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Evaluating Policies and Disclosures of Sugar Companies on Water Stewardship in the Sharda Basin

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Author: Dr. Sucheta Sardar

Dr. Sucheta Sardar has done her PhD from Jawaharlal Nehru University, New Delhi. She has a research experience of 8 years and has worked with NGOs like HomeNet South Asia and has also been associated with Oxfam India as a Consultant in the past.

Co-Author: Jafar Alam Ahmed

Contributors: Ishita Y Aggarwal and Shreya Kaushik

Reviewers: Mukunda Upadhyay, Animesh Prakash, Ranjana Das

Jafar Alam Ahmed is working as a Consultant - Private Sector Engagement (Water Governance), TROSA at Oxfam India

Mukunda Upadhyay is working as Programme Officer - Disaster Risk Reduction at Oxfam India

Animesh Prakash is working as Assistant Manager - TROSA, at Oxfam India

Ranjana Das is working as Lead Specialist, Responsible Business at Oxfam India

Ishita Y Aggarwal is working as Communications Coordinator at Oxfam India

Shreya Kaushik is working as Project Coordinator, Responsible Business at Oxfam India

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TROSA is a five-year regional program (2017 - 2021) jointly implemented by Oxfam and its partners to address the challenges of water governance in river basins of South Asia. It aims to ensure that riverine communities uphold their rights, build their resilience, and participate in water resource management.

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Oxfam India, a fully independent Indian organization, is a member of an international confederation of 20 organizations. The Oxfams are rights-based organizations, which fight poverty and injustice by linking grassroots interventions to local, national, and global policy developments.

Please contact jafar.consultant@oxfamindia.org or shobhit.consultant@oxfamindia.org for any details related to the current endeavor. Your suggestions shall be highly appreciated.

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ABBREVIATIONS

BIS	Bureau of Indian Standards
BOD	Biochemical Oxygen Demand
BCM	Billion Cubic Meters
BHSL	Bajaj Hindustan Sugar Limited
BDO	Block Development Officer
CSR	Corporate Social Responsibility
CGWB	Central Ground Water Board
CGWA	Central Ground Water Authority
CPCB	Central Pollution Control Board
COD	Chemical Oxygen Demand
CREP	Corporate Responsibility for Environmental Protection
CEMS	Continuous Emission Monitoring System
CETPs	Common Effluent Treatment Plants
DO	Dissolved Oxygen
ETP	Effluent Treatment Plant
EMP	Environment Management Plan
FGD	Focus Group Discussion
GPI	Gross Polluting Industry
KPMG	Klynveld Peat Marwick Goerdeler
KWh	Kilowatt-hour
KLD	Kilo Liters per Day
MT	Metric Tonnes
Mbgl	Metres Below Ground Level
mg/l	milligrams per liter
MW	Megawatt
MLD	Million Litres per Day
NGT	National Green Tribunal
NGOs	Non-Government Organisations
RTI	Right To Information
STP	Sewage Treatment Plant
SPCB	State Pollution Control Board
SDM	Sub Divisional Magistrate
TCD	Tonnes of Cane Crushed per Day
TGM	Technical Guidance Manual
TSS	Total Suspended Solids
UPPCB	U.P. Pollution Control Board
UP	Uttar Pradesh
UGR	Underground Reservoir
ZLD	Zero Liquid Discharge

EXECUTIVE SUMMARY

Transboundary Rivers of South Asia (TROSA) project funded by the Government of Sweden is a five-year regional program (2017 - 2021) jointly implemented by Oxfam and its partners to address the challenges of water governance in the river basins of South Asia. It's aim is to ensure that riverine communities uphold their rights, build their resilience, and participate in water resource management.

In the Mahakali basin, Oxfam India strives to achieve positive changes in the lives of marginalized and vulnerable riparian communities. One of its objectives is to influence improvement of policies and practices of the private sector and other actors in a way that they respect the rights of river basin communities to water resources, actively resulting in reduced conflict.

This report is an output of the study titled "Evaluating Policies and Disclosures of Companies and Financial Institutions and Influence Compliance and Accountability Tools" led by Oxfam India. The study tries to evaluate and determine the policies and disclosure mechanisms of three sugar companies and their affiliate distilleries, in Palia Kalan block of Lakhimpur Kheri district of Uttar Pradesh, namely Bajaj Hindustan Sugar Ltd., Gobind Sugar Mills Ltd. and Kisan Sahakari Chini Mills. The study evaluates the companies' commitments in ensuring compliance to corporate water governance practices and relevant national and state regulations and industry best practices on water conservation and non-contamination.

The study follows thorough literature review of the policies and disclosures of the sugar companies and relevant laws and regulations on water conservation and non-contamination, as available in the public domain, and compliance on the part of the companies to the same. The study also delves into specific NGT trials faced by the companies for non-compliance to the existing rules and regulations. In order to understand community perspectives on water challenges faced as a result of sugar production processes and redressal mechanisms by these companies, telephonic qualitative survey interviews were also conducted.

The study findings suggest that data in the public domain regarding the policies and disclosures of the companies were very inconsistent with their commitments. Financial disclosures and specific details of water-efficient technology upgradation and ZLD claimed by the companies in their Annual Reports were not provided and interpretation in their disclosures was very vague. Kisan Sahakari Chini Mills, a cooperative, does not have any policies and disclosures in the public domain.

The study findings present a very vague and non-consistent approach by the sugar companies in their commitment to the corporate water stewardship agenda. There is a visible gap in policy and practice disclosures and as such, these gaps can be discussed with the companies in particular and the sector in general through multi-stakeholder consultations. The way forward can be discussed in detail, thereby paving the way to a structured platform to address issues and implement best practices on the road to the corporate water stewardship journey. It is in this context that, the study also tries to provide some insights into the corporate water stewardship agenda and offers some key recommendations for positive uptake of corporate water stewardship practices in the production processes of the companies and the sector in general.

While there are gaps in policy and practices of the companies and the sector, Oxfam India believes that a positive engagement with the corporates to encourage positive collaboration on corporate water stewardship is the need and the appropriate way forward, provided they take positive steps towards their commitment on ensuring better and improved water usage policies and practices. Oxfam India and TROSA will be vocal about the positive steps undertaken by the corporates towards corporate water stewardship and thereby, trying to build a positive engagement for addressing community water issues at the last mile and also improving the corporates' brand image and reputation as an agent for responsible business behaviour.

SECTION 1: INTRODUCTION

Water scarcity has been a top discussion for quite a few years now. Over usage of water has resulted in a situation with a dire need to control and ensure judicious usage. Water being a shared and rare resource, it is necessary for all the stakeholders to come together and find solutions to move in a sustainable manner. In India, agriculture is the largest consumer of water followed by industry. Several industries are not only huge consumers of ground and surface water but also contaminate the nearby water bodies harming the aquatic and human lives dependent on it. The Central Pollution Control Board enlisted 17 categories of highly polluting industries and grossly polluting industries discharging effluents in the rivers and lakes contaminating the water bodies. These are: distillery including fermentation industry, sugar, fertilizer, pulp and paper, chlor alkali, pharmaceuticals, tye and dye intermediaries, pesticides, oil refineries, tanneries, petrochemicals, cement, thermal power plants, iron and steel, zinc smelter, copper smelter and aluminum smelter. Around 84 percent of the GPIs are found to be located in four states-Uttar Pradesh, Haryana, Andhra Pradesh and Gujarat[1].

According to an article in the Business Line, The Hindu, India is the second largest producer of sugar after Brazil, and the largest consumer of sugar. It gives employment to a huge section of the population. Sugarcane is primarily grown in nine states of India: Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Maharashtra, Punjab, Uttar Pradesh and Tamil Nadu. Around 50 million farmers and their families are dependent on sugarcane cultivation for their livelihoods. Again, a huge section of the population is dependent on the ancillary industries of sugarcane and value chain of sugar industries. A study by KPMG shows that on an estimate the sugar industry caters to 12 percent of rural population and each farmer contributes to the production of 2.9 MT of sugar every year. The area under sugarcane cultivation has been rising and has gone up by 12 percent in 2017-18 from 2.3 million hectares to 2.54 million hectares[2]. Around 37 lakh farmers are associated with sugarcane cultivation and around 2.96 crore labourers work in sugarcane farms. Around 5.66 crore people in Uttar Pradesh are dependent on sugarcane cultivation and sugar production for their livelihoods. Together UP and Maharashtra produce around 10 million tonnes of sugar. The sugar production in the major sugar producing states is given in the table below:

Table 1: Sugar Production in Major Sugar Producing States

STATE	2013-14	2014-15	2015-16	2016-17	2017-18
UTTAR PRADESH	6.6	7.1	6.8	8.8	12.0
MAHARASHTRA	7.7	10.5	8.5	4.2	10.7
KARNATAKA	4.2	5.0	4.1	2.1	3.6
TAMIL NADU	1.4	1.3	1.4	1.0	NA
GUJARAT	1.2	1.1	1.1	0.9	NA
ANDHRA PRADESH	1.0	0.9	0.8	0.5	NA
OTHERS	2.3	2.5	2.4	2.8	NA

[1] https://www.downtoearth.org.in/news/pollution/grossly-polluting-industries-more-than-doubled-in-8-years-soe-in-figures-64962

[2] https://www.oxfamindia.org/sites/default/files/2018-11/HUMAN%20COST%20OF%20SUGAR-A%20FARM%20TO%20MILLS%20ASSESSSMENT%20OF%20THE%20SUGAR%20VALUE%20CHAIN%20IN%20U.P.%202_0.pdf

In addition to the sugar industry's contribution to the rural economy, the sugar industry is largely associated with power generation and the alcohol industry. Ethanol and cogeneration are the key by-products of the sugar industry. Bagasse cogeneration for exportable power is a well-established trend in the sugar industry. Bagasse generated by sugar mills enable the mills to export power. However, the realization from the exportable power is dependent on the long-term power purchase agreements with the government and power companies.

These industries on one hand provide the base for the economic growth including employment to a large section of the population while on the other hand these undermine basic human rights like right to clean water. The industries directly affect the lives of the community in terms of access to clean drinking water and fresh air to breathe in. The industries discharge the effluents in the nearby water bodies like rivers, lakes, streams etc. and contaminate the surface as well as underground water. This adversely affects the living condition and basic lives of the community people.

1.1 PURPOSE OF THE STUDY

The study looks at these challenges faced by the community due to extreme water contamination by the nearby sugar industries. The community on one hand is dependent on the sugar mills for its livelihood, while on the other hand it is facing the adversities of water contamination. Water and air pollution by the industries have a cascading effect on generations in terms of health. Uttar Pradesh being the largest sugar producing state, is prone to high levels of water and air pollution. Despite the Air and Water Pollution Control Board prescribing the limits of different industries for effluent release and the procedure of ETP/STP, there still remains increasing water pollution in the nearby areas. It is important for the various stakeholders to come together and work to reduce the contamination and increase sustainability. Water stewardship can be an important path to form dialogues between the community, different government bodies, and the industries. Understanding water stewardship would help us assess the impact of direct and indirect impact of water usage and contamination through various production process on human and other aquatic lives. This study will put forward the different manuals and environmental clearance rules of different concerned authorities on sugar industries and analyse the ongoing policies and disclosures of the companies.

Sugar industry falls under three categories: public mills, private mills and cooperative mills. The distribution comprises 6 percent public mills, 40 percent private mills, and 53 percent cooperative mills. However, these figures are changing as the share of private mills have increased to 54 percent and that of cooperatives have declined to 43 percent[3]. States of Maharashtra, Karnataka and Tamil Nadu have high concentration of cooperative mills while in Uttar Pradesh private mills play a major role. There are a total of 732 sugar mills in India as of March 2018. These comprise 362 private mills, 327 cooperative mills and 43 public mills[4]. Three companies have been chosen for the study: Bajaj Hindustan Sugar Ltd, Govind Sugar Mill and Kisan Sahkari Chini Mills. Bajaj Hindustan Sugar Ltd and Govind Sugar Mills are private corporate companies while Kisan Sahakari Chini Mill is a cooperative. Both private and cooperative owned mills have been chosen to understand the type of disclosures and frequency of each entity.

1.2 AREA OF THE STUDY

The study is mainly focused on the Palia Kalan block of Lakhimpur Kheri district of Uttar Pradesh. The area has been chosen due to the presence of heavy industrial influence of the largest sugar mill: Bajaj Hindustan Sugar Ltd. The Kisan Sahakari Chini Mill is in Sampoorna Nagar, and the Govind Sugar Mill is in Khamaria.

1.3 OBJECTIVE OF THE STUDY

The objective has been mainly to focus on policies and disclosures of the sugar mill factories and its affiliate distilleries in the Sharda basin of Lakhimpur Kheri district of Uttar Pradesh. This is to ensure that the corporates work in compliance with relevant national, state and industrial environmental laws on water stewardship in order to maintain responsible business practices on reduction of water consumption and contamination with robust complaint redressal mechanism.

[3] http://www.in.kpmg.com/pdf/indian_sugar_industry.pdf

[4] https://dfpd.gov.in/sugar-sugarcane-policy.htm

The main objectives are

- Evaluate the policy and disclosures of the companies in maintaining and limiting water consumption and contamination.
- Evaluate the national and state regulatory laws to minimise the environmental degradation compliance of the sugar mill factories.
- Ensure the maintenance of a robust complaint redressal mechanism relating to community concerns on environmental safeguards and water rights.
- Bring up the problems faced by the communities due the presence of sugar industries and how their lives are dependent on industries both positively and negatively.
- Build a study and share finding with the targeted companies and industry associations for identifying gaps and poor performances and increasing efficiency and effectiveness in maintaining environmental concerns and promote good practices among its members.

1.4 METHODOLOGY

The current framework follows thorough literature review of the different policies and mandatory disclosures of the sugar industries - policies regarding the Effluent Treatment Plant and Zero Liquid Discharge, Environmental Impact Assessment, release amount of discharge and recycle of the by-products. The study then analyses the policies with the disclosures of the companies. The study also looks into the NGT trial of the company, if any, and the redressal grievances of the community stakeholder.

The study conducts a telephonic qualitative survey interview with the community people to understand the water problem in the area and how frequently the company addresses these problems. Due to Covid 19, the data collectors and field investigators could not reach the field and as a result, telephonic survey was the only option. Maintaining social distancing protocols also acted as a deterrent to conducting FGDs with the community. Telephonic survey has quite a few limitations, such as the questions need to be short and the interaction between the data collectors and interviewees are not always vivid. Moreover, since the interviewees were not able to see the data collectors, it sometimes created a lack of trust and they did not respond freely. Again, since the data collectors and field investigators could not visit the field, it became difficult to cross check the facts from the survey interviews. It also became difficult to cross check the claims made by the factories on different disclosures. However, the study managed to conduct a telephonic survey and was happy to see the response. Due to limited period of time of the study with a duration of only three months, it was difficult to file RTIs against the companies to disclose information, which were not published in public domain. Hence, this study focuses on the disclosures available in public domain.

1.5 DATA SOURCES

- Telephonic survey with the locals and the representatives of the sugar companies.
- National and state laws related to water pollution and ground water extraction
- Annual reports of the respective companies
- CSR Policies and Environmental Reports of the companies- Ground water usage data
- Ground water usage data
- District Census Handbook of Kheri
- Central Pollution Control Board website
- Environmental Standard, Ministry of Environment and Forests.

SECTION 2: SUGAR INDUSTRIES IN UTTAR PRADESH

Uttar Pradesh is the largest sugar producing state with a 30 percent share of the total production of sugar in the country followed by Maharashtra with 27 percent. Out of approximately 10 million tonnes of sugar produced in UP, only one-third is consumed by the state and the rest is exported to other states and cities, mainly Kolkata and the North-Eastern states of India.

The average per month return (Rs/ha) is highest for sugar cane crop compared to other crops like wheat and paddy. However, sugarcane bears a longer risk cycle due to its duration of 9-10 months in UP as compared to 3-4 months for wheat and paddy. During 2010, the per month return of sugarcane in UP was INR 4,511 per hectare which was more than the combined per month return of wheat and paddy. The rate of return in sugarcane crop is 80 percent whereas it is only 29 percent and 23 percent for wheat and paddy respectively.

Sugar mills in UP are mostly seasonal, running approximately for 6 months. Sowing of cane in UP usually begins in the month of January and continues till March. However, the mill starts in November for the preparatory phase to ensure smooth sugar production. Pricing of sugar in the last season, other crops grown in the same area, pending payments of sugar mills are the determining factors to decide on the sugarcane acreage. After sowing, the Cane Development Department conducts a crop survey where they estimate the net sown area by visiting the fields to formulate upcoming cane prices for the year. The cane societies develop a tentative calendar for sugarcane supply for registered farmer members. The calendar provided a fortnightly distribution of cane supply from their farms to the sugar mills. Based on the survey, each farmer is provided with a supply ticket based on which they plan their harvest. The farmers with supply tickets deliver the harvested cane to the mill centres located at their village centres or directly to the mill depending on the access to transport and distance of the mill from the field. Harvested cane needs to be supplied within 3 days to the centre and 5 days to the mill upon the receipt of the supply ticket to the farmers. The farmers are sometimes paid directly by the mills through their registered bank account but sometimes it takes as long as one year to complete the payment procedure.

Lakhimpur Kheri is one of the largest sugarcanes producing district of the state and has one of the highest operation units. This study will look into three big giant sugar factories, Bajaj Hindustan Sugar Mill in Palia Kalan, Govind Sugar Mill and Kisan Sahkari Chini Mill in Sampoorna Nagar.

Table 2: Sugarcane Cultivation in Uttar Pradesh

DISTRICT	Sugarcane Yield (metric tonne)	Operational Sugar mills
Bareilley	73.61	6
Meerut	115.48	7
Saharanpur	73.25	8
Muzaffarnagar	131.17	9
Lakhimpur Kheri	238.74	9

Source: Human Cost of Sugar, Oxfam, 2018

2.1 BRIEF GEOGRAPHY OF LAKHIMPUR KHERI DISTRICT

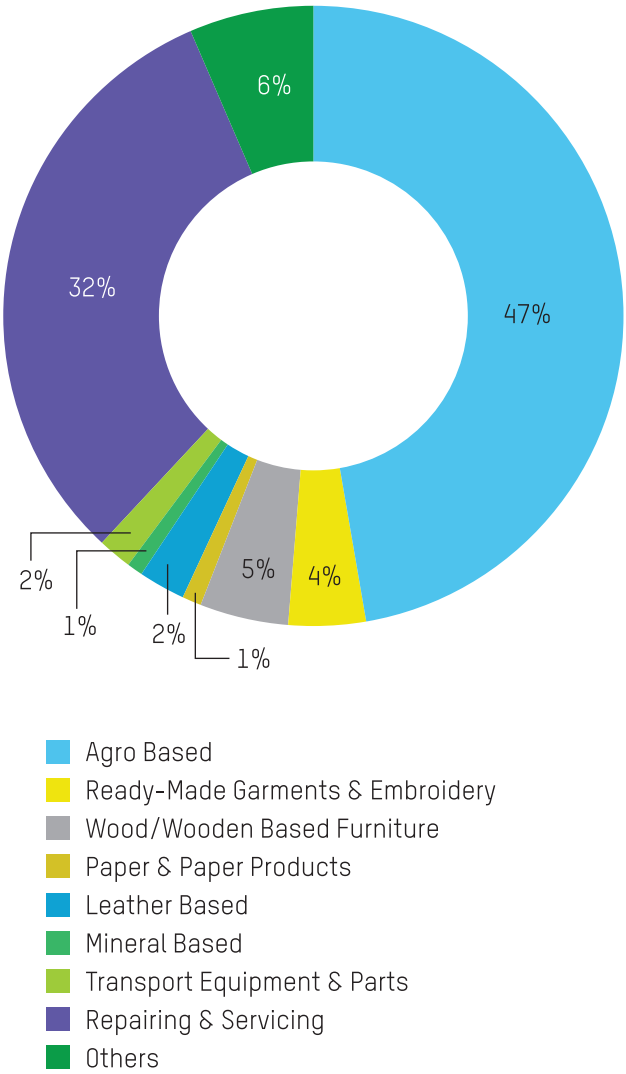
Lakhimpur Kheri is the northern district of Lucknow division and is situated in the sub-Himalayan border of Nepal. The main rivers which control the whole drainage system of the Lakhimpur Kheri district are Gomati and Ghagra. The district has a vast stretch of alluvial plains. The slope is from north-west to south-east. The region is situated along the Ganga, flowing through the boundary line of the district. There are a number of small rivulets, which are mostly the left-out course of Ganga.

Kheri Terai is situated in the northern part of the district covering major portion of Nighasan tahsil and part of Gola Gokaran Nath tahsil. All the streams in the region drain parallel to each other in south-east side. The entire terai is a flood prone area. Ghagra-Sharda flood plain is situated in the eastern part of the district covering Nighasan, Gola Gokaran Nath and Dhaureha tehsils. This belt is ridden by the offshoots of Sharda and Ghaghra rivers. These rivers often cause flood and shift course. Soil erosion is a common phenomenon. Besides there is a belt of marshy land along the rivers. Lakhimpur plain is situated near the Sharda river with the slope towards south east direction. The main physical feature of the entire region is alluvium, Dun gravels. Sharda river also known as Chauka river, locally. It is a confluence of two rivers, Kali and Sarju. It enters the district from Pilibhit and flows southwest and leaves the district at the extreme south-west corner of Nighasan and enter the Sitapur district. Kaurilaya (Ghaghra) river has its origin in Nepal and flow till its junction with Sharda after which it becomes Ghaghra. The river often experiences flood and cause much damage to the livelihood. The river frequently changes its course and in the old channel water collects and forms lakes and swamps.

Forest covers a large area of the district. Around 21.4 percent of the geographical area of the district are covered by forest. Forest has an important role in the district. In the adjoining areas of the forest, people pursue occupation such as woodcraft, cutting of timber, wood carving, and making toys to name a few. Due to the vast area under forest cover, wide varieties of wild animals are found such as wolves, wild pigs, sambhar, neelgai, hyena bear, etc. Among birds, peacocks, jungle fowls, partridges, vultures, bagulas etc. are found in abundance. Among minerals, the only minerals available in abundance in this area are kankar and good quality lime in the adjoining areas of Gola.

2.2 ECONOMIC LIVELIHOOD

Figure1: Industrial Profile of Kheri



Source: Author's analysis

Agriculture is the main occupation of the district. Around 47 percent of the people are dependent on agriculture. The main crops in the region are sugarcane, wheat and paddy. Kharif, Rabi and Zaid are the principal crops of the district. A large part of the cultivated land is double cropped. Rice is the most important crop of the kharif season. Maize is also cultivated in this season. Other crops are jowar and bajra, which are sown in sandy alluvial belt. During the rabi season, wheat is the most important crop. Other crops like gram, barely, pea and

mustard are also grown. Around 75 percent of the people are dependent on agriculture for livelihood. Another 32 percent are involved in repairing and servicing. Wooden furniture also comes in as a source of income for the people living near the forest.

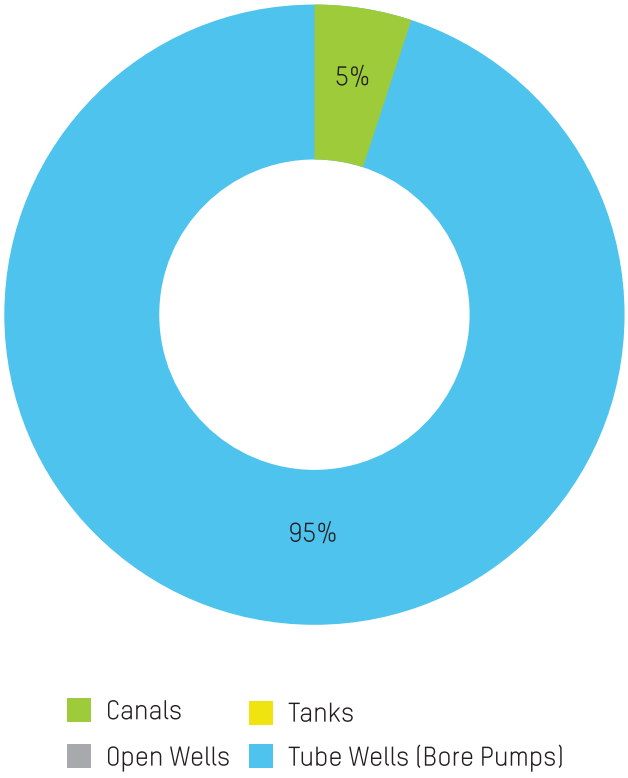
Underground water is the main source of irrigation in the area. 95 percent of the irrigation of the entire district is done through extracting ground water.

Table 3: Irrigated area for different crops in Lakhimpur Kheri

Major Field Crop cultivated	Area ('000 ha)							
	Kharif			Rabi				
	Irrigated	Rain fed	Total	Irrigated	Rain fed	Total	Summer	Total
Sugarcane	207.6	26.4	234	-	-	-	-	234
Wheat	0	0	0	182.7	10.4	193	0	193
Rice	166.3	16.9	183.2	0	0	0	2.2	185.4
Rapseed Mustard	0	0	0	18.5	10.9	29.4	-	29.4
Masoor	0	0	0	0.5	16.8	17.3	-	17.3
Maize	0.3	7.7	8	0	0	0	-	8.0

Source: Uttar Pradesh Agri Pardashi[5]

Figure 2: Sources of Irrigation



A report by Niti Ayog ranks Uttar Pradesh as the worst performing states for overexploiting underground water resources and takes the minimum action to restore it[6]. Irrigation in Lakhimpur Kheri region is mostly done through tube-wells, boring pumps, etc. Sugarcane is the highest irrigated crop cultivated followed by rice. Only a small portion of the sugarcane cultivated is rain-fed while the major portion is cultivated using ground water. Wheat is cultivated as rabi crop and is also majorly irrigated from ground water.

2.3 LAKHIMPUR KHERI DISTRICT GROUND WATER SCENARIO

The district is occupied by Ganga alluvial soil which primarily consists of coarse sand, gravel, clay and kankars. The granular zone with different grades of sand and gravel forms the multi-layer aquifer. Shallow aquifers are generally of unconfined nature whereas the deeper aquifers are of confined nature. In general, the depth of the water level in the area varies from 2.95 to 9.66 mbgl during pre-monsoon and 1.48 to 7.26 mbgl during the post-monsoon season.[7] The depth of Sharda and Ghagra rivers generally varies between 3 and 5

[5] http://upagripardarshi.gov.in/MediaGallery/UP67-Lakhimpur%20Kheri.pdf

[6] https://niti.gov.in/sites/default/files/2019-08/CWMI-2.0-latest.pdf

[7] http://cgwb.gov.in/District_Profile/UP/Lakhimpur-kheri.pdf

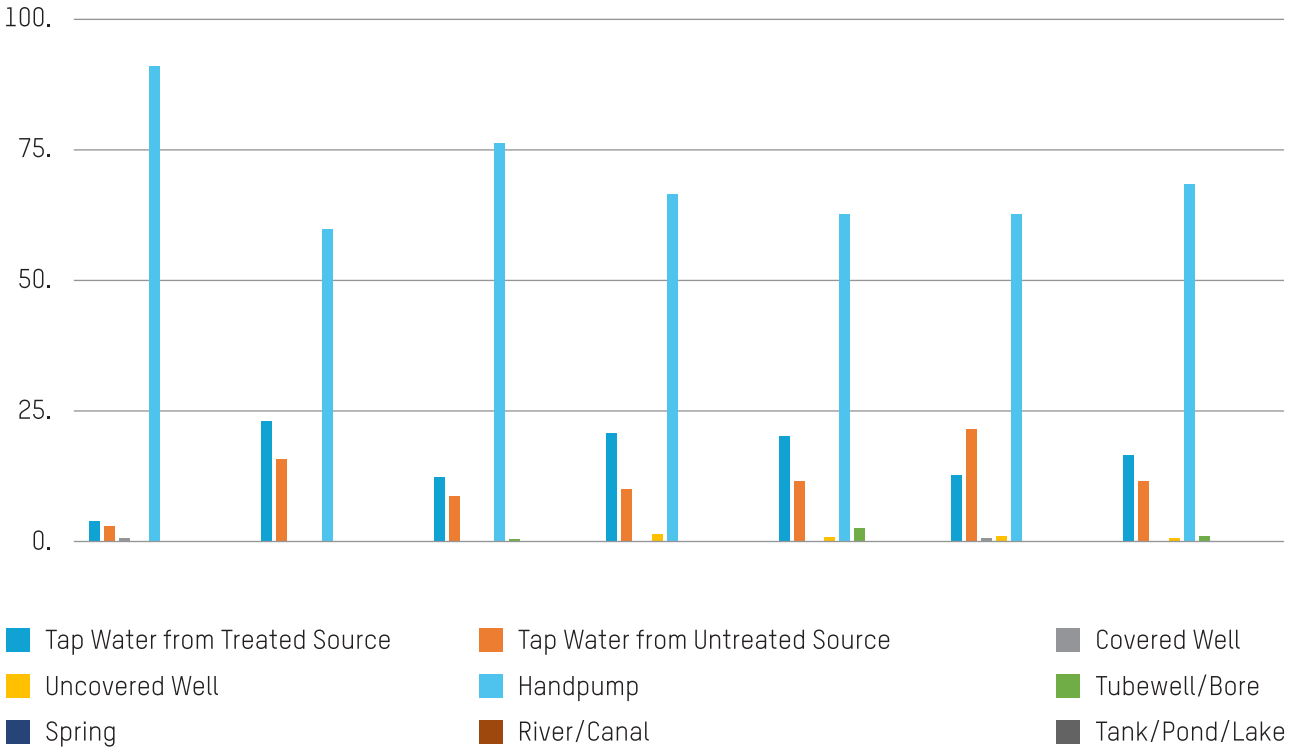
mbgl during pre-monsoon and between 2 and 3 mbgl in the post-monsoon season.

Ground water of the district varies in different blocks. The Niti Ayog report on quality of groundwater ranks Uttar Pradesh as one of the worst performing states with 70 percent of the fresh water contaminated[8]. The ground water of Palia Kalan and Nighasan block contains arsenic which are above the level of BIS acceptable limit. The water of Palia Kalan is also high in chromium content above the stipulated permitted limit. Chromium concentration was 450.26 µg/l in 2016 whereas the acceptable concentration was 50 µg/l. The other metals that exceed the permissible limit in Palia Kalan are Cadmium, Nickel and Iron[9].

High level of arsenic leads to poisoning known as Arsenicosis and is highly toxic. Long exposure to arsenic causes skin cancer, cancers in bladder and vessels, pigmentation and colour changes, reproductive disorder and other harmful diseases. A case in the NGT was lodged regarding high arsenic content in some districts of Uttar Pradesh. The investigating team found deaths and disease caused due to the problem[10]. Around 165 villages in Lakhimpur Kheri district where shallow ground water is found contains arsenic in excess of permissible limit of 0.05 mg/l prescribed for portable water from Bureau of Indian Standards. The CGWB stated that due to the exposure to arsenic content, people can either use treated water for drinking or install in-house water treatment systems for arsenic removal.

A large section of the population in the district is dependent on handpump for drinking water. These are either private handpumps located inside the premises, or public/shared handpumps constructed by the government. The other two main sources of drinking water are both treated and untreated tap water.

Figure 3: Sources of Drinking water in Lakhimpur Kheri



Source: Census 2011

[8] https://www.oxfamindia.org/blog/environmental-cost-sugar

[9] http://cwc.gov.in/sites/default/files/status-trace-toxic-metals-indian-rivers-2019-2.pdf

[10] https://jalshakti-ddws.gov.in/sites/default/files/Ltr_75_Court_Cases_All_State.pdf

2.4 SUGAR PRODUCTION PROCESS

Sugar is produced from two different raw materials: sugarcane and beet. In the tropical and semi tropical region, sugar is mostly produced from sugarcane whereas in the temperate region sugar beet is the primary raw material. In India, sugar is primarily produced from sugarcane. Sugarcane produced in India is a 10–12-month crop planted during January to March.

Sugarcane is brought to the factory where the juice is extracted in the milling plant. The juice is clarified after adding milk of lime and filtered to remove mud. Cane processing purchase ready-made burnt limestone powder and uses it to generate milk of lime. After clarification the thin juice has approximately 15 percent sugar content in it. Concentrations over 68 percent are required for sugar crystallization and this is achieved through evaporation. Water is removed from the juice in a series of evaporating vessels until syrup with a dry matter content of 68-72 percent of solution is obtained. This thick juice is further evaporated until sugar crystals are formed and the crystals and the accompanying syrup are then centrifuged to separate the two components. The final syrup collected containing 50 percent of the sugar, is molasses.

Molasses

Molasses is the most important by-product of the sugar production. Molasses are used in the cattle feeding or as a raw material for the fermentation industry. Final molasses are produced in the last operational stage of separating sugar from the mother liquor in centrifuges. Generally, the average production of molasses is 4.2 percent of the cane crushed. However, large fluctuations do exist. Molasses contains high pollution characteristics and these are generated in large volumes. Sugar factories combine with distillation plants and produce alcohol/ethanol. This ethanol is further used in the industry or blended with gasoline. It has been estimated that the sugar mills generate more than the quantity required in all the distilleries in the country. Certain percentage of the generated molasses is used to produce alcohol, which is insignificant compared to the amount of molasses surplus, which has no consumer. This surplus is then dumped into land and water courses at the end of the season[11].

Since molasses has a strong element of pollution, CPCB has certain guidelines and permissible limit to produce and release. However, many industries still follow the practice of storing molasses in unlimited pits locally known as kutcha pits. During rainy season and without proper storing mechanism followed, molasses gets diluted with water and becomes unsuitable for fermentation. Diluted molasses contains a BOD concentration of varying between 50000 and 80000 mg/l causing heavy pollution if not disposed out properly by the factories.

Table 4: below shows that pollution can be created from the potential of molasses

Parameters	Molasses	Admissible Effluent standards for Inland waterbodies	Admissible Effluent standards on land for irrigation
pH	3.5-4.1	5.5-8.5	5.5-9.0
Colour	Dark Brown	Colorless	-
Total Dissolved Solids (mg/l)	200000 – 3200000	2100	-
BOD (mg/l)	440000	30	100
COD (mg/l)	960000	250	-
Chlorides (mg/l)	32000	600	-
Sulphites (mg/l)	15000	1000	-
DO (mg/l)	Nil	5	-
Final wastage discharge		100lit/Tonne crushed	-

Source: CPCB [12]

[11] http://www.ijcrt.org/papers/IJCRTICGT017.pdf

[12] https://cpcb.nic.in/displaypdf.php?id=SW5kdXN0cnktU3BlY2lmaWMtU3RhbmRhcmRzL0VmZmx1ZW50L1N1Z2FyLnBkZg==

Ethanol

Ethanol is produced as an important by-product of sugar production. Ethanol is produced through the fermentation of molasses. It generates oxygen when combined with petrol and helps cutting the emission of harmful gasses. It also improves the engines efficiency by using less fuel.

Cogeneration

After the sugarcane crushing process, bagasse is the residue left, which is used to generate steam. This is used as a biofuel in co-generation power plant to meet power requirement of the sugar mill. The surplus power is supplied to the grid. One tonne of sugar can produce approximately 300 kg of bagasse which can be used to convert around 130 KWh of power. The power generated by an integrated sugar mill is partially captively consumed and the remaining is exported. Indian sugar industry has the potential to export 7500 MW power and total installed cogeneration capacity in all sugar mills is approximately 4200 MW of which the sugar mills are exporting around 3200 MW.

Distillery

Sugar factories are usually associated with a distillery to make the best use of the by-product. The distillery ferments the molasses and produces ethanol with 95 percent purity. Ethanol is used in industries and is further blended with gasoline. Waste from the ethanol is called vinasse. Anaerobic digestion of this is used to produce biogas, which is used for the production of boiler fuel for the distillery and the remaining are sent to the agricultural field or used in the composting of organic solids.

2.5 WASTE WATER GENERATED

2.5.1 Water usage

Sugar industries discharge their effluents containing high organic contents measured in terms of bio-chemical oxygen demand and other toxic constituents of different metals, organic and inorganic compound. Sugar mills consume large volumes of water in the process of manufacturing and also generate huge quantities of waste water throughout the process. It is estimated that raw water consumption is about 1500/2000 Lit/TCD (tonnes crushed per day) and waste water generation is about 1000 lit/TCD. The waste water generated includes water from the splashes to extract maximum amount of juice and to cool the roller bearings. According to CREP, industry should reduce waste water generation to 100 lt/TCD[13] and also should practice zero discharge to the inland surface body. Sugar industries generate ten times more than the CREP guidelines. There are two types of waste water generated: cold water and hot condense water. The cold water is used for cooling various accessories such as engines, crystallizers, cold maceration, juice dilution, lime preparation, laboratory testing and factory equipment cleaning. The hot water is used for lime and sulphate preparation, oliver wash, molasses conditioning, magma making, etc. A large volume of water is also required in the barometric condensers of the multiple effect evaporators and vacuum pans. This water gets polluted as it collects some organic substances from the vapour of boiling syrup in evaporators and vacuum pans.

2.5.2 Water conservation

Water conservation is the most important practice that sugar industries should follow. Situating near the river gives the access to plenty of flowing water that gets replaced every day. As a result, the total waste water generated by these industries is difficult to estimate and most of the time is underestimated. This not only hampers the aquatic lives but also flows through the agricultural fields and affects the crops adversely.

2.5.3 Waste water generation

Waste water generated from sugar processing has high content of organic material and high biochemical oxygen demand (BOD) due to the presence of sugars and organic materials arriving with the cane. Waste water are generated mainly from cleaning operation such as washing of mill house floor, various other division of boiling houses such as evaporators, clarifiers, vacuum pans, etc. The water from the spray pond overflows and it becomes a part of waste water. This contains low BOD if properly maintained. However, with poor maintenance and bad operating conditions, a substantial amount of sugar enters into the condense water. This polluted water is discarded in most of the cases instead of being recirculated and this significantly increases the waste volume. Additional waste originates from the

[13] http://www.cpcbenvis.nic.in/cpcb_newsletter/AGRO.pdf

leakage and spillover of juice, syrup, molasses in different parts and periodical washing of floor adds to huge quantity of pollution. These wastes contain high concentration of BOD. Again, flow off from boilers also adds to the waste discharge which are high in suspended solids but low in BOD.

Table 5: Average Water consumption of Sugar industries

Particulars		<2500 (Small)	2500-5000 (Medium)	5000-7500 (Large)	Suggested norms irrespective of capacity
		Average	Average	Average	
Water Requirement	Process	268	263	250	50
	Cooling	147	161	130	50
	Domestic (m^3/day)	109	193	250	100
Raw Material consumption (kg/quintal of sugar produced)	Bagasse	314	276	233	250
	Lubricant	0.116	0.123	0.105	0.050
	Lime	1.60	1.50	0.90	1.000
	Sulphur	0.460	0.430	0.40	0.350
	Caustic soda	0.053	0.027	0.024	0.015
	Coagulants	0.0059	0.0095	0.0048	0.10
	HCL	0.08	0.18	0.10	
	O.P Acid	0.073	0.20	0.090	0.050
Bye products kg tonne of cane crushed	Bagasse	313.46	291.22	300	260-300
	Molasse	43.58	41.00	40.00	38-42
	Press Mud	33.00	35.12	38.00	35-40
Effluent generated	(Lit/TCD)	230	250	233	100

Source: TGM for sugar industry

2.6 EFFECT OF EFFLUENTS ON WATER BODIES

The effluents discharged from the sugar mills get decomposed if those do not come in contact with water. However, with improper discharge mechanism, the effluents get access to water course, particularly the perennial and non-perennial rivers. Rapid depletion of oxygen with anaerobic stabilization of the waste contaminates the water, changing the colour and odour. Farmers have been using these effluents for irrigation and found that the growth, yield and soil quality has deteriorated. Different harmful contaminants such as chloride, sulphate, phosphate, and magnesium are discharged with the effluents, which are injurious to plants, animals and human beings. In addition, sugar industry possesses serious health hazard to the rural and semi urban population living along the streams and river and use the water for various domestic usage.

Sugarcane production requires an average of 20 mega litres of water per hectare. Presently 80 percent of this water requirement is being met through groundwater extraction. Though UP is a water abundant state, however, due to excess usage and not proper effluent treatment that are discharged are contaminating water to a large extent. According to the Central Groundwater Board (CGWB), the state's demand for groundwater has almost doubled in recent years. The Uttar Pradesh State water policy envisions that by 2025 groundwater use will increase by 137 percent (from 27 billion cubic meters (BCM) to 65 BCM)[14].

2.7 WATER POLLUTION REGULATIONS IN INDIA

With the high level of pollution, the concern on environmental hazard and huge pressure on ecosystem called for taking strong measure to prevent it. The first few significant laws regarding the protection of environmental resources appeared in the 1970s with ***National Committee on Environmental Planning and Coordination and the Enactment of the Wildlife***

[14] https://cdn.cseindia.org/userfiles/extended_version.pdf

Protection Act 1972. Since then, three important texts have been passed: ***The Water (Prevention and Control of Pollution Act, 1974, The Water and Control of Pollution Cess Act, 1977***, and the ***Environment Protection Act 1986. The Water Act 1974*** was established by the Pollution Control Board at the centre and state levels; it lays down the regulations that prohibits the pollution of water bodies and required consent of the potential polluting activities by the industries. The Water Cess Act on the other hand provided the Pollution Control Board with a funding tool, to enable them to charge for the water usage designed in a manner to provide financial support for the board's activities.

There has been an increase of 136 percent in the number of gross polluting industries and around 84 percent are located in major four states-Uttar Pradesh (1079), Haryana (638), Andhra Pradesh (193) and Gujarat (178). These gross polluting industries discharge more than 1,00,000 litres of water containing hazardous chemicals, into the river. Close to 11 percent of the industries continue to operate by flouting the pollution control standards. Half of the total gross polluting industries are from Uttar Pradesh and are responsible for polluting the Ganga[15]. Around 18 percent of the highly polluting industries that were required to install online continuous emission monitoring system (CEMS) did not comply. In 2014, CPCB directed the state governments to ensure that CEMS are installed in the highly polluting industries. In 2019, a total of 4245 industries were identified as highly polluting industries[16].

There are 764 industries in the main stem of Ganga out of which 687 industrial units are in Uttar Pradesh. These industries together discharge around 269 MLD wastewater. Among these, around 56 are sugar industries and at 85.7 MLD, discharge the highest volume of waste water. A total of 956 grossly polluting industries in Uttar Pradesh were issued notice from UPPCB for releasing effluent in Ganga basin[17].

The CPCB and SPCB have been continuously pursuing the polluting industries to install effluent treatment plan, which would help measure the amount of untreated effluent discharge of the industries. The main directions that these industries should comply are:

- To ensure that operation of ETP is started at least one month before the commencement of the upcoming crushing season, and operate even after completion of the crushing season so that any effluent generated during washing and maintenance is discharged after proper treatment so that the treated effluent meets the standard permissible limits.
- The units are not permitted to start functioning in the next crushing season until the unit upgrades or modifies or take the necessary measure and produce documentary evidence and assure the operation of the ETP as per the prescribed effluent quality norms.
- The units should keep and upgrade the log book of ETP, energy meter system and establish as environmental laboratory to analyse minimum parameters.
- The unit should implement all the necessary measures to minimise and reduce the waste water generation to 100 litres per tonne cane crushed and time bound action plan for zero liquid discharge (ZLD) option.
- The unit needs to obtain consent under Water Act and Air Act from State Board and adhere to all the stipulated conditions before commencement of operations in the next season.
- The records on water consumption, waste water generation, and operation and maintenance of ETP should be maintained.
- The unit needs to inform regarding the steps to be taken on rain water management system.

[15] https://www.downtoearth.org.in/news/pollution/grossly-polluting-industries-more-than-doubled-in-8-years-soe-in-figures-64962#:~:text=GPIs%20are%20industries%20that%20discharge,chemical%20units%2C%20slaughterhouses%2C%20etc.

[16] https://thewire.in/environment/polluting-industries-emissions-standards

[17] https://www.downtoearth.org.in/news/ganga-pollution-uttar-pradesh-issues-notices-to-956-industries-44278

Table 6: Water Consumption and waste water generation in Uttar Pradesh

Category of Industry	Number of Industry	Water Consumption (KLD)	Waste-water Generation (KLD)
Chemical	20	113.0	29.6
Distillery	27	69.2	33.0
Food, Dairy & Beverage	15	6.3	3.8
Others	35	90.7	18.1
Pulp & Paper	33	96.3	68.1
Sugar	56	278.4	85.7
Textile, Bleaching & Dyeing	59	11.4	9.0
Tannery	442	27.4	21.6
Total	**687**	**693**	**269**

Source: Status of Grossly Polluting Industries[18]

Among the 17 GPI in India, both sugar and distillery industries are in the red category for generating high pollution. It's mandatory for all the industries to have an Effluent Treatment Plant to continue their operations. All sugar mills and distilleries are to install online monitoring platform which record the effluent treatment and discharge by the mills. An assessment of the water consumption and waste water generation by the grossly polluting industries undertaken by National Mission for Clean Ganga, Ministry of Water Resources, River Development and Ganga Rejuvenation, GoI, showed that 32 percent of waste water discharge are by sugar mills followed by 12 percent from distilleries. Maintaining all environmental standards is a requirement for all the sugar mills and distilleries where they have to acquire an Environmental Clearance Certificate based on a thorough third party led Environmental Impact Assessment of the unit.

The Hon'ble NGT judgement in 2017 in the matter of MC Mehta Vs Union of India "mandated that no industries big or small can be permitted to pollute the groundwater, drains, water bodies and environment and in all events the discharge of effluents from the unit has to be strictly in compliance with the prescribed standards. The units shall be liable to be closed and shutdown with immediate effect, in case it is found defaulting".

The Hon'ble Supreme Court of India in WP (375 of 2012) passed a judgement dated 22.02.2017, *saying that "the concerned SPCBs are mandated to carry out inspections, to verify, whether or not, each industrial unit regarding 'consent to operate,' has a functional primary effluent treatment plant. Such of the industrial units, which have not been able to make their primary effluent treatment plant fully operational, within the notice period, shall be restrained from any further industrial activity. This direction gave agency, to disconnect the electricity connection of the defaulting industry. We therefore hereby further direct, that in case the concerned SPCBs make a recommendation to the concerned electrical supply and distribution agency/company, to disconnect electrical supply to an industry, for the reason that its primary effluent treatment plant is not functional, it shall honour such recommendation and shall disconnect the electricity supply to such defaulting industrial concern".*

In 2017, four sugar mills were imposed a fine of INR 25 lakh in Uttar Pradesh by NGT for causing damage to the environment. The mills contaminated ground water and released effluents causing death of animals and birds. The tribunal found that the mills never sought permission from CGWA to extract water, discharge effluents and gases[19].

[18] https://nmcg.nic.in/pdf/pollution%20assessment.pdf

[19] http://sustainabilityoutlook.in/news/fine-slapped-4-uttar-pradesh-sugar-mills-damaging-environment-759104

2.8 WHY MONITORING IS NECESSARY?

Monitoring is required to carry out by regulatory authorities to have an assurance that the company has been carrying its environmental responsibilities satisfactorily. The monitoring system helps to identify and document the compliance status. It increases environmental effectiveness through improved compliance record, reduced occupational hazards, and timely corrective actions for faulty operating equipment/instrument systems. It is not only a regulatory requirement, but also authorizes the company to publish the Environmental Management Plan (EMP) timely. Environmental Management Plan is the overall framework of specific responsibilities of the company to develop, install and monitor environment related plans for the company. EMP also involves planning, organizing, guiding, directing, communicating and finally controlling and reviewing to achieve the goals for which this management system is devised.

The company also needs to have an internal Environmental Audit showing the results, comparing performances, diagnosing problems, taking corrective actions based on the feedback and finally improving the system. The Government of India has notified the requirement for carrying out Environmental Audit for all the operating industries vide their Gazette Notification No 120 dated March 13, 1992. This is an amendment under the Environment Protection Act 1986 to help the industry in formulating the requisite information regarding its raw material usage, product profile, production in process, waste discharge, pollution control system etc. in a prescribed performa enclosed within the notification. The performa is prepared primarily to cover only the regulatory compliance requirements on the basis of data reported and presented by the industry. The environment statements to be submitted in the form of parts are:

Part A: the name and address of the owner and the date of the last environmental audit report submitted

Part B: the consumption of waste and raw materials. Water consumption is to be provided separately for process, cooling and domestic uses (in m^3/unit) and also in term of water consumption/unit of product for the various products.

Part C: relates to the quantities of hazardous wastes generated separately from the process and from pollution control facilities.

Part D: deals with the quantities of solid waste generated from the process as well as pollution control facilities

Part E: deals with the quantities of solid wastes generated from the process as well as pollution control facilities and seeks to know also about the quantities recycles or reutilised.

Part F: seeks information regarding characteristics (in terms of concentration and quantum) of hazardous and solid wastes and about the practices adopted for the disposal of both these categories of wastes.

Part G: calls for information on the impact of pollution measures on the conservation of natural resources and consequently on the cost of production.

Part H: to indicate its future proposal for investigation in environment protection, including abatement of pollution.

Part I: any other information in respect to environmental protection and abatement of pollution may be given.

2.9 DISCLOSURES OF BAJAJ HINDUSTAN SUGAR MILL

Bajaj Hindustan Sugar Mill (BHSL) is one of the largest sugar mills in Uttar Pradesh accounting for around 15 percent of total sugar production in Uttar Pradesh and 5 percent of total production in the entire country. BHSL has 14 sugar plants with an aggregate crushing capacity of 136000 TCD, 6 distilleries with average capacity of 800 KL/day and about 151 MW of surplus power[20]. These mills are spread throughout the state of UP with five in Western UP, 5 in Central UP and 4 in Eastern UP. Three types of products namely sugar, industrial alcohol and power (bagasse-based) are produced. The sugarcane is bought from the farmers in the commanding area and is paid the market rate. Every year the sugar mills conduct a survey on the varieties of sugarcane available and being cultivated, and depending on that provide a 180 days' time period to the farmers based on the maturity and recovery expected from the varieties. After receiving the ticket, farmers harvest the cane and transport it either by

[20] Annual Report, 2018-19

bullock carts or tractor trollies to the mill centre of the respective villages. This cane is then transported in trucks to the mills.

Bajaj Hindustan Sugar Ltd. claim to recycle by-product at 4.5 to 5 percent of cane crushed. All the by-products namely molasses, bagasse, fly ash and press mud are kept within 10 percent of cane crushed. The company claims to use the best technology available.

Disclosures claimed by the company:

- Zero Liquid Discharge as per CPCB/NGT
- Cooling tower installed on Under Ground Reservoir (UGR) to cool excess condensate water as was made conditional and operational under zero water discharge programme
- Grease is used at mills as lubricant which reduce the consumption of lubricants and same time pollution load on ETP also reduces
- Sulphur furnace live steam drain collected and reused
- Exhaust steam are used during soda boiling in evaporator, condensate going to drain are collected and reused
- Various hot water and cold-water consumption points flow meter are provided to control effluent and power
- Installation of 04 nos. vertical type cooler to improve efficiency and reduce leakages
- Construction of hazardous tank holding cap to collect the acidic and alkaline waste water to avoid direct flow into ETP
- Installation of Sewage Treatment plant in plant colony area
- Installation of better effluent collection pit and pumps
- Installation of 02 nos. Rain Water Harvesting system in plant area
- Arrangements are made to use the pan-boiled sweet water into sugar meter to save the steam
- Arrangements are made to collect the condensed water of exhaust steam lines header at various places in plant
- Arrangements are made to collect rain water during off season in injection/spray channel and used for trial and testing of plant
- Modification of cooling water pipe for different equipment to collect in UGR through gravity
- 100 percent circulation of cooling water to reduce the use of ground water and borewell running water
- Arrangements are made for the reuse of surplus hot water in place of fresh water during chemical boiling etc
- Drains of exhaust and live steam collected in vessel and sent to broiler as feed water

With the above installation, improvements claimed by the company are:

- Efficiency of Juice Sulphitor improved and pH levels are maintained
- Wastage of hot and cold water are controlled and consumptions are optimised
- Efficiency of ETP improved
- Treated sewage water is now being used in the horticulture which helps to meet the ZLD norms
- Effluent generation gets controlled to meet CPCB norms
- Steam consumption optimised by re-using the boiled sweet water in place of fresh water
- Wastage of hot water are prevented and gets collected, which is being used at various places to save steam consumption
- Reduced usage of ground water and reduced effluent generation

In the year 2017-18, the company claimed to have achieved:

- zero effluent discharge
- reduction of oil consumption and wastage
- use of grease at mills as lubricants which reduces the consumption of lubricant, and pollution load on ETP also reduces
- minimised usage of ground water
- reduction in the usage of ground water and also reduction in the generation of effluents

Table 7: Discharge of BHSL

		2017-2018		2018-2019
WATER CONSUMPTION TREND	Process	1170m^3/day		1170m^3/day
	Cooling	1430 m^3/day		1430 m^3/day
	Domestic	200 m^3/day		250 m^3/day
	Water Consumption/ tonnes of sugar	6.5m^3		2.41m^3
	Pollutant	Quantity of pollutants discharged	Concentration of Pollutants discharged	
POLLUTION DISCHARGED TO ENVIRONMENT/UNIT OF OUTPUT	BOD	28kg/day	28.0mg/l	20.2kg/day
	COD	135kg/day	135mg/l	165kg/day
	TSS	28kg/day	28mg/l	25kg/day
SOLID WASTE PRODUCTION AND UTILISATION	Press mud	58368.5T		51657.6 T
	Bagasse	434042		405901.0 T
	Boiler Ash	3906.3T		3422 T
	Molasses	74766.0T		61615.6 T
	Sludge from ETP	100.2T		131.2 T
	Oil & Grease	14.2T		10.2T

Source: Annual report, 2018-19

Additional Investment Proposal for Environment Protection:

- Segregation and separation disposal of unpolluted spray pond over flow, thus bringing down considerably the quantity of effluent following into the ETP
- Installation of V-Notch for effluent control
- Modification in the system of flow in the ETP
- Feeding of cow dung slurry and lime in adequate quantities was done in the aerobic lagoon
- Effluent discharge per day is 1000 KLPD at 100% capacity utilisation in which approximately 750 KLPD treated effluent are being recycled & approximately 250 KLPD are being used in agriculture purpose
- As a result of above-mentioned modifications, the BOD has been brought down to 24.0 mg/l & SS 20.0 mg/l

Bajaj Hindustan Sugar Ltd in its annual reports and the published documents, available in the public domain, show that types of waste generated by the industry has remained under permissible limit. It also maintained all the rules pertaining to the CPCB, CREP and SPCB have been followed. It has claimed that the ETP has improved and there is zero liquid discharge. However, the published documents do not have data on their compliance on Environment Impact Assessment, and how they deal with the waste discharged in the water bodies. In 2019, a show cause notice was issued in the name of Bajaj Hindustan Sugar Ltd., Lakhimpur Kheri district in Palia Kalan, stating that the company was not compliant with the CPCB norms and a distillery unit was temporarily shut down until further orders. According to NGT, an inspection was conducted on 24th May 2019, where the committee found that the distillery unit was not fully complying with the direction especially with the implementation of ZLD action plan and bio composting protocol. Hence NGT, imposed an environmental compensation fee of INR 58,20,000[21]. It further notified the prerequisite for installation of required system for achievement of specified volume reduction and for providing ETP for treatment and reuse of condensate and management of effluent stream.

[21] http://www.indiaenvironmentportal.org.in/files/file/Bajaj-Sugar-pollution-Lakhimpur-Kheri-NGT-order.pdf

In the notice on August 2020[22] to the district magistrate of Lakhimpur, CPCB notified that the distillery section of the Bajaj Hindustan Sugar Mill had not been compliant with the norms of SPCB on the standards for discharge of environmental pollutants for industries and common effluent treatment plants (CETPs).

It is a matter of high concern that despite the disclosure of the company which claimed to be within limits and following the norms of respective regulatory authorities, the NGT investigation team found otherwise. It becomes extremely necessary for the regulatory authorities to go for frequent checks and balances for the company to disclose rightly on the environment concerns. The mills though claimed to have installed in high technologies on environment concern have no disclosures on financial statements on the expenditures on the upgradation of technologies and advancement. There are no disclosures as to whether the ETP are being used one month before the crushing season and are kept running after the crushing season ends. No disclosures are provided on the commencement of water replenishment of the industries. No disclosures on sampling of different test on waste water analysis before or after treatment in ETP. No disclosures on ground water analysis.

2.10 DISCLOSURES OF GOBIND SUGAR MILLS LTD.

Gobind Sugar Mills Ltd. published its environmental statement and environmental audit for the last two years. Environmental Audit can be defined as a management tool comprising a systematic documented, periodic and objective evaluation of how well organization, management systems and equipment are performing with the aim of a) facilitating management control on environment control on environmental practices, b) assessing compliance with company policies, including meeting regulatory requirements. Environmental audit therefore has two basic components: i) Management audit on environmental philosophy of the organization, ii) Technical audit of the plant, equipment, facilities and operating practices compliance.

Table 8: Waste water Pollutant Discharged

Pollutant	Quantity of pollutants discharged (Mass/Day)	Concentration pollutant in Discharge (Mass/volume)	Percentage of variation from prescribed standard with reasons
BOD	20.2 kg/day	20.2 mg/l	Within the max limit of 30 mg/l
COD	165 kg/day	165 mg/l	Within the max limit of 250 mg/l
TSS	25 kg/day	25 mg/l	Within the max limit of 30 mg/l
Oil and Grease	1.20 kg/day	1.20 mg/l	Within the max limit of 10 mg/l
Water Consumption	Process		1170m^3/day
	Cooling		1430 m^3/day
	Domestic		250 m^3/day

Source: Annual report, Environmental Statement, 2019

Steps claimed to have been taken by the mill towards environmental protection and conservation of energy:

- Segregation and separation disposal of unpolluted spray pond over flow which can bring down the quantity of effluent.
- Installation of a flow meter for the effluent control
- Modification in the system of flow in the ETP
- Effluent discharge per day is 1000 KLPD at 100 percent capacity in which approx. 750 KLPD treated effluent are being recycled and approx. 250 KLPD are being used in agricultural process.

General observations

For both BHSL and GSML, there are no disclosures in public domain on:

- Water withdrawal by source type
- Average water intensity in the water stressed or water scarce areas

[22] https://cpcb.nic.in/openpdffile.php?id=UHVibGljYXRpb25GaWxlLzM4NTIfMTU5ODUyMzQxMl9tZWRpYXBob3RvMTAyODAucGRm

- Water discharge by destination type
- Water performance in the value chain
- Water-related regulatory compliance violations in the value chain
- Commitment to water stewardship and human rights to water
- High-level assessment of basin in which key value chain actors are located

2.11 DISCLOSURE OF KISAN SHAKARI CHINI MILL

Kisan Sahakari Chini Mill, a co-operative, does not have any disclosure of any sorts in the public domain.

SECTION 3: HOW COMMUNITY LIVES ARE AFFECTED BY THE INDUSTRIES

Sharda river is the main river that passes along Lakhimpur Kheri. Few rivulets flow from different villages and meets Sharda. The area is a marshy land with abundance of water. There are few sugar industries nearby and the largest one is Bajaj Sugar Mill in Palia Kalan. Other being Kisan Sahakari Chini Mills in Sampoorna Nagar and Govind Sugar Mill in Khamaria, Lakhimpur Kheri. There are many small and big sugar industries in the district. The effluents are discharged in the nearby 'nala' or narrow stream which is locally called 'sootea'. This stream flows within the villages and mostly remain filled with effluents discharged from the mills. During the monsoon season, the nala gets filled with water and spreads the chemicals which enters the cultivating fields and damages the crops. The effluents also spread in the other surface water and mixes with ground water which contaminates the drinking water as well. The tube-wells and bore wells are not deep enough in the households to pump out clean water.

In this study we have chosen Palia Kalan Block and conducted a telephonic survey of 23 community respondents from different villages to understand the important water and livelihood issues faced by them based on their lived experiences. With the given constraint of Covid 19 situation, physically conducting interviews was not possible and FGDs were also not possible in accordance with the social distancing norms. So, a telephonic survey was conducted taking ten villages. Samples were conducted from these villages with the help of our partner in Lucknow and Palia Kalan block. A total of 24 qualitative telephonic interviews were conducted.

KEY FINDINGS FROM THE SURVEY:

3.1. DRINKING WATER QUALITY

Access to clean drinking water is a struggle in the community. As already mentioned in the earlier section regarding the presence of heavy amount of arsenic and other metals in the water raises the concern regarding the access to clean and safe drinking water. Drinking water is mostly from private hand-pumps built by individual families. These hand-pumps are not deep enough to provide clean drinking water. There are hand-pumps built by the government, which provides better quality water. However, these hand-pumps either remain in a state of disrepair or are sparsely situated in the villages. The villagers for their daily need mostly cannot use the water from the government hand-pumps.

The water from the private hand-pumps is mostly at 25-40 feet depth. The water is not potable. According to the villagers, the water turns yellowish if kept overnight. This has a direct impact on the health of the villagers. According to the interviewees most of the people suffer from diseases such as diarrhoea, indigestion, jaundice, typhoid and other water borne disease. Continuous drinking of contaminated water has also developed stones in the stomach/gall bladder of many villagers. This has become very common in the recent few years. Some of the respondents also complained about the unclean water from the government taps. With no other option, boiling remains the only way out for them to drink water. Boiled water is given to kids. However, for the adults boiling water for daily needs becomes expensive and an extra burden for women, apart from completing other household chores.

According to one of the woman respondent,

"We collect the government tap water and sieve and drink it. The water from that too is contaminated. When it was installed, the water was clean. Now with time it has become contaminated because of the ground water. Sand comes out and if you use it too much, bad quality water comes out. There are 8-10 taps in total. These are located in the government school, cemetery, near our house etc. Initially the tap water was good, but now the quality is bad. Water is unclean. We have to boil, sieve and then give it to children to save them from diseases. If we just leave the water without boiling, a scum kind of layer forms on it."

Another women respondent said,

"Women's problems have increased. We have to boil water and give to children, have to wash clothes with hot water. Men just eat and leave for work. There are no toilets, young girls face risk, otherwise I have to accompany the girls to relieve themselves. If there were a toilet, then I would have saved 1 hour accompanying them."

Women in the villages are active regarding the water problem and joined "jal samiti" in the hope of getting some solution in their daily struggle to get clean drinking water. Together they went to BDO, Gram Pradhan and SDM but nothing was done. One of the women also said that they should go to the mills together and talk to the manager regarding the issue.

Some of the villages interviewed, have water tank installed which provide clean water through tap. According to the villagers the tank water is cleaner comparatively than the underground water extracted through hand-pumps. However, most of the villages do not have tanks installed and the people have to rely on hand-pumps.

3.2 SURFACE WATER QUALITY IN THE NEARBY WATER BODIES

According to the community people, surface water quality is deteriorating with time. Sharda river flows at a certain distance from the villages but there is at least one nala flowing from the village and meeting the river. All the effluents that come out of the industries are discharged in the nala which eventually meets river. The blackish water filled with chemicals releases odour and affects the aquatic life in it.

During rainy season the problem increase. The nala water level rises and enters the village and fields. With lack of proper drainage system in the villages, the dirty nala water stagnates in the village for days; insects and mosquitoes breed in it. In some villages, the nala crosses from within the village and there are no bridges built. So, the villagers have to cross the nala walking. Eruptions and irritation in the skin occurs with crossing the nala by foot. Mosquitoes and germs tend to breed in the nala and fever, dengue, malaria has become a common phenomenon for the last few years.

"There is just one sugar factory in our area. The factory runs for 6 months, the water that comes from this factory contains various chemicals. All the villages that lie from the east-west belt of this nalla get affected. This area becomes a breeding ground for germs and mosquitoes. 8-10 years back mosquitoes would be seen only seasonally in the rainy season for around 6 months. Mosquitoes are a year-long problem now. These mosquitoes are as big as house flies. If it rains too much then this toxic water floods the whole village. In case someone complains, not the small farmers but the bigger more influential farmers or politicians, that too, over a long period of time about a year or more, then the factory filters the water in 6-7 months and then the same things continue. They don't do it permanently".

Another respondent said,

"The Sharda river is far from here. From here Sutiya flows, there is a naala and that also flows into Sharda. The water is bad in the river. And the river that is near my village is also very unclean. If you take a look at how polluted it is, the insects in it, you will become shocked. This is how it stays all 12 months. It also has snakes and crocodiles, which eat up livestock. We have complained but nothing has happened."

Some of the villagers have also complained about killing of fish. This happens when the sugar mills release huge volume of black and contaminated effluents in the nearby water bodies. According to one of the respondents, the sugar mills release black water at night and in the morning a huge shoal of fish is found dead. The villagers even complained that the mills do not run their ETP and hence the water discharged is filled with chemicals causing harmful effect to the villagers. The river water does not remain black or contaminated throughout the year but only during the sugar-producing season when the mills run full-fledged.

"There are two major factories that is destroying the surface and ground water: Bajaj and Sampoornanagar sugar factories take ground water and after use they use a nalla to release the water straight into the rivers. There is an ETP plant in the factories but it's an eye wash. It is actually untreated, unfiltered water because if the ETP plant were working then the water would be clean. Every time we pass by the area of the factory, we see the black, dirty water coming out of the factory. It

smells so bad; you can't even go near it. Normally the water in the river is clean, it appears green. But when the factory releases the water, it turns black and starts stinking, causing the fish to die."

A respondent recalled his childhood when river water was clean and people used to bathe in the water and use the water for other purposes.

"Sharda river runs very close to our village. Earlier it was clean but now it's not. Earlier the river was clean, we used to bathe in it as children. Now it is very unclean. There is a govt factory called Sampoorna Nagar, the waste water that is black in colour from this factory, comes into the Sharda river. There is a huge problem of mosquitoes now in the village because of the dirty water. Earlier we would sleep under the open sky at night, now we just cannot do that. 10 years back, the water from the sugar mill in our area was not flowing into our village. So, we would consume the ground water and it would not turn yellow. But now because of the Bajaj Sugar Mill's effluents all villages in the radius of 20-25km from Palia have been affected. The ground water of all these villages is getting badly affected. The chemicals are seeping into the water. Our village is 12 km from the Bajaj Mill. The tank must be at 300ft and handpumps at 150ft, so the water now is okay. But if nothing is done about the waste water from the mill in the next 10 years, then the pollution will affect the ground water at deeper levels."

3.3 LIVELIHOOD

Agriculture is the main occupation in the area. The land is marshy and has alluvial soil, which is appropriate for sugar, wheat and paddy cultivation. Most of the people in the different villages are farmers. Those who do not possess land are manual labourers, either working in other people's fields or migrating to other states for work. They usually migrate to Haryana, Punjab and Delhi for work. Some work in the sugar mills. The sugar mills give employment to many youths in the villages.

There are three main types of crops cultivated: sugarcane, wheat and paddy. Sugarcane is primarily the main commercial crop whereas wheat and paddy are cultivated mostly for sustenance. These cultivated sugarcanes are bought by the sugar industries. The pricing of sugarcane is governed by the statutory provisions of the Sugarcane Order, 1966 that was issued under the Essential Commodities Act (ECA), 1955[23].

Sugarcane is a one-year crop. It is sowed in the month of January and harvested in the month of October. The harvesting is done on the basis of the date that the sugar industries provide. After harvesting the sugarcane is delivered to the mills by the farmers or to the village centres, if the mills are far. The sugarcane is to be harvested within 3 days of the prescribed date by the mills.

3.4 PROBLEMS FACED BY THE SUGARCANE FARMERS

Palia Kalan is a low land where only sugarcane, wheat and paddy are cultivated. Other crops are not suitable for this area. Every year flood occurs and damages the crops. Flood is a huge problem in these villages. During flood, the river water mixes with the nala blackish water and enters the village and fields. Nala water contains chemicals and other contaminated minerals that are harmful for the crops. Every year it damages a huge portion of the cultivated crops.

In the dry season, water level falls. There are no drip irrigation facilities. The farmers water the crops by extracting underground water through boring pumps. During the summer season the water level drops which is harmful for the sugarcane crop as sugarcane requires sufficient amount of water. During the rainy season when the monsoon is too much, the sugarcane gets damaged as the cane melts down.

Most of the sugarcane in Palia Kalan is sold to Bajaj Hindustan Sugar Mills. The farmers complain regarding payment delay. In the last few years, the farmers have not received payments on time, and these have been delayed for more than a year. In some case there is delay as long as three years. Villagers narrated incidents of when farmers demanded clearance of pending payments, the mill management negotiated to give them sugar instead of money. With no money, the farmers are bound to take loans to cultivate.

[23] https://docplayer.net/28710243-The-current-sugarcane-pricing-policy-its-critical-analysis-mr-tarun-sawhney-president-isma.html

"Sugarcane is grown once a year, but payments are made after 1 or 1.5 years. Mills complain of not receiving payments or facing losses. We only sell to Bajaj Sugar Mills. But there is no competition, and farmers do not have any option. If there were more mills there would be competition and payments would come on time. Right now, mills dictate farmers' lives. When payments are not received, farmers take loans to grow crops. When they are unable to pay, they migrate outside for other jobs. There is no drip irrigation system. We have and use our personal borings during dry season. During rainy season, low-lying areas get flooded and crops (cane, dhaan) get destroyed. The water from Saryu river (a tributary of Sharda river) affects the crops as much as the Sharda river, which comes from Nepal. Other rivers also come from Nepal such as Mohana. There is a kacha dam but when rains come, it breaks and the water floods our area," one of the respondents said.

3.5 CONTRIBUTION OF THE MILLS TO THE VILLAGES

The presence of the sugar mills had given livelihood to many in the villages. The mills buy majority of the sugarcane cultivated by the farmers. The rest is sold in the mandi (market place). Since the government fixes the price, the farmers do not face much loss on the price.

Some youths in the villages get employed in the mills but primarily as manual labourers. The mills employ people mostly from outside the villages. The wage rate paid by the mills are just half of what the labourers get outside. According to the respondents, the mill pays 120-150 rupees per day whereas people get around 300 rupees a day if they work outside. Hence, people often migrate to earn their livelihood. As part of their CSR activities, the sugar mills sometimes mend the roads but are mainly for easing their transport rather than the sole purpose for the villagers. Bajaj Hindustan Mill has built a school in a nearby village that imparts education to the kids free of cost. However, the mills have not taken any step regarding the water pollution problem in the area. The mills are the sole cause to the water contamination in the nearby villages and are supposed to take care of the problems faced by the community.

According to the community people, *"with the establishment of these sugar mills there has been no real support to the community. The mills buy the sugarcane and the other crops grown by the farmers are for personal use. We depend on the sugarcane for all our needs to earn money, conduct marriages, etc. If we need money, we have to sell what other crops we have in the house. Some youths of the village get employed in mills, but the mills are not so big that all can get employed, forcefully. And what help? If we take a loan, we have to repay it. If our crops get destroyed in rain or drought, we do not receive any support from the mills. It's not as though the mills offer any money if crops get destroyed. The biggest thing is that their work is going on, why would they help? Secondly, we live in a backward village/region/area. There is no scope for law to take its course here in this remote village. And because there is no fear of law, the mills continue with their actions."*

SECTION 4: CORPORATE WATER STEWARDSHIP

Corporate water disclosure is an important act of the companies to report water management related information to the stakeholders (investors, NGOs, communities, suppliers and employers). This helps to understand the efforts taken by the companies on sustainability and equitable management of water resources. However, some companies do not find it necessary or feasible to disclose all the information related to water management and in some cases, it might not be the most relevant topic of the companies to prioritize and disclose information[24]. The disclosures help to understand: a) the mills interaction to water, b) mills water challenges and opportunities, c) commitment and response to water related issues, and d) knowledge on hot spot basins where immediate action needs to be taken.

Access to clean water and improper waste disposal by the sugar mills has call for concern. The people of Palia Kalan block facing numerous challenges related to water will face cascading effects on generations to come. The contamination of the surface water and the unclean naala flowing from the midst of the village causing different health related problems need to be checked by the factories. It is the responsibilities of the factories to look after the water contamination issues and minimize to the extent possible.

The livelihood of the people is dependent on the sugar factories to a large extent. Most of the people are engaged in agriculture as their primary source of income. Sugar cane cultivation is the main crop cultivated and is bought mostly by the sugar factories. Other crops such as wheat and paddy are not much for commercial purpose. Hence, the main source of earning of most of the people is from sugarcane cultivation; the sugar mill factories being the main consumer.

On the other hand, the presence of the factories and the release of contaminated effluents have brought in water related problems to them. Water is the most essential element of life and it is the right of every individual to get access to clean water. Along with the surface water, the people of Palia Kalan district continue to struggle for years for clean drinking water. The presence of iron, arsenic and other harmful chemicals in the underground water stands as impediments for their right to clean and safe drinking water. The excess amount of chemicals released by the mills for years might have increased the harmful chemical content in the underground water causing health hazards.

With the efforts of the civil society and the checks from the government, the mills have started providing some information related to their permits and regulation on environmental issues such as Environmental Impact Assessment, Environmental Impact Management, annual reports quoting the figures on the amount of ground water extracted, running of ETP, online monitoring of the water used, how the factories are trying to minimize their water usage and the technologies adopted to minimize the water usage etc.

However, despite all the information provided and the reports being maintained according to the norms provided, when the NGT investigation committee visited the Bajaj Hindustan Sugar Mill, Palia Kalan, distillery unit, it found it to be non-compliant with the prescribed norms by the CPCB. Hence, the concern arises on the credibility of the figures quoted by the industries. This calls for frequent checks and monitoring by the regulatory authorities to come out with the actual facts within the premises of the closed walls of the industries. It is extremely important that the companies should come up with the actual figures and regular disclosures of the relevant facts to estimate the real threat to the environment.

4.1 RECOMMENDATIONS FOR EFFECTIVE WATER STEWARDSHIP

- The sugar mills need to acknowledge and respect the water rights of the communities living in Sharda basin. Strict restrictions on ground water extraction needs to be implemented by the government with frequent monitoring from the local authorities. Laws on ground water contamination should be enforced

[24] https://ceowatermandate.org/files/Disclosure2014ES.pdf

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with the help of community involvement. Recycling of the waste generated should be done on mandatory basis and ensure that water is treated before releasing in the river. Adoption of water recirculation systems and reuse the waste water. Treated waste water have many roles and can be used in agriculture or refilling the lakes and other water bodies, washing of floors, etc. Dry floor cleaning is also encouraged to reduce waste water generation.

- ETP needs to maintained with proper coordination between the process personals and ETP operators and Environmental Engineer. An improper ETP will lead to under achieving prescribed statutory norms by the authority. The ETPs should start commencing a month prior the start of crushing season. This would ensure the conditional requirement to take full effluent load in the ETP.

- Reuse of water is not practiced in shop-floor of the mill and boiling house in almost all the industries. Hence, proper water conservation and water management plan need to be adopted and implemented in the entire sugar mill to reuse the spilled, leaked, and overflowed water that would not only help in recovery of sugar but also avoid and reduce consumption of extra water.

- The percolation and leakage of untreated effluents also pollute the ground water and create environmental hazards. Suitable drainage system linking to the ETP can minimize such effluent flow.

- The sugar mills which are expanding their crushing capacity needs will increase the usage of groundwater extraction. This needs to be monitored and cross checked by the monitoring authority as the amount of increase in the water usage claimed by the company in the Environment Impact Assessment.

- Rainwater harvesting is an important step that each sugar factory should consider. Rain water is a precious source of water which is freely available and utilizing the source can be one of the ways to reduce ground water extraction. Sugar factories can collect rain water within the premises and in the vicinity and store it for utilization in the process.

- Ground water extraction is done on a large scale by the farmers too to irrigate sugarcane crop. Sugarcane is a water intensive crop and needs sufficient amount of water, which is mostly uplifted from underground. The farmers also use flood irrigation. However, excessive flood destroys the crop. The flood irrigation should be utilized by having proper drainage mechanism in the fields and store the excess water to be used later. This would minimize the groundwater extraction. Government needs to encourage technique for increasing usage of surface water rather than extraction from ground water.

- The factories can also make proper utilization of flood water and use it in different stages of production such as cleaning, cooling and condensing. With a channelized drainage system, flood water can be collected and stored in the tanks inside the sugar factories to be used when required. This can also minimize the groundwater extraction.

- Drip irrigation or sprinkle irrigation is another way to reduce ground water usage. In Palia Kalan, drip irrigation is not much prevalent. From the interviews with community people, it was found that there are provisions of drip irrigation and the subsidies have to be claimed by the farmers. However, it is not much used in the area because of the cumbersome process. Drip irrigation reduces water consumption as it minimizes the loss of water from evaporation and maximum utilization of water can be done.

- The villages do not have proper drainage system and hence during the rainy season the water stagnates in the villages. The rain water gets mixed up with the nala-contaminated water and spreads across the village. Proper drainage system needs to be built from the panchayat and the government to reduce such spread and hence, minimize health related issues.

- Environmental awareness in the community level can help educate regarding water scarcity and ways to tackle it. Though it seems that Palia Kalan is a water abundant marshy land, the water table has reduced with time.

- Setting up environment management committee to monitor regular activities and disclosures of the factories and conduct frequent checks. This monitoring committee should be at the local level with members varying from different stakeholders such as from UPPCB, NGT, Gram Pradhan, village representative from Jal Samities, Universities and NGOs.

- The compliance report is published at half-yearly interval. The frequency should be increased to monthly or at least, quarterly, which would be easier to monitor and accompanied by surprise visits by the monitoring committee. This can reduce the companies to report non-credible data.

Water is the most precious element of life. Right to clean water is a fundamental right of every human being. It is vital for improving health, welfare and productivity of all. Fast depletion of water is posing serious threats to mankind. It is high time that all stakeholders should come together and commit to bring in environmental sustainability and protect the livelihoods of the communities dependent on water. Water stewardship has the potential to improve the sense of responsibility of the corporate businesses to be accountable and respect the human right to water and sanitation.

BIBLIOGRAPHY

Advisory services, 'The Indian Sugar Industry Sector Roadmap 2017', KPMG available at http://www.in.kpmg.com/pdf/indian_sugar_industry.pdf

Basu, 2015 ' Ganga Pollution: Uttar Pradesh issues notices to 956 industries', available at https://www.downtoearth.org.in/news/ganga-pollution-uttar-pradesh-issues-notices-to-956-industries-44278

Court case OA No. 156 of 2015 (MA No. 474 of 2015) Mrs. Sunita Pandey Vs Union of India regarding availability of clean water in Balia and Other districts of Uttar Pradesh, available at https://jalshakti-ddws.gov.in/sites/default/files/Ltr_75_Court_Cases_All_State.pdf

Dwivedi R., (2019), 'Environmental cost of sugar' Oxfam India available at https://www.oxfamindia.org/blog/environmental-cost-sugar

Pandey K., (2019) 'Grossly polluting industries more than doubled in 8 years: SOE in Figures', Down to Earth, 6th June, available at https://www.downtoearth.org.in/news/pollution/grossly-polluting-industries-more-than-doubled-in-8-years-

Parivesh, A news letter from ENVIS Centre, Central Pollution Control Board (1994), available at http://www.cpcbenvis.nic.in/cpcb_newsletter/AGRO.pdf

Poddar, P.K., Sahu, O., (2015), 'Quality and Management of waste water in sugar industry', Appl Sci water, 7:461-468

Sen. S, (2018) 'Human Cost Of Sugar A farm-to-mill assessment of sugar supply chain in Uttar', Oxfam India Pradesh available at https://www.oxfamindia.org/sites/default/files/2018-11/HUMAN%20COST%20OF%20SUGAR-A%20FARM%20TO%20MILLS%20ASSESSSMENT%20OF%20THE%20SUGAR%20VALUE%20CHAIN%20IN%20U.P.%202_0.pdf

http://www.indiansugar.com/PDFS/scan0068__1_.pdf

https://dfpd.gov.in/sugar-sugarcane-policy.htm

Status of Trace and Toxic Metals in Indian Rivers, Ministry Of Jal Shakti http://cwc.gov.in/sites/default/files/status-trace-toxic-metals-indian-rivers-2019-2.pdf

Steinburg, 'Uttar Pradesh stands for Ground water', Centre for Science and Environment, available at https://cdn.cseindia.org/userfiles/extended_version.pdf

The Gazette of India, (2016), Ministry of Environment, Forest and Climate change Notification, available at https://cpcb.nic.in/displaypdf.php?id=SW5kdXN0cnktU3BlY2lmaWMtU3RhbmRhcmRzL0VmZmx1ZW50L1N1Z2FyLnBkZg==

https://www.downtoearth.org.in/news/pollution/grossly-polluting-industries-more-than-doubled-in-8-years-soe-in-figures-

18 % highly polluting Industries not complying with emission standards: Govt, February, 2020, available at https://thewire.in/environment/polluting-industries-emissions-standards

Status for Grossly Polluting Industries, National Mission for Clean Ganga, available at https://nmcg.nic.in/pdf/pollution%20assessment.pdf

Sawhney, 'The Critical Sugarcane pricing policy and its critical analysis, available at https://docplayer.net/28710243-The-current-sugarcane-pricing-policy-its-critical-analysis-mr-tarun-sawhney-president-isma.html

Reports

Annual Report, several years, Bajaj Hindustan Ltd.

Business Responsibility Policy, 2019, Bajaj Hindustan Ltd.

Annual Report, several years, Govind Sugar Mill Ltd.

Environmental Statement, several years, Govind Sugar Mill Ltd.

Consent under Section 25/26 of The Water (Prevention and control Pollution) Act, 1974

NOC for Groundwater Withdrawal to M/s Govind sugar Mill Ltd., Central Ground Water Authority, Ministry of Water Resources

Environment, Social, Health and Safety Policy, (2018), Govind Sugar Mill Ltd.

Regulatory Norms

Direction Under 18 (1) (b) of the Water (Prevention and Control Pollution) Act 1974, to ensure water conservation and water management from sugar manufacturing units.

Guidelines on Techno-economic feasibility of implementation of Zero Liquid discharge for Water Polluting Industries

Guidelines for Utiltisation of Treated Effluent for Irrigation

Technical EIA Guidance Manual for Sugar Industries, 2009, 2010

District Census Handbook, Kheri, 2011

AWS Standard 2. Guidance, 2019

Pandey, D.S., (2013), Ground water scenario of Lakhimpur Kheri District, UP

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Oxfam India, 412, NSIC New MDBP Building, 4th Floor,
Okhla Industrial Estate, New Delhi – 110020.
Phone: 011 4653 8000 | Website: www.oxfamindia.org

@OxfamIndia @OxfamIndia @Oxfam_India Oxfam India