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Article

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Article

The Policy Framework of Natural Resource Management in Oil-Dependence Countries

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Abstract: A variety of critical empirical studies are interested in and focused on complex issues related to natural resource management and resource curse, whilst less can be found combining diverse factors that affect the dynamics of this curse and mitigate it. The case study of Norway is used as the benchmark policy framework in oil-rich countries to invest oil revenues and set correct fiscal policies. In this study, an analytical framework was structured to evaluate the coherence of resource management with sustainability as a starting point, contributing to further assessments of how the adaptation of such policies is incorporated in resource management to mitigate the resource curse. The analysis also suggests that oil-rich countries can learn from Norway's experience to mitigate this resource curse and utilize oil revenues in the interest of the country. In addition, the analysis helps in effective management and the protection of ecological resources as these are becoming an increasingly important strategic part of natural wealth. This study aimed to provide an overarching framework designed to help conceptualize key issues of natural resource management and the resource curse in oil-rich countries and understand the challenges facing those countries in managing the natural resources.

Keywords: resource management; oil curse; footprint; fiscal policy; sustainability; footprint

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1. Introduction

A variety of critical empirical studies are interested in and focused on complex issues related to natural resource management and resource curse, whilst less can be found combining diverse factors that affect the dynamics of this curse and mitigate it. Growth can be generated and sustained by natural resources. It is, therefore, crucial to improve the management of natural resources in the long-term and develop pro-poor economic strategy. Likewise, the international context of managing natural resources is shifting. Several emerging economies represent major natural resource importers. This growing demand for natural resources induces the efficiency of the management of resources and makes it even more urgent. This study focuses on the economic and environmental dimension of the management of oil resources. The aim is to enable decision-makers from agencies, finance ministries and planning to consider natural resource contribution to poor development, as well as the importance of policies that promote sustainable management (Ochola et al. 2010; D. OECD 2009b).

There is a consensus that economic growth is a key requirement in the long-term and is often the key contributor to growth and development. Country-by-country and time evidence shows that the long-term poverty reduction primarily results from growth due to the initial conditions (mainly levels of income and resources inequality) and whether the poor are economically active in sectors and areas. This combined pattern and pace of growth require a joint approach to have a substantial effect on poverty reduction (Cooperation and Development 2007).

In the literature, natural resource management categorises natural resources into non-renewable and renewable resources. Consequently, to differentiate between various categories of resources, it is necessary to define natural resources. The focus of economic development is on a range of natural commodities whether they are renewable or non-renewable. Timber and non-timber wood products, wild fish catches, etc., are commodities made from sustainable natural resources. Oil and minerals are primarily materials extracted from non-renewable natural resources, and these goods are the backbone of the economy of many developed countries. Moreover, farm activities are a vital part of the economy in these developed countries, as well as soil and water supplies (Conrad 1999). However, in some low-income countries of Africa, Asia, and Latin America, natural tourism is an essential component of international tourism receipts. Coal mining has a significant effect on the development of countries like Botswana. In brief, renewable resources can play a vital role in maintaining access to energy for poor people (Ahuja and Tatsutani 2009).

A wide range of positive externality is generated by natural resources at the local and international levels. In addition, natural resources also provide better service to products such as water filtration and purification systems. For example, natural resource services at the state or regional level provide soil stabilisation in wetlands supported by upstream plants, which allow downstream water storage, irrigation and hydroelectric facilities to perform in a better way. Global services including forest or land carbon sequestration have the potential to contribute to climate change mitigation (OECD 2009a).

The basic functions of natural resource are broken down broadly into two following points:

- Provide important raw material for the productions of good and services
- Various environmental services that will diminish if natural resources are depleted.

There are two effects in terms of resource management which are:

- Depletion resources
- Degradation of resources

In this way, several approaches to endorse improved management of natural resources are proposed. This section seeks to analyse these concepts in order to investigate whether they may contribute to the development of natural resource policy of countries in the sustainable use of natural resources (Shardul Agrawala et al. 2003).

It should be highlighted that relevant challenges are faced with the sustainable use of natural resources. Sustainable resource management relies on the ability to monitor stocks and take corrective measures when they are seriously damaged or declined.

2. Sustainable Development

Sustainable development defined as “development that meets the needs of the present without compromising the ability of the future generations to meet their own needs” (Emas 2015, p. 1)

In general, a consensus on sustainable development is at minimum captures of two essential ideas:

- It contains three dimensions namely, economic, social, and environmental. To be sustainable, development has to balance between the three different components that contribute to the overall quality of life (Des 2013).
- An obligation for this generation has to be fulfilled for the future generations by leaving adequate economic, social and environmental resources for them to live with the welfare the previous generation had, at least (Des 2013).

2.1. The Resource Management Approaches

There are many sets of representative concepts that imitate the main approaches to resource management. Two main ideas are discussed as follows:

2.1.1. Carrying Capacity

The principals take into account the notion of carrying capacity that contrasts the use of resource resources with the bio-physical limit provided for the availability of such goods. "Carrying capacity indicates the maximum number of a species that a given unit of land can "carry" indefinitely" (Wisniewski 1980, p. 55). However, it is claimed that for humans, this notion is not relevant. Furthermore, many other concepts for resource management try to compare the goods and services that are available from nature for a given population with the standard of living. The concept of ecological footprint is similar to the idea of carrying capacity (Akkucuk 2015).

2.1.2. Ecological Footprint

The ecological footprint refers to the use of water and land to provide all resources consumed by humans and eliminate the waste material generated by the population. It is a comprehensive measure that is responsible for the degradation of the environment, and is commonly used to indicate this degradation. In terms of the balance between country growth and global environmental production, each county faces several challenges (Guo et al. 2020). Several studies use this as an index for environmental degradation (Hassan et al. 2019c; Siche et al. 2010).

This index has direct and indirect benefits demonstrating the environmental effects of production and consumption. In several ways, the impact of economic growth on the ecological footprint has been addressed in the literature (Hassan et al. 2019c; Hassan et al. 2019b; Aşıcı and Acar 2016); Moreover, the impact on forging direct investment (FDI) (Liu and Kim 2018; Zafar et al. 2019; Udemba 2020), socio-political factors (Charfeddine and Mrabet 2017; S.-T. Chen and Chang 2016; Dogan et al. 2019), and globalisation (Sabir and Gorus 2019; Figge et al. 2017; Ahmed et al. 2019; Rudolph and Figge 2017) has been investigated.

However, the literature on the influence of natural resource management is mostly ignored. The world economy is heavily dependent on resource-abundant countries. On average, every megajoule of crude oil has an emission of 10.3 grams. Investing in crude oil infrastructure and policies could bring more significant climate benefits. A policy or regulatory operation must be the challenge with flaming. Yet, there have been wide differences even in the best global forecasts of crude oil supply so far, as economic data predicting how many barrels of oil companies are supposed to produce on the basis of fuel prices have been flipped over that period. Many of the essential processes that lead to emissions are also missing (Masnadi et al. 2018).

The footprint can be used to evaluate the limits of consumption of natural resources and considering the resource's depletion. If sustainability is defined in such a way and can be measured and consistent, sustainable resource management will be possible. However, the footprint does not provide a complete picture of sustainable resource management. Furthermore, the footprint neglects quality of life; it only reflects the lifestyle's pull on nature (Beske-Janssen et al. 2015).

The assessment of the footprint merely notes that the overall usage of natural resources does not exceed the regeneration stage of nature if overshooting is to be prevented. Most important is that the carrying capacity is quite irrelevant, whereas yield's resource, in the case of renewable resources, can be increased, and the depletion in the case of non-renewable resources can be expanded by ethnology. The proper management of natural resources thus leads to an improvement and enhancement of the carrying capacity. Moreover, technological efficiency is a crucial strategy to reduce the draw of humanity on nature (Chambers et al. 2014).

In the same vein, these countries must reduce their level of footprint by effectively managing and protecting their ecological resources as they become an increasingly important strategic part of natural wealth. The results will be not only national but also global sustainability if countries perform their long-term interest.

The intervention of national policies of governments, which can be divided into three groups, can influence how resources are managed (see Figure 1):

- Data Collection

Selecting which statistics are obtained determines what is deemed to be important for many natural resources, including the performance of fiscal, social, trade and resource use. In addition, it is ensured that both individuals and organisations comply with regulations and legislations. For that to be the case, transparent and publicly available sustainability indicators and accounts that measure key sustainability requirements are needed to be established. It evolves by establishing accounts of natural capital or (biological capacity) and setting specific goals for the use of natural capital (United Nations Environment Programme 2016).

- Managing National Assets

Governments handle a variety of national assets. These include educational institutions, transport and communication services, etc. Each of these resources must be dealt with, which ultimately can help shape the stability of society. For that to be the case, and for sustainability, adapting infrastructure such as small-scale energy-saving and supporting research for sustainability can strengthen the contribution of education to sustainability (Terrapon-Pfaff et al. 2014).

- Guide the Market

Governments are most instrumental in managing their economies, accomplished not merely by monetary policies, but also by putting standards and regulations in place by developing inducement systems (taxes and subsidies) for market direction and revenue generation and even in the context of international negotiations. This could be achieved by putting in place regulations that promote sustainability (taxes and subsidies), for instance, that encourage an equitable reduction in the consumption of resources that promote the use of resources (Ashford and Hall 2011).

Therefore, sustainability-oriented management techniques would approach the environmental footprint in terms of life-cycle solutions to sustainable growth. To successfully monitor progress towards sustainability, ecological footprint must consider land requirements to maintain local activities. The footprint index offers policymakers the ability to monitor the utilisation of local resources (Wiedmann et al. 2006). Even though the ecological footprint index tends to be insufficiently reliable to compare jurisdictions globally, it can be practically used as a resource for local policy management. It can be explicitly used for the following three goals (Steer 2008):

- To ensure publicly available information, community discourse and engagement by individual footprints. Accessibility through the Internet of individual footprint calculators is a particularly useful way of fostering and raising public awareness that is important for the political purpose of ecological information.
- To allow and motivate official action through the use of footprint analysis as part of impact assessments.
- To structure government guidelines as a framework for strategic planning and sustainable development.

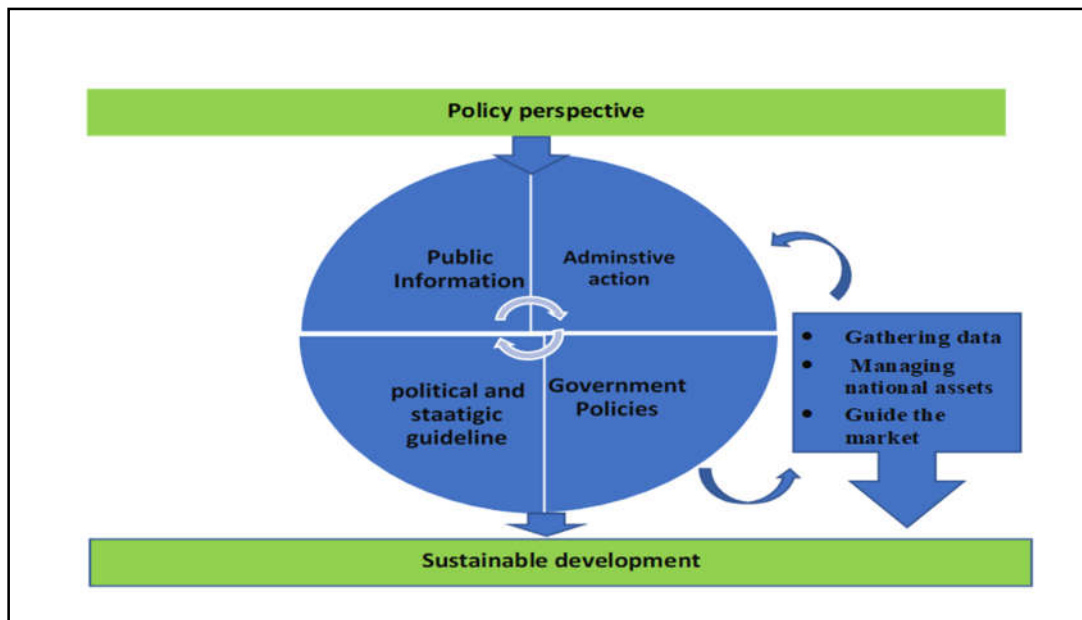


Figure 1. From the ecological footprint to sustainable development—A framework for policymakers.

Due to its utility in evaluating environmental effects, energy consumption, and natural resource management, the ecological footprint may also be important in governmental processes and particular projects. The assessment of ecological footprint is important in strategic planning initiatives such as local master-planning or annual reports. It can orient environmental management processes, provide a basis for data collection and coordination, set goals and monitor success, assist ecological monitoring efforts, and inform regional economic growth strategic decision-making (Wiedmann et al. 2006).

Environmental policy development and other government policies increasingly require the involvement of multiple participant groups, including economic agents, political-administrative and multi-stakeholder, and experts. Thus, introducing new issues into the national environmental policy agenda about the use of footprinting should be followed by political goals to achieve results that could impact the political and social context. The first target for governments might be to decrease the ecological footprint over time, but attention should also be extended to other environmental issues and priorities.

The concept of sustainable development and resource management from the policy perspective can be summarized in Figure 1. In sum, it is crucial to focus on the critical requirements of sustainability in order to achieve sustainable resource management, and the most critical aspect is to prevent the ecological overshoot that was considered the most important issue of resource management. Investing in a sustainable future, raising awareness of the value of applying ecological constraints to decision-making, and making government choices that diminish the footprint are all important areas to consider.

3. The Economic Approach to Resource Management (Non-Renewable Resources)

Under this concept, the management of natural resources is less straightforward than the previous concept. The basic economic concept of non-renewable resources, which by definition is limited, will decline if the resource is used. Nonetheless, technical advancement, recycling and the discovery of new deposits will reduce the scarcity of these resources (Grosse 2010; W. Chen and Lei 2018). The exploitation of these types of resources ensures that the size of the stocks will reduce their supply. Eventually, this ensures that a society of current exploitation and use will bear the opportunity cost and will consume less in the future, considering the present rate of consumption (Carvalho 2017).

Gray (1913) was a pioneer in resource economics. In specific, he worked on conservation economic prospects and the rent model for natural resources. Gray (1913) should be seen as a backdrop to two important discussions in the economics of natural resources. On the one side, he partly predicted the modern debate on the significance of environmental discounting. From another point of view, it can also be seen as an explicit precursor to today's discourse on the needs of sustainable economies since the intergenerational equity problem related to the extraction of natural resources is on the agenda of economics. The economy, thus, became again related in the debate on a significant topic. It is becoming important to distribute cross-generational capital and to address sustainability. The majority of Gary's studies have focused particularly on this work.

Since then, many of the perspectives available trace back to Gray (1913). In 1931, Hotelling coined the theory of the optimum utilisation rate of non-renewable resources which continues to be applicable today. He assumed that a natural resource loss could be either too slow or too fast. The social cost of losing capital outweighs the social gains over its period of use. There is always an optimal rate of loss. The rent of the resource is the exceeding price of the mineral over the extract costs when preferably a resource is readily available. This rent is maximised if the rent rise is equivalent to the discount rate. Robert Solow followed up Hotelling's theory, and reported that these resource rents would be invested in economic capital in try to cope with subsequent generations for their lack of natural wealth which is also known as the law of Hartwick (1977). These ideas form the foundation for the capital which certain resource-rich countries are creating to spend their wealth in the future (Kuhlman and Farrington 2010).

Hartwick (1977) formalized a kind of sustained economy, with the ability to convert exhaustible wealth into capital stocks, a special kind of intergenerational transfers. If all revenues from exhaustible wealth are followed in the Hartwick rule of reproducible wealth, the economy can be made sustainable. In an abundant resource economy, the Hartwick rule Hartwick (1977) provides the "general rule" to sustainability—a maximum constant amount of consumption can be retained when (net) investment is equal to the rent value on the resources generated at any point of time. Hartwick's finding is so appealing because it has generalised the fundamental message of neoclassical resource economics. Exhaustible input of natural resources may be supplemented with manmade capital to the extent that it would not affect future generations if those natural resources are exhausted (Asheim et al. 2007). These concepts form the base of funds set up by many resource-rich countries to spend their resource income in the future.

Non-renewable resource management is concerned with how the stock of resources should be used optimally. Therefore, the concern is to put forward strategies to concentrate on the role of government policies and institutions in the management of non-renewable natural resources. In particular, natural resource-based economies and how they optimally manage the revenue of these resources are keeping the previous concept (footprint) under control and will eventually achieve sustainability through management (Collier and Laroche 2015; Viñuela et al. 2014).

Managing natural resources poses unique challenges. Economies with natural resources are vulnerable to periods of boom and bust. Additionally, when a country unexpectedly finds and begins exporting vast volumes of natural resources, the exchange rate will change dramatically, leading to a collapse in the productivity of other industries. This situation is known as "Dutch disease" (Van der Ploeg 2011b). Important policy responses to these "boom and bust" and "Dutch disease" periods include stimulus funds, specific public spending financed by windfall income, export diversification, appropriate use of tax regimes, and sustaining external debt at a sustainable level (Berg et al. 2012).

3.1. Weak and Strong Sustainability

On approaching substitutability, differentiation was made between "weak" and "strong" sustainability in the debate centres. Weak sustainability, natural economic and

social capital is known to be substituted. In strong sustainability, economic activity protects natural capital and enhancing social well-being (De Oliveira Neto et al. 2018).

Some resources must fall within the scope of a strong sustainability requirement, while others must fall within the scope of a weak variety. Which of the two depends on the degree to which resources may be replaced. For example, the decline of fossil fuels is a weak sustainability problem. A collection of thresholds cannot be ignored as strong sustainable. Any outcome of the proposed intervention should remain within those thresholds during the impact evaluation. It is essentially a question of established social and political interests to set those thresholds. The parameters for assessing the political effects in that room are therefore weak sustainability. Assuming that strong sustainability requirements are satisfied, the most sustainable consequence would be the greatest volume of natural resource as well as of natural resource production (Kuhlman and Farrington 2010; Ayres et al. 1998).

This framework lays the groundwork for oil-rich countries to pursue two different policy approaches to sustainability (weak or strong). In this context, oil-rich countries in the management of oil revenues should adopt both viewpoints sustainability concepts. As argued by Nasrollahi et al. (2020), from a weak sustainability point of view, a tax should be levied on energy usage, providing it with a real price. Nevertheless, it enhances the environmental process from a strong sustainability point of view. There is a major obstacle that can be caused by lower oil costs, leading to a rise in energy demand. The energy use should be taxed offering a real price for it. Therefore, the environmental crisis can be interpreted in terms of a strong sustainability approach when handling the recurrence of these nations. Hence, in managing the recurrence of these countries, the environmental problem should be considered with a view to a strong sustainability approach. From a weak sustainability point of view, these countries are less restricted to achieving sustainability through economic development (Nasrollahi et al. 2020). Moreover, investing the existing oil revenue in the infrastructure sector will avoid weak sustainability in order to ensure a sufficient, stable and permanent income to compensate for it in the future (Khodaparast Shirazi et al. 2020).

Furthermore, there is a growing world perspective on the management of natural resources. Many developing economies are big natural resource importers. This increasing need for natural resources allows the effective use of resources with more criticality (OECD 2009a). With sound management, the long-term, balanced pro-poor development may be focused on natural capital. They must be used efficiently, equitably, and sustainably to ensure that the natural resources not only endorse, but also sustain growth. For instance, by improved efficiency or production, the commercial value can be maximised, and its profitability can be expanded through engaging in human resources and intellectual development. Fiscal revenues may be channelled through weak expenditure, whereas policy mechanisms that enable diversification outside of the exploitation of natural resources may stimulate further value-adding growth (OECD 2009a).

The transition of natural resources into specific types of wealth, including human and social capital, will only provide a foundation for sustainable growth when certain conditions are fulfilled (e.g., by education investment). Both related to social, economic, and environmental considerations must be taken into consideration in decisions to turn nature capital into other types of income. Often, there are trade-offs between various stakeholders and critical transformation levels that should not be reached. Oil income, the associated stream of economic, social and environmental gains, can fall beyond certain limits quite often irreversible. Some natural resources are indispensable and must be conserved to sustain long-term growth and sustainable development (OECD 2009a).

3.2. The Governance Dimension of the Natural Resource's Management

The nature of these resources, the stakeholders involved, and the institutional structure and rules should be informed about the governance of natural resources. Under weak natural resources institutions (e.g., uncertain rights, lack of market and remote locations),

unique challenges in this respect are established (Agrawal 2001; OECD DAC 2008). Specifically, the ability of elite groups to exploit access and exclude the poor is a challenge that often leads to small elites benefiting from natural resources and does not promote the growth of the nation, let alone lifting people out of poverty. Apart from corruption and weak governance problems, a variety of possible uses—sometimes mutually contradictory—of natural resources generate trade-offs and conflicting interests and objectives (OECD DAC 2008). Natural resources governance requires political decisions like market-based measures, regulations, collaboration, and information. These policies have different distributional effects. To ensure a pro-poor outcome, significant involvement of the poor in governance mechanisms must be paid special attention (OECD 2009a).

This section attempts to determine the best way for oil-dependence countries to manage oil revenues. As was said, most countries that are rich in oil are affected by the so-called resource curse, which seeks to mitigate the oil curse and use oil income to government advantage. A limited number of success stories can be established in the developed and developing countries, such as Norway, on which a successful framework and fiscal policy can be designed and enforced. These policies may prevent or mitigate the resource curse into long-term growth (McKay 2012).

For those countries, the oil sector has generally been relatively poor, characterised by frequent production disruptions, limited domestic development, and limited income inflows and allocations. Furthermore, the tax policy is often revised, and the implementation of the policy is yet to be completed. The resource curse has impacted these countries heavily, and their full growth potential has never been reached despite massive oil wealth (Arezki et al. 2012).

4. Methodological Approach

The research frameworks include the basic concepts and terms, as stated by Coral and Bokelmann (2017), which can be used to articulate the causal explanations required of the theory. Furthermore, analytical frameworks help formulate research and provide a general set of parameters for all types of analysis and are used to resolve complexity. Sanchez-Plaza et al. (2019) indicated that the design of general frameworks might help to define elements and the interaction between them.

The objective of this work is the development of a conceptual framework for fiscal policy revenue management. In the sense of sustainable growth, the conceptual framework explains potential mechanisms associated with oil income control, based on the triple bottom line of the environment, economy and society. This framework describes a conceptual framework to be applied in oil-rich countries addressing the resource curse from a point of view of sustainability and fiscal policy for oil revenue. The conceptual framework provides tools to approach such countries to mitigate the resource curse sustainably.

A wealth of natural resources entails several challenges for resource-rich countries. This involves loss of competitiveness in the non-oil sectors, the excessive use of commodity resources for government revenues, and export profits by the so-called “Dutch disease” (Macartan et al. 2007). The Dutch disease occurs when the additional wealth generated by the sale of natural resources leads to an appreciation of the real exchange rate. In consequence, this reduces the exports to the non-resource industries and decreases the imports (Van der Ploeg 2011a; Lartey 2011).

The Institutional Model and Rentier State model Theory are the theoretical models that best explain the phenomenon of the resource curse (Van Ingen et al. 2014). Rent-seeking involves looking for financial benefits or taking advantage of non-productive economic activity. A rentier state earns large rentals from foreign businesses, organisations, or governments. Such governments are autonomous from their people due to their surplus of profits from extractive industries. Ultimately, it creates a society with almost no middle class, and no democracy (Van Ingen et al. 2014).

The institutional model emphasises the poor economic policy and management, where political institutions are weak. Political leaders are likely to collect profits, while bureaucracy and economic inequality flourish. The resource curse is responsible for considering the absorption of sales revenue as capital consumption, considering that the non-renewable government depends on its oil revenue to fund the expenses of mobilising resource projects, which enable resource mobilisation and boost productivity and they are frequently abandoned later (Macartan et al. 2007; Coutinho 2011). However, institutional quality could diminish the negative impact of oil revenue on economic growth. A.S. Hassan et al. (2019) found that oil revenue had an impact on growth and institutional quality mitigated the detrimental effect on oil abundance on long-term economic growth. They highlight the need to implement sound policy to incorporate their entire oil mechanism into a sound management framework. In a similar vein, Ologunde et al. (2020) indicate that oil revenues in selected oil-rich African countries have a potentially detrimental impact on sustainable development. Accordingly, they stress urgent fiscal policy intervention for sustainable growth in oil-rich countries and correcting the quality of inefficient public institutions.

The resource curse threatens to exacerbate governance and weakens government institutions. Large leases, which are derived from the profits of natural resources, contribute to rent-seeking behaviour. Rent-seekers divert money and generates deadweight losses for society from successful uses (Hausmann and Rigobon 2003). Political elite rent-seeking behaviour has adverse effects on governance in oil-rich countries that are all too high. Nevertheless, economic factors have a little inexorable impact on national economies, as states will minimise their impact by pre-emptive policies (Van Ingen et al. 2014).

Countries that can generate oil revenue also have less dependence on citizens' taxes which often leads to weak connections between governments and the public. Resource and non-resource income are adverse in studies by (Macartan et al. 2007; Bornhorst et al. 2009). Fluctuations in income are the result of natural resource price volatility, in particular oil. This volatile source of income leads to future financing uncertainties and long-term planning. In good years, instability leads to high investment levels, with drastic decreases in declining years (Segal 2012; Bartsch et al. 2004).

4.1. Fiscal Policy

Like in most major oil-exporting countries, upstream oil activities are regulated by state oil companies; oil revenues collect in the country directly and exclusively. The use of oil income is, therefore, a fiscal policy choice and it is through public spending that oil revenues, including inflation, affect the real economy. It was noted that resource-rich countries are not adequately strong in terms of policy frameworks to facilitate the implementation of effective fiscal policies (Mohamed 2020; Daniel et al. 2013).

If a minimum stabilization feature is established by resource-dependent countries, they will be able to investigate how to properly handle saving and spending. Investment in the development of a country-specific tax policy system for the distribution of revenue from natural capital is currently greater than the expenditure projections for future generations. Beyond what is required to sustain short to medium-term stability, not all states will deem it useful (i.e., to conserve natural resources revenues).

In other terms, it may be in the benefit of certain countries to invest as much money now as the stabilisation system allows, rather than conserve further resources for future generations. Studies also concluded that the usage of natural resource income in the domestic economy by capital-starved resource-rich emerging countries would be growing (see, e.g., (Baunsgaard et al. 2012; Van der Ploeg 2011a)).

Poorer countries should invest more and save less on economic growth. The stabilisation financing strategy of overcoming this problem is to devise a mechanism for sharing natural resource earnings (the deposit and withdrawal rules) in place of current budget expenditure by generating savings beyond the stabilisation and short- to medium-term saving steps. Even if a country wants to spend more now, the economy may not be capable

of absorbing enhanced spending and investment quickly and productively. Additionally, a developed nation may have reasonable reasons to conserve more existing income before they become more competitive and sustainable.

The regulation of petroleum revenue will significantly boost a tax policy strategy. Such countries should structure their tax policy around non-oil deficits that are lower than expected prices and based on oil revenues. The oil-price fiscal rule should link government expenditure to the long-term projected price of petroleum. This legislation would reduce the uncertainty of government spending and save a large portion of the existing oil receipts.

Countries that depend on oil should enact effective policies to guarantee economic development, providing financial benefits from resource extraction and tax and revenue management policies (McKay 2012). Certain oil-exporters have been able to alleviate the consequences of the resource curse through adequate policies. This section reflects on the most successful government policies (Abata et al. 2012; Coutinho 2011; Iimi 2007). In particular, policy on revenue management encourages harmony and social stability by creating an income distribution mechanism. This is generally performed through the management of public investment (Van Ingen et al. 2014). Government bodies should develop a tool for evaluating longer-term oil revenues forecasts and outline fiscal policies that are propitious to oil-producing countries' long-term growth strategies

Fiscal Policy of Oil Producers

The collection, investment, and utilisation of oil income should be governed under the fiscal framework. Hamilton and Ley state that revenue should be generated through the fiscal policy of resource-rich countries. The strong financial positions make it possible for governments to pursue growth strategies without the volatility of petroleum revenue (Bjerkholt 2002).

Literature has admitted that petroleum-producing countries will be pursuing a tax-related strategy. Hamilton and Ley (2012) defining fiscal regulations as the fiscal performance summary indicator. The established tax rules include permanent fiscal regulations on wages, cautionary fiscal management, and current oil expenditure. Non-oil balance is a useful indicator for assessing the sustainability of fiscal policy. However, it is challenging to determine permanent income in the future, and the rule does not take into consideration the future spending, such as social security liabilities. Estimating projected revenue is not easy as it would not include potential social security spending.

Non-oil balance is a useful indicator to evaluate the sustainability of fiscal policy. To ensure fiscal sustainability, governments will strive to achieve a sustainable income balance. However, calculating permanent future incomes is also a problem, and the law does not take into account the expected costs, such as social security liabilities. The model is based on a permanent hypothesis of income (PIH) (Olters 2007; Bartsch et al. 2004; Khalid 1994). On the other hand, the precautionary fiscal rule is focused on oil revenue volatility. The rule is intended to ensure a reasonably stable future oil usage, even if the oil sales stop suddenly. Consequently, governments limit the flow of revenues from accumulated financial assets to consumption. North Sea oil producers, especially Norway, have succeeded in turning oil wealth into economic growth (Valdés and Engel 2000; Bartsch et al. 2004).

An alternative rule is based on a framework in which the government spends entirely on current oil revenues. Most oil-exporting countries, such as Nigeria, have a fiscal policy regulation of that kind which is not a sustainable policy. It prevents and is not desirable long-term growth (Stevens 2003).

4.2. Revenue Management

Responsible governments must be proactive in turning their countries' non-renewable oil resources into long-term production. Governments must guarantee fiscal restraint

by avoiding the burden of spending. Oil production produces large flows of oil production; government institutions can be placed under pressure. Revenue spent would, therefore, be driven by correct policies on revenue management aimed at infrastructure investment (Stevens 2003; Sy et al. 2011).

Besides, a revenue management framework should be structured to ensure that government departments and relevant players have transparency and accountability. Oil proceeds are used to minimise public debt utilising the widely accepted benchmark framework for petroleum exporting countries (Davis et al. 2003b; Sy et al. 2011).

4.3. Public Investment Management Systems

To ensure that oil income in low-income countries contributes to public investment instead of increased private consumption, effective public investment management systems are essential. Economic growth is dependent upon core public goods which are frequently lacking in underdeveloped countries. Governments may use oil revenues in a structured way to enable countries to support development. Research indicates that investment returns on infrastructure could be high, generally from 15 to 20%. World Bank forecasts that the long-term growth rate can be raised by at least two percent a year in investment infrastructure (Macartan et al. 2007; Davis et al. 2003b).

The life cycle of public investment can usefully be grouped into various component processes from the perspective of a finance ministry. Procedures for the selection and approval of new projects to obtain funding from the budget are called Processes. In addition, this process will allow the project to take place before approval is considered in the budget. Investment project processes are referred to as the implementation of the project. The procedures for the management of assets after the end of the building are called service and maintenance. Processes for assessing projects until finished to help guide better investment planning (“evaluation”) (Miller and Mustapha 2016). Thus, public investment management is regarded as being a framework composed of mechanism groups connected to the annual budget cycle at some crucial points in an investment management period (Figure 2).

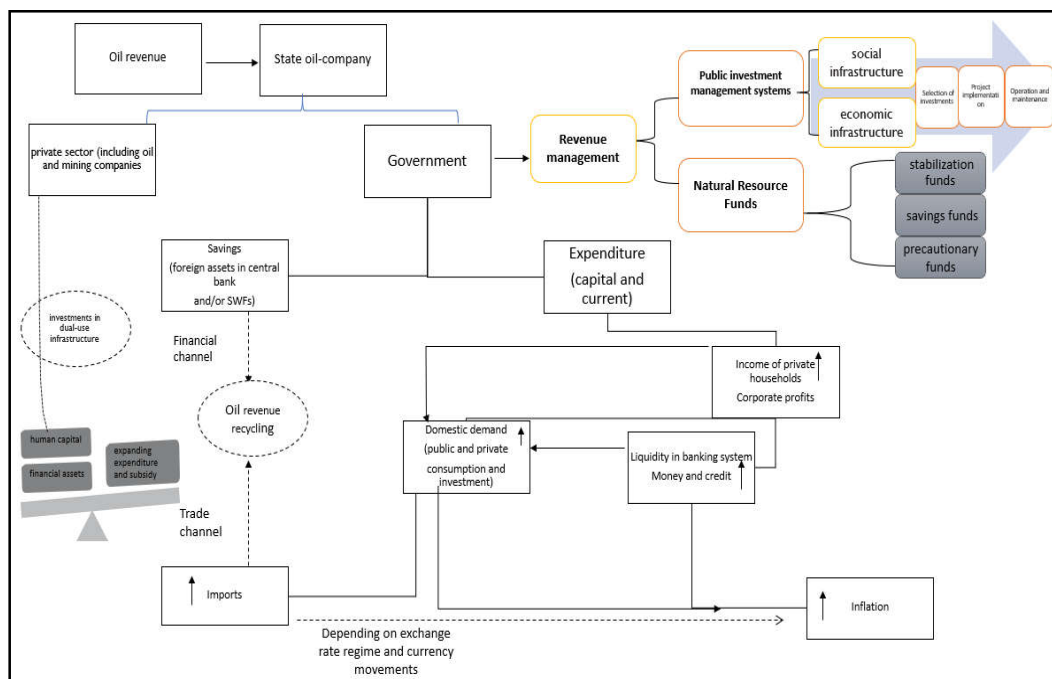


Figure 2. Conceptual framework illustrating the Fiscal revenue management policies and the economy—a stylised overview.

In project collection, life cycle planning, budgeting, implementation, monitoring, and confirmation, the government should start working for the improvement of public investment management. That is the most compelling restriction. Given the need for urgent infrastructure investment, the government prioritises and phase out projects as we strengthen our absorption capacity. Considering the capacity constraints, we cannot simultaneously fix or construct every road, rail, water system, and human development.

However, the management of public investment poses unique challenges to the political economy. There are extensive and unrivalled public infrastructure advantages, which make it hard for lawmakers to admit responsibility. Infrastructure creation and maintenance are complicated and costly for transactions. The long-term importance of public assets relies heavily on recurring maintenance spending. Activities may even be exposed to multiple flaws, also among dedicated policymakers. The specific challenges faced by resource-driven development countries amplify the challenges of managing the cohesive and sustainable portfolio of public investment. Usually, the limitations in certain economic industries tackle a variety of conditions and political constraints. Large rentals enable elected representatives to grow their political capital. The emphasis is generally placed on the development of new facilities at the expense of maintenance investments. Because the natural resources are distributed unevenly, large royalty shares are earmarked. The allocation of economic and social infrastructures can largely be considered for public investment (Barma et al. 2011).

However, the function of public investment as a social capital must also be understood. Often the investment budget itself is the best choice for strategic rent utilisation. There are many concerns around policy decisions made by the natural resource-donated governments on public spending. Management downstream issues rent spending overtime throughout the public and the economy. Given the present politically charged requests, countries have to weigh intertemporal consumption decisions versus saving. Sustainability in this dimension of the resource industry value chain is an overriding criterion for assessing the performance of resource-dependent countries (Cangiano et al. 2013).

4.4. Natural Resource Funds

Natural Resource Funds (NRF) may be introduced to facilitate the sharing of countries of wealth and to strengthen more oil income control in addition to spending and procurement legislation by public investment management framework (Van Ingen et al. 2014). Frequent oil shocks which led to the use of oil funds by oil-exporting countries, have revealed the macroeconomic vulnerability of capital. The NRF can serve as a fundamental tool to make more transparent use of oil revenues and decouple income from income inflow. Additionally, the oil funds are used to prop up the economy against the uncertainty of the natural resource markets, which will ensure a good long-term tax portfolio that fosters sustainable development. The capital will restrict the symptoms of Dutch disease (Davis et al. 2003b).

Three specific categories of oil funds, namely savings funds, stabilisation funds, and precautionary funds, have been established. Stabilisation funds seek to alleviate short-term volatility, while savings funds are designed to promote long-term sustainability (Davis et al. 2003a). The goal of precautionary funds is to guarantee financial stability in the early stages of oil development by the steering of petroleum profits to such funds. In reality, it was controversial to incorporate the NRFs into the overall fiscal policy, and the activity of these funds has made budget stability challenges. Additionally, there is some uncertainty regarding the degree to which oil funds will maintain fiscal sustainability. Potential lack of accountability and ease of access to the investments of such funds may encourage corruption in vulnerable countries (Davis et al. 2001, 2003a).

An essential annual medium-term option for resource-dependent countries is to follow expansionary or prudent management of resources. Inflationary pressure, increasing the cost, and sweeping other domestic industries can lead to excessive domestic spending. Liquid financial assets function both in the face of unstable resource prices and production

as vehicles for stabilisation and for saving. Some models argue that capital-scarce developing countries could generate potentially too high social and economic returns through a fast acceleration of both soft and hard domestic infrastructure investment (Cangiano et al. 2013). This segment also refers to the need to pay more attention to public investment, particularly investment via state-owned and private co-operation, beyond mainstream channels. This may serve as commitment tools for infrastructure delivery in resource-dependent settings, in particular, those with low administrative capacity.

Many key policies and capacity have to confront investments made by governments in the production of oil. The absorbing capacity and the management of public investment are critical for ringfencing. The downward transformation of the extractive value chain requires the evaluation of income spending and investments as regards the tangible benefits of the creation and preservation of assets rather than just the flow of investments. As such, the outcomes that count, together with the demand for money, are significant improvements of the economically and socially efficient public capital stock (Cangiano et al. 2013). People can profit significantly from resource management by having an equitable and detailed national policy, a consistent regulatory framework, and professional institutions.

Rich oil countries have tremendous potential for economic development by leveraging their oil wealth. Nonetheless, if poorly managed, the exploitation of resources could cost a country heavily. It is typically the responsibility of governments as guardians of their resource extraction to manage these resources for present and future generations. An ambitious and systematic strategic plan includes efficient and equitable resource management. In that effect, the government will undertake a variety of important decisions that impact specific communities and create plans for the future. In consultation with citizens, governments can use a regional policy mechanism to direct resource management decisions in order not to take part in decisions and to create a common sense of leadership (Cangiano et al. 2013).

5. Discussions and Conclusions

The resource curse indicates that economic growth performs poorly in countries with significant natural resources. Nevertheless, certain rich-in-energy countries managed to protect their resource-rich in the long run. It is necessary to enforce effective policies in resource-rich countries to fully leverage the advantages which can come from the abundance of natural resources. This study aimed to evaluate how oil-rich countries would avoid resource curse by successful fiscal and management policies. By taking the guidance of Norway and implementing fiscal policy focused on tax rules on its oil management, it is proposed that oil-exporting countries benefit significantly. The Norwegian fiscal system follows a cautionary fiscal policy strategy and a savings and stabilisation fund to handle the oil revenue of the government. The “Norwegian model” is used to control oil income fluctuations utilising the Savings and Stabilization Fund. Many oil-rich countries entirely spend their oil revenues and are therefore bound by excessive oil price volatility. Norway managed, after the depletion of oil resources, to put in place effective policies for fiscal and income management to ensure sustained development. The literature considers the optimal fiscal management policy as a rule-based approach to fiscal policy with consistent savings and stabilisation.

This study also seeks to determine how oil-dependence countries can best manage revenues from the oil sector. The presence of a small number of success stories in both the developed and developing worlds, such as Norway, should serve as a foundation on which to build and enforce a successful system and fiscal policy. It is hoped this will help to mitigate the so-called “resource curse” and to use oil revenues to the advantage of the country. It will also help to promote growth and to lift people out of poverty, as well as to reduce the impact of climate change on the oil industry and other natural resources on the economy. Two main concepts are discussed: carrying capacity and ecological footprint. Carrying capacity indicates the maximum number of individuals of a given species that

can be sustained within a defined area. The ecological footprint is the use of water and land for production of all resources that human consumes and eliminate the waste material that population generates. Many studies use this comprehensive measure as an indicator of the degradation of the environment. Every country encounters challenges concerning the balance between the development of the country and the production of the global climate. The world economy is heavily dependent on the countries' abundance, especially developing countries. However, the literature on the influence of natural resource management is mostly ignored.

The key point of the article is that a prudent and sustainable long-term fiscal policy framework must be established as a priority for the fiscal authorities in oil-rich economies. Effective adoption of a framework for fiscal policy requires a high level of consensus responsibility and transparency. In the case of Norway, the establishment of the Petroleum Fund could build on an existing and well-functioning institutional framework. In the area of governance and transparency, many oil-rich countries might also have major progress to make. These countries should concentrate on developing government systems with accountability transparency, and good budgeting practises while seeking to execute a budgetary policy that requires significant government funding accumulation. The analysis also suggests that oil-rich countries can learn from Norway's experience to mitigate this resource curse and utilise oil revenues in the interest of the country. In addition, they can also manage effectively and protect their ecological resources as these are becoming increasingly important strategic parts of natural wealth.

The analytical framework we developed aims to be a starting point for the more advanced elaboration of evaluation tools. Further testing of its applicability to other case studies would be useful to better evaluate its limitations and the needed improvements. Other applications of the framework developed could also be explored, for example, as a tool for the other international comparison like South African and what Saudi Arabia has achieved with Aramco to make a further contribution to the literature. Another interesting topic to explore would be the threshold level of weak and strong sustainability.

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References

- (Abata et al. 2012) Abata, Matthew Adeolu, James Sunday Kehinde, and Sehilat Abike Bolarinwa. 2012. Fiscal/monetary policy and economic growth in Nigeria: A theoretical exploration. *International Journal of Academic Research in Economics and Management Sciences* 1: 75.
- (Agrawal 2001) Agrawal, Arun. 2001. Common property institutions and sustainable governance of resources. *World Development* 29: 1649–72.
- (Ahmed et al. 2019) Ahmed, Zahoor, Zhaohua Wang, Faisal Mahmood, Muhammad Hafeez, and Nazakat Ali. 2019. Does globalization increase the ecological footprint? Empirical evidence from Malaysia. *Environmental Science and Pollution Research* 26: 18565–82.
- (Ahuja and Tatsutani 2009) Ahuja, Dilip, and Marika Tatsutani. 2009. Sustainable energy for developing countries. *SAPI EN. S. Surveys and Perspectives Integrating Environment and Society* 2:1–16.
- (Akkucuk 2015) Akkucuk, Ulas. 2015. *Handbook of Research on Developing Sustainable Value in Economics, Finance, and Marketing*. Hershey: IGI Global.

- (Arezki et al. 2012) Arezki, Rabah, Arnaud Dupuy, and Alan Gelb. 2012. *Resource Windfalls, Optimal Public Investment and Redistribution: The Role of Total Factor Productivity and Administrative Capacity*. International Monetary Fund Working Paper No 12/200. Washington, DC: International Monetary Fund
- (Asheim et al. 2007) Asheim, Geir B, Wolfgang Buchholz, and Cees Withagen. 2007. The Hartwick rule: myths and facts. In *Justifying, Characterizing and Indicating Sustainability*. Berlin: Springer, pp. 125–45.
- (Ashford and Hall 2011) Ashford, Nicholas A., and Ralph P. Hall. 2011. The importance of regulation-induced innovation for sustainable development. *Sustainability* 3: 270–92.
- (Aşıcı and Acar 2016) Aşıcı, Ahmet Atıl, and Sevil Acar. 2016. Does income growth relocate ecological footprint? *Ecological Indicators* 61: 707–14.
- (Ayres et al. 1998) Ayres, Robert U., Jeroen Cjm Van Den Bergh, and John M Gowdy. 1998. *Weak versus Strong Sustainability*. Tinbergen Institute Discussion Paper. Amsterdam: Tinbergen Institute.
- (Barma et al. 2011) Barma, Naazneen, Kai Kaiser, Tuan Minh Le, and Lorena Viñuela. 2011. *Rents to Riches?* Washington, DC: The World Bank.
- (Bartsch et al. 2004) Bartsch, Ulrich, Milan Cuc, Harinder Malothra, and Menachem Katz. 2004. *Lifting the Oil Curse: Improving Petroleum Revenue Management in Sub-Saharan Africa*. Washington, DC: International Monetary Fund.
- (Baunsgaard et al. 2012) Baunsgaard, Thomas, Mauricio Villafuerte, Marcos Poplawski-Ribeiro, and Christine Richmond. 2012. *Fiscal Frameworks for Resource Rich Developing Countries*. IMF Staff Discussion Note (12/04). Washington, DC: International Monetary Fund.
- (Berg et al. 2012) Berg, Andrew, Rafael Portillo, Edward F. Buffie, Catherine A. Pattillo, and Luis-Felipe Zanna. 2012. *Public Investment, Growth, and Debt Sustainability: Putting Together the Pieces*. Washington, DC: International Monetary Fund, pp. 12–144.
- (Beske-Janssen et al. 2015) Beske-Janssen, Philip, Matthew Phillip Johnson, and Stefan Schaltegger. 2015. 20 years of performance measurement in sustainable supply chain management—what has been achieved? *Supply Chain Management: An International Journal* 20: 664–80.
- (Bjerkholt 2002) Bjerkholt, Olav. 2002. *Fiscal Rule Suggestions for Economies with Non-Renewable Resources*. Oslo: University of Oslo.
- (Bornhorst et al. 2009) Bornhorst, Fabian, Sanjeev Gupta, and John Thornton. 2009. Natural resource endowments and the domestic revenue effort. *European Journal of Political Economy* 25: 439–46.
- (Cangiano et al. 2013) Cangiano, Marco, Teresa Curristine, and Michel Lazare. 2013. *Public Financial Management and Its emergIng Architecture*. Washington, DC: International Monetary Fund.
- (Carvalho 2017) Carvalho, Fernando P. 2017. Mining industry and sustainable development: Time for change. *Food and Energy Security* 6: 61–77.
- (Chambers et al. 2014) Chambers, Nicky, Craig Simmons, and Mathis Wackernagel. 2014. *Sharing Nature's Interest: Ecological Footprints as an Indicator of Sustainability*. London: Routledge.
- (Charfeddine and Mrabet 2017) Charfeddine, Lanouar, and Zouhair Mrabet. 2017. The impact of economic development and social-political factors on ecological footprint: A panel data analysis for 15 MENA countries. *Renewable and Sustainable Energy Reviews* 76: 138–54.
- (Chen and Chang 2016) Chen, Sheng-Tung, and Hui-Ting Chang. 2016. Factors that affect the ecological footprint depending on the different income levels. *AIMS Energy* 4: 557–73.
- (Chen and Lei 2018) Chen, Wenhui, and Yalin Lei. 2018. The impacts of renewable energy and technological innovation on environment-energy-growth nexus: New evidence from a panel quantile regression. *Renewable Energy* 123: 1–14.
- (Collier and Laroche 2015) Collier, Paul, and Caroline Laroche. 2015. *Harnessing Natural Resources for Inclusive Growth*. London: International Growth Centre, London School of Economics.
- (Conrad 1999) Conrad, Jon M. 1999. *Resource Economics*. Cambridge: Cambridge University Press.
- (Co-operation and Development 2007) Co-operation, Organisation for Economic, and Development. 2007. *Promoting Pro-Poor Growth: Policy Guidance for Donors*. Paris: OECD Publishing.
- (Coral and Bokelmann 2017) Coral, Claudia, and Wolfgang Bokelmann. 2017. The role of analytical frameworks for systemic research design, explained in the analysis of drivers and dynamics of historic land-use changes. *Systems* 5: 20.
- (Coutinho 2011) Coutinho, Leonor. 2011. The resource curse and fiscal policy. *Cyprus Economic Policy Review* 5: 43–70.
- (Daniel et al. 2013) Daniel, Philip, Sanjeev Gupta, Todd Mattina, and Alex Segura-Ubiergo. 2013. Extracting resource revenue. *Finance & Development* 50: 19–22.
- (Davis et al. 2001) Davis, Jeffrey, Annalisa Fedelino, and Rolando Ossowski. 2001. *11 Stabilization and Savings Funds for Nonrenewable Resources: Experience and Fiscal Policy Implications*. Washington, DC: International Monetary Fund.
- (Davis et al. 2003a) Davis, Jeffrey, Rolando Ossowski, James Daniel, and Steven Barnett. 2003. Stabilization and savings funds for nonrenewable resources: experience and fiscal policy implications. In *Fiscal Policy Formulation and Implementation in Oil-Producing Countries* Washington, DC: International Monetary Fund, pp. 273–315.
- (Davis et al. 2003b) Davis, Jeffrey M., Annalisa Fedelino, and Rolando Ossowski. 2003. *Fiscal Policy Formulation and Implementation in Oil-Producing Countries*. Washington, DC: International Monetary Fund.
- (De Oliveira Neto et al. 2018) De Oliveira Neto, Geraldo Cardoso, Luiz Fernando Rodrigues Pinto, Marlene Paula Castro Amorim, Biagio Fernando Giannetti, and Cecilia Maria Villas Bôas de Almeida. 2018. A framework of actions for strong sustainability. *Journal of Cleaner Production* 196: 1629–43.

- (Des 2013) Des, U. 2013. *World Economic and Social Survey 2013: Sustainable Development Challenges*. New York: United Nations, Department of Economic and Social Affairs, pp. 123–136.
- (Dogan et al. 2019) Dogan, Eyup, Nigar Taspinar, and Korhan K. Gokmenoglu. 2019. Determinants of ecological footprint in MINT countries. *Energy & Environment* 30: 1065–86.
- (Emas 2015) Emas, Rachel. 2015. The concept of sustainable development: Definition and defining principles. In *Brief for GSDR 2015*. pp. 1–3. Available online: https://sustainabledevelopment.un.org/content/documents/5839GSDR%202015_SD_concept_definiton_rev.pdf (accessed on 28 August 2020).
- (Figge et al. 2017) Figge, Lukas, Kay Oebels, and Astrid Offermans. 2017. The effects of globalization on Ecological Footprints: an empirical analysis. *Environment, Development and Sustainability* 19: 863–76.
- (Gray 1913) Gray, Lewis C. 1913. The economic possibilities of conservation. *The Quarterly Journal of Economics* 27: 497–519.
- (Grosse 2010) Grosse, François. 2010. Is recycling part of the solution? The role of recycling in an expanding society and a world of finite resources. *SAPI EN. S. Surveys and Perspectives Integrating Environment and Society*. 3: 1–17
- (Guo et al. 2020) Guo, Jing, Jun Ren, Xiaotao Huang, Guifang He, Yan Shi, and Huakun Zhou. 2020. The Dynamic Evolution of the Ecological Footprint and Ecological Capacity of Qinghai Province. *Sustainability* 12: 3065.
- (Hamilton and Ley 2012) Hamilton, Kirk, and Eduardo Ley. 2012. *Fiscal Policy for Sustainable Development in Resource-Rich Low-Income Countries*. In *Is Fiscal Policy the Answer? A Developing Country Perspective*. Edited by Blanca Moreno-Dodson. pp. 147–69. Washington, DC: World Bank Group. Available online: <https://elibrary.worldbank.org/doi/book/10.1596/978-0-8213-9630-8> (accessed on 12 September 2020).
- (Hartwick 1977) Hartwick, John M. 1977. Intergenerational equity and the investing of rents from exhaustible resources. *The American Economic Review* 67: 972–74.
- (Hassan et al. 2019a) Hassan, Adewale Samuel, Daniel Francois Meyer, and Sebastian Kot. 2019a. Effect of Institutional Quality and Wealth from Oil Revenue on Economic Growth in Oil-Exporting Developing Countries. *Sustainability* 11: 3635.
- (Hassan et al. 2019b) Hassan, Syed Tauseef, Muhammad Awais Baloch, Nasir Mahmood, and JianWu Zhang. 2019b. Linking economic growth and ecological footprint through human capital and biocapacity. *Sustainable Cities and Society* 47: 101516.
- (Hassan et al. 2019c) Hassan, Syed Tauseef, Enjun Xia, Noor Hashim Khan, and Sayed Mohsin Ali Shah. 2019c. Economic growth, natural resources, and ecological footprints: evidence from Pakistan. *Environmental Science and Pollution Research* 26: 2929–38.
- (Hausmann and Rigobon 2003) Hausmann, Ricardo, and Roberto Rigobon. 2003. *An Alternative Interpretation of The 'resource Curse': Theory and Policy Implications*. Cambridge: National Bureau of Economic Research.
- (Imi 2007) Iimi, Atsushi. 2007. Escaping from the Resource Curse: Evidence from Botswana and the Rest of the World. *IMF Staff Papers* 54: 663–99.
- (Khalid 1994) Khalid, Ahmed M. 1994. Empirical Tests of the Rational Expectations—Permanent Income Hypothesis: Evidence from Pakistan. *The Pakistan Development Review* 33: 1043–53.
- (Khodaparast Shirazi et al. 2020) Khodaparast Shirazi, Jalil, Vahid Mohamad Taghvaei, Mohamad Nasiri, and Abbas Assari Arani. 2020. Sustainable development and openness in oil-exporting countries: green growth and brown growth. *Journal of Economic Structures* 9: 1–19.
- (Kuhlman and Farrington 2010) Kuhlman, Tom, and John Farrington. 2010. What is sustainability? *Sustainability* 2: 3436–48.
- (Lartey 2011) Lartey, Emmanuel K. K. 2011. Financial openness and the Dutch disease. *Review of Development Economics* 15: 556–68.
- (Liu and Kim 2018) Liu, Hongbo, and Hanho Kim. 2018. Ecological footprint, foreign direct investment, and gross domestic production: Evidence of Belt & Road Initiative countries. *Sustainability* 10: 3527.
- (Macartan et al. 2007) Macartan, Humphreys, Jeffrey Sachs, and Joseph Stiglitz. 2007. *Escaping the Resource Curse*. New York: Columbia University Press.
- (Masnadi et al. 2018) Masnadi, Mohammad S., Hassan M. El-Houjeiri, Dominik Schunack, Yunpo Li, Jacob G. Englander, Alhassan Badahdah, Jean-Christophe Monfort, James E. Anderson, Timothy J. Wallington, Joule A. Bergerson, and et al. 2018. Global carbon intensity of crude oil production. *Science* 361: 851–53. doi:10.1126/science.aar6859.
- (McKay 2012) McKay, John. 2012. *Natural Resources: Curse or Cure for Africa?* Johannesburg: Brenthurst Foundation.
- (Miller and Mustapha 2016) Miller, Mark, and Shakira Mustapha. 2016. *Public Investment Management*. London: Overseas Development Institute.
- (Mohamed 2020) Mohamed, Elwasila Saeed Elamin. 2020. Resource Rents, Human Development and Economic Growth in Sudan. *Economics* 8: 99.
- (Nasrollahi et al. 2020) Nasrollahi, Zahra, Mohadeseh-sadat Hashemi, Saeed Bameri, and Vahid Mohamad Taghvaei. 2020. Environmental pollution, economic growth, population, industrialization, and technology in weak and strong sustainability: using STIRPAT model. *Environment, Development and Sustainability* 22: 1105–22.
- (Ochola et al. 2010) Ochola, Washington Odongo, Pascal C Sanginga, and Isaac Bekalo. 2010. *Managing Natural Resources for Development in Africa: A Resource Book*. Ottawa: IDRC.
- (OECD 2009a) OECD. 2009a. *DAC Guidelines and Reference Series Natural Resources and Pro-Poor Growth The Economics and Politics: The Economics and Politics*. Paris: OECD Publishing.
- (OECD 2009b) OECD. 2009b. Natural resources and pro-poor growth: The economics and politics. In *DAC Guidelines and Reference Series*. Paris: OECD Publishing.

- (OECD DAC 2008) OECD DAC. 2008. *Natural Resources and Pro-Poor Growth: The Economics and Politics*. Paris: Organisation for Economic Cooperation and Development.
- (Ologunde et al. 2020) Ologunde, Ifeoluwa Adeola, Forget Mingiri Kapingura, and Kin Sibanda. 2020. Sustainable Development and Crude Oil Revenue: A Case of Selected Crude Oil-Producing African Countries. *International Journal of Environmental Research and Public Health* 17: 6799.
- (Olters 2007) Olters, Jan-Peter. 2007. *Old Curses, New Approaches? Fiscal Benchmarks for Oil-Producing Countries in Sub-Saharan Africa*. Washington, DC: International Monetary Fund, pp. 7–107.
- (Rudolph and Figge 2017) Rudolph, Alexandra, and Lukas Figge. 2017. Determinants of Ecological Footprints: What is the role of globalization? *Ecological Indicators* 81: 348–61.
- (Sabir and Gorus 2019) Sabir, Samina, and Muhammed Sehid Gorus. 2019. The impact of globalization on ecological footprint: empirical evidence from the South Asian countries. *Environmental Science and Pollution Research* 26: 33387–98.
- (Sanchez-Plaza et al. 2019) Sanchez-Plaza, Anabel, Annelies Broekman, and Pilar Paneque. 2019. Analytical Framework to Assess the Incorporation of Climate Change Adaptation in Water Management: Application to the Tordera River Basin Adaptation Plan. *Sustainability* 11: 762.
- (Segal 2012) Segal, Paul. 2012. How to spend it: Resource wealth and the distribution of resource rents. *Energy Policy* 51: 340–48.
- (Shardul Agrawala et al. 2003) Shardul Agrawala, Vivian. Raksakulthai, Maarten Van. Alast, Joel. Smith, John. Reynolds, and Peter. Larsen. 2003. *Environment Directorate Development Co-Operation Directorate*. Paris: Organisation for Economic Co-Operation and Development.
- (Siche et al. 2010) Siche, Raúl, Lucas Pereira, Feni Agostinho, and Enrique Ortega. 2010. Convergence of ecological footprint and emery analysis as a sustainability indicator of countries: Peru as case study. *Communications in Nonlinear Science and Numerical Simulation* 15: 3182–92.
- (Steer 2008) Steer, A. 2008. *Achieving Sustainable Development and Promoting Development Cooperation*. United Nations Publications. New York: United Nations.
- (Stevens 2003) Stevens, Paul. 2003. Resource impact: curse or blessing? A literature survey. *Journal of Energy Literature* 9: 3–42.
- (Sy et al. 2011) Sy, Amadou N. R., Rabah Arezki, and Thorvaldur Gylfason. 2011. *Beyond the Curse: Policies to Harness the Power of Natural Resources*. Washington, DC: International Monetary Fund.
- (Terrapon-Pfaff et al. 2014) Terrapon-Pfaff, Julia, Carmen Dienst, Julian König, and Willington Ortiz. 2014. A cross-sectional review: Impacts and sustainability of small-scale renewable energy projects in developing countries. *Renewable and Sustainable Energy Reviews* 40: 1–10.
- (Udemba 2020) Udemba, Edmund Ntom. 2020. Mediation of foreign direct investment and agriculture towards ecological footprint: A shift from single perspective to a more inclusive perspective for India. *Environmental Science and Pollution Research* 27: 26817–834.
- (United Nations Environment Programme 2016) United Nations Environment Programme. 2016. *Sustainable Consumption and Production: A Handbook for Policymakers (Global Edition)*. New York: UN.
- (Valdés and Engel 2000) Valdés, Mr Rodrigo O., and Eduardo Engel. 2000. *Optimal Fiscal Strategy for Oil Exporting Countries*. Washington, DC: International Monetary Fund, vol. 118.
- (Van der Ploeg 2011a) Van der Ploeg, Frederick. 2011a. Fiscal policy and Dutch disease. *International Economics and Economic Policy* 8: 121–38.
- (Van der Ploeg 2011b) Van der Ploeg, Frederick. 2011b. Natural resources: curse or blessing? *Journal of Economic Literature* 49: 366–420.
- (Van Ingen et al. 2014) Van Ingen, Chiara, Requier Wait, and Ewert Kleynhans. 2014. Fiscal policy and revenue management in resource-rich African countries: A comparative study of Norway and Nigeria. *South African Journal of International Affairs* 21: 367–90.
- (Viñuela et al. 2014) Viñuela, Lorena, Kai Kaiser, and Monali Chowdhurie-Aziz. 2014. Intergovernmental Fiscal Management in Natural Resource-Rich Settings. Available online: <http://hdl.handle.net/10986/20679> (accessed on 12 September 2020).
- (Wiedmann et al. 2006) Wiedmann, Thomas, Jan Minx, John Barrett, and Mathis Wackernagel. 2006. Allocating ecological footprints to final consumption categories with input–output analysis. *Ecological Economics* 56: 28–48.
- (Wisniewski 1980) Wisniewski, Robert L. 1980. Carrying capacity: Understanding our biological limitations. *Humboldt Journal of Social Relations* 7:55–70.
- (Zafar et al. 2019) Zafar, Muhammad Wasif, Syed Anees Haider Zaidi, Naveed R Khan, Faisal Mehmood Mirza, Fujun Hou, and Syed Ali Ashiq Kirmani. 2019. The impact of natural resources, human capital, and foreign direct investment on the ecological footprint: The case of the United States. *Resources Policy* 63: 101428.