Corporate environmentalism: Enforcement of environmental laws to companies

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-Saanil Patnayak

***Abstract*: This dissertation Examines the existing environmental laws laid down by the UK government with an objective of protecting the environment from the chemical sector. The dissertation will study and examine this sector in UK briefly and provide a comparative and contextual analysis. This paper aims at explaining how are chemical companies exploiting the resources supported by existing statistics. Furthermore, the dissertation will compare the existing rules and regulations of UK with the top three leading chemical producing countries in the world. Finally, the dissertation concludes that, although there exists several rules and regulations for companies to manage their recourses and operations, there still is a need of certain reforms for better content. This topic is a vast and an ambiguous subject which still lacks an in depth research but the main motive of this dissertation is to shed some light on this issue as there still exists a bewilderment.**

Table of content

Introduction

This dissertation aims at analysing the current environmental situation and the impact of business and industries on environment. Industrial process can have a huge impact on the climate change, pollution of air, water and soil, health issues, extinction of species and more such as, land pollution, marine and coastal pollution, hazardous material, solid, waste, pesticides and pest control products, asbestos and harmful dust, radiation and noise pollution. Environmental problems that deplete natural resources and strain livelihoods, many of which are a result of poor industrial practices. If left unchecked, these problems could negatively impact businesses both directly, as in supply chain disruptions, and indirectly, as in health hazards, that lead to loss of man-hours and efficiency.[1]

This dissertation's main focus will be on how large-scale chemical companies in UK are contributing towards the protection of the environment and following the SDGs laid down by the United Nations. This dissertation would further compare UK's development with other countries'. Every country has certain rules and regulations to control, check and limit the overuse the chemical usage by the companies. In this dissertation we would compare such rules and regulations laid down by the government of UK with other top three chemical producing countries such as India, China and USA. After doing the research and a brief study, we would come to an outcome stating which country is doing better than the others in achieving the SDGs and contributing less to the environment harm.

The first chapter, "**Corporate environmentalism and climate resources: UK**," starts with giving a brief about what chemicals are and what are the usual effects of chemicals on the environment. The second part of this chapter talks about how chemical firms and it's activity has an impact on the environment. Furthermore, the chapter will focus on the UN's 17 Sustainable Development Goals and how the UK is dealing with them, as well as the policies that need to be implemented by policymakers to ensure that UK chemical industries progress toward decarbonization through technological roadmaps such as DECC and BIS.

The second chapter, "Legal provisions for environmental management," explains the basic law agents and provisions that the government has put in place to regulate and monitor chemical companies' activities. The chapter begins with a discussion of environmental agents. The Environment Agency (EA) is responsible for enforcing environmental regulations and standards established by the government.[2] This chapter elaborates on the role of the EA and how it supervises chemical companies in the United Kingdom. Finally, this chapter discusses the enforcement provisions, which are the penalties for violating the environmental protection act's regulations. According to the guidance, the Environment Agency evaluates the five criteria of proportionality, consistency, transparency, focusing enforcement action, and accountability when deciding what type of action to take. If the company is found to be in violation, the next step is sentencing and fines, which are governed by the evaluation process.

The third chapter, "Effects of Globalization on the Environment," compares the top three chemical-producing countries and how their environmental and labour laws are governed. This chapter will examine how globalisation and industrialisation have harmed the environment, as well as how these countries are dealing with the effects of climate change.
The primary goal of this chapter is to compare all of the rules and regulations in the United Kingdom, as well as how businesses respond to them, to the rules and regulations in the top chemical producing countries such as China, India, and the United States.

Finally, the chapter discusses the world's three largest chemical producers: the United States, China, and India. There have been many case studies about chemical disasters in these countries and what the governments of these countries have done to prevent such disasters in the future by establishing new rules and regulations to monitor companies' chemical activities and waste disposal systems. This chapter compares China, India, and the United States to the United Kingdom and will conclude which country is doing better that the other based on relevant statistics and facts in preventing environmental harms and achieving SDG targets.

[1] https://anglictina-maturita.cz/global-issues-and-environment/

[2] Carmen Arguedas,Sandra Rousseau, Emission Standards and Monitoring Strategies in a Hierarchical Setting, 2014.

Chapter 1: Corporate environmentalism and Climate resources: UK

Introduction

Chemicals

A chemical is a substance created by using a chemical process to create a chemical-based component. Chemicals are critical for poverty reduction and achieving the Sustainable Development Goals. They are very important in modern life. Chemicals, on the one hand, play an important role in human development, but they can also be equally harmful if not addressed properly, posing a major threat to health and the environment. Chemical effects can also lead to financial issues. As a result, the significance of effective chemical management throughout their entire life cycle of production and consumption is overstated, both in terms of the long-term contribution that chemicals make to socioeconomic transformation and the significant challenges to the environment and human health resulting from ineffective management.

Most Common Chemicals and Effects

There are thousands of chemicals used in chemical industries, most of which are used to make final consumer goods, create energy and to produce other industrial chemicals. Some are primarily used for industrial manufacturing on a global scale, namely:

a) **Sulfuric Acid**, these chemicals are most commonly produced in industries in the world. This chemical grows over 3% a year and is largely driven by demands from Asian region. b) **Ethylene**, this chemical is produced over 150 million tons every year[3]. c) **Sodium Hydroxide**, it is an inorganic compound which is used for industrial applications such as paper production and textile production, over 70,000,000 tons are produced every year. d) **Propylene,** it is an organic gas and it is a natural by-product of fermentation process. This chemical is most important compound for the advancement of green chemistry sector.[4]

Effects of Chemicals

The chemical industry focuses on its activities on the extraction and processing the raw materials[5]. These raw materials can be natural or synthetic, the industry transforms these raw materials into other substances with an aim to meet consumer needs. Throughout the different stages of transformation, liquid or gaseous wastes are generated in a large amount from the chemical process. The environmental regulations on chemical industry states that; if the heat treatment is chosen for the waste, then the emissions have to be a subject of heat treatment for a certain period at a temperature above 850 or 1100 degrees i.e the more chloride content of the waste, the more temperature. It also states that, the pollutants released from the chimney are required, after the thermal destruction of the waste, to be below the threshold of the variable pollution, which depends on the process, of locality. The regulatory duty of environmental matters makes it necessary to imply the processes which are adapted to the needs of each situation.

Chemical Companies' Impact

The process of industrial manufacturing leads to emission of hazardous chemical waste which affects people and environment. Chemicals can leak into the atmosphere from a variety of sources I.e. landfills, incinerators, tanks, drums or factories. Hazardous chemical can occur at **sources** (places where the chemical originates) and can travel to different places through agents like air, water and soil where people may come in contact with them.

The opportunities and challenges of reducing industrial energy demand and carbon dioxide (CO2) emissions in the chemical sector are examined, with a focus on the situation in the United Kingdom (UK), though the lessons learned are applicable to a large portion of the developed world[6]. A wide range of products can be classified as heterogeneous in this field, including advanced materials, cleaning fluids, composites, dyes, paints, pharmaceuticals, plastics, and surfactants.

The UK chemicals sector includes a wide range of organisations using different chemical processes to transform raw materials to products for sale to customers. The sector team defined the chemical sector as being those industries included in Standard Industrial Classification (SIC) codes 20 and 21,[7] i.e. those involved in the manufacture of chemicals and pharmaceuticals.[8] As described in

[3] Denise Fan,Der-Jong Dai,Ho-Shing Wu, Ethylene Formation by Catalytic Dehydration of Ethanol with Industrial Considerations, 2012

[4] Richard D. Adams,Claudio Pettinari, Foreword, 2012

[5] E. O. Grechina,N. I. Plyaskina,V. N. Kharitonova, Formation of Conditions for a Strategic Alliance of Extractive Companies for Implementation of Gas, 2019

[6] Paul W. Griffin,Geoffrey P. Hammond,Jonathan B. Norman,
ndustrial energy use and carbon emissions reduction in the chemicals sector: A UK perspective

[7] Nancy A. Nelson,Joel D. Kaufman, Fatal and nonfatal injuries related to violence in Washington workplaces, 1992.

[8] Tévécia Ronzon,Robert M'Barek, Socioeconomic Indicators to Monitor the EU's Bioeconomy in Transition, 2018

section 3, the emissions from the sector are a result of chemicals manufacturing (i.e. SIC code 208)[9] and the roadmap therefore focusses on these activities.

There are more than 2,500 enterprises involved in chemicals manufacturing (SIC code 20) with an annual turnover of around £32 billion with 106,000 employees approx. The sector is extensively involved in trading with total number of exports of £27.1 billion and total imports of £26.6 billion in 2013. In 2013, £617 million was spent by the industry on R&D in UK on chemicals and chemical products (excluding pharmaceuticals). Pharmaceuticals covered under SIC code 21 include more than 500 further enterprises with around £15 billion annual turnover and approximately 50,000 employees (ONS, 2014).[10]

Industries have various impacts on the environment which depends upon the type of activity that is taking place. Modern technology industries are meant to have a lower impact on the environment being advanced and modern other than old traditional industries like steel manufacturing and chemical production. Industrialisation is an important part of economic growth and society development but at the same time it is also harmful for the environment. Industries have a major negative impact on the air, emissions of the pollutants being the result of the operations causes air pollution. The minute particles called particulate matters are dangerous when breathed in, other pollutants such as sulphur dioxide and nitrogen oxides can cause acid rains which can harm public health and damage the environment[11]. The industrial water wastes which are called effluent can come out of industrial outlets, treatment plants and sewers. These wastes pollutes the underground water and river reservoirs. It can result into damaging wildlife and potential drinking water[12]. The hazardous chemicals used in heavy industries were often dumped on industrial sites and were a cause of soil and land pollution. Sources of soil pollution are, oil refineries, oil depots, gas stations, garages, metal treatment, dry cleaning, chemical plants, coating factory, printing business, textile industry and various other sites holding hazardous materials.[13]

Major hazard incidents can have negative impacts on large economic strategies, environment and humans. The Buncefield[14] incident in 2005 is estimated to have costed £1 billion and the release of foot and mouth from Pirbright[15] in 2007 is estimated to have costed the farming community £100 million.[16]

Even though there is a general acceptance of the need for hazardous installations, people expect, and the law requires, a proper risk management programs and to place all necessary measures in prevention of major accidents.

The chemicals business is dealing with a number of issues, including: a gradual shift in production toward increased storage and warehousing, Financial restrictions or ageing plant in declining subsectors are both factors to consider. Rapid growth, as well as supply demands in growing areas, ageing workforce, and a loss of trained labour are all factors to consider. Maintaining adequate safety processes and competency is critical to ensuring that businesses are capable of dealing with the technical and managerial problems of operating a significant hazardous enterprise, as well as employer and employee recognition and acceptance of their roles.

Strong health and safety leadership is needed to ensure that the major hazard issues are effectively controlled by the companies and they continue to obtain information and learn lessons from others. A focus on involving workers in risk management is needed[17]. Another emerging challenge is the potential for SMEs to provide major hazard capability as business models change from bulk production to storage and formulation: A trend toward the use of lower-skilled individuals who may lack a basic awareness of chemical/major hazard, controls, and safety measures, potentially increasing the probability of serious events[18], with severe consequences within and beyond the site boundary. Some employers are showing a reluctance to buy the fact that there is a major hazard risk associated with their activities, SMEs, particularly in the sub-COMAH sector, need to improve their expertise and understanding of off-site risks and their repercussions.

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[9] SIC codes are the Standard Industrial Classification codes used in the UK to classify businesses according to their type of activity. SIC code 20 covers the manufacture of chemicals and chemical products. SIC code 21 covers the manufacture of basic pharmaceutical products and pharmaceutical preparations.

[10] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/416669/Chemicals_Report.pdf

[11] Muhammad Bello Muhammad,Rahimah Abdul Aziz,Vivien W.C. Yew, The Effects of Air Pollution on Socio – Economic Activities in Sokoto State, Nigeria, , 2018

[12] Andrew C. Johnson,Monika D. Jürgens,Richard J. Williams,Klaus Kümmerer,Andreas Kortenkamp,John P. Sumpter, Do cytotoxic chemotherapy drugs discharged into rivers pose a risk to the environment and human health? An overview and UK case study, 2008

[13] https://www.coolgeography.co.uk/gcsen/EW_UK_Industry_Environment.php

[14] Fadwa Eljack,Monzure-Khoda Kazi, Process safety and abnormal situation management, 2016.

[15] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/250363/0312.pdf

[16] R. L. Ward., ARE THE GOLD MINES OVERTAXED?, 1936

[17] E. Michael Shanahan,Ruth Sladek, Shoulder pain at the workplace, 2011

[18] , Christopher Bearman,Peter A. Bremner, A day in the life of a volunteer incident commander: Errors, pressures and mitigating strategies 2013

Businesses attempting to (tactically) avoid designation as a Control Of Major Accident Hazards Regulations 2015 (COMAH) site by keeping dangerous chemicals in quantities just below COMAH designation limits can run into problems as a result of the COMAH concept[19]. Even if they are lower risk, such sites do have the potential for major off-site effects and need adequate levels of worker competence and safety leadership to effectively handle such risks.

Chemical Companies and Environment law

In the case of certain activities involving any environmental change, it is difficult to predict exactly what impact the operation would have on environmental quality or on human health. The body of legislation that aims to protect the environment is environmental law[20]. It encompasses several different fields of practise and addresses a wide variety of problems, from climate change to polluted property. EU law has, among other things, led to the most rapid development of environmental laws in the United Kingdom[21], particularly in the last 25 years.

A key concern of the Conservative Party since the referendum has been to disperse fears that Brexit may lead to weaker natural, creature welfare or nourishment benchmarks [22]. In July 2017, at that point, Environment Secretary Michael Gove announced the government was committed to a Green Brexit, in which natural benchmarks would not be brought down as a result of taking off the EU. He also restored the Division of Environment, Nutrition, and Country Undertakings by effectively pushing for the presentation of the long-awaited 25-year Environment Plan, which provides a much-needed long-term natural advancement strategy. The majority of environmental regulations and standards in use in England today are derived from EU legislation.[23]

Some EC Directives are: REACH is the acronym used to describe the Chemical manufacture and storage new EU Chemical policy which is currently under negotiation. It has been developed to deal with growing chemicals and the Department of Environment concerns, Food and Rural Affairs is responsible for the coordination of the UK position.

Existing substances regulation (ESR) are: EC Council Regulation (EEC) on the evaluation and control of the risks of existing substances.[24] Regulation EC 304/2003 implements the Rotterdam Convention on the Prior Informed Consent, the 'PIC procedure'[25]. It gives importing countries the opportunity to refuse, or apply conditions to, imports of certain dangerous chemicals.[26]

Some Legislations are: Control of Major Accident Hazards Regulations (COMAH) as amended these Regulations aim to prevent and mitigate the effects of those major accidents involving dangerous substances[27].Operators of establishments that retain dangerous substances in quantities exceeding defined levels are subject to the Regulations. The majority will most likely be found in the chemical business, but they will also be found in other industries.[28] The Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 (CHIP) guarantees that individuals have access to the information they need to be safe from chemicals. Chemical vendors must identify dangers and provide proper package labels and safety data sheets under the CHIP.[29] The Control of Hazardous Substances Regulations of 2002 (COSHH) Employers are required to regulate hazardous substance exposures in order to safeguard both employees and others who may be exposed as a result of employment activities under these regulations.[30] Regulations for the Transportation of Dangerous Goods by Road (1996) (CDGR) CDGR imposes responsibilities on everyone involved in the transportation of dangerous products by road, requiring them to understand what they must do to reduce the risk of incidents and ensure an effective response.[31]

[19] D. Chandrasegaran,R.A.R. Ghazilla,Karl Rich, Human factors engineering integration in the offshore O&G industry: A review of current state of practice, 2020

[20] The Legal Framework for Environmental Protection in the Hashemite Kingdom of Jordan Analysis of the Environmental Protection Law No. 52 of 2006, Saleh Al-Sharari, 2014.

[21] Jakub Kronenberg, Ecological Economics and Industrial Ecology, 2007

[22] Brexit's implications for environmental policy - UK in a ...

[23] The Carriage of Dangerous Goods by Road Regulations 1996

[24] Delphine Bard,David Mark,Carsten Möhlmann, Current standardisation for nanotechnology, 2009.

[25] Neil Emmott,Martin Slayne, Legislation and Policy Concerning Mercury in the European Union,.

[26] New Regulations for UK dangerous chemicals export, 1992.

[27] L. Cullen,M. Anderson, Human Factors Integration for a New Top Tier COMAH Site, 2005.

[28] Control of Major Accident Hazards Regulations 1999

[29] Chemicals (Hazard Information and Packaging for Supply) Regulations 2002

[30] Control of Substances Hazardous to Health Regulations 2002. Hamid Ghodse, Addiction at Work, 2017.

[31] A. Di Fazio,D. Bettinelli,E. Louette,J.P. Mechin,M. Zazza,P. Vecchiarelli,L. Domanico, European Pathways to Introduce EGNOS and Galileo for Dangerous Goods Transport, 2016.

Sustainable Development Goals: UK

Sustainable development is an important topic as it is considered a lot these days. Sustainable development lays down the pattern and use of the resources and sets a particular aim to meet human needs and also preserving natural environment at the same time[32]. The main purpose of preserving the resources is to meet the human needs in the present as well as in the future. The quoted definition of sustainable development is "development that meets the needs of the present without compromising the ability of future generations to their own needs"[33]

According to the sustainable development goals set by UN in 2015, there are 17 goals, with 169 associated targets for human development with 230 statistical indicators . The rallying cry is 'leave no one behind'[34]. According to the a survey conducted by HSBC in 2020, Among 9100 businesses of all sizes and sectors, including 1000 UK based firms among 10 nations, UK delivered a meaningful progress against SDG agenda.[35] "It's encouraging to see that UK businesses are showing leadership to become more sustainable and make a long-term difference to their customers, employees and the local communities in which they operate."[36] HSBC's head of sustainable finance Rob King said. A review, which was launched on Monday (8 October) 2018, aims to represent the positive contributions made by corporations, local authorities and policymakers to the 17 Global Goals and their 169 objectives. The review, scheduled to be addressed to the UN at the July 2019 High-Level Political Forum, also highlighted which areas the UK needs to take greater action on[37]. In a statement, the Government indicated that the final results of the review would be backed by evidence and would reflect on both domestic and foreign interventions. "The UK, the global framework for addressing the most pressing global challenges of our time, was at the forefront of negotiating the SDGs and the 2030 Agenda," the statement reads. "We would like to show several examples in the Voluntary National Review of the great work being done by different groups across the country."[38]

Roadmaps

A 'roadmap', is an written instrument to visualise future paths, the relationship between them, and the required actions to achieve a certain goal. A 'technology roadmap' is a plan that matches short and long-term goals with specific technological solutions to help an individual to meet those goals[39]. Roadmaps for meeting policy objectives go beyond technological solutions into broader consideration of strategic planning, market demands, supplier capabilities, and regulatory and sufficient information. [40]

This project's roadmaps look into decarbonisation in a variety of UK industries, including how much carbon reduction potential is currently available, which technologies will be required to extend that potential, and how firms would be affected in the long run. The roadmaps' goal is to offer current and fresh evidence, analyse it, and come up with a "consensual blueprint" to guide future action on matters including future energy and manufacturing industrial strategy and policy, decarbonisation and energy efficiency company investments, R&D, and skills.

This Decarbonisation and energy efficiency roadmap for the chemicals sector assess the potential for a low-carbon future across the most energy-intensive industrial sectors in the UK. It inspects how the industry could decarbonise and increase energy efficiency whilst remaining competitive[41]. Changes in the international economy and the need to decarbonise mean that UK businesses face increasing challenges, as well as new opportunities. The UK government is committed to moving to a low carbon economy, including the most energy-intensive sectors. [42]

These sectors use a lot of energy, but they're also crucial for the UK's transition to a low-carbon economy, as well as contributing to economic development and balance[43]. The roadmap project's goals were to:

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[32] Link Jason, Ecosystem-Based Fisheries Management

[33] Urban Planning and Ethics, Encyclopedia of Public Administration and Public Policy, Third Edition

[34] O. Oketch Moses, The corporate stake in social cohesion

[35] HSBC survey, 2019. https://www.edie.net/news/7/Survey--UK-businesses-poised-to-deliver-on-the-SDGs/ accessed on 27th November 2020

[36] https://environmentjournal.online/articles/uk-businesses-are-leading-the-way-to-sustainability-survey-suggests/ accessed on December 2020

[37] https://environmentjournal.online/articles/uk-businesses-are-leading-the-way-to-sustainability-survey-suggests/

[38] https://transform.iema.net/article/uk-businesses-positive-about-their-role-achieving-sdgs

[39] David A. Dorr,Nima A. Behkami, Application of engineering & technology management practices to university R&D research in sustainable healthcare information technology for primary care clinics.

[40] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/416669/Chemicals_Report.pdf

[41] Dina Wahyuni,Janek Ratnatunga, Carbon strategies and management practices in an uncertain carbonomic environment – lessons learned from the coal-face, 2015.

[42] Hwa Meei Liou, A comparison of the legislative framework and policies in Taiwan's Four GHG reduction acts, 2011.

[43] Ali Kemal Çelik,Sami Özcan,Abdullah Topcuoğlu,Kürşad Emrah Yildirim, Effects of the tourism industry on the balance of payments deficit, 2013.

· Improve understanding of individual industrial sectors' emissions-abatement potential, relative costs of alternative abatement options, and the related business environment, including investment decisions, barriers, and competitiveness issues;
· Establish a shared evidence base to inform future policy and identify strategic conclusions and potential next steps to help deliver cost-effective decarbonisation in the Mediterranean (over the period from 2020 to 2050).

Each roadmap aims to present existing and new evidence, analysis, and conclusions in order to inform future actions on issues like industry leadership, industrial policy, decarbonization and energy efficiency technologies, business investments, research, development, and demonstration (RD&D), and skills[44]. This roadmap is the product of extensive engagement with business, academia, and government (Department of Energy and Climate Change (DECC) and Department of Business, Innovation, and Skills (BIS)).[45]

Chapter 2: Legal Provisions and Enforcement of Environmental Management.

Existing Regulation: UK

The Environmental Agency (EA) oversees a wide range of organisations that have an impact on England's environment, people, and economy, from huge corporations to small businesses and individuals. Enterprises that the EA supervises are expected to be efficient, and the EA expects businesses to share responsibility for reducing their environmental impact and complying with legal requirements. This report details the progress made by the chemical industry in collaborating with the EA to attain these goals[46].

As a regulator, the Environment Agency is responsible for implementing environmental regulations and standards set by government. Their role include[47]:

- Monitoring and proof of the state of the environment, advising and educating governments and others on policy growth[48]
- Reviewing permits and guidance to ensure that they are valid and comply with updated requirements[49]
- Checking that companies and citizens comply with laws and their permits
- Issuing licences for corporations and individuals and setting requirements to ensure that companies function without damaging people and the environment.

The EU Regulation 528/2012 on the marketing and use of biocidal products (Biocides Regulation) is applicable in the UK via the Biocidal Products and Chemicals[50]

There are three directly applicable European Union Regulations that govern the marketing and sale of biocidal products, hazardous chemicals, and certain other substances, as well as any transactions involving them. The three EU Regulations impose duties that are equivalent to those imposed by domestic legislation, and are intended to safeguard human health and the environment from the dangers connected with the supply, use, and import/export of hazardous chemicals[51].

1. The EU **Biocides Regulation** establishes new rules for the approval of biocidal products, including their availability on the market, use, and control within the EU. Biocidal products are those that are used to control organisms that are dangerous to human or animal health, as well as those that damage natural or artificial materials[52]. Rodent poisons, insect repellents, and wood preservatives are examples[53]. Because such items can pose major dangers to humans, animals, and the environment, their placement on the market and use are controlled.[54]

[44] Transforming coal for sustainability: a strategy for China, 2003.

[45] J. Malinauskaite,H. Jouhara,L. Ahmad,M. Milani,L. Montorsi,M. Venturelli, Energy efficiency in industry: EU and national policies in Italy and the UK, 2019.
[46] https://www.cia.org.uk/Portals/0/Documents/Sustainability%20-%20public%20page/EA%20Environmental%20outlook%20for%20the%20Chemicals%20sector%202016.pdf
[47] Ibid.
[48] Ibid.
[49] Karen Ashby,Richard Boon, Numeric Action Levels: The New Driver for Stormwater Programs in Southern California, 2012.
[50] Biocidal Products and Chemicals (Appointment of Authorities and Enforcement) Regulations 2013/1506
[51] Written observations on the request by the general assembly for an advisory opinion, 1996.
[52] Elżbieta Bielak,Ewa Marcinkowska,Justyna Syguła-Cholewińska, Investigation of finishing of leather for inside parts of the shoes with a natural biocide, 2020.
[53] William E. Bickley, Book Review, 1951.
[54] Biocidal Products and Chemicals Regulations 2013/1506

2. The **2013 Regulations** appoint the Secretary of State for England, the Welsh Ministers for Wales, [55]and the Scottish Ministers for Scotland as the competent authorities for carrying out the Biocides Regulation's requirements. The Secretary of State is the competent authority for subjects that do not fall under the purview of a devolved administration.[56]
3. Provision is also established to allow the biocides competent authorities to fully recover costs paid in connection with activities performed under the EU Biocides Regulation.
4. The EU Regulation on the export and import of hazardous chemicals (the PIC Regulation) governs the export and import of specific hazardous chemicals[57], providing countries the authority to decide whether or not they want to import any PIC-listed substances. It does so in order to give effect to the UN Rotterdam Convention, which encourages shared responsibility and collaboration in the international trading of hazardous chemicals.[58]

Enforcement

In England, the Environment Agency is in charge of enforcing the most serious environmental crimes. Natural Resources Wales is also in charge of the majority of environmental enforcement in Wales. Local county and unitary authorities in England and county boroughs in Wales are other prosecutorial agencies that pursue environmental violations in England and Wales. Environmental law violations can be dealt with using a variety of powers, as well as a variety of disposal options accessible to prosecuting organisations and courts if offenders plead or are found guilty.

The following enforcement documents show the Environment Agency's enforcement policy[59]: The "Enforcement and Sanctions Statement" provides a high-level description of how the Environmental Protection Agency enforces environmental standards. The "Enforcement and Sanctions Guidance" explains how the EPA enforces environmental laws using civil and criminal sanctions. The "Enforcement and Sanctions Offence Response Options" is a detailed guide that lists all of the Agency's regulated offences as well as possible solutions.[60]

The United Kingdom Supreme Court ruled in Vedanta v. Lungowe [61] that civil claims for negligence made by Zambian claimants against an English parent corporation (Vedanta) and its Zambian subsidiary (Konkola Copper Mines Ltd (KCM)) for damages suffered in Zambia can be heard in English courts[62]. The ruling is noteworthy for worldwide efforts to hold enterprises accountable for their "bad repercussions" on human rights, despite the fact that it is framed as a domestic tort law case[63]. Lord Briggs' decision was based on the entitlement of victims to substantial justice, and he wrote for a unanimous Court. Lord Briggs held that parent businesses that claim to be in charge of their subsidiaries' human rights, environmental, social, or labour standards owe a duty of care to those who have been damaged by the company.[64] This concept has the potential to change how companies conduct due diligence and accountability for human rights violations. [65]

Criminal enforcement is merely one option accessible to regulators, according to the enforcement paperwork, and the Environment Agency has extensive discretion in deciding whether or not to pursue. When deciding what type of action to take, the Environment Agency should evaluate the five criteria of proportionality, consistency, transparency, focusing enforcement action, and accountability, according to the guidance.

Sentencing for Environmental Offence

Under s.33 of the Environmental Protection Act 1990, and may be prosecuted in either the Magistrates' Court or the Crown Court[66]. However, as of March 12, 2015, there is no upper limit on the fines that Magistrates' Courts can impose, which is a significant expansion of their sentencing powers and will result in a significant number of offences remaining in the Magistrates' Court rather than being committed to the Crown Court for sentencing [67]. In the Magistrates' Court, the maximum penalty was a £50,000 fine

[55] Colin Turpin, Adam Tomkins, Devolution and the structure of the United Kingdom.
[56] Regulation 649/2012
[57] J. van der Kolk, Import/Export of Hazardous Chemicals.
[58] Aaron Cosbey,Soledad Aguilar,Melanie Ashton,Stefano Ponte, Environmental Goods and Services Negotiations at the WTO: Lessons from Multilateral Environmental Agreements and Ecolabels for Breaking the Impasse.
[59] Richard Hooley, Lender Liability for Environmental Damage, 2001.

[61] Vedanta V lungowe and others (2020)
[62] Van Ho, T. (2020). Vedanta Resources Plc and Another v. Lungowe and Others. *American Journal of International Law, 114*(1), 110-116. doi:10.1017/ajil.2019.77
[63] Ibid.
[64] https://www1.essex.ac.uk/ebhr/documents/Improving-Paths-to-Accountability-for-Human%20Rights-Abuses-in-the-Global-Supply-chains-A-Legal-Guide.pdf
[65] Alexandra Gatto, Multinational Enterprises and Human Rights, 2011.
[66] Ole Windahl Pedersen, New Dynamics of Environmental Law Enforcement, 2018.
[67] Environmental Protection Act 1990 c. 43. s. 33 Prohibition on unauthorised or harmful deposit, treatment or disposal etc. of waste.

and/or 12 month imprisonment[68], while in the Crown Court, the maximum penalty was an unlimited fine and/or up to five years imprisonment[69].

R. v F Howe & Son (Engineers) Ltd, the Court of Appeal reviewed the important criteria to consider in determining an acceptable level of penalties in regulatory offences, including[70]:

· How far the defendant fell short of the appropriate standard[71]
· If a person has died as a result of the breach, this will be regarded an aggravating factor.
· The legal standard of care is the same regardless of the size of the company, and the financial strength or weakness of the organisation has no bearing on the level of care required.
· The severity of the risk and the danger posed by the offence;
· The scope of the breaches, such as whether they occurred in a single occurrence or over a period of time
· and the Defendant's resources.

Conclusion

Although they are not strictly applicable to environmental offences (and have been largely supplanted by the Environmental Sentencing Guidelines), they might nevertheless be a good place to start when deciding how much of a fine the court should impose.[72]

The new sentencing guidelines represent a fundamental shift in how these types of offences are punished, and they establish a step-by-step approach for courts to follow. To begin, the court must determine if the Defendant is an individual or a corporation[73]. Second, judges must assess the Company's turnover and assign it a category ranging from "Very Large" to "Micro." Depending on the size of the company, different beginning points and sentence ranges apply. The responsibility of the defendant and the harm inflicted by the offence are next considered[74]. Finally, courts are encouraged to consider whether any supplementary orders, such as compensation or forfeiture, should be made.

The Sentencing Council issued Sentencing Guidelines for Environmental Offenses in 2013[75], which apply to all offences relating to unauthorised waste deposit (fly-tipping) under s.33 of the Environmental Protection Act 1990, [76]and illegal discharges to air, land, and water under regs 12 and 38 of the Environmental Permitting (England and Wales) Regulations 2010/675 that are brought before the courts after July 1, 2014[77].

In *R. v Southern Water Services Ltd [2014]*, lord chief justice said, “There is very little mitigation that can be put forward in the absence of any explanation as to what the company's main board has done to reform itself, to eliminate its offending behaviour, and to give a full explanation of what happened in the occurrence before the learned court. It is critical - and we want to be clear about this - that in serious offences like this one, the company's Chief Executive and main board of directors - particularly one with a history of minor criminality like this one - must explain to the court the cause of its offending behaviour, the current offence, and its proposed solutions for protection of public.” [78]

Chapter 3: Effects of Globalization on the Environment

Introduction

Globalization has had far-reaching consequences for our way of life. It has contributed to faster technological access, enhanced connectivity and creativity. Activists have pointed out that globalisation has contributed to a rise in product use that has disrupted the ecological cycle. Increased consumption contributes to a rise in the production of products, placing stress on the environment in turn. Countries engaged in international treaties and working groups are expected to be concerned with climate change, and they will try to comply with global environmental standards. [79]

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[78] *R. v Southern Water Services Ltd [2014] EWCA Crim 120; [2014] 2 Cr. App. R. (S.) 29*

[79] https://www.environment.co.za/environmental-issues/globalization-and-its-impact-on-the-environment.html#:~:text=Increased%20consumption%20leads%20to%20an,from%20one%20place%20to%20another.

Increased utilization also leads to an increase in the production of goods, which in turn stresses the environment. Globalization on the other hand also leads to an increase in the transportation of raw materials and food. Earlier, people used to consume self or locally grown food, but globalization has exposed people to products that are developed in foreign countries and imported goods. This leads to the increase in the pollution level of the environment caused by the fuel consumed of the transportation of these goods. It also raises several other environmental issues such as noise pollution and landscape intrusion.

Transportation poses a pressure on the non-renewable sources of energy, such as gasoline. The gases that are emitted from the aircraft have led to the depletion of the ozone layer which has eventually resulted in increasing the greenhouse effect. The industrial waste that is produced as a result of production is emptied on ships and dumped in oceans. This kills many underwater organisms and deposits many harmful chemicals in the ocean. The ecosystem that is damaged from the oil spilled from one of the leaking containers of British Petroleum in 2010 is just one of the examples of the threat globalization poses to the environment.[80]

Globalisation boosts deforestation. Deforestation is an indirect and very significant cause of the greenhouse effect. Clearing and logging decreases the volume of CO_2 that plants convert into oxygen. This results into an equivalent increase in the volume of CO_2 in the atmosphere and thus causes the greenhouse effect. Burning the cleared wood releases vast quantities of CO_2. [81]

In total, estimated emissions from deforestation represent some 20% of the increased concentration of GHG in the atmosphere. Deforestation is mainly due to the conversion of forests into agricultural land, especially in developing countries. [82]For instance, Brazil for a little over a decade, much of its agriculture was export-oriented. Between 1996 and 2003, Brazilian soy exports to China rocketed from 15000 to 6 million tonnes. This dynamism involved deforestation and converting part of the rainforest into farmland.[83]

Top Chemical-Producing Countries of the World

India

India is now a significant producer of chemical products. India produces the world's 6% sulphuric acid, 6.2% soda ash, and 4% caustic soda, as well as a wide range of other chemical products. Mumbai, Kolkata, Sindri, Jamshedpur, Chennai, Bangalore, Vadodara, Ahmedabad, Kanpur, Amritsar, Delhi, and other major chemical industry centres in India.[84]

In India, chemicals are governed by 15 acts and 19 rules[85].Some of the categories include import and export, chemical manufacturing, chemical transportation, consumer interest in chemical use, and human health and environmental protection. These organisations each have their own set of rules. In contrast, the Environment (Protection) Act of 1986 acts as a link between regulations without interfering with the authority of other rules..[86] Several ministries and regulatory bodies at the national and state levels enforce the laws. India has recognised the significance of regulatory measures in protecting human health and the environment from chemical hazards. The Ministry of Environment and Forestry (MoEF) has established an electronic waste management system for the first time, which will go into effect on May 1[87].

These rules holds producers' accountability for recycling and reducing e-waste. The Indian government is also initiating to adopt the Globally Harmonized System (GHS) of classification and labelling of chemicals[88]. India has still not officially adopted it. The highlights of the policy have been discussed with various stakeholders and the MoEF is set to finalize the framework of this regulation that could be implemented early next year. With India set to implement the new GHS rules in phases, the industry is expecting essential revision of laws on handling and storage of hazardous chemicals.[89]

India's chemical industry is the 6TH largest in the world and continues to expand dangerously[90]. Little wonder, the country on an average of 4 major countries accidents every 3 months in the past 3 years. India took a hard stance against the sector after Bhopal gas tragedy, [91] 'the world's worst industrial disaster", India has not banned methyl isocyanate, the gas that leaked on 2-3 December

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1985, killing over 3,500 and leaving a biological impact on later generations[92]. India went soft after the eco liberalisation in 1992 to attract investors. In 2018 the union government reluctantly banned carbyl-sevin, the insecticide plant was manufacturing in Bhopal Methyl still remains legal in the country.

A population-based surveillance method is used to present the mortality experience of 88,000 Union Carbide Corporation employees from 1974 to 1983[93]. Many long-term employees were included in the analysis, with retirees and terminations accounting for the majority of deaths. In comparison to the general U.S. population, the whole population had a 30% lower overall mortality rate and a 10% lower cancer mortality rate[94]. In both hourly and salaried males, benign neoplasms and malignant melanoma of the skin were found. Because of higher rates among hourly male labourers and a cluster in one place, mortality rates for lymphosarcoma and reticulosarcoma were significantly raised.[95]
At the same time, the national chemical policy has been pending since 2012. "We need a comprehensive law which regulates chemical use, production and safety," says DD Basu, former scientist, CPCB.[96]

Because of this indirect monitoring of the chemical industry, nine Union ministries have a stake in the sector. The MoEFCC is the nodal ministry in charge of enforcing the Environment (Protection) Act of 1986..[97] The Ministry of Commerce and Industry, in collaboration with the Ministry of Finance, is in charge of chemical import and export[98]. "There is no justification for having so many Union ministries overseeing one sector.".[99]

China

China is quickly becoming a world leader in chemical production, not just in Asia. The Chinese chemical industry began to develop in 1950, when intensive efforts were made to develop the Chinese heavy chemical industry. Increased production of caustic soda, soda ash, sulphuric acid, hydrochloric acid, and nitric acid was prioritised. These efforts resulted in a threefold increase in output over the last three decades. China's major chemical-producing centres are concentrated in the country's north.[100]. The contribution of chemical output is greatest in the urban areas of Nanking, Shanghai, and Shantung. Other chemical plants can be found in Manchuria, Fushun, Penki, Dairen, and Anshan. Manchuria is home to the largest of the plants.

China buys a lot of interest in India for the ground of its chemical sector. Over the last 20 years from 2016, China has become the largest producer and chemical producer worldwide[101]. The growth of Industry also resulted in large scale degradation of air, ground and water
in China. Tianjin Port's explosion in chemical warehouse in 2015, was visible from space, was a land testimony to safety and health issues. [102]
The Measures on Environmental Management Registration of New Chemical Substances have been declared by China's Ministry of Ecology and Environment (MEE)[103]. MEE is also known as the 'China REACH.' The term 'China REACH' refers to the registration, evaluation, authorization, and restriction of chemicals.[104] Through the identification of chemicals, both Chinese and EU regulation aims to enhance human and environmental health. Both pieces of law divide their application based on annual tonnage, and they may also limit the use of very hazardous compounds. The fundamental distinction between MEE and EU REACH is that EU REACH is concerned with chemical requirements, whereas MEE is concerned with new substance notice.

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[95] Ibid.
[96] https://www.downtoearth.org.in/news/environment/poison-unlimited-india-s-chemicals-industry-remains-dangerously-68718
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[102] https://www.lexology.com/library/detail.aspx?g=5a83993d-b11b-4c8a-9e91-010be1c2a167 (accessed on 3rd December 2020)
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[104] G. Crompton, Packaging legislation, 2012.

United States

The United States of America is the world's major chemical producing country[105]. It produces nearly 30% to 35% of the world's nitric acid, soda ash, and caustic soda, and ranks second in sulphuric acid production..[106]

The largest chemical producing states are Ohio, Kentucky, Pennsylvania, Virginia and mostly all the northern states. Apart from these states, a few chemical-producing units exists in other states. More than 70% of the chemical output comes from the Atlantic coast, which stretches from New York, New Jersey, Maryland, and Florida in the southeast. Aside from these, the chemical sector in the southern United States is rapidly developing. States like New Mexico, Arizona, Utah, Colorado, Kansas, and Oklahoma are fast developing to the point where, within a few decades, their production will equal that of the north-eastern states[107].

All heavy chemical goods have a sizable and ready market in the United States. The most prominent buyers of these items are light chemical plants. The light chemical sector produces a wide range of products, including detergents, toiletries, and medications. These are naturally occurring secondary compounds derived primarily from basic or heavy chemical products. Lever Brothers, Colgate, and several other detergent manufacturers, as well as Max Factor, are now headquartered in the United States. For decades, Helene Curtis has dominated the international toilet product market. All of these factories are located along the Atlantic coast for export purposes.

The Chemical sector produces a multitude of environmental impacts. It is a major user of natural gas, which is needed for energy and as a feedstock. More than 1.5 million tonnes of air pollutants were emitted by the sector, with carbon monoxide (CO), sulphur dioxide (SO2), and nitrogen oxides (NOx) accounting for more than 80% of the total (NEI, 2002). Energy is responsible for nearly half of these emissions[108].The Chemical sector is also in charge of a large number of chemicals that are reported to the EPA's Toxic Release Inventory. Only about 5% of the more than 10 billion pounds of chemicals managed are disposed of or otherwise released into the environment, with the remainder going to treatment, energy recovery, and recycling.[109]

Largest Chemical Producing Companies

The largest chemical businesses in the world have increased their sales by an average of 13.65%. Covering the way for robust growth in the chemical industry year over year. All companies that manufacture, produce, and sell industrial chemicals are included in the chemical industry. In 2002, the chemical sector was worth USD 1.8 trillion, but it now generates over USD 4.1 trillion in yearly sales.[110] The largest chemical company in the world is DuPont, followed by BASF, and Sinopec.[111]

Dupont

DuPont is a chemical manufacturing firm based in the United States that was formed by the merging of Dow Chemical and DuPont. DuPont's headquarters are in Wilmington, Delaware, and the company had yearly revenues of USD 85.97 billion last year. The current market capitalization of DuPont is USD 52.69 billion.[112]

Sinopec

This is a Chinese oil and gas corporation headquartered in Beijing. Sinopec's sales increased by 22% last year, the most among the top chemical companies on this list. Sinopec is also known for the petrochemicals, chemical fibres, chemical fertilisers, and other chemical products that it manufactures and sells. Sinopec had a revenue of USD 69.21 billion last year and a market capitalization of USD 84.45 billion.. [113]

Ineos

Ineos is a multinational chemical corporation located in London, United Kingdom. Ineos is divided into 20 business units, each of which operates independently. Ineos, which has 22,000 people globally and specialises in the development and processing of chemical goods, petrochemicals, and even plastics, had sales of USD 36.97 billion last year. [114]

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[113] http://www.sinopec.com/listco/En/about_sinopec/our_business/chemical/

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Tata Chemicals Ltd

Tata chemicals limited was established in 1939 in Mithapur within the state of Gujarat, in India. Tata Chemicals Limited (TCL) is a global company, which serves 40+ countries on five continents as their customers. Superbrands ranks Tata Chemicals among the top 10% of business and consumer brands in India across the chemical industry and consumer brand categories. The company is the world's third largest producer of soda ash and sixth largest producer of sodium bicarbonate..[115]

Conclusion

The implementation of a modern system of chemical administration is a necessary prerequisite for these countries' development and transition to a sustainable economy, particularly in light of the strategic goal of developing the supply chain, high technology chemistry, and the manufacturing of advanced chemicals and other substances. Despite the fact that some aspects of the chemical management laws, such as laws governing categorisation, labelling, safety precautions for chemical products, and chemical substance licencing, have been established and partially implemented in these nations. However, due to the lack of a centralised systematic approach or a nationwide chemical management framework, the effectiveness of the adopted laws for reducing the adverse effect of chemicals on health and environmental is insufficient. In addition to this, the current regulatory system does not support all chemical compounds and their ingredients due to definitions of words issues and poor research methodology explanation of the matter of chemical identification. Substances present as aspects of goods, for example, and hazardous aromatic compounds in petroleum refinery merchandise are not regulated in most countries, including the United States. This situation makes it impossible to claim that chemicals are managed all through their complete lifecycle in the country. The lack of a method to investigate may lead to issues associated with the information confidences may pose a significant barrier to advancement and small- and medium - scale enterprises in the coming years.

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