. At the moment, an existing entity that could seamlessly assume this position is the Climate Action 100+, which is coordinated by five partner organizations that include the Asia Investor Group on Climate Change (AIGCC), Ceres, Investor Group on Climate Change (IGCC), Institutional Investors Group on Climate Change (IIGCC), and the Principles for Responsible Investment (PRI).[131]

With respect to operational leadership, the oil and gas industry appears to be well-positioned to design a template for the working of a Climate Change-specific regime – a peculiar system of certification. MiQ, which is an independent, not-for-profit partnership between Rocky Mountain Institute and SystemIQ, has developed a certification system to encourage methane abatement through a differentiated market for natural gas buyers and sellers.[132] The oil and gas industry acknowledges that methane leaked into the atmosphere is a much more powerful climate pollutant than carbon dioxide.[133] Year by year, the industry emits over 84

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[128] Ken Silverstein, "Institutional Investors Have More Power Than Governments to Shape Climate Future" (26 July 2019) online: *Forbes* < https://www.forbes.com/sites/kensilverstein/2019/07/26/institutional-investors-have-more-power-than-governments-to-shape-climate-future/?sh=54e9676530d1>.

[129] *Ibid.*

[130] *Ibid.*

[131] Michael Edesess, "The Misguided Role of Institutional Investors in Climate Change" (30 November 2020), online: *Advisor Perspectives* <https://www.advisorperspectives.com/articles/2020/11/30/the-misguided-role-of-institutional-investors-in-climate-change>.

[132] Alex Chin, "Rocky Mountain Institute (RMI) and SYSTEMIQ launch MiQ to tackle methane emissions from the oil and gas sector" (2 December 2020), online: *RMI: Energy Transformed* <https://rmi.org/press-release/rocky-mountain-institute-rmi-and-systemiq-launch-miq-to-tackle-methane-emissions-from-the-oil-and-gas-sector/>.

[133] *Ibid.* See also Isabelle Gerretsen, "IPCC report prompts calls to tackle methane emissions at Cop26" (11 August 2021), online: *Climate Home News* <https://www.climatechangenews.com/2021/08/11/ipcc-report-prompts-calls-tackle-methane-emissions-cop26/> (stressing that methane has a warming impact 84 times that of CO2 over a 20-year period).

million tons of methane, which is equivalent to the total emissions from road transport vehicles around the world.[134] The MiQ Certification System will urgently and effectively reduce methane emissions from the production of natural gas, reports Alex Chin, an RMI's media contact.[135] According to Chin, "[t]he market-based certification will allow for a differentiation of the gas markets based on methane emissions performance and, therefore, generate different price levels that create an economic incentive for companies that are lagging behind to invest in methane abatement".[136] As gas buyers are increasingly seeking guarantees about the origin of LNG imports, the MiQ certification will help buyers to verify the methane emission performance of gas entering the LNG streams, pre-liquefaction.[137] As Georges Tijbosch, a Senior Adviser of MiQ explains, certifying gas based on methane performance "will allow suppliers to make purchasing decisions based on the environmental impact of gas, creating a financial incentive for producers to invest in the technology, procedures and policies that reduce their methane emissions".[138] This indeed reinforces the position of this paper that a meaningful climate action regime must have an economic incentive to compel compliance. At the same time, it demonstrates that a non-State-actor-led climate action regime can be easily crafted if it attracts enough coordinated campaigns for it.

4.3 The Implementation Lesson

The implementation of the KPCS does not toe the line of a conventional treaty. In the first instance, it is a voluntary initiative as opposed to an obligatory one. Being a market-based scheme, the participants eager not to halt the influx of their diamond revenue did not hesitate to implement the regime within their national territories. The spontaneity of the implementation was unique because, unlike a conventional treaty, there was no lag time for ratification. Again, the threat of being out of the legal diamond trading circle was the main impetus that drove the implementation of the regime. Essentially, the way the regime was set up, coupled with the involvement of the largely non-State actor diamond industry body, made it to be a self-regulatory regime because it co-opts and triggers off every part of the diamond trading chain to become a continuously and perpetually vigilant self-regulatory system. The implementation of KPCS indeed demonstrates the achievement of easy consensus (industry-government cooperation) in providing a global public good, because the common economic interests of all parties were at stake.[139] It is important to note that

134 Chin, *supra* note 131.
135 *Ibid.*
136 *Ibid.*
137 *Ibid.*
138 *Ibid.*
139 See J Andrew Grant, "Consensus Dynamics and Global Governance Frameworks: Insights from the Kimberley Process on Conflict Diamonds?" (2013) 19:3 Canadian Foreign Policy Journal

the implementation is also widespread because non-diamond producing countries are compelled to implement the agreement within their national boundaries because of that important consequence of non-participation in the legitimate diamond trading circle for non-implementation.[140]

An additional element of the implementation that must be emphasized is the efforts made by the participants to impose severe sanctions for breach of the regime at the home front by elevating the status of their respective KPCS local laws to that of criminal law. In most, if not all the participant countries, it is a criminal offence to deal in rough diamonds without an appropriate government certificate. The criminal element of the KPCS law is thus a spectacular phenomenon worthy of note – a creation of normative synergy between industry's cooperative regulation and state's brunt authority. Thus, without such a compelling force of law, it might have been difficult to implement the non-binding agreement within the national boundaries.

Essentially, any effort to achieve a meaningful remedial alternative to the Climate Change crisis, which takes the soft law approach should inevitably, induce parties to act on their own volition without compulsion; and create a disincentive for failing to comply and implement. The disincentive must have a purposeful economic element. So long as the current carbon taxing and cap-and-trade continue without serious economic deprivation on the part of both national governments and polluting entities, nothing will change in the fight against Climate Change.

5. CONCLUSION

If States and key stakeholders must work together to safeguard the future of mankind as Hugo Boyko advocates for,[141] then a meaningful soft law option may be explored for a Climate Change action. In the current age of neo-liberalism when economic interests tend to drive most considerations, whether, by individuals, governments, or corporations, the carbon taxing, and cap-and-trade being devoid of economic constraints will not champion the cause of climate action. Both systems, which are market-based initiatives are currently profit-driven. With them, it is a case of business as usual – a monetization of the right to pollute. The current UNFCCC-based regime lacks meaningful legal and economic bite despite its hard law nature. While most, if not all parties, to the treaty have not demonstrably met their emissions reduction levels, no sanctions have been imposed based on the

323, online: <http://dx.doi.org/10/1080/11926422.2013.844909> (discussing the nature of the consensus that enabled the KPCS agreement).

140 Regarding some of the participant countries who include non-diamond producers, see *Interlaken Declaration on the Kimberley Process Certification Scheme for Rough Diamonds*, 5 November 2002, online: <https://www.diamonds. net/Docs/MoralClarity/KP-InterlakenDeclaration-KPCS-1102.pdf>.

141 Hugo Boyko, "Introduction" in Hugo Boyko, 2nd ed, *Science and the Future of Mankind* (The Hague: Dr. W. Junk Publishers, 1964) 7.

treaty. Thus, like most international treaties based on State authority, the Paris Agreement would continue to be a political instrument that provides a sense of hope, but may continue to flounder on its promise. A soft law-based alternative regime system must be tried out, and this can be propelled by creating meaningful constraints to the economic benefits that accrue to both the regulator and the regulated under the current regime.

As in the case of the KPCS, there are a number of catalysts indicating that the global socio-political climate is already being prepared for the implementation of a market-based soft law regime for climate action. First, growing Climate Change activism is pushing for better regulation of GHG emissions. This involves both organized NGO bodies and dispersed groups like student bodies. Such activisms have the tendency to trigger a consumer domino effect towards boycotts. The potential implication of such consumer activism is the loss of economic interests such as revenue on the part of targeted polluting entities and by extension the government. Second, institutional investors are in a position to match the activism with leadership for better GHG emission regulation. They have the economic strength not only to steer key actors to the path of GHG reduction but equally can compel obedience to any crafted regime. The institutional investor leadership will traverse between the regulated entities and the civil society, thus providing a grassroots governance style like the KPCS.

REFERENCES

350.org, 'Stop Fossil Fuels: Build 100% Renewables' <https://350.org/> accessed 14 June 2021

Amyot-Bilodeau D, and Gagné M, 'Omnibus Bill C-38 – A Major Reform of Federal Environmental Laws' <https://www.mccarthy.ca/en/insights/articles/omnibus-bill-c-38-major-reform-federal-environmental-laws> 16 September 2012

Avi-Yonah R S and Uhlmann DM, 'Combating Global Climate Change: Why a Carbon Tax Is Better Response to Global Warming Than Cape and Trade' (2009) 28 Stanford Environmental Law Journal 3

Bodansky D, 'The Legal Character of the Paris Agreement' (2016) 25 Review of European, Comparative and International Environmental Law 142

Boyko H, 'Introduction' in Hugo Boyko, 2nd ed, *Science and the Future of Mankind* (The Hague: Dr. W. Junk Publishers, 1964)

British Columbia, 'Climate Action Legislation' <https://www2.gov.bc.ca/gov/content/ environment/climate-change/planning-and-action/legislation#:~:text=Carbon%20Tax%20Act%20(2008),choices%20that%20produce%20fewer%20emissions > accessed 1 May 2021

Carl J, and Fedor D, 'Tracking Global Carbon Revenues: A Survey of Carbon Taxes Versus Cap-and-Trade in the Real World' (2016) 96 Energy Policy 50

Chin A, 'Rocky Mountain Institute (RMI) and SYSTEMIQ launch MiQ to tackle methane emissions from the oil and gas sector' <https://rmi.org/press-release/rocky-mountain-institute-rmi-and-systemiq-launch-miq-to-tackle-methane-emissions-from-the-oil-and-gas-sector/> accessed 2 December 2020

Chinkin C M, 'The Challenge of Soft Law: Development and Change in International Law' (1989) 38(4) International & Comparative Law Quarterly 850

Climate Action Network Canada - Réseau action climat, 'A Green New Deal for Canada' <https://climateactionnetwork.ca/a-green-new-deal-for-canada/> accessed 30 July 2020

Climate Action Network Canada - Réseau action climat, 'About CAN-Rac' <https://climateactionnetwork.ca/about-can-rac/> accessed 30 July 2020

Dietrich C, 'Diamonds in the Central African Republic: Trading, Valuing and Laundering' (The Diamonds and Human Security Project, Partnership Africa Canada, January 2003) <https://reliefweb.int/report/central-african-republic/diamonds-central-african-republic-trading-valuing-and-laundering>

Dietrich C, "Hard Currency: The Criminalized Diamond Economy of Democratic Republic of the Congo and its Neighbours" (The Diamonds and Human Security Project, Occasional Paper #4, 2002) <https://reliefweb.int/report/angola/hard-currency-criminalized-diamond-economy-democratic-republic-congo-and-its>

Edesess, M., 'The Misguided Role of Institutional Investors in Climate Change' <https://www.advisorperspectives.com/recommend/36198> accessed 30 November 2020

Ekins P, and Barker T, 'Carbon Taxes and Carbon Emissions Trading' (2001) 15 Journal of Economic Surveys 325

Ellis J, 'Constitutionalization of Nongovernmental Certification Programs' (2013) 20:2 Indiana Journal of Global Legal Studies 1035

Ezeudu M, 'From a Soft Law Process to Hard Law Obligations: The Kimberley Process and Contemporary International Legislative Process' (2014) 16 European Journal of Law Reform 104

Ezeudu ME, Transnational Trade Regulation as a Model for Peace and Transparency: The Case of the Niger Delta and an Oil Certification Regime (Doctoral Dissertation, York University, 2012)

Falkner R, 'The Paris Agreement and the New Logic of International Climate Politics' (2016) 92 International Affairs 1107

Feldman DL, 'Conflict Diamonds, International Trade Regulation, and the Nature of Law' (2003) 24 University of Pennsylvania Journal of International Law 835

Fishman JL, 'Is Diamond Smuggling Forever? The Kimberley Process Certification Scheme: The First Step Down the Long Road to Solving

the Blood Diamond Trade Problem' (2004-2005) 13 University of Miami Business Law Rev 217

Gibson RB, 'Assessment Law is still too vague to achieve lasting green goals' <https://policyoptions.irpp.org/magazines/october-2019/assessment-law-is-still-too-vague-to-achieve-lasting-green-goals/> 11 October 2019

Gilgen E, 'The Case of Conflict Diamonds: An Analysis of Regime Theories and Regime Interaction" (NCCR Trade Regulation, Working Paper No. 2007/01, January 2007)

Giogette C, 'The Role of Nongovernmental Organizations in the Climate Change Negotiations' (1998) 9 Colorado Journal of International Environmental Law and Policy 115

Global News, 'Is Canada's carbon tax working? Experts, advocacy groups weigh in' <https://globalnews.ca/news/7646946/canada-carbon-tax-experts/> accessed 18 February 2021

Global Witness, 'A Rough Trade: The Role of Companies and Governments in the Angolan Conflict' <http://www.globalwitness.org/sites/default/files/pdfs/A_Rough_Trade.pdf> accessed 1 December 1998

Global Witness, 'Conflict Diamonds: Possibilities for the Identification, Certification, and Control of Diamonds' <https://reliefweb.int/sites/reliefweb.int/files/resources/83488766797D3C3 6C125690D0035BF37-conflictdiamonds.htm > accessed 10 June 2000

Government of Canada, 'Additional information on the federal carbon pollution pricing benchmark' <https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/carbon-pollution-pricing-federal-benchmark-information.html> accessed 20 July 2021

Government of Canada, 'Carbon pollution pricing systems across Canada' <https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work.html> accessed 20 July 2021

Government of Canada, 'Greenhouse Gas Emissions' <https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/greenhouse-gas-emissions.html> accessed 1 May 2021

Government of Canada, 'Strategic Assessment of Climate Change Revised, October 2020' <https://www.canada.ca/en/services/environment/conservation/assessments/strategic-assessments/climate-change.html> accessed 27 April 2021

Grant JA, and Taylor I, 'Global Governance and Conflict Diamonds: The Kimberley Process and the Quest for Clean Gems' (2004) 93 The Round Table 385

Grant, JA, 'Consensus Dynamics and Global Governance Frameworks: Insights from the Kimberley Process on Conflict Diamonds?' (2013) 19 Canadian Foreign Policy Journal 323 <http://dx.doi.org/10/1080/11926422.2013.844909>

Haites, E, 'Carbon Taxes and Greenhouse Gas Emissions Trading Systems: What Have We Learned?' (2018) 18 Climate Policy 955

Hájek. M and other 'Analysis of Carbon Tax Efficiency in Energy Industries of Selected EU Countries' (2019) 134 Energy Policy 110955

Harrington AR, 'Faceting the Future: The Need for and Proposal of the Adoption of a Kimberley Process-Styled Legitimacy Certification System for the Global Gemstone Market' (2009) 18 Transnational Law and Contemporary Problems 353

Hrvatin V, 'A brief history of Canada's climate change agreements' <https://www. canadiangeographic.ca/article/brief-history-canadas-climate-change-agreements> accessed 30 May 2016

Hsu SL, and Elliot R, 'Regulating Greenhouse Gases in Canada: Constitutional and Policy Dimensions' (2009) McGill Law Journal 463

Interlaken Declaration on the Kimberley Process Certification Scheme for Rough Diamonds, 5 November 2002 <https://www.diamonds.net/Docs/MoralClarity/KP-InterlakenDeclaratio n-KPCS-1102.pdf>

Jones, B, 'Canada Proposes New Plan to invest $15 Billion in Climate Action, Raise Carbon Price to $170/Tonne' <https://www.jdsupra.com/legalnews/canada-proposes-new-plan-to-invest-15-88238/> 15 December 2020

Kaplan M, 'Carats and Sticks: Pursuing War and Peace through the Diamond Trade' (2003) 35 New York University Journal of International Law and Policy 559

Karon T, 'Why De Beers Wants You 'Blood Diamond'-Savvy: The gem giant, facing twin threats of dwindling market share and a boycott fueled by human rights concerns, takes a new tack' <http://content.time.com/time/magazine/article/0,9171,49841,00.html> 13 July 2000

Kimberley Process, '2013 KPCS Core Document Amended' <https://www.kimberleyprocess. com/en/kpcs-core-document-version-2016-0>

Koyame M, 'United Nations Resolutions and the Struggle to Curb the Illicit Trade in Conflict Diamonds in Sub-Saharan Africa' (2005) 1 African Journal of Legal Studies 80

Lesnikowski A and others, 'What does the Paris Agreement mean for adaptation?' (2017) 17 Climate Policy 825

Malamut, SA, 'A Band-Aid on a Machete Wound: The Failures of the Kimberley Process and Diamond-Caused Bloodshed in the Democratic Republic of the Congo' (2005-2006) 29 Suffolk Transnational Law Review 25

Maynard, "A Code of Conduct for Transnational Corporations" (1983) 4 The Company Lawyer 103

NASA Global Climate Change: Vital Signs of the Planet, "Facts" <https://climate.nasa.gov/effects/> accessed 2 May 2021

Nordhaus, WD, 'To Tax or Not to Tax: Alternative Approaches to Slowing Global Warming' (2007) 1 Review of Environmental Economics and Policy 26

Office of the Auditor General of Canada, '2009 Spring Report of the Commissioner of the Environment: Chapter 2 – Kyoto Protocol Implementation Act' <https://www.oag-bvg.gc.ca/internet/english/parl_cesd_200905_02_e_32512.html> accessed 29 April 2021

Osler, 'Canadian Government Carbon and Greenhouse Gas Legislation' <https://www.osler.com/PDFs/Resource/en-ca/Canadian-Government-Carbon-and-Greenhouse-Gas-Legi.pdf> accessed 3 March 2021

Pandey CL, 'Managing Climate Change: Shifting Roles for NGOs in the Climate Change Negotiations' (2015) 24 Environmental Values 799

Price TM, 'The Kimberley Process: Conflict Diamonds, WTO Obligations, and the Universality Debate' (2003) 12 Minnesota Journal of Global Trade 1

Prunier, G, Africa's *World War: Congo, the Rwandan Genocide, and the Making of a Continental Catastrophe* (Oxford: Oxford University Press, 2009)

Prunier, G, *From Genocide to Continental War: The 'Congolese' Conflict and the Crisis of Contemporary Africa* (London: Hurst & Company, 2009)

Rajamani, L, 'Ambition and Differentiation in the 2015 Paris Agreement: Interpretative Possibilities and Underlying Politics' (2016) 65 International and Comparative Law Quarterly 493

Reyntjens, F, *The Great African War: Congo and Regional Geopolitics, 1996-2006* (Cambridge: Cambridge University Press, 2009)

Rodgers EJA, 'Conflict Diamonds: Certification and Corruption: A Case Study of Sierra Leone' (2006) 13 Journal of Financial Crime 267

Salo, RS, 'When the Logs Roll Over: The Need for an International Convention Criminalizing Involvement in the Global Illegal Timber Trade' (2003-2004) 16 Georgetown International Environmental Law Rev 127

Savaresi A, 'The Paris Agreement: a new beginning?' (2016) 34 Journal of Energy and Natural Resources Law 16

Schram F., 'The Legal Aspects of the Kimberley Process' (International Peace Information Service, Antwerp, Belgium, January 2007) <http://archive.niza.nl/docs/2007011710363 48313.pdf>

Silverstein K, 'Institutional Investors Have More Power Than Governments to Shape Climate Future' <https://www.forbes.com/sites/kensilverstein/2019/07/26/institutional-investors-have-more-power-than-governments-to-shape-climate-future/?sh=54e9676530d1> 26 July 2019

Smillie I, 'The Kimberley Process Certification Scheme for Rough Diamonds' (Partnership Africa Canada, Comparative Case Study 1, October 2005) <https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/4470.pdf>

Snoddon T, and Tombe T, 'Analysis of Carbon Tax Treatment in Canada's Equalization Program' 2019 45 Canadian Public Policy 377

Spash CL, 'This Changes Nothing: The Paris Agreement to Ignore Reality' (2016) 13 Globalization 928

Stober E, 'Youth rally around the world in global climate strike' <https://globalnews.ca/news/5962704/global-climate-strike-overview/> accessed 27 September 2019

Streck C, Keenlyside P, and von Unger M, 'The Paris Agreement: A New Beginning' (2016) 13 Journal of European Environmental and Planning Law 3

Tamm IJ, 'Diamonds in Peace and War: Serving the Conflict-Diamond Connection' (WPF Report 30: World Peace Foundation, WPF Program on Intrastate Conflict, CARR Centre for Human Rights Policy, Cambridge, Massachusetts, 2002) <https://www.belfercenter. org/publication/diamonds-peace-and-war-severing-conflict-diamond-connection>

Thoms, Laura, 'A Comparative Analysis of International Regimes on Ozone and Climate Change with Implications for Regime Design' (2003) 41:3 Colum J Transnat'l L 795

Turner T, *The Congo Wars: Conflict, Myth & Reality* (London: Zed Books, 2007)

United Nations, 'The Paris Agreement' <https://www.un.org/en/climatechange/paris-agreement> accessed 8 June 2021

United Nations, 'What is Kyoto Protocol?' <https://unfccc.int/kyoto_protocol> accessed 8 June 2021

Uzsoki D, *Sustainable Investing: Shaping the Future of Finance* (Winnipeg, MB: International Institute for Sustainable Development, February 2020) <https://www.iisd.org/system/files/publications/sustainable-investing.pdf>

Vaughan A, 'What does Canada's withdrawal from Kyoto protocol mean?' <https://www.theguardian.com/environment/2011/dec/13/canada-withdrawal-kyoto-protocol> accessed 13 December 2011

Wallis AC, 'Data Mining: Lessons from the Kimberley Process for the United Nations' Development of Human Rights Norms for Transnational Corporations' (2005) 4 Northwestern Journal of International Human Rights 388

Weisbach, DA, 'Carbon Taxation in the EU: Expanding the EU Carbon Price' (2012) 24 Journal of Environmental Law 183

Woody KE, 'Diamonds on the Souls of her Shoes: The Kimberly Process and the Morality Exception to WTO Restrictions' (2006-2007) 22 Connecticut Journal of International Law 335

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JAGUAR AND PUMA IN BRAZILIAN SEMI-ARID REGION – SCAPEGOATS FOR WEAK GOVERNANCE?

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ABSTRACT

Exclusively Brazilian, the Caatinga is a seasonally dry tropical forest where the endangered jaguar (*Panthera onca*) and puma (*Puma concolor*) co-occur with the lowest regional Human Development Indexes. New land uses challenge traditional livelihoods and add threats to species historically poached in retaliation for livestock depredation. Chronicle biodiversity conflicts became acute after a reported increase in depredation allegedly because of those changes and conflicts among stakeholders. Using the framework of human dimensions of wildlife management, pioneer research on the vulnerabilities of rural communities to jaguar-and-puma conflicts was led in 'Boqueirão da Onça', within and surrounding that polygon of protected areas. The aim was to identify, describe, understand, and predict human behaviour, and link the outcomes with the IUCN natural resources governance concept. Negative attitudes arose from 72% and 35.2% participants towards the proximity of jaguar and proximity of puma, respectively. When asked about institutions working for wildlife protection, and institutions working for people facing problems caused by carnivores, 64.9% and 88.8%, respectively, were unaware of them. Regarding beliefs about co-occurrence with jaguars or pumas, 80.9% and 82.9%, respectively, mentioned more problems than benefits, with 74.5% believing in the increase of both species' populations due to the creation of protected areas. This scenario may ease jaguar and puma to become scapegoats for human-wildlife and broader social conflicts, unless values such as justice and transparency are pursued.

Keywords: Biodiversity conflicts; Human dimensions; Protected areas; Governance

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1. INTRODUCTION

Many communities that become neighbours or inhabitants of protected areas consciously or unconsciously live the paradox between the benefit of co-occurrence with wildlife in highly relevant ecological regions, natural resources managed and surveyed to persist in the long term with quality, and the burden of all that may jeopardize their livelihood, traditional habits, behaviours and practices, restrain free-ranging of their livestock and compromise the utility of some elements in the name of existence value and natural heritage from non-dwellers perspective. That paradox often triggers human-wildlife conflicts (HWC) and conflicts among stakeholders related to species, wildlife management and/or new uses of the territory and land. Whether aware or not, these traditional communities deal with governance issues, with more or less preparedness of management agencies, decision makers, leaderships, corporations and facilitators. A "bad" governance undermines people, biodiversity and its interactions. A "good" governance is not a package but an infinite process that must take into account the norms, values, principles and approaches that will be applied in a dialogical decision-making, fairly including diverse right holders and stakeholders together.[1] "Good" or "bad" may change with time, with the background where it takes place and with the individual or social group involved and its interactions and established relations with resources and nature. Because it is rooted in human dimensions linked to ethics and morals, anthropology and culture, beliefs and norms, power and accountability, governance is complex, sensitive and time-demanding beyond a project life cycle. Thus, not all conservation projects, programs or policies approach the subject as a goal to pursue or as a keystone in its foundation.

Neighbouring or residing within a protected area that is also home to large, roaming animals, demanding extensive areas to thrive and carrying the label of charismatic, adds complexity to an already challenging process. Charisma arises not from the eventual damage or its conservation status but from the controversial opinions and feelings they provoke.[2] Therefore, conservation of species, habitats and human quality of life will not be effective or endure unless human dimensions of biodiversity conflicts are not assessed.

Carnivores like jaguar (*Panthera onca*) and puma (*Puma concolor*) in the neotropics belong to that category of charismatic species. These species are essential to maintain ecological equilibrium as they guarantee the diversity and resilience of ecosystems where they inhabit. As predators, they control

[1] Grazia Borrini and others, 'Governance of Protected Areas: From Understanding to Action.' [2013] Best practice protected area guidelines series <https://www.iucn.org/content/governance-protected-areas-understanding-action-0> accessed 28 July 2021.

[2] Silvio Marchini, 'Who's in Conflict with Whom? Human Dimensions of the Conflicts Involving Wildlife', *Applied Ecology and Human Dimensions in Biological Conservation* (Springer Berlin Heidelberg 2014) <http://link.springer.com/10.1007/978-3-642-54751-5_13> accessed 28 July 2021.

herbivore populations through a top-down effect on trophic cascades[3] and because they usually leave part of their hunted preys, they supply food to maintain the diversity of scavenger and decomposer communities.[4] Small and mainly large carnivores are hunted and killed worldwide, especially in retaliation to conflicts with rural communities.[5] Moreover, large animals such as big cats have always been subject to human fascination and fear, generating an enormous and strong record of conflicts.[6] The dynamics of HWC is challenging and solving conflicts between different social groups can be even more complicated than solving problems between humans and predators.[7] Studies show that the contact with rural populations has resulted in purposeful elimination of large felids that are killed due to depredation of herds or as a trophy hunt.[8] This problem is one of the most urgent felids conservation issues and in order to maintain big cats worldwide, the human dimensions and interactions with these animals need to be better understood.[9]

The north-eastern region of Brazil, comprehending the Caatinga domains where this research took place, has the lowest number of studies on HWC with big cats. In a review by Lozano and others[10] about publications concerning human-carnivore relationships between 2000 and 2016, the

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3 William J Ripple and Robert L Beschta, 'Linking a Cougar Decline, Trophic Cascade, and Catastrophic Regime Shift in Zion National Park' (2006) 133 Biological Conservation 397 <https://linkinghub.elsevier.com/retrieve/pii/s0006320706002989> accessed 28 July 2021.

4 L Mark Elbroch and Heiko U Wittmer, 'Table Scraps: Inter-Trophic Food Provisioning by Pumas' (2012) 8 Biology letters 776 <https://doi.org/10.1098/rsbl.2012.0423> accessed 28 July 2021.

5 Philip J Nyhus, 'Human–Wildlife Conflict and Coexistence' (2016) 41 Annual Review of Environment and Resources 143 <https://www.annualreviews.org/doi/10.1146/annurev-environ-110615-085634> accessed 28 July; K Ullas Karanth and Ravi Chellam, 'Carnivore Conservation at the Crossroads' (2009) 43 Oryx 1 <https://doi.org/10.1017/s003060530843106x> accessed 28 July.

6 Thora M Herrmann and others, 'Values, Animal Symbolism, and Human-Animal Relationships Associated to Two Threatened Felids in Mapuche and Chilean Local Narratives' (2013) 9 Journal of Ethnobiology and Ethnomedicine 41 <http://ethnobiomed.biomedcentral.com/articles/10.1186/1746-4269-9-41> accessed 28 July 2021.

7 Alexandra Zimmermann and others, 'Contemporary Views of Human-Carnivore Conflicts on Wild Rangelands' in Johan T du Toit, Richard Kock and James C Deutsch (eds), *Wild Rangelands* (John Wiley & Sons, Ltd 2010) <https://onlinelibrary.wiley.com/doi/abs/10.1002/9781444317091.ch6> accessed 28 July 2021.

8 Kathleen Krafte Holland, Lincoln R Larson and Robert B Powell, 'Characterizing Conflict between Humans and Big Cats Panthera Spp: A Systematic Review of Research Trends and Management Opportunities' (2018) 13 PloS one e0203877 <https://doi.org/10.1371/journal.pone.0203877> accessed 28 July 2021; Marcelo Mazzolli, Mauricio E Graipel and Nigel Dunstone, 'Mountain Lion Depredation in Southern Brazil' (2002) 105 Biological Conservation 43 <https://www.sciencedirect.com/science/article/pii/S0006320701001781> accessed 28 July 2021; Francesca Belem Lopes Palmeira and Walter Barrella, 'Conflitos Causados Pela Predação de Rebanhos Domésticos Por Grandes Felinos Em Comunidades Quilombolas Na Mata Atlântica' (2007) 7 Biota Neotropica 119 <https://www.biotaneotropica.org.br/v7n1/pt/abstract?article+bn03707012007> accessed 28 July 2021.

9 Herrmann and others (n 6); Krafte Holland, Larson and Powell (n 8); Zimmermann and others (n 7).

10 Jorge Lozano and others, 'Human-Carnivore Relations: A Systematic Review' (2019) 237 Biological Conservation 480 <https://linkinghub.elsevier.com/retrieve/pii/S0006320718318330> accessed 4 August 2021.

Caatinga as a domain or as a semi-arid region was not even mentioned. Despite the high ecological relevance of Caatinga, the newest frontier to science in Brazil, and the regional conservation status of jaguar (critically endangered) and puma (endangered),[11] in the last decade the Caatinga has seen changes being implemented very fast in pristine areas. These landscapes with emerging socioeconomic interests are also regions where apex predators have their distribution range, and concomitantly used by traditional pastoralist groups growing small number of livestock (mainly goats and sheep) grazing in the wild, especially in the dry season, and displaying a very close to 'hunt-and-gather' behaviour combined with a small-scale farming, in the short rainy season. The population is formed by families in a situation of high socioeconomic vulnerability, that depend on natural resources for their livelihoods.

After sharp decrease in jaguar populations until 1970's for fur markets, nowadays its populations are threatened for persecution and poaching of its individuals as retaliation for depredation of livestock, with or without proved guilt, and even though depredation events are more frequent having puma as perpetrator.[12] Domestic animals such as dogs and pigs are also commonly seen attacking lambs and small livestock (Campos, 2019, pers. comm.).

New land uses through the establishment of wind and solar farms, mining (legal and illegal) and commercial crops have encroached and fragmented jaguar and puma habitats, which demand extensive areas to obtain resources necessary for their survival.[13] In addition, infrastructure associated with these developments, such as road networks where none existed before, have paved the way for outsiders to increase hunting pressure on the wild prey of these big cats.[14]

In this paper we addressed the issue that big cats become, in fact, scapegoats for problems that go beyond HWC, such as lack of "good" governance, as per the judgment of as many as possible stakeholders within the Brazilian Dry Forest. We did it by analysing how the relationships

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[11] Fernanda Cavalcanti de Azevedo and others, 'Avaliação Do Risco de Extinção Da Onça-Parda Puma Concolor (Linnaeus, 1771) No Brasil' [2013] Biodiversidade Brasileira 107 <https://www.icmbio.gov.br/portal/images/stories/biodiversidade/fauna-brasileira/avaliacao-do-risco/carnivoros/onça-parda_Puma_concolor.pdf> accessed 4 August 2021; A Desbiez, RC Paula and S Cavalcanti, 'Plano de Ação Nacional Para a Conservação Da Onça-Pintada' [2013] Instituto Chico Mendes de Conservação da Biodiversidade, ICMBio 1 <https://www.icmbio.gov.br/portal/images/stories/docs-pan/pan-onca-pintada/1-ciclo/pan-onca-pintada-livro.pdf> accessed 4 August 2021; Carlos Roberto Fonseca and others, *Caatinga* (José Maria Cardoso da Silva, Inara R Leal and Marcelo Tabarelli eds, Springer International Publishing 2017) <https://books.google.com.br/books?hl=pt-BR&lr=&id=029GDwAAQBAJ&oi=fnd&pg=PR5&dq=Silva,+J.M.C.,+Leal,+I.R.+and+Tabarelli,+M.+(ed.),+Caatinga.+The+largest+tropical+dry+forest+region+in+South+America,+Cham:+Springer+International+Publishing,+pp.+429-443.&ots> accessed 4 August 2021.

[12] Desbiez, Paula and Cavalcanti (n 11).

[13] L David Mech, 'A New Era for Carnivore Conservation' (1996) 24 Wildlife Society Bulletin (1973-2006) 397 <http://www.jstor.org/stable/3783319> accessed 4 August 2021.

[14] Douglas de Matos Dias and others, 'Human Activities Influence the Occupancy Probability of Mammalian Carnivores in the Brazilian Caatinga' (2019) 51 Biotropica 253 <https://onlinelibrary.wiley.com/doi/10.1111/btp.12628> accessed 4 August 2021.

between people, and relationships between people and institutions, impact on the conservation of jaguars and pumas in the Caatinga. We identified, described and tried to understand human dimensions of the individual but also attempted to investigate association between aspects that belong to an individual and are affected by aspects of the individual's interpersonal and institutional environment, not necessarily under his/her control. In this context, some research questions arose: is it the perception of economic and social vulnerability alone that leads a person to hunt for food or to chase and kill a jaguar (or puma) because they are convinced that it is a risk to personal safety or their way of life? Or the trigger is their perceived vulnerability to conflict due to experiences with or exposure to the species, or their lack of future prospects, or their lack of trust in institutions, as a consequence of their perception of historical negligence and poor transparency from public administration and other institutions? Or again, when they perceive those institutions that should safeguard people's interests acting against them, by excluding them from governance since its very beginning, is accountability projected towards big cats? And because they cannot control any of these external factors that leave them vulnerable, how does an experience of livestock loss (or simply delay in goat or sheep returning home) translate into threat to jaguar and puma? Our aim is that this pioneer approach may provide valuable insights to support the young protected areas managed by the central government.

2. METHODOLOGY

2.1 Study area

The study took place in a region called 'Boqueirão da Onça', a polygon of protected areas established by the Decrees 9336 ("Boqueirão da Onça" National Park, with 347,557 hectares) and 9337 ('Boqueirão da Onça' Environmental Protected Area, with 505,692 hectares, including 11,651 hectares of "Toca da Boa Vista" Wildlife Zone), both published on 5th April 2018.

"Boqueirão da Onça" is within the range of the Caatinga biome, a Seasonally Dry Tropical Forest and Woodlands (SDTFW),[15] the second most vulnerable Brazilian biome to climate change,[16] where populations of the largest wildcats of Americas, jaguar and puma, co-occur with the lowest human development indexes (HDI) of North-eastern Brazil. The climate is semi-arid, characterized by high mean temperatures (30^{o}C) and low mean annual precipitation (693 mm), and presents two well-defined seasons, rainy

[15] Luciano Paganucci de Queiroz and others, *Caatinga* (José Maria Cardoso da Silva, Inara R Leal and Marcelo Tabarelli eds, Springer International Publishing 2017) <http://link.springer.com/10.1007/978-3-319-68339-3> accessed 4 August 2021.

[16] Alistair WR Seddon and others, 'Sensitivity of Global Terrestrial Ecosystems to Climate Variability' (2016) 531 Nature 229 <https://doi.org/10.1038/nature16986> accessed 4 August 2021.

and dry, usually with long periods of drought.[17] Caatinga comes from the indigenous word "ka'a-tinga" which means "white bush", the typical feature of vegetation cover during the dry season.

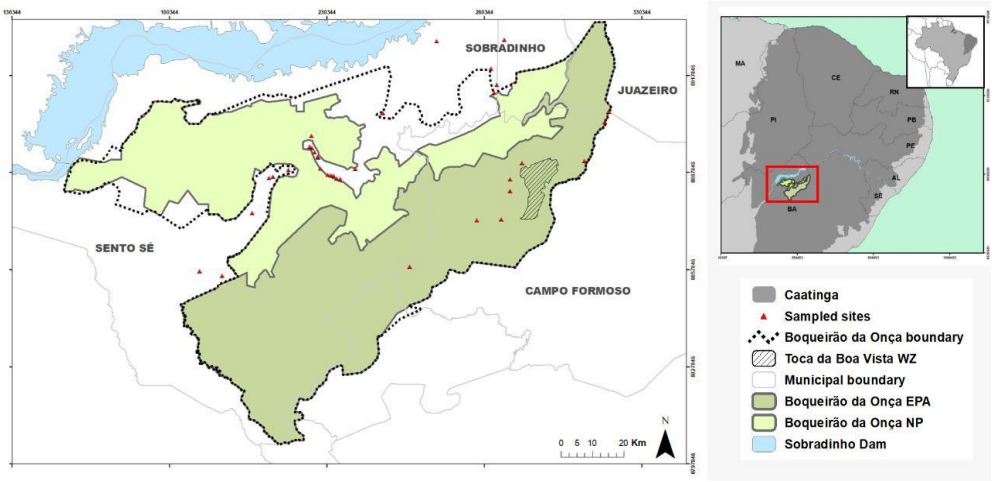

Figure 1: Location of the study area formed by protected areas: Boqueirão da Onça National Park (NP), Boqueirão da Onça Environmental Protection Area (EPA) and Toca da Boa Vista Wildlife Zone (WZ), north-eastern Brazil

The region has a heterogeneous landscape, with the presence of saws, plateaus, *lajedos* (rocky slab), *veredas*, as well as dry or wet *boqueirões* (deep forested valleys). It is also rich in grottoes and small temporary rivers, which accumulate water even during the driest periods of the year. These are key locations for all the biota and human populations in the region, since they ensure the water supply, with their springs, and forest cover that prevents the loss of water from the soil through evaporation.[18]

The presence of government authorities as wildlife management agencies is new, irregular and mainly for control of hunting and fire. Channels and means available for communication between rural inhabitants and authorities either are absent or suffer from noise, consequence of a history of oppression and negligence, that caused a rupture among residents of rural and natural areas and urban residents, the first perceiving an absence of fundamental rights and a vulnerability to conflict with wildlife, to be managed by themselves. The arrival of corporations to exploit natural resources met human populations' expectations that have never been achieved through public administration. Internet connection recently arrived, triggered by the operational demands of wind and solar plants, even with the absence of water supply, sanitation, electricity supply, health care

[17] Guilherme de Oliveira and others, 'Conserving the Brazilian Semiarid (Caatinga) Biome under Climate Change' (2012) 21 Biodiversity and Conservation 2913 <http://link.springer.com/10.1007/s10531-012-0346-7> acessed 4 August 2021.

[18] Cláudia Bueno de Campos and others, 'Medium and Large Sized Mammals of the Boqueirão Da Onça, North of Bahia State, Brazil' (2019) 59 Papéis Avulsos de Zoologia e20195912 <https://www.revistas.usp.br/paz/article/view/150168> acessed 4 August 2021.

provision, public transportation or schools for all levels, in the majority of rural communities.

2.2 Stakeholders

Within a framework of conflicts related to environmental issues, the stakeholder is the one (individual or group) with legitimacy, political influence, enough power to interfere and hinder a decision to be implemented, and moral claims.[19] In this research, stakeholders correspond to the adults residing within and surrounding protected areas in "Boqueirão da Onça", livestock owners or not, farmers or not, men and women, being the single criteria the co-occurrence with jaguar and puma, and the volunteer cooperation with the research.

2.3 Data collection

In this explanatory, deductive and observational research,[20] a semi-structured questionnaire was submitted to the Ethics Committee in Research involving Human Beings (CEP), and once approved[21], applied face-to-face to 168 people from 27 sites (farms and communities) between October 2018 and April 2019. The protocol had 108 questions, arranged in four sections: 1. exposure to the conflict (comprising variables such as exposure to the species, experience with the species, attitudes, beliefs, perceptions and habits), 2. sensitivity to the conflict (comprising variables such as perceived control behaviour, attitudes, relation with wildlife management agencies, socioeconomic vulnerability, knowledge, perceptions and social norms), 3. conflict adaptation capacity (comprising variables such as knowledge, attitudes, beliefs, husbandry practices, and socioeconomic vulnerability), and, 4. personal questions (comprising variables such as land tenure, and income source).

2.4 Sampling strategy

This is a cross-sectional, probabilistic study with sampling having used clusters. Three data collection campaigns were established; thus, the polygon was divided into three sections. Each section corresponds to one cluster.[22] The total number of sites (including farms, communities) identified within the polygon were 93, and for convenience, one third of sites were to be visited to apply the questionnaire. The proportion of sites to data collection

[19] Lawrence Susskind and Jeffrey Cruikshank, *Breaking the Impasse: Consensual Approaches to Resolving Public Disputes.* (Basic Books 1987) <https://scienceimpact.mit.edu/breaking-impasse-consensual-approaches-resolving-public-disputes> accessed 4 August 2021.

[20] Helen Newing, *Conducting Research in Conservation: Social Science Methods and Practice* (Routledge, Taylor and Francis Group 2011).

[21] CAAE n. 68314417.1.0000.5395, 28th June 2017 (CEP); SISBIO n. 67264-1 (Art. 28, IN 03/2014).

[22] Floyd J Fowler Jr., *Survey Research Methods, 2nd Ed.* (Sage Publications, Inc 1993) <https://books.google.com.br/books?hl=pt-BR&lr=&id=WM11AwAAQBAJ&oi=fnd&pg=PP1&dq=Fowler,+F.J.+(1993).+Survey+research+methods.+Newbury+Park,+CA:+SAGE+Publications+Inc.&ots=6PtHChcQbU&sig=zcMJQ_tH970UBM8ylBiJiUvrcqI#v=onepage&q&f=false> accessed 4 August 2021.

followed the proportion of territory of each municipality belonging to "Boqueirão da Onça" (five municipalities in total). Random sites were chosen within each municipality (16 in Sento Sé, seven in Campo Formoso, four in Umburanas, three in Sobradinho and one in Juazeiro). In farms and small communities one adult per house was interviewed; in medium to large communities, one adult in alternate houses in every street was interviewed.

Eventually, due to threats to field researchers, following a series of unexpected events such as the intensification of activities in one illegal mining site and enforcement related to illegal hunting mainly in one cluster, not 31 but 27 sites were surveyed. Expected sample size (n=381) follows Dillman[23] and Salant and Dillman[24] guidelines and relates to the whole population residing in the study area.

2.5 Data analysis

Data was analysed with a statistical trust level of 95%. Some descriptive statistical analysis was done to explore the data and to create graphics (average, standard deviation, percentage, and frequency). Other statistical tests were used to assess categorical variables: Qui-Square ($\chi 2$), Fisher exact test, Wilcoxon, Linear Regression and Logistic Regression**.**

3. RESULTS

Of the 168 people interviewed, 134 agreed to respond to the complete protocol. To assess people's perception of vulnerability to conflict due to experience with or exposure to the species, questions on attitudes were applied. On the question about attitude towards proximity of jaguar or puma, 72% declared to be against the proximity of jaguar and 35.2% against the proximity of puma, within a context where the frequency of contact (sightseeing or report from other people) with puma is significantly higher than the frequency of contact (sightseeing or report from other people) with jaguar (Wilcoxon test, p-value=0.0077).

People articulated a low perception of risk to their personal safety (20% and 15.3% of respondents, for jaguar and puma, respectively), and a higher perception of risk to their livelihoods (58.2 and 61.5% of respondents, for jaguar and puma, respectively). Table 1 shows that there was no relation between individual aspects that could enhance people's socioeconomic vulnerability and influence attitudes towards the species, protected areas or wildlife management, such as schooling level, knowledge on ecology and behaviour of jaguar and puma or habits related to traditional husbandry practices.

[23] D Dillman, *Mail and Internet Surveys: The Tailored Design Method (2nd Ed.): 2007 Update with New Internet, Visual, and Mixed-Mode Guide*, vol 1 (2nd edn, John Wiley and Sons 2007).

[24] Priscilla Salant and Don, A Dillman, *How to Conduct Your Own Survey* (1994) <https://www.wiley.com/en-cg/How+to+Conduct+Your+Own+Survey-p-9780471012733> accessed 4 August 2021.

Table 1: Factors related to attitudes towards jaguars and pumas, protected areas, and wildlife management

Aspects influencing human dimensions	*Attitudes*	*p-value*	*Jaguar*	*Puma*
Schooling level	Towards the increase on hunting control	0.313		
	Towards the increase on tourism due to jaguar and puma appeal	0.098		
	Towards the opportunity of more locals improve their knowledge about their carnivores' neighbours	0.283		
	Towards the installation of ponds for wildlife drink water especially in the dry season	0.207		
	Towards new enterprises supported by the management agency as alternative to traditional livelihoods	0.194		
Knowledge on ecology and behaviour of jaguar and puma	Towards exclusion of people from protected areas known as carnivores' territories	0.814		
Habits related to traditional husbandry practices	Towards proximity of carnivores			
Natural areas for livestock grazing during day			0.003	0.005
Structures available (or not) as night-shelters for livestock			0.036	0.151
Areas excluded (or not) from livestock access to prevent predation			0.016	0.041
Gathering livestock (or not) every end of the day	Towards exclusion of people from protected areas known as carnivores' territories	1.000		
Potential transition for husbandry including improved corrals as pen-proof attack of carnivores		0.628		

Table 2: Factors that determine attitudes towards jaguars and pumas in Caatinga

Factor	*Effect*	*Reference*	*OR*	*p-value*
Number of events of loss			1.39	0.084
Social norm to poach jaguar (or puma)	More than 1		6.7	<0.001
Landowner	Yes	No	0.28	0.043
Income	Livestock or farming	Pension or social benefit	0.5	0.183
	Occasional employment		0.13	0.019
	Fixed employment		0.07	0.04

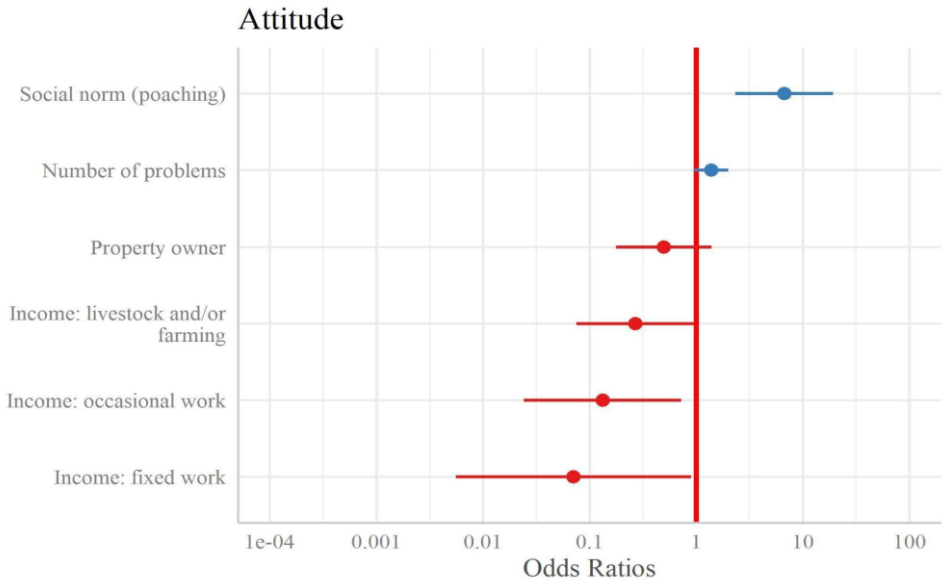

Figure 2: Odds ratios of factors influencing attitudes towards jaguars and pumas in Caatinga

To assess human dimensions of HWC beyond socioeconomic aspects, questions on beliefs towards co-occurrence with jaguar and puma and perception of abundance of these species' populations were applied. Regarding beliefs about co-occurrence with jaguars or pumas, 80.9% and 82.9% of respondents, respectively, mentioned to expect more problems than benefits, with 74.5% believing in the increase of both species' populations due to the establishment of protected areas. Table 2 and Figure 2 shows from the highest to the lowest, the factors that determined attitudes towards jaguars and pumas in the Brazilian dry forest.

The model predicts attitudes through 'number of problems' (events of loss, from themselves or neighbours), 'social norms', 'land tenure' and 'source of income'. The probability of negative attitude towards carnivores increased 39% with each event of predation by a jaguar (or puma), being his

own livestock or reported by an acquaintance. Someone who would get approval for a behaviour of persecution and poaching of jaguar (or puma) from at least one of his acquaintances, had 6.7 more chances to display a negative attitude towards the species. If the person did not own the land, the chance of displaying a negative attitude towards the species increased 3.6 times (=1/0.28). People depending on a retirement pension had more negative attitudes towards the species.

To assess relationships between people and institutions, questions on knowledge about institutions working for jaguar or puma conservation, and about institutions working for people facing problems caused by jaguar or puma, were applied. Of respondents, 64.9% were unaware of the presence in the region of institutions working for jaguar or puma conservation, and 88.8% of institutions working for people facing problems caused by jaguar or puma. Among those who answered, 80.2% also declared not feeling capable of controlling the threat that jaguar or puma may become.

4. DISCUSSION

Results tend to draw our attention from the business-as-usual aspects that make someone vulnerable to conflict with carnivores, even though the features of Caatinga socio-ecological system provide us a set of variables improbable to find out of semi-arid environments, to aspects that depend more on interpersonal and person-institutions relationships, such as those that may undermine or promote "good" governance.

Jaguar population in "Boqueirão da Onça" is estimated at approximately 30 individuals, and puma population, approximately 120 individuals (Campos, 2019, pers. comm.). Puma's behaviour contrasts with jaguar behaviour also in aspects related to proximity to human settlements and their properties, puma being more confident in approaching than jaguar. From all the South American felids, puma is the most plastic,[25] which translates into more sights of pumas and more encounters of pumas and livestock, many ending with depredation. Kansky and Knight[26] distinguish two human dimensions of human-wildlife conflicts: species characteristics and experience species. Species characteristics relate to species attributes, including the perceptions on presence versus absence, abundance or frequency of sightseeing or reports from a third party. Experience species concern the kind of experience that one may have in the encounter (personal or his property) with one individual of that species or the impact of one's perception of abundance of that species. Less residents saw or heard reports about jaguar compared to puma. Consistently, respondents highlighted the elusiveness of jaguar compared to puma. People having trouble with jaguar

[25] ICMBio, 'Sumário Executivo Do Plano De Ação Nacional Para a Conservação Da Onça-Parda' 1 <http://www.icmbio.gov.br/portal/images/stories/docs-plano-de-acao/pan-onca-parda/sumario-onçaparda-icmbio-web.pdf> accessed 4 August 2021.

[26] Ruth Kansky and Andrew T Knight, 'Key Factors Driving Attitudes towards Large Mammals in Conflict with Humans' (2014) 179 Biological Conservation 93 <https://linkinghub.elsevier.com/retrieve/pii/S0006320714003255> accessed 4 August 2021.

(all predation events) is less than half of those having problems with puma (predominantly predation events). However, the intolerance is higher towards jaguar proximity. That may be a consequence of the impact of a predation event caused by a jaguar (or the attack to humans, which is present in few accounts from the elders only and related to rare events that took place decades ago). Thus, it is not the frequency, it is not the number of lost animals - it is the strength printed in one's mind,[27] comparably higher with jaguar, a large carnivore, rarely seen, with the size of a man, with impressive strength and beauty.

Once we match this with the belief of majority of respondents that not only lack knowledge about the potential benefits of co-occurrence with charismatic species (mammal-watching tourism, scientific tourism, among others) but also belief that management agency prioritize jaguar and puma abundance and welfare in detriment to villagers safety and life quality, a weakness of governance seem exposed in the shape of unequal knowledge about the purpose of the protected area and imbalance in decision-making about wildlife management that may compromise human well-being and traditional livelihoods. The main economic activity in Caatinga and the second source of families' income (the first is retirement pension) is extensive livestock growing (mainly goats and sheep). Herds have few animals, and they represent the savings for a family emergency. The traditional husbandry with animals grazing in the wild expose livestock to many threats, including depredation. Few families have appropriate corrals as night-shelters, despite 96% of the respondents stating their perception of the importance of an improved pen to prevent attacks. Their socioeconomic vulnerability arises masked as perception of risk for co-occurrence with the predator, compromising their livelihoods. Social benefits availed in the last two decades by the central government, especially 'bolsa-família' and 'retirement pension for small farmers', allowed an upgrade in human development in the rural communities residing within or surrounding natural areas.[28] Many became less dependent on natural resources, in theory less dependent on bushmeat to have animal protein in the family menu. A lower hunting pressure on jaguar and puma natural prey would help to mitigate the HWC, but in Caatinga that is to be assessed still. Governmental assistance prevents more frequent hunting, thus, supposedly, less exposure to free-ranging wild animals. Combined with the acknowledgement of elusiveness of jaguar (puma too, however less), paves the path for a low perception of risk to personal safety. A "good" governance of natural resources benefits people and biodiversity and must provide a framework that mitigate biodiversity conflicts and eliminate or reduce diffuse aspects that ease broader social conflicts.[29]

[27] Daniel Kahneman, 'Pensar Depressa e Devagar' [2012] Maia: Círculo de Leitores.
[28] Carlos Fioravanti, 'A Corrosão Da Caatinga' (2018) 266 Revista Pesquisa Fapesp 60. <https://revistapesquisa.fapesp.br/a-corrosao-da-caatinga/> accessed 4 Ausgust 2021.
[29] Borrini and others (n 1).

Biodiversity conflicts goes beyond the impact that wildlife causes on humans and the impact that humans cause on wildlife and includes the conflicts between humans either for dissonant opinions about species and/or wildlife management.[30] The opposing values gridlock of nature protectionists and social conservationists[31] has fostered biodiversity conflicts when the issues are protected areas and wildlife management. Economic rationalism suggests that communities within and surrounding protected areas respond firstly to economic triggers, either for the enforcement (negative) or for leisure opportunities, economic aid to conservation and educational programs related to benefits provided by the protected area (positive)[32] However, previous studies have shown that transparency in the relations established between institutions and between institutions and communities is key for interests' conciliation,[33] and trust between stakeholders determines acceptability (or intolerance) towards protected areas.[34] In Brazil many protected areas were established during the military regime and the wildlife management agency performing managerial programs, projects and plans within and surrounding protected areas (ICMBIO) is fourteen years old only and demands time and effort withdrawing from its progenitor (IBAMA) whose role is control and law enforcement. The lack of engagement and the novelty of call for participation, plus the reflexivity on truth, justice and equity guiding governmental decision-making processes, from its initial phases, are becoming subject and routine recently.[35] Caatinga is in the early stages of engagement, once responses indicate the fact that the majority of those who cooperated with the research did not know about the existence of institutions responsible for wildlife or wildlife management.

Sensitivity increases when Caatinga' history and economic policies and its priorities are acknowledged. Due to frequent and severe droughts that caused mass migrations and thousands of deaths, at the end of the 19th century, the first ideas of the São Francisco River transposition emerged. For

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30 Beatrice Frank, 'Human–Wildlife Conflicts and the Need to Include Tolerance and Coexistence: An Introductory Comment' (2016) 29 Society & Natural Resources 738 <https://doi.org/10.1080/08941920.2015.1103388> accessed 4 Ausgust 2021.

31 Adrian Phillips, 'Turning Ideas on Their Head: The New Paradigm For Protected Areas' (2003) 20 The George Wright Forum 8 <http://www.jstor.org/stable/43599027> accessed 4 August 2021.

32 Katrina Eadie Brandon and Michael Wells, 'Planning for People and Parks: Design Dilemmas' (1992) 20 World Development 557 <https://www.sciencedirect.com/science/article/pii/0305750X9290044V> accessed 4 August 2021.; John F Oates, *Myth and Reality in the Rain Forest: How Conservation Strategies Are Failing in West Africa* (University of California Press 1999) <https://www.nhbs.com/myth-and-reality-in-the-rain-forest-book> accessed 4 August 2021.

33 Thaddeus R Miller, Ben A Minteer and Leon-C Malan, 'The New Conservation Debate: The View from Practical Ethics' (2011) 144 Biological Conservation 948 <https://linkinghub.elsevier.com/retrieve/pii/S0006320710001448> accessed 4 August 2021.

34 Marc J Stern, 'The Power of Trust: Toward a Theory of Local Opposition to Neighboring Protected Areas' (2008) 21 Society & Natural Resources 859 <http://www.tandfonline.com/doi/abs/10.1080/08941920801973763> accessed 4 August 2021.

35 Charles R Warren and others, '"Green On Green": Public Perceptions of Wind Power in Scotland and Ireland' (2005) 48 Journal of Environmental Planning and Management 853 <http://www.tandfonline.com/doi/abs/10.1080/09640560500294376> accessed 4 August 2021.

the engineering project to be implemented (meaning the creation of the sixth largest artificial lake in the world, "Sobradinho" Dam) many villages were resettled from river margins to places where people had no history, connection or skills to dwell. It was not their choice, it happened as a top-down decision and process with irreversible impacts on livelihoods. Memory of that is still alive with many elders and their descendants. With democracy and human development reaching regions for decades inaccessible and excluded from the right to be inquired and partaking in decision-making on projects, programs and policies that impact their lives - governance -, now they demand to articulate their needs and claims when it comes to the uses of their territories.

For the public administration and management agencies it is necessary to distinguish among public support to a goal (such as conservation) from public support to public policies to achieve that goal (such as the establishment of protected areas coexisting with traditional livelihoods and quality of life for human populations). It also requires from the management agencies to break the patterns that caused power imbalances and nowadays are present in residents' speeches displaying their perception of vulnerability and unheard voices.

The high potential for energy generation from renewable sources in Caatinga matches the increasing demand for energy and the need to change the energetic matrix in Brazil. Wind and solar farms are the newest uses of territory, with economic incentives and support from central and state governments. The weak governance takes form as perception of vulnerability and perpetuation of inequality, injustice and negligence. Informal comments such as, "I have to change traditional husbandry practices to prevent the livestock from grazing in the wild and thus diminish the chance of encountering the predator, even not having economic conditions to do it?"; "I have to change hunting behaviour and habits of growing, to set livestock aside from natural areas and protect wildlife. But wind farms are being installed in pristine areas…"; "Will I be forced to move from here, like my ancestors were by government decision?"; were articulated by respondents, displaying feelings and uncertainties on what the future may be.

This complex and rapidly changing scenario, driven by external forces, fosters intolerance towards the major representatives of conservation initiatives, the charismatic jaguar and puma, ironically subject to the same external forces and out of its control. It helps to understand why none of the assessed human dimensions in the scale of individual (schooling level, knowledge on ecology and behaviour of jaguar and puma, or habits related to traditional husbandry practices) explained attitudes towards jaguar, puma, protected areas or wildlife management. It helps to understand the incoherence between the perception of the importance of an improved pen as night-shelter for livestock to prevent attacks from most respondents (96%) and the almost one third of respondents unwilling to change traditional

practices (30.8%). Kahneman[36] would label this as gambler's fallacy, that happens when people evaluate the probability of a certain event by assessing how similar it is to events that they have experienced before. People acknowledging their socioeconomic constraints, public administration negligence and power imbalances when corporations and government interests seem to prevail over their livelihoods, do not rely on any external support to enable conditions for behaviour change - furthermore feel incapable to control the threat that carnivore may become and retaliate (intentionally or unintentionally) with inaction.

Historically Caatinga was the backyard for sugarcane producers in the coastal North-eastern capitals, like Olinda, Recife, and Salvador, that depended on livestock as draught-animals and as a second source of income. Cowboys ("*vaqueiros*") lead those animals to native pastures, leave them in the higher altitudes for five to six months, and then lead them back.[37] This transhumance in the "*sertões*", no one's land, built a nomadic-gathering-hunter man, until the golden age of sugar in north-eastern reached its end. The nomadic-state-of-mind and the utilitarian value of the natural resources seems to prevail, despite the increase in human settlements in number and size. "*Vaqueiros*" became small farmers (in the rainy season) and goat and sheep growers, species very well adapted to the environment. Jaguars and pumas continue to be a problem, like they were in the past, a threat to livelihood, and losing an animal is an economic loss and a reminder of that dispute of territory, resources and strength, between man and carnivore. Belief that co-occurrence with jaguar and puma brings more problems than benefits persist as an inherited memory. A "good" governance would help to improve present and future co-occurrence with carnivores.

Furthermore, Caatinga biome is the less protected Brazilian biome, only 7.4% of the region is within protected areas,[38] less than 2.0% belongs to the full protection category (Brazilian System of Conservation Units that allows only research, environmental education and tourism regulated by the Management Plan of the area) and even though inadequate to safeguard its biodiversity.[39] It is recent the accessibility to villages and communities in this extensive region, and energy and communication is still unstable in many of them. To engage residents in a participatory consultation and decision-making process that will lead to the creation of conservation units within the timeframe required is a challenge for both parties: government and civil society, for financial, logistic, language and preparedness constraints to deal fairly and with transparency with social and cultural diversity. Thus many expressed their concern with the potential increase of jaguar and puma populations abundance because they were not clarified neither about the

[36] Kahneman (n 27).

[37] Manuel Correia de Andrade, *A Terra e o Homem No Nordeste* (Editora Universitaria UFPE 1998).

[38] José Maria Cardoso da Silva and others, *Caatinga* (José Maria Cardoso da Silva, Inara R Leal and Marcelo Tabarelli eds, Springer International Publishing 2017) <http://link.springer.com/10.1007/978-3-319-68339-3> accessed 4 August 2021.

[39] ibid.

meaning of conservation units (categories, purposes and shared responsibilities); nor about the fact that large roaming animals, demanding vast areas to survival, do not acknowledge borders; nor about tangible and intangible benefits that neighbouring protected areas with occurrence of charismatic species may bring to people.[40] A strategy of stakeholders' engagement since the planning for novel uses of territory and land could pave the path for a better and stronger governance, mitigating biodiversity conflicts and conciliating nature and social conservationists aims. Brookfield[41] said that decision-makers base their decisions in an environment according to their perceptions about it, which may or not match with what the environment actually is. However, actions based on their decisions are played in a real environment. Mature institutions performing public policies in a diverse socio-ecological system like the Brazilian semi-arid need to reinforce this mindset.

Finally, among the human dimensions influencing attitudes towards jaguar, puma, protected areas or wildlife management, social norms came first. Understanding the history of Caatinga occupation and land-use patterns, the consequence of large-scale projects, government policies and residents' adjustments and development are steps to improve governance of natural resources. Nevertheless, despite Caatinga human populations highly depend on natural resources, the exercise of power and responsibilities over it and the participation in decision-making, are not determined just by ecological or economic aspects influencing individuals.[42] Norms and institutions underlie perceptions and attitudes. This research highlighted the socioeconomic vulnerability of Caatinga inhabitants, their perception of risk and their economic loss as consequence of co-occurrence with jaguar and puma, but also unveiled how conservation initiatives and management agencies from public administration failed to address human dimensions of human-wildlife conflicts beyond economic factors. An effective and fair governance hopefully will acknowledge the strong cultural features of Brazilian semi-arid dwellers, the "*sertanejo*" traditional livelihood, whose history and relationship with nature are as old as the rocky paintings in Caatinga domains. And will allow jaguars and pumas to thrive.

5. CONCLUSIONS

Framing the assessed human dimensions of HWC in Brazilian Dry Forest within the IUCN concept and aims of natural resources governance allowed to show that jaguar and puma are consciously or unconsciously retaliated by livestock growers and dwellers and neighbours of protected areas, as a response to their perception of vulnerabilities, lack of control of

[40] Kansky and Knight (n 26).

[41] Harold C Brookfield, 'On the Environment as Perceived' (1969) 1 Progress in Geography: International Reviews of Current Research 51.

[42] Timothy D Baird, Paul W Leslie and J Terrence McCabe, 'The Effect of Wildlife Conservation on Local Perceptions of Risk and Behavioral Response' (2009) 37 Human Ecology <http://www.jstor.org/stable/40343988> accessed 4 August 2021.

potential threats to their livelihood, lack of transparency from management agencies, power imbalances among stakeholder, and exclusion from decision-making processes. Jaguar and puma become scapegoats for unattained expectations on fundamental rights and wide participation in all stages of processes that impact traditional communities and natural resources that they depend upon.

Similarities with individual aspects of residents and neighbours of protected areas also home to charismatic species in other biomes were found. Nevertheless, this research went further by assessing external aspects that influence one's attitudes, perceptions and beliefs towards jaguar, pumas, wildlife management and protected areas, such as interpersonal relations and people-institutions relationships. Elements from historic occupancy of the semi-arid and socioeconomic dynamics related to priorities in territory and land uses and perceived inequalities were brought to the arena of impacts on jaguar and puma conservation. Results may provide valuable insights for managers of this complex socio-ecological system, a management ideally shared by public administration and citizens.

It is now known that residents of Brazilian Dry Forest co-occurring with jaguar and puma do not tolerate proximity with individuals from these species, with higher intolerance towards jaguars. The perception of risk to their livelihoods as a result of co-occurrence with jaguar and puma was higher than the perception of risk to personal safety.

It is not their schooling level, or knowledge on ecology and behaviour of jaguar and puma, or habits related to traditional husbandry practices that influence attitudes towards jaguar, puma, protected areas or wildlife management. Were social norms, predation events causing livestock loss, land tenure and income that emerged as the human dimensions influencing attitudes towards jaguar, puma, protected areas or wildlife management. Peoples' unawareness about the existence of institutions working for jaguar and puma conservation or for people facing problems caused by jaguar or puma is high, which combined with their perception of lack of control of the threat that jaguar or puma may become, increased their perception of self-vulnerability to conflict with these carnivores.

The belief that co-occurrence with jaguar and puma brings more problems than benefits prevailed, and most residents articulated their certainty that the establishment of protected areas would favour the increasing of jaguar and puma populations. If certain aspects may change by one's decision and power, others depend on projects, programs and policies being discussed, built, availed, implemented, monitored and adjusted through the dialogical, fair and inclusive process of democracy.

REFERENCES

Andrade M C, *A Terra e o Homem No Nordeste* (1998) Editora Universitaria UFPE

Azevedo F C, and others, 'Avaliação Do Risco de Extinção Da Onça-Parda Puma Concolor (Linnaeus, 1771) No Brasil' [2013] Biodiversidade Brasileira 107 <https://www.icmbio.gov.br/portal/images/stories/biodiversidade/fauna-brasileira/avaliacao-do-risco/carnivoros/onça-parda_Puma_concolor.pdf> accessed 4 August 2021

Baird T D, Leslie P W, and McCabe J T, 'The Effect of Wildlife Conservation on Local Perceptions of Risk and Behavioral Response' (2009) 37 Human Ecology <http://www.jstor.org/stable/40343988> accessed 4 August 2021

Borrini G, and others, 'Governance of Protected Areas: From Understanding to Action.' (2013) Best practice protected area guidelines series <https://www.iucn.org/content/governance-protected-areas-understanding-action-0> accessed 28 July 2021

Brandon K E, and Wells M, 'Planning for People and Parks: Design Dilemmas' (1992) 20 World Development 557 <https://www.sciencedirect.com/science/article/pii/0305750X9290044V> accessed 4 August 2021

Brookfield H C, 'On the Environment as Perceived' (1969) 1 Progress in Geography: International Reviews of Current Research 51

Campos C B, and others, 'Medium and Large Sized Mammals of the Boqueirão Da Onça, North of Bahia State, Brazil' (2019) 59 Papéis Avulsos de Zoologia e20195912 <https://www.revistas.usp.br/paz/article/view/150168> acessed 4 August 2021

da Silva J M C, and others, *Caatinga* (José Maria Cardoso da Silva, Inara R Leal and Marcelo Tabarelli eds, Springer International Publishing 2017) <http://link.springer.com/10.1007/978-3-319-68339-3> accessed 4 August 2021

Desbiez A, Paula R C, and Cavalcanti S, 'Plano de Ação Nacional Para a Conservação Da Onça-Pintada' (2013) Instituto Chico Mendes de Conservação da Biodiversidade, ICMBio 1 <https://www.icmbio.gov.br/portal/images/stories/docs-pan/pan-onca-pintada/1-ciclo/pan-onca-pintada-livro.pdf> accessed 4 August 2021

de Queiroz L P, and others, *Caatinga* (José Maria Cardoso da Silva, Inara R Leal and Marcelo Tabarelli eds, Springer International Publishing 2017) <http://link.springer.com/10.1007/978-3-319-68339-3> accessed 4 August 2021

Dias, D M and others, 'Human Activities Influence the Occupancy Probability of Mammalian Carnivores in the Brazilian Caatinga' (2019) 51 Biotropica 253 <https://onlinelibrary.wiley.com/doi/10.1111/btp.12628> accessed 4 August 2021

Dillman D A, *Mail and Internet Surveys: The Tailored Design Method (2nd Ed.): 2007 Update with New Internet, Visual, and Mixed-Mode Guide*, vol 1 (2nd edn, John Wiley and Sons 2007)

Elbroch L M, and Wittmer H U, 'Table Scraps: Inter-Trophic Food Provisioning by Pumas' (2012) 8 Biology letters 776 <https://doi.org/10.1098/rsbl.2012.0423> accessed 28 July 2021

Fonseca C R, and others, *Caatinga* (José Maria Cardoso da Silva, Inara R Leal and Marcelo Tabarelli eds, Springer International Publishing 2017) <https://books.google.com.br/books?hl=pt-BR&lr=&id=029GDwAAQBAJ&oi=fnd&pg=PR5&dq=Silva,+J.M.C.,+Leal,+I.R.+and+Tabarelli,+M.+(ed.),+Caatinga.+The+largest+tropical+dry+forest+region+in+South+America,+Cham:+Springer+International+Publishing,+pp.+429-443.&ots> accessed 4 August 2021

Fowler Jr. F J, *Survey Research Methods, 2nd Ed.* (Sage Publications, Inc 1993) <https://books.google.com.br/books?hl=pt-BR&lr=&id=WM11AwAAQBAJ&oi=fnd&pg=PP1&dq=Fowler,+F.J.+(1993).+Survey+research+methods.+Newbury+Park,+CA:+SAGE+Publications+Inc.&ots=6PtHChcQbU&sig=zcMJQ_tH970UBM8ylBiJiUvrcqI#v=onepage&q&f=false> accessed 4 August 2021

Frank B, 'Human–Wildlife Conflicts and the Need to Include Tolerance and Coexistence: An Introductory Comment' (2016) 29 Society & Natural Resources 738 <https://doi.org/10.1080/08941920.2015.1103388> accessed 4 August 2021

Fioravanti C, 'A Corrosão Da Caatinga' (2018) 266 Revista Pesquisa Fapesp 60. <https://revistapesquisa.fapesp.br/a-corrosao-da-caatinga/> accessed 4 August 2021

Herrmann T M, and others, 'Values, Animal Symbolism, and Human-Animal Relationships Associated to Two Threatened Felids in Mapuche and Chilean Local Narratives' (2013) 9 Journal of Ethnobiology and Ethnomedicine 41 <http://ethnobiomed.biomedcentral.com/articles/10.1186/1746-4269-9-41> accessed 28 July 2021

Holland K K, Larson L R, and Robert B Powell, 'Characterizing Conflict between Humans and Big Cats Panthera Spp: A Systematic Review of Research Trends and Management Opportunities' (2018) 13 PloS one e0203877 <https://doi.org/10.1371/journal.pone.0203877> accessed 28 July 2021

ICMBio, 'Sumário Executivo Do Plano De Ação Nacional Para a Conservação Da Onça-Parda' (2013) 1 <http://www.icmbio.gov.br/portal/images/stories/docs-plano-de-acao/pan-onca-parda/sumario-onçaparda-icmbio-web.pdf> accessed 4 August 2021

Kahneman D, 'Pensar Depressa e Devagar' (2012) Maia: Círculo de Leitores

Kansky R, and Knight A T, 'Key Factors Driving Attitudes towards Large Mammals in Conflict with Humans' (2014) 179 Biological Conservation 93

<https://linkinghub.elsevier.com/retrieve/pii/S0006320714003255> accessed 4 August 2021

Karanth K U, and Chellam R, 'Carnivore Conservation at the Crossroads' (2009) 43 Oryx 1 <https://doi.org/10.1017/s003060530843106x> accessed 28 July 2021

Lozano J, and others, 'Human-Carnivore Relations: A Systematic Review' (2019) 237 Biological Conservation 480 <https://linkinghub.elsevier.com/retrieve/pii/S0006320718318330> accessed 4 August 2021

Marchini S, 'Who's in Conflict with Whom? Human Dimensions of the Conflicts Involving Wildlife', *Applied Ecology and Human Dimensions in Biological Conservation* (Springer Berlin Heidelberg 2014) <http://link.springer.com/10.1007/978-3-642-54751-5_13> accessed 28 July 2021.

Mazzolli M, Graipel M E, and Dunstone N, 'Mountain Lion Depredation in Southern Brazil' (2002) 105 Biological Conservation 43 <https://www.sciencedirect.com/science/article/pii/S0006320701001781> accessed 28 July 2021

Mech L D, 'A New Era for Carnivore Conservation' (1996) 24 Wildlife Society Bulletin (1973-2006) 397 <http://www.jstor.org/stable/3783319> accessed 4 August 2021

Miller T R, Minteer B A, and Malan L-C, 'The New Conservation Debate: The View from Practical Ethics' (2011) 144 Biological Conservation 948 <https://linkinghub.elsevier.com/retrieve/pii/S0006320710001448> accessed 4 August 2021

Newing H, *Conducting Research in Conservation: Social Science Methods and Practice* (Routledge, Taylor and Francis Group 2011)

Nyhus P J, 'Human–Wildlife Conflict and Coexistence' (2016) 41 Annual Review of Environment and Resources 143 <https://www.annualreviews.org/doi/10.1146/annurev-environ-110615-085634> accessed 28 July 2021

Oates J F, *Myth and Reality in the Rain Forest: How Conservation Strategies Are Failing in West Africa* (University of California Press 1999) <https://www.nhbs.com/myth-and-reality-in-the-rain-forest-book> accessed 4 August 2021

Oliveira G, and others, 'Conserving the Brazilian Semiarid (Caatinga) Biome under Climate Change' (2012) 21 Biodiversity and Conservation 2913 <http://link.springer.com/10.1007/s10531-012-0346-7> acessed 4 August 2021

Palmeira F B L, and Barrella W, 'Conflitos Causados Pela Predação de Rebanhos Domésticos Por Grandes Felinos Em Comunidades Quilombolas Na Mata Atlântica' (2007) 7 Biota Neotropica 119 <https://www.biotaneotropica.org.br/v7n1/pt/abstract?article+bn03707012007> accessed 28 July 2021

Phillips A, 'Turning Ideas on Their Head: The New Paradigm For Protected Areas' (2003) 20 The George Wright Forum 8 <http://www.jstor.org/stable/43599027> accessed 4 August 2021

Ripple W J, and Beschta R L, 'Linking a Cougar Decline, Trophic Cascade, and Catastrophic Regime Shift in Zion National Park' (2006) 133 Biological Conservation 397 <https://linkinghub.elsevier.com/retrieve/pii/s0006320706002989> accessed 28 July 2021

Salant P, and Dillman D A, *How to Conduct Your Own Survey* (1994) <https://www.wiley.com/en-cg/How+to+Conduct+Your+Own+Survey-p-9780471012733> accessed 4 August 2021

Seddon W R, and others, 'Sensitivity of Global Terrestrial Ecosystems to Climate Variability' (2016) 531 Nature 229 <https://doi.org/10.1038/nature16986> accessed 4 August 2021

Stern M J, 'The Power of Trust: Toward a Theory of Local Opposition to Neighboring Protected Areas' (2008) 21 Society & Natural Resources 859 <http://www.tandfonline.com/doi/abs/10.1080/08941920801973763> accessed 4 August 2021

Susskind L, and Cruikshank J, *Breaking the Impasse: Consensual Approaches to Resolving Public Disputes.* (Basic Books 1987) <https://scienceimpact.mit.edu/breaking-impasse-consensual-approaches-resolving-public-disputes> accessed 4 August 2021

Warren C R, and others, '"Green On Green": Public Perceptions of Wind Power in Scotland and Ireland' (2005) 48 Journal of Environmental Planning and Management 853 <http://www.tandfonline.com/doi/abs/10.1080/09640560500294376> accessed 4 August 2021

Zimmermann A, and others, 'Contemporary Views of Human-Carnivore Conflicts on Wild Rangelands' in Johan T du Toit, Richard Kock and James C Deutsch (eds), *Wild Rangelands* (John Wiley & Sons, Ltd 2010) <https://onlinelibrary.wiley.com/doi/abs/10.1002/9781444317091.ch6> accessed 28 July 2021

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Contribution	Author 1	Author 2	Author 3	Author 4
Conceived and designed the research or analysis	Yes	No	No	Yes
Collected the data	Yes	No	No	No
Contributed to data analysis & interpretation	Yes	No	No	Yes
Wrote the article/paper	Yes	Yes	Yes	Yes
Critical revision of the article/paper	Yes	Yes	Yes	Yes
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Research involving human bodies (Helsinki Declaration)
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