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Sustainable Industries In India Viz. Plastic, Wastewater, Metal Food, Dye, Etc.

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ABSTRACT: Grasim Industries has been ranked number one in the debut 2021 Capri Global Capital Hurun India Impact 50, a list of top 50 companies headquartered in India based on their alignment with the 17 Sustainable Development Goals (SDGs).With a cumulative sustainability score of 47, Grasim Industries emerged as India's most sustainable company. Tech Mahindra came second with a score of 46, followed by Tata Power Company and Wipro with 45 each. Jinisha Sharma, Social Impact and Strategy Executive, Capri Global Capital, said beyond just corporate social responsibility, there is a strong business case for companies to benefit stakeholders and not just shareholders. "This list is only a starting point and we hope that more companies participate over the years."Anas Rahman Junaid, MD and Chief Researcher, Hurun India, said that stories of these corporations tell the story of sustainable development in modern India. The list indicates that India Inc. is actively pursuing structural updates to systematically measure and report sustainability goals.Only 14 companies reported their sustainability goals against all 17 SDG pillars. The SDGs most prioritised by them are climate action (SDG 13) and responsible consumption and production (SDG 12). Life below water (SDG 14) is the least prioritised. Only Adani Ports and Special Economic Zone has a documented measurable goal against the same.

KEYWORDS: sustainable , industries, Grasim, goals, development, shareholders, tata power, stakeholders

I.INTRODUCTION

In the last year, India has made huge strides in its sustainability initiatives and commitment. In its pursuit to be self-reliant, the government has put a premium on Sustainable India. Environment sustainability and climate concerns are deeply embedded in the traditional and cultural ethos highlighting the Indian government's commitment towards a sustainable future. Clean, efficient energy systems[1], disaster-resistant infrastructure, and a lifestyle that is attuned to conserving natural resources are all part of India's path to sustainability.BW Businessworld's efforts with India's Most Sustainable Companies, which is in its second edition, in partnership with Sustain Labs Paris, is to recognise the companies that have set the path towards achieving this sustainable future. The list holistically ranks companies by incorporating key dimensions such as resource efficiency, businesses for the greater social good, inclusive chain supply and several critical factors[2]. The top 20 of the list see major Indian companies included in it alongside multinationals such as Hindustan Unilever (HUL), which has been a pioneer in its sustainability agenda in India and globally. Among the top rankers, HDFC scored high due to its responsible lending policies, encouraging green housing and the integration of employees into climate strategy. Tech Mahindra scored on its data-driven approach towards sustainability and effectively leveraging business capabilities to positively impact communities. Marico is setting a benchmark in integrating suppliers into the company's sustainability strategy.[3]

HUL has strong performances across climate resilience, emissions reduction and impact on the community through its several corporate social responsibility efforts. Tata Communications ranked high due to its transparency, gender parity in remuneration and efficient utilisation of resources in FY21.Seven of the top 20 companies are technology-led players and FMCG companies take three spots. Sectors such as BFSI, auto, pharma too have examples where sustainable practices have become part of the company's mission-critical.It was also interesting to see multiple companies from Indian businesses such Mahindra, Tata and Godrej among the top 20 reflecting that sustainaibility is at the core of these groups than just in some of their business units.[4] The leadership of these companies have made sustainability the top priority on their agenda.

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All efforts are indeed needed to make India future-fit. As the Indian government ensures sustainable consumption and production patterns through sustainable natural resource management, waste reduction, and promotion of resource efficiency, some of which are reflected in government policies such as Zero Defect Zero Effect Scheme, Smart Cities, Swachh Bharat Abhiyan (Clean India Mission), Waste Management Rules, Star Labelling Programme, Perform Achieve and Trade (PAT) Scheme and others, corporate India too has an increasingly important role to play.[5]

BW Businessworld's Most Sustainable Companies list is an attempt to highlight this role and to celebrate India Inc's best practices that contribute towards creating a sustainable India. The annual endeavour this year not only scored companies on many different aspects but also included expert comments coming from a Jury Panel, allowing for the numbers to be seen in context, thereby providing a complete picture. The end goal is to amplify more such initiatives so that more companies can drive India's green commitment.[6] The plastics industry manufactures polymer materials—commonly called plastics—and offers services in plastics important to a range of industries, including packaging, building and construction, electronics, aerospace,Manufacturing and transportation.[7]

It is part of the chemical industry. In addition, as mineral oil is the major constituent of plastics, it therefore forms part of the petrochemical industry.

Besides plastics production, plastics engineering is an important part of the industrial sector. The latter field is dominated by engineering plastic as raw material because of its better mechanical and thermal properties than the more widely used commodity plastics. The economics of plastics processing is determined by the type of process. Plastics can be processed with the following methods: machining, compression molding, transfer molding, injection molding, extrusion, rotational molding, blow molding, thermoforming, casting, forging, and foam molding. Processing methods are selected based on equipment cost, production rate, tooling cost, and build volume. High equipment and tooling cost methods are typically used for large production volumes whereas low - medium equipment cost and tooling cost methods are used for low production volumes.[1] Compression molding, transfer molding, injection molding, forging, and foam molding have high equipment and tooling cost.[1] Lower cost processes are machining, extruding, rotational molding, blow molding, thermoforming, and casting. [8] Bioplastics are plastic materials produced from renewable biomass sources, such as vegetable fats and oils, corn starch, straw, woodchips, sawdust, recycled food waste, etc. Some bioplastics are obtained by processing directly from natural biopolymers including polysaccharides (e.g. starch, cellulose, chitosan and alginate) and proteins (e.g. soy protein, gluten and gelatin), while others are chemically synthesised from sugar derivatives (e.g. lactic acid) and lipids (oils and fats) from either plants or animals, or biologically generated by fermentation of sugars or lipids. In contrast, common plastics, such as fossil-fuel plastics (also called petro-based polymers) are derived from petroleum or natural gas.[9]

One advantage of bioplastics is their independence from fossil fuel as a raw material, which is a finite and globally unevenly distributed resource linked to petroleum politics and environmental impacts. Life cycle analysis studies show that some bioplastics can be made with a lower carbon footprint than their fossil counterparts, for example when biomass is used as raw material and also for energy production. However, other bioplastics' processes are less efficient and result in a higher carbon footprint than fossil plastics.[1][2][3]

The distinction between non-fossil-based (bio)plastic and fossil-based plastic is of limited relevance since materials such as petroleum are themselves merely fossilized biomass. As such, whether any kind of plastic is degradable or non-degradable (durable) depends on its molecular structure, not on whether or not the biomass constituting the raw material is fossilized. Both durable bioplastics, such as Bio-PET or biopolyethylene (bio-based analogs of fossil-based polyethylene terephthalate and polyethylene), and degradable bioplastics, such as polylactic acid, polybutylene succinate, or polyhydroxyalkanoates, exist. Bioplastics must be recycled similar to fossil-based plastics to avoid plastic pollution; "drop-in" bioplastics (such as biopolyethylene) fit into existing recycling streams. [10] On the other hand, recycling biodegradable bioplastics in the current recycling streams poses additional challenges, as it may raise the cost of sorting and decrease the yield and the quality of the recyclate. However, biodegradation is not the only acceptable end-of-life disposal pathway for biodegradable bioplastics, and mechanical and chemical recycling are often the preferred choice from the environmental point of view.[4]

Biodegradability may offer an end-of-life pathway in certain applications, such as agricultural mulch, but the concept of biodegradation is not as straightforward as many believe.[11] Susceptibility to biodegradation is highly dependent on the

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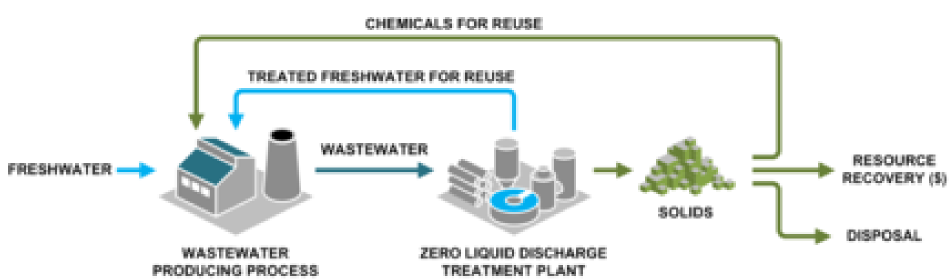
chemical backbone structure of the polymer, and different bioplastics have different structures, thus it cannot be assumed that bioplastic in the environment will readily disintegrate. Conversely, biodegradable plastics can also be synthesized from fossil fuels.[1][5]

As of 2018, bioplastics represented approximately 2% of the global plastics output (>380 million tons).[6] With continued research on bioplastics, investment in bioplastic companies and rising scrutiny on fossil-based plastics, bioplastics are becoming more dominant in some markets, while the output of fossil plastics also steadily increases.[12]

II.DISCUSSION

Wastewater treatment is a process which removes and eliminates contaminants from wastewater and converts this into an effluent that can be returned to the water cycle. Once returned to the water cycle, the effluent creates an acceptable impact on the environment or is reused for various purposes (called water reclamation).[1] The treatment process takes place in a wastewater treatment plant. There are several kinds of wastewater which are treated at the appropriate type of wastewater treatment plant[13]. For domestic wastewater (also called municipal wastewater or sewage), the treatment plant is called a Sewage Treatment. For industrial wastewater, treatment either takes place in a separate Industrial wastewater treatment, or in a sewage treatment plant (usually after some form of pre-treatment). Further types of wastewater treatment plants include Agricultural wastewater treatment and leachate treatment plants. Processes commonly used in wastewater treatment include phase separation (such as sedimentation), biological and chemical processes (such as oxidation) or polishing.[14] The main by-product from wastewater treatment plants is a type of sludge that is usually treated in the same or another wastewater treatment plant.Biogas can be another by-product if anaerobic treatment processes are used. Treated wastewater can be reused as reclaimed water. The main purpose of wastewater treatment is for the treated wastewater to be able to be disposed or reused safely. However, before it is treated, the options for disposal or reuse must be considered so the correct treatment process is used on the wastewater.The term "wastewater treatment" is often used to mean "sewage treatment".[3] Industrial wastewater treatment describes the processes used for treating wastewater that is produced by industries as an undesirable by-product. After treatment, the treated industrial wastewater[15] (or effluent) may be reused or released to a sanitary sewer or to a surface water in the environment. Some industrial facilities generate wastewater that can be treated in sewage treatment plants. Most industrial processes, such as petroleum refineries, chemical and petrochemical plants have their own specialized facilities to treat their wastewaters so that the pollutant concentrations in the treated wastewater comply with the regulations regarding disposal of wastewaters into sewers or into rivers, lakes or oceans.[7]:1412 This applies to industries that generate wastewater with high concentrations of organic matter (e.g. oil and grease), toxic pollutants (e.g. heavy metals, volatile organic compounds) or nutrients such as ammonia.[16] Some industries install a pre-treatment system to remove some pollutants (e.g., toxic compounds), and then discharge the partially treated wastewater to the municipal sewer system.[17]

(Most industries produce some wastewater. Recent trends have been to minimize such production or to recycle treated wastewater within the production process. Some industries have been successful at redesigning their manufacturing processes to reduce or eliminate pollutants.[10] Sources of industrial wastewater include battery manufacturing, chemical manufacturing, electric power plants, food industry, iron and steel industry, metal working, mines and quarries, nuclear industry, oil and gas extraction, petroleum refining and petrochemicals, pharmaceutical manufacturing, pulp and paper industry, smelters, textile mills, industrial oil contamination, water treatment and wood preserving). Treatment processes include brine treatment, solids removal (e.g. chemical precipitation, filtration), oils and grease removal, removal of biodegradable organics, removal of other organics, removal of acids and alkalis, and removal of toxic materials.[18]



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Wastewater from an industrial process can be converted at a treatment plant to solids and treated water for reuse.

III.RESULTS

The Iron and Steel industry in India is among the most important industries within the country. India surpassed Japan as the second largest steel producer in January 2019.[1] As per worldsteel, India's crude steel production in 2018 was at 106.5 tonnes (MT), 4.9% increase from 101.5 MT in 2017, which means that India overtook Japan as the world's second largest steel production country. Japan produced 104.3 MT in year 2018, decrease of 0.3% compared to year 2017. Industry produced 82.68 million tons of total finished steel and 9.7 million tons of raw iron. Most of the iron and steel in India is produced from iron ore.[2]

Most of the public sector undertakings market their steel through the Steel Authority of India (SAIL).The Indian steel industry was de-licensed and de-controlled in 1991 and 1992 respectively.[3] National steel policy – 2005 has the long-term goal of having a modern and efficient steel industry of world standards in India. The focus is to achieve global competitiveness not only in terms of cost, quality, and product mix but also in terms of global benchmarks of efficiency and productivity. The Policy aims to achieve over 100 million metric tonnes of steel per year by 2019-20 from the 2004-05 level of 38 mt. This implies annual growth of around 7.3% per year from 2004-5 onward.[19]

The strategic goal above is justified because steel consumption in the world, around 1000 million metric tonnes in 2004, is expected to grow at 3.0% per annum to reach 1,395 million metric tonnes in 2015, compared to 2% per annum in the past fifteen years. China will continue to have a dominant share of the demand for world steel. Domestically, the growth rate of steel production over the past fifteen years was 7.0% per annum. The projected rate of 7.3% per annum in India compares well with the projected national income growth rate of 7-8% per annum, given an income elasticity of steel consumption of around 1.[5] Prime Minister Jawaharlal Nehru, a believer in Harold Laski's Fabian socialism, decided that the technological revolution in India needed maximization of steel production. He, therefore, formed a government-owned company, Hindustan Steel Limited (HSL), and set up three steel plants in the 1950s.[20] In early 21st century Kalinganagar and Bokaro both emerged as the leading steel hub with multiple steel factories due to their ideal location with coal mines and other mineral deposits nearby.

The Munitions India Limited continues to be one of the largest metallurgical organisations of India with its dedicated metallurgical factories at Heavy Alloy Penetrator Project, Trichy for non-ferrous metals such as tungsten for anti-submarine warfare and tank ammunition the only plant in India,[29] Grey Iron Foundry, Jabalpur, for making engines and armoured body of vehicles[30] Yantra India Limited for special alloys, steel, aluminium, brass and other special alloys for aerospace, rockets, bombs and missiles

The food industry is a complex, global network of diverse businesses that supplies most of the food consumed by the world's population. The food industry today has become highly diversified, with manufacturing ranging from small, traditional, family-run activities that are highly labour-intensive, to large, capital-intensive and highly mechanized industrial processes. Many food industries depend almost entirely on local agriculture, animal farms, produce, and/or fishing.[1]

It is challenging to find an inclusive way to cover all aspects of food production and sale. The UK Food Standards Agency describes it as "the whole food industry – from farming and food production, packaging and distribution, to retail and catering."[2] The Economic Research Service of the USDA uses the term food system to describe the same thing, stating: "The U.S. food system is a complex network of farmers and the industries that link to them. Those links include makers of farm equipment and chemicals as well as firms that provide services to agribusinesses, such as providers of transportation and financial services. The system also includes the food marketing industries that link farms to consumers, and which include food and fiber processors, wholesalers, retailers, and foodservice establishments."[3] The food industry includes:

- Agriculture: raising crops, livestock, and seafood. Agricultural economics.
- Manufacturing: agrichemicals, agricultural construction, farm machinery and supplies, seed, etc.
- Food processing: preparation of fresh products for market, and manufacture of prepared food products

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- Marketing: promotion of generic products (e.g., milk board), new products, advertising, marketing campaigns, packaging, public relations, etc.
- Wholesale and food distribution: logistics, transportation, warehousing
- Foodservice (which includes catering)
- Grocery, farmers' markets, public markets and other retailing
- Regulation: local, regional, national, and international rules and regulations for food production and sale, including food quality, food security, food safety, marketing/advertising, and industry lobbying activities
- Education: academic, consultancy, vocational
- Research and development: food science, food microbiology, food technology, food chemistry, and food engineering
- Financial services: credit, insurance[21]

Areas of research such as food grading, food preservation, food rheology, food storage directly deal with the quality and maintenance of quality overlapping many of the above processes.

Only subsistence farmers, those who survive on what they grow, and hunter-gatherers can be considered outside the scope of the modern food industry.

The dominant companies in the food industry have sometimes been referred to as Big Food, a term coined by the writer Neil Hamilton.[4][5][6][7]

Food processing includes the methods and techniques used to transform raw ingredients into food for human consumption. Food processing takes clean, harvested or slaughtered and butchered components and uses them to produce marketable food products. There are several different ways in which food can be produced.

One-off production: This method is used when customers make an order for something to be made to their own specifications, for example, a wedding cake. The making of one-off products could take days depending on how intricate the design is.

Batch production: This method is used when the size of the market for a product is not clear, and where there is a range within a product line. A certain number of the same goods will be produced to make up a batch or run, for example a bakery may bake a limited number of cupcakes. This method involves estimating consumer demand.

Mass production: This method is used when there is a mass market for a large number of identical products, for example chocolate bars, ready meals and canned food. The product passes from one stage of production to another along a production line.

Just-in-time (JIT) (production): This method of production is mainly used in restaurants. All components of the product are available in-house and the customer chooses what they want in the product. It is then prepared in a kitchen, or in front of the buyer as in sandwich delicatessens, pizzerias, and sushi bars.[22]

IV.CONCLUSIONS

Industrial dye degradation is any of a number of processed by which dyes are broken down, ideally into innocuous products.[1] Many dyes, specifically in the textile industry such as methylene blue or methyl red, are released into ecosystems through water waste.[2] Many of these dyes can be carcinogenic. In paper recycling dyes can be removed from fibres during a deinking stage prior to degradation. Heterogeneous photocataylsis is one approach to the degradation of dyes.[3]

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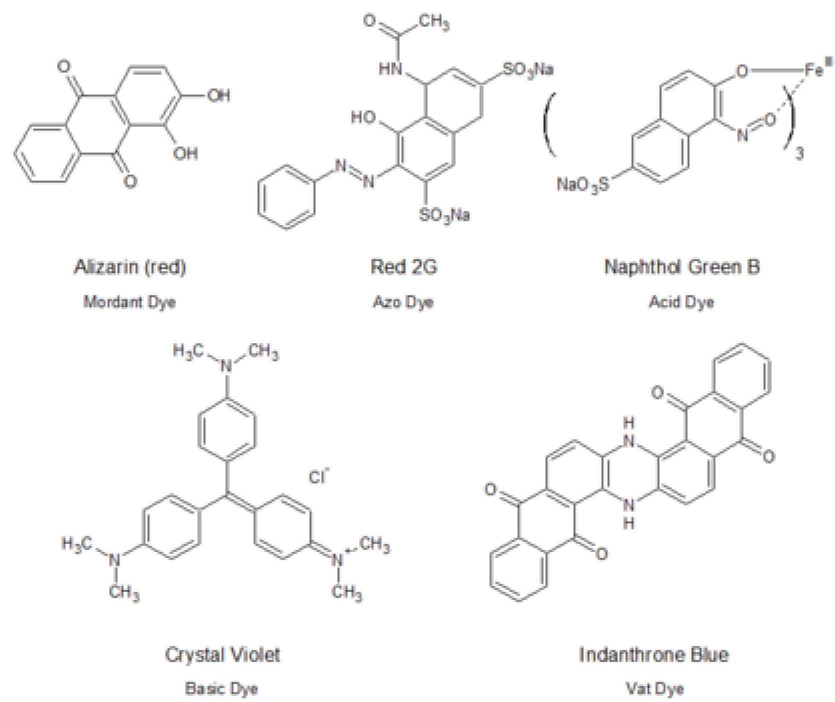

As applied to dye-containing effluents from the textile industry, several approaches are standardized for removal or degradation of dyes.[4] These include oxidation, e.g. using air or hydrogen peroxide, ozone, or Fenton chemistry. One challenge is that oxidants can be indiscriminent such that large amounts of reagents can be required (see Chemical oxygen demand). One promising approach combines oxidation with photocatalysis.[5] Reduction is also employed, a standard reagent being dithionite, which traditionally affords leuco dyes. Precipitation, often coupled with flocculation, is yet another approach, although it can produce substantial quantities of solids.[20]

Soon after, a study entitled “Jobs in a Sustainable Economy” by Michael Renner of the Worldwatch Institute was published, using the term "sustainable industries".[2] This 1991 report concluded, "Contrary to the jobs-versus-owls rhetoric that blames environmental restrictions for layoffs, the movement toward an environmentally sustainable global economy will create far more jobs than it eliminates. The chief reason: non-polluting, environmentally sustainable industries tend to be intrinsically more labour intensive and less resource intensive than traditional processes.[21]" Among the features of sustainable industry offered in the paper were energy efficiency, resource conservation to meet the needs of future generations, safe and skill-enhancing working conditions, low waste production processes, and the use of safe and environmentally compatible materials. Some of the benefits, however, would be offset by higher prices (due to labor costs) and a theoretically larger population needed to perform the same amount of work, increasing the agricultural and other loads on the system.[22]

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