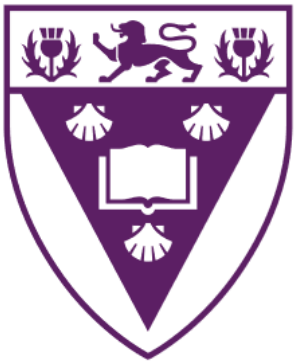

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Where leaders learn

Sustainable Consumption Behaviour Across an Income Gradient in Hout Bay, South Africa

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IN FULL FULFILMENT OF MASTER OF SCIENCE IN ENVIRONMENTAL SCIENCE

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Plagiarism Declaration

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Abstract

Household consumption patterns significantly impact environmental sustainability, yet there is limited understanding of how consumption behaviour varies across socio-economic contexts, especially in emerging economies and highly unequal societies such as South Africa. Using data from 302 households across an income gradient, this study examines sustainable consumption behaviour (SCB) and the drivers of SCB in Hout Bay, Western Cape province, South Africa, focusing on food, mobility, and housing practices using the SCB cube model. Using a self-reported approach behaviour linked to the consumption areas of food, mobility and housing on was assessed against a list of common household actions relating to food, mobility and housing (energy consumption). a 5-point Likert response scale (1 = Never, 2 = Rarely, 3 = sometimes, 4 = often, 5 = always). To understand the drivers of SCB, the measures of attitude, environmental concern, environmental knowledge, environmental risk perception, social norms and governance were examined. Findings reveal moderate engagement in SCB by households, with marked differences between income groups. Concerning food consumption, high-income households showed high SCB, often using fresh ingredients and leftovers, while low-income groups engaged less in organic food and energy-saving cooking. Regarding mobility, high-income households were largely unsustainable, preferring to use private vehicles over public transport, while low-income households relied on walking and public transport, possibly due to limited options. Concerning housing, practices such as air-drying clothes were common across income levels, though renewable energy use was low, with higher-income households having more access. The study findings suggest income shapes variance in behaviour, particularly in mobility and food, and underscores the need for targeted interventions to promote sustainable behaviour across all income groups. Regarding the drivers of SCB, the findings show that attitudes, environmental concern, knowledge and social norms were the key drivers of sustainable behaviour in the consumption areas of food and housing, environmental risk perception had a limited effect, and there was a negative association with governance. Income had a positive relationship with attitudes, environmental concern, and environmental knowledge. These findings show the importance of tailored policies to enhance sustainable consumption practices. This study contributes to a comprehensive understanding of SCB drivers, providing a foundation for strategies that support sustainable lifestyle transitions.

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Chapter 1: Introduction

1.1. General Introduction

Humans' unsustainable consumption patterns of resources such as water, energy, food, and land (Bleischwitz *et al.*, 2018) contribute to environmental degradation and unsustainable development (Fischer, Böhme and Geiger, 2017; Ghali-Zinoubi, 2022). Humans consume more resources in nine months than the planet can produce in a year (UNEP, 2017; Geiger, Fischer and Schrader, 2018), with substantial environmental impacts, including altering the earth's biological, physical, and chemical conditions (Wolff, 2020). Massive consequences exist for the planet and human well-being with ever-rising human-led greenhouse gas (GHG) emissions, resource depletion, pollution intensification, biodiversity loss and land degradation.

The Intergovernmental Panel on Climate Change (IPCC) has emphasised that 'key tipping points' in the climate system will occur within .1.5–2°C of global warming (IPPC *et al.*, 2018). However, the IPCC maintains that limiting temperature increases to 1.5°C is achievable through "rapid and far-reaching transitions in systems of consumption and production, as well as protection and restoration of ecosystems" (Welch and Southerton, 2019:31). The IPCC highlights changes in consumption patterns relating to low energy, land, and GHG-intensive consumption goods, which are important factors of 1.5°C scenarios (IPPC *et al.*, 2018). Shifting towards sustainable lifestyles has been included in climate policy strategies to achieve net-zero carbon societies. The IPCC's Special Report on 1.5°C warming notes that changes in behaviour and lifestyles are crucial to supporting mitigation and adaptation efforts (IPPC *et al.*, 2018; Koide *et al.*, 2019).

Household consumption represents between 60% to 70% of GHG emissions and 80% of freshwater use (Berman, Shwom and Cuite, 2019; Daignault *et al.*, 2023). According to Ivanova *et al*. (2016), consumption accounts for up to 80% of all resource use in affluent societies, and the rate and intensity of urban household consumption over the last few years have been increasing (Shittu, 2020). Household consumption forms an essential part of the production and consumption chain, as consumers make the final choice of the goods and services consumed, and their lifestyles determine how they influence sustainability practices (Mont and Heiskanen, 2015; Caeiro and Ramos, 2016). According to Whitmarsh, Poortinga

and Capstick (2021), behaviour change is central to addressing the climate crisis. Most of the interventions needed to reach emission reduction targets require at least some type of behavioural change and adapting to the growing impacts of climate change also requires changes in lifestyles. Households can substantially reduce their emissions through altering or adopting consumption patterns (Gwozdz, Reisch and Thøgersen, 2020). Therefore, behaviour should be part of the solution, not simply part of the problem, when it comes to promoting sustainable practices (Caeiro and Ramos, 2016). Thus, understanding sustainable consumption (SC) from a household perspective is important in attaining Sustainable Development Goals (SDGs) and has important policy implications for interventions needed to promote sustainable behaviours (Shittu, 2020). Changing how we live and our consumption patterns are foundational to addressing sustainability challenges (Akenji *et al.*, 2021).

Research on SCB is primarily from the Global North, with limited literature in the Global South, particularly from Sub-Saharan African (SSA) contexts. Developing countries are facing rapid rates of urbanisation and development (Juju *et al*., 2020; Elhoushy and Lanzini, 2021) (Juju *et al*., 2020; Elhoushy and Lanzini, 2021), with Sub-Saharan Africa (SSA) experiencing some of the highest rates of urbanisation around the world (Shackleton *et al.*, 2018). This rapid urbanisation has led to the "unprecedented expansion of urban slums and informal settlements, which now host most of the poor urban dwellers across the continent" (Juju *et al.*, 2020:4). Many fast-growing urban areas, particularly slums, have a lack of access to basic services (waste management, education and sanitation) and experience increased pollution levels (Juju *et al.*, 2020).

According to Purushottam (2019), South Africa is one of the nine African economies consuming resources beyond its capacity, indicating that research into sustainable consumption behaviour (SCB) from an SSA context is needed. Literature on SCB in South Africa is very heterogeneous, which makes it difficult to make critical conclusions about SCB in the country. The literature varies from drivers (Dlamini, Tesfamichael and Mokhele, 2021; Ifegbesan *et al.*, 2022; Rampedi and Ifegbesan, 2022) to individual SCB (Scott and Vigar-Ellis, 2014; Taljaard, Sonnenberg and Jacobs, 2018; Shimul, Cheah and Khan, 2022) and buying behaviours (Anvar and Venter, 2014; Struwig and Adendorff, 2018; Taljaard, Sonnenberg and Jacobs, 2018; Mkhize and Ellis, 2020; Shimul, Cheah and Khan, 2022).

Some of the most recent studies use secondary rather than primary data. For example, Ifegbesan *et al*. (2022), Rampedi and Ifegbesan (2022) and Kirsten and Eligius Biyase (2023) used the International Social Survey Programme Environment III 2010 dataset to conduct their studies, suggesting that more studies based on primary data are needed to build empirical standing and more accurately understand and promote SCB within a South African context. Measures on SCB are dominantly derived from literature from developed nations and may not completely fit the South African context (Kirsten and Eligius Biyase, 2023). It is reasonable to assume that different SCB patterns will follow different social, economic and cultural contexts (Elhoushy and Lanzini, 2021). Yet, there is comparatively limited research on the sustainable consumption behaviour of South Africans, particularly in the context of socio-economic disparities. This study can contribute to the extant literature on sustainable consumption in a Southern African context and advance understanding of how behaviour is shaped by the income status of households.

1.2. Study Rationale

Understanding how consumers engage with and understand sustainability behaviour is a crucial factor in contributing to achieving sustainability goals within South Africa. There is increasing recognition that individual behaviour is vital in understanding and addressing environmental and social challenges (Mont and Heiskanen, 2015; Caeiro and Ramos, 2016; Whitmarsh, Poortinga and Capstick, 2021). With its unique socio-economic landscape characterised by high consumption and the highest levels of income inequality in the world (Kirsten and Eligius Biyase, 2023), South Africa faces complex sustainability issues ranging from energy consumption, food waste, waste management and resource depletion (UNSA, 2019; UNSA and South African Government, 2020). Understanding the consumption patterns and drivers of sustainable consumption behaviour is critical for developing targeted strategies that are in line with the sustainable development goals (SDGs) (Chapter 2). Understanding how South African households participate in and perceive sustainable practices can inform policies and initiatives promoting sustainable consumption and lifestyles. To facilitate the transition to low-carbon lifestyles it is important to understand the underlying lifestyle factors of high-carbon consumption patterns and the implications of the changes required in people's current lifestyles. Such factors not only include socio-demographic characteristics but also attitudes, beliefs, and consumer choices (Koide *et al.*, 2019).

1.3. Research Questions

The main aim of this study is to explore the consumption patterns and drivers of residential sustainable consumption practices across an income gradient in Hout Bay, Western cape province, South Africa. The key research questions are:

- What is the reported sustainable consumption behaviour among households of different income statuses?
- What are the drivers of sustainable consumption behaviour among households.
- What are the implications of the findings on our understanding of and efforts to promote SCB as a sustainability pathway?

1.4. Description of Study Area

The study was conducted in Hout Bay (34°2′S,18°21′E), a suburb located in the City of Cape Town in the Western Cape province of South Africa (Figure 1.1.). The population of Hout Bay is approximately 3440, comprising Black Africans (46.2%), Whites (30.8%), and Coloureds (19%) (Statistics South Africa, 2012). The main language spoken in Hout Bay is English (36.6%), followed by isiXhosa (28.3%) and Afrikaans (19.6%). Cape Town exists in a unique environmental context that makes the city particularly vulnerable to challenges related to climate change. The city encircles the iconic Table Mountain National Park, which is surrounded by 307 km of coastline and is home to the Cape Floristic Region, a global biodiversity hotspot featuring several seasonal wetlands, freshwater bodies, and watercourses. The region's climate is classified as ‘warm-summer Mediterranean’, characterised by cold, wet winters and warm, dry summers (City of Cape Town, 2021).

Cape Town has been experiencing an increase in the consumption of materials, goods, and services, which is causing a strain on the available resources and infrastructure. Increased consumption is attributed to the city’s growing population and increasing levels of affluence (Institute for Global Environmental Strategies, 2021). Based on an assessment of consumption data across housing, food, mobility, goods, services and leisure, it is calculated that the average lifestyle carbon footprint in Cape Town is currently 9.2t-CO2e/capita/year, well above the global average of 4.3t-CO2e/capita/year. According to the Institute for Global Environmental Strategies (2021), the domains, in order of highest climate impact in Cape Town, are food

(45%), housing (22%), mobility (12%), goods (12%), services (5%) and leisure (4%). As a city in a developing country, Cape Town faces numerous socio-economic challenges, including high levels of unemployment, poverty, and informality, as well as health challenges from both communicable and non-communicable diseases, all of which contribute to high climate vulnerability (City of Cape Town, 2021).

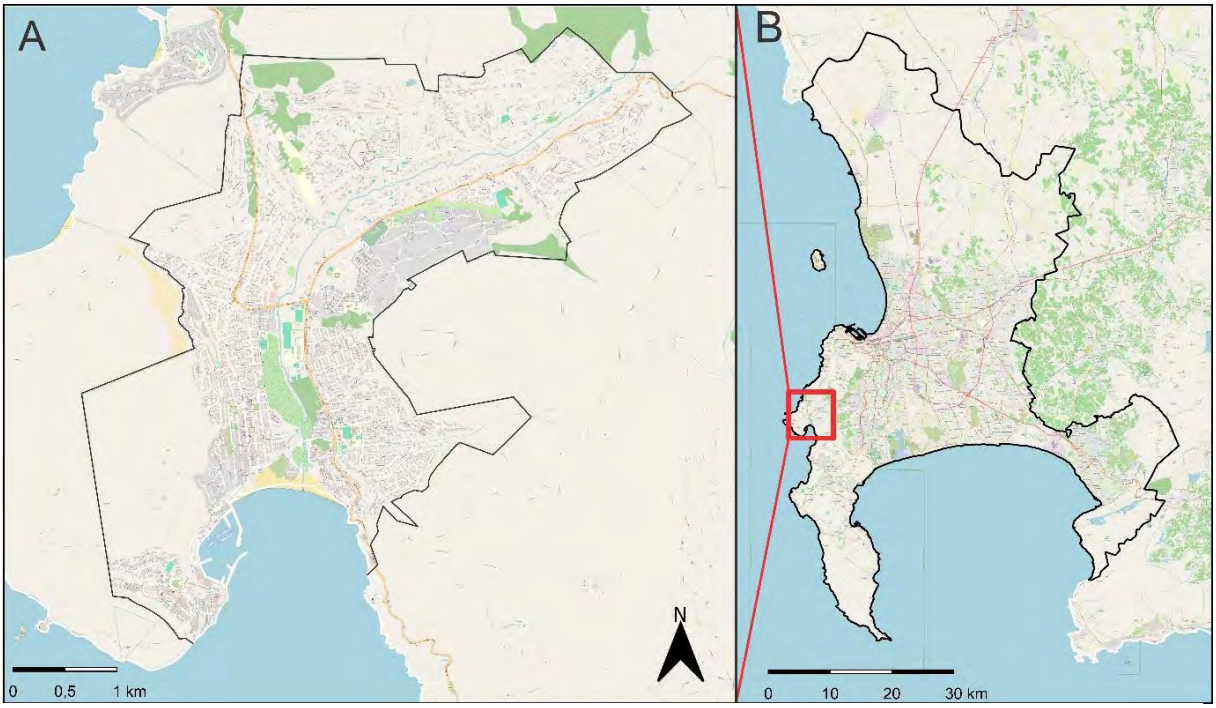

Figure 1.1: Location of Hout Bay, a suburb in the city of Cape Town, Western Cape Province, South Africa

Cape Town remains one of the most unequal and racially segregated cities in the world (Scheba, Turok and Visagie, 2021). The city's social composition and spatial distribution reflect the enduring influence of colonial and apartheid history, which systematically favoured white households and disadvantaged black households (Institute for Global Environmental Strategies, 2021; Turok, Visagie and Scheba, 2021). Although these policies were abolished in 1994, inequality persists (Turok, Visagie and Scheba, 2021). Historically segregated spatial planning further reinforces social divides by limiting opportunities available to residents of different neighbourhoods. For example, while most formal neighbourhoods are well-serviced, many low-income neighbourhoods lack resources, basic infrastructure, and lifestyle amenities, increasing their vulnerability (Institute for Global Environmental Strategies, 2021). In South

Africa, the majority of consumption of goods and services is concentrated in the upper-middle class (Institute for Global Environmental Strategies, 2021; Turok, Visagie and Scheba, 2023).

The suburb of Hout Bay has been referred to as a 'microcosm of post-Apartheid South Africa' (Karreth, 2022) due to the patterns of segregation that are still persistent three decades after the transition to democratic rule. During Apartheid, it was an area reserved for White residents (Sikota, 2015), and spatial inequality is still evident. Extremely uneven residential patterns reflect profound socio-economic inequalities (Scheba, Turok and Visagie, 2021). Hout Bay was originally a fishing village, with Black Africans coming to Hout Bay hoping to find work at the harbour. The suburb comprises large estates, small farms, large houses and hotels owned by a small number of rich and mainly White, English-speaking people, which are situated in the valley (Karreth, 2022). The populous, mixed-income township or semi-formal settlement of Hangberg principally hosts the 'Coloured' and Afrikaans-speaking community which was the designated Coloured community during Apartheid. According to Conradie, Hanse, and Oosthuizen (2019), overcrowding led to the construction of backyard shacks and buildings over the firebreaks above the settlement, and formal municipal services are available to some degree. The populous, impoverished township or informal settlement of Imizamo Yethu, situated on the eastern side of the Hout Bay valley, principally hosts Black African people houses characterised by modest shacks that are packed closely together with little outside space, water provision via communal taps, and electricity connections are often illegal (Conradie, Hansen and Oosthuizen, 2019; Karreth, 2022; Johnston, Darkey and Ibsen, 2023). Hout Bay's evolution as a residential suburb has been largely developer-driven. Private real estate has led to the emergence of security estates, constituting about 35% of all formal residential structures in the Valley (Worth, 2020). The economic disparities in Hout Bay are reflective of typical patterns of many cities in South Africa and provide an opportunity to explore how income differences shape SCB.

1.5. Layout of Thesis

The rest of the thesis is organised as follows: Chapter 2 provides a critical literature review, including the key debates and issues on sustainable consumption. Chapter 3 examines reported sustainable consumption behaviour across an income gradient. Chapter 4 explores the drivers

of sustainable consumption behaviour. Chapter 5 concludes the study, provides implications of the findings and recommendations, and suggests areas for future research.

Chapter 2: Literature Review

2.1. Introduction

The global sustainability challenges humanity is currently facing, such as food insecurity, poverty, increasing inequality, limited access to basic needs like water, energy and sanitation, climate change, biodiversity loss and ecosystem services degradation are linked to human beings' consumption and production patterns, which have grown rapidly over the last two decades (Fischer, Böhme and Geiger, 2017; Bengtsson *et al.*, 2018; Agyeman Boafo and Billo Juju, 2019). The global economy has grown unprecedentedly, and humanity uses unprecedented amounts of finite, non-renewable resources, has transformed a large part of the available ecosystems into cultivated land, and uses nature as a sink for waste and emissions at a worrying scale (Tukker, 2015). The way people live and the goods and services ingrained in routine practices, particularly housing, mobility, and food – can have significant environmental consequences. However, despite increasing awareness about issues surrounding unsustainable consumption, they have seldom been the focus of change. Instead, to ensure 'well-being' of the economy and businesses and to keep people content, consumption has been allowed to grow virtually unrestricted (Hansen and Nielsen, 2023).

Population growth, coupled with rapid industrialisation and urbanisation, has led to a huge increase in consumption worldwide, resulting in many environmental issues (Ghali-Zinoubi, 2022), such as resource depletion, pollution intensification, biodiversity loss and land degradation. Cities are responsible for up to 80% of carbon emissions globally, due to being the main concentration of production and consumption activities (Shittu, 2020). Climate change is leading to elevated temperatures with floods and avalanches, storms, hurricanes, droughts, fires, the Arctic ice and glaciers melting, sea levels rising, species' extinction, invasive species spreading out, and new diseases becoming recurring occurrences (Shittu, 2020; Glavič, 2021). These climatic hazards compromise rural and urban livelihoods and activities (Juju *et al.*, 2020). Challenging the issues facing urban centres, such as waste management or environmental degradation, could drive the SDGs' success. However, "to improve urban governance and reform industrial production it is important not to lose sight of the impact of household consumption in achieving the SDGs, particularly Goal 12, which deals with responsible consumption and production" (Shittu, 2020:2).

An important theme concerning consumption is that of inequality in consumption patterns. People in developed countries can consume up to 10 times more resources than those in developing countries (UNSA, 2019). The global one per cent of high-income earners is connected to double the amount of consumption-related emissions than the bottom 50% of the population (Caggiano *et al.*, 2023). Even within the same societies, there are large differences in the patterns of consumption in and across those societies (Peleg-Mizrachi and Tal, 2020), which is evident in South Africa. According to Kirsten and Eligius Biyase (2023), South Africa has one of the most unequal societies in the world, with the richest 20% in the country accounting for 61% of consumption and the poorest 20% accounting for only 4.5% of consumption (Gulati and Naudé, 2017).

Wealthy countries and individuals consume disproportionately more due to multiple factors such as social norms, media and advertising, which promote consumption relating to large homes, automobiles, and frequent air travel (Gupta *et al.*, 2024). The consumption patterns and lifestyles of the wealthy, which are over-represented in media, influence the social norms and aspirations of the growing middle classes, which sometimes then emulate upper-class consumption styles (Gupta *et al.*, 2024). High-income individuals may consume more, contributing to a higher carbon footprint (Peattie, 2010; Middlemiss, 2018; Castano Garcia *et al.*, 2021; Thøgersen, 2021; Huang *et al.*, 2024). With rising population growth globally, there is an ever-growing middle class, with the UNEP (2017) projecting an increase of between two and three billion new middle-class consumers by 2050. This consumer group is attracted to Western consumption patterns which are focused on individual accumulation as a key goal (Sharma and Jha, 2017; Ukenna and Nkamnebe, 2017). Given the increasing resource consumption patterns, Rees (2023) suggests that three additional Earth-like planets would be needed to supply the demands of the current population. The extra pressure these new urban consumers will place on the world's increasingly scarce resources will exacerbate existing tensions between the world's wealthiest 10%, whose lifestyles contribute half of global carbon emissions, and the growing numbers of urban poor, who are responsible for only 10% of carbon emissions (UNEP, 2016).

Understanding household consumption is a multifaceted task because consumption is shaped by a broad range of characteristics relating to "the production of goods, lifestyles, consumption practices, and how people move around" (Hansen, 2023:29). Among other sectors, households

affect the environment through everyday decisions, including the goods or services they buy, the use of the goods, decisions on where to live and work, their type of dwelling and many other ways (Bartolj, Murovec and Slabe-Erker, 2018). The environmental impacts of consumption are not intentional but are consequences of people aspiring to fulfil needs and desires and function in society (UNEP, 2016; Middlemiss, 2018).

2.2. Defining Sustainable Consumption

Sustainable consumption (SC) is defined as "the use of services and related natural resources and toxic materials as well as emissions of waste and pollutants over the life cycle of the service or product not to jeopardise the needs of future generations" (UNEP, 2017:6). The behaviours associated with SC are inherently complex, as they involve many sectors such as food, water and housing while also being embedded in other systems (social, cultural). At the same time, some behaviours are more difficult to carry out than others (recycling versus installing solar panels) (Geiger, Fischer and Schrader, 2018; Welch and Southerton, 2019). Sustainable consumption is an umbrella term that combines several crucial issues, such as "meeting needs, enhancing the quality of life, improving resource efficiency, increasing the use of renewable energy sources, minimising waste, taking a life cycle perspective and considering the equity dimension" (Dimitrova, Ilieva and Angelova, 2022:3). Thus, SC is about more than the purchase and consumption of 'environmentally-friendly' products, rather, it is linked to changing lifestyles and responsibility to future generations (Dimitrova, Ilieva and Angelova, 2022).

The unsustainability of consumption patterns and the environmental threats posed by consumerism mean that SCB should be encouraged. However, some believe that the term "sustainable consumption" (SC) is an oxymoron because 'to consume' is to use up or destroy a resource, whereas 'to sustain' is the opposite, meaning to maintain (Quoquab and Sukari, 2017). Even so, the idea of SC has been around for many years. Sustainable consumption is linked to sustainable development, which, according to the Brundtland Commission (1987) definition, outlines two key criteria: meeting human needs and respecting the constraints to preserve the environment's capacity to respond to these needs. Thus, sustainable development and consumption should meet the current needs without compromising the well-being of future generations and the planet (Sesini, Castiglioni and Lozza, 2020).

The concept of SC was first introduced as a policy concept in 1992 through Agenda 21 (Chappells and Trentmann, 2015; Cohen, 2020) and was defined two years later at the Oslo Symposium as "the use of services and related products which respond to basic needs and bring a better quality of life while minimising the use of natural resources and toxic materials as well as emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardise the needs of future generations" (Liu *et al.*, 2017; UNEP, 2017). Quoquab and Mohammad (2017) state that this definition is holistic, incorporating the individual's whole consumption pattern and emphasising improving the quality of life. However, the definition has faced some criticism. For example, Geiger *et al*. (2018) state that it stems from a political sphere and not a scientific sphere, though they do not elaborate.

The 2015 Paris Agreement (COP21) committed to "accelerate efforts to hold global average temperatures to below 2°C above pre-industrial levels, with the ambition of a 1.5°C limit and recognised that sustainable patterns of consumption and production, as well as sustainable lifestyles, play an important role in addressing climate change" (Welch and Southerton, 2019:31). Sustainable consumption is also linked to Sustainable Consumption and Production (SCP), introduced in 2002, the 10-Year Framework of Programmes (10YFP) on SCP and the Sustainable Development Goals (SDGs) (UNEP, 2015, 2017; C. Wang *et al.*, 2019; Castano Garcia *et al.*, 2021). The goals set out in the 2030 Agenda for Sustainable Development and intergovernmental processes like the 10-Year Framework of Programmes on SCP give further support to champions of sustainable lifestyles by acknowledging the powerful role they can play in lifting people out of poverty, ending hunger and reducing inequality while protecting the environment (UNEP, 2016). Sustainable Consumption and Production falls under Goal 12 – Responsible Consumption and Production. This goal is focused on achieving sustainable management and efficient use of natural resources and strongly focuses on waste and encouraging sustainable lifestyles (Gulati and Naudé, 2017; Vita *et al.*, 2019). SDG 12 has low political priority (Juju *et al.*, 2020) evident at different levels of governance and thematic areas, it is not featured in some of the key documents related SDG implementation and progress in SSA, like the African Union's Agenda 2063 (Juju *et al.*, 2020).

According to Liobikienė and Brizga (2022), policymakers tend to focus on the production side of this goal and the tools for reducing environmental impact. However, efficient production does not guarantee sustainability. According to Hansen and Nielsen (2023:4), "while

consumption was focal in the sustainable consumption agenda from the very start, it has repeatedly been reduced to questions of greening production, while there is a separate goal of 'ensuring sustainable consumption and production' (SDG12), almost all the targets of this goal deal with production only." Sustainable consumption is policy-relevant and essential to sustainable development (Castano Garcia *et al.*, 2021). However, despite the importance and rapid mitigation potential of behaviour change, most policy approaches to climate change solutions have given it scant attention, choosing to focus instead on the application of technology (Creutzig *et al*. 2016). Little is being done to directly address the overconsuming lifestyles, even as the IPCC releases some of the strongest scientific assessments of the consequences of consumerism and growth-obsessed capitalism. Very few net-zero strategies are focused on the potential contributions of lifestyle changes and their implications on future ways of living. By relying heavily on unproven technologies and prioritising interventions that continue to sustain economic growth, net-zero strategies risk leaving citizens feeling disenfranchised (Akenji *et al.*, 2021).

Though SC is a widely studied subject, the literature has no unified definition or consensus. Wang, Liu and Qi (2014) define SC as "an umbrella term that brings together several key issues such as meeting needs, enhancing the quality of life, improving resource efficiency, increasing the use of renewable energy sources, minimising waste, taking a life cycle perspective and taking into account the equity dimension". In contrast, Abdulrazak and Quoquab (2018:15) define SC as "the economic activity of choosing, using and disposing of goods and services and how this can be changed to bring social and environmental benefit". While definitions of SC differ, with Abdulrazak and Quoquab (2018) focusing on economic activities, and Wang, Liu and Qi (2014) conceptualising SC as a systemic, multidimensional concept, they tend to have overlapping concepts, such as changing how resources are consumed and quality of life. This study uses the definition presented by Geiger, Fischer and Schrader (2018:20), which conceptualises SC as "individual acts of satisfying needs in different areas of life by acquiring, using and disposing of goods and services that do not compromise the ecological and socio-economic conditions of all people (current or future) to satisfy their needs".

A common problem with the SC literature is that there are several different concepts that could be synonymous. Concepts such as pro-environmental behaviour (PEB), green consumption (GC), sustainable lifestyles and sustainable consumption behaviour (SCB) (Verplanken and

Roy, 2015) are often used interchangeably. A sustainable lifestyle is defined by Lubowiecki-Vikuk, Dąbrowska and Machnik (2021:93) as "a lifestyle that pertains to the continued, altruistic and frugal behaviours of an individual who maintains harmony with the society, economy and environment, which is reflected by several environmental and health-related practices in order to live within earth's limits". Rampedi and Ifegbesan (2022:1) define pro-environmental behaviour as including "many choices that individuals or groups of individuals make, the goal being to conserve the environment and reduce the consumption and destruction of natural resources".

Rampedi and Ifegbesan (2022) examined pro-environmental behaviour, and Kirsten and Eligius Biyase (2023) examined sustainable consumption behaviour but used the same measurement scale for two different concepts. Several studies use concepts like GC, PEB, ethical consumption and environmentally friendly consumption to convey the idea of SC (Quoquab, Mohammad and Sukari, 2019; Piligrimiene *et al.*, 2020; Ansu Mensah and Ansu Mensah, 2021; Testa *et al.*, 2021). Quoquab and Mohammad (2020) state that the interchangeable nature of these terms in the literature is problematic because the behaviours referenced with terms like PEB only focus on the environmental aspects of SC, yet SC goes beyond just environmental aspects, it also involves 'quality of life' and 'care for future generations.' However, Dimitrova, Ilieva and Angelova (2022) state that the interchangeable nature of these terms in the literature could be attributed to the complex and ambivalent nature of SC. Even though terms such as PEB or GC intrinsically seem to only focus on the environment, they link to SC. For example, Paço, Shiel and Alves (2019) state that adopting green behaviour is central to achieving sustainability. Testa *et al*. (2021) state that GC is a type of consumption that corresponds with safeguarding the environment for the present generations and the next, matching some definitions of SC. Given the interchangeable use of these definitions in the literature, this study will also incorporate research exploring concepts like PEB and GC.

Sustainability involves both ecological and socio-economic sustainability, and these two dimensions are intertwined (Geiger, Fischer and Schrader, 2018). The dimensions cannot be understood in isolation but should rather be examined together for the impacts to be examined accurately (Geiger, Fischer and Schrader, 2018). This is a frequent criticism of SC studies, as many overlook the social and economic dimensions of SC and strongly focus on the ecological

dimensions, which tend to ignore the complexity of SC (Sesini, Castiglioni and Lozza, 2020). According to Quoquab and Mohammad (2020), several studies consider the environmental aspect or green purchase behaviour as a proxy for sustainable consumption rather than encompassing the full scope of SCB. Researchers have started advocating for a more holistic approach to SC and there is a growing research interest and focus on the social dimensions of SC (Fischer, Böhme and Geiger, 2017; Kreuzer *et al*., 2019). Sustainability can only be achieved by embracing all dimensions of sustainability, which substantially adds to the complexity of consumers' thinking and acting (Hosta and Zabkar, 2021).

Sustainable consumption is inherently complex as it involves many sectors such as food, water, and housing and is also embedded in other systems (social-cultural) and, therefore, needs to be understood as being part of multiple systems (Welch and Southerton, 2019). Adding a layer of complexity to SCB is that some behaviours are more difficult to carry out than others (e.g., installing solar panels versus recycling) (Geiger, Fischer and Schrader, 2018; Welch and Southerton, 2019). Further, a wide range of factors, values, social structures, and intent can influence participation (Larson *et al.*, 2015), and this complexity should be acknowledged when studying SC. The complexity of SCB is well illustrated by the diversity of research on the subject (Verplanken and Roy, 2015; Concari, Kok and Martens, 2020), including studies from various disciplines and focusing on many different topics (Sesini, Castiglioni and Lozza, 2020) or different dimensions of SCB. Quoquab and Mohammad (2017) state that there are three pillars to SC, namely environmental concern, considering the needs of the future generation and meeting basic needs wisely. On the other hand, Geiger, Fischer and Schrader's (2018) definition of SC encompasses three dimensions, namely sustainability dimension, consumption phases and consumption areas, illustrating that the field of SC is very heterogeneous. The use of different concepts, such as PEB or GC, means that the focus of that research is on a particular aspect of SC and emphasises certain consumer intentions (Piligrimiene *et al.*, 2020).

2.3. Sustainable Consumption Behaviour

There are a large variety of behaviours that are considered to be sustainable consumption behaviours (SCB), and some of the most common SCB examined in the literature include the purchase and use of organic or green products (Liu *et al.*, 2012; Alzubaidi, Slade and Dwivedi,

2021; Yener, Secer and Ghazalian, 2023), energy or water saving (Peattie, 2010; Zakaria *et al.*, 2019; Mkhize and Ellis, 2020), use of renewable energy (Ukenna, Idoko and Ogbari, 2018; Yarimoglu and Binboga, 2019; Jelev, Mladenova and Simonova, 2022), waste minimisation or management and recycling (Kadic-Maglajlic *et al.*, 2019; Amoah and Addoah, 2021; Ifegbesan *et al.*, 2022), environmentally friendly transport (Caeiro, Ramos and Huisingh, 2012; Vita *et al*., 2019; Ansu Mensah and Ansu Mensah, 2021) and food consumption patterns (Vita *et al.*, 2019; Ansu-Mensah, Ansu-Mensah and Kuupiel, 2021). Other behaviours include cleaning the environment (Amoah and Addoah, 2021) and environmental activism (Mkhize and Ellis, 2020). Marzouk and Mahrous (2020) classify SC into two types: conservation behaviour (curtailing) and sustainable purchase behaviour (buying energy-efficient appliances). Curtailing behaviours are classified as behaviours that involve reducing the use of existing equipment, such as carpooling or switching off lights. Essentially these behaviours have low to no financial cost to perform and are performed with high frequency (Truelove and Gillis, 2018). The reduce, reuse and recycle waste management hierarchy is also mentioned in reference to SCB (Zakaria *et al.*, 2019; Mkhize and Ellis, 2020). This shows that SCB is remarkably varied and has a multitude of aspects that could be examined. According to Globalscan (2023), consumers tend to misunderstand what actions have the greatest impact on the natural environment, often prioritising tangible actions surrounding waste and actions perceived as more difficult to perform are less impactful, such as eating less meat or buying used items.

Many studies examine or concentrate on only one or two individual SCBs or specific domains of SC, rather than examining a broad range of behaviours (Caeiro, Ramos and Huisingh, 2012; Geiger, Fischer and Schrader, 2018). Some examples of studies that only examine a single dimension of SCB include the use of energy-efficient products (Li *et al.*, 2019), food consumption shopping habits (Van Tran and Nguyen, 2021; Gravelines *et al.*, 2022; Muresan *et al.*, 2022; O'Neill *et al.*, 2022), perceptions of eco-labels (Struwig and Adendorff, 2018), purchasing of used products (Borusiak *et al.*, 2020), adoption and use of solar (Kapoor and Dwivedi, 2020), clothing (Soyer and Dittrich, 2021), environmentally friendly packaging (Scott and Vigar-Ellis, 2014), purchasing of products that contain palm oil (Sundaraja, Hine and Lykins, 2021) and identified sustainable plastic consumer profiles (van Oosterhout *et al.*, 2023). While studying individual SCB does provide valuable insight into the specific issues addressed, it tends to leave a rather fragmented view of SC as a whole (Geiger, Fischer and

Schrader, 2018), as only studying an individual aspect of SCB such as energy use, does not provide a holistic picture of SCB. Focusing on different elements of SCB separately makes it difficult to identify a common pattern across empirical results. Therefore, it is important to know the patterns of sustainable behaviour that consumers undertake on a regular basis, not just one facet (Ganglmair-Wooliscroft and Wooliscroft, 2022). This can allow us to understand the spill-over effects of sustainable behaviour, allowing a better understanding of the environmental benefits of behaviour change (e.g., does saving electricity result in saving water?).

Consumers significantly influence how products are produced and used (Mont and Heiskanen, 2015). Understanding SC issues from a household perspective is important vital to achieving the SDGs, understanding the consumption challenges faced at the household level is important in "designing micro policies that account for the socio-economic contexts of specific households rather than generalised macro policies that may not trickle down to household units" (Shittu, 2020:3). Many studies have examined the SCB of households (Tudor *et al.*, 2011; Gustavsson and Elander, 2013; Kennedy and Kmec, 2018; Kaur *et al.*, 2022). Jelev, Mladenova and Stoimenova (2022) looked at sustainable urban household consumption in three different towns in Bulgaria in accordance with the United Nations Environmental Programme (UNEP) sustainability domains. Across all three towns, only a small portion of households had sustainable lifestyles. Sustainable transport was the least popular practice, and sustainable food consumption was widespread.

The United Nations Environmental Programme states that four domains are critical for environmental sustainability, namely food, housing (including electricity and water use), mobility, and consumption of other goods and services (United Nations Environment Programme, 2022). Further, several studies also refer to some or all of these areas as these are some of the most ecologically relevant areas regarding greenhouse gas emissions, acidification, tropospheric ozone, and resource/material requirements (Geiger, Fischer and Schrader, 2018). Peleg-Mizrachi and Tal (2020) define SC based on the four most polluting industries – animal/food production, residential energy consumption, mobility and textile or fashion. Several authors identify food, mobility and housing as key sectors for sustainability focus. Geiger, Fischer and Schrader (2018) identify food, housing, mobility and clothing as the

ecologically most relevant regarding GHG, acidification, tropospheric ozone and resource/material requirements in their SCB model.

Caeiro, Ramos and Huisingh (2012) state that at the household level, housing, food and drink and mobility have the greatest environmental impacts regarding GHG emissions, acidifying and ozone-depleting substances and resource and energy use. Liobikienė and Brizga (2022) found that in the Baltic States, between 62 – 71% of household carbon footprint was attributed to transport, food and housing. A case study on Japanese households found that some of the lifestyle factors, including long-distance leisure, materialistic consumption, and meat-rich diets identified as the main contributory factors to high carbon footprints (Koide *et al.*, 2019). Several authors highlight food, housing and mobility as key sectors as the main components of household carbon footprints (Donato, Lomas and Carpintero, 2015; Lorek and Vergragt, 2015; Ivanova *et al.*, 2016; Berman, Shwom and Cuite, 2019; Akenji *et al.*, 2021). Changes in household consumption patterns to low-carbon alternatives, such as transport model shifts, home energy reduction and dietary shifts, thus present a great mitigation potential (Ivanova *et al.*, 2020). Thus, this study focuses on these areas of SCB: food, housing (energy and water consumption), and mobility through the Sustainable Consumption Cube Model.

2.4. Theoretical Framework

Several theories and frameworks have been used to examine SCB from diverse perspectives and fields, including psychology, sociology and economics (Paço, Shiel and Alves, 2019). Some of the main theories include the theory of planned behaviour, which suggests that the intention to engage in sustainable consumption is influenced by attitudes, subjective norms, and perceived behavioural control (Strydom, 2018; Paço, Shiel and Alves, 2019; Matharu, Jain and Kamboj, 2021; Saari *et al.*, 2021), the social cognitive theory (Phipps *et al.*, 2013) and value belief norm theory which posits that an individual's values and beliefs influence behaviour and perceived social norms (Phipps et al., 2013; Lazaric et al., 2020). Seldom do studies look in detail at the different green behaviours and the extent to which they are being performed (Mkhize and Ellis, 2020). The conceptual framework that this study draws on is the SCB-cube model (Geiger, Fischer and Schrader, 2018), a multidimensional and interdisciplinary model of SCB that models and measures the SCB of adults (Figure 2.1). As stated earlier, studies on SC are fragmented and do not allow for identifying a common pattern

across consumption practices. Studies that have been conducted use different methodological approaches; hence, the findings are not directly comparable (Caeiro, Ramos and Huisingh, 2012).

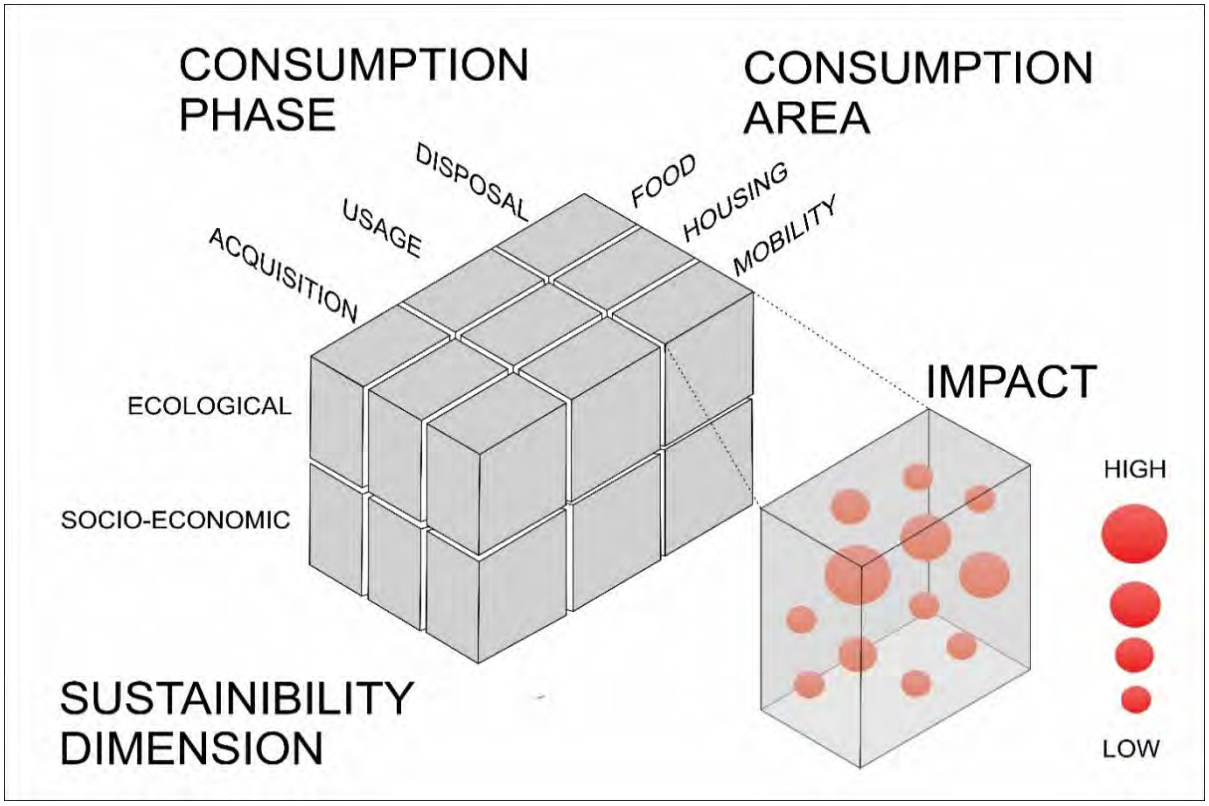

Figure 2.1: SCB cube model, adapted from Geiger, Fischer and Schrader (2018)

Numerous concepts and measurement scales have been used to examine SCB, which impedes knowledge integration (Caeiro, Ramos and Huisingh, 2012; Wallnoefer and Riefler, 2022). For example, Ganglmair-Wooliscroft and Wooliscroft (2022) identified 26 SCB items through semi-structured interviews with consumers. On the other hand, Saari *et al*. (2021) created a theoretical model with a construct for SCB that includes various practices associated with the behaviour without explaining the choice of those practices, and their SCB construct has only four items. Hamza, de Melo Pereira Lhamas, and Parackal (2023:1962) created a scale that included eight dimensions: "activism, personal sacrifice, communitarianism, environmental concern, healthy food, perceived consumer effectiveness, search for information, and social concern." Hopwood, Lenhausen and Bleidorn (2023) created a model with four underlying

dimensions: goods, food, transportation and engagement factors. The SCB-cube model offers explicit criteria to select SCB measurements systematically.

The model has four dimensions, namely sustainability dimensions, consumption phases, consumption areas and behaviour impact. The first dimension is the sustainability dimension which looks at both social-economic and ecological sustainability. Many studies tend to examine only the environmental dimensions of sustainability, reflected in studies using the terms pro-environmental behaviour or green behaviour. However, as stated earlier, sustainability involves both environmental and socio-economic dimensions, and only examining one aspect of sustainability ignores the complexity of SCB (Sesini, Castiglioni and Lozza, 2020). The second dimension looks at consumption phases. According to Dimitrova, Ilieva and Angelova (2022:1), "the whole consumption cycle should be studied to understand consumer behaviour rather than just initial choices because post-choice behaviour such as product usage, product life extension, and product disposal have a very important and equally significant impact on sustainability." Consumption comprises different phases and is not limited to only purchasing products (Geiger, Fischer and Schrader, 2018), which several studies use as a proxy for SCB (Quoquab and Mohammad, 2020). The consumption phases within the model are the acquisition, usage and disposal of products and goods. Many studies study SCB as generalised behaviour or examine only the acquisition or disposal phase, which neglects the usage phase (Wallnoefer and Riefler, 2022), contributing to a fragmented understanding of SCB.

The third dimension is the consumption areas, which are the different areas in which people consume resources. As stated earlier, food, transport, housing, and clothing are some of the most ecologically relevant areas regarding environmental impact (Geiger, Fischer and Schrader, 2018), and these are the consumption areas that the SCB-cube model highlights. Studies often do not look at any consumption area. For example, Figueroa-García, García-Machado and Yábar (2018), under the measurement item of SCB, did not have a single item that referenced a specific consumption area. The last dimension is the impact dimension, which falls within the cube. Behaviours that have a high environmental impact are prioritised and used within the model rather than low-impact behaviours.

To date, very few studies have used the SCB cube model, with a few notable exceptions (Fischer, Böhme and Geiger, 2017; Kreuzer *et al.*, 2019). Fischer, Böhme and Geiger (2017) used the framework to create a scale that examined young consumers' sustainable consumption behaviour (YCSCB) in the areas of food and clothing. Kreuzer *et al*. (2019) also used the framework to examine young adults' consumption behaviour in the areas of food and clothing, using the model to identify consumption behaviour and barriers to SCB. There is a large gap in the applicability of this framework to all consumption areas included in the framework, such as mobility and housing, as well as other consumer groups like households. The use of this model allows for a system-wide understanding of SCB at the household level, as SC is a multidimensional concept and cannot be fully understood or achieved through fragmented studies examining only a single aspect of sustainable behaviour. Households' behavioural practices are only one aspect of the SCB discussion. Understanding what drives or prevents households from participating in sustainable behaviour is important for designing interventions for promoting SCB.

2.5. Drivers of Sustainable Consumption

Sustainable household consumption is crucial for lowering GHG emissions and using resources efficiently and effectively (Shahbaz *et al*., 2022). However, these behaviours are contingent on several factors, processes, circumstances and dynamics, and it is important to understand these at different levels of household consumption practices (UNEP, 2016; Dimitrova, Ilieva and Angelova, 2022; Shahbaz *et al.*, 2022). There is a substantial portion of literature directed at understanding the drivers of SCB from multiple disciplines and theoretical perspectives. These drivers are crucial in influencing to what extent SCBs are adopted. However, Ukenna, Idoko and Ogbari (2018) state that there are no universally accepted drivers of SCB, as shown by the different studies on the subject from various disciplines, perspectives and theoretical frameworks. For example, Piligrimiene et al. (2020) state that there are internal and external determinants of sustainable consumption. Ifegbesan *et al*. (2022) state that there are three categories of drivers for pro-environmental behaviour, namely demographic (e.g., age, gender, education, household size), external (institutional and socio-economic) and internal (environmental knowledge and attitudes) drivers. In comparison, Testa *et al*. (2021: 4826) identify seven categories of drivers of GC: "behavioural, socio-demographic, intrapersonal values – environment, intrapersonal values – non-environmental, personal capabilities,

products, and producer-related, and context-related factors". This shows that the drivers of SCB are extremely varied.

A group of drivers that is often examined is socio-demographics such as gender, age and education (Bulut, Kökalan Çımrin and Doğan, 2017; Ifegbesan *et al.*, 2022; Kirsten and Eligius Biyase, 2023). For example, some studies show that women exhibit higher levels of sustainable consumption behaviour than males, a pattern attributed to cultural norms and women having to take responsibility for their household environments (Bulut, Kökalan Çımrin and Doğan, 2017; Banyte *et al.*, 2020; Lazaric *et al.*, 2020; Ifegbesan *et al.*, 2022; Shahbaz *et al.*, 2022). However, a study conducted by Ifegbesan and Rampedi (2018) examining the role of socio-demographic and geographical location on PEB in Nigeria found no significant difference in the SCB of male and female participants. The effects of age, education, income, and social class on sustainable consumption may vary (Lazaric *et al.*, 2020). It is important to note that there is no clear consensus on the effects of socio-demographics on sustainable consumption (Elhoushy and Lanzini, 2021).

Concerning age, some studies state that young consumers are more motivated to make sacrifices and demonstrate SCB than older consumers (Dimitrova, Ilieva and Angelova, 2022; Satinover, Nichols and Holt, 2023), whereas other studies find that the probability of adopting SCB increases with age (Morrison and Beer, 2017; Lazaric *et al.*, 2020; Wang *et al.*, 2021; Kaur *et al.*, 2022) which could related to lifelong learning (Ifegbesan *et al.*, 2022). Age negatively affects the consumption of fair-trade products, yet it would be overly simplistic to assume that older individuals are unconcerned with environmental issues (Blankenberg and Alhusen, 2018). There is considerable variability in environmental attitudes among older adults. Although environmental beliefs generally decline with age and older people are less likely to engage in 'active' behaviour like joining environmental groups or outdoor activities, they tend to participate more in 'home-based' pro-environmental behaviour (PEBs), such as recycling and reading environmental magazines and this difference is often attributed to the energy and stamina required for certain activities (Blankenberg and Alhusen, 2018). Bulut, Kökalan Çımrin and Doğan (2017) found that the baby boomers' generation (those born between 1946 and 1964) had the highest level of unnecessary consumption in their study, which looked at gender and generational-related differences in sustainable consumption. Dimitrova, Ilieva and Angelova (2022) found that young participants were more motivated to make

sacrifices to demonstrate SCB, and Ghaffar and Islam (2023) found that sustainable consumption was prevalent amongst millennials. Ifegbesan *et al*. (2022) found no significant difference in PEB with age, indicating that age may not be a consistent driver of SCB depending on contexts and thus should be examined as a driver with contexts in mind.

Concerning education, higher levels of education tend to favour SCB as more educated individuals are said to understand sustainability issues better and are more concerned about sustainable consumption. Higher education levels correlate with greater awareness of social welfare and engagement in activities such as environmental reading, recycling and nature participation (Ukenna, Idoko and Ogbari, 2018; Lazaric *et al*., 2020). According to Blankenberg and Alhusen (2018), certain behaviours, such as boycotting over-packaged items or using recycled paper, are more common among those with higher education, while individuals with lower education are more likely to engage in behaviours such as turning off the TV overnight or using public transport. Shahbaz *et al*. (2022) found that in Pakistan, there were higher levels of reported sustainable consumption practices in households with more educated individuals. A cross-national study found that consumers in the United Kingdom who had spent more time in formal education purchased products with less packaging, and in Brazil, those with higher education avoided material consumption (Whitmarsh, Capstick and Nash, 2017). Kirsten and Eligius Biyase (2023) found that in South Africa, SCB was highest among those with high socio-economic status, and Ifegbesan and Rampedi (2018) also found that social class positively influenced PEB. However, in a cross-national study, Ifegbesan *et al*. (2022) found that PEB was negatively related to income in South Africa. There is little data on the difference in sustainable consumption among social classes or income groups in emerging countries.

Overall, while socio-demographic variables shape SCB, they tend to be inconsistent predictors of behaviour, with no consensus on their overall effects on SCB (Elhoushy and Lanzini, 2021). López-Mosquera, Lera-López and Sánchez (2015) state that when compared to drivers such as environmental attitudes, beliefs and environmental activism, demographic and economic factors have less relevance in the decision process, further showing the lack of agreement surrounding drivers of SCB. Guzmán Rincón *et al*. (2021) found that in Colombia, socio-demographic variables did not impact behaviours. This shows that there is much variability in the influence of socio-demographic variables on SCB, emphasising the complexity of

understanding these behaviours and underscoring the need for a nuanced analysis. Understanding these variations may help contextualise the exploration of SCB in specific demographic groups or settings. These socio-demographic variations suggest that individual characteristics alone may not fully explain SCB, making it essential also to consider external drivers such as environmental concern, environmental knowledge, attitudes and social norms.

2.5.1. Attitudes

Attitudes have been identified as a psychological tendency that is conveyed by evaluating the natural environment positively or negatively (Sánchez, López-Mosquera and Lera-López, 2016; Blankenberg and Alhusen, 2018), and these attitudes are key to understanding behaviour in general. Positive environmental attitudes are expected to influence households' actions regarding behaviours such as recycling, water and energy saving, among others (Sánchez, López-Mosquera and Lera-López, 2016). Several studies have found that environmental attitudes influence SCB or the intention to partake in SCB (Liu *et al.*, 2012; Wang, 2017; Al Mamun *et al.*, 2018; Paço, Shiel and Alves, 2019; Ma *et al.*, 2023). A sustainable consumption attitude partially mediates the relationship between the awareness of a sustainable lifestyle and sustainable consumption practice (Zakaria *et al.*, 2019). Consumers are becoming more aware of the environmental, social, and economic impacts of their consumption, resulting in positive attitudes towards sustainable behaviour (Szulc-Obłoza and Żurek, 2024). These consumers are often more aware of the effect of their choices, willing to pay more for sustainable products and feel the impact of their actions. However, as already stated, attitudes do not always match actual consumption practices, which creates the so-called attitude-behaviour gap (Szulc-Obłoza and Żurek, 2024).

2.5.2. Environmental Concern

Environmental concern is an internal driver that reflects an individual's belief in their ability to impact environmental issues. It is a key motivator for sustainable consumption (Alzubaidi, Slade and Dwivedi, 2021; Ghali-Zinoubi, 2022). Hosta and Zabkar (2021) found that environmental concern has the strongest impact on Responsible Sustainable Consumer Behaviour (RSCB). However, it is important to note that while environmental concern strongly influences behavioural intention, high levels of environmental concern alone do not guarantee SCB (Saari *et al.*, 2021). Kabadayi, Koksal and Dursun (2016) found that in Turkey,

environmental concern did not contribute to all forms of pro-environmental behaviour, such as energy-saving behaviour, green buying behaviour, simple buying and recycling. Kirsten and Eligius Biyase (2023) found that in South Africa environmental concern was higher among lower socio-economic groups who could not act on those concerns due to financial constraints.

Environmental concern has dramatically increased worldwide, with many countries having environmentally concerned populations (Kulin and Johansson Sevä, 2021; Globalscan, 2023). However, the number of people committed to protecting the environment is rather small, and SC is not widely practised among consumers (Abdulrazak and Quoquab, 2018; Mkhize and Ellis, 2020). This is referred to as the attitude-behaviour or intention-action gap and is referenced in several studies on SC (UNEP, 2017; Deliana and Rum, 2019; Paço, Shiel and Alves, 2019; Elhoushy and Lanzini, 2021; Kulin and Johansson Sevä, 2021; Li *et al.*, 2021; Hwang and Yeo, 2022). This gap means a discrepancy exists between people's attitudes towards the environment and their actual behaviour (Quoquab, Mohammad and Sukari, 2019). Elhoushy and Lanzini (2021) suggest that there is a broader intention-behaviour gap in developing countries as there is a lack of opportunity to act consistently with pro-social and pro-environmental intentions. Overall, environmental concern remains a relevant driver to explore because it plays a crucial role in shaping individuals' motivation to SCB and often acts as a significant predictor across various contexts.

2.5.3. Environmental Knowledge

Environmental knowledge or an individual's understanding of environmental concepts and issues is crucial in shaping SCB. "All new information that individuals gain on the state of the environment can influence their knowledge, which, in turn, can lead them to question and change their lifestyles, thus have an impact on their behaviour" (Saari *et al.*, 2021:3). Several studies have found that environmental knowledge influences SCB (López-Mosquera, Lera-López and Sánchez, 2015; Al Mamun *et al.*, 2018; Lin and Niu, 2018; Amoah and Addoah, 2021; Čapienė, Rūtelionė and Tvaronavičienė, 2021; Saari *et al.*, 2021; Dimitrova, Ilieva and Angelova, 2022; Ghaffar and Islam, 2023; Ma *et al.*, 2023). Saari *et al*. (2021) state that environmental knowledge is the most important predictor of SCB. However, Lin and Niu (2018) state that environmental knowledge alone is insufficient to change consumers' actions to protect the environment. While knowledge alone may not directly influence behaviour, it can modify attitudes and contribute to more sustainable actions (Amoah and Addoah, 2021;

Dimitrova, Ilieva and Angelova, 2022). In a study in Germany, Geiger, Geiger and Wilhelm (2019) found that though there was a high level of environmental knowledge, PEB uptake was average, stating that the influence of knowledge was overridden by intervening factors such as situational restrictions or old behaviours. Liu, Teng and Han (2020) found that environmental knowledge had no significant direct influence on PEB in China it was still considered a crucial variable.

2.5.4. Environmental Risk Perception

Environmental risk perception (ERP) stimulates people's sense of urgency and responsibility to protect the environment and encourages more environmental protection behaviour (Zeng, Jiang and Yuan, 2020). According to Saari *et al*. (2021:3), "people react in three ways to environmental risks: having a rational understanding of the issue, being willing to act, and being emotionally affected by environmental degradation." ERP has been found to affect SCB directly (Zeng, Jiang and Yuan, 2020; Saari *et al.*, 2021; Rampedi and Ifegbesan, 2022) or is an antecedent of sustainable behaviour intention (Ghaffar and Islam, 2023). The feeling of risk can cause an emotional response to environmental degradation and the condition of the environment, potentially resulting in a strong commitment to environmental causes (Saari *et al.*, 2021).

2.5.5. Governance

Institutional and economic factors, including government regulations, business initiatives, and economic conditions, can influence sustainable consumption. Government regulations play a strong role in encouraging SCB, especially in high-income countries (Figueroa-García, García-Machado and Yábar, 2018). A cross-national study conducted in 31 countries found that in high-income countries, effective environmental governance encouraged individuals to engage in SC (Wang, 2017). This is corroborated by Kulin and Johansson Sevä (2021), who state that people are more likely to engage in PEB in countries where the quality of government is high. Ganglmair-Wooliscroft and Wooliscroft (2022) also found that government regulations can influence the uptake of some SCB, stating that the Austrian government has a long history of promoting regional organic agriculture, which explains the high PEB. In contrast, New Zealand's' agricultural policies focus more on exports and therefore, Austria has a higher percentage of organic grocery purchases than New Zealand (Ganglmair-Wooliscroft and

Wooliscroft, 2022). Ensuring public safety and decreasing social inequality in communities can motivate PEB (Rajapaksa, Islam and Managi, 2018).

2.5.6. Social Norms

Social influences and social norms from peers and social networks are important in promoting sustainable consumption and changing consumption patterns within social groups. Several studies have shown that social influences influence SCB (Figueroa-García, García-Machado and Yábar, 2018; Wakefield and Axon, 2020; Čapienė, Rūtelionė and Tvaronavičienė, 2021; Ghaffar and Islam, 2023; Khan and Thomas, 2023). Lazaric *et al*. (2020) found peer effects to be important for promoting SC and changing consumption patterns in social groups. Sustainable consumption seems to remain within the acceptability limits of the individual's social environment and requires the social approval of the individual's close network, such as family and friends (Lazaric *et al.*, 2020). Piligrimiene *et al.* (2020) found that the social environment had an indirect, but positive impact on behaviour related to green product purchasing. However, Alzubaidi, Slade and Dwivedi (2021) found that social influences did not affect intentions towards PEB in Saudi Arabia, which they state could be due to the recent changes occurring in the country surrounding rapid development and economic growth, potentially impacting how these consumers think.

2.5.7. Other Drivers

Several other drivers have been examined in the literature that have been found to have links with SCB; environmental activism or being a member of an environmental group was linked to engaging with SCB (Nassani *et al.*, 2013; López-Mosquera, Lera-López and Sánchez, 2015; Rampedi and Ifegbesan, 2022). Perceived consumer effectiveness (Joshi and Rahman, 2019; Alzubaidi, Slade and Dwivedi, 2021), perceptions (Deliana and Rum, 2019; Zakaria *et al.*, 2019), environmental awareness or consciousness (Buerke *et al.*, 2017; Lin and Niu, 2018; Khan and Thomas, 2023; Yener, Secer and Ghazalian, 2023), consumer awareness (Buerke *et al.*, 2017), exposure to sustainability content on social media (Confetto *et al.*, 2023), spirituality (David Lee *et al.*, 2016; Saxena and Sharma, 2023), religiosity (Batool *et al.*, 2023), willingness to make sacrifices for the environment (Rampedi and Ifegbesan, 2022), sustainable retailers, product packaging, availability, and lower pricing perception (Ghaffar *et al.*, 2023) are some of the other drivers that have been examined.

Drivers of SCB do not work independently or in isolation, but often, SCB will be influenced by multiple drivers. For example, Li et al. (2021) found that awareness alone did not reduce energy consumption, but subjective factors also played an important role in consumption, and Volschenk, Viljoen and Schenck (2021)Volschenk, Viljoen and Schenck (2021) found that there were multiple influences on participation in a curbside recycling programme; including the education level of household members responsible for waste management, how long households had lived in their homes and the size of the household among other factors. While strong environmental reasons may exist to reduce consumption, other factors often motivate a low-carbon lifestyle (Whitmarsh, Capstick and Nash, 2017). These factors need to be considered to promote SCB. For example, Pamla, Thondhlana and Ruwanza (2021) state that water conservation behaviour is mainly driven by households not wanting to run out of water, suggesting environmentally friendly behaviour may not be the primary motivation for sustainable practices. The drivers of sustainable consumption encompass both internal and external variables, and the findings of various studies discussed here show a complex interplay between these drivers.

2.6. The South African Context

South Africa, as a BRICS (Brazil, Russia, India, China, and South Africa) country, is rapidly growing and is facing ever-increasing urbanisation and population and thus is trying to achieve high economic growth at the cost of the environment (Dreyer, Sonnenberg and Van der Merwe, 2022). Caglar, Guloglu and Gedikli (2022) state that developing countries often use natural resources intensively and without environmental awareness, as economic growth is primarily driven by industrial growth, meaning that the environmental quality of fast-growing developing countries is very much at risk. The growing middle class of Africa is becoming affluent and changing its consumption patterns despite the declining resource base and low production of materials (Agyeman Boafo and Billo Juju, 2019). The unsustainable exploitation of South Africa's natural resources is causing much environmental pollution and, if left unchecked, is likely to aggravate food shortages, water scarcity, diseases, conflicts, migration and poverty, and eventually destabilisation of economies (Zakari *et al.*, 2022). The growing middle and high-income classes in South Africa contribute to materialistic and wasteful consumption (Purushottam, 2019), and on the other hand, the low-income classes do not have sufficient access to resources, are food insecure and struggle for necessities (Purushottam, 2019; Dreyer,

Sonnenberg and Van der Merwe, 2022; Kirsten and Eligius Biyase, 2023). This is a critical challenge for sustainable development and emphasises that a sustained change in consumption patterns is needed to align the earth's capacity and human needs.

South Africa is an emerging economy with high levels of income inequality. It is considered one of the most unequal societies in the world, with a Gini Coefficient of 0.68 and more than half of the country's population living in poverty (UNSA and South African Government, 2020; Kirsten and Eligius Biyase, 2023). The country's economy is struggling with high unemployment, slow growth, weakened international competitiveness, and a reliance on carbon-intensive energy (UNSA and South African Government, 2020). These issues are rooted in the colonial and apartheid history of South Africa, which has created a dual economy and entrenched stark racial, gender, and regional disparities in income, wealth, land ownership, education, health, housing, and access to decent employment, skills, and resources (UNSA and South African Government, 2020).

South Africa is facing complex sustainability issues; hence, there is an urgent need for more integrative and comprehensive approaches to ensure progress towards sustainability goals (Purushottam, 2019). South Africa's annual temperatures have increased above the global average over the past five decades (Mthembu and Nhamo, 2021). South Africa is highly dependent on fossil fuels for energy production, as around 70% of electricity produced in the country is from coal (Mutumbi, Thondhlana and Ruwanza, 2022), and is in the top 20 largest emitters of GHG in the world (UNSA, 2019). The country also cannot keep up with the energy demand, leading to persistent power cuts (Mutumbi, Thondhlana and Ruwanza, 2022). South Africa also generates around 54 million tonnes of solid waste annually, and only about 10% of this is recycled, while the rest ends up in landfills or dumps (UNSA, 2019). Further, the transport sector accounts for around 70% of energy consumption and is the largest carbon emitter in the country (Mokoele, 2022). Around 10 million tonnes of food are lost or wasted annually in the country (UNSA, 2019).

South Africa is semi-arid and has been impacted by persistent droughts, with five provinces being declared drought disaster zones. These droughts have led to some areas in the country implementing water cuts and rationing to avoid "day zero" (Pamla, Thondhlana and Ruwanza, 2021). Alongside this, due to the legacy of Apartheid, the country struggles with unequal access to resources (UNSA, 2019). The country faces numerous environmental challenges, including

climate change-induced extreme weather events, a rapid loss of biodiversity and ecosystems, inequitable access to and benefits from natural resources, poor waste management, pollution of air, water, and land, food insecurity, diminishing freshwater resources, and the spread of invasive species (UNSA, 2019). These issues are exacerbated by South Africa's carbon-intensive production, which is heavily reliant on fossil fuels for power generation and petroleum (UNSA, 2019). Mthembu and Nhamo (2021:1) concludes that "not enough is being done to support sustainable consumption and production (SDG 12)."

As mentioned in Chapter 1, some recent studies conducted in South Africa on SCB use secondary rather than primary data, suggesting that more studies based on primary data are needed to build empirical standing and more accurately understand and promote SCB within a South African context. Measures on SCB are dominantly derived from literature from developed nations and may not completely fit the South African population (Kirsten and Eligius Biyase, 2023). It is reasonable to assume that different social, economic and cultural contexts will follow different patterns (Elhoushy and Lanzini, 2021). Therefore, more studies are required to determine whether measures from the Global North can be used in a Global South context. There is little known about the sustainable consumption behaviour of South Africans, particularly across an income gradient. This study aims to expand the literature on sustainable consumption behaviours in a Southern African context and understand how these behaviours may differ according to the income of households.

Bisschoff and Liebenberg (2016) found that South African consumers had a relatively good understanding of green purchasing behaviour. However, the overall environmental concern of consumers is different. Mkhize and Ellis (2020) found that South African consumers are moderately ecologically conscious in their consumption behaviour, and the most eco-friendly behaviour consumers exhibited was changing lightbulbs to energy-efficient bulbs. However, Marx-Pienaar and Erasmus (2014) found that consumers do not consciously consider the environment or society when consuming goods and services. Scott and Vigar-Ellis (2014) found that South African consumers had limited knowledge of environmentally friendly packaging. Maduku (2024) found that environmental concerns influenced consumers' intentions towards sustainable consumption. Not much is known about SCB among South Africans, especially across different socio-demographic groups. Furthermore, there is not much

discussion on how to encourage this behaviour among individuals, particularly in developing countries (Quoquab and Sukari, 2017).

Chapter 3: Reported Sustainable Consumption Behaviour Among Households Across an Income Gradient in Hout Bay, South Africa

3.1. Abstract

Household consumption patterns significantly impact environmental sustainability, yet there is a limited research focus on how consumption behaviour varies across socio-economic contexts, especially in emerging economies like South Africa. Using a self-reporting approach, this study examines sustainable consumption behaviour (SCB) in Hout Bay, South Africa, focusing on food, mobility, and housing practices using the SCB cube model with data from 302 households. Findings reveal moderate engagement in SCB by households, with marked differences between income groups. Concerning food consumption, high-income households showed high SCB, often using fresh ingredients and leftovers, while low-income groups engaged less in organic food and energy-saving cooking. Middle-income households had moderate to low engagement, mainly cooking meals with fresh ingredients. Regarding mobility, high-income households' practices were largely unsustainable preferring private vehicles to public transport, while low-income households relied on walking and public transport, potentially due to limited options. Middle-income households showed a mixed engagement with sustainable mobility behaviour. Middle-income households showed a mixed engagement with sustainable mobility behaviour. With regards to housing, practices such as air-drying clothes were common across all income levels, though renewable energy use was low, with higher-income households having more access. The study findings suggest income shapes variance in behaviour, particularly in mobility and food, and underscores the need for targeted interventions to promote sustainable behaviour across all income groups.

3.2. Introduction

Unsustainable human consumption patterns of resources such as water, energy, food, materials and land negatively affect the planet, contributing to major environmental and social issues (UNEP, 2016; Quoquab, Mohammad and Sukari, 2019; Hansen, 2023). Human activities are linked to pollution, depletion or overuse of resources, global warming and biodiversity loss (Ghali-Zinoubi, 2022). Consumption is intrinsically linked to sustainability, as any choice about how much, what to consume or disposal of goods, directly or indirectly impacts the environment as well as future generations (Caeiro, Ramos and Huisingh, 2012; Trudel, 2018). Therefore, behaviour needs to shift to sustainable alternatives to avoid overconsumption, which exerts harmful impacts on the environment (Quoquab and Mohammad, 2020).

A key issue with consumption patterns is that they are often highly unequal. High-income households tend to consume more resources than low-income households, with a correspondingly higher carbon footprint (Peattie, 2010; Middlemiss, 2018; Shittu, 2020; Castano Garcia *et al.*, 2021; Thøgersen, 2021; Huang *et al.*, 2024). The environmental effects of unsustainable consumption patterns vary by wealth. For example, "in 2019, the top 10% of emitters were responsible for 48% of global emissions, whereas the bottom 50% were responsible for just 12% of global emissions" (Ripple *et al*., 2023:847). People in developed countries can consume up to 10 times more resources than those in developing countries (UNSA, 2019). Even within the same societies, there are large differences in the patterns of consumption in and across those societies (Peleg-Mizrachi and Tal, 2020), which is evident in South Africa. However, people living in developing countries are the most vulnerable to climate change risks (Welch and Southerton, 2019), bearing disproportionate costs from climate-related impacts. South Africa has one of the most unequal societies in the world (Kirsten and Eligius Biyase, 2023), with the richest 20% in the country accounting for 61% of consumption and the poorest 20% accounting for only 4.5% of consumption (Gulati and Naudé, 2017), yet very few studies have examined the difference in sustainability behaviour across income disparities. Consequently, this chapter focuses on reported behaviour among households and how the behaviour varies across different income levels.

Sustainable consumption is defined as "the use of services and related natural resources and toxic materials as well as emissions of waste and pollutants over the life cycle of the service or product not to jeopardise the needs of future generations" (UNEP, 2017:6). It is a critical step in addressing environmental issues as the consumption of resources has direct and indirect impacts that alter the earth's biological, chemical, and physical conditions (Wolff, 2020). According to the IPPC, human activities have caused around 1°C of global warming above pre-industrial levels, and if the warming continues at its current rate, it is likely to reach 1.5°C between 2030 and 2052 (IPPC *et al.*, 2018). Climate change effects include elevated temperatures with storms, floods, droughts, melting of Arctic ice and glaciers, rising sea levels, biodiversity loss and many other challenges (Glavič, 2021). The rate and extent of climate change are larger than previously projected, and the window of opportunity to avoid catastrophic global change is quickly closing (IPPC *et al.*, 2018). The IPPC has determined that limiting temperature increases is still achievable via certain methods, one of which being, 'rapid and far-reaching transitions' in systems of consumption and production (IPPC *et al.*, 2018). Critical components to this are shifting consumption patterns toward low demands around energy and land, as well as low GHG-intensive goods (IPPC *et al.*, 2018). Behavioural and lifestyle changes are essential for enabling conditions that enhance the feasibility of mitigation and adaption options for 1.5°C-consistent system transitions (Koide *et al.*, 2019; Glavič, 2021).

Several studies have examined sustainable consumption behaviour, demonstrating that behaviour is an incredibly complex phenomenon and varies across multiple systems and areas (Geiger, Fischer and Schrader, 2018; Welch and Southerton, 2019). Thus, it is more useful to understand the system of behaviour rather than examining an individual behaviour which can lead to a fragmented understanding of SCB (Geiger, Fischer and Schrader, 2018). Previous studies have identified the importance of examining household consumption patterns (Shittu, 2020), as well as the key consumption areas that have a significant impact, such as food, mobility and housing (Caeiro, Ramos and Huisingh, 2012; Donato, Lomas and Carpintero, 2015; Lorek and Vergragt, 2015; Ivanova *et al.*, 2016; Geiger, Fischer and Schrader, 2018; Berman, Shwom and Cuite, 2019; Peleg-Mizrachi and Tal, 2020; Liobikienė and Brizga, 2022; United Nations Environment Programme, 2022). However, studies do not often look in detail at the different behaviours and to what extent they are being performed (Mkhize and Ellis,

2020). At the household level, mobility, housing and food and drink have the greatest impacts (Caeiro, Ramos and Huisingh, 2012) and are the basis of analysis in this chapter.

The theoretical framework used in this chapter is described in full detail in Chapter 2. The SCB cube model (Geiger, Fischer and Schrader, 2018) can be used to examine SCB as part of a complex integrated system consisting of various dimensions. The model has four dimensions.

- The sustainability dimension involves both socio-economic and ecological sustainability dimensions (Chapter 2, section 2.4: Theoretical Framework).
- Consumption phases involve the different phases in which consumption occurs, namely, acquisition, usage, and disposal.
- Consumption areas: people consume in every aspect of their lives, and the areas that the model focuses on include food, mobility, and housing, which are some of the most ecologically relevant areas regarding their environmental impacts.
- The final dimension is the impact dimension, which occurs within the cube. This means that high-impact behaviours are prioritised to be part of the cube rather than including behaviours that do not have much impact.

The use of this model allows for a holistic approach towards understanding household SCB. Sustainable consumption behaviour is incredibly complex and multi-faceted, and by employing this model, it becomes possible to analyse the many dimensions involved in SCB in a structured way, providing a better picture of how households contribute to environmental sustainability through their daily activities.
Within this context, the aims of this chapter were to:

- Identify and describe the reported consumption behaviour practised by households.
- Analyse how the reported behaviour differed by income disparity.
- Discuss the implications of the findings for promoting sustainability at the household level.

3.3. Methodology

The study was guided by the question: what is the reported sustainable consumption behaviour among households of different income status in Hout Bay, South Africa? Data collection took place between January and March 2024 using household surveys.

3.3.1. Sample Selection

A stratified random sampling approach was used to identify sample households. Households were chosen using the random point tool in QGIS (Figure 3.1). The actual point randomised map is not shown to protect the anonymity and confidentiality of households. If a household chosen through the random point generation did not choose to participate or the point was on green space or a non-accessible area, the next available household was chosen. In total, 302 households participated, comprising 113 low-income households, 76 middle-income households and 97 high-income households. It was generally difficult to access middle to high-income households, as a large portion of them live in gated communities that are access-controlled. Each interview took between 30 and 40 minutes to administer. Ethical clearance for the study was obtained through the Rhodes University Ethics Committee, ethics number 2023-7408-8191.

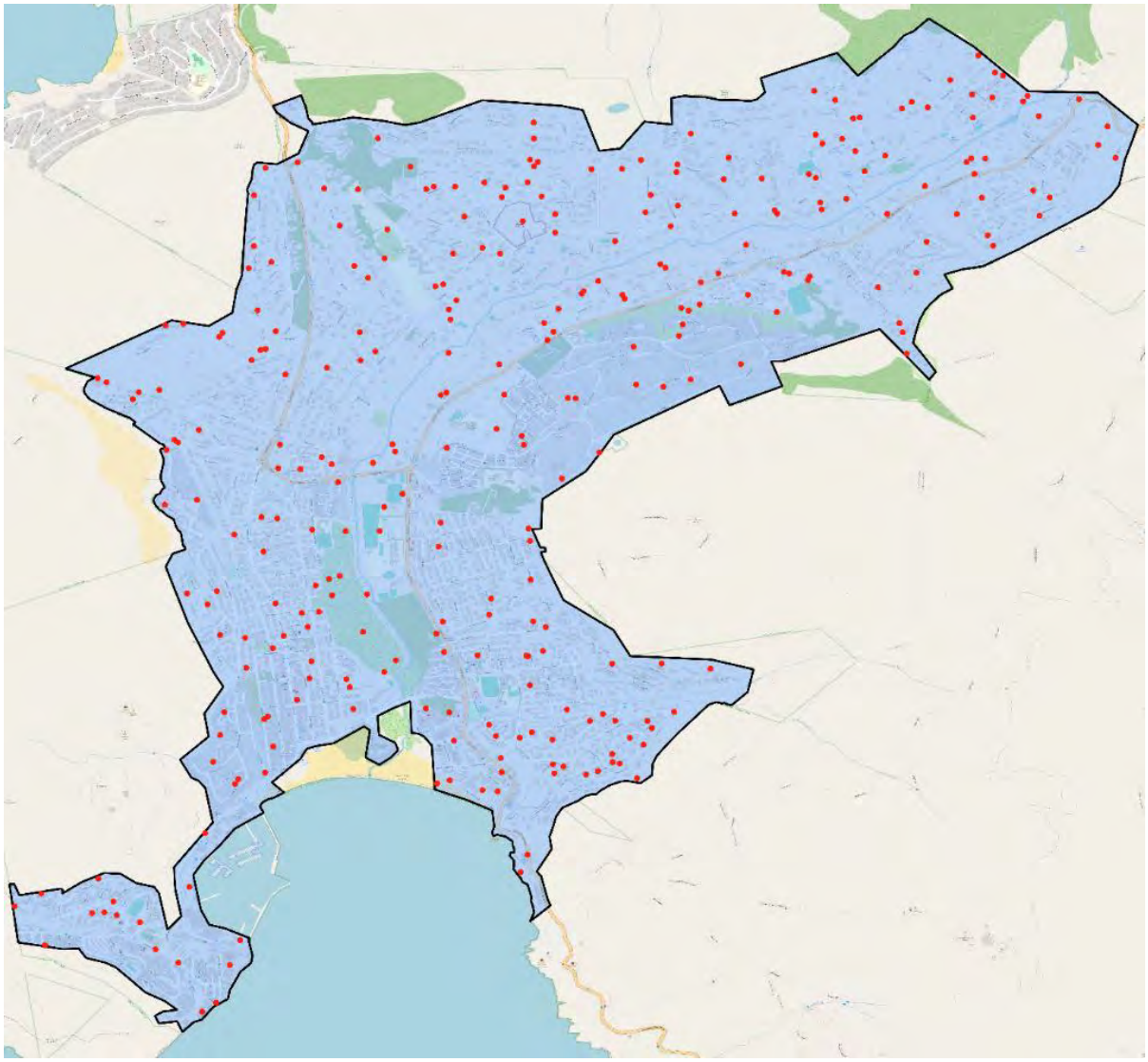

Figure 3.1: Example of a randomised point map of Hout Bay, Western Cape, South Africa

3.3.2. Data Collection Methods

The survey questionnaire (Appendix A) had three sections designed to gather data on household sustainable consumption behaviour (SCB), the drivers of SCB and socio-demographic information. The first section of the questionnaire collected information on self-reported sustainable behaviour in the areas of food (16 items), mobility (10 items) and housing (14 items) following the SCB-cube model adapted from Geiger *et al*. (2018) (Figure 1). The model spans three consumption phases – acquisition, usage and disposal, as well as environmental and socio-economic dimensions of sustainability. Participants were asked to indicate the

frequency of engagement with behaviour linked to the consumption areas of food, mobility and housing on a 5-point Likert response scale (1 = Never, 2 = Rarely, 3 = sometimes, 4 = often, 5 = always), with all questions in section one on this scale. The food-related questions, drawn from Geiger, Fischer and Schrader (2018) included the following statements: '*I eat meat for the main meals*; *I eat dairy products; I buy certified organic food; I buy imported fruits from overseas (e.g., mango); I cook in an energy-saving way (with little water, suitable lids); I buy frozen foods and meals; I dispose of food in the garbage; I refrain from foods with excessive packaging; I use leftovers for the next meal; I buy snacks and drinks in one-way packaging (e.g., takeaway, fast food); I buy fair trade food products; I buy regional food products; I produce/grow food myself; I eat healthily; I cook my meals with fresh ingredients* and *I buy foods close to their expiration date*.'

Mobility questions assessed household transportation habits and included the statements: '*How often do members of your household travel by private vehicle owned by the household? How often do members of your household travel by electric vehicle? Is the environment an important consideration to your household when purchasing a car? How often do members of your household make use of public transport in your area? How frequently do members of your household travel by plane? How often do members of your household ride-share or carpool to destinations? Do members of your household walk to destinations? Do members of your household cycle to destinations? If you have the ability, how often do members of your household work from home?'* These behaviours were chosen as car and air travel account for a significant amount of global carbon emissions (UNEP, 2016; Acaroglu, 2019; Ivanova *et al*., 2020; United Nations Environment Programme, 2022), and reducing travel by car and prioritising other transportation modes such as public transport or walking and cycling are effective action areas for sustainable behaviour (United Nations Environment Programme and One Earth, 2018; Institute for Global Environmental Strategies, Aalto University and D-mat ltd, 2019; Ivanova *et al*., 2020; Koide *et al*., 2021). Ridesharing allows consumers to save money, and walking and cycling are good for a person's health (Acaroglu, 2019; Koide *et al*., 2021). Swapping to electric vehicles is a sustainable alternative to current vehicles (UNEP, 2020; Koide *et al*., 2021; Sovacool *et al*., 2022) and working from home (workers conduct work from home rather than having to travel to their workplace) could reduce carbon footprint (UNEP, 2020).

The last section of the questionnaire was designed to collect information on the consumption area of housing, which included water and energy-related behaviour. The questions included: '*How frequently does the household make use of renewable energy sources for electricity? How frequently does the household make use of rainwater or greywater systems? How often is energy and water efficiency an important consideration when buying household appliances and products? When purchasing furniture, how often does your household purchase second-hand? How often do you make use of appliances like aircon and heaters? How often do you air-dry washed clothing rather than use a dryer? How often do our appliances (dishwasher and washing machine) run at full loads,* and *how often do members of the household shower rather than bath?'* These behaviours were chosen as the behaviours that are stated to have the highest mitigation potential, including purchasing renewable electricity and producing renewable electricity, effective thermal insulation, and energy-efficient household appliances (Institute for Global Environmental Strategies, Aalto University and D-mat Ltd, 2019; Ivanova *et al*., 2020; Koide *et al*., 2021; Liobikienė and Brizga, 2022; OECD, 2023). Other behaviours that have been mentioned throughout the literature include reducing 'unnecessary' water consumption; installing water conservation equipment, air-drying clothing and making sure that a load of washing is full; taking showers rather than baths and shopping vintage (Phipps *et al*., 2013; United Nations Environment Programme and One Earth, 2018).

3.3.3. Data Analyses

Data analysis was conducted in Jamovi and Statistica. To measure the reliability of measures and internal consistency a reliability test was performed using Cronbach's alpha. A value above 0.7 is generally considered acceptable, indicating a good level of internal consistency among the survey items. The reliability analysis was conducted for all three consumption areas included in the study, namely, food, mobility, and housing, to ensure that the data were reliable and that item measurements were consistent (Table 3.1).

Table 3.1: Cronbach's alpha of SCB measurement items

Consumption area	Mean	SD	Cronbach's α
Food	2.93	0.574	0.815
Mobility	3.44	0.766	0.784
Housing	3.00	0.748	0.718

The socio-demographic data were summarised using descriptive statistics. For the SCB areas (food, mobility and housing), the modal response of participants was calculated for all participants as well as by income group to see what the most frequently occurring responses were. To analyse the strength and direction of the relationship between income and SCB, a non-parametric Spearman's rank correlation was conducted. The SCB areas of food, mobility and housing were averaged to produce a composite score, which was then correlated with the income groups (high, middle and low) - with reverse-coding where relevant.

Several items in the Sustainable Consumption Behaviour (SCB) questionnaire were reverse-coded to ensure that higher scores consistently represent more sustainable behaviour. For the food category, the following items were reverse coded: 'I eat meat for the main meals', *'I eat dairy products,' 'I buy imported fruits from overseas (e.g., mango)', 'I buy frozen foods and meals', 'I dispose of food in the garbage'*, and *'I buy snacks and drinks in one-way packaging (e.g., takeaway, fast food)'.* In the mobility category, reverse coding was applied to *'How often do members of your household travel by private vehicle?'* and *'How frequently do members of your household travel by plane?'* In the housing category, the item '*How often do you make use of appliances like aircon and heaters?'* was also reverse-coded. Reverse coding these items allows for a better understanding of the SCB engagement, with higher scores indicating a stronger connection with sustainable consumption practices.

To analyse participants' segments based on sustainable consumption behaviour (SCB) indices, segmentation was applied to each area (food, mobility, housing) and the overall SCB index. The study participants were grouped into three categories: low, moderate, and high engagement, based on their average scores across each index, using the original Likert scale (1–5). Specifically, scores between 1.0 and 2.5 were classified as "low," scores from 2.6 to 3.5 as "moderate," and scores from 3.6 to 5.0 as "high." This segmentation was achieved in Jamovi

using computed variables and conditional formulas, allowing participants to be categorised based on their level of engagement in each SCB area as well as overall. This approach facilitated comparison across engagement levels, supporting further exploration of behavioural patterns within each segment.

3.3.4. Limitations

The study uses self-reported behaviour measures. Measures were drawn from the literature predominantly from the Global North and may not completely fit a South African population, for example, including a question pertaining to the use of electric vehicles. Therefore, there might be a lack of comparability to many studies in the field of sustainable consumption as there are extremely varied measures, indicators and methods used to analyse SCB.

The SCB framework has only been used to examine the areas of food and clothing, and there were no measures for housing and mobility, meaning there is a lack of socio-economic sustainability measures for these consumption areas. Further, Geiger, Fischer and Schrader (2018) state that housing includes energy and water use but make no mention of things like construction, living space size, or purchase of housing materials, which several other authors and UN documents have referred to (UNEP, 2016; UNEP and One Earth, 2018]). The construction sector is also an important user of resources and material production and can heavily impact ecosystems and biodiversity (UNEP, 2016). In addition, heating and cooling are responsible for a large share of GHG emissions, contributing to biodiversity loss (UNEP, 2016). There is a lack of comparative studies according to specific consumption areas as most studies tend to only examine drivers of SCB with a generalised model of SCB, not delving into how the behaviour may affect specific sectors of SCB.

3.4. Results

3.4.1. Profile of the Sample Participants

The socio-demographic characteristics of the sample participants by income groups and for the total sample are summarised in Table 3.2. For the total sample, the largest age group was within the 35-44 years age group (28%), followed by 26% of the participants being within the 45-54 age range. The overall average household size was 3.56; half of the participants earned wages (50%), and 48% had tertiary education. English was the most spoken language (43%), followed

by Afrikaans (26%) and isiXhosa (24%). Most participants were Coloured (31%) or Black (28%), and more than half (52%) lived in formal houses, with 15% living in a shack and 13% in RDP housing. When socio-demographic data were disaggregated by income group, clear disparities between the groups emerged.

High-income participants tended to be older, with 33% of participants between 45-54 years, than the middle and low-income participants and had the smallest household size (3.4). High-income households predominantly spoke English (84%), with only 4% of this group speaking Afrikaans and only 1% speaking isiXhosa. High-income participants had the highest level of education, with 90% of participants having tertiary-level education and 9% having secondary-level schooling. Almost all high-income households (99%) lived in formal houses and primarily earned their income from wages (45%), owning their businesses (37%), and 12% on private pensions.

Middle-income participants tended to be younger to middle-aged, with 34% aged between 35-44 years and 28% being between 25-34 years of age. A fairly large proportion of middle-income participants had a tertiary education (61%), followed by 34% having a secondary-level schooling. Forty percent of the middle-income participants spoke English as their first language, followed by speaking isiXhosa (32%) and Afrikaans (22%). More than half of the middle-income participants earned wages (53%), followed by income from own businesses (32%) and lived mostly in formal houses (51%) or flats (20%), followed by RDP houses (18%) and a room in a backyard (3%), and the mean household size was 3.19 people.

For the low-income household group, the main age groups for low-income participants were 35-44 and 45-54, with both age groups having 28% participants, followed by 25-34 years at 21%. The main income sources for low-income households were wages (53%) and social grants (40%). The main level of schooling for this group was secondary school (43%), followed by primary school (37%). Low-income participants primarily spoke Afrikaans (46%), followed by isiXhosa (39%) and 11% speaking English. Thirty-seven percent of low-income participants lived in shacks, followed by those who lived in government-provided Reconstruction and Development Program (RDP) housing (17%), a room in a backyard (16%), a house (15%) and 13% in a flat. Low-income households had the largest household size (3.99).

Table 3.2: The socio-demographics of the sample

Attribute	High-income (n=97)	Middle income (n=76)	Low-income (N=116)	Total sample (n=302)
Age of participants (%)				
18-24	4	7	5	6
25-34	3	28	21	17
35-44	23	34	28	28
45-54	33	13	28	26
55-64	19	9	12	13
65 or older	19	8	7	11
Household size (mean +)	3.40	3.19	3.99	3.56
Education of participants				
No education	0	4	10	5
Primary	0	1	37	16
Secondary	9	34	43	30
Tertiary	90	61	8	48
Other	1	0	2	1
Income source				
Wages	45	53	53	50
Social grant	0	1	40	17
Private pension	12	7	0	6
Own business	37	32	3	22
Other	4	1	0	2
Languages spoken				
Afrikaans	4	22	46	26
English	84	40	11	43
isiXhosa	1	32	39	24
Other	6	1	1	3
Ethnic group				
Black	3	41	40	28
Coloured	1	29	54	31
Indian	1	0	0	0
Other	1	5	4	3
White	93	24	1	37
Dwelling Type				
Boarding house	-	1	-	-
Flat	-	20	13	11
House	99	51	15	52
RDP housing	-	18	17	13
Room in backyard	-	3	16	7
Shack	-	1	37	15

3.4.2. Level of Engagement With SCB

Overall, there was moderate to low engagement in SCB, with moderate engagement being the norm (80%). Only 6% of households had a high engagement in SCB, and 14% had a low engagement level. For the different consumption areas, housing had the highest level of high engagement (29%), followed by food (14%). Mobility had the lowest level of high engagement at only 1%. The least engaged area was mobility, with 35% of households having low engagement with mobility, followed by food (29%) and housing (27%) (Figure 3.2).

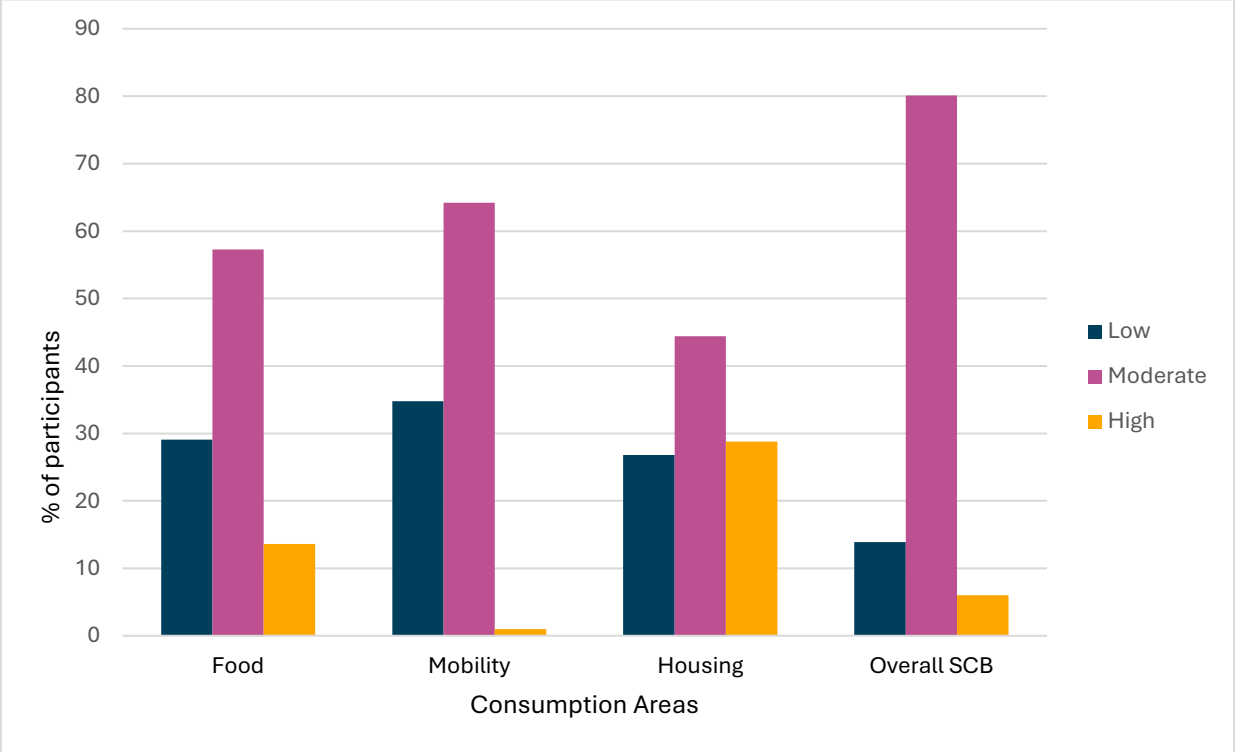

Figure 3.2: Level of engagement in behaviour by income group

Figure 3.3 shows that overall, across all income groups, moderate engagement was the main level of engagement with SCB, with low-income households having the highest level of moderate engagement (30%), followed by high-income households (27%) and then middle-income households (23%). High-income households show to most engagement with SCB overall, with 6% having a high level of engagement, compared to 0.3% of middle-income households and no low-income households. For the consumption area of food, high-income households had the highest engagement (12%), whereas low-income households had the lowest

engagement (22%). For middle-income households, they were mainly moderately engaged in food SCB (18%). Mobility had the lowest engagement overall, and high-income households were the least engaged with mobility (22%), while low-income households showed the highest engagement with mobility behaviour but only 1%. Middle-income households had moderate to low engagement in mobility SCB, with the highest proportion engaging moderately in mobility SCB (19%). For the consumption area of housing, 20% of low-income households had low engagement, while high-income households (24%) were the most engaged. Middle-income households were moderately engaged (23%).

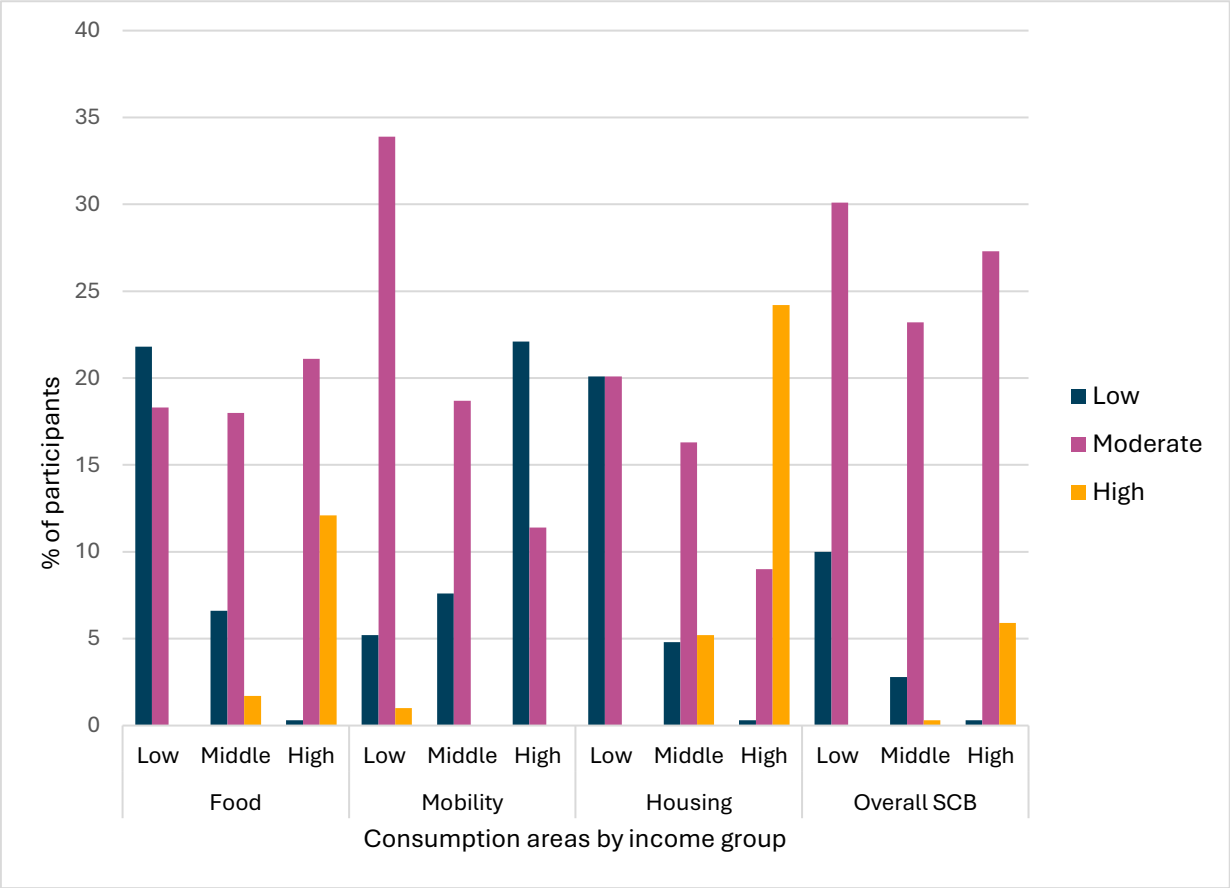

Figure 3.3: Level of engagement in SCB by households, divided by income groups

3.4.3. Reported Food Consumption Practices

Table 3.3 provides a summary of the reported food consumption behaviour of participants. Across the total sample, participants engaged moderately in sustainable food consumption behaviour, with a notable exception in using leftovers, where 29% of participants always used leftovers. Forty-seven percent of participants cooked meals with fresh ingredients, and 30%

often ate healthily. A significant number of participants (52%) did not grow food, and 31% of all participants never bought organic food. Regarding unsustainable food practices, 41% of all participants often ate meat for main meals, 31% often ate dairy products, 30% of participants often bought frozen meals, and over a third often disposed of food in the garbage (35%) and bought food in one-way packaging (34%).

Table 3.3: Reported food consumption practices by income group

Practice	**High-income (n=97)**		**Middle (N=76)**		**Low-income (N=116)**		**All (N=302)**	
	Modal response	%	Modal response	%	Modal response	%	Modal response	**%**
Eating meat for the main meal.	O	51	S	38	O	39	O	41
Eating dairy products.	O	45	O	29	S	39	O	31
Buying certified organic food.	S	38	S	45	N	57	N	31
Buying imported fruits from overseas (e.g., mango).	S	35	S	43	N	27	S	33
Cooking in an energy-saving way.	O	37	S	46	R	36	S	32
Buying frozen foods and meals.	R	46	S	34	O	46	O	30
Disposing of food in the garbage.	R	30	O	37	O	53	O	35
Refraining from foods with excessive packaging.	O	39	S	41	S	31	S	34
Using leftovers for the next meal.	A	56	S	32	S	28	A	29
Buying snacks and drinks in one-way packaging.	R	59	O	45	O	54	O	34
Buying fair trade food products.	S	47	S	53	R	34	S	41
Buying regional food products.	O	57	S	39	N	34	S	29
Growing own food.	N	32	N	43	N	71	N	52
Eating healthily.	O	61	S	29	N	33	O	30
Cooking own meals with fresh ingredients.	A	53	O	41	O	53	O	47
Buying foods close to their expiration date.	S	45	S	34	N	41	S	32
Key: Always = A; O = Often; Sometimes = S; Rarely = R and Never = N								

Analysis by income group showed that high-income participants exhibited more sustainable food consumption practices than middle and low-income households. About 37% often cooked in an energy-saving way, and 56% always used leftovers for the next meal. Approximately 70% of high-income participants often bought regional or local food products, although 32% never grew their own food. Regarding healthy eating, 61% of high-income participants often ate healthily, and more than half (53%) always cooked meals with fresh ingredients. However,

51% often ate meat for main meals, and 45% often consumed dairy products. Buying frozen meals (46%), disposing of food in the garbage (30%) and buying food in one-way packing (59%) were all rarely engaged in.

Middle-income participants showed moderate to low sustainable food use practices. Forty-one percent of middle-income participants often cooked meals with fresh ingredients, and 44% never grew their own food. Regarding unsustainable practices, 29% often ate dairy products, 37% often disposed of food in the garbage, and 45% purchased food items in one-way packaging. More than half of the reported practices were “sometimes” engaged with.

Low-income participants reported the least engagement in sustainable food practices. Nearly 60% never bought certified organic food, and 36% stated that they cooked very little in an energy-saving way. Buying regional products, foods close to their expiration date and growing their own food all recorded "never" as the modal response, with 71% of participants saying that they never grew their own food. Despite this, just above half (53%) of low-income participants said they often cooked food with fresh ingredients. About 34% rarely bought fair-trade products, and 34% never bought regional products or bought foods close to their expiration date. In terms of unsustainable practices, only 39% often ate meat for main meals, and 46% often bought frozen foods. Just above half (53%) often disposed of food waste in the garbage, and 54% bought single packaged food items.

The data reflect variations in food consumption practices, including engagement with practices such as using leftovers, cooking with fresh ingredients, and growing food. Each income group demonstrates varying degrees of sustainable and unsustainable behaviour, with high-income participants more frequently engaging in practices like using leftovers and cooking with fresh ingredients. In contrast, low-income participants showed higher levels of food waste and reliance on frozen foods. Middle-income participants exhibited a mix of both sustainable and unsustainable practices, reflecting moderate engagement across several categories.

3.4.4. Reported Mobility Behaviour

Table 3.4 presents the mobility patterns of participants. Across the sample, about 28% of participants never travelled by privately owned vehicle. Most participants (87%) do not travel by electric vehicle, possibly due to non-ownership of electric vehicles. Regarding

environmental considerations when purchasing a car, 36% of participants indicated "never," with a mean response of 2 (very little). About 36% of the participants often walked to destinations, with a mean response of 3 (sometimes). Slightly above half (55%) of participants never cycled to destinations, with a mean response of 2 (very little), and 35% of participants never worked from home.

Table 3.4: Reported mobility consumption behaviour by income group

Practice	**High-income (n=97)**		**Middle income (N=76)**		**Low-income (N=116)**		**All (N=302)**	
	Modal response	%	Modal response	%	Modal response	%	Modal response	**%**
How often do members of your household travel by private vehicle? (owned by the household)	A	70	S	36	N	61	N	28
How often do members of your household travel by electric vehicle?	N	91	N	72	N	92	N	87
Is the environment an important consideration to your household when purchasing a car?	S	30	S	41	N	59	N	36
How often do members of your household make use of public transport in your area?	N	63	S	33	O	47	O	27
How frequently do members of your household travel by plane?	S	46	N	32	N	78	N	42
How often do members of your household ride-share or carpool to destinations?	R	36	S	34	O	34	S	29
Do members of your household walk to destinations?	R	29	O	33	O	54	O	36
Do members of your household cycle to destinations?	N	60	N	50	N	53	N	55
If you have the ability, how often do members of your household work from home?	O	48	S	32	N	68	N	34
Key: Always = A; O = Often; Sometimes = S; Rarely = R and Never = N								

Analysis by income group showed that for high-income participants, 91% never travelled by electric vehicle, and public transport usage was rarely reported, with 63% of participants indicating "never". Thirty-six percent rarely carpooled or used ride-sharing, 29% *rarely* walked to destinations, and 60% *never* cycled to destinations, instead relying on the use of private vehicles, with 70% of high-income households *always* using a private vehicle. Lastly, 48% of

high-income households often worked from home when they had the ability to do so. Comparatively, a slightly lower but still high proportion of the middle-income group (72%) never travelled by electric vehicle, and about half never used a bicycle as a form of transport. Thirty-three percent of middle-income households often walked to destinations, 32% never travelled by plane, and over half of the behaviours were engaged with sometimes. For low-income participants, 61% never travelled by private vehicle. Environmental considerations were not a priority when purchasing a car for 59% of participants. Public transportation was frequently used, with 47% *often* using public transportation. Seventy-eight percent of low-income households never travelled by plane, and 34% *often* carpooled to destinations. About 44% often walk to destinations, 53% never cycle, and 68% never work from home.

These findings suggest that transportation habits and preferences are significantly influenced by income, with high-income households showing greater reliance on private travel while low-income households demonstrate more dependence on public transport and walking. Additionally, there is a generally low adoption of environmentally friendly practices such as electric vehicle usage and cycling.

3.4.5. Reported Housing Consumption Behaviour

Table 3.5 provides an overview of reported housing-related (energy and water) use practices among households. Across all the samples, the most reported was having a shower rather than a bath (31%) and running appliances (dishwashers and washing machines) at full loads (25%), with participants reporting always practising these actions. The least reported practices were *never* using renewable energy sources (45%) and *never* using greywater or rainwater systems (43%). Energy and water efficiency were often an important consideration for 28% of the participants across all income groups. About 33% of the participants *rarely* used appliances like air-conditioners and heaters, and 39% of all participants *often* air-dried clothing rather than using a dryer.

Comparison by income group showed that high-income households reported frequent engagement in most of the sustainable practices. For example, most high-income households (73%) reported *always* showering instead of bathing, while only 33% and 37% of middle-income and low-income, respectively. Nearly 60% of high-income households ran appliances at full loads, and 56% *always* air-dried their clothing. Comparatively, about 41% of middle-

income households reported air-drying their clothes, while more than half of low-income households reported so. Less than two-fifths of low-income households (38%) reported that energy and water efficiency was *always* an important consideration, while about 31% *always* made use of renewable energy sources. Regarding the use of appliances such as air-conditioners and heaters, 54% *rarely* used these appliances.

Table 3.5: Reported housing consumption behaviour by income group

Practice	**High-income (n=97)**		**Middle income(N=76)**		**Low-income (N=116)**		**All (N=302)**	
	Modal response	%	Modal response	%	Modal response	%	Modal response	%
How frequently does the household make use of renewable energy sources for electricity?	A	31	N	33	N	71	N	45
How frequently does the household make use of rainwater or greywater systems?	S	28	N	32	N	72	N	43
How often is energy and water efficiency an important consideration when buying household appliances and products?	A	38	S	45	R	27	O	28
When purchasing furniture, how often does your household purchase second-hand?	S	36	S	42	O	29	S	33
How often do you make use of appliances like aircon and heaters?	R	54	S	43	N	41	R	33
How often do you air-dry washed clothing rather than use a dryer?	A	56	O	41	O	51	O	39
How often do our appliances (dishwasher + washing machine) run at full loads?	A	59	S	36	R	33	A	25
How often do members of the household shower rather than bath	A	73	O	33	N	37	A	31
Key: Always = A; O = Often; Sometimes = S; Rarely = R and Never = N								

For middle-income households, the use of renewable energy and rainwater or greywater systems was not common, with just over 30% (33% and 32%, respectively) reporting never engaging in these practices. By comparison, even more low-income households (70%) reported never using renewable energy and rainwater. The use of appliances such as air-conditioners or heaters was the lowest among this group, with 41% never using these appliances. Overall, while air-drying clothes and running full loads of appliances were relatively common practices, the

use of renewable energy and rainwater systems was much less frequent among this group of participants. Energy and water efficiency were considered important by some, but the use of efficient systems and behaviour varied significantly.

3.4.6. Relationship Between SCB and Income Status

Table 3.6 shows the Spearman's rank correlation between the different SCB areas and income. There is a strong positive correlation between income and food behaviour, which indicates that having a high income is associated with higher engagement in sustainable food behaviour. Income has a strong negative correlation with mobility attitudes, indicating that individuals with higher incomes tend to have significantly lower mobility attitudes. Lastly, there is a strong positive correlation between housing behaviour and income, similarly suggesting that a higher income is likely to yield sustainable housing behaviour.

Table 3.6: Spearman's rank correlation between SCB and income

Consumption area	**Spearman (Rho)**	**p-value**
Food	0,671	<0,001*
Mobility	-0,529	<0,001*
Housing	0,776	<0,001*

3.5. Discussion

3.5.1. *Food Consumption Behaviour*

The data reflect variation in food consumption behaviour, with most households having minimal to moderate engagement in food sustainable consumption behaviour, which is consistent with findings elsewhere. For example, Kehayova-Stoycheva, Ivanov and Vasilev (2023) found that in Bulgaria, households engaged in a low to moderate number of SCB food activities. Similarly, Li *et al*. (2023) found that in China, no households fell into a high sustainability zone for food sustainability.

In this study, each income group demonstrated varying degrees of sustainable and unsustainable behaviour, which could suggest that while there may be some awareness of sustainability and practice of sustainability behaviour, it may not be a primary concern for most

households. For example, nearly half of the participants often cooked with fresh ingredients, and about a third always used leftovers or often cooked healthily. In a similar study, Jelev, Mladenova and Stoimenova (2022). found that some of the most commonly practised behaviours in three Bulgarian cities were eating home-cooked food, more fruits and vegetables, and locally produced and fresh food. The OECD (2023) also found in a cross-country study that over half of households often or always consumed local foods. Kehayova-Stoycheva, Ivanov and Vasilev (2023) found that more than 70% of households in Bulgaria consumed home-cooked food. In this study, there was minimal engagement in practices such as growing own food, but these findings are inconsistent with another study conducted in Cape Town. Mistry and Spocter (2020) found that in a middle-class suburb, almost two-thirds of participants grew edible foods in their gardens. The minimal engagement with growing food in this study could be attributed to some individuals living in dense, overcrowded settlements with limited space for growing their own food, particularly for low-income households. Davies *et al*. (2021:2) state that "a household's ability to engage in urban agriculture depends on several factors, including settlement formality, property rights, and the location of a household in relation to food retailers."

Middle-income participants exhibited a mix of both sustainable and unsustainable practices, reflecting moderate engagement across several categories. Middle-income households showed moderate engagement in food SCB, with most households reporting the use of fresh ingredients and the rest of the behaviours being undertaken sometimes. High-income households demonstrated significant engagement with sustainable consumption food practices, particularly regarding the use of leftovers, cooking with fresh ingredients and sustainable energy use, purchasing regional products and eating healthily. Other researchers have reported findings showing that people with high socio-economic status tend to have healthier eating habits, characterised by increased consumption of fruits and vegetables (Pocol *et al.*, 2020). The OECD (2023) found that more high-income participants gave weight to healthy eating than lower-income households and ate more locally produced food.

Low-income households exhibited a low engagement with sustainable food behaviour, with a high percentage of households never buying organic foods, in line with findings from Van Tran and Nguyen (2021) in Vietnam, Schäufele-Elbers and Janssen (2023) in Germany, and Feil *et al*. (2020) in Brazil. The OECD (2023) found that less than a third of participants across several

countries reported often or always consuming organic products, and participants from lower-income households were more likely to report that they never consumed organic food. This could be attributed to these foods being more expensive than other products, impacting the way consumers are motivated to pay or not the premium price associated with organics. They may also not be as widely available as conventional foods or may not be perceived as healthier (Feil *et al.*, 2020a; Van Tran and Nguyen, 2021; Mkhize and Ellis, 2024). Other behaviours that were rarely or never practised by low-income households include purchasing regional, fair-trade products or products close to their expiration date. According to Hughes, McEwan and Bek (2015), only six percent of South African consumers are familiar with the Fairtrade product logo, suggesting that a lack of knowledge leads to potentially limited or non-engagement with SCB. The low engagement with sustainable food behaviour by low-income households could be attributed to not having the finances to implement sustainable consumption behaviour; a large proportion of the South African population is vulnerable to poverty or live below the poverty line and thus do not have the luxury of engaging in sustainable practices.

Over half of the low-income households cooked with fresh ingredients often, despite an overall low engagement with the other behaviour. Low-income participants showed higher levels of food waste and reliance on frozen foods. Processed food is often consumed, in part, due to convenience (OECD, 2023). Food waste tended to be thrown away rather than composted, in line with the OECD (2023), which found low rates of food waste composting. Food waste is associated with several socio-economic characteristics, such as household composition, including the number of children and adults in the household and the income status of the household (OECD, 2023). Nguyen *et al*. (2022) found that in Australia, households sorted less than half of their food waste sustainably due to a lack of space.

There was frequent meat and dairy consumption across all income groups, but it was highest among high-income households. According to Huang *et al*. (2024), a rise in income correlates with increased carbon footprints, particularly due to higher consumption of plant- and animal-based products and more frequent dining out. In South Africa, meat contributes a significant amount to the country's carbon footprint due to high consumption and carbon intensity (Akenji *et al.*, 2021). South Africans generally have a strong cultural association with meat as a central feature of meals and as a sign of success or affluence (Institute for Global Environmental

Strategies, 2021). Thus, the cultural importance of meat in South African society is something that should be taken into consideration when designing sustainable diet interventions.

Pricing and financial constraints might be the primary driving factor for food consumption habits. A survey in the Baltic States found that most participants stated that price was the primary factor when choosing foods (Liobikienė and Brizga, 2022), and the OECD (2023) found that participants in all income groups reported that affordability was a higher priority than environmental considerations. Thus, the low levels of engagement in food SCB by households could partially be attributed to financial limits. The affordability of food items or the perceived cost of engaging in sustainable food behaviour could prevent South African households from engaging in food-related sustainability behaviour. Not fully understanding what practices are sustainable could also be a potential reason for the moderate to low engagement in food SCB. Asvatourian *et al*. (2018) found that in Scotland, only a minority of participants associated environmental impacts with the types of food that people eat, indicating a lack of awareness surrounding how food consumption impacts the planet.

3.5.2. Reported Mobility Practices

Overall, actions relating to sustainable mobility were the least practised, as has been found elsewhere. For example, Jelev, Mladenova and Stoimenova (2022) and Kehayova-Stoycheva, Ivanov and Vasilev (2023) found that sustainable consumption activities related to mobility were the least undertaken in their studies in Bulgaria. In the current study, there was very low usage of electric vehicles across the total sample, potentially due to electric vehicles not being a feasible option in developing countries owing to high price range and insufficient charging infrastructure for electric vehicles (Rajper and Albrecht, 2020; Collett *et al.*, 2021). Liobikienė and Brizga (2022) also found that electric and hybrid cars were not widespread in the Baltic States due to a lack of government support and undeveloped charging infrastructure. Similarly, cycling as a mode of transport was not widespread, with over half of the participants never cycling to their destinations, which could also be attributed to a lack of infrastructure, considering that it might be a risky form of transport (Gärling and Friman, 2015; Mitullah, Vanderschuren and Khayesi, 2017). Risk is linked to the fatality of pedestrians and cyclists and is attributed to a combination of issues: road networks prioritise high-speed vehicular traffic, with limited infrastructure for non-motorised travel, especially outside central areas. Many urban poor, reliant on walking and public transport, must navigate long distances along arterial

roads with few safe crossings, increasing crash risks. The lack of sidewalks, formal crossings, and interconnected pedestrian routes further exacerbates conflicts with motorised transport, making walking and cycling hazardous (Jobanputra, 2013). Even with the risk associated, walking emerges as a more common mode of transport among participants, aligning with findings from Jelev, Mladenova and Stoimenova (2022), who found that the most common sustainable transportation alternative in Bulgaria was walking.

Middle-income households showed a mixed engagement with sustainable mobility behaviour. About a third of middle-income households frequently walked to their destinations. Low-income households showed a high reliance on alternative forms of transportation, such as public transport and walking, with very low use of private vehicles. Mitullah, Vanderschuren and Khayesi (201) state that the poor in African cities rely on 'non-motorised transport' and public transport. A study conducted in Sierra Leone found that there was a high dependency on walking due to affordability and poor road infrastructure that could not support the operation of motorised transport - particularly in neighbourhoods challenged by topography and peripherality (Oviedo *et al.*, 2022). Kehayova-Stoycheva, Ivanov and Vasilev (2023) found that in Bulgaria, a city in Bulgaria that less than a third of households preferred to travel by public transport and bicycle.

Interestingly, while the OECD (2023) found a high reliance on private cars in nine different countries (Belgium, Canada, Israel, France, the Netherlands, Sweden, Switzerland, the United Kingdom and the United States), where it accounted for more than half of commuter travel, the trend was not observed in this study. Most participants 'never' used private vehicles, implying a deviation from global trends, although this could be attributed to low-income participants being the largest participant group in this study and being the group the least engaged in owning private vehicles. Car ownership is linked to the socio-economic characteristics of households such as "income, household composition and employment status; the characteristics of the transport system such as car purchase costs, available road infrastructure and non-access to public transport; and attributes of the built environment" (Gärling and Friman, 2015:164). Thus, the reliance on walking and public transport by the low- and middle-income households in this study could be attributed to not having any other choice rather than actively choosing these transport forms for sustainability purposes.

High-income households displayed a clear preference for private vehicles, leading to low use of public transport, cycling and walking. This is in line with several studies – Tao, He and Thøgersen (2019) found that in Australia and China, having a low household income reduced the chances of owning a car. Bruderer Enzler and Diekmann (2019) found that in Sweden, richer households spent more money on fossil fuel consuming transport than lower-income households, and the OECD (2023) found that the use of conventional cars appeared higher for high-income households than for low-income households. This reliance on private vehicles not only reduces engagement with sustainable transport alternatives but also contributes to larger ecological footprints, as highlighted by Peleg-Mizrachi and Tal (2020) and Huang *et al*. (2024). Peleg-Mizrachi and Tal (2020) found that in Israel, wealthier people had higher footprints related to transport related to the greater use of private vehicles, utilisation of transcontinental flights, along relatively lower use of public transport. Huang *et al*. (2024) found that in Japan, higher-income groups tended to have larger carbon footprints in private transport compared to lower-income groups. High-income households could rely more on private transport as they may perceive alternative forms of transport being a hassle through time and monetary costs or perceived inconvenience of using them (Dütschke *et al.*, 2022). ideas42 (2024) states that there are several reasons why people tend to rely on private vehicles. Many drivers default to using their cars even when other options might be faster or cheaper, partly due to unreliable public transport and safety concerns for pedestrians. The immediate costs of walking or taking the bus are more noticeable than the less salient expenses of driving, such as fuel and parking. Drivers may also justify car use through motivated reasoning, citing personal circumstances like difficult commutes.

Additionally, habitual use of private vehicles, which is reinforced by convince, infrastructure issues and cost perceptions could reinforce the behaviour. Dütschke *et al*. (2022) found that in Germany, habits were predictive of past behaviour and future intention of everyday mobility, indicating that people do not re-evaluate their transport modes regularly. To reduce the use of private vehicles, there needs to be better and more accessible public transport options, as well as potential carbon taxes on cars. For example, in Gothenburg, Sweden, congestion taxes were implemented in 2013, and these congestion taxes led to substantial traffic reductions and an estimated 2-3% reduction in carbon emissions in the region (Börjesson, 2018).

Additionally, just under half of the high-income participants worked from home (meaning they have the option to conduct their work from the comfort of their houses rather than having to travel to an office or place of work) and represented the highest proportion among the different income groups. Low-income households were the least engaged in working from home, possibly because the nature of their work cannot be undertaken from home. According to Cetrulo, Guarascio and Virgillito (2022, working from home appears to be a privilege for a few occupations rather than a generalised possibility. The feasibility of working from home is positively correlated with high-paying occupations. Educational attainment, formal employment status, and household wealth are positively associated with the possibility of working from home, indicating the vulnerability of various groups of workers (Garrote Sanchez *et al*., 2021).

The limited practice of sustainable mobility behaviour reflects the role of economic and infrastructure constraints on mobility behaviour. Several behaviours are not undertaken due to structural and infrastructure constraints within the country (cycling and electric vehicles), and the high use of alternative forms of transport by low-income households is potentially undertaken as they have no other option rather than considering the environment. The high use of private transport by high-income households could be linked to convenience or habitual behaviour, which is something that is not regularly re-evaluated.

3.5.3. Reported Housing Practices

Across the behaviour areas, adoption of SCB was generally higher for housing than food and mobility in line with findings elsewhere. For example, Jelev, Mladenova and Stoimenova (2022) and Kehayova-Stoycheva, Ivanov and Vasilev (2023) found that households were most sustainable in areas of electricity and water consumption. Adoption of household sustainable behaviour varied amongst households, with some behaviours being more embraced than others. Trębska (2024) found that Polish households were highly sustainable regarding several behaviours, including energy and water saving – however, the consumers were more concerned with resource efficiency than environmental degradation.

There was limited use of all renewable energy systems, in line with the OECD (2023), which found that in nine countries across the globe less than a third of participants have installed renewable energies. Similarly, Kehayova-Stoycheva, Ivanov and Vasilev (2023) found that less

than 7% of households in Bulgaria used solar PV systems. In this study, high-income households had the highest adoption rates of renewable energy use for electricity. This can be explained by affordability rather than environmental motivations because high-income households tend to have disposable income needed to invest in renewable energy. In the South African context, the higher use of renewable energy by high-income households could be related to the ongoing issue of loadshedding in the country, rather than sustainability motivated. Venter *et al.* (2025) found that wealthier households in South Africa were more likely to invest in solar energy in response to the country's energy crisis, benefitting from being able to afford the upfront costs of installation and the long-term savings on electricity. Disposable income can allow well-off households to make upfront investments in sustainability practices that may not be available to lower-income households. Lavelle, Rau and Fahy (2015) found that better-off participants in Ireland with a higher educational status were more likely to engage in behaviour that required a higher financial commitment at some point in time. Similarly, Trotta (2018) found that in the UK, there was a direct relationship between increasing household income and the probability of investing in energy-efficient retrofit measures. A study done on residential energy use in the USA found that the adoption of renewable energy was undertaken more by white and well-off communities (Sovacool *et al.*, 2022). Similarly, the use of greywater or rainwater systems was not widespread among participants. However, high-income households reported the highest use of rainwater or greywater systems relative to middle and low-income groups, consistent with du Toit and Chilwane (2022). This can be attributed to affordability issues as high income can afford the rainwater and grey water infrastructure such as gutters and water tanks. Further, high-income households tend to have a big roof area and yards for tanks. In contrast, low- and middle-income households might not be able to finance the infrastructure and have limited roof and yard space. Low-income people in South Africa tend to live in high-density areas, lacking access to basic amenities, with limited access to water and sanitation facilities and with limited outside space (Conradie, Hansen and Oosthuizen, 2019; Gara, 2021; Institute for Global Environmental Strategies, 2021), which means that these low-income households do not have the ability or access to install systems like rainwater harvesting.

Over half of high-income households exhibited energy and water-efficient behaviours such as air-drying clothes, running appliances at full loads and showering. Middle-income households had lower engagement in housing sustainability behaviour, with very low adoption of

renewable energy sources and greywater or rainwater systems. Low-income households also showed low engagement in housing sustainability behaviour, but there was high engagement in air-drying clothing. The OECD (2023) found that few households reported frequently buying second-hand items, in line with this study, where only low-income households often purchased second-hand items. There was a rare engagement in running appliances at full loads or showering rather than bathing in the low-income group, which could be explained by the fact that some of these households do not have such appliances. Jelev, Mladenova and Stoimenova (2022) report that behaviours that lagged in engagement were non-use of the bathtub when bathing, turning off the shower during soaping, and avoiding the use of the dishwasher unless it is full, were attributed to non-ownership of the appliances rather than choice of practice. Mutumbi, Thondhlana and Ruwanza (2021) found in their study in South Africa that less than half of the participants in low-income areas had appliances such as dishwashers or air conditioners.

There was a higher tendency amongst participants to adopt simpler or everyday energy or water-saving actions such as air-drying clothing, running appliances at full loads and showering rather than bathing, consistent with Shahbaz *et al*. (2022); OECD (2023), and Jelev, Mladenova and Stoimenova (2022). Jelev, Mladenova and Stoimenova (2022) found that the main behaviours reported related to ensuring lower costs of electricity, heat, and water, which may suggest a focus on cost-friendly behaviours that do not require high investment. The OECD (2023) states that people are more likely to practice actions that are easier to adopt than actions that might reduce comfort or are difficult to adopt. Uptake is particularly low for costly or not well-understood technologies (OECD, 2023). In Turkey, participants were more careful with the consumption behaviours that had economic costs, such as ‘turning off the lights when they are not used’ and ‘not starting the washing machine unless it is full’ rather than all consumption areas (Şener and Hazer, 2008). According to Nel, Booysen and van der Merwe (2016), convenience plays a crucial role in the willingness of participants to participate. People are generally less likely to practice energy-saving actions if there is a high behavioural cost relating to money, effort or convenience. This is known as the low-cost hypothesis - if the perceived cost of engaging in a behaviour is low, the greater the probably that attitudes are transported into actual behaviour (Casaló, Escario and Rodriguez-Sanchez, 2019). Thus, behaviours like air-drying clothing could be seen as having a lower cost than the use of greywater systems. Another point to consider is that of dwelling area – individuals who live in apartments or rent

a dwelling are more likely to report lower ranges of practices since they lack direct control over being able to install solar technology or water tanks (Stanes, Klocker and Gibson, 2015; Baldini, Trivella and Wente, 2018), future research could study rental demographics, as the current study did not address them.

3.5.4. Overall SCB

Across all consumption domains, there was moderate to low engagement in sustainable behaviour, with only a percent of households in this study falling into a high level of sustainable consumption. This is consistent with Ganglmair-Wooliscroft and Wooliscroft (2022), who found that, on average, consumers tend to undertake a few or a limited number of sustainable behaviours. Similarly, Mkhize and Ellis (2020) found that South African consumers displayed moderate ecologically conscious consumer behaviour, and Li *et al*. (2023) also found that no households in China achieved a high sustainability score when looking at household food consumption. However, the findings of this study are in opposition to Shahbaz *et al.* (2022), who found that in Pakistan, households engaged in medium to high levels of sustainability, and low sustainability households being the smallest percentage of the sample, indicating a deviation from some international studies.

In this study, housing had the highest sustainability engagement and mobility had the least, in line with Kehayova-Stoycheva, Ivanov and Vasilev (2023). According to Whitmarsh, Capstick and Nash (2017), people are relatively inconsistent with environmental behaviours. For example, they may recycle but do not reduce driving. There is not much evidence that the 'sustainable consumer' people are likely to adopt a variety of sustainable behaviours which are driven by different motivations and contexts (Whitmarsh, Capstick and Nash, 2017). For example, Lavelle, Rau and Fahy (2015) found that In Ireland, lower-income and less educated participants reported everyday habitual behaviours such as buying reusable items and saving water and energy, suggesting that some habitual behaviours may be linked to financial necessity rather than deliberate choice, the better-off participants were more likely to engage in occasional green behaviours such as purchasing energy-efficient appliances. The presence of or access to infrastructure and services that allow for sustainability predetermines if people can actualise their pro-environmental values, especially in an urban context, where provision systems, infrastructure, housing costs and obligations due to contracted time are heavily predetermined (Wiedenhofer *et al.*, 2018). On top of structural issues, many behaviours that

negatively impact the environment tend to occur frequently and in unchanging settings (driving to work, disposing of garbage), and these behaviours are ingrained into everyday life and difficult to change (Kurz *et al.*, 2015). Habitual daily behaviour can be a powerful barrier to change; once habits take shape, they persist without much deliberation or re-consideration (Linder *et al.*, 2022).

3.5.5. The Influence of Income On SCB

Analysis of sustainable consumption behaviour (SCB) across the consumption areas revealed differences between income groups. High-income households were more likely to engage in a broader range of sustainable behaviour, aligning with findings from Kirsten and Eligius Biyase (2023), who observed that SCB was highest among those with high socio-economic status in South Africa. The current study found that food and housing were positively related to income, while mobility was negatively correlated with income, suggesting that as a household's income increases, so do their sustainable behaviour regarding food and housing; however, as household income increases, sustainable mobility behaviour decreases. This could potentially be attributed to the high use of private vehicles by high-income households and the high use of alternative forms of transportation by low-income households. However, this reliance on alternative forms of transportation could be linked to issues surrounding costs and accessibility rather than a focus on sustainability (Oviedo *et al.*, 2022). Many of the behaviours that are engaged in may not be undertaken specifically for sustainability purposes; rather, they are the convenient or only choice, such as the use of public transport or air-drying clothes. According to Whitmarsh, Capstick and Nash (2017), environmentally beneficial behaviours are often contextually driven and motivated by a range of rationales, including pro-environmental, pro-social, self-deterministic and economic rationales.

Shittu (2020) argues that one of the most important factors in translating attitudes into sustainable behaviour is having a high income, and according to Ifegbesan *et al*. (2022), income can positively affect certain behaviours while negatively affecting others, such as the use of public transport and bicycles. Li *et al*. (2023) examined food sustainable consumption in China and found that sustainability increased as households grew and received higher annual income. Shahbaz *et al*. (2022) found that in Pakistan, income positively affects the sustainable consumption behaviour in the areas of food, energy and water of households and gradually increases as the income level of the household increases. Szulc-Obłoza and Żurek (2024) found

that in Poland, income positively influenced the approval of spending money on sustainable products and services. In Nigeria, people belonging to upper or upper-middle classes tend to engage more in pro-environmental behaviour; the behaviour measured in the study included 'looking after the environment is important to this person', 'caring for nature and saving life resources', 'protecting the environment vs economic growth'; 'past two years: the individual has given money to an ecological organisation', and 'past two years: the individual has participated in demonstrations for the environment' (Ifegbesan and Rampedi, 2018). A study in China found that middle-class individuals were more; in contrast, Ganglmair-Wooliscroft and Wooliscroft (2022) found that income had no significant correlation with sustainable consumption behaviour, similar to Casaló and Escario (2018) who found that in Spain there was no significant link between pro-environmental behaviour and income. In contrast, a study in Australia found that the lowest-income households were doing more work in terms of environmental sustainability than the highest-income households when looking at sustainability behaviours relating to energy consumption, water consumption, recycling practices and shopping practices (Waitt *et al.*, 2012). It is important to acknowledge that while high-income households may have higher levels of self-reported sustainable behaviours, when concerning consumption of resources, high-income households tend to consume more resources than low-income households and thus have a correspondingly higher carbon footprint (Peattie, 2010; Middlemiss, 2018; Shittu, 2020; Castano Garcia *et al.*, 2021; Thøgersen, 2021; Huang *et al.*, 2024). Thus, future studies should consider examining the carbon footprint or total consumption levels of households, or examining the levels of self-reported sustainable behaviours against actual consumption levels.

Unsustainable household behaviours could be linked to the high costs that are associated with engaging in pro-environmental behaviour regularly and the inability to make sustainable decisions immediately (Lavelle *et al*., 2015). According to Lazaric *et al*. (2020), belonging to the low-income group has a negative effect on the chances of adopting sustainable behaviour, as concern for the environment would seem to be a 'luxury', especially for groups that struggle to adjust their budgets to the economic constraints. Sustainable consumption may not be as important of consideration when compared to other issues, and people may not have the resources to engage in this behaviour (Middlemiss 2018). While a growing sector of middle to higher-income consumers tend to engage in overconsumption behaviours, low-income consumers are challenged by the affordability of sustainable alternatives (Dreyer, Sonnenberg

and Van der Merwe, 2022). Everyday life and goods and services are strongly structured according to the available time and income of households (Wiedenhofer *et al.*, 2018). For example, actions such as using public transport or conserving water and energy rarely involve additional costs and are, therefore, less dependent on a consumer's income level (Dreyer, Sonnenberg and Van der Merwe, 2022). Jelev, Mladenova and Stoimenova (2022) state that Bulgarian households are mainly focused on their current costs in the short run rather than on investing in modern housing appliances and conditions, which can cut costs in the long run. Sustainable behaviour that has a large financial cost, such as efficiency upgrades, is seen as inconvenient and time-consuming (Truelove and Gillis, 2018).

The findings of this study show that income plays a critical role in shaping the adoption of sustainable consumption behaviour, highlighting a lack of access to some sustainable behaviour for low-income households and discrepancies between the different consumption areas for all income groups, with housing having the most behaviour practised and mobility having the least engaged with behaviour and emphasising the importance of addressing income inequalities when it comes to promoting household SCB.

3.6. Conclusions

This study examines the sustainable consumption behaviour of households in South Africa across an income gradient. The study suggests that income status plays a role in the adoption and range of SCB that households can partake in. Overall, there is moderate to low engagement in SCB from South African households, with high-income households having greater engagement. Overall, the disparities in household SCB highlight the need for policies that make SCB more accessible to all income groups, with potential policies targeting specific areas such as the low uptake of home-grown food across all groups. Thus, it can be argued that heterogeneity matters in sustainability debates and practice. Hence, authorities mandated with supporting sustainability practices, such as municipalities, should consider how social status might shape and constrain sustainability practices as a basis for tailoring relevant interventions.

Chapter 4: Drivers of Sustainable Consumption Behaviour Among Households in Hout Bay, South Africa

4.1. Abstract

Evidence suggests that the earth is under severe pressure from human-induced change relating to unsustainable consumption of goods such as energy, water, transport and food. Though households are at the centre of unsustainable consumption practices, there is limited understanding of the drivers of consumption behaviour across socio-economic contexts, especially in emerging and highly differentiated economies like South Africa. Using data from questionnaires administered to 302 households, the study investigates the drivers of sustainable consumption behaviour (SCB) across the domains of food, mobility, and housing across a differentiated socio-economic household gradient in Hout Bay, Western Cape, South Africa. the modal response of participants was calculated for all participants as well as by income group, to estimate the most frequently occurring responses and was displayed via descriptive statistics. A non-parametric Spearman's rank correlation was performed to explore the relationship between the drivers, socio-demographic data and SCB. The findings show that attitudes, environmental concern, knowledge and social norms were the key drivers of sustainable behaviour in the consumption areas of food and housing, environmental risk perception had a limited effect, and there was a negative association with governance. Income had a positive relationship with attitudes, environmental concern, and environmental knowledge. These results highlight the importance of tailored policies and targeted awareness campaigns to enhance sustainable consumption practices. This study contributes to a nuanced understanding of SCB drivers, providing a foundation for strategies that support sustainable lifestyle transitions.

4.2. Introduction

Unsustainable human consumption patterns of resources such as water, energy, food, materials and land negatively affect the planet, contributing to major environmental and social issues (UNEP, 2016; Quoquab, Mohammad and Sukari, 2019; Hansen, 2023). Human activities are linked to biodiversity and ecosystem decline, altering the earth's climatic system, pollution and depletion or overuse of resources (McPhearson *et al.*, 2021; Ghali-Zinoubi, 2022) Consumption is intrinsically linked to sustainability, as any choice about how much, what to consume or disposal of goods, directly or indirectly impacts the environment as well as future generations (Caeiro, Ramos and Huisingh, 2012; Trudel, 2018). Therefore, behaviour needs to shift to sustainable alternatives to avoid overconsumption, which exerts harmful impacts on the environment (Quoquab and Mohammad, 2020). Sustainable household consumption is crucial for lowering GHG emissions and using resources efficiently and effectively (Shahbaz *et al*., 2022). However, these behaviours are contingent on several factors, processes, circumstances and dynamics, and it is important to understand these to understand different levels of household consumption practices (UNEP, 2016; Dimitrova, Ilieva and Angelova, 2022; Shahbaz *et al.*, 2022). Thus, it is important to understand what could potentially drive behaviour, and as such, there is a substantial proportion of literature directed at understanding the drivers of SCB (Wang, Liu and Qi, 2014; Paladino and Pandit, 2019; Slocum, Drugova and Curtis, 2022; Teresa Foti *et al.*, 2022; Vighnesh *et al.*, 2022; Batool *et al.*, 2023; Confetto *et al.*, 2023; Yener, Secer and Ghazalian, 2023) from multiple disciplines and theoretical perspectives. These drivers are crucial in influencing to what extent SCBs are adopted.

Although there are many studies examining the drivers of SCB, there is limited understanding of the drivers of SCB in a developing country context. Developing countries are faced with a multitude of challenges relating to development and sustainability, which are compounded by ever-increasing populations, rising urbanisation and unemployment (Ifegbesan *et al.*, 2022). Various drivers have been examined in the literature, including socio-demographic factors and socio-psychological factors (Rampedi and Ifegbesan, 2022). The drivers of sustainable consumption encompass both internal and external factors such as ‘socio-demographics, institutional, socio-economic, environmental knowledge, attitudes, intrapersonal values – environment, intrapersonal values – non-environmental, personal capabilities, products, and producer-related, and context-related factors’ (Piligrimienė *et al.*, 2021; Testa *et al.*, 2021;

Rampedi and Ifegbesan, 2022). Drivers of SCB do not work independently or in isolation, but often, SCB is influenced by multiple drivers. For example, Li *et al*. (2021) found that awareness alone did not reduce energy consumption, but subjective factors also played an important role in consumption, and Volschenk, Viljoen and Schenck (2021) found that there were multiple influences on participation in a curbside recycling programme, including the education level of household members responsible for waste management, how long households had lived in their homes and the size of the household among other factors. While strong environmental reasons may exist to reduce consumption, other factors often motivate a low-carbon lifestyle (Whitmarsh, Capstick and Nash, 2017). These factors need to be considered to promote SCB. For example, in a study of water use behaviour in Makhanda, South Africa, (Pamla, Thondhlana and Ruwanza, 2021) argued that water conservation behaviour is mainly driven by households not wanting to run out of water, suggesting environmentally friendly behaviour may not be the primary motivation for sustainable practices. The drivers of sustainable consumption encompass both internal and external factors, and the findings of various studies discussed here show a complex interplay between these drivers.

Very few studies have been conducted on drivers of SCB in a South African context, and the most recent studies use secondary rather than primary data (Ifegbesan *et al.*, 2022; Rampedi and Ifegbesan, 2022; Kirsten and Eligius Biyase, 2023). These studies used the International Social Survey Programme Environment III 2010 (ISSP, 2010) dataset for analysis of the drivers for this study. There are several measurement methods or extended theories that have been used to study drivers of SCB and related concepts. For example, several studies have used the Theory of Planned Behaviour (TPB) to examine drivers of SCB, and several studies have extended the TPB to include measures not in the original TPB. Other theories used include the value-belie-norm theory and social cognitive theory (Phipps *et al.*, 2013; Concari, Kok and Martens, 2020; Sheoran and Kumar, 2022). The use of these multiple theories and methods across the literature makes it difficult to have comparable results in the literature. Thus, this study employs a measurement method that has already been used in South Africa but has only been used in secondary studies, and the drivers of this are examined in the next section.

4.3. Drivers of Sustainable Consumption Behaviour

The drivers of sustainable consumption behaviour are well documented in the literature including attitudes, environmental concern, environmental knowledge, environmental risk perception, social norms and governance.

4.3.1. Attitudes

Attitudes have been identified as a psychological tendency that is conveyed by evaluating the natural environment positively or negatively (Sánchez, López-Mosquera and Lera-López, 2016; Blankenberg and Alhusen, 2018) and are key to understanding behaviour in general. Generally, positive environmental attitudes are expected to positively influence households' actions regarding behaviour like recycling, water and energy saving (Sánchez, López-Mosquera and Lera-López, 2016). Several studies have found that environmental attitudes influence SCB or the intention to engage in SCB (Liu *et al.*, 2012; Wang, 2017; Paço, Shiel and Alves, 2019; Ma *et al.*, 2023). López-Mosquera, Lera-López and Sánchez (2015) examined recycling, environmentally responsible purchase behaviour and car use in Spain and found that participants with firm environmental attitudes made the most environmentally aware purchases and reduced car use for environmental purposes. In contrast, another study in Spain found that only curtailment behaviour (separating rubbish and using street rubbish bins) was significantly correlated with environmental attitudes (Casaló, Escario and Rodriguez-Sanchez, 2019). Khan and Thomas (2023) found that in Saudi Arabia, sustainable consumption relating to pollution control and sustainable gasoline consumption were significantly influenced by ecological attitudes. Al Mamun *et al*. (2018) found that in Malaysia, attitude was an influential determinant of green consumption relating to the use of green products.

Consumers are becoming more aware of the impacts their consumption has on the environment, society and the economy, resulting in positive attitudes towards sustainable behaviour (Szulc-Obłoza and Żurek, 2024). These consumers tend to be more knowledgeable about the effects of their choices, feel the impact of their actions and are inclined to pay a premium for sustainable products. However, some researchers point out that attitudes do not always match actual consumption practices, which creates an attitude-behaviour gap (Szulc-Obłoza and Żurek, 2024). Given the empirical evidence highlighting the significant role of attitudes in influencing sustainable consumption behaviour, it is expected that positive attitudes promote

sustainable consumption behaviour in the areas of housing, food and mobility. It is also expected that well-off households will exhibit more positive attitudes towards the environment than middle- and low-income households.

4.3.2. Environmental Concern

Environmental concern (EC) refers to "the awareness or insight that the natural state of the environment is being threatened by resource overuse or pollution" (Blankenberg and Alhusen, 2018:3) and has been found to be a key motivator for sustainable consumption and behavioural intention (Blankenberg and Alhusen, 2018; Alzubaidi, Slade and Dwivedi, 2021; Shahbaz *et al.*, 2022). Ghali-Zinoubi (2022) found that in Tunisia, environmental concern was a significant motive for environmentally conscious purchasing of products. Saari *et al*. (2021) found that in nine European countries, sustainable consumption relating to purchase behaviour and energy and water use was influenced by environmental concerns. Hosta and Zabkar (2021) found that environmental concern had the strongest impact on Responsible Sustainable Consumer Behaviour (RSCB), relating to general environmentally and socially responsible behaviours. Bruderer Enzler and Diekmann (2019) found that in Sweden, there was a clear pattern indicating an association between higher environmental concern and more environmentally friendly behaviour for all consumption domains: food, mobility and housing. However, it is important to note that while environmental concern strongly influences behavioural intention, high levels of environmental concern alone do not guarantee SCB (Saari *et al.*, 2021). Kabadayi, Koksal and Dursun (2016) found that in Turkey, environmental concern did not contribute to all forms of pro-environmental behaviour, such as energy-saving behaviour, green buying behaviour, simple buying and recycling. Kirsten and Eligius Biyase (2023) found that in South Africa, environmental concerns were higher among lower socio-economic groups who could not act on those concerns due to financial constraints. Based on the literature, it is expected that a high level of EC will encourage sustainable consumption behaviour, while a low EC will not.

4.3.3. Environmental Knowledge

Environmental knowledge is the amount of information individuals have regarding environmental concepts and issues and their ability to understand the impact of these issues on the environment (Blankenberg and Alhusen, 2018; Saari *et al.*, 2021). According to Saari *et al*.

(2021:3), environmental knowledge is "not only about the negative effects of environmental issues but also the potential mitigation approaches that shape individuals' intentions and attitudes." Individuals who are more knowledgeable about environmental problems are inclined to have a positive environmental attitudes and better chances of engaging in sustainable consumption behaviour (Saari *et al.*, 2021). Several studies have found that environmental knowledge influences SCB (López-Mosquera, Lera-López and Sánchez, 2015; Al Mamun *et al.*, 2018; Lin and Niu, 2018; Čapienė, Rūtelionė and Tvaronavičienė, 2021; Shahbaz *et al.*, 2022; Ghaffar and Islam, 2023; Ma *et al.*, 2023). Saari *et al*. (2021) found that in nine European countries, environmental knowledge had a strong direct impact on SCB. Rampedi and Ifegbesan (2022) found that environmental knowledge was a strong predictor of environmental behaviour. In a study in Germany, Geiger, Geiger and Wilhelm (2019) found that though there was a high level of environmental knowledge, PEB uptake was average, stating that the influence of knowledge was overridden by intervening factors such as situational restrictions or old behaviour. Amoah and Addoah (2021) found that in Ghana, environmental knowledge was highly significant in explaining pro-environmental behaviour, which includes green environmental behaviour, cleaning environmental behaviour, efficient water resources and good sanitation behaviour. Liu, Teng and Han (2020) found that environmental knowledge had no significant direct influence on PEB in China it was still considered a crucial variable. Given this background, it is expected that a high level of environmental knowledge will be associated with a high level of pro-environmental behaviour and that high-income households are likely to exhibit more environmental knowledge than middle- and low-income households.

4.3.4. Environmental Risk Perception

Environmental risk perception (ERP) stimulates people's sense of urgency and responsibility to protect the environment and encourages environmental protection behaviour (Zeng, Jiang and Yuan, 2020). The feeling of risk can cause an emotional response to environmental degradation and the condition of the environment, potentially resulting in a strong commitment to environmental causes (Saari *et al.*, 2021). According to Saari *et al*. (2021:3), people "react in three ways to environmental risks: having a rational understanding of the issue, willingness to act, and being emotionally affected by environmental degradation." However, it has been found that there is a discrepancy between ERP and behaviour (Zeng, Jiang and Yuan, 2020).

Saari *et al*. (2021) found that in nine European countries, environmental risk perception directly influenced SCB, relating to the purchase of foods that are pesticide and chemical-free, energy and water saving and avoidance of purchasing certain products. Zeng, Jiang and Yuan (2020) found that in China, ERP is positively correlated with pro-environmental behaviour. Given the consistent evidence in the literature highlighting the significant role of ERP in influencing SCB, it is expected that a high level of ERP will promote a high level of sustainable consumption behaviour, while low ERP will not.

4.3.5. Social Norms

Following certain norms is related to peers as people search for conformity and try to avoid social disapproval. Individuals with social ties to others who hold pro-environmental norms are more likely to engage in PEB (Blankenberg and Alhusen, 2018). According to Dreyer, Sonnenberg and Van der Merwe (2022), social norms are a significant influencing factor as individuals with a strong sense of moral or social responsibility will be more motivated and willing to practice sustainable behaviour. People do not behave in isolation, and influences, in the form of opinions or behaviour, from the social environment can often motivate or hinder changes (Piligrimiene *et al.*, 2020; Dimitrova, Ilieva and Angelova, 2022).. Lazaric *et al*. (2020) found that in France, peer effects are important for promoting sustainable consumption behaviour relating to a broad range of behaviours, ranging from the purchase of dairy products to the use of washing machines and changing consumption patterns in social groups.

Group belongingness matters - consumers and citizens are more able to identify with those most proximate to them, and this identification is more influential than information campaigns for promoting sustainable consumption. Sustainable consumption seems to remain within the acceptability limits of the individual's social environment and requires the social approval of the individual's close network, such as family and friends (Lazaric *et al.*, 2020). Piligrimiene *et al*. (2020) looked at green product buying behaviour and found that the social environment has an indirect positive effect on sustainable consumption. However, Alzubaidi, Slade and Dwivedi (2021) found that social influences did not affect intentions towards PEB in Saudi Arabia, which they state could be due to the recent changes occurring in the country surrounding rapid development and economic growth, potentially impacting how these consumers think. Given the empirical evidence highlighting the role of social norms in

influencing sustainable consumption behaviour, it is expected that social norms will promote sustainable consumption behaviour.

4.3.6. Governance

Government regulations play a strong role in influencing sustainable consumption, especially in high-income countries (Figueroa-García, García-Machado and Yábar, 2018). Individuals who are concerned about the environment are more likely to act pro-environmentally in countries where government institutions are fair, efficient and impartial, compared to those in countries where government institutions are not efficient or impartial (Kulin and Johansson Sevä, 2021). Efforts from the relevant stakeholders can lead to substantial results if they are supported by strong governance and effective, sustainable consumption policies (Yaqub *et al.*, 2024). A cross-national study conducted in 31 countries (a mix of developed and developing countries, such as Denmark and South Africa) found that in high-income countries, effective environmental governance encouraged people to participate in SC (Wang, 2017). This is corroborated by Kulin and Johansson Sevä (2021), who state that people are more likely to engage in PEB in countries where the quality of government is high. Ganglmair-Wooliscroft and Wooliscroft (2022) also found that government regulations can influence the uptake of some SCB, stating that the Austrian government has a long history of promoting regional organic agriculture, which explains the high PEB in the country. Given the evidence that governance influences sustainable consumption, it is expected that high governance will promote sustainable consumption behaviour.

4.3.7. Income Status

The drivers of SCB may also vary across an income gradient because different income groups can experience specific barriers or drivers when it comes to engaging in sustainability. Kirsten and Eligius Biyase (2023) found that in South Africa, those with a higher socio-economic status displayed high levels of environmental knowledge. In contrast, environmental concern was higher among those with low socio-economic status, which they link to the exposure to degradation hypothesis – people that are more exposed to environmental degradation will have higher levels of environmental concern. However, low-income groups may struggle to adjust their budgets to engage with sustainable behaviour. For example, the high costs associated with renewable energy use make them inaccessible to low-income households. Understanding

whether drivers of SCB also vary across an income gradient may be relevant in explaining why some behaviours may vary across income groups.

Several studies have found that environmental perceptions and attitudes towards environmental issues or SCB tended to be higher among high-income households; Nahar, Hossain and Mahiuddin (2023) found that in Bangladesh, participants' perceptions and attitudes about pollution were stronger when their income was higher. Sulemana, James and Valdivia (2016) found that in both African and developed countries, participants in the upper and middle classes had higher levels of environmental concern than the lower classes. Eom, Kim and Sherman (2018) found that in the USA, personal beliefs about climate change predicted support for pro-environmental policies more strongly among individuals with a higher socio-economic status. However, in some cases, studies have found the opposite; Huddart Kennedy, Krahn and Krogman (2015) found that in Canada, household income was negatively related to environmental concerns when looking at pro-environmental behaviour (use of vehicles, product purchase, reuse of goods, composting, recycling and energy and water saving) and carbon footprint; environmental concern may depend more on the quality of one's immediate environment than on the income. Lo (2014) conducted a 36-country survey and found that there was an inverse relationship between income and perception of environmental risks; higher-income participants were relatively less concerned about long-term environmental risks, whereas lower-income participants saw the environmental consequences as very dangerous. How people support and engage in sustainable behaviour is significantly affected by contextual, social, economic and cultural factors (Eom, Kim and Sherman, 2018). Given this background, this chapter examines the key drivers of sustainable consumption behaviour among households across a differentiated socio-economic context. The key questions of the study included:

- What are the drivers of sustainable behaviour in the domains of food, mobility and housing consumption?
- How do the drivers differ across an income gradient?
- What are the implications of the findings on our understanding of drivers to SCB?

4.4. Methodology

4.4.1. Sample Selection Design

The sampling approach of this study is similar to the one reported in Chapter 3, Section 3.1.

4.4.2. Data Collection

Data were collected through a questionnaire. The questionnaire was designed to collect information on the socio-demographic profile of the respondents as described in Chapter 3, and the perceived drivers of sustainable consumption behaviour. Measures were adapted from the International Social Survey Programme Environment III 2010 dataset (ISSP, 2010) and relevant literature (Figueroa-García, García-Machado and Yábar, 2018; Piligrimiene *et al*., 2020; Saari *et al*., 2021; Rampedi and Ifegbesan, 2022; Kirsten and Eligius Biyase, 2023), and included measures of attitude, environmental concern, environmental knowledge, environmental risk perception, social norms and governance. The study participants were asked to indicate if they agreed or disagreed with the statements measuring the above-mentioned measures with responses on a 5-point Lickert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree).

To measure attitude, measures were drawn from Rampedi and Ifegbesan (2022), the respondents were asked about the extent to which they agree or disagree with the following three statements: "*People worry too much about the future of the environment and not enough about prices and jobs; people worry too much about harming the environment, and that many claims about the environment are exaggerated.*" Responses to the following statements were reverse coded to ensure that lower scores reflect more supportive attitudes toward sustainable consumption behaviours (SCB): *"It is just too difficult for someone like me to do much about the environment*" and "*There are more important things to do in life than protect the environment*."

To measure environmental concern (3 items), measures were drawn from Saari *et al*. (2021) and Kirsten and Eligius Biyase (2023) the participants were asked about the extent to which they agree or disagree with the following statements: "*We worry too much about the future of the environment and not enough about prices and jobs; People worry too much about human progress harming the environment,* and *many of the claims about environmental threats are*

exaggerated." All items in the Environmental concern section were reverse coded for low scores to indicate high environmental concern and high scores to indicate low environmental concern.

Environmental knowledge (3 items)measures were drawn from Rampedi and Ifegbesan (2022) and Kirsten and Eligius Biyase (2023), and included items measuring how much respondents felt they knew about the causes of environmental problems and the corresponding solutions. The statements included: *"In reference to the above issues, I know much about the causes of these sorts of environmental problems; I know much about the solutions to these environmental problems,* and *I find it hard to know whether the way I live is helpful or harmful to the environment*." The last statement was reverse coded, for low scores to indicate a high level of awareness about one's actions on the environment and for high scores to reflect uncertainty about one's environmental impact. The first two questions in environmental knowledge are related to a list of nine environmental issues being faced across the globe.

Environmental Risk Perception (3 items) measures were drawn from Saari *et al*. (2021), Rampedi and Ifegbesan (2022) and Kirsten and Eligius Biyase (2023) and measured the respondents' perceptions of the dangers of the air pollution that is emitted by cars and by industry and the rise in the world's temperature, drawing on the following statements: "*In general, do you think that air pollution is caused by cars; In general, do you think that air pollution is caused by industry;* and *in general, do you think that the rise in the world's temperature is caused by climate change*".

Social norms (5 items) were drawn from Figueroa-García, García-Machado and Yábar (2018) and Piligrimiene *et al*. (2020), and explored the influence of friends and family on consumption patterns and the perceived societal value of sustainable behaviour. Social norms were measured by responses to the following statements: "*There are many people in my closest environment who choose sustainable consumption patterns; the opinions of my friends and family about my consumption patterns are important to me; I like it when others notice and value my efforts to preserve the environment; individuals who choose green products are greatly appreciated in society,* and *I have felt pressured by friends or family to perform an activity for the benefit of the environment.*"

The last driver was governance (2 items) was drawn from Figueroa-García, García-Machado and Yábar (2018) and included the statements: "*The government does enough to motivate more responsible behaviour,* and *the government is responsible for doing what is necessary so I can do things in favour of the environment*." The statement: "The government does enough to motivate more responsible behaviours" was reverse coded, with a low score indicating a high level of support from the government and a high score reflecting a low level of support.

4.4.3. Data Analyses

Cronbach's alpha was conducted in Jamovi to assess the internal consistency of the scale items. For Cronbach's alpha, a value of 0.7 or higher was considered acceptable internal consistency. Table 4.1 shows the Cronbach's alpha for the driver's measurement scale. All measurement items, except for environmental knowledge and government, have a good internal consistency. Environmental Knowledge had a lower alpha value ($\alpha = 0.649$), indicating questionable reliability. Governance also had a low Cronbach's alpha ($\alpha = 0.00749$), indicating poor internal consistency. Although governance has a poor internal consistency, it was still been included in the study due to its theoretical importance. Governance plays an important role in shaping the structural conditions available for SCB, however future studies could strengthen the governance measure to better understand its role in shaping SCB.

Table 4.1: Cronbach's alpha of driver's measurement items

	Mean	**SD**	**Cronbach's α**
Attitude	2.92	1.14	0.785
Environmental concern	3.02	1.14	0.844
Environmental knowledge	2.95	0.874	0.649
Environmental risk perception	4.09	0.785	0.793
Social norms	2.92	0.785	0.735
Governance	2.40	0.839	0.00749

A descriptive analysis of the drivers is presented, and although this may not provide meaningful insight into the actual patterns of the drivers, it is still relevant as it provides a foundational overview of the participants responses and highlights the general trends in the data. For the drivers, the modal response of participants was calculated for all participants as well as by

income group, to estimate the most frequently occurring responses and was displayed through descriptive statistics. To analyse the strength and direction of the relationship between the drivers, socio-demographic data and SCB, a non-parametric Spearman's rank correlation was conducted in Statistica Version 14.0.0.15. The drivers (attitude, environmental concern, environmental knowledge, environmental risk perception, social norms and governance) were averaged to calculate a composite score, which was then correlated with the sustainable consumption behaviour areas (food, mobility and housing). Socio-demographic variables were also correlated with the SCB and the drivers.

4.4.4. Limitations

The measures on drivers are drawn from studies conducted in developed countries, or secondary studies, meaning that there is a likelihood that the measures used may not fit the South African population completely, due to the heterogeneity within the country (Kirsten and Eligius Biyase, 2023). The second limitation relates to social desirability bias in self-reported questionnaires, where individuals are likely to respond positively to portray a pro-environment image. However, the responses may not always be fully consistent with their actual beliefs or subsequent behaviour (Gravelines *et al*., 2022).

4.5. Results

Table 5.2 presents a summary of the participants' reported attitudes, environmental concerns, environmental knowledge, environmental risk perception and social norms by income group.

4.5.1. Attitude

The results show that high-income households tended to have positive attitudes towards the environment relative to middle- and low-income households. For example, high-income participants strongly disagreed with the statements 'it was difficult for them to do much about the environment' (48%) and 'that there were more important things in life than protecting the environment' (60%) (Table 5.2). About 37% of high-income households agreed that they did what was right for the environment, indicating their supportive views towards environmental protection. Comparatively, middle-income households were largely ambivalent about their ability to do something about the environment, whether there were 'more important things in

life than the environment' and whether they did something about the environment regardless of costs. Low-income households felt it was 'difficult to do much about the environment,' with 32% agreeing with the statement, while 32% strongly agreed that 'there are more important things to do in life than protect the environment.' About 44% strongly disagreed with the statement that they do what is right for the environment, indicating that the environment may not be a key concern for this group. Overall, the results show marked differences in attitudes between the different income groups, with a largely positive attitude for high-income households, ambivalence for middle-income groups and negative attitudes for low-income households.

4.5.2. Environmental Concern

Regarding environmental concern, high-income households tended to have higher levels of environmental concern relative to middle- and low-income households. Thirty-six percent of high-income participants disagree with the statements that 'we worry and focus too much on the environment at the expense of jobs and prices' and that 'people worry too much about human progress harming the environment.' About 43% of high-income participants strongly disagreed with the statement that 'many of the claims about environmental threats are exaggerated,' indicating a relatively high level of environmental concern among this group. Middle-income participants displayed an overall neutrality toward all the environmental concern statements. About 37% of low-income households strongly agreed with the statement that 'we worry too much about the future of the environment and not enough about prices and jobs', suggesting a greater focus on economic concerns for this group. Thirty-seven percent of low-income households agreed that 'people worry too much about human progress harming the environment', and 29% were neutral about the statement stating that 'many claims about environmental threats are exaggerated.' Overall, the results show marked differences in environmental concerns among the income groups, with mainly positive environmental concerns for high-income households, ambivalence for middle-income households and negative environmental concerns for low-income households.

4.5.3. Environmental Knowledge

High-income participants showed the highest levels of self-assessed understanding of environmental issues. Just over half (52%) agreed that they knew much 'about the causes of

environmental problems,' and 42% agreed that they knew about 'the solutions to environmental problems.' Nearly half of high-income households (48%) disagreed that they 'find it hard to know whether how they lived impacts the environment,' indicating that this group was knowledgeable about the impact that their lifestyles have on the environment. For middle-income households, the responses were largely neutral regarding the causes of environmental problems (45%), and they 'found it hard to know how their lives impact the environment' (39%); 36% of middle-income households disagreed that they 'know about the solutions to environmental problems.' Low-income households showed an overall low level of environmental knowledge with 41% of low-income households strongly disagreed that they 'know about the causes of environmental problems,' and 38% disagreed that they 'know about the solutions to environmental problems.' Low-income households agreed (31%) that they 'find it hard to know whether how they live impacts the environment.' Overall, high-income households have high levels of environmental knowledge, compared to a neutral level among middle-income households and low levels among low-income households.

4.5.4. Environmental Risk Perception

All groups demonstrated high levels of environmental risk perception (ERP). For high-income households, just about half (52%) agreed that 'air pollution was caused by cars', 51% strongly agreed that 'pollution was caused by industry', and 46% strongly agreed that the 'rise in the world temperature was caused by climate change.' Similar trends were seen across middle- and low-income groups. Middle-income households agreed with all the statements: 'air pollution was caused by cars' (32%), 'air pollution was caused by industry' (37%), and the 'rise in the world's temperature was caused by climate change' (36%), compared to 44%, 38% and 43% for low-income households, respectively. Altogether, the results indicate a wide recognition of environmental risks across income levels.

4.5.5. Social Norms

Concerning social norms, there were no marked differences between income groups. About 56% of high-income households agreed that 'many people in their close environment chose SC', and 29% disagreed that they 'felt pressured to perform an activity for the benefit of the environment.' The rest of the responses for high-income households were neutral. For middle-income households, 42% agreed that 'the opinions of their friends and family about their

consumption patterns were important to them', and 39% agreed that they 'liked it when others noticed and valued their efforts to preserve the environment.' The rest of the responses for middle-income households were neutral. There was more variation in the responses given by low-income households. Thirty-four percent of low-income households disagreed that 'there were many people in their close environment that chose SC', 44% agreed that 'the opinion of their friends and family about their consumption patterns was important to them,' and 36% agreed that they 'liked it when others noticed and valued their efforts to preserve the environment.' A nearly similar proportion of low-income households (32%) disagreed that 'individuals who chose green products were appreciated in society,' and 33% strongly disagreed that they had 'felt pressured to perform an activity for the benefit of the environment.'

4.5.6. Governance

Concerning governance, more low-income households (74%) than high-income (51%) households strongly disagreed that 'the government did enough to motivate more responsible behaviour,' with middle-income households responding neutrally to the statement (42%). Both high-income (28%) and middle-income (30%) households agreed that 'the government was responsible for doing what was right,' whereas low-income households strongly disagreed (24%).

Overall, high-income households seemed to have higher environmental perceptions (attitude, concern, knowledge) than the other income groups, with middle-income households remaining mostly neutral regarding environmental perceptions and low-income households having low levels of environmental perceptions. All income groups had a high level of environmental risk perception, indicating that they were aware of environmental risks.

Table 4.2: Descriptive results of drivers by income groups

	High-income (n=97)		**Middle income (n=76)**		**Low-income (n=116)**		**Total sample (n=302**	
	Mode	(%)	Mode	%	Mode	%	Mode	%
Attitude								
It is just too difficult for someone like me to do much about the environment.	SD	48	N	36	A	32	SD	24
There are more important things to do in life than protect the environment.	SD	60	N	39	SA	30	SD	26
I do what is right for the environment, even when it costs more money or takes more time.	A	37	N	32	SD	44	N	25
Environmental concern								
We worry too much about the future of the environment and not enough about prices and jobs.	D	36	N	45	SA	37	N	25
People worry too much about human progress harming the environment.	D	36	N	29	A	37	A	26
Many of the claims about environmental threats are exaggerated.	SD	43	N	46	N	29	N	28
Knowledge								
In reference to the above issues, I know much about the causes of these sorts of environmental problems.	A	52	N	45	SD	41	N	27
I know much about the solutions to these environmental problems.	A	42	D	36	D	38	D	30
I find it hard to know whether the way I live is helpful or harmful to the environment.	D	48	N	39	A	31	D	32
Environmental risk perception								
Air pollution is caused by cars.	A	52	A	32	A	44	A	43
Air pollution is caused by industry.	SA	51	A	37	SA	38	SA	40
The rise in the world's temperature is caused by climate change	SA	46	A	36	SA	43	SA	41
Social norms								
There are many people in my closest environment who choose sustainable consumption patterns.	A	56	N	46	D	34	A	31
The opinions of my friends and family about my consumption patterns are important to me.	N	33	A	42	A	44	A	40
I like it when others notice and value my efforts to preserve the environment.	N	45	A	39	A	36	A	35
Individuals who choose green products are greatly appreciated in society.	N	39	N	36	D	32	N	29
I have felt pressured by friends or family to perform an activity for the benefit of the environment.	D	29	N	38	SD	33	N	26
Governance								
The government does enough to motivate more responsible behaviours.	SD	51	N	42	SD	74	SD	57
The government is responsible for doing what is necessary so I can do things in favour of the environment.	A	28	A	30	SD	24	A	25
Key: SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree								

4.5.7. The Relationship Between SCB And Socio-Demographic Variables

There was a statistically significant but weak negative correlation between household size, food behaviour and housing (Table 4.3). There was a statistically insignificant positive relationship between household size and mobility. Age had a significant but weak positive relationship with food and housing but a negative association with mobility. Lastly, there was a moderate to strong positive association between education and all three behaviour areas of food, mobility and housing.

Table 4.3: Spearman's rank correlation between SCB and socio-demographic variables

Variable	**FOOD**		**MOBILITY**		**HOUSING**	
	Spearman R	*p-value*	*Spearman R*	*p-value*	*Spearman R*	*p-value*
Household size	-0.160	0.006*	0.003	0.956	-0.161	0.006*
Age	0.263	<0.001*	-0.108	0.061	0.252	<0.001*
Education	0.482	<0.001*	0.144	0.013*	0.589	<0.001*

Table 4.4. shows several significant relationships among the variables. Education and income showed significant positive associations with attitudes, environmental concern, environmental knowledge and social norms, suggesting that higher levels of these factors were linked to increased pro-environmental attitudes and awareness. Environmental risk perception was significantly associated with household size but not with other demographic factors. The role of government exhibits significant negative associations with education, indicating a complex dynamic in how these variables interact with perceptions of governmental responsibility in sustainable practices. No significant correlations were observed between the variables and age or household size across most factors, reflecting the nuanced influence of demographic factors on sustainability drivers.

Table 4.4: Spearman's rank correlation between drivers and socio-demographics

Driver	**Household size** *Spearman; p-value*	**Age** *Spearman; p-value*	**Education** *Spearman; p-value*	**Income** *Spearman; p-value*
Attitude	-0.097; 0.098	0.185; <0.001*	0.574, <0.001*	0.724; <0.001*
Environmental concern	-0.044 0.455	0,163; 0,005*	0.535; <0.001*	0.641; <0.001*
Environmental knowledge	-0.104; 0.078	0.205; <0.001*	<0.001*; 0.572	0.664; <0.001*
Environmental risk perception	0.217; 0.000*	0.102; 0.078	0.098; 0.094	0.062; 0.294
Social norms	-0.029; 0.620	-0.051; 0.380	0.246; <0.001*	0.286; <0.001*
Government support	-0.031; 0.605	0.010; 0.866	-0.165; 0.005	-0.114; 0.056

4.5.8. The Relationship Between SCB And Drivers

The results indicate that attitude and environmental concern were consistently strong drivers of SCB, especially within the food and housing categories. Attitude showed a strong positive correlation with food SCB and a moderate positive correlation with housing SCB (Table 4.5), suggesting that positive environmental attitudes were significantly associated with sustainable food and housing choices. However, mobility had a negative correlation with attitudes, indicating that individuals with stronger pro-sustainability attitudes tended to report lower mobility averages. Environmental concern also showed a strong positive correlation with both housing and food SCB, indicating that greater concern for environmental issues is linked to more sustainable behaviour in these areas. Mobility was also negatively correlated with environmental concerns. Knowledge had a positive correlation with food SCB and housing SCB but yielded a negative correlation with mobility. Environmental risk perception did not yield a statistically significant correlation with all three SCB areas. Social norms were weakly but positively correlated to food and housing practices and had a weak negative correlation with mobility. Government was negatively correlated with food and mobility but did not have a significant correlation with housing. Overall, these findings highlight attitude, environmental concern, and knowledge as the most influential drivers of SCB, particularly for food and housing, while the effects of social norms, policies, and risk perception appear less straightforward. In the case of mobility, these factors were associated with reduced mobility

averages, suggesting that individuals with stronger environmental values and knowledge were more likely to engage in behaviours that limit mobility.

Table 4.5: Spearman's rank correlation between SCB and external factors

Consumption area	Spearman rank coefficient (rho)	p-value
Food		
Attitudes	0.731	<0.001*
Environmental concern	0.613	<0.001*
Environmental knowledge	0.676	<0.001*
Environmental risk perception	-0.097	0.092
Social norms	0.267	<0.001*
Government support	-0.295	<0.001*
Mobility		
Attitudes	-0.377	<0.001*
Environmental concern	-0.303	<0.001*
Environmental knowledge	-0.340	<0.001*
Environmental risk perception	-0.071	0.222
Social norms	-0.129	0.025*
Government support	-0.124	0.034*
Housing		
Attitudes	0.707	<0.001*
Environmental concern	0.636	<0.001*
Environmental knowledge	0.637	<0.001*
Environmental risk perception	0.005	0.934
Social norms	0.323	<0.001*
Government support	-0.103	0.077

4.6. Discussion

The study examined the drivers of sustainable consumption among a differentiated household gradient in Hout Bay, South Africa.

4.6.1. Socio-Demographic Factors

Education was positively related to all three SCB areas of food, mobility and housing in line with the notion that more educated individuals are more likely to understand sustainability issues than less educated individuals and, in turn, are more concerned about sustainable

consumption. This has also been reported by Ukenna, Idoko and Ogbari (2018), who found that in Nigeria, education level was a primary driver of overall SCB relating to renewable energy and transportation, sustainability-driven GDP, recycling behaviour and waste management behaviour. In a study in Brazil, Feil *et al*. (2020) found there was a positive link between level of education and behaviour towards organic foods, a pattern which has been widely reported in studies elsewhere (Casaló and Escario, 2018; Ifegbesan and Rampedi, 2018; Casaló, Escario and Rodriguez-Sanchez, 2019; Rampedi and Ifegbesan, 2022). Higher education levels tend to correlate with greater awareness of social welfare and engagement in activities such as environmental reading, recycling, and nature participation (Blankenberg and Alhusen, 2018; Ukenna, Idoko and Ogbari, 2018; Lazaric *et al.*, 2020). Shahbaz *et al*. (2022) found that more educated individuals in Pakistan reported higher levels of sustainable consumption practices across the consumption areas of food, energy and water. A cross-national study found that consumers in the United Kingdom who had spent more time in formal education purchased products with less packaging, and in Brazil, those with higher education avoided consumption (Whitmarsh, Capstick and Nash, 2017).

Age was significantly related to food and housing, suggesting that the older the individuals, the higher the likelihood of engaging in stainable practices, as has been found elsewhere (Morrison and Beer, 2017; Lazaric *et al.*, 2020; Wang *et al.*, 2021; Kaur *et al.*, 2022). Ilakovac *et al*. (2020) found that age had a positive impact on household food waste in Croatia. Martinsson, Lundqvist and Sundström (2011) found that age was an important factor in energy saving in Sweden. This could be attributed to "lifelong learning and the increase in environmental knowledge that individuals acquire over time" (Ifegbesan *et al*., 2022:12) or potentially that older households have more incentives to reduce energy consumption by investing in energy efficient retrofit measures, as they spend more time at home, thus consuming more energy (Trotta, 2018).

Concerning household size, larger households were associated with limited sustainable behaviour, consistent with the findings by Williams, Thondhlana and Kua (2022), who found that among high-income households in South Africa, large households were more likely to consume more electricity than smaller households and (Mutumbi, Thondhlana and Ruwanza, (2021) who found that in South Africa, household size had a negative relationship with electricity saving behaviour. In this study this could be explained by difficulty in assigning

ascription in large homes or settings. However, Li *et al*. (2023) found that in China, sustainability increased as households grew in size, and Baldini, Trivella and Wente (2018) found that investing in energy-efficient appliances increased with the number of household inhabitants – more household members resulted in greater energy consumption leading to a greater incentive to invest in energy saving. The divergent findings of this study from global literature suggest that more studies should be conducted looking at the number of household members and SCB.

4.6.2. Attitude

The strong positive correlations between attitude and SCB in the food and housing categories suggest that internal motivations play a critical role in promoting sustainable behaviour, in line with other studies that have found that environmental attitudes tend to have a significant influence on SCB or influence the intention of SCB behaviour. López-Mosquera, Lera-López and Sánchez (2015) found that attitudes were important variables when it comes to the promotion of responsible purchase behaviour and car use in Spain. Szulc-Obłoza and Żurek (2024) found that consumers in Poland with a positive attitude about sustainable behaviour 'acquire, use, and dispose of products' in a sustainable way. Casaló and Escario (2018) found that environmental attitudes are positively associated with environmental behaviour relating to waste, recycling, energy and cycling. Several other studies also found a link between attitudes and SCB (Liu *et al.*, 2012; Wang, 2017; Al Mamun *et al.*, 2018; Paço, Shiel and Alves, 2019; Paladino and Pandit, 2019; Rampedi and Ifegbesan, 2022; Khan and Thomas, 2023; Ma *et al.*, 2023; Yaqub *et al.*, 2024).

Nässén *et al*. (2015:487) found that pro-environmental attitudes by themselves have a rather small influence on household energy use, stating that "people may simply not be aware of how their behaviour causes GHG emissions or what changes could be effective for reducing emissions." They also show that social, economic and physical structures may be more important than attitude. Wyss, Knoch and Berger (2022) found that when environmental gains are high and personal costs are low, then pro-environmental attitudes better predict environmental behaviours. While food and housing were positively related to attitudes in the current study, mobility was negatively correlated with attitudes, differing from a study done in Spain that found participants with firm environmental attitudes reduced their car use (López-Mosquera, Lera-López and Sánchez, 2015). This could indicate that despite positive attitudes,

issues relating to practical constraints (cost, lack of sustainable transport options) or habitual use of unsustainable forms of transport (Dütschke *et al.*, 2022) may limit people's abilities to act on their attitudes in this consumption area.

The current study also found that there is a positive relationship between income and attitudes, as income increases, so do the environmental attitudes, in line with several other studies. Nahar, Hossain and Mahiuddin (2023) found that in Bangladesh, attitudes about environmental pollution were stronger when participants' monthly income was relatively high, and Martinsson, Lundqvist and Sundström (2011) found the same in Sweden. The current study also found a positive relationship between attitudes and education, in line with Bühren and Wicker (2024), who found that among Europeans, individuals with lower and medium education express significantly lower environmental attitudes than higher-educated participants, and Nahar Hossain and Mahiuddin (2023) found that in Bangladesh, people who had received a tertiary education had stronger environmental attitudes. This link between attitudes and income could be attributed to environmental matters being seen as not essential for low-income households and can only be engaged in when other basic needs, such as 'adequate food, shelter, and economic security,' have been met (Dlamini *et al.*, 2020). This can be seen in the agreement with the statement "*There are more important things to do in life than protect the environment*" by the low-income participants in the study; the environment is not a key priority for this group, potentially due to economic constraints.

A study conducted in the USA found that high-status participants expressed a sense that being environmentally friendly is good and achievable. In contrast, lower-status participants expressed "eco-powerlessness", which relates to uncertainty and fear in the face of environmental issues and a sense that their daily actions have very little impact on broader issues (Kennedy and Givens, 2019). This can be seen in this study with the agreement by low-income participants toward the statement "It is just too difficult for someone like me to do much about the environment." The low-cost hypothesis further reflects this income-related disparity in attitudes; when the costs or pressure of adopting a behaviour is low, people find it easier to transform their attitudes into behaviour, and when the cost is high, there is no or minimal behaviour change (Trotta, 2018).

The study highlights the significant role that attitudes play in contributing to sustainable consumption behaviour and finds a positive relationship between income and attitudes.

Households that have a higher income and positive attitudes towards the environment are more likely to adopt behaviour that aligns with sustainability. This implies that any interventions or policy measures based on attitudes will be most effective when targeted towards high-income households. However, the study found a negative relationship between attitudes and mobility behaviour, suggesting that households with strong environmental attitudes may face challenges when it comes to practising sustainable mobility behaviour, which can be linked to the high use of private vehicles by high-income households. This highlights the attitude-behaviour gap in mobility behaviours among high-income households. While high-income households may have high environmental attitudes, there is a gap between those attitudes and the actual behaviours practised, particularly for the consumption area of mobility. In contrast, low-income households exhibited lower environmental attitudes but were more engaged in sustainable mobility behaviours (use of public transport and walking), however, this is more out of necessity than wanting to be sustainable. These findings highlight that there are sector-specific constraints towards sustainable behaviours, and thus, interventions need to be tailored towards addressing these constraints. Future research could be conducted to understand the specific reasons why high-income households do not act on their attitudes in the sustainability area of mobility to better inform future interventions.

4.6.3. Environmental Concern

The strong positive correlations between environmental concern and food and housing SCB suggests that awareness that the environment is being threatened is a key driver for sustainable consumption behaviour. This is in line with findings elsewhere that have found environmental concerns to influence SCB (Ukenna, Idoko and Ogbari, 2018; Hosta and Zabkar, 2021; Rampedi and Ifegbesan, 2022). A study in South Africa found that environmental concerns were significant determinants of intention to engage in sustainable consumption, relating to energy saving, green purchasing, food waste and reusable bags (Maduku, 2024). Bruderer Enzler and Diekmann (2019) found that in Sweden, environmental concern was correlated with environmental behaviour for all consumption domains (food, mobility and housing). However, the effects are much lower for housing than for food and mobility, slightly differing from the findings of the current study.

The current study found that environmental concern had a negative correlation with mobility, which can also be linked to the high use of private vehicles by high-income households. Some

studies have found that environmental concern may not be linked to all behaviour; a study in Turkey found that environmental concern did not foster all forms of pro-environmental behaviour such as energy-saving behaviour, green buying behaviour, simple buying and recycling (Kabadayi, Koksal and Dursun, 2016), and van Oosterhout *et al*. (2023) found that in eight European countries, concern was not a strong predictor of sustainable plastics consumption. Thus, while environmental concern may be an important factor, it may not be the most important factor, and high levels of environmental concern do not always translate into SCB (Kabadayi, Koksal and Dursun, 2016; Saari *et al.*, 2021; Kirsten and Eligius Biyase, 2023; van Oosterhout *et al.*, 2023). This suggests that while concern for environmental issues motivates sustainable choices in areas individuals can control directly, it has less impact on behaviour influenced by external factors. For example, people can choose to buy local foods or install energy-efficient appliances (if they have the means to do so). However, for an area like transport, factors such as the availability and reliability of alternative transport options will influence whether somebody can make use of alternative transport.

The low engagement with cycling across the sample indicates that the infrastructure for this form of transport may be lacking, or there may be an issue of safety and may be perceived as unsafe. The findings suggest that increasing environmental concern through awareness campaigns might be more effective in domains where individuals have greater control, such as food and housing. However, that may not be as effective for environmental concerns; rather, systematic constraints may need to be addressed first for mobility. Making public transport more accessible could contribute to reduced car dependency. For example, Brazil and Colombia have integrated successful, sustainable bicycle programmes into the urban transport system of low-income neighbourhoods by adding long-term bicycle storage and maintenance infrastructure, bicycling rights-of-ways near major transit stations, and encouraging safe bicycle usage through education, art, and incentive programs. Building safe bicycling infrastructure has the potential to shift public perceptions of the risks of bicycling and generate more modal usage of bicycles (Manoela *et al.*, 2014; Fried *et al.*, 2020)

This study found a positive correlation between environmental concern and education; Peisker (2023) examined drivers of environmental concern in 206 European regions and found that regions with younger and better-educated populations exhibited higher levels of environmental concern, which they link to the joint outcome of better science literacy, improved abstract

thinking skills, and social norms in this group. The study found a positive relationship between income and environmental concern; as income increases, so does the participants' environmental concern, which is in line with several studies. Bruderer Enzler and Diekmann (2019) found that in Sweden, lower environmental concern and higher income are both related to less environmentally friendly behaviour, relating to the GHG emissions of mobility, housing and food. Franzen and Meyer (2010) conducted a cross-national study (involving both developed and developing countries) and found that individuals with higher incomes displayed higher levels of concern for the state of the natural environment, and Peisker (2023) found that in 206 European regions, one of the drivers of environmental concern was income level, the environmental concern of participants increased with income level. Which they attributed to a Maslowian finite pool of worry, meaning that concern about immediate needs (economic security) trumps concern about higher-level needs like environmental protection. Sulemana, James and Valdivia (2016) found that in both African and developed countries, participants in the upper and middle classes were more environmentally concerned than the lower classes.

This corelation between environmental concern and education and income could be attributed to the social class hypothesis, which argues that environmental concern is related to high education and income levels; people tend to be concerned with ‘higher concerns’ such as the environment once they have met their basic needs (Mtutu and Thondhlana, 2016; Sulemana, James and Valdivia, 2016). However, several studies have found the opposite. For example, in a study that looked at the link between people’s dietary intakes and their behaviour and attitudes to pro-environmental issues in Scotland, Asvatourian *et al*. (2018) found that people with lower incomes were more concerned about environmental issues than those with higher incomes, which they link to higher-income participants being more well educated. Huddart Kennedy, Krahn and Krogman (2015) found that in Canada, household income was negatively related to environmental concerns when looking at pro-environmental behaviour (use of vehicles, product purchase, reuse of goods, composting, recycling and energy and water saving) and carbon footprint. Kirsten and Eligius Biyase (2023) found that in South Africa, environmental concern was higher among those with low socio-economic status, which they link to the exposure to degradation hypothesis. Indicating that overall environmental concern may be context-dependent and could be influenced by other factors or may be part of a complex relation with other factors like structural or social contexts.

Performing sustainable behaviour involves knowledge, time, money, supportive facilities and enabling services. Therefore, the influence of environmental concern on behaviour will potentially be weaker in societies where there are economic constraints, a lack of information about environmental issues or access to sustainable alternatives (Tam and Chan, 2017). Sulemana, James and Valdivia (2016) found that in African countries, participants seemed to care more about economic growth and jobs than the environment, consistent with the high levels of unemployment across the continent. This is seen in the current study with the strong agreement among low-income households with the statement, "*we worry too much about the future of the environment and not enough about prices and jobs.*"

The study highlights the significant role that environmental concern plays in contributing to sustainable consumption behaviour and also finds a positive relationship between income and environmental concern. Households that had a higher income and positive attitudes towards the environment were more likely to adopt practices that align with sustainability, which could be explained by affordability; environmental issues are a type of 'luxury' for low-income individuals and can only be indulged in after basic needs have been met (Dlamini, Tesfamichael and Mokhele, 2022). For low-income households, economic concerns are of more importance than environmental concerns; thus, policies need to emphasise the co-benefits of climate action, for example, highlighting job creation in the renewable energy sector (Peisker, 2023). Environmental policies that do not take economic concerns into consideration risk being unpopular and shifting public priorities away from environmental concerns (Peisker, 2023).

Several authors have linked education and environmental concern (Mtutu and Thondhlana, 2016; Dlamini, Tesfamichael and Mokhele, 2022; Liu, Shryane and Elliot, 2024); thus, in order to increase environmental concern, there should be a focus on environmental education through both informal and formal avenues. However, there was a negative relationship between environmental concern and mobility, indicating that strong environmental concerns may be insufficient to overcome structural or infrastructural challenges. Thus, any efforts towards improving environmental concerns should also be linked with improvements to infrastructure to make it easier to act on environmental concerns.

4.6.4. Environmental Knowledge

Moderate positive correlations between knowledge and SCB, particularly in food and housing, imply that understanding environmental issues may enable individuals to make more sustainable choices, indicating that people who are relatively more knowledgeable about the environment will engage in environmentally friendly behaviour. Wang *et al*. (2018) found that in China, consumers' knowledge about electric vehicles significantly related to their intention to adopt electric vehicles, and Sun, Liu and Zhao (2019) found that in China, environmental knowledge increased green consumption, relating to recycling, driving, energy and water consumption and avoiding certain products. A study conducted in Poland found that households equipped with greater knowledge about energy-saving techniques exhibit a higher propensity to adopt energy-efficient behaviour (Gajdzik *et al.*, 2024). In the UK, knowledge plays a key role in several environmental behaviours, such as reducing energy consumption and changing purchasing patterns (Pothitou, Hanna and Chalvatzis, 2016). Trotta (2018) found that knowledge was positively correlated with energy-saving behaviour and the adoption of energy-efficient appliances, also in the UK.

However, Lin and Niu (2018) state that environmental knowledge alone is insufficient to change consumers' actions to protect the environment. While knowledge alone may not directly influence behaviour, it modifies attitudes and contributes to more sustainable actions (Amoah and Addoah, 2021; Dimitrova, Ilieva and Angelova, 2022). Geiger, Geiger and Wilhelm (2019) found that while there was a high level of environmental knowledge in Germany, the uptake of pro-environmental behaviour (PEB) relating to mobility, private energy consumption, waste management, consumption choices, social behaviour and nutrition, the influence of knowledge was overridden by intervening factors such as situational restrictions or old behaviour. Liu, Teng and Han (2020) found that in China, environmental knowledge had no significant direct influence on PEB relating to green consumerism, water and energy use, and waste recycling. The current study found a negative relationship between mobility and environmental knowledge, and similar findings were found in Chile. Otto *et al*. (2016) found that there was a significant negative relationship between environmental knowledge and the use of cars and planes, attributing this behaviour to being highly dependent on financial resources and income, which could be the case in this study due to the high use of private vehicles by high-income households.

The current study found a positive relationship between income and environmental knowledge, findings that are in line with other studies. Kirsten and Eligius Biyase (2023) found that in South Africa, those with a higher socio-economic status displayed high levels of environmental knowledge. Low *et al*. (2020) found that in Malaysia, participants with higher household incomes had increased awareness of haze pollution and adopted more safety measures compared with participants with lower household incomes. Otto *et al*. (2016) found that income fully accounted for the positive relationship between environmental knowledge and pro-environmental behaviour, stating that income is generally related to education and thus determines environmental knowledge.

The study argues that while environmental knowledge plays in contributing to can contribute to sustainable consumption behaviour, it may not be enough to stir people towards SCB, possibly due to external factors such as infrastructure or availability of sustainable options such as accessible public transport or affordable renewable energy.

4.6.5. Environmental Risk Perception

The generally weak and non-significant correlations between environmental risk perception (ERP) and SCB across categories suggest that merely recognising environmental risks may not be sufficient to drive sustainable behaviour, especially seeing as there was a relatively high level of agreement for ERP among the participants. These findings differ from several studies that have found ERP to influence SCB. For example, Rampedi and Ifegbesan (2022) found a significant relationship between ERP and environmental behaviour relating to recycling, pesticide and chemical-free foods, lessening driving, energy and water saving and avoiding purchasing in South Africa. Khan and Thomas (2023) found that participants were aware of the harm that excessive usage does to the environment, resulting in them favouring the purchase of eco-friendly cars and, where possible, using public transportation. Several other studies have found that ERP influences behaviour (Zeng, Jiang and Yuan, 2020; Saari *et al*., 2021; Ghaffar and Islam, 2023; Zeng, Jiang and Yuan, 2020; Saari *et al*., 2021; Ghaffar and Islam, 2023).

Environmental risk perception in the current study is not related to any socio-demographic variables other than household size. However, other studies have found correlations between socio-demographics and ERP. Ergun, Karadeniz and Rivas (2024) found that in European countries, risk perception is exhibited by more educated individuals. Lo (2014) found in a

cross-national study that richer individuals were less concerned with environmental risks, potentially due to material insecurity reinforcing the sense of risk that individuals who live in more difficult economic situations are more exposed to risks. The lack of significant findings in the current study could potentially indicate that people may not translate risk awareness into action due to a perceived lack of control or competing priorities. Thus, focusing on other factors rather than risks may be an effective strategy for promoting SCB. More studies examining ERP are needed to understand if and how it may drive SCB in different contexts.

4.6.6. Social Norms

Social norms positively correlated with food and housing indicating that behaviour perceived as socially approved or expected can enhance sustainable practices, especially when choices are visible to others. Jansen, Hoja and Rahe (2024) found that sustainability behaviour towards sustainable food consumption (adapted from Geiger) was predicted by pro-socialness. Figueroa-García, García-Machado and Yábar (2018) found that in Spain, SCB (performance of general activities for the environment and human rights and consuming local products) was predicted by social environmental influence, especially those from friends and family. Kour (2024) found that social norms have a direct influence on the willingness of consumers to purchase green products in India. Several other studies have shown that social influences or norms influence SCB (Wang *et al*., 2019; Wakefield and Axon, 2020; Čapienė, Rūtelionė and Tvaronavičienė, 2021; Ghaffar and Islam, 2023).

The current study found that there was a negative correlation between social norms and mobility due to the high use of private vehicles by high-income households, differing from Khan and Thomas (2023), who examined mobility and gasoline SCB and found that social norms significantly influenced SCB. The current study found a positive relationship between education and social norms, as well as income and social norms. A study done in the US found that environmental identities strongly predicted environmental behaviour when the behaviour was visible to others (Brick, Sherman and Kim, 2017). According to Lazaric *et al*. (2020), SCB requires the social approval of the individual's close network, such as family and friends. The findings suggest that social norms may be a way to promote sustainable behaviour, for example, community-based initiatives or visibility of sustainable practices. For example, A study in Belén, Costa Rica, found that a social norm intervention, which compared a household's water

use to that of its neighbour, led to measurable reductions in water use (Calvo Gonzalez, Jose Miranda and de Castro Zoratto, 2015).

4.6.7. Governance

The negative correlation between government influence and SCB in all domains suggests a possible disconnect between government efforts and individual sustainable behaviour. Government regulations play a strong role in encouraging SCB, especially in high-income countries (Figueroa-García, García-Machado and Yábar, 2018). A cross-national study in 31 countries (a mix of developed and developing countries, such as Denmark and South Africa) found that in high-income countries, effective environmental governance encouraged people to participate in SCB (Wang, 2017). This is corroborated by Kulin and Johansson Sevä (2021), who state that people are more likely to engage in PEB in countries where the quality of government is high. People may perceive government policies as insufficient, poorly implemented, or even as barriers to their sustainable choices. A study by Mthembu and Nhamo (2021) examined the trajectory of the climate SDG in South Africa and found that, while South Africa has good climate change mitigation policies and strategies in place, they are largely ineffective due to being voluntary, a lack of concrete actions to implement them, inconsistencies in the broader policy framework and a lack of adequate institutions to implement policies and strategies. This indicates that insufficient implementation of policies in South Africa could actually be a potential barrier to sustainable behaviour.

The different impacts of the drivers across the SCB domains, as well as the link with income, show the complexity that comes with promoting sustainable behaviour, as some drivers play a more prominent role depending on the consumption area and the income of a household. Factors like attitudes, environmental concern and knowledge are more effective drivers for food and housing, whereas mobility behaviour appears to be influenced by factors beyond attitudes, environmental concern and knowledge, potentially influenced by infrastructure and accessibility. Attitudes, environmental concerns, knowledge and social norms are all associated with income. This highlights that a tailored approach is needed for promoting SCB. Policies or interventions should target the most relevant drivers for each consumption area. For example, bettering public transport infrastructure and availability might be more relevant for mobility, while educational campaigns could be more impactful for food and housing behaviour. Having interventions that will better environmental awareness and knowledge in South Africans, can

contribute to increasing SCB (Rampedi and Ifegbesan, 2022). It is essential to understand that drivers of SCB are multifaceted and will have different levels of importance and relate to different systems. For example, changing behaviours toward more sustainable options is not only linked to an individual's attitudes about the environment, rather, it can also be dependent on their social systems, or what infrastructure is available.

4.7. Conclusions

This study examines the drivers of SCB in the residential sector in South Africa and offers insight into how sustainability may be promoted. The study reveals that attitudes, environmental concerns, and knowledge significantly influence sustainable behaviour in the consumption areas of food and housing, where people may have more direct control. Social norms positively impact all consumption areas, highlighting the importance of community influence in promoting SCB. However, environmental risk perception had a limited effect, suggesting that simply raising awareness of risks may not effectively promote sustainable practices. The negative association with perceived government influence implies a potential gap between policy and public expectations, calling for more visible or aligned governmental actions. Income is positively related to all the drivers except for environmental risk perception and governance. The relationship between income and drivers emphasises how financial resources influence the ability to act on drivers, such as knowledge, attitudes, and social norms. Higher-income groups may have greater flexibility to align their behaviour with sustainable practices, while lower-income groups may face obstacles that limit their choices despite similar levels of concern or awareness. This underscores the need to consider income as a significant factor when analysing SCB. These findings highlight the complexity of promoting sustainable behaviour, with some drivers having more influence on behaviour depending on the consumption area and the income of a household. It is important to highlight this complexity and the differences in drivers when looking at sustainable behaviours and what drives them in a South African context. The socio-economic disparities within the country shape what infrastructure and resources households have access to, shaping how they engage with sustainable behaviours. This suggests that in order for any sustainable behaviour policies or interventions to be successful, they need to be tailored to the specific contexts they will be used in rather than using the same interventions across multiple different contexts.

Chapter 5: Synthesis and Recommendations

5.1. Summary of Key Findings

5.1.1. Sustainable Consumption Behaviour

The results of this study show that income status plays a role in the adoption and range of SCB that households can engage in. There was moderate to low engagement in SCB by households between income groups, with high-income households reporting greater engagement. Regarding food consumption, high-income households often used fresh ingredients and leftovers, while low-income households engaged less in organic food and energy-saving cooking. Regarding mobility, high-income households preferred private vehicles, while low-income households relied on walking and public transport. With regards to housing, practices such as air-drying clothes were common across income levels, though renewable energy use was low, with higher-income households having more access to renewable energy sources. This highlights that there in the South African context, income plays a critical role in shaping how households adopt sustainable consumption behaviour. The variability in behaviour across the consumption areas and the income gap shows that higher-income households may be better equipped to partake in SCB, whereas low-income households might face practical constraints, emphasising the importance of addressing income inequalities when considering the promotion of household-level SCB. The disparities in household SCB highlight the need for policies that enable SCB to be more accessible to all income groups, with potential policies targeting specific areas such as the low uptake of home-grown food across all groups. Sustainable consumption behaviour is crucial for achieving a sustainable future.

5.1.2. Drivers of SCB

The study suggests that attitudes, environmental concerns, knowledge and social norms significantly affect sustainable behaviour in the consumption areas of food and housing. These are areas where people may have more direct control and show the importance of community influence when it comes to SCB, whereas mobility behaviour appears to be influenced by factors beyond attitudes, environmental concern and knowledge, potentially influenced by infrastructure and accessibility. However, environmental risk perception does not have a relationship with any SCB, indicating that being aware of risks may not effectively promote

SCB. The negative association with governance implies a potential disparity between policy and public expectations. The different impacts of the drivers across the SCB domains, as well as the link with income, show the complexity that comes with promoting sustainable behaviour, especially in a country like South Africa, where there is a vast gap between income groups. It is important to recognise that higher-income households may be better equipped to engage in SCB, whereas low-income households may face practical constraints, and drivers like attitude or environmental concern will not contribute to sustainable behaviours without the right interventions or policies to promote or enable these behaviours in all income groups.

5.2. Recommendations

Changes in SCB cannot only be achieved through changes in consumption patterns, as these patterns are associated with complex causes that are linked to both behavioural and structural forces (Biswas and Roy, 2015; Claudelin *et al.*, 2018; Liobikienė and Brizga, 2022; Gupta *et al.*, 2024). Factors such as infrastructure, culture, urbanisation, and economic structure all play a significant role when it comes to shaping household consumption; thus, there is a need for extensive stakeholder involvement on different levels involving municipalities, businesses, science, and other stakeholders to implement changes in consumption systems (Liobikienė and Brizga, 2022). Interventions need to be context-specific, as nationally driven programmes may not fit the specific needs or realities of a local area (Shittu, 2020); it is critical to know about "the history, culture, values, and norms of the region and its residents as a key factor in both the design and enforcement of any external intervention" (Wang, 2017:1149).

- Given the high reliance on private vehicles for high-income households, among this group alternative forms of transportation should be encouraged. More public transport infrastructure developments for urban and long-distance travel, e.g., cycling lanes, buses, and trains (Ivanova *et al.*, 2020), and the promotion of already existing public transport available such as the MyCiTi Bus (https://www.myciti.org.za/). A behavioural intervention that aimed to reduce commuting by car in Pristina, Kosovo, by addressing common barriers and promoting sustainable alternatives. The campaign provided participants with a free, personalised 30-day bus pass, a public bus map, and a trifold calendar to track their car-free commutes. They also received weekly emails encouraging them to plan their car-free travel and were entered into a raffle for a branded water bottle. The emails also emphasised

positive social norms and the benefits of alternative forms of transport. The intervention helped reduce private vehicle use and increased participants walking to work. The intervention influenced social norms and future commuting intentions. Employees in the intervention group were more likely to perceive that their colleagues and social circles had positive attitudes toward bus commuting while reporting lower perceived norms around car use. They also showed a higher probability of walking to work in the future, though no significant change was observed in their intentions to use the bus. This highlights the potential of targeted interventions to foster more sustainable commuting habits (ideas42, 2024).

- Since high-income households have the highest levels of working from home (WFH) among participants in this group, the local municipality should work with businesses to promote and encourage WFH for those who can do this type of work to lessen the high use of private vehicles.
- The use of community initiatives to promote social norms surrounding SCB can be a pathway towards promoting SCB. Shittu (2020:9) states that involving households in community activities and engaging in collaborative consumption could "inspire households to see themselves as co-producers of goods and services", which could thus improve attempts towards achieving SCB. For example, in the study area, there is a community-run garden (https://loveinabowl.co.za/) that provides food for vulnerable people within the community and allows residents to purchase local produce. This type of community programme could be supported by allocating underutilised land to community gardens and having the local municipalities get involved with these programmes.
- Given the positive relationship between knowledge, education and SCB, environmental education should be enhanced through educational programmes and campaigns to promote SCB. Environmental education, both formal and non-formal, could be integrated into education systems to promote pro-environmental behaviour (Ifegbesan and Rampedi, 2018), but this can only be a long-term plan. Formal education should make environmental studies mandatory to equip learners with knowledge about the natural environment and the consequences of unsustainable human activities. Non-formal education should extend across all sectors of society, emphasising lifelong learning for sustainable development and ecological stewardship (Ifegbesan and Rampedi, 2018), and sustainable lifestyles.
- Given the link between attitudes and sustainable behaviour and the link between attitudes and income, policymakers and businesses should appeal to the green values of high-income

households and promote the environmental benefits of green products or services (Gladstone and Bellezza, 2024).

- Providing more information on what technologies are available and the benefits of sustainable options and alternatives; to reduce any misconceptions and costs or quality can be another option for promoting SCB at the household level. For example, having environmentally relevant labels on products and certification programmes are possible ways to increase consumer knowledge surrounding the environmental impacts of food products (OECD, 2023).
- To improve energy and water use in households, energy and water efficiency programmes can be implemented. Sovacool *et al*. (2022) state that a strategy to promote sustainable behaviour can be to harness pay-as-you-go programmes, leasing programmes or community models that do not require consumers to buy a given technology.
- Offering subsidies or financial incentives to lower-income households could help remove the financial barriers to engaging with SCB, therefore allowing these households to increase their adoption of renewable energies or purchasing of organic products. Mahmoodi *et al*. (2021) found that among Swiss consumers, incentive-based electricity tariffs were of interest to both environmentally concerned consumers and consumers with little to no environmental concern. Using incentive-based electricity tariffs could be a way to promote energy saving; some examples include rewarding households for using electricity during off-peak hours or rewarding households that install renewable energy technologies.
- Policies related to pricing of products could contribute to better accessibility of low-carbon or sustainable alternatives, as it is not possible to achieve more sustainable consumption patterns by only changing how households consume. The availability of GHG-intensive consumption could be limited through regulative instruments such as bans, restrictions or carbon tax, but this should also be balanced by making low-carbon options and alternatives more available, structurally and financially (Dubois *et al.*, 2019). For example, placing higher prices on private vehicles, but making public transport more readily available and accessible at the same time can encourage the use of public transport and yield environmental benefits. For example, a study in Singapore found that congestion tax increased the use of public bus services by between 12% to 20% (Agarwal and Koo, 2016).
- Habits are one of the strongest impediments to lifestyle change, acting to ‘lock in’ behaviour (Whitmarsh, Poortinga and Capstick, 2021). Many behavioural practices that

negatively impact the environment tend to occur frequently and in unchanging settings (e.g., driving to work, disposing of garbage), and this behaviour is ingrained into everyday life and difficult to change (Kurz *et al.*, 2015). Habitual daily practices can be powerful barriers to change because once habits take shape, they persist without much deliberation or re-consideration (Linder *et al.*, 2022). Changing habitual behaviour requires disrupting the environmental factors that automatically cue the performance of habits (UNEP, 2017) and making habitual behaviour into a conscious process (Gkargkavouzi, Halkos and Matsiori, 2019). Possible ways this could be achieved include making sustainable options the default (have grocery stores promote local and organic food options over others) or reinforcing behaviours through incentives (reward programmes for using public transport). For example, discounts or loyalty points could be offered to people who consistently use the MyCiTi Bus frequently.

- Nudging is another way to promote behaviour change. It involves purposeful changes in the environment that guide and enable people to make choices automatically and do so without restricting options or changing economic incentives. It can be done by simplifying the information provided or offering default choices (Lehner, Mont and Heiskanen, 2016; McNeill, 2023). Research has found that nudging has the potential to reduce the environmental impacts of consumption (Lehner, Mont and Heiskanen, 2016). A study in Belén, Costa Rica, found that two interventions significantly reduced water consumption among participants. A social norm intervention, which compared a household's water use to that of its neighbours, and a plan-making intervention, which prompted households to set conservation goals and outline specific actions that led to reductions in water use. However, the interventions had varied impacts - the plan-making intervention was most effective for low-consumption households, whereas the neighbourhood comparison had the strongest impact on high-consumption households. This suggests that social norms and goal setting could be flexible and scalable approaches to promoting SCB for local governments in resource-constrained settings (Calvo Gonzalez, Jose Miranda and de Castro Zoratto, 2015). Thus, the local municipality could create community challenges where neighbourhoods compete to reduce consumption or use a mobile app or website where households can track their consumption in certain areas (water or electricity, for example); the website could offer tips, recommendations and reminders to help households achieve sustainability goals.

- Feedback on energy and water use can be beneficial to reducing household energy or water consumption. For example, Thondhlana and Kua (2016) found that in Makhanda, South Africa, the interest of households in engaging in energy conservation behaviour was sustained over the entire duration of the project, perhaps due to continuous feedback on energy conserved and its concomitant benefits.
- It is important to note that when done in isolation, approaches and measures have marginal effects (Tukker *et al.*, 2010). For example, increasing tax on private vehicles but not bettering public transport options may not lead to much change around private vehicle use. Rather, a combination of measures might yield better results; Thondhlana and Kua (2016) found that households that received a combination of the treatment measures (namely, reminder stickers, pamphlets, discussions and feedback) recorded greater energy-saving than those who did not. This indicates that combining multiple interventions can lead to better behaviour change for sustainable consumption. For example, making public transport more easily accessible and more available, raising awareness on the environmental impacts of private transport, placing taxes or tariffs on private transport and providing incentives for the use of public transport all done together may be more effective in changing mobility behaviour than just placing taxes on private vehicle use. A comprehensive approach may be more effective than relying on a single intervention to promote SCB.

5.3. Suggestions for Further Studies

In light of this background, future research can include the following aspects for a nuanced understanding of SCB:

- A qualitative or mixed methods study to get an in-depth understanding of how households subjectively understand, view and interact with sustainable behaviours and drivers of SCB.
- Conduct a study examining different geographic areas to see if geographic regions may influence SCB.
- Including more consumption areas in the study of SCB, specifically clothing and consumer goods and leisure, to get an even more in-depth understanding of SCB.

- Using the SCB framework to see if there are any spillovers in behaviour. For example, are households that reduce water consumption more likely to engage in other behaviours, such as choosing sustainable food options?
- Including more measures that are not asked on a Likert scale. For example, the size of household property or number of cars owned by households.
- A longitudinal study to examine behaviour changes over time.
- A study examining the actual measured levels of consumption or carbon footprint to examine whether self-reported sustainable behaviours match actual consumption patterns.

5.4. Conclusions

The differences in sustainable consumption behaviour (SCB) across income groups highlight the unequal access to resources, infrastructure and opportunities in South Africa. High-income households have the ability to engage in a broader range of sustainable behaviours, particularly in the consumption areas of housing and mobility, whereas middle and low-income households may face structural barriers that prevent them from engaging in sustainable behaviours. While there is a difference in SCB across income groups, overall, the engagement with SCB was moderate to low, indicating that for residents of Hout Bay, sustainability may not be a primary concern when engaging in their everyday behaviours, highlighting the need for better dissemination of information surrounding sustainable behaviours, as well as tailored interventions that help all income groups engage with SCB to the best of their abilities.

This study highlights that any policies or interventions that focus on changing behaviours without acknowledging structural issues, such as inaccessible alternative transport options, may not be effective; rather, emphasis needs to be placed on making sustainable alternatives or options available, which can then promote households to act. It is important to recognise, for future studies, that not all measures pulled from developed country contexts will be appropriate to understand behaviours in a South African or developing country context. For example, this study found the use of electric vehicles to be incredibly low among households. Thus, even though much literature in developed countries calls for switching to electric vehicles as a sustainable alternative, it currently is not an appropriate measure in a South African context; rather, emphasis should be placed on more financially accessible forms of alternative transport.

This study emphasises the need for localised, context-sensitive approaches to sustainability. While global models and best practices offer insights, South Africa's distinct socio-economic landscape requires targeted interventions which prioritise affordability, accessibility, and structural reform over only individual behavioural change.

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Appendix A

SECTION 1: SUSTAINABLE CONSUMPTION BEHAVIOURS

5-point Likert scale: To what extent do you partake in the following behaviours: 1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always

FOOD	1	2	3	4	5
1. I eat meat for the main meals.					
2. I eat dairy products.					
3. I buy certified organic food.					
4. I buy imported fruits from overseas (e.g. mango).					
5. I cook in an energy-saving way (with little water, suitable lids etc.).					
6. I buy frozen foods and meals.					
7. I dispose of food in the garbage.					
8. I refrain from foods with excessive packaging.					
9. I use leftovers for the next meal.					
10. I buy snacks and drinks in one-way packaging (e.g., takeaway, fast food).					
11. I buy fair trade food products.					
12. I buy regional food products.					
13. I produce/grow food myself.					
14. I eat healthily.					
15. I cook my own meals with fresh ingredients.					
16. I buy foods close to their expiration date.					
MOBILITY	1	2	3	4	5
1. How often do members of your household travel by private vehicle? (owned by the household)					
2. How often do members of your household travel by electric vehicle?					
3. Is the environment an important consideration to your household when purchasing a car?					
4. How often do members of your household make use of public transport in your area?					
5. How frequently do members of your household travel by plane?					
6. How often do members of your household ride-share or carpool to destinations?					
7. Do members of your household walk to destinations?					
8. Do members of your household cycle to destinations?					
9. If you have the ability, how often do members of your household work from home?					
HOUSING	1	2	3	4	5
1. How frequently does the household make use of renewable energy sources for electricity?					
2. How frequently does the household make use of rainwater or greywater systems					
3. How often is energy and water efficiency an important consideration when buying household appliances and products?					

4. When purchasing furniture, how often does your household purchase second-hand?					
5. How often do you make use of appliances like aircon and heaters?					
6. How often do you air-dry washed clothing rather than use a dryer?					
7. How often do our appliances (dishwasher + washing machine) run at full loads?					
8. How often do members of the household shower rather than bath					

SECTION 2: DRIVERS

To what extent do you agree with each of the following statements. For each item, please rate your agreement on a scale of 1 to 5, where 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

Attitude	**1**	**2**	**3**	**4**	**5**
1. It is just too difficult for someone like me to do much about the environment.					
2. There are more important things to do in life than protect the environment.					
3. I do what is right for the environment, even when it costs more money or takes more time.					
ENVIRONMENTAL CONCERN	**1**	**2**	**3**	**4**	**5**
1. We worry too much about the future of the environment and not enough about prices and jobs.					
2. People worry too much about human progress harming the environment.					
3. Many of the claims about environmental threats are exaggerated.					

KNOWLEDGE

The table below is a list of environmental issues that are being faced.

Air pollution	Chemicals and pesticides	Water shortage	Water pollution	Nuclear waste	Domestic waste disposal	Climate change	Genetically modified foods	Using up our natural resources

1.1. In reference to the above issues, I know much about the **causes** of these sorts of environmental problems.					
1.2. I know much about the **solutions** to these environmental problems.					
2. I find it hard to know whether the way I live is helpful or harmful to the environment.					
ENVIRONMENTAL RISK PERCEPTION	**1**	**2**	**3**	**4**	**5**
In general, do you think that ___ is ___					
1. Air pollution is caused by cars.					
2. Air pollution is caused by industry.					
3. The rise in the world's temperature is caused by climate change.					
SOCIAL NORMS	**1**	**2**	**3**	**4**	**5**
1. There are many people in my closest environment who choose sustainable consumption patterns.					
2. The opinions of my friends and family about my consumption patterns are important to me.					

3. I like it when others notice and value my efforts to preserve the environment.					
4. Individuals who choose green products are greatly appreciated in society.					
5. I have felt pressured by friends or family to perform an activity for the benefit of the environment.					
POLICIES AND INSTITUTIONAL FRAMEWORKS	**1**	**2**	**3**	**4**	**5**
1. The government does enough to motivate more responsible behaviours.					
2. The government is responsible for doing what is necessary so I can do things in favour of the environment.					

SECTION 3: HOUSEHOLD SOCIO-DEMOGRAPHIC DATA

1. How many people live in the household:	
2. Gender	
Female	
Male	
Non-binary	
Prefer not to say	
3. **Home language**	
isiXhosa	
Afrikaans	
English	
Other	
Age:	
18-24	
25-34	
35-44	
45-54	
55-64	
65 or older	
4. **Ethnicity**	
Black	
White	
Coloured	
Indian	
Other	
5. **Main source of income**	
Wages	
Social grants	
Private pensions	
Own business	
Other	
6. **Annual Household Income**	

Less than R5 000	
R10 000-R20 000	
R20 000 – 50 000	
R50 000 – 100 000	
Greater than 100 000	
7. **Employment status**	
Employed	
Self-employed	
Unemployed	
Pensioned	
8. **Highest Educational Background:**	
Primary school	
Matric or equivalent	
Bachelor's degree	
Master's degree	
Ph.D. or higher	
Other (please specify)	
Higher certificate	
None	
9. **Type of Dwelling**	
House/cluster house	
Flat	
RDP	
Hostel/compound/boarding house	
Room in backyard	
Shack	
Other	