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Assessment of Policy Integration of Sustainable Consumption and Production into National Policies

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Abstract: Sustainable Consumption and Production (SCP) was adopted as a stand-alone goal and reflected as one of the cross-cutting objectives of the Sustainable Development Goals (SDGs), with a central role to address global resource consumption and its associated environmental impacts, as well as numerous social and economic issues. With this broad characterization of SCP, policy integration is crucial in addressing it at national level. This paper analyzes characteristics of SCP policy integration based on a survey of national government policies. It reveals that SCP is not fully integrated in national policy-making; high resource consumption sectors such as urban planning, building, and tourism are not fully incorporated into national SCP policies, and there is only limited participation of relevant government ministries other than environment ministries. We find that among countries with horizontal policy integration, those with Green Economy/Green Growth frameworks tend to have better sectoral integration; and those with SCP-specific frameworks are likely to have broader coordination of ministries. By conducting cross-analysis using income level and region, the different characteristics of SCP policy-making approaches were identified. The results of this study provide a better understanding of how SCP is integrated into policy for effective national policy-making and measurement of the SDG Goal 12.

Keywords: sustainable consumption and production; sustainable development goals; policy integration; sustainability governance; green economy; green growth

1. Introduction

Global resource demand and environmental pressure have been drastically increasing as both population and per capita consumption reach historic levels [1]. To cope with this global challenge, Sustainable Consumption and Production (SCP) has repeatedly been emphasized in the international process especially since the Rio Summit in 1992. The 10-Year Framework of Programmes for SCP (10YFP) was adopted at the Rio+20 summit in 2012, calling for "fundamental changes in the way societies consume and produce" which is "indispensable for achieving global sustainable development" [2]. Having recognized it as a core and overarching objective of sustainable development [3], SCP was adopted as one of the Sustainable Development Goals (SDGs) in 2015 [4]. In addition to its adoption as a stand-alone goal, SCP has a cross-cutting role and is essential to achieving the SDGs, with targets other than Goal 12 also oriented to achieving the shift towards SCP patterns [5].

The use of resources is highly associated with consumption and production activities; resources are primary inputs to products and services in society. The most widely used definition of SCP is

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 the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardise the needs of future generations" in the Oslo Symposium, 1994 [6]. As illustrated by this widely adopted definition, SCP provides a comprehensive framing for issues surrounding the use of resources—not only focusing on improvement of resource efficiency and minimizing its use but also addressing well-being and basic needs. Thus, analyzing resource use from an SCP framing provides a broad lens from which to understand how effective policy could support better linkages between managing resource sustainability and delivering on broader societal objectives. This broad view of SCP and its links between socio-economic dimensions and natural resources is recognized not only by researchers but also by policy-makers. For example, in Agenda 21 Chapter 4 [7], governments call for "new systems of national accounts and other indicators of sustainable development" that do not depend on economic growth; there should be "new concepts of wealth and prosperity which allow higher standards of living through changed lifestyles and are less dependent on the Earth's finite resources and more in harmony with the Earth's carrying capacity".

Akenji and Bengtsson [3] present SCP as having two broad and interrelated objectives: the achievement of wellbeing for all people; and keeping the negative environmental impacts of socio-economic activities to within carrying capacity. They further argue that an effective framing for SCP requires three things, namely: "(1) A thorough understanding of the drivers of production and consumption, including the social, economic and cultural context in which these activities take place (e.g., inequity, commodification of culture and many forms of human interaction, individualism and competition, marketing and advertising practices, corporate governance and the design of financial markets); (2) Understanding patterns of production and consumption in society (planned obsolescence in products, inefficiencies, peer-to-peer influence), including how they respond to the identified drivers; and (3) Using a lifecycle perspective, prioritizing areas where production and consumption have the highest impact on society and the environment (food and agriculture, transport and mobility, housing and construction and manufactured goods)".

Policy integration is central to sustainable development; effective policy integration is necessary to pursue the SDGs, which requires diverse expertise in different institutions and sectors [8]. We argue that the importance of policy integration is also applicable to SCP, with its complexity and cross-cutting characteristics similar in nature to the SDGs. Many policy sectors ranging from environment, agriculture, infrastructure to industry are related to SCP because consumption and production occurs virtually throughout all economic activities. Also, various sustainability impact areas such as waste, pollution, resource extraction, and quality of life are linked with the objectives of SCP. Addressing SCP in one sector may have positive or negative impacts in other policy areas; some sectoral SCP issues are interlinked, thus requiring coordination between policies to achieve the same objectives. As its sectoral focuses broaden, coordination among different government ministries, not only environment ministries, has become crucial for national policy design and implementation of SCP. While there can be integration of environmental objectives into each sectoral and organizational level, policy integration can also be fostered through cross-sectoral strategic frameworks; this type of integration is conceptualized as horizontal policy integration [9]. A considerable number of countries have developed a specific action plan for SCP or have mainstreamed SCP into other cross-sectoral strategies. Due to the complex characteristics, context and political economy in each country, no single approach in addressing SDGs fits all countries [8]. Suitable approaches to policy integration of SCP would also depend on the situation in each country.

Measuring the progress of national-level policy-making for SCP is not straightforward. The proposed SDG indicator 12.1.1 is: "Number of countries with SCP national action plans or SCP mainstreamed as a priority or a target into national policies", and it intends to measure the existence of national plans related to SCP. However, the data collection methodology had not yet been developed as of November 2016 and the indicator is classified as Tier III—"lack of scientific

methodology" [10]. Monitoring of such SCP national policy indicators would require substantive understanding of policy integration of SCP because policies related to SCP are spread across different sectors and ministries at different levels of integration. Despite the importance of understanding the level and type of policy integration of SCP being practised by national governments, there has been very limited systematic empirical investigation on a large scale and in a systematic manner across all analyzed countries. A few reports summarize overviews of regional and national SCP policies mainly through qualitative reviews of secondary information [11,12]. Other documents focus on general principles for SCP policy-making as a handbook or guideline [13–16].

In this study, country approaches to SCP policy integration were examined based on the results of a survey of national governments as part of a project called the Global Survey on National SCP Policies and Initiatives. Based on the survey responses, SCP policy integration from sectoral and organizational perspectives was analyzed using empirical data. The results were cross-analyzed with the existence of SCP-related cross-sectoral policy frameworks such as Sustainable Development, Green Economy, Green Growth, and SCP specific policy. The results of this study provide a better understanding of the characteristics of different approaches of national SCP design and provide a comparison between different income-levels as well as non-economic factors.

2. Background and Analytical Framework

2.1. The Concept of Policy Integration

Policy integration is an essential approach to addressing modern policy issues that cut across organizational, sectoral, and institutional boundaries. The concept of policy integration emerged in response to the issue of sustainable development in the 1990s [17]. The concept has then evolved in the context of integrating the environmental dimension of sustainability into other policy domains, and so it is sometimes specifically labeled as environmental policy integration. A widely used definition of environmental policy integration is provided by Laffery and Hovden [9] as "the incorporation of environmental objectives into all stages of policy-making in non-environmental policy sectors, with a specific recognition of this goal as a guiding principle for the planning and execution of policy (. . .) accompanied by an attempt to aggregate presumed environmental consequences into an overall evaluation of policy, and a commitment to minimise contradictions between environmental and sectoral policies by giving principled priority to the former over the latter". It highlights the importance of incorporating the objectives and guiding principles of environmental sustainability into other sectors in the policy cycle. In promoting the environmental dimension in other sectors, policy coordination, mainstreaming, and coherence are also used as similar concepts [18]. Peters [19] categorizes the obstacles of coordination in the government as follows: (i) redundancy between organizations working on the same task; (ii) lacunae of organizations focusing on a necessary agenda; and (iii) incoherence of goals and requirement for policies. In addition, policy interaction, collaboration, and cooperation can be considered as related terms; e.g., policy integration "could require increased collaboration or cooperation between the agencies in different policy fields, but not necessarily" [20].

There are multiple dimensions and layers in policy integration. One of the framings proposed by Briassoulis [21] is examining five objects of policy integration: policy objects, policy actors, policy goals, policy structures and procedures, and policy instruments. In this framework, policies can be integrated when the relationship between these objects is addressed through substantive, analytical, procedural, and/or practical dimensions of policy integration. For better design of policy integration schemes, it emphasizes the importance of identifying the type of strategic policies to be integrated and level of integration, as well as ensuring the commitment and organizational responsibility for policy integration. Another important framing is the distinction between vertical and horizontal policy integration. Laffery and Hovden [9] define vertical policy integration as "the extent to which a particular governmental sector has adopted and sought to implement environmental objectives as central in the portfolio of objectives that the governmental body continuously pursues"; and horizontal

policy integration is defined as "the extent to which a central authority has developed a comprehensive cross-sectoral strategy" for policy integration. According to Laffery and Hovden vertical integration itself may not be sufficient in achieving the ambitions of policy integration for sustainable development and may be inefficient without the framework provided by central government under horizontal policy integration.

2.2. Analytical Framework of SCP Policy Based on Policy Integration

We draw on key elements highlighted in the conceptual discussion of environmental policy integration and adapt them to SCP. The main dimensions of policy integration considered in this analysis are: integration into policy sectors; coordination between organizations such as government ministries; and the distinction between horizontal and vertical policy integration. These are described below.

2.2.1. Vertical Policy Integration

The two approaches to policy integration as conceptualized by Lafferty and Hovden [9] have an important implication for national strategic planning of SCP. Vertical environmental policy integration is defined as "the extent to which a particular governmental sector has adopted and sought to implement environmental objectives as central in the portfolio of objectives that the governmental body continuously pursues" [9]. In this approach, the environmental objective will be embedded in each sectoral policy without any horizontal mechanisms and frameworks. It does not necessarily involve institutional mechanisms and coordination based on an institutional setup, but each ministry and sector will integrate the environmental component into its policy-making under its own initiative. Notably, SCP policy does not only address environmental and resource issues but also the social aspects and implications of their use in society. Countries promoting SCP in different sectors without a cross-sectoral policy framework practise vertical integration.

2.2.2. Integration between Sectoral Policies or Integration of SCP Objectives into Other Sectors

According to Briassoulis [21], sustainable development cannot be addressed by "sectoralized, unit-dimensional, uni-disciplinary and uncoordinated policies" because policies tend to be not coordinated, to be overlapped, or to be in conflict, and a single sectoral policy cannot solve the whole complex issue. From this perspective, one definition of environmental policy integration is provided by Lafferty and Hovden [9] as "incorporation of environmental objectives into all stages of policy-making in non-environmental policy sectors." This dimension is applicable to SCP, as it is an embedded objective over various sectors in achieving sustainable consumption and production patterns. Policy sectors relevant to SCP are quite broad, and include most sectors related to socio-economic activity and resource consumption. Since the key approaches to SCP are lifecycle and systemic perspectives, SCP objectives are expected to be integrated into policy sectors related to various resources (e.g., water, energy, land), industries and public services (e.g., tourism, construction, agriculture, urban development), and consumption domains (e.g., food, mobility, housing). To illustrate, the priority sectors of SCP policies suggested in a policy assessment report by the EU SWITCH–Asia Project include those different dimensions: e.g., environmental protection, urban development, construction and housing, mobility and transport, food and agriculture, natural resources, manufacturing and consumer goods, tourism, and energy and water [12].

2.2.3. Coordination between Organizations Beyond Individual Government Departments

Another dimension of environmental policy integration defined by Lafferty and Hovden [9] is "to aggregate presumed environmental consequences into an overall evaluation of policy, and (. . .) to minimize contradictions between environmental and sectoral policies". Meijers and Stead [22] conceptualize policy integration as "management of cross-cutting issues in policy-making that transcend the boundaries of established policy fields, (. . .) which do not correspond to the institutional

responsibilities of individual departments". The aspect of minimizing contradictions between environmental and sectoral policies speaks very strongly to SCP objectives. The process of harmonizing environmental aspects into policy cycles and sectoral policies requires strong coordination. Under the discussion of policy integration for sustainable development, Thomas [23] indicated "institutional coordination" as one of his four concepts of integration. A guideline by UN Environment [13] also encourages inter-ministerial coordination: e.g., incorporation of finance ministries in SCP policy-making. Inter-ministerial coordination in charge of various policy sectors can ensure integration of these areas. In national SCP policy-making, one option is to assign responsibility to a single government institution, such as the environment ministry [13]. This is one of the typical practices in many countries. However, considering the broad sectoral coverage of SCP and the necessity to ensure policy integration, the literature suggests a need to reexamine this practice to ensure participation of other ministries related to the primary focuses of the SCP.

2.2.4. Horizontal Policy Integration

Horizontal environmental policy integration is defined as "the extent to which a central authority has developed a comprehensive cross-sectoral strategy" [9]. In this approach, coordination through an established cross-sectoral policy framework and institutional setup plays a significant role in ensuring policy integration across different sectors and organizations. In the context of SCP, countries promoting SCP with relevant cross-sectoral strategies fit this category. Within this type of policy integration, two approaches are typically taken by countries: (i) developing a specific action plan dedicated to SCP; and/or (ii) mainstreaming SCP into a broader national strategy.

One approach in horizontal SCP policy integration is to establish a specific SCP policy framework, and coordinate policy-making and implementation based on the framework. For example, National Action Plans for SCP (SCP–NAPs) have been developed by more than 30 countries. Countries that have developed SCP–NAPs include Ghana, Mauritius, Tanzania, and Zambia in Africa; Brazil, Colombia, Cuba, Dominican Republic, Ecuador, Mexico, Peru, and Uruguay in Latin America; and the Czech Republic, Finland, Poland, and U.K. in Europe [24]. The EU Switch-med Programme also assisted the development of SCP–NAPs in Algeria, Egypt, Israel, Jordan, Lebanon, Morocco, Palestine, and Tunisia [25]. The typical characteristics of SCP–NAPs are defining priority sectors, objectives, and action plans through participatory and stakeholder processes including business and civil sectors. The guideline for national SCP programmes suggests several steps, including the establishment of an advisory group, conducting a scoping exercise, selecting priority areas, defining objectives and targets, and selecting policies and initiatives [13].

Another approach is to mainstream SCP into broader national strategic planning frameworks. The guideline for national SCP programmes also proposes to integrate SCP within existing national strategies on sustainable development, national development, or poverty reduction, so that SCP should not be "a one-off initiative" to elaborate a document, but should be integrated and mainstreamed into other policy areas [13]. SCP can be reflected as one of the important pillars and cross-cutting objectives in achieving sustainable development. Integrating SCP as a part of existing strategies for sustainable development or other development plans is common in South-east Europe, Eastern Europe, Caucasus and Central Asia, North America, and West Asian regions [24]. Although there are conceptual differences, many countries regard both SCP and Green Economy/Growth as the means to achieve environmental sustainability of economic activities, and of production and consumption chains. Thus, the main principles and tools of SCP are sometimes incorporated in Green Economy and Green Growth policies, which can draw attention to financing and investments to achieve SCP [14]. The development of a Green Growth Strategy, for example, has been assisted by Global Green Growth Initiative (GGGI) in more than 30 countries [26].

The choice between establishing a specific SCP–NAP or mainstreaming SCP into a broader policy framework depends on the country and its policy environments. It is not the intention of this paper to recommend any one approach over the other. However, ensuring policy integration of SCP objectives

in various sectors is essential for addressing global resource consumption and sustainable development. This paper seeks to understand and describe the determinant characteristics of countries and their choice of approaches, such as vertical and horizontal policy integration, and the relationship of these with the sectoral and organizational dimensions of SCP policy integration.

3. Materials and Methods

This study is based on analysis of a survey of national government policies to promote SCP. The data used is from the Global Survey of National SCP Policies and Initiatives; the survey was designed and conducted by the Secretariat of the 10-Year Framework of Programmes for SCP (10YFP) under the United Nations Environmental Programme (UN Environment) in 2015, and the data processed and analyzed by the Institute for Global Environmental Strategies (IGES). The population frame used in the survey was a list of national focal points (NFPs) of the 10YFP, which are typically officers from national ministries such as environment ministries, economic planning offices, or foreign affairs ministries. In response to the survey questions, coordination with other institutions was encouraged to ensure accuracy of the responses, and more than 70% of the respondents received inputs from outside of their organizations. In total, 46 countries and the European Union have responded. The responding countries cover low- to high-income countries in Europe, Latin America, Africa, West Asia, and the Asia-Pacific with a response rate of 36% (In comparison with 129 NFPs).

The questionnaire used in the Global Survey consists of three parts: (a) background information about respondents; (b) national SCP policy; and (c) SCP policies and initiatives. In this study, we only use the data from (b) national SCP policy, which provides information on the status of national policy-making including national SCP policy frameworks, institutional mechanisms, funding and technical resources, as well as challenges and capacity needs. The raw data are not currently available to the public, but a summary of the survey results and general discussion is provided in a series of the report of UN Environment to be published in 2017 [27]. As metadata, the classification of countries based on income level by the World Bank [28] and regional attribution of countries based on UN Environment's geo-scheme [29] were collected. The categories of low-income and lower middle-income, and Asia-Pacific and West Asia, were combined respectively into single categories due to the limited responses in these. A response from the European Union was excluded in cross analysis with income-level because it is not applicable to the European Union, which is a group of countries of different income-levels.

The Global Survey has a set of questions about national policy sectors involved with SCP. The questionnaire asks whether the government address SCP in existing national policies. For those who responded "Yes" to this pre-question, a close-end question was asked to indicate the focus of these existing national policies addressing SCP. The multiple answers to this question were analyzed separately in two parts according to the nature of policies. The first group was sectoral policies which indicate whether SCP is addressed in each policy sector, i.e., environment protection/conservation, industrial/economic development, poverty alleviation, energy, public procurement, urban planning/development, buildings and construction, food and agriculture, tourism, and other sectors. The second group is cross-sectoral policies, where SCP is incorporated into the national strategic plans: i.e., Sustainable Development, SCP specifically (e.g., the SCP Action Plan), and Green Economy/Green Growth. There might be other sectors and cross-cutting policy concepts that potentially address SCP, but those are not considered in this study due to the limitations of the survey data.

To examine the sectors where SCP is vertically integrated, the responses in the first group were analyzed by descriptive statistics. They were also cross-analyzed with income level and region using a linear probability model and a logit model to identify the differences associated with these country attributions. Two different models are used in this study because both have different strengths. The linear probability model is useful for intuitive interpretation of the estimated coefficients and when the purpose of analysis is to know the associations between two variables rather than prediction; the logit model can guarantee the predicted value falls within 0 to 1 but sacrifices ease of interpretation [30].

After that, hierarchical clustering analysis and correlation analysis were applied to this dataset to assess the policy integration between different sectors. All the statistical analysis in this study was conducted by R version 3.3 (R Core Team, Vienna, Austria) [31]. Visualization of the result of correlation analysis was carried out with the "corrplot" package of R [32].

The survey data also included a question about ministries participating in SCP policy-making. The multiple answers to this question (i.e., ministries in charge of environment, finance, energy, industry, agriculture, development cooperation, transport, tourism, infrastructure, and other) were analyzed using descriptive statistics to assess the status of organizational policy integration. An additional research question here was whether the relevant ministry is participating in SCP policy-making. To investigate this, correlation analysis between sectoral policy focus and participating ministry was conducted.

To investigate the progress of horizontal policy integration of SCP and its effects on vertical policy integration, the response data on the existence of cross-sectoral policies incorporating SCP (i.e., Sustainable Development, SCP specifically, and Green Economy/Green Growth) was utilized. The responses about cross-sectoral policies were first analyzed using descriptive statistics and linear probability and logit models using income level and region as independent variables. Then, the total number of sectoral focuses addressing SCP and the total number of ministries participating in SCP policy-making were calculated by aggregating the number of policies and ministries. These aggregated variables are considered as the representations of the level of sectoral and organizational policy integration. The relationship between the existence of cross-sectoral policies and the values of the aggregated variables was examined by regression analysis to examine the effect of horizontal policy integration on vertical policy integration using income level and region as controlling variables. Linear probability and logit models were also used to investigate closely the effect of the existence of cross-sectoral policies on each of the policy sectors and ministries addressing SCP.

4. Results and Discussion

4.1. Sectoral Policy Integration

4.1.1. Sectoral Policies Addressing SCP

The proportion of respondents addressing SCP through each sectoral policy is summarized in Figure 1. Our findings show that SCP is predominantly addressed in the environmental and resources sectors: i.e., energy (72%) and environment protection and conservation (68%). In addition, public procurement (60%) appears to be a major cross-cutting sector where national governments actively engage with the SCP issue. This reflects the fact that, predominantly, SCP is perceived as an issue associated with the use and saving of energy resources as well as the avoidance of pollution (environment protection) and natural resources distortion (conservation). It is also the case that many countries place importance on the leading role of the government through public procurement policy integrating SCP objectives.

In comparison with those sectors, SCP does not appear to be fully integrated into concrete and specific policy sectors. Food and agriculture (55%) and industrial and economic development (53%) are involved with SCP only to a moderate extent. Engagement with urban planning and development (36%), tourism (43%), and buildings and construction sectors (45%) is quite limited. Addressing each of these concrete policy sectors is essential for promoting SCP because the consumption and production of goods and services occur in association with these key sectors. According to footprint studies [33,34] and the sustainable consumption literature [35,36], areas such as food, housing, mobility, consumer goods, and leisure are considered key areas causing upstream resource extraction and associated environmental impacts throughout the lifecycle. Regardless of the importance of these sectors in addressing sustainable consumption, urban planning (closely related to mobility), tourism (leisure), building and construction (housing) have only limited integration of SCP objectives.

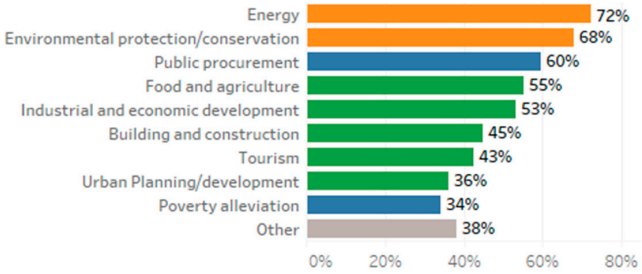


Figure 1. Proportion of countries with sectoral policies addressing SCP. Note: Survey question "Is SCP currently addressed in existing national policies? If yes, please indicate the focus of this/these national policies". All responses were "yes" to the pre-question. Cross-cutting sustainability policy areas excluded. n = 47. Colour: environmental and resources sector in orange, cross-cutting sector in blue, economic and consumption sectors in green. Source: authors based on data from the Global Survey on National SCP Policies and Initiatives with permission from the 10YFP Secretariat under UN Environment [27].

The sector focus and priority of SCP policies are expected to vary depending on the specific context of countries. To compare the sectoral integration of SCP between the countries with different income levels and regions, the same response data were examined by the linear probability model and logit model. The result of analysis based on the linear probability model and the logit model for six sectors using income level (and region) as independent variables were compared in Table 1. The results for other sectors are included in the supplementary material (Table S1). According to the linear probability model with income and region as independent variables (LPM-2 in Table 1), upper-middle income countries are 43% more likely to be addressing SCP in the industrial and economic development sector than high-income countries with 5% statistical significance with holding regions constant ($p < 0.05$). After controlling for income level, countries in Europe are 48% and 64% more likely to be involved in this sector than Latin America ($p < 0.05$) and Africa ($p < 0.1$), respectively. Based on the logit model (Logit-2 in Table 1), the predicted probability that a country address SCP in industrial and economic development is no less than 94% in upper middle-income Europe. The predicted probability becomes much less for a high-income European country (55%) and an upper middle-income Latin American country (49%), and a low to lower middle-income African country (33%). This indicates that industrial and economic development and its associated environmental problems are part of the central policy agenda in middle-income countries, where environmental problems are typically intensified along with rapid industrial development. Non-economic factors represented by region also determine the prominence of this sector. Asian and European countries place more importance on addressing SCP in the industrial sector, possibly because of their priority is on manufacturing and export-led development in Asia and the awareness of the importance of resource-efficient industry in Europe.

Based on the linear probability model (LPM-2 in Table 1), after controlling for income, poverty alleviation is 67% more likely to be integrated with SCP in African countries compared to Europe, but is not highly significant ($p < 0.1$). In terms of income level, the predicted probability that a country address SCP in poverty alleviation is 50% in low to lower middle-income countries, while it is predicted to be 21% in high-income countries based on the logit model (Logit-1 in Table 1). This result implies that under-consumption, where people's basic needs are not met through current consumption levels, is perceived as a priority SCP issue in lower income and/or African countries. They could then try to leverage domestic resources and international support in addressing the nexus between SCP and poverty alleviation. Apart from these areas, although not directly asked in the questionnaire, it is essential to address the high level of consumption and its associated global environmental impacts and resource extraction. This applies to high-income countries where average material consumption levels are significantly higher [37], and also to the rapidly-growing consumer class in emerging economies [3,38].

Table 1. The effects of income level and region on sectoral policies addressing SCP.

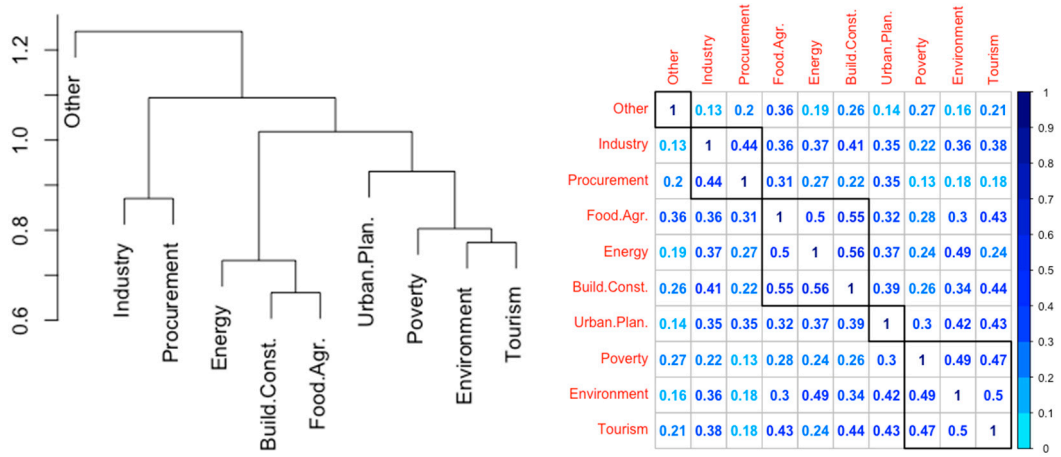
Dependent Variable		Energy				Public Procurement			
Model		LPM-1	LPM-2	Logit-1	Logit-2	LPM-1	LPM-2	Logit-1	Logit-2
Income-level	High	-	-	-	-	-	-	-	-
	Up.mid.	0.08 (0.15)	0.23 (0.20)	0.41 (0.76)	1.23 (1.05)	0.13 (0.17)	0.07 (0.21)	0.56 (0.71)	0.33 (0.94)
	Low-low.mid.	0.02 (0.18)	0.32 (0.33)	0.07 (0.85)	1.64 (1.65)	−0.18 (0.19)	−0.32 (0.35)	−0.72 (0.80)	−1.55 (1.65)
Region	Europe		-		-		-		-
	Asia		−0.34 (0.24)		−1.74 (1.19)		0.32 (0.25)		1.81 (1.39)
	Latin		−0.19 (0.22)		−1.01 (1.14)		0.01 (0.23)		0.04 (0.98)
	Africa		−0.38 (0.35)		2.01 (1.73)		0.17 (0.37)		0.97 (1.72)
Intercept		0.68 *** (0.11)	0.74 *** (0.12)	0.77 (0.49)	1.10 # (0.58)	0.58 *** (0.11)	0.54 *** (0.12)	0.32 (0.46)	0.17 (0.50)
Dependent Variable		**Food/Agriculture**				**Industrial/Economic Development**			
Model		**LPM-1**	**LPM-2**	**Logi-1**	**Logit-2**	**LPM-1**	**LPM-2**	**Logit-1**	**Logit-2**
Income-level	High	-	-	-	-	-	-	-	-
	Up.mid.	−0.05 (0.17)	0.16 (0.22)	−0.20 (0.67)	0.75 (0.95)	0.17 (0.17)	0.43 * (0.21)	0.71 (0.68)	2.54 # (1.37)
	Low-low.mid.	−0.08 (0.20)	0.31 (0.36)	−0.32 (0.78)	1.35 (1.53)	−0.07 (0.20)	0.44 (0.35)	−0.30 (0.79)	2.50 (1.82)
Region	Europe		-		-		-		-
	Asia		−0.20 (0.26)		−0.90 (1.08)		-0.13 (0.25)		−0.86 (1.32)
	Latin		−0.37 (0.24)		−1.60 (1.05)		-0.48 * (0.23)		−2.77 # (1.47)
	Africa		−0.49 (0.38)		−2.09 (1.61)		-0.64 # (0.36)		−3.38 # (1.89)
Intercept		0.58 *** (0.12)	0.64 *** (0.13)	0.32 (0.46)	0.58 (0.52)	0.47 *** (0.12)	0.54 *** (0.12)	−0.11 (0.46)	0.18 (0.51)
Dependent Variable		**Urban Planning/Development**				**Poverty Alleviation**			
Model		**LPM-1**	**LPM-2**	**Logit-1**	**Logit-2**	**LPM-1**	**LPM-2**	**Logit-1**	**Logit-2**
Income-level	High	-	-	-	-	-	-	-	-
	Up.mid.	−0.02 (0.16)	0.11 (0.21)	−0.07 (0.70)	0.50 (0.98)	0.20 (0.16)	0.11 (0.20)	0.97 (0.75)	0.55 (0.98)
	Low-low.mid.	−0.07 (0.19)	−0.26 (0.34)	−0.31 (0.84)	−16.62 (2088)	0.29 (0.19)	−0.24 (0.33)	1.32 (0.85)	−16.40 (2202)
Region	Europe		-		-		-		-
	Asia		−0.31 (0.24)		−1.65 (1.32)		−0.09 (0.23)		−0.64 (1.35)
	Latin		−0.24 (0.23)		−1.09 (1.07)		0.15 (0.22)		0.72 (1.03)
	Africa		0.24 (0.36)		16.42 (2088)		0.67 # (0.34)		18.27 (2202)
Intercept		0.37 ** (0.11)	0.43 *** (0.12)	−0.54 (0.48)	−0.30 (0.50)	0.21 # (0.11)	0.20 # (0.11)	−1.32 * (0.56)	−1.36 * (0.60)

Note: Standard error in parenthesis. $p < 0.001$ ***, 0.01 **, 0.05 *, 0.1 #. $n = 46$. LPM: Linear probability model. Logit: Logit model. Dependent variables are dummy variables on the existence of each sectoral policy addressing SCP (1: Yes, 0: No). A response from the European Union was excluded from this analysis because it cannot be classified by income level. Source: authors based on data from the Global Survey on National SCP Policies and Initiatives with permission from the 10YFP Secretariat under UN Environment [27].

Energy, public procurement, food, and urban planning might show some trends when looking at regional comparisons, but these are not statistically significant. According to the linear probability model (LPM-2 in Table 1), a slight tendency was observed that public procurement might be emphasized in Asia; the integration of SCP into energy and urban planning sectors might be weak in Asia; and the food and agricultural sector might not be emphasized in Latin America compared to Europe, controlling for income level ($0.1 < p < 0.25$). These differences in sectoral focus are either a reflection of needs based on priority issues of the countries (e.g., the poverty and SCP nexus in the African region) or pitfalls of policy efforts regardless of the significance of these sectors (e.g., energy, food, and urban planning in non-European responding countries). In the former case, where the relatively high priority in these sectors is due to specific issues in the region and countries, discussion of policy design and international cooperation for SCP should address these unique needs. In the latter case, where some high-impact and still relevant sectors are not fully integrated with SCP, the emphasis should be on how to broaden the scope of SCP into these key sectors involved with it.

4.1.2. Integration between Policy Sectors

Not every sector is expected to be integrated to the same level; there might be some groups of policy sectors that tend to be addressed with closer integration. To identify the level of integration between policy sectors, correlation analysis between sectoral policy focuses and cluster analysis based on the correlation coefficients were conducted. The proximity between policy sectors is shown as the height between the sectors and connecting nodes between them in the dendrogram of hierarchical cluster analysis in Figure 2a. There appear to be five main policy sector clusters: (i) energy, building, and food; (ii) industry and procurement; (iii) poverty, environment, and tourism; (iv) urban planning; and (v) other. Correlation coefficients and clusters with a number of cluster K = 5 are summarized in Figure 2b.



(**a**) Dendrogram of sectoral policy clusters (**b**) Correlation between sectoral policies

Figure 2. Result of clustering and correlation analysis of sectoral policies addressing SCP. Note: (**a**) Dendrogram of hierarchical clustering by group average method; (**b**) Correlation coefficient in cells. Squares for clusters (K = 5). n = 47. Source: authors based on data from the Global Survey on National SCP Policies and Initiatives with permission from the 10YFP Secretariat under UN Environment [27].

The result of correlation analysis and the description of each cluster excluding others are discussed below, in combination with the result of cross-analysis with income level and region in Table 1.

- Consumption domains: food and agriculture, buildings and construction, and energy sectors fit with this cluster. The involvement of these sectors in national SCP policy-making shows strong correlations ($r \geq 0.5$). These areas are strongly associated with key household consumption such

as food and housing, and they require robust lifecycle and cross-cutting approaches beyond rural-urban and production-consumption distinctions. These areas tend to be more integrated with SCP in Europe than other regions among respondents, but without statistical significance.

- Centralized agenda: public procurement and industrial/economic development are categorized in this cluster. The existence of these policies integrating SCP is fairly strongly correlated (r = 0.44). The characteristics of these sectoral policies are that they are more relevant to the centralized role of government. Public procurement emphasizes the leading role of the government sector in creating demand for sustainable products, while industrial and economic policies are typically handled by central government. These sectors tend to be addressed in upper middle-income countries (industry/economic development: $p < 0.05$) or those Asian countries that responded (public procurement: $p < 0.25$).
- Localized agenda: tourism, environmental protection/conservation, and poverty alleviation are classified into this cluster. These sectors show near strong correlations ($r \geq 0.47$). These issues are typically associated with localized issues such as rural and community development. Conventional environmental pollution caused by industry affects local communities, while environmental conservation is associated with the protection of natural resources typically abundant in non-urban settings. Tourism can be a major income source for local communities, while poverty tends to be a crucial issue among rural and urban communities. Poverty alleviation and tourism tend to be integrated with SCP in African countries ($p < 0.1$) and in the middle- to low-income countries ($p < 0.2$), respectively.
- Urbanized agenda: among the multiple answer options, only urban planning and development fit into this cluster. This agenda is highly associated with the issue in urban areas; the role of urban planning is significant in determining the environmental impacts induced from mobility, housing, and other lifestyle aspects as well as the use and development of urban infrastructure. Among responding countries, European countries tend to address this area more, compared to Asia ($p < 0.25$).

4.2. Organizational Policy Integration

4.2.1. Ministries Participating in SCP Policy-Making

The proportion of responding countries with participation of each ministry in SCP policy-making is summarized in Figure 3. The result indicates that SCP policy is predominantly handled by environment ministries (96%). Following this, relatively higher level of involvement was observed for ministries responsible for agriculture (87%), energy (83%), and industry (77%). The strong presence of energy ministries is compatible with the fact that energy is the sector that most frequently addresses SCP (72%). The significant participation of agriculture and industry ministries would probably be because conventional environmental issues such as industrial pollution and agricultural pesticides are more advanced in terms of coordination than other sectors related to SCP; they are typically addressed through coordination between these ministries and environment ministries.

By contrast, the participation of the ministries responsible for tourism (47%), infrastructure (51%), and transport (55%) are limited regardless of the importance of relevant sectors such as mobility, housing, and tourism. When we combine this result with sectoral focuses (Figure 1), the integration of SCP objectives in these areas is quite limited both from organizational and sectoral policy integration perspectives. It was also revealed that finance ministries have only moderate participation in SCP policy-making (60%), despite their significant role in allocating the budget and developing taxation policies, which determine the financial incentives in the market economy, and their role in allocating domestic resources to different sectoral policies.

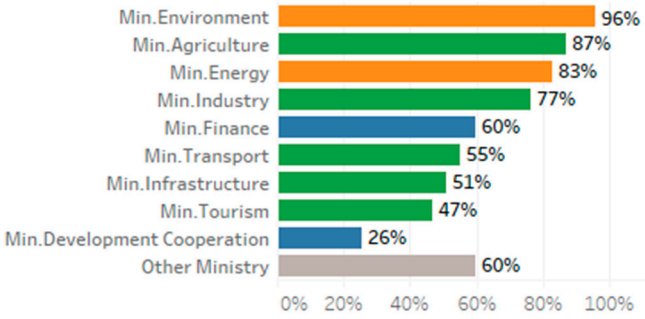
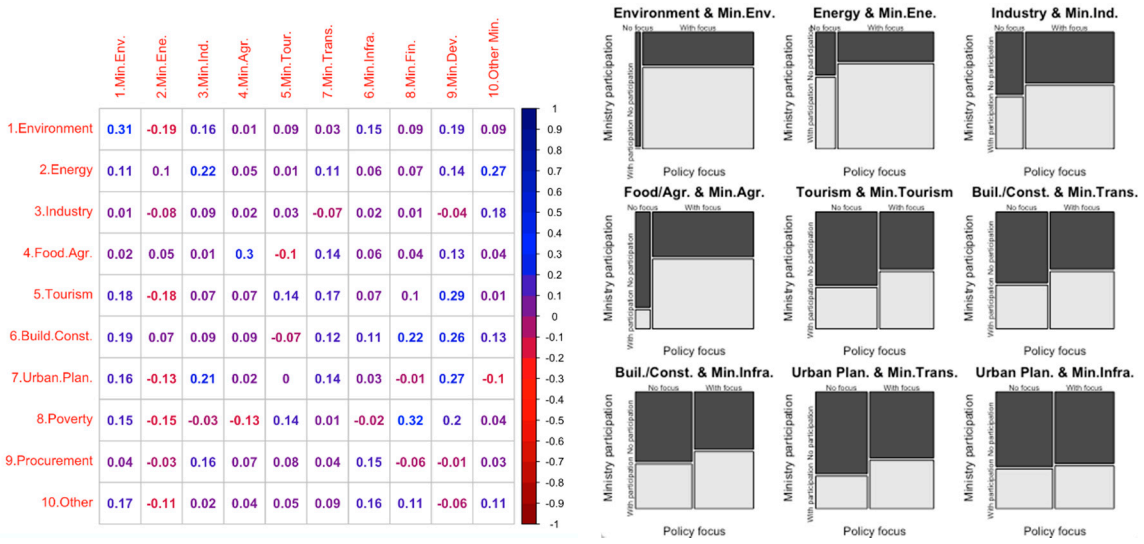


Figure 3. Proportion of countries with participation of ministries in SCP policy-making. Note: Survey question "To your knowledge, what are the ministries participating in SCP policy-making at national level? (e.g., through participation in designing policies, representation in inter-ministerial groups)" $n = 47$. Colour: ministries responsible for environmental and resources in orange, cross-cutting agenda in blue, economic and consumption sectors in green. Source: authors based on data from the Global Survey on National SCP Policies and Initiatives with permission from the 10YFP Secretariat under UN Environment [27].

4.2.2. Relationship between Organizational and Sectoral Integration

We now have a better understanding of the level and characteristics of sectoral and organizational SCP policy integration. The next research question is how these two dimensions of policy integration are related to each other. To investigate this, correlation analysis between sectoral policy focus and the participating ministry was conducted as shown in Figure 4a. For a better understanding of the interaction, a mosaic plot of the responses for those two questions is provided in Figure 4b.



(**a**) Correlation between sector and ministry (**b**) Mosaic plot of relevant sector and ministry

Figure 4. Result of correlation analysis of sectoral policies and ministries addressing SCP. Note: (**a**) Correlation coefficient in cells; (**b**) relevant sector and ministry combination as Environment protection/conservation and environment ministries; Energy and energy ministries; Industrial/economic development and industry ministries; Food/agriculture and agriculture ministries; Tourism and tourism ministries; Buildings/construction transport ministries; Buildings/construction and infrastructure ministries; Urban planning/development and transport ministries, Urban planning/development and infrastructure ministries. $n = 47$. Source: authors based on data from the Global Survey on National SCP Policies and Initiatives with permission from the 10YFP Secretariat under UN Environment [27].

As a result, there were only a few areas where there was a weak correlation between policy sectors and the participation of relevant ministries. For example, the environmental protection/ conservation sector is weakly correlated with the participation of environment ministries ($r \geq 0.3$), similar to the correlation between the food/agriculture sector and agriculture ministries ($r \geq 0.3$). As can be seen from Figure 4b, the changes in policy focus are weakly associated with the change in the participation of the ministry responsible for those areas. However, it should be noted that even for countries addressing these sectors, many countries lack participation of the relevant ministries (upper-right part of mosaic plots in Figure 4b). Apart from this, the analysis also identified the fact that countries addressing SCP with poverty alleviation policies tend to have the participation of finance ministries with weak correlation ($r \geq 0.3$). This might be an indication that some countries, such as those in Africa that are integrating SCP into poverty alleviation, tend to be aware of the importance of mobilizing financial resources.

On the other hand, a majority of policy sectors have only very weak or no correlation between the sectoral focus and the presence of the relevant ministry. The tourism sector and tourism ministries, the buildings/construction sector and ministries in charge of transport or infrastructure, the urban planning sector and the transport ministries, and the energy sector and ministries responsible for energy or industry, all show very weak correlation ($0.3 > r \geq 0.1$). The industrial/economic development sector and industry ministries, the urban planning/development sector and the ministry of infrastructure have virtually no correlation ($r < 0.1$). The mosaic plots in Figure 4b also indicate that there is very limited association between the changes in sectoral focus and relevant ministry participation. This suggests that many countries address relevant sectors without the presence of the ministry directly responsible in the sector. It could also indicate that participation of the ministry concerned does not ensure the full sectoral integration of SCP into that sector. In the latter case, the ministry may only participate superficially, such as joining coordination meetings or working groups, but it does not intensively work on integrating SCP into the relevant sectors as a priority, and so sectors were not considered as appropriately addressing SCP. This random pattern of correlation might be partly due to response bias, but it also potentially reflects the fact that there is not full cohesion between sectoral and organizational policy integration.

Therefore, our question is, who is handling SCP policies in various sectors? Our findings indicate that environment ministries appear to be coordinating various sectors on behalf of the line ministries directly responsible for specific sectors. Correlation between tourism, buildings/construction, urban planning/development, and poverty alleviation sectors and the presence of the ministries for the environment shows some, albeit very weak, correlations ($0.3 > r \geq 0.1$). This can be interpreted as meaning that ministries for the environment are involved in SCP policy-making in various sectors beyond the conventional domain of environmental protection and conservation. In addition, whenever they participate, the ministries responsible for development coordination also seem to serve various sectors, although they too have very weak correlations with tourism, urban planning/development, buildings/construction, food/agriculture, energy, and poverty alleviation sectors ($0.3 > r \geq 0.1$). This can be an indication that ministries in charge of development cooperation play a role in addressing SCP in various sectors when countries are involved in international cooperation, through either receiving or providing international development support.

4.3. Horizontal Policy Integration

4.3.1. Cross-Sectoral Policies Addressing SCP

Horizontal policy integration refers to "the extent to which a central authority has developed a comprehensive cross-sectoral strategy" [9]. In the context of SCP, it can mean different types of cross-sectoral strategies related to sustainability. In the survey, countries were asked whether they have specific SCP policies, and/or if they are addressing SCP through Sustainable Development and Green Economy or Green Growth policy. The survey responses revealed that SCP policy tends to

be mainstreamed into other sustainability frameworks instead of solely relying on specific policy dedicated to SCP. Many countries responded that they address SCP through Sustainable Development policies (74%), while some countries address it through Green Economy or Green Growth policies (54%). However, less than half of the responding countries address SCP through specific SCP policies such as SCP Action Plans (41%). This is compatible with guidelines by UN Environment recommending that SCP can be either addressed through a dedicated plan or be mainstreamed into other existing national strategies or policies [13].

To investigate the prominence of these cross-sectoral policies horizontally integrating SCP, the linear probability model and the logit model were used to analyze the effects of income level and region on the existence of each of the three types of cross-spectral policies incorporating SCP (Table 2). The results of the linear probability model (LPM-2 in Table 2) indicate that countries addressing SCP through sustainable development are more prominent in Europe compared to any other region controlling for income level with 1% statistical significance ($p < 0.01$). It was also the case for low- to lower-middle income countries ($p < 0.01$) and upper middle-income countries with 5% significance level ($p < 0.05$) compared to high-income countries controlling for region. By interpreting the coefficients on both income and region, high-income Europe is likely to have 38% or 24% more probability in establishing a Sustainable Development framework incorporating SCP objectives compared to upper middle-income Asia or Latin America, respectively.

The existence of a specific cross-sectoral SCP policy seems to be slightly more prominent in some regions other than Europe. Based on the linear probability model (LPM-2 in Table 2), African countries tend to have such policies compared to Europe controlling for income level ($p < 0.05$). By looking at the effect of both income and region, low to lower middle-income African countries are likely to have 29% more probability in establishing a specific SCP framework than high-income European countries. Although not statistically significant, Asian and Latin American responding countries tend to have specific SCP policies compared to Europe ($p < 0.3$). Regarding Green Growth/Green Economy policies, there are no statistically significant relationships identified, but European responding countries seem to have a greater tendency to incorporate SCP into Green Economy/Green Growth policies compared to other regions ($p < 0.2$).

4.3.2. Relationship between Horizontal and Vertical Policy Integration

This section analyzes the effects of horizontal SCP policy integration on vertical policy integration. Horizontal policy integration is the extent to which the government develops cross-sectoral policies for SCP, such as incorporating SCP objectives into Sustainable Development, Green Economy, or Green Growth policies, or having a specific policy dedicated to SCP. These cross-sectoral policies are expected to facilitate policy integration of SCP into different sectors and organizations. The survey asked respondents to specify policies addressing SCP for both cross-sectoral and sectoral levels in addition to the ministries participating in SCP policy-making. Based on these data, the effects of the existence of cross-sectoral policies incorporating SCP (i.e., horizontal policy integration) on the coverage of sectors and the participation of ministries addressing SCP (i.e., vertical policy integration) were examined. Table 3 summarizes the results of multiple regression analysis using aggregated variables of the number of sectoral policies and ministries addressing SCP as dependent variables (values ranging from 0 to 10) and the existence of cross-sectoral policies as independent variables with and without controlling for income level and regions. According to these aggregated variables, on average, a country addresses SCP objectives in 5.0 out of 10 policy sectors with participation of 6.4 out of 10 types of ministries. For a better understanding of each sector, the fitting results of the linear probability model and the logit model using the existence of sectoral policies as dependent variables for five sectors are shown in Table 4. The results for other sectors are included in the supplementary material (Table S2).

Table 2. The effects of income level and region on the existence of cross-sectoral policies.

Dependent Variable		SCP				Green Economy/Growth				Sustainable Development			
Model		LPM-1	LPM-2	LPM-1	LPM-1	LPM-1	LPM-1	Logit-1	Logit-2	LPM-1	LPM-2	Logit-1	Logit-2
Income-level	High	-	-	-	-	-	-	-	-	-	-	-	-
	Up.mid.	0.33 # (0.16)	−0.04 (0.14)	−0.04 (0.14)	−0.04 (0.14)	−0.04 (0.14)	0.08 (0.22)	−0.66 (0.68)	0.36 (0.94)	−0.04 (0.14)	0.37* (0.15)	−0.17 (0.71)	19.26 (3633)
	Low-low.mid.	0.14 (0.19)	0.32 # (0.17)	0.32 # (0.17)	0.32 # (0.17)	0.32 # (0.17)	0.29 (0.36)	−0.54 (0.79)	1.24 (1.52)	0.32 # (0.17)	1.01 *** (0.26)	17.79 (2063)	56.46 (6860)
Region	Europe						-		-		-		-
	Asia						−0.37 (0.26)		−1.57 (1.09)		−0.75 *** (0.18)		−21.13 (3633)
	Latin						−0.37 (0.24)		−1.61 (1.03)		−0.61 *** (0.17)		−20.4 (3633)
	Africa						−0.53 (0.38)		−2.27 (1.61)		−0.88 ** (0.27)		−39.11 (6062)
Intercept		0.26 * (0.11)	0.20 # (0.12)	0.68 *** (0.10)	0.68 *** (0.10)	0.68 *** (0.10)	0.68 *** (0.10)	0.54 (0.48)	0.90 # (0.54)		0.68 *** (0.10)	0.83 *** (0.09)	0.77 (0.49)

Note: Standard error in parenthesis. $p < 0.001$ ***, 0.01 **, 0.05 *, 0.1 #. $n = 46$. LPM: Linear probability model. Logit: Logit model. Dependent variables are dummy variables on the existence of each cross-sectoral policy incorporating SCP (1: Yes, 0: No). A response from the European Union was excluded from this analysis because it cannot be classified by income-level. Source: authors based on data from the Global Survey on National SCP Policies and Initiatives with permission from the 10YFP Secretariat under UN Environment [27].

Table 3. The effects of cross-sectoral policies on the number of sectors and ministries addressing SCP.

Dependent Variable		No. of Policy Sectors Addressing SCP		No. of Ministries Participating in SCP Policy-Making	
Model		**Model 1**	**Model 2**	**Model 1**	**Model 2**
Cross-sectoral Policy	**SCP**	0.14 (0.85)	−0.42 (1.03)	1.56 # (0.77)	1.34 (0.94)
	GE/GG	2.72 ** (0.85)	2.95 ** (0.94)	0.26 (0.77)	0.40 (0.86)
	SD	0.29 (0.96)	0.76 (1.33)	−0.52 (0.87)	−0.61 (1.21)
Income-level	**High**		-		-
	Up.mid.		0.62 (1.34)		0.41 (1.23)
	Low-low.mid.		−1.74 (2.61)		0.53 (2.39)
Region	**Europe**		-		-
	Asia		0.88 (1.93)		0.64 (1.77)
	Latin		0.12 (1.70)		−0.25 (1.55)
	Africa		2.31 (2.75)		0.55 (2.52)
Intercept		3.23 ** (0.95)	2.52 # (1.45)	5.99 *** (0.86)	5.66 *** (1.33)

Note: Standard error in parenthesis. $p < 0.001$ ***, 0.01 **, 0.1 #. $n = 46$. Linear regression model. Dependent variables are the aggregated variables of total number of sectors or ministries addressing SCP (values range from 0 to 10). A response from the European Union was excluded from this analysis because it cannot be classified by income-level. Source: authors based on data from the Global Survey on National SCP Policies and Initiatives with permission from the 10YFP Secretariat under UN Environment [27].

The result shows that countries with a Green Economy/Green Growth policy tend to have a broader coverage of sectoral focuses addressing SCP. Compared to the countries without such policy, those addressing SCP with Green Economy/Green Growth strategy are associated with a 2.95 point increase in the number of sectors addressing SCP ($p < 0.05$) based on the regression model controlling for income and region (Model 2 in Table 3); and associated with a 2.72 point increase based on the model not controlling for income and region (Model 1 in Table 3). The linear probability model shown in Table 4 (LPM) can examine this impact in terms of concrete sectors addressing SCP; e.g., countries with a Green Economy/Green Growth policy are 54%, 48%, and 43% more likely to address SCP in building, energy and food sectors, respectively, with statistical significance ($p < 0.01$) after controlling for income and region. Those countries might also be 31% more likely to address the tourism sector with close statistical significance ($p < 0.1$). These areas are mainly the first cluster (i.e., consumption domains) identified in the previous section about integration between policy sectors. Therefore, when incorporating the objective of SCP, Green Economy/Growth policies may have an effect on expanding the sectoral scope of SCP into these high-impact household consumption areas associated with cross-cutting and lifecycle perspectives.

Countries with specific SCP policies appear to be more oriented towards inter-organizational coordination rather than progressive in sectoral policy integration. Governments with SCP-specific policies are likely to have 1.56 more ministries participating in SCP policy-making with close 5% statistical significance ($p < 0.06$) based on the regression model without controlling for income and region (Model 1 in Table 3) and associated with 1.34 more ministries without statistical significance ($p < 0.2$) after controlling for these factors (Model 2 in Table 3). These countries are associated with 38%, 21%, and 29% more participation by ministries responsible for transport ($p < 0.05$), agriculture ($p < 0.1$), and tourism ($p < 0.15$) after controlling for region and income level. This effect is potentially

significant because many of the existing SCP national action plans are involved with the process of participation by ministries and stakeholders as well as the establishment of institutional mechanisms such as working groups or roundtables on SCP. On the other hand, these national plans tend to identify several priority sectors and focus on elaborating the action plans and/or roadmaps in progressing SCP in those identified areas. This might be the reason that they did not have much effect on fostering the sectoral policy integration of SCP.

Table 4. The effects of cross-sectoral policies on sectoral policies addressing SCP.

Dependent Variable		Energy		Public Proc.		Food/Agri.		Build./Const.		Tourism	
Model		LPM	Logit	LPM	Logit	LPM	Logit	LPM	Logit	LPM	Logit
Cross-sectoral Policy	SCP	−0.18 (0.14)	−1.48 (1.07)	0.09 (0.16)	0.51 (0.84)	0.09 (0.17)	0.47 (0.81)	0.00 (0.16)	−0.09 (0.90)	−0.10 (0.17)	−0.58 (0.82)
	GE/GG	0.48 *** (0.13)	3.22 ** (1.08)	0.24 (0.15)	1.46 # (0.82)	0.43 ** (0.15)	1.94 ** (0.72)	0.54 *** (0.14)	2.73 ** (0.86)	0.31 # (0.16)	1.62 * (0.79)
	SD	0.34 # (0.18)	2.12 (1.31)	0.44 * (0.21)	2.99 * (1.45)	−0.13 (0.22)	−0.72 (1.04)	0.14 (0.20)	0.89 (1.21)	−0.25 (0.22)	−1.18 (1.00)
Income-level	High	-	-	-	-	-	-	-	-	-	-
	Up.mid.	0.09 (0.18)	1.38 (1.58)	−0.12 (0.21)	−0.59 (1.06)	0.17 (0.22)	0.97 (1.17)	−0.14 (0.21)	−0.84 (1.07)	0.40 # (0.22)	1.89 # (1.06)
	Low-low.mid.	−0.25 (0.36)	−1.14 (2.55)	−0.79 # (0.41)	−4.87 * (2.39)	0.36 (0.42)	1.89 (2.03)	−0.43 (0.40)	−2.52 (2.40)	0.26 (0.43)	1.21 (1.96)
Region	Europe	-	-	-	-	-	-	-	-	-	-
	Asia	0.16 (0.26)	0.52 (1.97)	0.70 * (0.31)	5.23 * (2.33)	−0.18 (0.31)	−1.02 (1.54)	0.21 (0.30)	1.31 (1.71)	−0.09 (0.32)	−0.26 (1.47)
	Latin	0.24 (0.23)	1.02 (1.80)	0.35 (0.27)	2.38 (1.59)	−0.31 (0.27)	−1.72 (1.42)	0.02 (0.26)	0.15 (1.45)	−0.12 (0.28)	−0.40 (1.31)
	Africa	0.31 (0.38)	1.42 (2.62)	0.62 (0.44)	4.11 # (2.49)	−0.44 (0.45)	−2.33 (2.15)	0.41 (0.42)	2.50 (2.52)	0.13 (0.46)	0.79 (2.10)
Intercept		0.15 (0.20)	−2.02 (1.41)	−0.01 (0.23)	−3.59 * (1.66)	0.43 # (0.24)	−0.22 (1.10)	0.07 (0.22)	−2.42 # (1.37)	0.28 (0.24)	−1.18 (1.13)

Note: Standard error in parenthesis. $p < 0.001$ ***, 0.01 **, 0.05 *, 0.1 #. $n = 46$. LPM: Linear probability model. Logit: Logit model. Dependent variables are dummy variables on the existence of each sectoral policy addressing SCP (1: Yes, 0: No). A response from the European Union was excluded from this analysis because it cannot be classified by income-level. Source: authors based on data from the Global Survey on National SCP Policies and Initiatives with permission from the 10YFP Secretariat under UN Environment [27].

There was no clear relationship identified for countries with sustainable development policy incorporating SCP. Although it shows a slight tendency to be strong in sectoral policy integration and weak in organizational integration, the variation is too large to conclude anything on its effects. This might be because the depth and breadth of integration of SCP induced by horizontal integration in sustainable development policy vary because sustainable development covers much broader aspects, and some countries might fail to set SCP as a priority among various agendas or mobilize the actual involvement of ministries and resources into SCP.

4.3.3. Limitation of This Study

It should be noted that the survey data used for this paper has certain limitations that should be considered when the results are being interpreted. The first limitation is selection bias. The population frame of this survey is the national focal points (NFPs) of the 10YFP on SCP; countries with NFPs are potentially more active in SCP policy-making than those that do not assign NFPs. Furthermore, responding countries might be biased towards being the ones that work more intensively on SCP and that assign more resources to this approach, compared to non-responding countries. Therefore, the results of this survey do not necessarily come to general conclusions that would apply to every country in the world; they are most robust in reflecting the characteristics of policy-making approaches of those countries that are already working on SCP. Moreover, the sample size is limited (47 responses),

and the geographical distribution of the respondents is uneven; e.g., nonresponses in non-European countries were higher than in Europe, which led to a smaller sample size in these regions. For this reason, a reference category for analysis was set as high-income and European countries, and some categories with small sample size were combined.

The second limitation is measurement error. The survey result may be affected by the view of responding government officers, which might be different from the actual institutional situation of the country. Although respondents (i.e., NFPs) were encouraged to coordinate with other government agencies and ministries to answer the questionnaire—and many of them indicated that they had collaborated in drafting national responses—the survey results should be considered as reflecting the understanding of the responding government officers.

Finally, despite the above limitations, every effort has been made to ensure that the data and methodology are of sound scientific standards. There is also ground-breaking value in the size and scientific approach of the survey itself in that it is the first large-scale survey of national governments directly focused on national SCP policy-making. Existing literature mostly addresses individual country cases or broadly compares a few countries; it mostly relies on secondary sources of information [11,12]; or it is focused on normative research to identify guiding principles and practical recommendations [13–16].

5. Conclusions

In this study, the responses to the questionnaire survey from national governments were analyzed to assess the characteristics of policy integration of SCP. Through a literature review, the applicability of the concept of policy integration to SCP policy-making was examined. Two important dimensions applicable to SCP policy, namely sectoral and organizational policy integration, and the distinction between vertical and horizontal policy integration, were identified from the existing literature on environmental policy integration. The statistical analyses including regression analysis, linear probability and logit models, and clustering and correlation analysis, were used to examine the level and characteristics of these dimensions in SCP policy integration at the national level.

The results of our analysis revealed that both sectoral and organizational policy integration of SCP in national policies are limited. In terms of sectoral policy integration, some economic and consumption sectors such as urban planning, tourism, and building are not addressed by many countries (they are only addressed by 36–45% of responding countries). Most of the countries perceive SCP as a matter of environmental protection/conservation and use of energy resources, implying that the focus of SCP is either on downstream end-of-pipe pollution control or upstream control of resource use and conservation. With regard to organizational policy integration, it was again concluded that there was only limited participation of line ministries directly in charge of some high-impact areas such as tourism ministries, infrastructure ministries, and transport ministries (only 47–55% of responding countries). Environment ministries are mostly involved with SCP (96%) and tend to handle various sectoral policies including tourism, building, and urban planning on behalf of the line ministries directly responsible in those sectors, implying that SCP is not going beyond the traditional silos of the government system. A lack of the presence of key ministries might lead to a failure in effective integration of SCP, which could cause difficulty in addressing resource consumption and its associated environmental impacts from these high-impact sectors.

SCP is an issue embedded in the socio-economy and requires addressing the close linkage between different policy sectors, which sometime contradict each other and/or are mutually beneficial. The cluster analysis using correlation coefficients identified that integration between some sectors related to SCP is progressing. Strong to fairly strong correlations were identified among the policy sectors fitting into four clusters: (i) consumption domains, such as food, building, and energy; (ii) centralized agenda, such as industry and procurement; (iii) localized agenda, such as poverty, environment, and tourism; and (iv) urbanized agenda, which is urban planning/development. Each of those policy clusters involves specific characteristics in policy-making approaches. For example,

it is vital to enable sustainable lifestyles in major consumption domains. Central government and the industry sector should also have leading roles for the centralized agenda, while community development and the rural economy should be addressed in the localized agenda. By contrast, city government and planning plays a central role in the urbanized agenda. Further discussion on effective and integrative policy design addressing both synergy and contradictions in each SCP policy cluster could be a first step in ensuring comprehensive policy integration of SCP. A cross-analysis of survey responses with income level and region identifies some priority areas such as industrial/economic development in upper middle-income countries and poverty alleviation in African countries. This should be considered in future international cooperation and domestic policy-making efforts by strategically integrating SCP in the context of specific needs of the region and countries. Although not directly addressed by the questionnaire, high resource consumption and its associated environmental impacts in high-income countries, as well as the rapidly growing consumer class in middle-income countries, are also important themes to consider. Ensuring integration of SCP objectives into these policy clusters including consumption domains (e.g., food, building, and energy) and urbanized agenda (i.e., urban planning) can be a first step in addressing this issue.

Many countries are taking a mainstreaming approach to horizontal policy integration; e.g., incorporating SCP as part of their broader national strategic planning policies such as Sustainable Development and/or Green Economy. Fewer than half of the responding countries have a specific SCP policy such as a national SCP action plan. The cross-analysis of the survey responses revealed that the existence of national cross-sectoral policies might have different effects on the sectoral and organizational policy integration of SCP. Countries with a Green Economy/Green Growth policy incorporating SCP tend to be sectoral integration-oriented (i.e., addressing SCP in broader sectors), while those with specific SCP policies might be coordination-oriented (i.e., more participation of ministries). However, none of them would be perfect for SCP policy integration. Countries addressing SCP through a Green Economy or Green Growth policy should consider a more effective institutional setup to ensure the participation of various ministries. The ones with specific SCP policies can continue their emphasis on organizational integration in SCP policy-making and should consider broadening the scope of SCP policies into non-traditional sectors, as well as try to take an integrative approach towards SCP instead of addressing SCP in each sector separately.

The results of this study provided insights into the measurement of SDG indicator 12.1.1 and policy-relevant 10YFP indicators [39]. It was confirmed that countries are mainstreaming SCP into their broader strategic planning (horizontal integration) and/or addressing it through concrete sectors (vertical integration), not solely establishing SCP national action plans. In addition, the extent to which countries are addressing SCP depends on each country, ranging from those addressing the issue only with a few sectors predominantly handled by an environment ministry to those addressing SCP through broader sector domains with the involvement of multiple ministries. In measuring these international SCP policy indicators, the depth and breadth of SCP policy integration should be considered through systematic assessment of actual policy-making efforts. Further study would be necessary to more precisely assess SCP policy integration both at national and sub-national levels. Moreover, further discussion of effective and integrative policy designs for SCP, addressing various sectors and organizational involvement that incorporates effective operationalization of national strategic plans, is recommended.

Supplementary Materials: The following are available online at www.mdpi.com/2079-9276/6/4/48/s1, Table S1: The effects of income level and region on sectoral policies addressing SCP (part 2), Table S2: The effects of cross-sectoral policies on sectoral policies addressing SCP (part 2).

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References

1. United Nations Environment Programme. *Decoupling Natural Resource Use and Environmental Impacts from Economic Growth*; United Nations Environment Programme: Nairobi, Kenya, 2011.
2. United Nations. *The Future We Want: Outcome Document Adopted at Rio+20 Conference on Sustainable Development*; United Nations: New York, NY, USA, 2012.
3. Akenji, L.; Bengtsson, M. Making Sustainable Consumption and Production the Core of Sustainable Development Goals. *Sustainability* **2014**, *6*, 513–529. [CrossRef]
4. United Nations. *Transforming Our World: The 2030 Agenda for Sustainable Development A/RES/70/1*; United Nations: New York, NY, USA, 2015.
5. United Nations. UN Chronicle: Goal 12—Ensuring Sustainable Consumption and Production Patterns: An Essential Requirement for Sustainable Development. Available online: https://unchronicle.un.org/article/goal-12-ensuring-sustainable-consumption-and-production-patterns-essential-requirement (accessed on 5 April 2017).
6. United Nations Environment Programme. *ABC of SCP: Clarifying Concepts on Sustainable Consumption and Production*; United Nations Environment Programme: Nairobi, Kenya, 2010.
7. United Nations. *United Nations Conference on Environment and Development: Agenda 21*; United Nations: New York, NY, USA, 1992.
8. United Nations Department of Economic and Social Affairs. *Policy Integration in Government in Pursuit of the Sustainable Development Goals*; United Nations Department of Economic and Social Affairs: New York, NY, USA, 2015.
9. Lafferty, W.M.; Hovden, E. Environmental Policy Integration: Towards an Analytical Framework. *Environ. Politics* **2003**, *4016*, 157–159. [CrossRef]
10. United Nations Statistical Division. *Work Plans for Tier III Indicators: Compiled by UNSD through an Online Questionnaire Sent to International and Regional Entities Responsible for Global Data Compilation*; United Nations Statistical Division: New York, NY, USA, 2016.
11. United Nations Environment Programme. *Global Outlook on Sustainable Consumption and Production Policies Taking Action Together*; United Nations Environment Programme: Nairobi, Kenya, 2012.
12. Schandl, H.; Heyenga, S.; Hosking, K.; Akenji, L.; Bengtsson, M.; Bhattacharya, T.R.; Foran, T.; Gandhi, R.; Guo, F.; Walker, P.; et al. *Capacity Building and Policy Needs Assessment for Sustainable Consumption and Production*; United Nations Environment Programme: Nairobi, Kenya, 2013.
13. Bentley, M. *Planning for Change: Guidelines for National Programmes on Sustainable Consumption and Production*; United Nations Environment Programme: Nairobi, Kenya, 2008.
14. Akenji, L.; Bengtsson, M.; Briggs, E.; Chiu, A.; Daconto, G.; Fadeeva, Z.; Fotiou, S.; Gandhi, R.; Mathews, C.; Metternicht, G.; et al. *Sustainable Consumption and Production: A Handbook for Policymakers (Global Edition)*; United Nations Environment Programme: Nairobi, Kenya, 2015.
15. Akenji, L.; Bengtsson, M.; Salem, J. *Sustainable Consumption Guide for Policymakers: Debunking Myths and Outlining Solutions (Asia Edition)*; United Nations Environment Programme: Nairobi, Kenya, 2015.
16. Regional Activity Centre for Sustainable Consumption and Production. *Switch-Med SCP Policy Toolkit: Mainstreaming Sustainable Consumption and Production into Key Economic Sectors in the Mediterranean*; Regional Activity Centre for Sustainable Consumption and Production: Barcelona, Spain, 2014.
17. Jordan, A.; Lenschow, A. Policy paper environmental policy integration: A state of the art review. *Environ. Policy Gov.* **2010**, *20*, 147–158. [CrossRef]
18. Visseren-Hamakers, I.J. Integrative environmental governance: Enhancing governance in the era of synergies. *Curr. Opin. Environ. Sustain.* **2015**, *14*, 136–143. [CrossRef]
19. Peters, B.G. Managing horizontal government: The politics of co-ordination. *Public Adm.* **1998**, *76*, 295–311. [CrossRef]

20. Mickwitz, P.; Kivimaa, P. Evaluating policy integration. *Evaluation* **2007**, *13*, 68–86. [CrossRef]
21. Briassoulis, H. Policy integration for complex policy problems: What, why and how. In Proceedings of the Berlin Conference on the Human Dimensions of Global Environmental Change, Berlin, Germany, 3–4 December 2004.
22. Meijers, E.; Stead, D. Policy integration: What does it mean and how can it be achieved? A multi-disciplinary review. In Proceedings of the Berlin Conference on the Human Dimensions of Global Environmental Change, Berlin, Germany, 3–4 December 2004.
23. Thomas, E.V. Sustainable development, market paradigms and policy integration. *J. Environ. Policy Plan.* **2003**, *5*, 201–216. [CrossRef]
24. United Nations Environment Programme. National Action Plans and Poverty Alleviation. Available online: http://staging.unep.org/resourceefficiency/Home/Policy/SCPPoliciesandthe10YFP/NationalActionPlansPovertyAlleviation/tabid/78379/Default.aspx (accessed on 11 April 2017).
25. Regional Activity Centre for Sustainable. Consumption and Production National SCP Action Plans—SwitchMed. Available online: https://www.switchmed.eu/en/corners/policy-makers/actions/action-2 (accessed on 11 April 2017).
26. Global Green Growth Initiative. Green Growth Planning & Implementation Overview. Available online: http://gggi.org/activities/ggpi/ggp-overview/ (accessed on 10 December 2016).
27. United Nations Environment Programme. *Shaping the Economy of Sustainable Development: An Overview of National Policies and Initiatives Supporting the Shift towards Sustainable Consumption and Production*; United Nations Environment Programme: Nairobi, Kenya. (in press)
28. The World Bank Group. The World Bank—DataBank. Available online: http://databank.worldbank.org/data/ (accessed on 28 Sepember 2016).
29. United Nations Environment Programme. Environment Live. Available online: http://environmentlive.unep.org/ (accessed on 20 April 2017).
30. Hellevik, O. Linear versus logistic regression when the dependent variable is a dichotomy. *Qual. Quant.* **2009**, *43*, 59–74. [CrossRef]
31. R Core Team. *R: A Language and Environment for Statistical Computing*; R Foundation for Statistical Computing: Vienna, Austria, 2016.
32. Wei, T.; Simko, V. Corrplot: Visualization of a Correlation Matrix (R Package Version 0.77). Available online: https://CRAN.R-project.org/package=corrplot (accessed on 20 April 2017).
33. Hertwich, E.G.; Peters, G.P. Carbon footprint of nations: A global, trade-linked analysis. *Environ. Sci. Technol.* **2009**, *43*, 6414–6420. [CrossRef] [PubMed]
34. Lettenmeier, M.; Liedtke, C.; Rohn, H. Eight tons of material footprint—Suggestion for a resource cap for household consumption in Finland. *Resources* **2014**, *3*, 488–515. [CrossRef]
35. Akenji, L.; Chen, H. *A Framework for Shaping Sustainable Lifestyles*; United Nations Environment Programme: Nairobi, Kenya, 2016.
36. Leppänen, J.; Neuvonen, A.; Ritola, M.; Ahola, I.; Hirvonen, S.; Hyötyläinen, M.; Kaskinen, T.; Kauppinen, T.; Kuittinen, O.; Kärki, K.; Lettenmeier, M.; Mokka, R. *Future Scenarios for New European Social Models with Visualisations Scenarios for Sustainable Lifestyles 2050: From Global Champions to Local Loops*; UNEP/Wuppertal Institute Collaborating Centre on Sustainable Consumption and Production: Wuppertal, Germany, 2015.
37. United Nations Environment Programme. *Global Material Flows and Resource Productivity. An Assessment Study of the UNEP International Resource Panel*; United Nations Environment Programme: Nairobi, Kenya, 2016.
38. Akenji, L.; Bengtsson, M.; Bleischwitz, R.; Tukker, A.; Schandl, H. Ossified materialism: Introduction to the special volume on absolute reductions in materials throughput and emissions. *J. Clean. Prod.* **2016**, *132*, 1–12. [CrossRef]
39. United Nations Environment Programme. *Indicators of Success for the 10-Year Framework of Programmes on Sustainable Consumption and Production Patternr: Principles, Process and Methodology (Pilot Phase Version—Final Draft)*; United Nations Environment Programme: Nairobi, Kenya, 2016.