

Green Taxation in the Service of Sustainable Development in Morocco: Bibliometric and Literature Review

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Abstract

This article deals with an innovative reflection on green taxation in Morocco, which focuses on tax requirements and environmental benefits for the economy. The article offers an opportunity to present a bibliometric analysis and literature characterizing the Moroccan tax system while answering the question related to the environment. This article, thanks to this study, questions the tax and institutional system based on an overview of economic theories related to environmental taxation. The article examines the concordance between the goals expected by the national charter for sustainable development and fiscal actions, carrying out a detailed analysis of the laws to establish the place of environmental taxation between tax requirements and ecological objectives.

Keywords: Taxation, Green, environment, Accounting, Ecological

INTRODUCTION

For decades, climate challenges have been a major concern for the entire world, they are increasingly burdensome and their effects are today more perceptible. Climate change, essentially global warming, threatens not only economic activity and development, but also the health and life of the world's population.

The Conference of the Parties (COP) which, since 1995, has brought countries together to discuss and monitor the achievements and implementation of the commitments of the parties on climate change and its warming, in particular. The Millennium Development Goals (MDGs) adopted by the United Nations in 2000 devote a major interest to the environment. The objective is to "reserve the environment" articulates on the importance of sustainable and inclusive development while preserving natural resources. The Sustainable Development Goals (SDGs) have called for the preservation of the planet and the sustainability of resources through global action that aims at prosperity and development.

This action, which concerns not only rich countries but also developing ones, including Morocco, is concretized through several tools and measures of regulation, control and incentive. Taxation is one of the most effective and widespread means in the world to achieve environmental goals. Green taxation is a form of incentive for economic actors to integrate the 'environmental' dimension into their production activities.

Morocco is one of the countries that took the first initiatives to develop this economy. According to the president of the European Bank for Reconstruction and Development, Odile Renaud-Basso, out of 200 million euros invested in the Kingdom in 2021, more than half is in green financing. Indeed, Morocco approaches the green transition in a relevant way, first of all, it addresses it as a means to respond to environmental challenges and water stress and then as an opportunity to develop green industrial sectors, ensure energy independence, and have access to the new green economy markets. And since any new project requires adapted and specific funding, it is time to develop in Morocco a means that has shown its effectiveness in several countries around the world. It is about environmental taxation, by its penal or incentive version, the ultimate objective of this taxation is to direct the behavior of economic agents towards the protection and enhancement of the natural environment.

The objective of this work is to address the following issue: how can green taxation ensure the financing of the green economy in Morocco? To get there, we will first take a tour on the concept of the green economy and that of environmental taxation, showing the place of this taxation in the Moroccan tax system, describe the Moroccan context of the green economy and finally cite the main proposals recommended to develop a Moroccan environmental taxation.

1. Theoretical framework of green taxation

Green, ecological taxation, Eco-taxation, greening of taxation, or even environmental taxation is primarily called upon to guide the behavior of the company - but also of households- to fight against environmental degradation and climate change. If the terminology differs, the fields of application and areas of intervention are on the other hand well defined and generally concern the preservation of natural resources including ecosystems and biodiversity, and the reduction of pollution resulting from economic activity.

Since 1990, environmental taxation has taken more and more space within national institutions and international organizations. This is due to the increasingly perceived threats, and the awareness and better understanding of these risks reflected by the reaction of civil society and pro-environmental entities and their pressures on political actors. The environmental challenges are intensified also by the accelerated development of methods and volume of production, which are nowadays more extreme. Green taxation is simply defined as "the set of taxes, levies and fees based on a pollutant, or a product or service that damages the environment or takes natural resources" (Rotillon, 2007). The idea of green taxation is to transfer part of the tax burden to the most polluting activities or those most dangerous for the preservation of the environment.

The OECD defines green taxation or environment-related taxation as "an important government instrument for shaping the relative prices of goods and services. The characteristics of these taxes included in the database are used to calculate revenue from environment-related taxes with a breakdown by environmental domain: energy products; motor vehicles and transport services; measured or estimated emissions to air or water, ozone-depleting substances, some sources of diffuse pollution of water, waste management and noise, as well as the management of water, land, soil, forests, biodiversity, of wildlife and fish reserves. (OECD, n.d.). This ideal instrument for injecting appropriate signals into the market to internalize externalities is naturally defined in addition to the notion of tax by a relevant criterion that the potential effect of the tax on the environment (Barde&Cournède, 2002). Indeed, regardless of the name, green taxation aims first and last to create an impact on the use of resources or the alteration of the environment. If taxation is the preferred instrument, there are others that have the same purpose, namely, normative instruments (regulation, prohibitions, definition of thresholds, etc.) (Tabeut&Bougantouche, 2018). Regarding pollution, for example, regulations, which by imposing and providing standards (emission standards, quality standards, process standards, or product standards) allows polluters to emit only a given quantity of the harmful substance or gas. Then, the economic instruments that allow internalization of externalities, i.e. imposed on producers/polluters to integrate into their calculations the external cost incurred by the rest of society. These economic tools are generally the payment of pollution abatement subsidies to pollutants, the Pigouvian tax (making the polluter pay the external cost incurred by the victims of pollution at the optimal level of pollution), the distribution (either free or by auction) of tradable emission permits (Chiroleu-Assouline, 2011). The value of this tax, often broad-based, low-rate and high-yield, is twofold: First, its existence already constitutes a deterrent to harmful activities, and consequently the reduction of environmental degradation, the second interest is the reduction of other taxes unfavorable to growth and employment (allowed by the use of the product generated by the environmental tax to finance public policies) (Collin, 2014).

2. State of environmental taxation in Morocco

Morocco, like many developing countries, is at the center of climate concerns due to the major challenges it must face. Located in a particularly vulnerable region, it is highly exposed to the multifaceted risks posed by climate change, such as impacts on economic structure, development, public health, and scarcity of natural resources. Aware of this situation, the public authorities have implemented in recent years a whole set of legislative and regulatory measures to both encourage and promote the green economy, and optimize the use of resources in the context of sustainable and inclusive development, however, much remains to be done.

2.1. An important legal arsenal for environmental protection

In Morocco, the difficult and delicate situation caused by risk factors has imposed on the country the prioritization of environmental issues. Thus, the management of water as a natural resource has gained momentum in recent decades, but without marginalizing other aspects of the fight against environmental degradation. Indeed, the promulgation in the 1990s of the water law (Dahir no. 1-95-154 of 18 Rabii I 1416 (16 August 1995) promulgating the law no. 10-95 on water. B.O. no. 4325 of September 20, 1995, s. d.) constitutes an awareness of the scarcity and vulnerability of this resource to the impact of human

activity. The legislator has defined the concept of public good applicable to water (public ownership), it has provided for rational planning and distribution of water, it has also laid down rules relating to health protection through the regulation of use. The essential contribution of the said law is undoubtedly the regulation and control of human activities that may harm or pollute this resource, through the implementation of sanctions and a water policy. Law 12-03 on environmental impact assessments (Dahir no 1-03-61 of 12 May 2003 promulgating Law no 13-03 on combating air pollution. B.O. no 5118 of 19 June 2003, s. d.) enacted in 2003 introduced a new culture that puts the environment at the heart of economic development. This law thus established the obligation to assess the risks to natural environments that may be caused directly or indirectly by public and private infrastructure and industry projects.

For its part, the law n°13-03 relating to the fight against air pollution (Dahir n° 1-03-61 of May 12, 2003 promulgating law n°13-03 relating to the fight against air pollution. B.O. n° 5118 of June 19, 2003, s. d.) constitutes another equally important text in the legal arsenal for environmental protection. In this sense, the law provides - together with the implementing decrees - a clear and rigorous response by prohibiting, sanctioning, and closely monitoring all sources and activities likely to "to release, emit or discharge into the air pollutants such as toxic or corrosive gases, fumes, vapors, heat, dust, odors beyond the quantity or concentration authorized by the standards set by regulation" (article 4).

The implementing decree n° 2-09-286 setting air quality standards and air monitoring modalities (Decree n° 2-09-286 of 20 hijja 1430 (8 December 2009) setting air quality standards and air monitoring modalities. B.O. n° 5806 of 21 January 2010, s. d.) identified thresholds for the protection of health and ecosystems as well as limit values for some pollutants such as sulphur dioxide, nitrogen dioxide, carbon monoxide, lead, cadmium, etc.

For its part, Decree No. 2-09-631 setting the limit values for the release, emission or discharge of pollutants into the air from stationary pollution sources and the modalities of their control (Decree No. 2-09-631 of 23 rejeb 1431 (6 July 2010) setting limit values for the release, emission or discharge of pollutants into the air from stationary pollution sources and the modalities for their control. B.O. No. 5862 of 5 August 2010, s. d.) was adopted with the aim of reducing the harmfulness to the air of these substances. Finally, the framework law establishing the National Charter for the Environment and Sustainable Development (CNEDD) (Dahir No. 1-14-09 of 4 Jumada I 1435 (March 6, 2014) enacting framework law No. 99-12 containing the National Charter for the Environment and Sustainable Development. B.O. No. 6240 of March 20, 2014., n.d.) promulgated in 2014 defined the guidelines, principles, and objectives of state policies on the environment. This legal arsenal, notably legislative, is then seen to be rich, but environmental taxation remains an instrument still in its infancy in Morocco.

2.2. Main taxes and perspective in Morocco

Although environmental taxation is relatively recent in Morocco, measures to protect the environment have already been implemented. While waiting for the implementation of a real mechanism, the internal consumption tax (TIC) on certain products, petroleum and energy-consuming equipment, the charges for the use of public services, as well as the VAT, form a kind of prefiguration of the environmental tax.

Environmental protection taxes A multitude of taxes that may be assimilated or considered ecological, even if their primary objective is budgetary and not environmental, are applicable. These are in particular, the taxes provided for by the general tax code and the legislation relating to local taxation:

- The tax on quarry products extraction: it is a local tax (for the benefit of municipalities), it is based on the quantity extracted from quarry products (sand, stone, gypsum,...).
- The tax on driver's licenses: is another local tax for the benefit of prefectures and provinces.
- Annual special tax on vehicles: is a national tax provided for in the general tax code.
- The tax for the benefit of municipalities on public passenger transport on the activity of taxis and public transport buses... To these taxes are also added the large internal consumption taxes (TIC) provided for in the Customs Code and Indirect Taxes applicable on imported or locally produced products, goods and works. These are in particular ICT on energy products and bitumens; and from the 2022 finance law (article 3) on certain electrical and electronic items and equipment, such as household appliances (refrigerators, freezers, air conditioners...). The other ICT concerns electronic devices such as (televisions, computers, smartphones,), as well as batteries for vehicles. This orientation continued through the subsequent finance laws in 2023 and 2024.

3. Economic benefits of green taxation

The introduction of green taxation in environmental policies has many advantages according to economic theories. Hence, a theoretical analysis appears opportune in order to identify these economic advantages. To this end, we can distinguish two fundamental principles:

- **Polluter pays principle**

The beginnings of a green taxation date back to the twentieth century (in 1920), when a certain Arthur C. Pigou published «Economics of Welfare» in which he proposed to internalize externalities (Arthur, C.P, 1932). By externality, Pigou states that there is an externality when the effect of the action of one economic agent on another occurs outside any market, this externality "generally arises from a divergence of appreciation between the costs on the basis of which an agent makes a decision, and those that this decision implies for society" (Gilles Rotillon, 2007). The form of taxation proposed by Pigou aimed at correcting the price signal received by economic agents by consequently leading to a change in their behavior. This is why we can say that the tax will encourage them to choose between buying the good with a maintenance of the externality (for example, the damage caused by pollution) or its reduction (by reducing this same pollution through less polluting investments).

- **Principle of the double dividend**

In theory, and to keep the example of pollution, the tax rate according to Pigou must align with the marginal cost of reducing pollution and the marginal cost of damage. Consequently, the tax, by equalizing the marginal costs of abatement, will play a fundamental role in reducing pollution, what is called the "first dividend" of an environmental tax. (Hourcade (J.-C.), Bureau (D.) ,1998). To define the notion of the «first dividend», Pigou showed that it is a reduction of environmental degradation through the modification of production and/or consumption behaviors. There is also a second dividend which is none other than the revenue generated by these ecological taxes, whose redistribution must be made between businesses and households and between rich households and poor households through subsidies, tax credit, subsidies, and a recycling of polluting production cycles. This expression of «double dividend» of environmental taxation, on the one hand, was first used by the British economist David Pearce and this, to make British Prime Minister Margaret Thatcher understand the scope of the green tax reform initiated by Sweden through the adoption of an eco-tax on CO₂ emissions in 1990. On the other hand, and to fully grasp the principle of the "double dividend" of environmental taxation (Hourcade and Bureau taking the example of Europe in the 1980s where the debate has intensified on a trade-off between social charges weighing on work and generating unemployment and an energy tax. By allocating the revenues from this eco-tax to the reduction of taxes on labour (particularly in terms of income tax), unemployment would be reduced de facto with an equal tax burden.

Green taxes offer many economic benefits and promote the transition towards more sustainable and environmentally friendly growth. By encouraging businesses and households to adopt eco-responsible behaviours, they stimulate technological innovation in green sectors such as renewable energy, clean transport and the circular economy. They also allow to integrate environmental costs into the prices of goods and services, thus reducing negative externalities such as air and water pollution. In the medium and long term, this translates into a reduction of public expenditure on health or disaster management. In addition, green taxes can be an alternative source of revenue for the state, while supporting job creation in green sectors. Thus, it contributes to strengthening economic competitiveness, while responding to climate and social challenges.

4. METHODS AND MATERIALS

With the acceleration of scientific and technological progress, the amount of knowledge produced exceeds human capacity to assimilate it entirely. To manage this growing complexity, bibliometric analysis techniques have been developed. Based on statistical methods, these techniques allow to automatically process scientific writings in natural language. Unlike linguistic statistics, which mainly analyze literary texts, bibliometrics focuses specifically on the bibliographic references of scientific publications. The major distinction between these two disciplines lies in the entities they account for: bibliometrics is interested in citations and bibliographic references, while linguistic statistics focus on words and text content.

Bibliometrics applies statistical and mathematical methods to scientific publications in order to quantify written communication processes. Its fundamental principles are as follows: firstly, scientific writing is considered an objective product of thought, reflecting the author's research activity; secondly, scientific publication represents the convergence of individual and collective thoughts, thus linking the work of

different researchers. Bibliometrics quantitatively analyzes publications to understand schools of thought and their evolution. It differs from scientometrics, which focuses on the quantitative aspects of creating, disseminating and using scientific information.

Our objective is to conduct a bibliometric study of scientific publications related to green taxation in Morocco. This study will allow us to analyze the bibliographic data of scientific writings produced in this field, through advanced research tools and bibliometric processing, namely Scopus, Bibliometrix and VOSviewer.

The first step in this type of analysis is to build a database containing all the scientific outputs to be studied. In our case, we opted for a keyword search on Scopus, since it is the main source of scientific production the source that provided us with the greatest number of results. The choice of keywords was made according to our problem, and after a series of tests, we selected the combination of keywords that gave us maximum results, without straying much from our theme: "Green" AND "Taxation". The results obtained were eventually cleaned using Scopus search filters, to arrive at a total of 950 documents retained, and deemed relevant for our study.

5. RESULTS OF BIBLIOMETRIC ANALYSIS

In this step, we will conduct a brief bibliometric analysis to assess trends and characteristics of publications in our field of research over time. We will then conduct a comprehensive thematic analysis in order to explore the major themes and recurring concepts. This thematic exploration will help us organize existing knowledge, understand key issues and identify gaps and opportunities for future research.

5.1. Evolution of scientific production

The figure 1 has implemented the growing evolution of scientific production related to green taxation from the year 2010 and 2024. Progress remains relatively modest from 2010 to 2018, reflecting an ever-increasing interest in the topic under study. However, a more pronounced dynamic settles in from 2019, with a significant increase in the number of publications, reaching a peak in 2023 with 193 publications. This acceleration is explained by the rise of environmental concerns on a global scale, the climate crisis, as well as the increasing integration of ecological taxation into public policies. It also reflects the increased mobilization of researchers around fiscal instruments as a lever for ecological transformation and sustainable development.

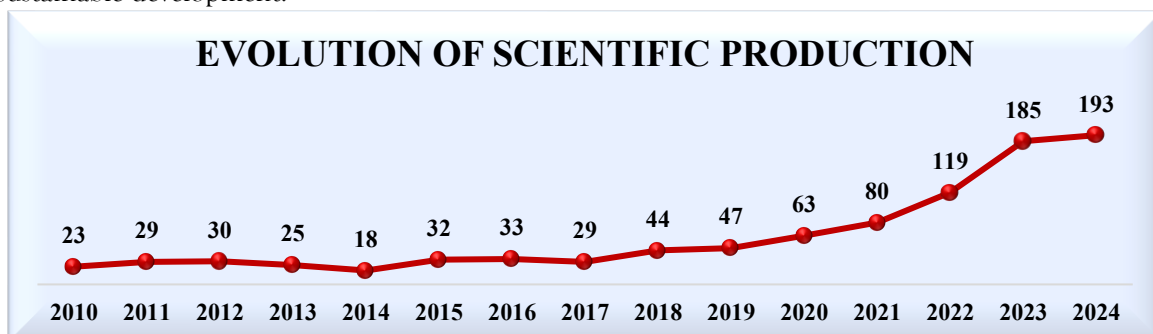


Figure 1: Evolution of scientific production Source: Scopus

5.2. The most influents journal

Table 1 consists of a bibliometric analysis of the most impactful journals in the field of green taxation, revealing a notable concentration of publications in high-impact journals such as the Journal of Cleaner Production, Energy Economics, and Energy Policy. These journals, all published by Elsevier, have high Cite Scores (from 19 to 21.7), reflecting the quality and relevance of the research published. The Journal of Cleaner Production stands out with its 393,051 publications and a highly cited article on heavy metal adsorption materials, highlighting the growing interest in environmental solutions. At the same time, journals such as Sustainability (Switzerland) and Energies also play a key role in disseminating work on energy transition and sustainable development, topics closely linked to green taxation. There are also publications on climate risk or the link between energy policy and economic performance, reflecting the gradual integration of fiscal, economic and environmental dimensions in scientific research. This trend towards a single explanation that growing scientific interest in fiscal mechanisms is considered as levers for a greener and resilient economy.

The presence of articles in economic and financial journals such as the Journal of Financial Economics and the Review of Quantitative Finance and Accounting also shows that green taxation is no longer just

a matter for environmentalists, but becomes an object of interdisciplinary research. Studies on the carbon risk perceived by investors or on economic uncertainty illustrate how tax issues that are linked to the ecological transition impact investment choices and organizations' strategies.

From all the above, the diversity of the publishers of the Scopus database (Elsevier, MDPI, Springer Nature, etc.) and methodological approaches (quantile regressions, multicriteria analyses, non-linear models) gives a vision that green taxation generates interdisciplinary interest, mobilizing economists, ecologists and management specialists. This wealth testifies to the growing importance of fiscal instruments in responding to contemporary climate challenges.

Journal Title	TP	TC	Cite Score	The most frequency articles	TimeCited	Years	Publisher
Journal of Cleaner Production	393051	18950	20.7	A review on conventional and novel materials towards heavy metal adsorption in wastewater treatment application	1024	2021	Elsevier
Energy Policy	53896	3177	17.0	Assessing oil price volatility co-movement with stock market volatility through quantile regression approach	327	2023	Elsevier
Ecological Economics	450030	58414	7.7	Anxiety and the ecological crisis: An analysis of eco-anxiety and climate anxiety	482	2020	Institut Physics
Energy Policy	38347	2005	19.1	Depletion of fossil fuels and anthropogenic climate change-A review	1315	2013	Elsevier
Energy Policy	234672	32275	7.3	Methods and Techniques for CO2 Capture: Review of Potential Solutions and Applications in Modern Energy Technologies	309	2022	Multidisciplinary Publishing (MDPI)
Energy Economics	53584	2468	21.7	Energy consumption, financial development and economic growth in India: New evidence from a nonlinear and asymmetric analysis	488	2017	Emerald
Journal of Business Management and Financial Innovations	1196	481	2.5	Financial innovation and economic growth: Evidence from Zimbabwe	42	2016	Business
Journal of Financial Economics	10162	645	15.8	Do investors care about carbon risk?	737	2021	Elsevier
Journal of Quantitative Finance and Accounting	1256	397	3.2	The impact of economic policy uncertainty and inflation risk on corporate cash holdings	37	2023	Springer
International Journal of Economics	23028	1139	20.2	An integrated green supplier selection approach with analytic network process and improved Grey relational analysis	473	2015	Elsevier

Table 1: Top 10 most frequent journals / (TC: Total citation) / (TP: Total publication) Scopus

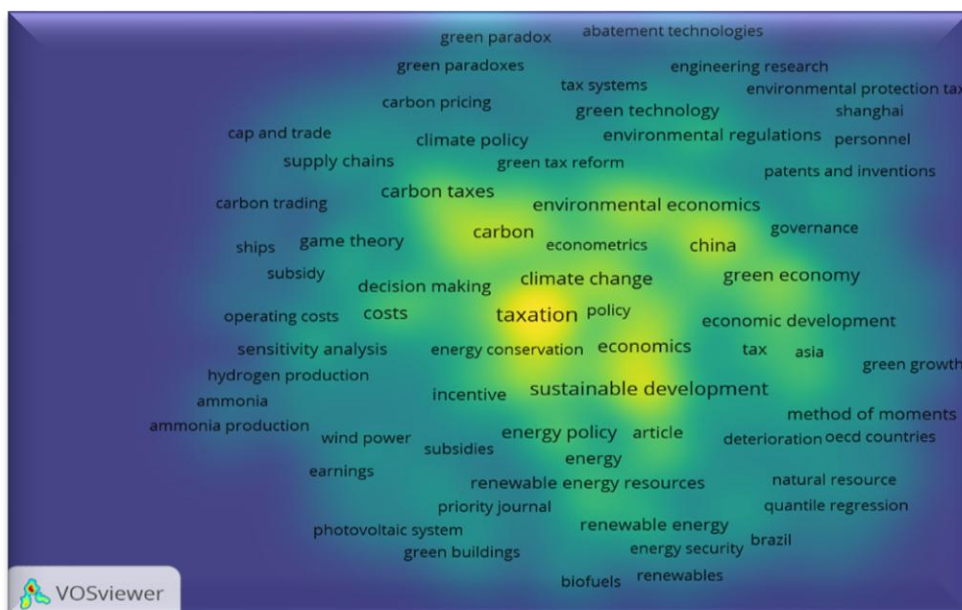


Figure 3: Densitymap

Source: Vosviewer

5.4. Scientific productions by country

The diagram depicts the progress of scientific research centered on the concept of green taxation between 2010 and 2023, while highlighting the contributions of various countries. We note significant publication activity, especially in China, which has largely dominated creation since 2015 with an exponential increase from 2020, surpassing the 350 publications in 2023. India and Germany are in second and third place respectively, also showing a marked increase in their publications. This evolution reflects a growing interest on the part of researchers and policy makers in ecological taxation as a vector for environmental transition, climate justice, and economic innovation. Nations such as the USA, Italy and Germany continue to have a constant, though less significant, production which might suggest either more sector-oriented management or incorporation of the topic into related disciplines. In general, this upward trend reflects the growing importance of green taxation as a multidisciplinary research area and policy priority at the global level.

Source : Bibliometrix

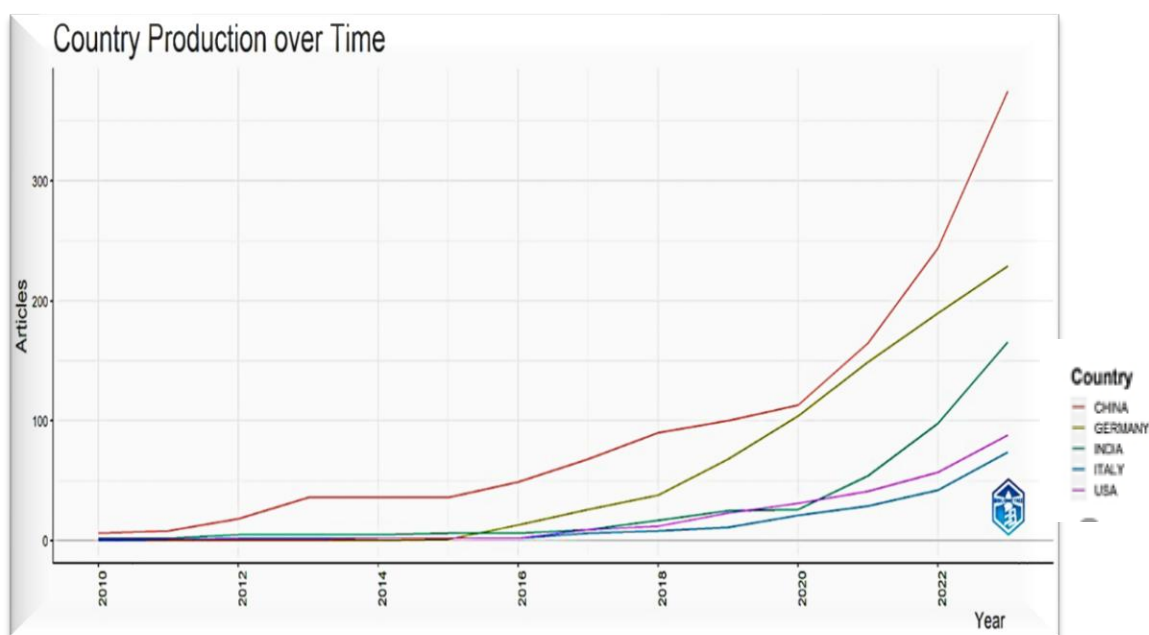


Figure 4: Country Production over Time

CONCLUSION

Green taxation is a strategic lever for the transition towards sustainable development, particularly in countries undergoing economic and environmental change, such as Morocco. This bibliometric and literature review reveals a growing scientific interest in this theme over the previous years, reflecting the global awareness of climate issues and the need for effective and fair fiscal tools. The reviewed publications highlight not only the diversity of economic, environmental, social and financial approaches – but also the interdisciplinary way of green taxation in contemporary public policies.

Green taxation is indeed a powerful lever to encourage more sustainable practices by integrating environmental costs into the prices of goods and services. In Morocco, although this form of taxation is not yet fully implemented, the country has nevertheless introduced several tax measures related to the environment. Good coordination between fiscal policies and other environmental measures is essential to maximise the benefits and minimise the costs associated with this action. Thus, the results of this study pave the way for a better understanding of environmental taxation and its role in the Moroccan context. They enrich the debate on the priorities of tax reform and the means and adaptation to climate change. Despite certain limitations, such as the lack of data to assess in advance the impact of implementing green taxation in the medium and long term, this study nevertheless opens up research perspectives, in particular on the competitiveness of national companies, as well as on social and territorial equity within the framework of this new tax system with an environmental aim.

Currently, Morocco is working on a major project related to the development of its green economy. Morocco has all the means to succeed in this transition and the adoption of environmental taxation will be an asset that will accelerate the process. However, the implementation of an ecological tax reform is not a simple question to maintain, so that this reform achieves its main objective, namely the change in the behavior of economic agents towards the environment, it must meet certain conditions and be based on fundamental pillars, notably social acceptability which is defined as a form of general public consent to a given policy.

In the end and for an implementation of an efficient and flexible environmental taxation, it would be wise to do a benchmarking work with the foreign experiences started by the countries close to Morocco in terms of economy and adopted tax regime, in order to target the axes of development and draw the right lessons for a healthy environment and painless taxation.

In order to measure the real impact of existing green tax systems, it is imperative that empirical research contextualised at national level be carried out in the future and that the conditions for their effectiveness be identified. For green taxation to effectively serve sustainable development, it must be based on a systematic vision, involving everyone's participation and based on scientific data.

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