



A comparative analysis of plastic regulation in Germany and Pakistan

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ABSTRACT

The problem of plastic pollution, from rising production, through century-long lifespans and the uncertain danger of micro plastics, is now almost universally acknowledged and addressed in different ways across the globe. Its adverse effects related to climate change, chemical pollution and biodiversity, and its dangerous dynamics only allow to debate how, not if, plastic pollution is to be approached. However, the potential approaches are numerous and depend on a large variety of external factors. This paper examines those potentials in relation to paths already taken in Germany and Pakistan, and does so from a legal point of view using a comparative law approach, allowing for a classification along some overarching tendencies such as plastic reduction vs. plastic waste management and recycling, binding supranational law vs. voluntary international agreements, measure-oriented vs. system-building, market-based vs. ordo-liberal approaches. Schematically, these contrasting tendencies correspond to the approaches chosen in Germany and Pakistan, and may thus allow for a critical evaluation beyond single measures.

Keywords: *Plastic pollution, Comparative Environmental Law, European Environmental Law, International Environmental Law, German Law, Pakistani Law*

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1. Introduction

Despite continuous efforts in affording plastic pollution, it remains one of the most relevant environmental problems to date [1] [2]. As production of plastics keep rising [3], the amount of plastics amassed throughout the world's ecosystems, due to century-long lifespans and the lack of biodegradability, approaches dangerous levels. Along with the problem, the world's awareness has been rising, and numerous efforts have been undertaken to tackle plastic pollution [4] [5]. Nonetheless, rising production and a lack of waste management capacities result in serious issues in the fields of climate change, chemical pollution and biodiversity [6]. Potential approaches are numerous and variable, thus a scientific view on how successful different approaches are, is of significant relevance in order to affront plastic pollution from a scientific and environmentally-centred standpoint. An essential instrument to gain normative results from an observation of measures and data on production and waste management, and to assess measures accordingly, is the functionalist method in comparative environmental law [7] [8].

Starting out from a systemic perspective on the legal orders analysed, examining the relevant sources of law, and their interrelations, up to implementation and the influence foreign influences [e.g. from international or supranational law] exercise, the measures and their context can be functionally compared along certain fundamental lines, allowing

for a classification following four main axes. From a fundamental juxtaposition of plastic reduction and plastic waste management or recycling [9] [10], a next step concerns the difference between market-based and ordo-liberal "hard law" approaches [11] [12], between punctual measures and a system-building approach, and finally the contrast between voluntary international agreements and binding supranational law. These differences partly correspond to the differences between the plastic pollution prevention strategies in Pakistan and Germany and are thus of essential importance for a schematic comparison.

This general approach is concretised by way of the following research questions: what different approaches in reducing plastic pollution exist and how successful are they considering type and context of different measures? What role do synergies and combinations of different types of measures play to foster success? How does EU framework legislation influence national legislation, particularly when comparing to a non-EU country, what role does EU legislation play for the differences between plastic regulation in Germany and Pakistan?

2. Methods

The core of this study is the comparative analysis of the approaches and measures taken to respond to the plastic pollution problem in two different legal contexts. A suitable research method to this end is the type of legal comparativism that Zweigert and Kötz developed under the name of functionalism, which is

supported by Kirk Junker in “Environmental Law Across Cultures” [7] [8]. This method is elaborated and explained following a structure of five steps. This method can follow two different sub-methods, called type I and type II comparisons. The feature of distinction is the presence of common features, that allow a closer [type II] comparison, based on shared a priori similarities. These features can notably be found in the structure of the legal system, or in the presence of substantial shared international obligations. Since Germany and Pakistan have different legal systems [civil law and common law], and share only a limited number of international obligations, EU law serving as the basis for German environmental legislation and not being applicable in Pakistan, it is suitable to conduct a “free” [type I comparison] between the two approaches to plastics regulation. This comparison of the different legal responses is crucial to understand the role played by the different legal frameworks, notably the influence of EU law on different outcomes.

First the essentials will be laid out under the same function. Based on the function of reducing plastic pollution [both of one’s own production and in one’s own territory, which might have to be specified further in this method], all sources of law, legal tools or mechanisms and their context [implementation, compliance, etc.] as far as suitable and relevant will be examined, including domestic legislation as well as European and International Law.

Those essentials will then be juxtaposed. In a next step, the different approaches to meet the same functions will be analysed to answer the question why these differences persist, what their relation is to one another and what influence legal structures in both countries may exert on these differences. Out of these differences and similarities and the legal structures, mechanisms and tools they are built upon, a system will be built to foster understanding of what exactly is compared, how results can be understood, and what are possible conclusions out of it.

As a last step and as an addition and elaboration of the system being built, a syntax and vocabulary of the system and the comparison will be developed, in order to gain an understanding of how different legal systems use different terms and whether and in what way differences in the field of syntax and vocabulary are relevant to properly understanding and interpreting the results of the comparison, so to end up with suitable and comprehensible conclusions.

3. Results

3.1 Country A: Pakistan

3.1.1 Legal System

Pakistan has a common law system that was installed during colonial times. However, since the independence significant parts of civil law as well as criminal law were codified, resulting in a rather mixed system. This mixture is complemented by constitutional law and a federal structure that are based on the US example, and punctually remaining influences in positiv law stemming from the traditions of either Islamic Law or jirga-based law. Thus, Pakistani Law represents a quite specific combination of different influences that make it hard to categorise along the usual lines of civil and common law system. More concretely however, when it comes to sources of environmental legislation, Pakistan’s constitution does not have specific provisions guaranteeing environmental rights; a priori obligations regarding environmental legislation result only from international law by way of treaties that Pakistan has ratified.

3.1.2 Legal Strategy for plastic pollution control

Regulative context

In 1975, the government established the Federal Environment Ministry in order to follow up to the Stockholm Declaration of 1972. The core responsibility of the Ministry included proliferation of the Pakistan Environmental Protection Ordinance [PEPO] in 1983, which was the initial all-inclusive legislation established in Pakistan. Its main objective was to set up legally and administratively sound institutions, including the Pakistan Environmental Protection Council [PEPC], and the Federal and Provincial Environmental Protection agencies [13]. Pakistan also participated in the Earth Summit held in Brazil [Rio-De Janeiro] in 1992 [14]. In the same year, the National Conservation Strategy [NCS] was developed by Pakistan with the intention of providing a broader framework to efficiently address ecological issues.

Pakistan then designed the Environmental Quality Standards [NEQS] in 1993 and passed the Pakistan Environmental Protection Act [PEPA] [1997] in 1997. After its implementation, the Act replaced and repealed the PEPO [1983]. There is a framework provided by the PEPA 1997 to: implement the National Conservation Strategy [NCS]; establish the provincial sustainable development Funds, Protection and Conservation of species; preserve the alternative or renewable resources; develop the Environmental Tribunals; appoint the Environmental Magistrates; and establish the Initial Environmental Examination [IEE], and Environmental Impact Assessment [EIA]. One of the major challenging issues facing Pakistan today is a lack of legislation or extensive policy for waste management. Although Pakistan has signed the Basel, as well as the Rotterdam and Stockholm conventions, their fragile institutional capacity persists

to be a major barrier to the enactment of these international treaties [15].

However, to handle this problem, Pakistan has partnered with the Chemicals and Waste Management Program [16]. This is an objective-based project aimed at strengthening the institutional capacity while developing, adopting, monitoring, and implementing a sustainable policy regarding chemical and hazardous waste management [17].

In 2013, the National Impact Assessment Program [NIAP] was jointly enacted in Pakistan by the International Union for Conservation of Nature and other allies. An exceptional measure, NIAP intends to apply a multi-pronged strategic approach to bring enhancement to the EIA's effectiveness and establish Strategic Environmental Assessments [SEA] in Pakistan. The program is based on policy interventions through the establishment of SEA, strengthening all relevant sectors, by development of tools and scientific mechanisms to tackle pollution, as SEA demands incorporation of the key sustainable development principles into Pakistan's environmental policies and initiatives [18].

Examples: hospital waste management and private pilot projects

Plastic-made products are heavily used in healthcare organizations in Pakistan, and thus discussing this source is important. In fact, hospitals have become one of the major sources leading to pollution. Since the introduction of the Hospital Waste Management [HWM] Rules [2005], this pollution has been reduced to some extent [19]. These rules are installed under the Pakistan Environmental Protection Act [PEPA] [1997], and follow the corresponding WHO guidelines, defining certain waste types, including chemical and infectious waste, pathological waste, genotoxic waste, and non-risk waste [20]. This approach implies several types of measures, including segregation, accumulation, carrying, process, and safe discarding [21].

Reports of mishandling of hospital waste and inadequate infrastructural arrangements are made very frequently [22]. It has been found that the WHO and Pakistan's Ministry of Climate Change [MoCC] of Pakistan have set some guidelines with rules, which are overlooked, as hazardous and illegal dumping of hospital waste is frequently reported by media. Numerous incidents happened when disposition of infectious plastic waste was made in the deep or open land [23]. Open disposition of hospital waste can be accessed by stray birds and scavengers and the reason is non-operational burning amenities in cities [24]. Likewise, illegal recycling of infectious waste produced by hospitals has been reported [25].

A pilot project for collecting plastic and recycling has been introduced to curb the plastic pollution in Pakistan, supported by the World Wildlife Fund

[WWF] and the Coca-Cola Foundation. Citizens may deposit used plastic bottles that will then be recycled by a private partner organisation. A recent report, based on a study commissioned by WWF, shows that on average humans could be consuming around 5gm of plastic weekly by way of air, water and food. Besides, it observed that most activities associated with waste are performed by children under the age of nine [25]. The primary reason behind this is the fact that laws related to pollution as well as of labour are not strictly implemented or followed. Government in Pakistan meanwhile tends to strengthen narratives of individual responsibility, emphasising changes in everyday life in order to mitigate plastic pollution.

Strategy to Reduce Plastic Pollution

In 2017, a production-focused approach, the use of oxo-biodegradable technology was adopted in Pakistan as a strategic measure to counter plastic pollution. Oxo-biodegradable plastics can be completely broken down naturally in the environment without any destructive impacts on the environment [26].

In 2019, the government implemented a model in the capital city, Islamabad, by imposing a ban on polyethylene bags and fostering biodegradable bags. The ban is accompanied by a system of sanctions to ensure implementation [27]. A crucial fact has been overlooked by authorities; pollution is not caused only by polyethylene in Pakistan. Other major causes include polypropylene and other single-use plastics. Widely used types of plastics include non-woven PP, CPP, WPP, BOPP, metalized films, and shrink wraps. These are common in single-use products and thus contribute to plastic pollution.

The latest Economic Survey of Pakistan 2019–2020 reveals that most of the plastic-made products consumed by the public are enduringly leftover within a year of being manufactured [20]. Therefore, the pollution made by these products has detrimental impacts on the environment, human health, oceans and wild life. Specific laws and further measures have been enacted by the national and provincial governments, the main issue in Pakistan however remains effective implementation of these laws [24].

3.2 Country B: Germany

3.2.1 Germany's Legal System

To understand how the German legal system, a civil law system with a codified federal constitution, influences specific environmental legislation, it is necessary to examine the interrelation of national and EU law. European regulations and directives can have different forms of influence on German law. That influence has its foundation as well as boundaries in the German Basis Law, with certain articles forming an "entry point" of [generally superior] European law into German national law.

3.2.2 Legal Strategy for Plastic Pollution Control

European Law

The basis upon which European Plastics Legislation [28] and Implementation stands can be found in the Circle Economy Action Plan from 2015, that was issued by the European Commission and updated in 2020, with measures being continuously implemented. Its different measures and strategies contribute to establishing a circular economy in the EU [29].

The most important part of this Action Plan for the evaluation of plastics legislation is the Plastics Strategy presented by the European Commission in 2018. It aims to tackle three main problems: the low quota of recycling of plastics, the environmental impact of plastics and the CO₂ emissions resulting from the production of plastics. Thus, the EU approach is situated in a continuum between human and environment protection and the creation of economic opportunity, mainly in the field of plastic recycling and the usage of recycled plastic [30].

The strategy includes six concrete fields of action: avoiding plastic waste, deepening the knowledge on plastics circulation, improving waste separation and recyclability of products, strengthening the recycled plastics market and regulations to lower the environmental impact of plastics [31]. However, both the action plan and the strategy are only abstract goals and promises, only partly translated into concrete legislative regulations.

First, there is the single-use plastics directive from 2019 [32]. This directive targets specific products causing the most harm to human health and marine biodiversity [33], that at the same time could easily be replaced by suitable, sustainable and payable alternatives on the market. It prohibits, starting from 2021, selling certain single-use plastics products [34]. The usage of oxo-degradable plastics are prohibited from 2021 onwards as well. Next to these strict measures, there are also “softer” measures included in the directive such as labelling requirements, prescriptions of waste location, and information on potential environmental harm. Another aspect of the directive concerns expanded producer responsibility, for instance for the cost of waste management.

Further measures have continuously been adopted in 2022 and 2023 as well, including new policy frameworks on biobased, biodegradable and compostable plastics, as well as a number of initiatives tackling microplastics in late 2023, although partly limited to regulation proposals or brochures, so that key areas remain without hard law regulation.

A key instrument is the revision of the packaging and packaging waste directive in 2024, which clearly chooses a regulative approach, setting targets for overall packaging reduction, as well as completely banning certain types of plastic packaging from 2030.

EU directive 2015/720 is another important instrument aiming at plastic bags and tackling the problem of marine pollution. It states goals of usage reduction for the years of 2019 and 2025, leaving implementation to the member states. While most member states use different kinds of levies, sometimes even bans, Germany started off with an industrial dialogue and voluntary commitments by market actors before turning to prohibition later.

The more general and older Waste Framework Directive from 2008 also comprises regulations on packaging waste aiming to reduce plastics. An update to this directive from 2018 increased the requirements for recycling and waste separation.

Next to these key European directives and strategies on plastic regulation and waste disposal, there are some others adding to the regulations in specific aspects such as directives on disposal, old vehicles, the marine strategy framework directive, the industrial emissions directive, as well as progressing work on micro plastics [35] [36].

Another legal approach, introduced in 2021 as part of a reform of the EU financing system, is a fiscal instrument, often referred to as “EU plastics tax”. A “national plastic contribution” was set into place, to be paid by EU member states to the EU budget “calculated on the amount of non-recycled plastic packaging waste”. Its aim being to both reduce plastics and generate income, criticism persisted, naming mainly the inability to decrease plastic usage, while stating that if successful, the newly generated income would rapidly disappear. This analysis leads to reproaches going so far as to blame the EU for “greenwashing an unpopular tax”, only using supposed environmental benefits as a pretext [37]. However, a quantitative analysis of the measure’s success is not possible yet.

German Law

The “Verpackungsverordnung”, later followed by the “Verpackungsgesetz” gives an example of how an originally administrative measure was later turned into a parliamentary legislative element. Additionally, the administrative act was originally a purely national one, however continuously influenced by EU legislation [39].

Another example is the German treating of the EU plastic bag directive. Starting with a voluntary agreement between the environment ministry and certain market actors, already reducing the usage of plastic bags by more than half, criticism from civil society led to a full prohibition law to fill the gaps left open by the voluntary character of the agreement before. An evolution from a market-based solution to a binding law due to failure of the first solution to achieve sufficiently good results might be understood as a more general example of the relation between different types of measures.

That conflict shows when it comes to micro plastics legislation, too. The voluntary agreement currently in place, has so far led to less than half of the necessary reduction. Although environmentally clearly insufficient, no binding legal measures have been taken so far.

A yet more decisive picture of German state strategies in tackling environmental damage from plastics is the 5 point plan of the environment ministry for less plastics and more recycling [40]. The plan itself aims at rather abstract goals, such as avoiding superfluous products and packaging, or establishing more sustainable design. However, by assigning to each of the points a number of existing initiatives, it becomes clear that the ministry's focus lies on educational work and industry dialogue rather than binding legal instruments up to prohibition.

International Law

While most relevant legislation on plastics regulation does come from European and German law, there are also international treaties and international law aspects influencing it. The most relevant regulatory tool available at the world stage, is the United Nations Convention on the Law of the Sea [UNCLOS], that came into force in 1994. Its extensive body of work includes the question of plastic waste and pollution, and deals with issues of non-compliance. Furthermore, the United Nations Environment Programme [UNEP] developed the Honolulu Strategy, which is voluntary, as a framework to reduce harmful impacts of marine debris worldwide. They share ambitious goals and problems with non-compliance; hence the importance of national and EU law.

4. Discussion

4.1 Analytic context

Germany has a civil law system and a written constitution, with article 20a of the constitution playing an important role in environmental legislation, establishing both responsibilities and duties for environmental action and offering principles along which other laws can be interpreted. This, as well as the duty to implement European Directives on the basis of the Grundgesetz, means that environmental legislation is supported by the constitution in multiple ways.

On the other hand, Pakistani Law is a common law system, based on the colonial history of the country, however large parts of civil and criminal law are codified. Furthermore, constitutional law and the federal structure of Pakistan are influenced by US law, with remaining influences of Islamic and jirga-based Law. Pakistani Law represents a mixed system, differing from the structures and culture of German Law. There is no explicit basis in the Pakistani constitution for environmental legislation; principles that create responsibilities and along which laws can be interpreted derive mostly from international law.

This basis in international law might be supposed to be "weaker" than the constitutional foundation environmental law has in the German system.

4.2 Similarities and differences

Based on the differences between Pakistan and Germany in terms of legal culture and history, as well as general economic and environmental "development" it is fair to assume substantial differences persisting in their approaches to plastics legislation. While the difference between civil law and common law is not as relevant here, due to the widespread codification of civil and criminal law in Pakistan, the absence of an overarching abstract constitutional principle regarding environmental law in Pakistan has to be considered as a potential difference in the foundation of environmental policy. Where Germany is bound to environmental legislation through EU law and its own constitution and thus has less deliberation on the question *whether or not to act* environmentally than on *how to act*, in Pakistan only International Law, mostly not enforceable judicially, plays an external role for developing environmental legislation. It seems reasonable to assume that differences both in existence and in intensity of environmental regulation, are shaped by this disparity.

And indeed, the share of overall plastic waste that is not disposed of properly and is thus susceptible to contribute to plastic pollution, lies at 80% in Pakistan compared to 0% in Germany [defined as: "waste not formally managed including disposal in dumps or open, uncontrolled landfills, where it is not fully contained"] While that data is only part of the picture and a larger share of overall plastic production than this contributes to plastic pollution, there is still a clear disparity of regulations between Germany and Pakistan. Another statistic that relativises this finding, is the plastic production per person, which is five times higher in Germany than in Pakistan. These relations have to be analysed through the lense of the geoeconomics of plastic production and waste management, especially the practices of waste exportation from Global North Countries into areas of the Global South, that is complementary to formally problematic waste management in these countries, and which creates an overall imbalance between production and waste management.

Another differentiation has to be made between waste management and production reduction. These two aspects can only be viewed complementarily to assess plastic pollution prevention. While the overall amount of plastic produced and consumed in Pakistan is lower than in Germany, especially per capita, this does not seem to result from plastic legislation, but rather reflects the economic development. When viewing the historical development of plastic production in Germany, no overall reduction of plastic waste can be seen either, only questionable successes in specific areas such as the reduction plastic bags. Hence, the relative differences in the current amount of plastic

production cannot measure the success of plastic regulation, since plastic production generally increases in both countries, with punctual successes being largely irrelevant.

Germany has a higher overall and per capita plastic production than Pakistan. The trend to production growth is similar in both countries; this difference is not caused by plastic regulation. There is no clue for differences in the success of plastic reduction legislation despite the different starting conditions, especially regarding the more complete and intense framework constitutional and European law offers in Germany. However, many European regulations and directives are rather recent, so that their success might not yet be reflected in statistics. Punctual results for instance regarding plastic bags legislation, as well as the success of EU-level bans on certain products indicate that this kind of measure can indeed be successful. Consequently, one could assume that the more extensive and intense, often EU-originated regulations in Germany have achieved comparatively significant results.

Germany has a better balance regarding formal waste management. While this finding is relativised by both the exportation of plastic waste and the higher overall production, it can still be noted as a successful result of waste management regulations, that appear to be formally tighter and stricter in Germany than in Pakistan. This, in contrast to the more extensive and relevant reduction efforts, can be traced to longer-standing legislation, thus the clearly visible results.

4.3 Critical Evaluation

For a critical evaluation, the differentiation between plastic reduction and plastic waste management has to be reiterated. Regarding plastic reduction, both countries are far from achieving any significant success. Given the different economic situation and context, Germany's failure here is more significant. However, EU regulations seem to be potentially able to curb plastic production, while Pakistan relies on more punctual measures, often in cooperation with businesses and innovation and thus pursuing market-centred approaches whose failure is apparent in Germany, making way for stricter ordo-liberal approaches. Further research can notably focus on the success of the implementation-focused strategies of the new EU Commission from 2024 onwards.

Meanwhile, plastic waste management shows clearer differences. As a probable result of lacking legislation and implementation, the difference in the percentage of waste properly disposed of is large. However, a formal perspective is potentially problematic, when contextualised with the general economic disparity and Germany's waste exportation issue.

The issues of implementation and economic dynamics already lead up to the general problems of this study. A comparative analysis built on the formal legal

regulations and resulting data, has to necessarily leave out all that happens in between the legal formality and the eventual outcome. While this work is not focused on single legal regulations, but pursues a more systematic approach, the role of non-legal aspects might still remain under-appreciated.

In the given study, both authors relied mainly on primary legal sources. The data needed to assess the results of legislation had to be taken from varying sources, trying to represent a reliable overall picture of the data available. One issue occurring regularly was the disparity in available sources between the EU-context, with its environmentally-minded civil society and potential sources in Pakistan. Eventually, the gap between hard law and hard data, meaning all issues with implementation, actual economic dynamics, was hard to take into account given the difficulty to find data able to fill in the gap. Next to the different contexts and international economic disparities between Germany and Pakistan, that might have been the most significant difficulty and problem for this study.

5. Conclusion

To summarise this study's results, a few contextual differentiations should be noted. Plastics regulation can be categorised into production reduction and waste disposal aspects. Regulation strategies can be broadly categorised along the spectrum-forming lines of 1. punctual measure-oriented vs. comprehensive, "system-building" regulation, 2. market-oriented flexible vs. ordo-liberal "hard law" regulation and 3. regarding its international context as originating in voluntary agreements vs. binding supranational law. This classification reflects the differences between German and Pakistani approaches to plastic pollution. While Pakistani legislation tends to focus on punctual measures, oftentimes operates in a market-oriented context, avoids hard laws and bans, and is based in non-binding international agreements, German legislation, at least in the recent years, is taking a turn to a "system-building" approach, combining different measures and strategies, while learning the lesson of failed market-oriented policy and voluntary business agreements and consequently taking a turn to ordo-liberal binding measures, up to outright bans, and doing so mostly in the context of binding EU legislation.

Judging from the data available, and taking into account the recentness of many developments, while assuming that punctual tendencies can anticipate further results, there is a correlation between the sides of the spectrums German legislation is following and a more successful plastic pollution reduction. The reach of this conclusion is limited, due to the different starting positions and contexts; however it is safe to say that the other side of the spectrum, insofar as pursued in Germany, was less successful, and is thus not susceptible to be more successful in Pakistan, independently from the different contexts.

Acknowledging that the influence economic development, neocolonial continuities and geoeconomics play for the results, is neither measurable, nor in the scope of a legal study, we have to focus on differences in legal culture and history to explain the differences regarding the first two aspects.

The rather strict and comprehensive EU legislation influencing German law can be assumed to play a considerable role regarding the ordo-liberal and system-building turn in Germany. Another aspect with a potentially ambiguous role is the constitutional law establishing environmental duties and responsibilities. While constitutional law alone was not sufficient to influence environmental legislation significantly, there are certainly synergies between German constitutional law and European environmental legislation, both leading to a decreasing scope of action for deliberative national legislation, which in turn suggests that the nature and evolution of German plastic legislation is linked to its constitutional foundation, which is inherently different to Pakistan's.

If we unavoidably reduce our scope of analysis to the legal structures alone, excluding economic, cultural, geographical and implementation-related issues, we must thus conclude by highlighting the considerable role of the different constitutional legal structures, in combination with the EU's legislation, for the different legislation strategies and consequently, different results in plastic pollution prevention.

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