BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI
ORIGINAL APPLICATION NO. 879 OF 2022

IN THE MATTER OF:
GAURI MAULEKHI **...APPLICANT**

VERSUS

UNION OF INDIA & ORS. **...RESPONDENTS**

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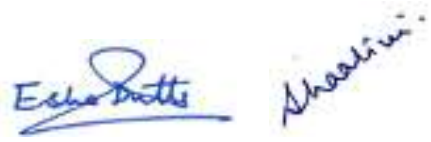
DELHI
DATED: 13.10.2025



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ADDITIONAL AFFIDAVIT ON BEHALF OF THE ORIGINAL APPLICANT.

I, Gauri Maulekhi, W/o Shri Dushyant Maulekhi, aged about 48 years, having office at Plot No. 26, D.D.A, Gulmohar Enclave, Opp. Gate No. 3, New Delhi – 110049, do hereby solemnly affirm and state as under:

1. I am the Original Applicant and I am conversant with the facts of the case and am competent to affirm the present additional affidavit.
2. I have read and understood the contents of the present affidavit which has been drafted upon my directions and the same are true and correct based on official records.
3. That the present Affidavit is being filed to place on record submissions regarding the following:-

   A. Criteria for bringing particular classes of industries, such as slaughterhouses, within the ambit of the Environmental Impact Assessment (EIA) regime.

   B. Position after interim Order dated 03.05.2023 i.e. Grant of Consent to Establish (CTEs) by various State Pollution Control Boards after interim Order dated 03.05.2023.

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A. CRITERIA FOR MANDATING EIA

4. It is submitted that the existing EIA framework under Notification S.O. 1533(E) dated 14.09.2006 (EIA Notification 2006) relies predominantly on quantitative thresholds such as project capacity, capital investment or production volume.

Illustrations:

a. **Production capacity** (e.g., "Cement plants ≥1 million tonnes/annum – Category A; <1 million – Category B; Chlor-alkali industry producing ≥300 tonnes/day production capacity if a unit is located outside notified industrial area/estate")

b. **Capital investment** (e.g., "Townships and Area Development Projects covering ≥50 ha or built-up area ≥1,50,000 sq m – Category B")

c. **Project area or length** (e.g., "Expansion of national highways ≥100 km involving right-of-way ≥40 m – Category A")

5. EIA notification 2006 does not explicitly account for **other environmentally and socially high-impact activities,** including slaughterhouses which fall under the 'Red category' having Pollution Index score of 90.3 and produce significant organic pollution, odour, and public-health hazards irrespective of size/output volume/project area/capital investment.

6. The Petitioner therefore places on record a scientifically informed, comparative and policy-grounded rationale for adopting qualitative, risk-based and location-sensitive screening criteria—drawing from internationally recognised models and from scientific studies of the Indian EIA system.

7. **Criteria set forth in the European Union Directives:** The *EU Environment Impact Assessment Directive [2011/92/EU] as amended by 2014/52/EU, hereinafter 'EU EIA Directive']* employs a **two-tier system**:

• **Annex I,** EU EIA Directive lists activities that require an EIA which includes poultry or pigs rearing industry; and

• **Annex II** lists other activities for which Member States must decide on a case-to-case or threshold basis—guided by **Annex III**

criteria concerning (i) project characteristics, (ii) environmental sensitivity of the location, and (iii) nature and reversibility of impacts. **Annex II** projects include slaughterhouses, intensive fish farming and livestock installations etc.

This model ensures that **small but high-risk industries**—including slaughterhouses located near sensitive or densely populated areas—are still subjected to mandatory pre-emptive environmental scrutiny.

8. Under **Article 4(2)** of the *EU EIA Directive*, Member States are empowered to determine, for the categories of projects listed in **Annex II** (which includes slaughterhouses), whether EIA should be carried out, **through a case-by-case examination** or **on the basis of thresholds or criteria established by the Member State**. However, such discretion is not unfettered and must be exercised in accordance with the criteria set out in **Annex III** and the objectives of the Directive.

9. **Annex III** sets out the core parameters to guide such screening as reproduced below:-

ANNEX III SELECTION CRITERIA REFERRED TO IN ARTICLE 4(3) (CRITERIA TO DETERMINE WHETHER THE PROJECTS LISTED IN ANNEX II SHOULD BE SUBJECT TO AN ENVIRONMENTAL IMPACT ASSESSMENT)

1. Characteristics of projects

The characteristics of projects must be considered, with particular regard to:

(a) the size and design of the whole project;

(b) cumulation with other existing and/or approved projects;

(c) the use of natural resources, in particular land, soil, water and biodiversity;

(d) the production of waste;

(e) pollution and nuisances;

(f) the risk of major accidents and/or disasters which are relevant to the project concerned, including those caused by climate change, in accordance with scientific knowledge;

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(g) the risks to human health (for example due to water contamination or air pollution).

2. Location of projects -

The environmental sensitivity of geographical areas likely to be affected by projects must be considered, with particular regard to:

(a) the existing and approved land use;

(b) the relative abundance, availability, quality and regenerative capacity of natural resources (including soil, land, water and biodiversity) in the area and its underground;

(c) the absorption capacity of the natural environment, paying particular attention to the following areas:

(i) wetlands, riparian areas, river mouths;

(ii) coastal zones and the marine environment;

(iii) mountain and forest areas;

(iv) nature reserves and parks;

(v) areas classified or protected under national legislation; Natura 2000 areas designated by Member States pursuant to Directive 92/43/EEC and Directive 2009/147/EC;

(vi) areas in which there has already been a failure to meet the environmental quality standards, laid down in Union legislation and relevant to the project, or in which it is considered that there is such a failure;

(vii) densely populated areas;

(viii) landscapes and sites of historical, cultural or archaeological significance.

3. Type and characteristics of the potential impact - The likely significant effects of projects on the environment must be considered in relation to criteria set out in points 1 and 2 of this Annex, with regard to the impact of the project on the factors specified in Article 3(1), taking into account:

(a) the magnitude and spatial extent of the impact (for example geographical area and size of the population likely to be affected);

(b) the nature of the impact;

(c) the transboundary nature of the impact;

(d) the intensity and complexity of the impact;

(e) the probability of the impact;

(f) the expected onset, duration, frequency and reversibility of the impact;

(g) the cumulation of the impact with the impact of other existing and/or approved projects;

(h) the possibility of effectively reducing the impact.

True copy of relevant extracts from the *EU Environment Impact Assessment Directive [2011/92/EU]* along with the amendment of 2014 *[2014/52/EU]* is annexed herewith as **Annexure No. 1 [Colly].**

10. The combined effect of **Article 4(2)** and **Annex III** is that even projects which are otherwise considered small in scale—must undergo a formal screening whenever their nature, location, or potential impacts suggest significant environmental consequences.

11. Accordingly, several Member States have, through this mechanism, subjected slaughterhouses to mandatory EIA where their siting or operations pose material pollution or community-health risks such as Germany, Spain and France.

12. The factors enumerated in Annex III—such as the characteristics of the project, its location, and the nature of potential impacts—correspond closely to the parameters required to be disclosed in Form I of the EIA Notification 2006, including project magnitude, site-specific environmental features, and anticipated environmental consequences. In essence, both adopt a multi-factoral approach aimed at ensuring that projects likely to have significant effects on the environment are subjected to a comprehensive impact assessment.

13. **Scientific studies on adopting qualitative risk based criteria:** Several academic studies have also underscored the importance of adopting a **hybrid framework**—one that combines both **quantitative thresholds** (such as production capacity or emission levels) and **qualitative risk-based criteria** (such as environmental sensitivity, pollution potential, and social impact)—for determining which industries should fall within the purview of EIA regime, some of which are as follows:-

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a. Within the Indian context, *Rajaram T. & A. Das, "Screening for EIA in India: Enhancing Effectiveness through Ecological Carrying Capacity Approach,"* published in *Journal of Environmental Management, 2011*, critically analysed the EIA Notification, 2006 and demonstrated that its capacity-based exclusions allow numerous high-polluting industries to evade appraisal. The authors proposed a **carrying-capacity-based and cumulative-impact-linked screening system**, aligning with the EU's case-by-case Annex III methodology. The Paper recommends that the list of projects within the purview of EIA Notification, 2006 needs to be expanded to include a number of projects clearly identified in Annex II of the EU EIA Directive. True copy of the research paper (Rajaram T. & A. Das, 2011) is annexed herewith as **Annexure No. 2.**

b. *U. Jha-Thakur & F. Khosravi, "Beyond 25 years of EIA in India: Retrospection and way forward"* published in *Environmental Impact Assessment Review 2021*, recommends that a broader range of projects which have significant environmental impact irrespective of their size, need to be included within the purview of EIA. True copy of the research paper (U. Jha-Thakur & F. Khosravi, 2021) is annexed herewith as **Annexure No. 3.**

c. In *Agustina Barilari, "Industries and Environmental Impact Assessment: Analysis of the Screening Process in Argentina,"* published in *Revista Internacional de Contaminación Ambiental, 2020*, the author examined EIA system and found that the **"complete screening model"**, integrating pollution load, risk of accidents, project dimensions, and location sensitivity, was the most reliable mechanism for determining EIA applicability in Argentina. True copy of the research paper (Barilari, 2020) is annexed herewith as **Annexure No. 4.**

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14. **Public health impact of slaughterhouses:** Further, scientific/ academic exercises carried out in areas located in close proximity with slaughterhouses, sheds light upon the severity of the health crisis that residents living in vicinity often face-

a. In *Abha Lakshmi Singh, Saleha Jamal, Shanawaz Ahmad Baba & Md. Manirul Islam, "Environmental and Health Impacts from Slaughter Houses Located on the City Outskirts: A Case Study"* published in *Journal of Environmental Protection'*, the authors examined the health of the residents living in close proximity with slaughterhouses located in the outskirts of Aligarh. The residents within 0 to 0.3 km reported various medical issues such as headache, general body ache, weakness, excessive coughing, shortness of breath and other respiratory symptoms. Further, discards, solid and liquid waste being dumped in an unsystematic manner in the open, leads to decomposing bodies become a breeding ground for a large number of disease vectors, resulting in water-borne diseases such as typhoid, malaria, paratyphoid, fever, diarrhea/dysentery, and air-borne diseases like asthma and also other diseases like cholera, hookworm and other intestinal infections etc. The Microbial tests conducted on water samples collected from the source of drinking water of the residents indicated towards the presence of disease carrying organisms which pose a significant health risk. True copy of the research paper (Abha Lakshmi Singh, Saleha Jamal, Shanawaz Ahmad Baba & Md. Manirul Islam, 2014) is annexed herewith as **Annexure No. 5.**

b. In another study, in *Shadab Ansari, Hadeel Majid Hussein, Saleh Hameed Ahmed, Yaser Saleem Siddiqui & Sohail Ayub "Impact of Slaughterhouse Waste on Adjoining Water Quality"* analysed the impact of water in areas near slaughterhouses and thereby how can the same impact human health. The study revealed various limbs via which public health can be impacted namely :

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(i) Waterborne diseases/ Bacterial Contamination- which happens due to consumption of contaminated water which can lead to Viral and Parasitic Infections eg. Hepatitis E, and parasites (e.g., Cryptosporidium, Giardia.

(ii) Chemical Contamination- Slaughterhouse wastewater contains presence of heavy metals eg lead, chromium owing to animal feed, medications and processing activities. Exposure to the afore-mentioned can lead to neurological damage, kidney issues and carcinogenic effects.

(iii) Residual Antibiotics- Rampant usage of antibiotics in animal farming leads to the ominous presence of antibiotic residues in slaughterhouse wastewater. This can lead to development of anti-biotic resistant bacteria affecting human health.

(iv) Vector-borne diseases- Poorly managed wastewater can serve as breeding ground for mosquitoes leading to malaria and dengue.

(v) Groundwater Contamination- Release of untreated waste water automatically contaminates the aquifers and underground water resources. True copy of the research paper (Shadab Ansari, Hadeel Majid Hussein, Saleh Hameed Ahmed, Yaser Saleem Siddiqui & Sohail Ayub, 2024) is annexed herewith as **Annexure No. 6.**

c. *Dhiman RC, Tiwari (2018) "Emergence of Zoonotic Diseases in India : A Systematic Review"*, the Authors delve upon as to how people working in slaughterhouses, tanneries & wool factories are at greater risks of contracting Zoonotic Diseases such as Anthrax during the cleaning or processing of contaminated animal materials. True copy of the research paper (Dhiman RC, Tiwari, 2018) is annexed herewith as **Annexure No. 7.**

15. A bare perusal of the aforesaid scientific studies indicates that slaughterhouses pose serious concerns with respect to public health, particularly endangering persons residing in their immediate vicinity,

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and thereby amount to a violation of the Right to Life guaranteed under **Article 21 of the Constitution of India.** It is pertinent to note that leather, skin and hide processing units—industries intrinsically linked to slaughterhouses in terms of raw material origin and pollution potential—are expressly included under the EIA Notification, 2006, thereby underscoring the environmental equivalence of slaughterhouses which too warrant similar regulatory scrutiny.

16. **On the basis of the aforesaid literature, Form- I, EIA Notification 2006 and international frameworks, the following criteria, which are to be read *cumulatively and in a holistic manner*, emerge for mandatory EIA of slaughterhouses and similar high-risk industries:-**

Nature Criterion (Characteristics of Projects)

a. Any facility whose operational characteristics intrinsically pose environmental or public-health risks should automatically trigger an EIA.
b. Any unit classified under the Central Pollution Control Board (CPCB) Red Category i.e. possessing a high Pollution Index (≥ 80) shall mandatorily require EIA.
c. Slaughterhouses generating effluents with high Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), pathogen load, or odorous emissions fall within this criterion.
d. The size and technological design of the project must be considered, especially where the design involves water-intensive or biologically contaminating processes (e.g., blood management, hide washing, rendering).
e. Projects involving substantial extraction or contamination of natural resources such as water, land, and biodiversity must undergo EIA regardless of capacity thresholds.
f. Special attention to water withdrawal from public or groundwater sources for washing, cleaning, or effluent dilution.

g. Facilities generating large quantities of biological, chemical, or solid waste must be subject to EIA to ensure adequate waste-treatment infrastructure.
h. Projects likely to cause air, water, or noise pollution, foul odour, vector proliferation, or public-health hazards due to biological waste exposure, must undergo assessment.
i. EIA must also be triggered if the project presents risks to human health through water contamination, air emissions, or community exposure.
j. Projects carrying risk of major accidents, biological hazard, or disaster—including disease outbreaks—shall not be exempted from EIA.

Risk Criterion (Type and Characteristics of Potential Impact): This criterion reflects the complexity, magnitude, and irreversibility of environmental impacts.

a. Facilities capable of causing long-term or irreversible contamination (groundwater, soil, odour footprint) must undergo EIA.
b. EIA should be mandatory where cumulative impact from multiple slaughterhouses or allied industries contributes to local degradation of air or water quality.
c. The assessment must consider spatial extent and the potential for transboundary or catchment-wide impacts.
d. Projects with persistent or recurrent emissions, or likely long-term social and ecological consequences, qualify for mandatory EIA.
e. Where a project affects a large population or geographical area—even if its physical footprint is small—the scale of impact warrants full assessment.
f. Where effective reduction or mitigation measures are uncertain or technologically unproven, precaution demands an EIA.

Context Criterion (Location of Projects): In line with Annex III's location sensitivity provisions, the necessity of EIA is triggered solely based on where a project is situated, irrespective of size or capacity.

a. Projects located near or likely to affect ecologically critical zones—including wetlands, riverbanks, riparian zones, forest or mountain regions—must be subjected to Category A EIA.
b. EIA is called for if the proposed activity conflicts with surrounding residential, institutional, or agricultural land uses.
c. Areas with limited regenerative capacity (e.g., groundwater-stressed basins, degraded lands) require enhanced scrutiny even for small projects.
d. Siting near protected areas, nature reserves, cultural heritage sites, or religious locations associated with high community sensitivity must trigger EIA.
e. Where the proposed site lies within an area already failing to meet environmental quality standards (as per CPCB/State Pollution Control Board data), additional units should not be permitted without comprehensive EIA.
f. Location near densely populated settlements, schools, or public utilities demands EIA due to the nuisance, odour, and social tension potential of slaughter operations.

Transparency Criterion: Given the moral, cultural, and social sensitivity surrounding slaughterhouses and animal-based industries, transparency and participation must be integral.

a. Public consultation under the EIA Notification 2006 should be non-waivable for such projects.
b. The proponent must disclose waste-management plans, effluent-treatment capacities, odour-control technologies, and post-closure site-management measures.

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c. Representatives of local bodies, animal welfare boards, and civil-society organizations should be involved during public hearings to ensure inclusivity.

B. POSITION AFTER INTERIM ORDER DATED 03.05.2023.

17. Vide order dated 03.05.2023, this Hon'ble Tribunal considered the pollution caused by slaughterhouses and their adverse effect on the surrounding areas and categorically directed that no large slaughterhouse can be established or expanded without EIA as per procedure applicable to B category project in terms of the EIA Notification dated 14.09.2006.

18. For the sake of convenience, the relevant paragraph of the order dated 03.05.2023 is reproduced as under:

> *15. We further direct that if no decision is taken by MoEF&CC within two months as directed above,* ***the requirement for EC will apply to all large slaughter houses as per classification in the 'Revised Comprehensive Industry Document on Slaughter Houses' i.e. "Large: More than 200 large animal i.e. bovines per day, or more than 1000 small animal i.e. goat and sheep per day (any day in a week)" with effect from 01.08.2023. Thereafter, no 'Large' slaughter house can be established or expanded without EIA as per procedure applicable to B category project in terms of EIA Notification dated 14.9.2006. This direction is being issued under Section 15 of the NGT Act.*** *The Tribunal may consider such directions in respect of medium slaughter houses on the next date."* ***[Emphasis Supplied]***

19. Subsequently, on the request of the Learned Counsel for the MoEF&CC/Respondent No. 1, the said Order dated 03.05.2023 was put in abeyance for a limited period of time vide subsequent orders passed in the matter, dated 01.08.2023, 09.08.2023 and 20.10.2023.

20. That the direction contained in the Order dated 03.05.2023 came into effect from 29.01.2024 as no further stay on the direction was granted by the Hon'ble Tribunal. Order dated 29.01.2024 is reproduced as under:-

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"1. Learned counsel appearing for the MoEF & CC submits that the technical working group constituted to study the issue has made recommendations which are pending for approval before the competent authority. In this background he has prayed for four weeks adjournment."

21. Therefore, the order dated 03.05.2023 applies to establishment or expansion of large slaughterhouses (slaughtering more than 200 large animals or more than 1000 small animals per day) **with effect from 29.01.2024.**

22. It is submitted that the Applicant served legal notice (Ref. No. 0408/2024) dated 02.08.2024 to MOEF&CC/Respondent No. 1 and State Pollution Control Boards (SPCBs) of 28 States and Pollution Control Committees (PCCs) of 8 Union Territories requesting to ensure that no Consent to Establish (CTE)/Consent to Operate (CTO) or/and authorization under the *Hazardous and other Wastes (Management and Transboundary Movement) Rules 2016* are granted to large slaughterhouses without prior EIA having been conducted and prior Environment Clearance (EC) granted. True copy of the legal notice (Ref. No. 0408/2024) dated 02.08.2024 has been annexed herewith as **Annexure No. 8.**

23. In response to RTIs filed by the Applicant under the Right to Information Act, 2005, to various States and UTs, seeking a list of large slaughterhouses to which CTE and CTO have been granted from 29.01.2024 till date, it has come to light that the following states have granted CTEs to large slaughterhouses after 29.01.2024:-

State	Large Slaughterhouses to which CTE has been granted.	Date of CTE
Andhra Pradesh	M/s AL Sami Food Exports Private Limited., (Formerly M/s Asvini Agro Exports), Sy No. 129, Ananthasagram (V), Agiripalli (M), Eluru District has obtained CTE (Expansion) from	28.02.2024

	the APPCB on 28.02.2024 in the jurisdiction of APPCB, RO, Eluru.	
Haryana	1) Chahal Foods VPO Bagru Kalan, Tehsil Safidon, Jind; and 2) Karma Protein Pvt. Ltd., Plot No. 16, HSIIDC, Jind	05.04.2024 15.10.2024
Maharashtra	M/s Reliable Agro Foods, Gut No. 160-161, at Kanadkhed, Tal. Purna, Dist. Parbhani.	02.05.2024
Karnataka	Pratha Meat Works Pvt. Ltd.	12.12.2024

True copy of CTEs granted to large slaughterhouses by the States of Andhra Pradesh, Haryana, Maharashtra and Karnataka are annexed herewith as **Annexure No. 9 [Colly].**

24. However, the following States have responded stating that no CTE/CTO has been granted to large slaughterhouses after 29.01.2024:-

State	**Date of Response**	**Response**
Chhattisgarh	13.02.2025	No CTE/CTO granted.
Meghalaya	03.02.2025	No CTE/CTO granted.
Sikkim	05.02.2025	Large Slaughter houses have not been established in Sikkim post 29.01.2024.
Guwahati	29.01.2025	Regional Office Golaghat- no large slaughterhouses are operating within its jurisdiction. Hence, no such application for CTE/CTO has been received after 29.01.2024.

Tripura	27.01.2025	No CTE/CTO granted.
Nagaland	29.01.2025	No CTE/CTO granted.
Himachal Pradesh	07.02.2025	Regional Offices Mandi and Bilaspur- No CTE/CTO granted.
Madhya Pradesh	13.02.2025	Regional Office Chhindwara- No CTE/CTO granted.
Bihar	13.02.2025	No CTE/CTO granted.
Punjab	03.02.2025	Regional Offices Ludhiana, Hoshiarpur, Rupnagar- No CTE/CTO granted.
Kerala	03.02.2025	Regional Offices Wayanad, Idukki, Thiruvananthapuram, Thrissur, Pathanamthitta- No CTE/CTO granted.
Haryana	06.02.2025	Regional Offices Ballabgarh, Kurukshetra, Mahendragarh, Karnal, Faridabad, Gurugram, Fatehabad, Rewari, Bhiwani, Charkhi Dadri, Sirsa, Sonipat- No CTE/CTO granted.
Dadra and Nagar Haveli, Daman & Diu	27.12.2024	No CTE/CTO granted.
Arunachal Pradesh	18.12.2024	No CTE/CTO granted.
Puducherry	12.12.2024	No CTE/CTO granted.
Andaman & Nicobar	02.12.2024	No CTE/CTO granted.
Andhra Pradesh	December 2024	Regional Offices Srikakulam, Ananthapuramu, Kadapa, Vizianagaram, Nellore, Kakinada, Guntur,

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		Vishakhapatnam, Ongole- No CTE/CTO granted.
Telangana	December 2024	Regional Offices Medchal, RC Puram, Rangareddy, Ramagundam, Warangal, Nizamabad, Sangareddy, Nalgonda- No CTE/CTO granted.

25. In light of the aforesaid Submissions, it is humbly prayed that this Hon'ble Tribunal may be pleased to direct that the following recommendations of the Expert Committee headed by Dr. S. R. Wate be forthwith implemented:-

"A. All slaughterhouses need to obtain prior environmental clearance under the EIA Notification, 2006. As per 'Prevention of Cruelty to Animals (Slaughter House) Rules, 2001'; a place is considered to be a slaughterhouse wherein 10 or more animals are slaughtered every day and is duly licensed or recognized under a Central, State or Provincial Act or any rules or regulations made thereunder.

B. The stand alone slaughterhouses, wherein 10-50 large animals per day or equivalent 60-300 small animals per day or combination thereof are slaughtered, will be appraised as Category B Projects for prior environmental clearance. The stand alone Meat Handling & Processing units having production of 1-5 tonnes of meat per day shall be appraised as category B projects.

C. The stand alone slaughterhouses, wherein >50 large animals are slaughtered per day or equivalent >300 small animal per day or a combination thereof are slaughtered, will be appraised as category A projects for prior environmental clearance. In the case of stand-alone Meat Handling & Processing units having production of >5 tonnes of meat per day shall be appraised as category A projects.

D. In case of integrated Slaughterhouse and Meat Handling & Processing units, project/activity shall be appraised as per slaughtering activity.

E. Poultry meat and/ or Fish processing/ freezing units or combination thereof (stand alone slaughterhouses, if applicable or integrated with meat Handling & Processing units or combination thereof) with a production capacity of 1- 5 tonnes of meat per day shall be appraised as category B project.

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F. Poultry meat and/ or Fish processing/ freezing units or combination thereof (stand alone slaughterhouses, if applicable or integrated with meat Handling & Processing units or combination thereof) with a production capacity of >5 tonnes of meat per day shall be appraised as category A project.

G. All Category B project will be appraised as Category B1 projects."

DEPONENT

VERIFICATION

Verified at Delhi on this _____day of October 2025 that the contents of this affidavit are true and correct based on official records. No part of it is false and nothing material has been concealed therefrom.

Identify
Nandita Mishra
D/9420/2023

DEPONENT

I Identified the deponent/executant who has signed in my presence

Place: Delhi
Date: 13.10.2025

Solemnly affirmed before me, re- over & explained to the deponent

Notary Public, DELHI

13 OCT 2025

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I

(Legislative acts)

DIRECTIVES

DIRECTIVE 2011/92/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 13 December 2011

on the assessment of the effects of certain public and private projects on the environment

(codification)

(Text with EEA relevance)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 192(1) thereof,

Having regard to the proposal from the European Commission,

After transmission of the draft legislative act to the national parliaments,

Having regard to the opinion of the European Economic and Social Committee [1],

After consulting the Committee of the Regions,

Acting in accordance with the ordinary legislative procedure [2],

Whereas:

(1) Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment [3] has been substantially amended several times [4]. In the interests of clarity and rationality the said Directive should be codified.

(2) Pursuant to Article 191 of the Treaty on the Functioning of the European Union, Union policy on the environment is based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should, as a priority, be rectified at source and that the polluter should pay. Effects on the environment should be taken into account at the earliest possible stage in all the technical planning and decision-making processes.

(3) The principles of the assessment of environmental effects should be harmonised, in particular with reference to the projects which should be subject to assessment, the main obligations of the developers and the content of the assessment. The Member States may lay down stricter rules to protect the environment.

(4) In addition, it is necessary to achieve one of the objectives of the Union in the sphere of the protection of the environment and the quality of life.

(5) The environmental legislation of the Union includes provisions enabling public authorities and other bodies to take decisions which may have a significant effect on the environment as well as on personal health and well-being.

(6) General principles for the assessment of environmental effects should be laid down with a view to supplementing and coordinating development consent procedures governing public and private projects likely to have a major effect on the environment.

(7) Development consent for public and private projects which are likely to have significant effects on the environment should be granted only after an assessment of the likely significant environmental effects of those projects has been carried out. That assessment should be conducted on the basis of the appropriate information supplied by the developer, which may be supplemented by the authorities and by the public likely to be concerned by the project in question.

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[1] OJ C 248, 25.8.2011, p. 154.
[2] Position of the European Parliament of 13 September 2011 (not yet published in the Official Journal) and decision of the Council of 15 November 2011.
[3] OJ L 175, 5.7.1985, p. 40.
[4] See Annex VI, Part A.

(8) Projects belonging to certain types have significant effects on the environment and those projects should, as a rule, be subject to a systematic assessment.

(9) Projects of other types may not have significant effects on the environment in every case and those projects should be assessed where the Member States consider that they are likely to have significant effects on the environment.

(10) Member States may set thresholds or criteria for the purpose of determining which of such projects should be subject to assessment on the basis of the significance of their environmental effects. Member States should not be required to examine projects below those thresholds or outside those criteria on a case-by-case basis.

(11) When setting such thresholds or criteria or examining projects on a case-by-case basis, for the purpose of determining which projects should be subject to assessment on the basis of their significant environmental effects, Member States should take account of the relevant selection criteria set out in this Directive. In accordance with the subsidiarity principle, the Member States are in the best position to apply those criteria in specific instances.

(12) For projects which are subject to assessment, a certain minimal amount of information should be supplied, concerning the project and its effects.

(13) It is appropriate to lay down a procedure in order to enable the developer to obtain an opinion from the competent authorities on the content and extent of the information to be elaborated and supplied for the assessment. Member States, in the framework of this procedure, may require the developer to provide, inter alia, alternatives for the projects for which it intends to submit an application.

(14) The effects of a project on the environment should be assessed in order to take account of concerns to protect human health, to contribute by means of a better environment to the quality of life, to ensure maintenance of the diversity of species and to maintain the reproductive capacity of the ecosystem as a basic resource for life.

(15) It is desirable to lay down strengthened provisions concerning environmental impact assessment in a transboundary context to take account of developments at international level. The European Community signed the Convention on Environmental Impact Assessment in a Transboundary Context on 25 February 1991, and ratified it on 24 June 1997.

(16) Effective public participation in the taking of decisions enables the public to express, and the decision-maker to take account of, opinions and concerns which may be relevant to those decisions, thereby increasing the accountability and transparency of the decision-making process and contributing to public awareness of environmental issues and support for the decisions taken.

(17) Participation, including participation by associations, organisations and groups, in particular non-governmental organisations promoting environmental protection, should accordingly be fostered, including, inter alia, by promoting environmental education of the public.

(18) The European Community signed the UN/ECE Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (the Aarhus Convention) on 25 June 1998 and ratified it on 17 February 2005.

(19) Among the objectives of the Aarhus Convention is the desire to guarantee rights of public participation in decision-making in environmental matters in order to contribute to the protection of the right to live in an environment which is adequate for personal health and well-being.

(20) Article 6 of the Aarhus Convention provides for public participation in decisions on the specific activities listed in Annex I thereto and on activities not so listed which may have a significant effect on the environment.

(21) Article 9(2) and (4) of the Aarhus Convention provides for access to judicial or other procedures for challenging the substantive or procedural legality of decisions, acts or omissions subject to the public participation provisions of Article 6 of that Convention.

(22) However, this Directive should not be applied to projects the details of which are adopted by a specific act of national legislation, since the objectives of this Directive, including that of supplying information, are achieved through the legislative process.

(23) Furthermore, it may be appropriate in exceptional cases to exempt a specific project from the assessment procedures laid down by this Directive, subject to appropriate information being supplied to the Commission and to the public concerned.

(24) Since the objectives of this Directive cannot be sufficiently achieved by the Member States and can therefore, by reason of the scale and effects of the action, be better achieved at Union level, the Union may adopt measures in accordance with the principle of subsidiarity as set out in Article 5 of the Treaty on European Union. In accordance with the principle of proportionality, as set out in that Article, this Directive does not go beyond what is necessary in order to achieve those objectives.

(25) This Directive should be without prejudice to the obligations of the Member States relating to the time limits for transposition into national law of the Directives set out in Annex V, Part B,

HAVE ADOPTED THIS DIRECTIVE:

Article 1

1. This Directive shall apply to the assessment of the environmental effects of those public and private projects which are likely to have significant effects on the environment.

2. For the purposes of this Directive, the following definitions shall apply:

(a) 'project' means:

— the execution of construction works or of other installations or schemes,

— other interventions in the natural surroundings and landscape including those involving the extraction of mineral resources;

(b) 'developer' means the applicant for authorisation for a private project or the public authority which initiates a project;

(c) 'development consent' means the decision of the competent authority or authorities which entitles the developer to proceed with the project;

(d) 'public' means one or more natural or legal persons and, in accordance with national legislation or practice, their associations, organisations or groups;

(e) 'public concerned' means the public affected or likely to be affected by, or having an interest in, the environmental decision-making procedures referred to in Article 2(2). For the purposes of this definition, non-governmental organisations promoting environmental protection and meeting any requirements under national law shall be deemed to have an interest;

(f) 'competent authority or authorities' means that authority or those authorities which the Member States designate as responsible for performing the duties arising from this Directive.

3. Member States may decide, on a case-by-case basis if so provided under national law, not to apply this Directive to projects serving national defence purposes, if they deem that such application would have an adverse effect on those purposes.

4. This Directive shall not apply to projects the details of which are adopted by a specific act of national legislation, since the objectives of this Directive, including that of supplying information, are achieved through the legislative process.

Article 2

1. Member States shall adopt all measures necessary to ensure that, before consent is given, projects likely to have significant effects on the environment by virtue, inter alia, of their nature, size or location are made subject to a requirement for development consent and an assessment with regard to their effects. Those projects are defined in Article 4.

2. The environmental impact assessment may be integrated into the existing procedures for consent to projects in the Member States, or, failing this, into other procedures or into procedures to be established to comply with the aims of this Directive.

3. Member States may provide for a single procedure in order to fulfil the requirements of this Directive and the requirements of Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control [1].

4. Without prejudice to Article 7, Member States may, in exceptional cases, exempt a specific project in whole or in part from the provisions laid down in this Directive.

In that event, the Member States shall:

(a) consider whether another form of assessment would be appropriate;

(b) make available to the public concerned the information obtained under other forms of assessment referred to in point (a), the information relating to the decision granting exemption and the reasons for granting it;

(c) inform the Commission, prior to granting consent, of the reasons justifying the exemption granted, and provide it with the information made available, where applicable, to their own nationals.

The Commission shall immediately forward the documents received to the other Member States.

The Commission shall report annually to the European Parliament and to the Council on the application of this paragraph.

[1] OJ L 24, 29.1.2008, p. 8.

Article 3

The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case and in accordance with Articles 4 to 12, the direct and indirect effects of a project on the following factors:

(a) human beings, fauna and flora;

(b) soil, water, air, climate and the landscape;

(c) material assets and the cultural heritage;

(d) the interaction between the factors referred to in points (a), (b) and (c).

Article 4

1. Subject to Article 2(4), projects listed in Annex I shall be made subject to an assessment in accordance with Articles 5 to 10.

2. Subject to Article 2(4), for projects listed in Annex II, Member States shall determine whether the project shall be made subject to an assessment in accordance with Articles 5 to 10. Member States shall make that determination through:

(a) a case-by-case examination;

or

(b) thresholds or criteria set by the Member State.

Member States may decide to apply both procedures referred to in points (a) and (b).

3. When a case-by-case examination is carried out or thresholds or criteria are set for the purpose of paragraph 2, the relevant selection criteria set out in Annex III shall be taken into account.

4. Member States shall ensure that the determination made by the competent authorities under paragraph 2 is made available to the public.

Article 5

1. In the case of projects which, pursuant to Article 4, are to be made subject to an environmental impact assessment in accordance with this Article and Articles 6 to 10, Member States shall adopt the necessary measures to ensure that the developer supplies in an appropriate form the information specified in Annex IV inasmuch as:

(a) the Member States consider that the information is relevant to a given stage of the consent procedure and to the specific characteristics of a particular project or type of project and of the environmental features likely to be affected;

(b) the Member States consider that a developer may reasonably be required to compile this information having regard, inter alia, to current knowledge and methods of assessment.

2. Member States shall take the necessary measures to ensure that, if the developer so requests before submitting an application for development consent, the competent authority shall give an opinion on the information to be supplied by the developer in accordance with paragraph 1. The competent authority shall consult the developer and authorities referred to in Article 6(1) before it gives its opinion. The fact that the authority has given an opinion under this paragraph shall not preclude it from subsequently requiring the developer to submit further information.

Member States may require the competent authorities to give such an opinion, irrespective of whether the developer so requests.

3. The information to be provided by the developer in accordance with paragraph 1 shall include at least:

(a) a description of the project comprising information on the site, design and size of the project;

(b) a description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects;

(c) the data required to identify and assess the main effects which the project is likely to have on the environment;

(d) an outline of the main alternatives studied by the developer and an indication of the main reasons for his choice, taking into account the environmental effects;

(e) a non-technical summary of the information referred to in points (a) to (d).

4. Member States shall, if necessary, ensure that any authorities holding relevant information, with particular reference to Article 3, make this information available to the developer.

Article 6

1. Member States shall take the measures necessary to ensure that the authorities likely to be concerned by the project by reason of their specific environmental responsibilities are given an opportunity to express their opinion on the information supplied by the developer and on the request for development consent. To that end, Member States shall designate the authorities to be consulted, either in general terms or on a case-by-case basis. The information gathered pursuant to Article 5 shall be forwarded to those authorities. Detailed arrangements for consultation shall be laid down by the Member States.

ANNEX I

PROJECTS REFERRED TO IN ARTICLE 4(1)

1. Crude-oil refineries (excluding undertakings manufacturing only lubricants from crude oil) and installations for the gasification and liquefaction of 500 tonnes or more of coal or bituminous shale per day.

2. (a) Thermal power stations and other combustion installations with a heat output of 300 megawatts or more;

   (b) Nuclear power stations and other nuclear reactors including the dismantling or decommissioning of such power stations or reactors [1] (except research installations for the production and conversion of fissionable and fertile materials, whose maximum power does not exceed 1 kilowatt continuous thermal load).

3. (a) Installations for the reprocessing of irradiated nuclear fuel;

   (b) Installations designed:

      (i) for the production or enrichment of nuclear fuel;

      (ii) for the processing of irradiated nuclear fuel or high-level radioactive waste;

      (iii) for the final disposal of irradiated nuclear fuel;

      (iv) solely for the final disposal of radioactive waste;

      (v) solely for the storage (planned for more than 10 years) of irradiated nuclear fuels or radioactive waste in a different site than the production site.

4. (a) Integrated works for the initial smelting of cast iron and steel;

   (b) Installations for the production of non-ferrous crude metals from ore, concentrates or secondary raw materials by metallurgical, chemical or electrolytic processes.

5. Installations for the extraction of asbestos and for the processing and transformation of asbestos and products containing asbestos: for asbestos-cement products, with an annual production of more than 20 000 tonnes of finished products, for friction material, with an annual production of more than 50 tonnes of finished products, and for other uses of asbestos, utilisation of more than 200 tonnes per year.

6. Integrated chemical installations, i.e. those installations for the manufacture on an industrial scale of substances using chemical conversion processes, in which several units are juxtaposed and are functionally linked to one another and which are:

   (a) for the production of basic organic chemicals;

   (b) for the production of basic inorganic chemicals;

   (c) for the production of phosphorous-, nitrogen- or potassium-based fertilisers (simple or compound fertilisers);

   (d) for the production of basic plant health products and of biocides;

   (e) for the production of basic pharmaceutical products using a chemical or biological process;

   (f) for the production of explosives.

[1] Nuclear power stations and other nuclear reactors cease to be such an installation when all nuclear fuel and other radioactively contaminated elements have been removed permanently from the installation site.

7. (a) Construction of lines for long-distance railway traffic and of airports [1] with a basic runway length of 2 100 m or more;

   (b) Construction of motorways and express roads [2];

   (c) Construction of a new road of four or more lanes, or realignment and/or widening of an existing road of two lanes or less so as to provide four or more lanes, where such new road or realigned and/or widened section of road would be 10 km or more in a continuous length.

8. (a) Inland waterways and ports for inland-waterway traffic which permit the passage of vessels of over 1 350 tonnes;

   (b) Trading ports, piers for loading and unloading connected to land and outside ports (excluding ferry piers) which can take vessels of over 1 350 tonnes.

9. Waste disposal installations for the incineration, chemical treatment as defined in Annex I to Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste [3] under heading D9, or landfill of hazardous waste, as defined in point 2 of Article 3 of that Directive.

10. Waste disposal installations for the incineration or chemical treatment as defined in Annex I to Directive 2008/98/EC under heading D9 of non-hazardous waste with a capacity exceeding 100 tonnes per day.

11. Groundwater abstraction or artificial groundwater recharge schemes where the annual volume of water abstracted or recharged is equivalent to or exceeds 10 million cubic metres.

12. (a) Works for the transfer of water resources between river basins where that transfer aims at preventing possible shortages of water and where the amount of water transferred exceeds 100 million cubic metres/year;

   (b) In all other cases, works for the transfer of water resources between river basins where the multi-annual average flow of the basin of abstraction exceeds 2 000 million cubic metres/year and where the amount of water transferred exceeds 5 % of that flow.

   In both cases transfers of piped drinking water are excluded.

13. Waste water treatment plants with a capacity exceeding 150 000 population equivalent as defined in point 6 of Article 2 of Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment [4].

14. Extraction of petroleum and natural gas for commercial purposes where the amount extracted exceeds 500 tonnes/day in the case of petroleum and 500 000 cubic metres/day in the case of gas.

15. Dams and other installations designed for the holding back or permanent storage of water, where a new or additional amount of water held back or stored exceeds 10 million cubic metres.

16. Pipelines with a diameter of more than 800 mm and a length of more than 40 km:

   (a) for the transport of gas, oil, chemicals;

   (b) for the transport of carbon dioxide (CO_2) streams for the purposes of geological storage, including associated booster stations.

17. Installations for the intensive rearing of poultry or pigs with more than:

   (a) 85 000 places for broilers, 60 000 places for hens;

   (b) 3 000 places for production pigs (over 30 kg); or

   (c) 900 places for sows.

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[1] For the purposes of this Directive, 'airport' means an airport which complies with the definition in the 1944 Chicago Convention setting up the International Civil Aviation Organisation (Annex 14).

[2] For the purposes of this Directive, 'express road' means a road which complies with the definition in the European Agreement on Main International Traffic Arteries of 15 November 1975.

[3] OJ L 312, 22.11.2008, p. 3.

[4] OJ L 135, 30.5.1991, p. 40.

18. Industrial plants for the production of:

    (a) pulp from timber or similar fibrous materials;

    (b) paper and board with a production capacity exceeding 200 tonnes per day.

19. Quarries and open-cast mining where the surface of the site exceeds 25 hectares, or peat extraction, where the surface of the site exceeds 150 hectares.

20. Construction of overhead electrical power lines with a voltage of 220 kV or more and a length of more than 15 km.

21. Installations for storage of petroleum, petrochemical, or chemical products with a capacity of 200 000 tonnes or more.

22. Storage sites pursuant to Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide ([1]).

23. Installations for the capture of CO_2 streams for the purposes of geological storage pursuant to Directive 2009/31/EC from installations covered by this Annex, or where the total yearly capture of CO_2 is 1,5 megatonnes or more.

24. Any change to or extension of projects listed in this Annex where such a change or extension in itself meets the thresholds, if any, set out in this Annex.

([1]) OJ L 140, 5.6.2009, p. 114.

ANNEX II

PROJECTS REFERRED TO IN ARTICLE 4(2)

1. AGRICULTURE, SILVICULTURE AND AQUACULTURE

(a) Projects for the restructuring of rural land holdings;

(b) Projects for the use of uncultivated land or semi-natural areas for intensive agricultural purposes;

(c) Water management projects for agriculture, including irrigation and land drainage projects;

(d) Initial afforestation and deforestation for the purposes of conversion to another type of land use;

(e) Intensive livestock installations (projects not included in Annex I);

(f) Intensive fish farming;

(g) Reclamation of land from the sea.

2. EXTRACTIVE INDUSTRY

(a) Quarries, open-cast mining and peat extraction (projects not included in Annex I);

(b) Underground mining;

(c) Extraction of minerals by marine or fluvial dredging;

(d) Deep drillings, in particular:

(i) geothermal drilling;

(ii) drilling for the storage of nuclear waste material;

(iii) drilling for water supplies;

with the exception of drillings for investigating the stability of the soil;

(e) Surface industrial installations for the extraction of coal, petroleum, natural gas and ores, as well as bituminous shale.

3. ENERGY INDUSTRY

(a) Industrial installations for the production of electricity, steam and hot water (projects not included in Annex I);

(b) Industrial installations for carrying gas, steam and hot water; transmission of electrical energy by overhead cables (projects not included in Annex I);

(c) Surface storage of natural gas;

(d) Underground storage of combustible gases;

(e) Surface storage of fossil fuels;

(f) Industrial briquetting of coal and lignite;

(g) Installations for the processing and storage of radioactive waste (unless included in Annex I);

(h) Installations for hydroelectric energy production;

(i) Installations for the harnessing of wind power for energy production (wind farms);

(j) Installations for the capture of CO_2 streams for the purposes of geological storage pursuant to Directive 2009/31/EC from installations not covered by Annex I to this Directive.

4. PRODUCTION AND PROCESSING OF METALS

(a) Installations for the production of pig iron or steel (primary or secondary fusion) including continuous casting;

(b) Installations for the processing of ferrous metals:

(i) hot-rolling mills;

(ii) smitheries with hammers;

(iii) application of protective fused metal coats;

(c) Ferrous metal foundries;

(d) Installations for the smelting, including the alloyage, of non-ferrous metals, excluding precious metals, including recovered products (refining, foundry casting, etc.);

(e) Installations for surface treatment of metals and plastic materials using an electrolytic or chemical process;

(f) Manufacture and assembly of motor vehicles and manufacture of motor-vehicle engines;

(g) Shipyards;

(h) Installations for the construction and repair of aircraft;

(i) Manufacture of railway equipment;

(j) Swaging by explosives;

(k) Installations for the roasting and sintering of metallic ores.

5. MINERAL INDUSTRY

(a) Coke ovens (dry coal distillation);

(b) Installations for the manufacture of cement;

(c) Installations for the production of asbestos and the manufacture of asbestos products (projects not included in Annex I);

(d) Installations for the manufacture of glass including glass fibre;

(e) Installations for smelting mineral substances including the production of mineral fibres;

(f) Manufacture of ceramic products by burning, in particular roofing tiles, bricks, refractory bricks, tiles, stoneware or porcelain.

6. CHEMICAL INDUSTRY (PROJECTS NOT INCLUDED IN ANNEX I)

(a) Treatment of intermediate products and production of chemicals;

(b) Production of pesticides and pharmaceutical products, paint and varnishes, elastomers and peroxides;

(c) Storage facilities for petroleum, petrochemical and chemical products.

7. FOOD INDUSTRY

(a) Manufacture of vegetable and animal oils and fats;

(b) Packing and canning of animal and vegetable products;

(c) Manufacture of dairy products;

(d) Brewing and malting;

(e) Confectionery and syrup manufacture;

(f) Installations for the slaughter of animals;

(g) Industrial starch manufacturing installations;

(h) Fish-meal and fish-oil factories;

(i) Sugar factories.

8. TEXTILE, LEATHER, WOOD AND PAPER INDUSTRIES

(a) Industrial plants for the production of paper and board (projects not included in Annex I);

(b) Plants for the pre-treatment (operations such as washing, bleaching, mercerisation) or dyeing of fibres or textiles;

(c) Plants for the tanning of hides and skins;

(d) Cellulose-processing and production installations.

9. RUBBER INDUSTRY

Manufacture and treatment of elastomer-based products.

10. INFRASTRUCTURE PROJECTS

(a) Industrial estate development projects;

(b) Urban development projects, including the construction of shopping centres and car parks;

(c) Construction of railways and intermodal transhipment facilities, and of intermodal terminals (projects not included in Annex I);

(d) Construction of airfields (projects not included in Annex I);

(e) Construction of roads, harbours and port installations, including fishing harbours (projects not included in Annex I);

(f) Inland-waterway construction not included in Annex I, canalisation and flood-relief works;

(g) Dams and other installations designed to hold water or store it on a long-term basis (projects not included in Annex I);

(h) Tramways, elevated and underground railways, suspended lines or similar lines of a particular type, used exclusively or mainly for passenger transport;

(i) Oil and gas pipeline installations and pipelines for the transport of CO_2 streams for the purposes of geological storage (projects not included in Annex I);

(j) Installations of long-distance aqueducts;

(k) Coastal work to combat erosion and maritime works capable of altering the coast through the construction, for example, of dykes, moles, jetties and other sea defence works, excluding the maintenance and reconstruction of such works;

(l) Groundwater abstraction and artificial groundwater recharge schemes not included in Annex I;

(m) Works for the transfer of water resources between river basins not included in Annex I.

11. OTHER PROJECTS

(a) Permanent racing and test tracks for motorised vehicles;

(b) Installations for the disposal of waste (projects not included in Annex I);

(c) Waste-water treatment plants (projects not included in Annex I);

(d) Sludge-deposition sites;

(e) Storage of scrap iron, including scrap vehicles;

(f) Test benches for engines, turbines or reactors;

(g) Installations for the manufacture of artificial mineral fibres;

(h) Installations for the recovery or destruction of explosive substances;

(i) Knackers' yards.

12. TOURISM AND LEISURE

(a) Ski runs, ski lifts and cable cars and associated developments;

(b) Marinas;

(c) Holiday villages and hotel complexes outside urban areas and associated developments;

(d) Permanent campsites and caravan sites;

(e) Theme parks.

13. (a) Any change or extension of projects listed in Annex I or this Annex, already authorised, executed or in the process of being executed, which may have significant adverse effects on the environment (change or extension not included in Annex I);

(b) Projects in Annex I, undertaken exclusively or mainly for the development and testing of new methods or products and not used for more than two years.

ANNEX III

SELECTION CRITERIA REFERRED TO IN ARTICLE 4(3)

1. CHARACTERISTICS OF PROJECTS

The characteristics of projects must be considered having regard, in particular, to:

(a) the size of the project;

(b) the cumulation with other projects;

(c) the use of natural resources;

(d) the production of waste;

(e) pollution and nuisances;

(f) the risk of accidents, having regard in particular to substances or technologies used.

2. LOCATION OF PROJECTS

The environmental sensitivity of geographical areas likely to be affected by projects must be considered, having regard, in particular, to:

(a) the existing land use;

(b) the relative abundance, quality and regenerative capacity of natural resources in the area;

(c) the absorption capacity of the natural environment, paying particular attention to the following areas:

(i) wetlands;

(ii) coastal zones;

(iii) mountain and forest areas;

(iv) nature reserves and parks;

(v) areas classified or protected under Member States' legislation; special protection areas designated by Member States pursuant to Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds [1] and to Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora [2];

(vi) areas in which the environmental quality standards laid down in Union legislation have already been exceeded;

(vii) densely populated areas;

(viii) landscapes of historical, cultural or archaeological significance.

3. CHARACTERISTICS OF THE POTENTIAL IMPACT

The potential significant effects of projects must be considered in relation to criteria set out in points 1 and 2, and having regard in particular to:

(a) the extent of the impact (geographical area and size of the affected population);

(b) the transfrontier nature of the impact;

(c) the magnitude and complexity of the impact;

(d) the probability of the impact;

(e) the duration, frequency and reversibility of the impact.

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[1] OJ L 20, 26.1.2010, p. 7.
[2] OJ L 206, 22.7.1992, p. 7.

I

(Legislative acts)

DIRECTIVES

DIRECTIVE 2014/52/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 16 April 2014

amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

(Text with EEA relevance)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 192(1) thereof,

Having regard to the proposal from the European Commission,

After transmission of the draft legislative act to the national Parliaments,

Having regard to the opinion of the European Economic and Social Committee ([1]),

Having regard to the opinion of the Committee of the Regions ([2]),

Acting in accordance with the ordinary legislative procedure ([3]),

Whereas:

(1) Directive 2011/92/EU of the European Parliament and of the Council ([4]) has harmonised the principles for the environmental impact assessment of projects by introducing minimum requirements, with regard to the type of projects subject to assessment, the main obligations of developers, the content of the assessment and the participation of the competent authorities and the public, and it contributes to a high level of protection of the environment and human health. Member States are free to lay down more stringent protective measures in accordance with the Treaty on the Functioning of the European Union (TFEU).

(2) The Commission Communication of 30 April 2007, entitled 'The mid-term review of the sixth Community Environment Action Programme' and the Report from the Commission of 23 July 2009 on the application and effectiveness of Council Directive 85/337/EEC ([5]), the predecessor to Directive 2011/92/EU, stressed the need to improve the principles of environmental impact assessment of projects, and to adapt Directive 85/337/EEC to the policy, legal and technical context, which has evolved considerably.

([1]) OJ C 133, 9.5.2013, p. 33.
([2]) OJ C 218, 30.7.2013, p. 42.
([3]) Position of the European Parliament of 12 March 2014 (not yet published in the Official Journal) and decision of the Council of 14 April 2014.
([4]) Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (OJ L 26, 28.1.2012, p. 1).
([5]) Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment (OJ L 175, 5.7.1985, p. 40).

(3) It is necessary to amend Directive 2011/92/EU in order to strengthen the quality of the environmental impact assessment procedure, align that procedure with the principles of smart regulation and enhance coherence and synergies with other Union legislation and policies, as well as strategies and policies developed by Member States in areas of national competence.

(4) In order to coordinate and facilitate the assessment procedures for cross-border projects, and, in particular, to conduct consultations in accordance with the Convention on Environmental Impact Assessment in a Transboundary Context of 25 February 1991 (Espoo-Convention), the Member States concerned may set up, on the basis of equal representation, a joint body.

(5) The mechanisms set out in Regulations (EU) No 347/2013 ([1]), (EU) No 1315/2013 ([2]) and (EU) No 1316/2013 ([3]) of the European Parliament and of the Council, which are relevant for Union co-financed infrastructure projects, may also facilitate the implementation of the requirements of Directive 2011/92/EU.

(6) Directive 2011/92/EU should also be revised in a way that ensures that environmental protection is improved, resource efficiency increased and sustainable growth supported in the Union. To this end, the procedures it lays down should be simplified and harmonised.

(7) Over the last decade, environmental issues, such as resource efficiency and sustainability, biodiversity protection, climate change, and risks of accidents and disasters, have become more important in policy making. They should therefore also constitute important elements in assessment and decision-making processes.

(8) In its Communication of 20 September 2011 entitled 'Roadmap to a Resource Efficient Europe', the Commission committed itself to including broader resource efficiency and sustainability considerations in the context of the revision of Directive 2011/92/EU.

(9) The Commission Communication of 22 September 2006 entitled 'Thematic Strategy for Soil Protection' and the Roadmap to a Resource-Efficient Europe underline the importance of the sustainable use of soil and the need to address the unsustainable increase of settlement areas over time ('land take'). Furthermore, the final document of the United Nations Conference on Sustainable Development held in Rio de Janeiro on 20-22 June 2012 recognises the economic and social significance of good land management, including soil, and the need for urgent action to reverse land degradation. Public and private projects should therefore consider and limit their impact on land, particularly as regards land take, and on soil, including as regards organic matter, erosion, compaction and sealing; appropriate land use plans and policies at national, regional and local level are also relevant in this regard.

(10) The United Nations Convention on Biological Diversity ('the Convention'), to which the Union is party pursuant to Council Decision 93/626/EEC ([4]), requires assessment, as far as possible and as appropriate, of the significant adverse effects of projects on biological diversity, which is defined in Article 2 of the Convention, with a view to avoiding or minimising such effects. Such prior assessment of those effects should contribute to attaining the Union headline target adopted by the European Council in its conclusions of 25-26 March 2010 of halting biodiversity loss and the degradation of ecosystem services by 2020 and restoring them where feasible.

([1]) Regulation (EU) No 347/2013 of the European Parliament and of the Council of 17 April 2013 on guidelines for trans-European energy infrastructure and repealing Decision No 1364/2006/EC and amending Regulations (EC) No 713/2009, (EC) No 714/2009 and (EC) No 715/2009 (OJ L 115, 25.4.2013, p. 39).

([2]) Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network and repealing Decision No 661/2010/EU (OJ L 348, 20.12.2013, p. 1).

([3]) Regulation (EU) No 1316/2013 of the European Parliament and of the Council of 11 December 2013 establishing the Connecting Europe Facility, amending Regulation (EU) No 913/2010 and repealing Regulations (EC) No 680/2007 and (EC) No 67/2010 (OJ L 348, 20.12.2013, p. 129).

([4]) Council Decision 93/626/EEC of 25 October 1993 concerning the conclusion of the Convention on Biological Diversity (OJ L 309, 13.12.1993, p. 1).

(11) The measures taken to avoid, prevent, reduce and, if possible, offset significant adverse effects on the environment, in particular on species and habitats protected under Council Directive 92/43/EEC ([1]) and Directive 2009/147/EC of the European Parliament and of the Council ([2]), should contribute to avoiding any deterioration in the quality of the environment and any net loss of biodiversity, in accordance with the Union's commitments in the context of the Convention and the objectives and actions of the Union Biodiversity Strategy up to 2020 laid down in the Commission Communication of 3 May 2011 entitled 'Our life insurance, our natural capital: an EU biodiversity strategy to 2020'.

(12) With a view to ensuring a high level of protection of the marine environment, especially species and habitats, environmental impact assessment and screening procedures for projects in the marine environment should take into account the characteristics of those projects with particular regard to the technologies used (for example seismic surveys using active sonars). For this purpose, the requirements of Directive 2013/30/EU of the European Parliament and of the Council ([3]) could also facilitate the implementation of the requirements of this Directive.

(13) Climate change will continue to cause damage to the environment and compromise economic development. In this regard, it is appropriate to assess the impact of projects on climate (for example greenhouse gas emissions) and their vulnerability to climate change.

(14) Following the Commission Communication of 23 February 2009 entitled 'A Community approach on the prevention of natural and man-made disasters', the Council, in its conclusions of 30 November 2009, invited the Commission to ensure that the implementation, review and further development of Union initiatives, take into consideration disaster risk prevention and management concerns as well as the United Nations Hyogo Framework for Action Programme (2005-2015) adopted on 22 January 2005, which stresses the need to put in place procedures for assessment of the disaster risk implications of major infrastructure projects.

(15) In order to ensure a high level of protection of the environment, precautionary actions need to be taken for certain projects which, because of their vulnerability to major accidents, and/or natural disasters (such as flooding, sea level rise, or earthquakes) are likely to have significant adverse effects on the environment. For such projects, it is important to consider their vulnerability (exposure and resilience) to major accidents and/or disasters, the risk of those accidents and/or disasters occurring and the implications for the likelihood of significant adverse effects on the environment. In order to avoid duplications, it should be possible to use any relevant information available and obtained through risk assessments carried out pursuant to Union legislation, such as Directive 2012/18/EU of the European Parliament and the Council ([4]) and Council Directive 2009/71/Euratom ([5]), or through relevant assessments carried out pursuant to national legislation provided that the requirements of this Directive are met.

(16) For the protection and promotion of cultural heritage comprising urban historical sites and landscapes, which are an integral part of the cultural diversity that the Union is committed to respecting and promoting in accordance with Article 167(4) TFEU, the definitions and principles developed in relevant Council of Europe Conventions, in particular the European Convention for the Protection of the Archaeological Heritage of 6 May 1969, the Convention for the Protection of the Architectural Heritage of Europe of 3 October 1985, the European Landscape Convention of 20 October 2000, the Framework Convention on the Value of Cultural Heritage for Society of 27 October 2005 can be useful. In order to better preserve historical and cultural heritage and the landscape, it is important to address the visual impact of projects, namely the change in the appearance or view of the built or natural landscape and urban areas, in environmental impact assessments.

(17) When applying Directive 2011/92/EU, it is necessary to ensure smart, sustainable and inclusive growth, in line with the objectives set out in the Commission's Communication of 3 March 2010 entitled 'Europe 2020 — A strategy for smart, sustainable and inclusive growth'.

([1]) Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna (OJ L 206, 22.7.1992, p. 7).

([2]) Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (OJ L 20, 26.1.2010, p. 7).

([3]) Directive 2013/30/EU of the European Parliament and of the Council of 12 June 2013 on safety of offshore oil and gas operations and amending Directive 2004/35/EC (OJ L 178, 28.6.2013, p. 66).

([4]) Directive 2012/18/EU of the European Parliament and the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC (OJ L 197, 24.7.2012, p. 1).

([5]) Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations (OJ L 172, 2.7.2009, p. 18).

(18) With a view to strengthening public access to information and transparency, timely environmental information with regard to the implementation of this Directive should also be accessible in electronic format. Member States should therefore establish at least a central portal or points of access, at the appropriate administrative level, that allow the public to access that information easily and effectively.

(19) Experience has shown that in cases of projects, or parts of projects, serving defence purposes, including projects related to activities by allied forces on the territory of Member States in accordance with international obligations, the application of Directive 2011/92/EU could result in the disclosure of relevant confidential information which would undermine defence purposes. Provision should therefore be made to authorise Member States not to apply that Directive in such cases, where appropriate.

(20) Experience has shown that, as regards projects having as their sole purpose the response to cases of civil emergency, compliance with Directive 2011/92/EU could have adverse effects, inter alia, on the environment, and provision should therefore be made to authorise Member States not to apply that Directive in such cases, where appropriate.

(21) Member States have several options for implementing Directive 2011/92/EU as regards the integration of environmental impact assessments into national procedures. Accordingly, the elements of those national procedures can vary. Due to this fact, the reasoned conclusion by which the competent authority finalises its examination of the environmental impact of the project may be part of an integrated development consent procedure or may be incorporated in another binding decision required in order to comply with the aims of this Directive.

(22) In order to ensure a high level of protection of the environment and human health, screening procedures and environmental impact assessments should take account of the impact of the whole project in question, including, where relevant, its subsurface and underground, during the construction, operational and, where relevant, demolition phases.

(23) With a view to reaching a complete assessment of the direct and indirect effects of a project on the environment, the competent authority should undertake an analysis by examining the substance of the information provided by the developer and received through consultations, as well as considering any supplementary information, where appropriate.

(24) In the case of projects adopted by a specific act of national legislation, Member States should ensure that the objectives of this Directive relating to public consultation are achieved through the legislative process.

(25) The objectivity of the competent authorities should be ensured. Conflicts of interest could be prevented by, inter alia, a functional separation of the competent authority from the developer. In cases where the competent authority is also the developer, Member States should at least implement, within their organisation of administrative competences, an appropriate separation between conflicting functions of those authorities performing the duties arising from Directive 2011/92/EU.

(26) In order to enable the competent authority to determine whether projects listed in Annex II to Directive 2011/92/EU, their changes or extensions, are to be subject to an environmental impact assessment (screening procedure), the information which the developer is required to supply should be specified, focussing on the key aspects that allow the competent authority to make its determination. That determination should be made available to the public.

(27) The screening procedure should ensure that an environmental impact assessment is only required for projects likely to have significant effects on the environment.

(28) The selection criteria laid down in Annex III to Directive 2011/92/EU, which are to be taken into account by the Member States in order to determine which projects are to be subject to environmental impact assessment on the basis of their significant effects on the environment, should be adapted and clarified. For instance, experience has shown that projects using or affecting valuable resources, projects proposed for environmentally sensitive locations, or projects with potentially hazardous or irreversible effects are often likely to have significant effects on the environment.

(29) When determining whether significant effects on the environment are likely to be caused by a project, the competent authorities should identify the most relevant criteria to be considered and should take into account information that could be available following other assessments required by Union legislation in order to apply the screening procedure effectively and transparently. In this regard, it is appropriate to specify the content of the screening determination, in particular where no environmental impact assessment is required. Moreover, taking into account unsolicited comments that might have been received from other sources, such as members of the public or public authorities, even though no formal consultation is required at the screening stage, constitutes good administrative practice.

(30) In order to improve the quality of an environmental impact assessment, to simplify the procedures and to streamline the decision-making process, the competent authority should, where requested by the developer, issue an opinion on the scope and level of detail of the environmental information to be submitted in the form of an environmental impact assessment report ('scoping').

(31) The environmental impact assessment report to be provided by the developer for a project should include a description of reasonable alternatives studied by the developer which are relevant to that project, including, as appropriate, an outline of the likely evolution of the current state of the environment without implementation of the project (baseline scenario), as a means of improving the quality of the environmental impact assessment process and of allowing environmental considerations to be integrated at an early stage in the project's design.

(32) Data and information included by the developer in the environmental impact assessment report, in accordance with Annex IV to Directive 2011/92/EU, should be complete and of sufficiently high quality. With a view to avoiding duplication of assessments, the results of other assessments under Union legislation, such as Directive 2001/42/EC of the European Parliament and the Council ([1]) or Directive 2009/71/Euratom, or national legislation should, where relevant and available, be taken into account.

(33) Experts involved in the preparation of environmental impact assessment reports should be qualified and competent. Sufficient expertise, in the relevant field of the project concerned, is required for the purpose of its examination by the competent authorities in order to ensure that the information provided by the developer is complete and of a high level of quality.

(34) With a view to ensuring transparency and accountability, the competent authority should be required to substantiate its decision to grant development consent in respect of a project, indicating that it has taken into consideration the results of the consultations carried out and the relevant information gathered.

(35) Member States should ensure that mitigation and compensation measures are implemented, and that appropriate procedures are determined regarding the monitoring of significant adverse effects on the environment resulting from the construction and operation of a project, inter alia, to identify unforeseen significant adverse effects, in order to be able to undertake appropriate remedial action. Such monitoring should not duplicate or add to monitoring required pursuant to Union legislation other than this Directive and to national legislation.

([1]) Directive 2001/42/EC of the European Parliament and the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment (OJ L 197, 21.7.2001, p. 30).

(36) In order to stimulate more efficient decision-making and increase legal certainty, Member States should ensure that the various steps of the environmental impact assessment of projects are carried out within a reasonable period of time, depending on the nature, complexity, location and size of the project. Such time-frames should, under no circumstances, compromise the achievement of high standards for the protection of the environment, particularly those resulting from Union legislation on the environment other than this Directive, and effective public participation and access to justice.

(37) In order to improve the effectiveness of the assessments, reduce administrative complexity and increase economic efficiency, where the obligation to carry out assessments related to environmental issues arises simultaneously from this Directive and Directive 92/43/EEC and/or Directive 2009/147/EC, Member States should ensure that coordinated and/or joint procedures fulfilling the requirements of these Directives are provided, where appropriate and taking into account their specific organisational characteristics. Where the obligation to carry out assessments related to environmental issues arises simultaneously from this Directive and from other Union legislation, such as Directive 2000/60/EC of the European Parliament and of the Council ([1]), Directive 2001/42/EC, Directive 2008/98/EC of the European Parliament and of the Council ([2]), Directive 2010/75/EU of the European Parliament and of the Council ([3]) and Directive 2012/18/EU, Member States should be able to provide for coordinated and/or joint procedures fulfilling the requirements of the relevant Union legislation. Where coordinated or joint procedures are set up, Member States should designate an authority responsible for performing the corresponding duties. Taking into account institutional structures, Member States should be able to, where they deem it necessary, designate more than one authority.

(38) Member States should lay down rules on penalties applicable to infringements of the national provisions adopted pursuant to this Directive. Member States should be free to decide the kind or form of those penalties. The penalties thus provided for should be effective, proportionate and dissuasive.

(39) In accordance with the principles of legal certainty and proportionality and in order to ensure that the transition from the existing regime, laid down in Directive 2011/92/EU, to the new regime that will result from the amendments contained in this Directive is as smooth as possible, it is appropriate to lay down transitional measures. Those measures should ensure that the regulatory environment in relation to an environmental impact assessment is not altered, with regard to a particular developer, where any procedural steps have already been initiated under the existing regime and a development consent or another binding decision required in order to comply with the aims of this Directive has not yet been granted to the project. Accordingly, the related provisions of Directive 2011/92/EU prior to its amendment by this Directive should apply to projects for which the screening procedure has been initiated, the scoping procedure has been initiated, (where scoping was requested by the developer or required by the competent authority) or the environmental impact assessment report is submitted before the time-limit for transposition.

(40) In accordance with the Joint Political Declaration of Member States and the Commission of 28 September 2011 on explanatory documents ([4]), Member States have undertaken to accompany, in justified cases, the notification of their transposition measures with one or more documents explaining the relationship between the components of a directive and the corresponding parts of national transposition instruments. With regard to this Directive, the legislator considers the transmission of such documents to be justified.

(41) Since the objective of this Directive, namely to ensure a high level of protection of the environment and of human health, through the establishment of minimum requirements for the environmental impact assessment of projects, cannot be sufficiently achieved by the Member States but can rather, by reason of the scope, seriousness and transboundary nature of the environmental issues to be addressed, be better achieved at Union level, the Union may adopt measures, in accordance with the principle of subsidiarity as set out in Article 5 of the Treaty on European Union. In accordance with the principle of proportionality, as set out in that Article, this Directive does not go beyond what is necessary in order to achieve that objective.

(42) Directive 2011/92/EU should therefore be amended accordingly,

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([1]) Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (OJ L 327, 22.12.2000, p. 1).

([2]) Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (OJ L 312, 22.11.2008, p. 3).

([3]) Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (OJ L 334, 17.12.2010, p. 17).

([4]) OJ C 369, 17.12.2011, p. 14.

HAVE ADOPTED THIS DIRECTIVE:

Article 1

Directive 2011/92/EU is amended as follows:

(1) Article 1 is amended as follows:

(a) in paragraph 2, the following definition is added:

'(g) "environmental impact assessment" means a process consisting of:

(i) the preparation of an environmental impact assessment report by the developer, as referred to in Article 5(1) and (2);

(ii) the carrying out of consultations as referred to in Article 6 and, where relevant, Article 7;

(iii) the examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer in accordance with Article 5(3), and any relevant information received through the consultations under Articles 6 and 7;

(iv) the reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point (iii) and, where appropriate, its own supplementary examination; and

(v) the integration of the competent authority's reasoned conclusion into any of the decisions referred to in Article 8a.';

(b) paragraph 3 is replaced by the following:

'3. Member States may decide, on a case-by-case basis and if so provided under national law, not to apply this Directive to projects, or parts of projects, having defence as their sole purpose, or to projects having the response to civil emergencies as their sole purpose, if they deem that such application would have an adverse effect on those purposes.';

(c) paragraph 4 is deleted;

(2) Article 2 is amended as follows:

(a) paragraphs 1 to 3 are replaced by the following:

'1. Member States shall adopt all measures necessary to ensure that, before development consent is given, projects likely to have significant effects on the environment by virtue, inter alia, of their nature, size or location are made subject to a requirement for development consent and an assessment with regard to their effects on the environment. Those projects are defined in Article 4.

2. The environmental impact assessment may be integrated into the existing procedures for development consent to projects in the Member States, or, failing this, into other procedures or into procedures to be established to comply with the aims of this Directive.

3. In the case of projects for which the obligation to carry out assessments of the effects on the environment arises simultaneously from this Directive and from Council Directive 92/43/EEC (*) and/or Directive 2009/147/EC of the European Parliament and the Council (**), Member States shall, where appropriate, ensure that coordinated and/or joint procedures fulfilling the requirements of that Union legislation are provided for.

In the case of projects for which the obligation to carry out assessments of the effects on the environment arises simultaneously from this Directive and Union legislation other than the Directives listed in the first subparagraph, Member States may provide for coordinated and/or joint procedures.

Under the coordinated procedure referred to in the first and second subparagraphs, Member States shall endeavour to coordinate the various individual assessments of the environmental impact of a particular project, required by the relevant Union legislation, by designating an authority for this purpose, without prejudice to any provisions to the contrary contained in other relevant Union legislation.

Under the joint procedure referred to in the first and second subparagraphs, Member States shall endeavour to provide for a single assessment of the environmental impact of a particular project required by the relevant Union legislation, without prejudice to any provisions to the contrary contained in other relevant Union legislation.

The Commission shall provide guidance regarding the setting up of any coordinated or joint procedures for projects that are simultaneously subject to assessments under this Directive and Directives 92/43/EEC, 2000/60/EC, 2009/147/EC or 2010/75/EU.

(*) Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (OJ L 206, 22.7.1992, p. 7).
(**) Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (OJ L 20, 26.1.2010, p. 7).';

(b) in paragraph 4, the first subparagraph is replaced by the following:

'4. Without prejudice to Article 7, Member States may, in exceptional cases, exempt a specific project from the provisions laid down in this Directive, where the application of those provisions would result in adversely affecting the purpose of the project, provided the objectives of this Directive are met.';

(c) the following paragraph is added:

'5. Without prejudice to Article 7, in cases where a project is adopted by a specific act of national legislation, Member States may exempt that project from the provisions relating to public consultation laid down in this Directive, provided the objectives of this Directive are met.

Member States shall inform the Commission of any application of the exemption referred to in the first subparagraph every two years from 16 May 2017.';

(3) Article 3 is replaced by the following:

'*Article 3*

1. The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:

(a) population and human health;

(b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;

(c) land, soil, water, air and climate;

(d) material assets, cultural heritage and the landscape;

(e) the interaction between the factors referred to in points (a) to (d).

2. The effects referred to in paragraph 1 on the factors set out therein shall include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned.';

(4) Article 4 is amended as follows:

(a) paragraphs 3 and 4 are replaced by the following:

'3. Where a case-by-case examination is carried out or thresholds or criteria are set for the purpose of paragraph 2, the relevant selection criteria set out in Annex III shall be taken into account. Member States may set thresholds or criteria to determine when projects need not undergo either the determination under paragraphs 4 and 5 or an environmental impact assessment, and/or thresholds or criteria to determine when projects shall in any case be made subject to an environmental impact assessment without undergoing a determination set out under paragraphs 4 and 5.

4. Where Member States decide to require a determination for projects listed in Annex II, the developer shall provide information on the characteristics of the project and its likely significant effects on the environment. The detailed list of information to be provided is specified in Annex IIA. The developer shall take into account, where relevant, the available results of other relevant assessments of the effects on the environment carried out pursuant to Union legislation other than this Directive. The developer may also provide a description of any features of the project and/or measures envisaged to avoid or prevent what might otherwise have been significant adverse effects on the environment.';

(b) the following paragraphs are added:

'5. The competent authority shall make its determination, on the basis of the information provided by the developer in accordance with paragraph 4 taking into account, where relevant, the results of preliminary verifications or assessments of the effects on the environment carried out pursuant to Union legislation other than this Directive. The determination shall be made available to the public and:

(a) where it is decided that an environmental impact assessment is required, state the main reasons for requiring such assessment with reference to the relevant criteria listed in Annex III; or

(b) where it is decided that an environmental impact assessment is not required, state the main reasons for not requiring such assessment with reference to the relevant criteria listed in Annex III, and, where proposed by the developer, state any features of the project and/or measures envisaged to avoid or prevent what might otherwise have been significant adverse effects on the environment.

6. Member States shall ensure that the competent authority makes its determination as soon as possible and within a period of time not exceeding 90 days from the date on which the developer has submitted all the information required pursuant to paragraph 4. In exceptional cases, for instance relating to the nature, complexity, location or size of the project, the competent authority may extend that deadline to make its determination; in that event, the competent authority shall inform the developer in writing of the reasons justifying the extension and of the date when its determination is expected.';

(5) in Article 5, paragraphs 1 to 3 are replaced by the following:

'1. Where an environmental impact assessment is required, the developer shall prepare and submit an environmental impact assessment report. The information to be provided by the developer shall include at least:

(a) a description of the project comprising information on the site, design, size and other relevant features of the project;

(b) a description of the likely significant effects of the project on the environment;

(c) a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;

ANNEX

(1) The following Annex is inserted:

'*ANNEX II.A*

INFORMATION REFERRED TO IN ARTICLE 4(4)

(INFORMATION TO BE PROVIDED BY THE DEVELOPER ON THE PROJECTS LISTED IN ANNEX II)

1. A description of the project, including in particular:

   (a) a description of the physical characteristics of the whole project and, where relevant, of demolition works;

   (b) a description of the location of the project, with particular regard to the environmental sensitivity of geographical areas likely to be affected.

2. A description of the aspects of the environment likely to be significantly affected by the project.

3. A description of any likely significant effects, to the extent of the information available on such effects, of the project on the environment resulting from:

   (a) the expected residues and emissions and the production of waste, where relevant;

   (b) the use of natural resources, in particular soil, land, water and biodiversity.

4. The criteria of Annex III shall be taken into account, where relevant, when compiling the information in accordance with points 1 to 3.';

(2) Annexes III and IV are replaced by the following:

'*ANNEX III*

SELECTION CRITERIA REFERRED TO IN ARTICLE 4(3)

(CRITERIA TO DETERMINE WHETHER THE PROJECTS LISTED IN ANNEX II SHOULD BE SUBJECT TO AN ENVIRONMENTAL IMPACT ASSESSMENT)

1. **Characteristics of projects**

The characteristics of projects must be considered, with particular regard to:

(a) the size and design of the whole project;

(b) cumulation with other existing and/or approved projects;

(c) the use of natural resources, in particular land, soil, water and biodiversity;

(d) the production of waste;

(e) pollution and nuisances;

(f) the risk of major accidents and/or disasters which are relevant to the project concerned, including those caused by climate change, in accordance with scientific knowledge;

(g) the risks to human health (for example due to water contamination or air pollution).

2. **Location of projects**

The environmental sensitivity of geographical areas likely to be affected by projects must be considered, with particular regard to:

(a) the existing and approved land use;

(b) the relative abundance, availability, quality and regenerative capacity of natural resources (including soil, land, water and biodiversity) in the area and its underground;

(c) the absorption capacity of the natural environment, paying particular attention to the following areas:

(i) wetlands, riparian areas, river mouths;

(ii) coastal zones and the marine environment;

(iii) mountain and forest areas;

(iv) nature reserves and parks;

(v) areas classified or protected under national legislation; Natura 2000 areas designated by Member States pursuant to Directive 92/43/EEC and Directive 2009/147/EC;

(vi) areas in which there has already been a failure to meet the environmental quality standards, laid down in Union legislation and relevant to the project, or in which it is considered that there is such a failure;

(vii) densely populated areas;

(viii) landscapes and sites of historical, cultural or archaeological significance.

3. **Type and characteristics of the potential impact**

The likely significant effects of projects on the environment must be considered in relation to criteria set out in points 1 and 2 of this Annex, with regard to the impact of the project on the factors specified in Article 3(1), taking into account:

(a) the magnitude and spatial extent of the impact (for example geographical area and size of the population likely to be affected);

(b) the nature of the impact;

(c) the transboundary nature of the impact;

(d) the intensity and complexity of the impact;

(e) the probability of the impact;

(f) the expected onset, duration, frequency and reversibility of the impact;

(g) the cumulation of the impact with the impact of other existing and/or approved projects;

(h) the possibility of effectively reducing the impact.

ANNEX IV

INFORMATION REFERRED TO IN ARTICLE 5(1)

(INFORMATION FOR THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT)

1. Description of the project, including in particular:

(a) a description of the location of the project;

(b) a description of the physical characteristics of the whole project, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;

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Screening for EIA in India: Enhancing effectiveness through ecological carrying capacity approach

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ABSTRACT

Developing countries across the world have embraced the policy of high economic growth as a means to reduce poverty. This economic growth largely based on industrial output is fast degrading the ecosystems, jeopardizing their long term sustainability. Environmental Impact Assessment (EIA) has long been recognized as a tool which can help in protecting the ecosystems and aid sustainable development. The Screening guidelines for EIA reflect the level of commitment the nation displays towards tightening its environmental protection system. The paper analyses the screening process for EIA in India and dissects the rationale behind the exclusions and thresholds set in the screening process. The screening process in India is compared with that of the European Union with the aim of understanding the extent of deviations from a screening approach in the context of better economic development. It is found that the Indian system excludes many activities from the purview of screening itself when compared to the EU. The constraints responsible for these exclusions are discussed and the shortcomings of the current command and control system of environmental management in India are also explained. It is suggested that an ecosystem carrying capacity based management system can provide significant inputs to enhance the effectiveness of EIA process from screening to monitoring.

1. Introduction

Around 110 low and middle income countries occupy about 75% of the world's land area and contain 93% of its population, but enjoy only about 19% of the world's 135 countries' gross domestic product (World Bank, 1997). Wood (2003) rightly pointed out that lack of improvement in EIA systems of developing nations will prove inadequate in terms of environmental protection at the global scale despite effective EIA systems in developed countries. The developing nations have also started some action in this regard as some 80 developing countries enacted some form of EIA legislation by the mid-1990s (World Bank, 1997; Glasson et al., 2005). However, the legal and institutional arrangements have not been made with a long term vision of sustainability. This shortcoming of EIA systems in most of the developing nations is being justified by citing their need to grow fast economically to be in a position to eliminate poverty and achieve the Millennium Development Goals (UN, 2005b).

The Screening guidelines for EIA reflect the first level of commitment the nation displays towards tightening its environmental protection system. This paper analyses the screening guidelines for EIA in India and dissects the rationale behind the exclusions and thresholds set in them. The screening process in India is compared with that of the EU EIA directive with the aim of understanding the extent of deviations from that of a screening philosophy in an economically developed scenario. Out of the exclusions from the EIA process in India the case of exemption for units inside industrial estates from the EIA process is analyzed in detail. The Tiruppur textile industry is highlighted for its positive and negative contributions and details about other similar cases are listed to show the extent of the problem. Finally the merits of ecological carrying capacity based environmental management are discussed along with its scope to improve the effectiveness of the EIA process from screening to monitoring.

2. Screening: significance in EIA

The process of screening can be defined as: "to determine whether or not a proposal should be subject to Environmental Impact Assessment (EIA), and if so, at what level of detail" (IAIA, 1999). Even though the above definition conveys the objective of

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the screening process in a simple and straightforward manner, the process of determining the same becomes complicated in a developing country. As this typically requires dedicated institutional capacity to carry out this task; time and resources from the project proponents; and imposes economic burden on small enterprises. EIA process at its best is expected to achieve the following: to protect the productivity and capacity of natural systems and the ecological processes which maintain their functions; and to promote development that is sustainable and optimizes resource use and management opportunities (IAIA, 1999). Although the stated objectives of every developing country is sustainable development (Earth Summit, 1997), in actual reality they are faced with complicated choices over conflicting tradeoffs primarily between the short term need to alleviate poverty and protection of environment for long term sustainability. Hence, the framing of screening guidelines assumes significance, as very stringent screening will hinder the economic growth of a nation and a liberal process or absence will result in inefficiency, wastage of resources and devastation of life-support systems (Jones, 1999; World Bank, 2002). Hence, the need for a rational screening process which even though need not stake out the exact mid point of the two probable scenarios outlined above, but has to tend towards a sustainable development strategy.

2.1. Approaches to screening

There are two fundamentally different approaches to EIA screening – (i) an environment centered approach, based on judgment of likely significant impact on environment from a proposal and (ii) a development-centered approach, based on the size and/or type of development. There is also a third option, being a hybrid of these two. Glasson et al. (2005) outlines the types of screening approaches as (i) thresholds approach and (ii) case-by-case screening approach. The thresholds approach adheres to the concept of a development approach where the thresholds are set in terms of size/capacity of projects and the case-by-case approach is an environment centered one where regardless of the size/capacity of proposals, every proposal is scrutinized for its impact on a specific environment. Lawrence (2003) details the screening approaches as being carried out in two stages such as determining (i) what should trigger an EIA requirement and (ii) which particular set of EIA requirements should be applied. Further, it is pointed out that these two screening steps normally focus on what (action), by whom (proponent) and where (the environment). Canter and Canty (1993) distinguish between screening based on policy delineation and that based on a preliminary study. Under screening based on policy delineation, further classification is made into project thresholds; sensitive area criteria; positive and negative lists.

An effective screening approach has to be a hybrid of the environment centered and development centered approaches. Because, though the environment in a certain location can be classified as sensitive, still certain benign green industries which can be located there needs to be listed for clarity and to avoid misuse or the other way the industries which should not be located can be specified. Such lists will remove the burden of case by case analysis on the screening authority and minimize the chance of ambiguity and corruption in decision making. Even in localities designated for location of all types of industries, only a certain quantity of pollutants can be safely assimilated by the various media (air, water and soil). Hence, a combined approach needs to be adopted to optimize the use of resources for effective screening. The details and the essential elements of such a combined approach are discussed in the forthcoming sections in the context of India.

2.1.1. Screening for EIA in India & the European Union

To evaluate a screening rationale compromised against the constraints of a developing nation, we need to analyze and compare it against a screening context free from most of those constraints. Hence, the screening guidelines of India are compared with that of the European Union with an aim to understand the extent of the deviations. The EU is characterized by high levels of literacy and per capita income than the developing world. High literacy levels ensure adequate environmental awareness and activism ensuring pressure on the authority to frame relevant legislation through adequate consultation with the stakeholders. High per capita income provides a country with resources to institute capacity aimed at environmental protection as indicated by the environmental kuznet's curve (UN, 2005a). The EU Directive is chosen for comparison as it can be considered to be free of the constraints faced by developing nations in general and India in particular. Moreover, the EU directive is a model legislation which needs to be emulated by the member nations and, hence, a better model to compare than the legislation of any country which invariably might be compromised by its prevailing socio-political regime.

In the EU, Environmental assessment is considered to be "a procedure that ensures that the environmental implications of decisions are taken into account before the decisions are made" (EU, 2005) and screening as "the process of determining whether or not EIA is required for a particular project" (European Commission, 2001). The screening requirement as per the EU Directives 85/337/EEC and 97/11/EC can be summarized as follow:

(i) Category of projects listed in Annex I of the EU directive which is well recognized as having the potential to affect the environment have to undergo EIA irrespective of their attributes.
(ii) The projects which under certain circumstances like low production capacity, location and technology might have negligible impact on the environment are listed in Annex-II of the directive. Whether the above premise holds well or not, has to be decided on a case to case basis guided by the criteria listed in Annex-III of this directive.

Though currently there is wide variation on thresholds and/or criteria adopted by EU member states, as per the directive, no project or activity can be excluded outright and at the least every project is required to be reviewed on a case by case basis against the specified criteria (European Commission, 2001). Now let us look at the developmental context and the screening rationale followed in India.

2.1.2. India: the screening context

India has invested considerable effort in carrying out the universally accepted principles of Rio Declaration. In one of its 27 principles, the Rio Declaration calls for EIA to be undertaken for activities that are likely to have a significant adverse impact on the environment (UN, 1992). The detailed analysis of India's EIA system under EIA Notification 1994 is available in Paliwal (2006) and Rajaram and Das, 2006. The screening guidelines of EIA 1994 are first presented and then the current guidelines as per EIA 2006 are discussed to understand the evolution of screening. Under EIA 1994, screening guidelines were issued for four categories of activities: Industry, Mining, Thermal Power, River Valley & Hydroelectric and Infrastructure. For the complete EIA notifications refer MEF (1994). The question of what will be put inside the EIA net and what will not be, evolved on an exclusionary non-participatory platform (Dubey, 2004).

The main approach to screening was one of excluding certain categories of projects based on investment thresholds. Hence,

exclusions from EIA included industries in the small-scale sector (with an investment less than INR 10 million (Euro 0.2 million)), certain industrial projects with investment less than INR 1000 million (Euro 200 million). It can be presumed that SSIs were exempted for their role in poverty alleviation by employing unskilled labor in large numbers and other constraints which are discussed later in this paper. This provision of exclusions in EIA 1994 based on investments for both new and expansion projects had encouraged rampant 'salami slicing' by the project proponents to circumvent the EIA process in India (Kohli and Menon, 2005). Under this scenario, change towards the best practice screening was expected from EIA 2006 which is discussed next.

2.2. EIA Notification 2006: changes in screening requirement

The screening criteria for EIA Notification 2006 (EIA 2006 henceforth) were evolved by the MEF and though public comments were invited, only a select few of the interested groups were invited to express their opinion (Saldanha et al., 2007). The main change in the screening criteria of 2006 was the adoption of capacity based exclusions than the investment size of a project. Another key change is the division of projects into A and B categories based on capacity. The Ministry of Environment & Forests (MEF) deals only with category A projects and the State Environmental Impact Assessment Agency (SEIAA) under the State Pollution Control Boards (SPCB) screens the category B projects, classifies them into B1 and B2 (MEF, 2006). B1 projects require an EIA and B2 projects need only to submit information on Form-I (questionnaire requesting information on raw materials used, waste generated and environmental features of the location) along with an Environmental Management Plan (EMP) for emissions and effluents. Although these changes make the screening process similar to the Annex I & II projects of the EU directive, it has many deficiencies as detailed below.

2.2.1. Exclusions from screening in EIA Notification 2006: industries not listed in Schedule-I

The Annex I of EU EIA directive which list projects that have to carryout an EIA contains 22 types of projects with a total of 44 listings including the project sub-types. In comparison the Indian listing of category A projects in Schedule I of EIA 2006 contains 28 types of projects with a total of 34 including the sub-types. Further in comparison to 88 projects including sub-types in Annex-II of EU directive, there are only 34 projects including sub-types under category B in EIA 2006. This difference in the number of projects illustrates the extent of exclusions from the Indian EIA process. The projects listed in EU directive and excluded from Indian EIA are listed in Appendix 1.

The critical nature of this difference becomes clear when we consider the fact that owing to high population and an environment dependent majority, impacts considered negligible in EU will have a substantial effect on the environment and communities in India (refer Rajaram and Das, 2007 for detailed discussion). This would mean that the listing of activities for screening in developing nations such as India has to be much more comprehensive than that of the EU. Moreover, the criteria for screening category B projects for further classification into B1 and B2 have not been specified till date.

2.2.2. Capacity based exclusions of listed industries/projects

For many of the projects which are covered in EIA 2006, capacity thresholds have been specified below which they are excluded from the EIA requirement. These projects along with the exclusionary threshold/criteria are listed in Table 1. From the above listing it can be seen that all the excluded capacities have the potential to impact the environment if located in ecologically fragile areas and ecosystem dependent communities. The philosophy behind these exclusions might be the aim to lessen the burden on the proponents and authorities rather than effective environmental protection. It can be noticed that industrial estates have been given a major concession. It is obvious that this is aimed at encouraging industrial growth, but the track record of industrial estates in adhering to the environmental norms are very poor (Polluted Places, 2008; Greenpeace, 1999; Banerjee, 2003; Rajaram and Das, 2008a). Since the EIA 2006 does not list all industries with impact potential like the EU annex II, it is possible to setup an industrial estate of less than 500 Ha area (say 490 ha) comprising entirely of small-scale textile dyeing units without carrying out an EIA. Such industrial estates which are functioning presently have had significant negative impact in the environment as detailed in the next section.

Table 1
List of projects with exclusionary thresholds in EIA 2006

Ref no.	Type of Project	Capacity/Criteria
1a	Mining	<5 Ha
1c	Hydroelectric power plants	<25 MW
1d	Thermal power plants Pet coke diesel and other fuels	<5 MW
3a	Non-toxic secondary metallurgical processing	<5000 ton/annum
4b	Coke oven plants	<25000 ton/annum
4d	Chlor-alkali (membrane tech)	inside industrial estates
4f	Leather/hide/skin processing	inside industrial estates
5e	Petrochemical based processing	inside industrial estates
5f	Synthetic organic chemicals	inside industrial estates
5j	Sugar industry	<5000 ton/day cane crushing capacity
7c	Industrial estates/EPZ/SEZ/Biotech parks/leather complexes	<500 Ha and not having any category A or B industry
7e	Ports & harbours	<10000 ton/annum of fish handling
7f	Highways	expansion for < 30 km
8a	Building & construction projects	<20000 sq.m.
8b	Townships and area development projects	<50 Ha & <150000 sqm

3. Blanket exemption for certain industries in industrial estates – why and where it can lead?

Under EIA 1994, the Small Scale Industry (SSI) was an outright exemption from EIA and in EIA 2006 they are still given the concession if they are located inside industrial estates. The case of exclusion of SSI is taken up for further discussion and analysis mainly because of the impact they have had on the environment which can be reduced through their inclusion into the EIA system. The reasons put forward in India for concession to SSIs are as follow: small investors cannot spend for EIA studies; the quantity of pollutant release is small when compared to large factories; EIA and EC delays the process of setting up an industry; the negative impact on the environment is small when compared to the bigger positive impact of job creation; the impact of pollution is local and can be monitored by State Pollution Control Boards (SPCB); excluded SSIs can be put in industrial estates and facilitated through common effluent treatment plants (CETP) and industrial growth is the only way to achieve poverty alleviation.

The role of SSIs – which are similar in nature to certain extent to the TVIEs (Town & Village Industrial Enterprises) in China, Small and Medium Enterprises (SMEs) as they are termed in Europe and Small Businesses in US – in the economic growth in general and job creation in particular is well appreciated and

Governments have initiated special laws to consider their interests in environmental law and enforcement (Agarwal, 2001; ECOTEC, 2000; EPA, 2005). The impact of SSIs on the economy can be clearly understood when we consider that it provides immediate large scale employment to unskilled workforce, offering a method of ensuring a more equitable distribution of national income and facilitating an effective mobilization of resources of capital and skill which might otherwise remain unutilized (Gulati, 1996: pp1). In India the SSIs together with Micro and medium enterprises have a share of 40% in the industrial production and 33% of the total manufactured exports employing about 31 million people in 12.8 million enterprises. The labor intensity in this sector is estimated to be four times higher than larger enterprises (MoMSME, 2006). The World Bank and the International Finance Corporation (IFC) have been particularly active in promoting small-scale enterprises, setting up a separate department for them in 2000 and allotted USD1.5 billion toward their development in 2002 (Rajshri and Lanjouw, 2004). The environmental degradation associated with uncontrolled promotion of SSIs is also widely recognized (ECOTEC, 2000; Snigdha and Mitrab, 2005; Ogenis, 2001). The case of Tiruppur textile industry is presented in the next section to illustrate their positive economic impact and the ineffectiveness of the current strategies in controlling their negative impact on the environment.

3.1. Case study: The Tiruppur textile industry

3.1.1. The Tiruppur textile industry: economic contribution

Tiruppur, the leading cotton knitwear industrial cluster in South India, located in Tamil Nadu State has more than 9000 small-scale knitwear related units employing about 500,000 people. The export valued from Tiruppur during the year 2006–7 was about USD 2 billion (Samuel Raja, 2008).

3.1.2. Impact on Environment

The study by Appasamy and Nelliyat (2000) brought out the following facts about the environmental impacts in Tiruppur: 702 bleaching and dyeing units were functioning by 2000 and their water consumption was about 86 million litres per day (MLD). Despite the construction of individual and common effluent treatment plants at considerable cost, salts, mainly chloride, continue to be discharged unabated. Although each individual unit discharges only a small quantity of effluents, the combined discharge of more than 700 bleaching and dyeing units outstrip the assimilative capacity, causing damage to agriculture, fisheries, and local ground water in and around Tiruppur.

3.1.3. Judicial Intervention

The farmers got themselves organized and resorted to agitation and legal recourse demanding the judiciary to rectify the situation brought on by the failure of the Government. The judiciary promptly pulled up the SSIs for not heeding their earlier directions and ordered them to pay up the subscription fees for putting up a joint zero discharge effluent treatment plant within a deadline or face closure (Sridhar, 2005a). The 'Loss of Ecology Commission' a State Government Agency had asked the Tiruppur dyes union to pay INR 4 Crores (USD 0.83 million) of compensation, a figure contested by the farmers union as it works out to a meagre INR 240/hectare (Sridhar, 2005b). As of June 2009, the Tiruppur SSIs were lobbying the government to implement a 300 km effluent pipeline project estimated to cost INR 800 Crores to convey the effluent to the Bay of Bengal (BS, 2009).

3.2. Is Tiruppur an isolated case?: How industrial estates are Responding to central control

The environmental damage perpetuated by the textile industry in Tiruppur is not an isolated case as evident from the environmental damage in these industrial estates dominated by SSI clusters: Ankleshwar-Chemicals, Howrah-Foundries, Kanpur-Tanneries, Nandesari-Chemicals, Panipat-Chemicals, Ambur-Tanneries, etc. (Polluted Places, 2008; Greenpeace, 1999; Banerjee, 2003; Rajaram and Das, 2008a). For more details about other sites in India devastated by SSIs see Polluted Places (2008). In the light of the contributions and problems associated with the SSIs, how many and how much of the arguments put forward for their exclusion is valid? Is there any way to move forward and progress towards sustainable industrial growth and poverty alleviation without its attendant destruction of life-support systems? Can EIA play any role at all in this constraint ridden situation? To understand the reasons for this situation it is necessary to look at the overall framework of environmental management in India and the position occupied by screening for EIA in it.

4. The link between screening for EIA and general pollution control in India

The link between the environmental management of projects which are required to conduct an EIA and those that are exempted from an EIA is given in Fig. 1. The figure shows that, category A industries which are required to conduct an EIA as per EIA 2006 are dealt by the MEF for grant of environmental clearance and the SPCB is required to conduct the public hearing and forward the minutes along with the final EIS to MEF. Whereas category B industries go through the screening process by the SPCB and if these projects are categorized as B1 (EIA required) go through all the steps as a category A industry but at the state level with the SPCB being the sole clearance authority. The projects categorized as B2 (EIA not required) are required to submit an environmental management plan and apply for 'consent to establish (CTE)' under the Air and Water Acts. The SPCB scrutinizes the EMP and provides CTE with or without conditions. The construction of the project is started and when it is ready for commissioning, they need to apply to the SPCB for 'consent to operate (CTO)'. The SPCB verifies the implementation of the EMP and provides CTO with which the project can be commissioned.

4.1. Why EMP is inadequate for Unlisted industries

Industries which are exempted from conducting EIA studies are required to apply for CTE by filling up forms under The Water (Prevention and Control of Pollution) Act, 1974 and The Air (Prevention and Control of Pollution) Act, 1981 (MEF, 2010). These forms typically request information regarding the raw materials used, quantity of water consumed, wastes generated (air emissions, liquid effluents, solid/hazardous wastes) and the treatment scheme proposed for treatment and disposal of the wastes. The EMP typically consists of proposed treatment schemes for disposal of the contaminants in concentrations upto or below the allowable limit specified by the SPCBs. These limits of contaminants in India are collectively known as Minimum National Standards (MINAS). For example as per MINAS, liquid effluents with Bio-chemical Oxygen Demand of less than 30 mg/L (BOD<30 mg/L) can be discharged into water bodies, provided the other contaminants listed under MINAS also meet their limits. These uniform discharge standards such as MINAS are ineffective in controlling pollution of the environment as they do not consider the cumulative effect of high

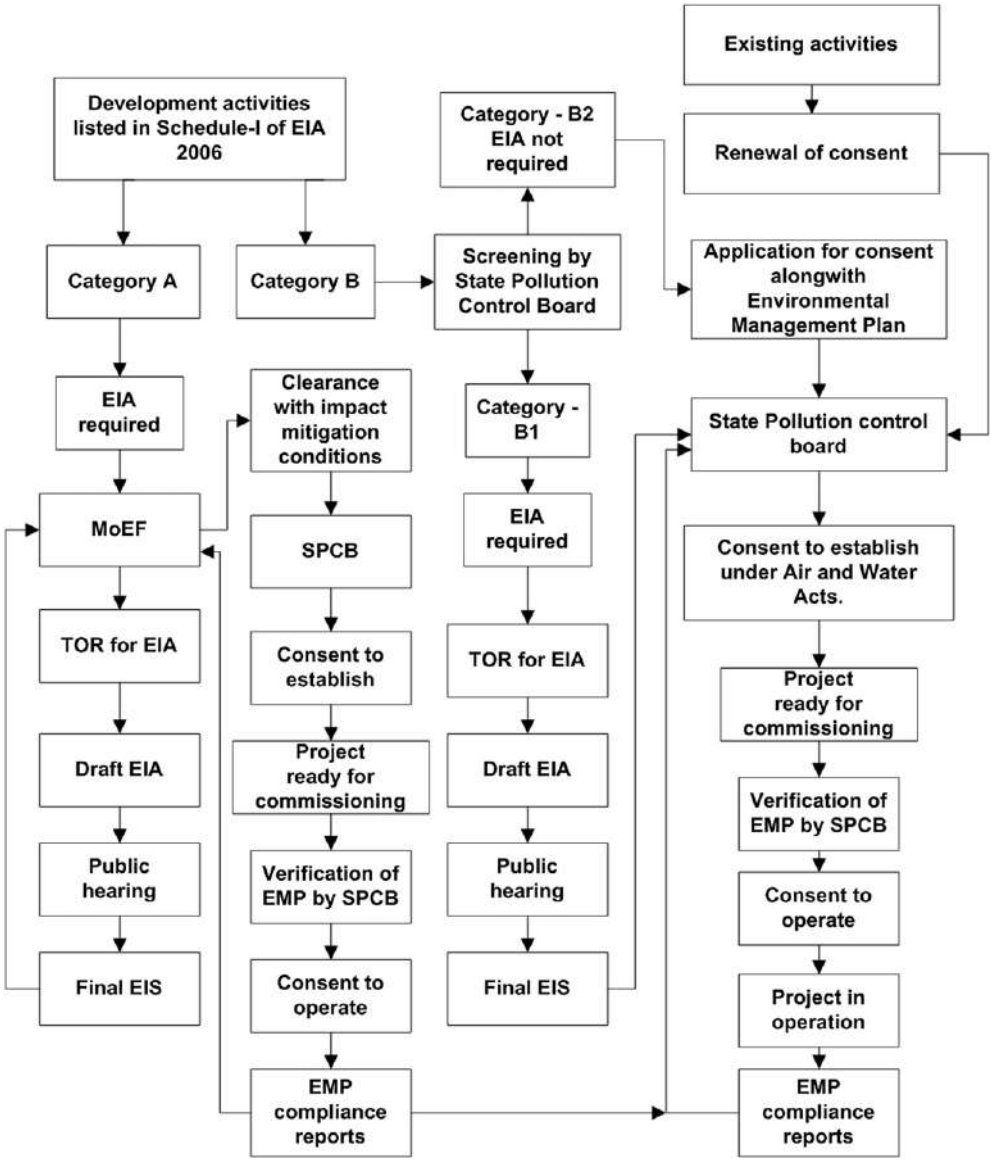

Fig. 1. Flow sheet of environmental management for projects requiring EIA and projects exempted from EIA.

volume of discharges from single or multiple sources. Hence, developed nations have already adopted ecosystem specific standards such as Total Maximum Daily Load (TMDL) (USEPA, 2008). The detailed discussion of the drawbacks of the MINAS under the Command and Control (CAC) system for control of Industrial effluents in India can be found in Rajaram and Das (2008a).

4.2. How cumulative impacts are ignored under mere environmental management plans (EMPs)

Exemption of industries from the EIA process under the premise that they can be taken care through the consent forms has not proved to be the right policy. Even industries conducting EIA studies still submit an EMP for liquid effluents and air emissions aimed at satisfying the MINAS and not the ecosystem specific impact mitigation plan. This compromises the effectiveness of the whole EIA system and reduces it to a mere form filling formality in India. When the consideration of direct impacts from activities is not mitigated through the EMP and its effective implementation and follow-up, consideration of cumulative impacts under the EMP remains elusive in India. But as calculating the cumulative impacts require data from multiple activities, it is the regulatory authority which is best placed to carryout the task than the proponent of a single activity.

5. Discussions: carrying capacity based clearances as an Alternative to Conventional project EIAs

The problem of how to bring all the industries including the SSIs into the EIA net can be solved if the constraints regarding access to expert knowledge and cost of conducting the study can be reduced and/or shared. Traditionally as per the EIA systems which evolved in the developed countries, the project proponents are responsible to carryout EIA at their expense. This cost which works out to be a fraction of the total investment for a large scale venture assumes a larger proportion for smaller ventures i.e. SSIs/SMEs. Hence,

instead of excluding the SSIs from conducting such studies, why should not the regulatory authority take the responsibility? The chronic problem of credibility of EIA studies conducted by the consultant-proponent nexus can be cured by shifting the responsibility of determining the significance of impacts to the regulatory authority with involvement of local public/NGOs. The model where the Government takes responsibility to carry out EIA and achieve its intended objectives (to protect the productivity and capacity of natural systems) by linking it with ecological carrying capacity of the area is proposed in Fig. 2.

This proposed model requires the following to be effective: detailed database of ecological processes and the functions they maintain, carrying capacity of the natural system in terms of its productivity and safe pollutant assimilation, linkages which the local populace has with ecological components and current status/trend of key resources in terms of its sustainability. The regulatory authority with the help of such information will be in a good position to judge the impact of any new activity on the sustainability of the local human–ecological interactions. Moreover, industries affect the environment mainly through extraction of resources (water chiefly), discharge of liquid effluents, and emission of air pollutants and disposal of solid/hazardous wastes. Other impacts in the case of SSIs are minor in comparison to large projects and are negligible when located in urban/industrial areas. Of the four main impacts outlined above, except solid/hazardous waste other impacts cannot be transferred to other ecosystems easily. And in terms of their effect on the local ecosystems, air emissions have the least impact when compared to other factors. This is a key factor in the unrestrained release of greenhouse gases which have impacted the global commons (atmosphere). Hence, extraction of resources and discharge of water pollutants which have a cumulative impact on the local ecosystem have to be regulated based on the carrying capacity. The solid/hazardous waste needs to be integrated into the regional waste management plan and the air emissions have to be tied along with the national emissions target.

For any EIA system to be successful it should have an efficient monitoring programme to ensure that pre-project plans & promises are met consistently. It is important that the EMP from EIA is integrated properly into the EMS of the functioning project for it to be effective (Bailey, 1997; Morrison-Saunders and Bailey, 1999). In resource scarce developing nations, this cannot be achieved by SPCBs alone without the participation of local community. Industrial pollution reduction through informal regulation by community pressure has been recognized as being influential (Schumacher, 1989; Blackman and Bannister, 1996; Goldar and Banerjee, 2004). The local community in many parts of the world which is primarily dependent on the ecosystems through agriculture and/or hunting-gathering have a wealth of knowledge about their environment. This ability to read local ecological processes mainly developed through experience and passed on through generations by their instincts to just survive. The model of community based resource management which is popular in the area of forest management (Nayak and Berkes, 2008) needs to be replicated in other ecosystems as well. Hence, we have to institutionalise their role as partners in managing our ecosystems with proper consideration and utilization of traditional ecological knowledge for fixing criteria and indicators of ecosystem health apart from the use of resource intensive scientific models (Rajaram and Das, 2008b).

Further, the Government needs to strengthen its SPCBs in terms of manpower and infrastructure as more investment is likely in future in the dirty sectors of chemicals, pesticides, and every imaginable industry with high pollution potential. The cost of carrying out all these studies need not be borne fully out of public funds. Instead, the total cost can be divided among the SMEs which will definitely be lesser than the cumulative cost when the SMEs conduct them individually and can also be collected in monthly or quarterly instalments much like the yearly fees for license under the Water and Air Acts collected from them at present. Funds spent on such ventures are justified when we consider the fact that annually ecosystem degradation in India is estimated to be around 10% of GDP or around USD 70 billion (Pachauri, 2004) (based on GDP of USD 688.7 billion in 2004 (World Bank, 2005)) which is the loss of capital asset and much of it irreversible for a long time.

From the proposed Environmental clearance procedure the regulating authorities with the help of local participation can keep account of every effluent outlet and control the industrial development of any area inline with its carrying capacity as staying within source and sink capacity is primary to achieve sustainable development (Sadler, 1996, pp 209). Of course SMEs approved through this system can still go on to release untreated effluents, but monitoring and control through local public participation can avoid the repeat of Tiruppur like situations in future and promote pro-poor growth of SMEs which ultimately will lead to alleviation of poverty, the important of Millennium Development Goals. The cost of developing local ecosystem databases, conducting EIA and carrying capacity studies can be further reduced by involving NGOs, research institutes and local universities and can be made more significant and participatory by incorporating Local Ecological

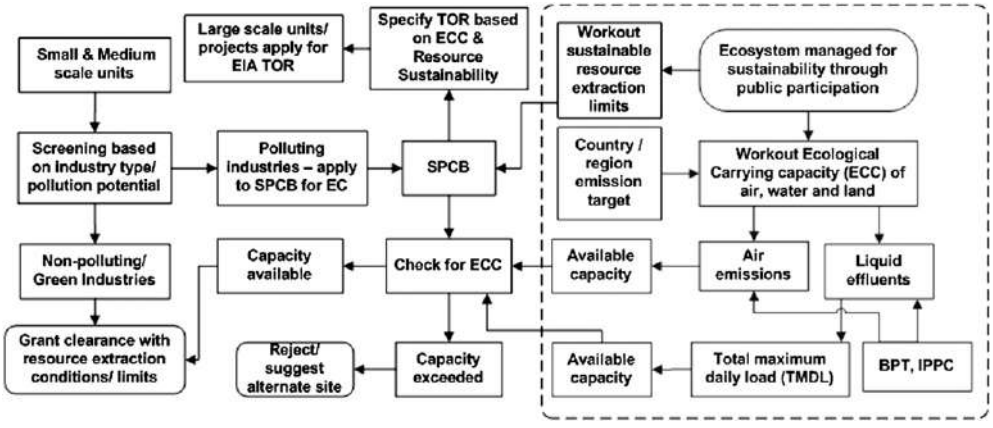

Fig. 2. Modified Environmental Clearance & Monitoring Process based on Ecological Carrying Capacity.

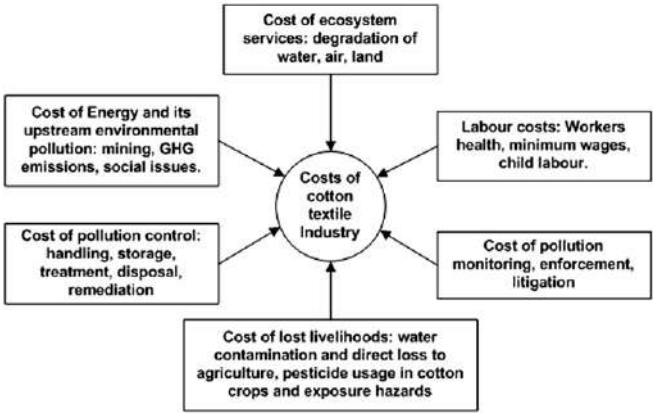

Fig. 3. Costs of Textile Industry which are to be internalised.

Knowledge (LEK). This approach will definitely lead to a much effective system of environmental conservation and management as an informed citizenry is recognized of having the ability to reduce environmental disasters (Skanavis et al., 2005).

5.1. Economic growth Led poverty alleviation at what cost?

The task of designing environmental management systems cannot be undertaken blindly to fulfil the requirements of economic growth without scrutinizing the actual need/attendant effects of unrestrained economic growth. Globally it has become very clear that liberalised economic growth aimed at creating wealth which is expected to trickle down to the poor is not happening but is increasing poverty and inequality (Stiglitz, 2002). Further it is the poor who suffer most due to ecosystem degradation (Millennium report, 2005) which in the case of Tiruppur SSIs has been the result of externalizing the cost of economic production & export of textiles. To arrive at the true cost of production of textiles in this case, we need to account for the various components of cost of ecosystem damage into the cost of textiles manufactured which is presently borne collectively by the society as shown in Fig. 3. According to a World Bank study, between 1975 and 1995, as India's GDP doubled, industrial and vehicular pollution load went up between four and eight times respectively (Anon, 1999, pp 32). Deterioration in urban environment, increase in slum population, and in air, river, and water pollution has vastly affected the quality of life of the urban poor (Khurana, 2004, pp1).

The trend of relying on exports like textiles, pesticides, chemicals and other products which the developed world is willing to import (for the simple reason that the real cost of manufacturing them are unrecoverable and unjustifiable against the irreversible loss of life-support systems) is not sustainable in the long term. Hence, there is an urgent need for any society to adopt a zero tolerance policy when it comes to safeguarding its life-support systems for continued sustainable survival. But even pollution intensive Industrial manufacturing is very much required for satisfying any society's internal consumption, and to trade the surplus produced according to sustainable strategies in order to import goods and services which are locally unavailable.

Implementing sustainable strategies should begin through existing tools such as EIA and focus on making it effective. Sadler (1996, pp39) identifies three distinct review parameters as: procedural: – does the EA process conform to established provisions and principles?, substantive: – does the EA process achieve the objectives set, i.e., support well informed decision making and result in environmental protection? and transactive: – does the EA process deliver these outcome at least cost in the minimum time possible, i.e., is it effective and efficient?. The substantive objective of environmental protection can only come about through an EIA system with components from screening to monitoring strengthened to enable development which is environmentally sustainable. A supporting system such as an ecosystem carrying capacity based management system can provide significant inputs to enhance the effectiveness of EIA process from screening to monitoring.

6. Conclusions and Recommendations

The current screening regulation of EIA 2006 in India with its exclusions is off-line from a sustainable development strategy. A more logical inclusive approach along the lines of the EU directive should be adopted. The list of projects in category B needs to be expanded to include a number of projects clearly identified in Annex II of the EU EIA directive. Clear and transparent criteria for categorizing projects into B1 and B2, needs to be specified in EIA 2006. The SSIs/SMEs in industrial estates excluded from EIA system have polluted the ecosystems around industrial areas across the country threatening India's sustainability and need to be brought under the EIA system. The constraints of the SSIs can be alleviated by adopting the proposed EIA system based on ecological carrying capacity where their constraints are considered. The Project EIA system for industries needs to be integrated with SEA and carrying capacity studies with SPCBs and local institutions playing the central responsible role in pre-project EIA and post-clearance monitoring. The SPCBs in India need to be strengthened in terms of infrastructure and manpower to protect the environment against the increasing tide of polluting industries which will be setup in India in the coming years. Framework and methods to incorporate the local ecological knowledge of the local people must be developed and adopted in the EIA process to enable it to achieve its substantive purposes.

Appendix. Projects with impact potential not covered under EIA 2006 in comparison with EU directive.

Annex I (EIA Mandatory)

7. (a) Construction of lines for long-distance railway traffic 11. Groundwater abstraction or artificial groundwater recharge schemes where the annual volume of water abstracted or recharged is equivalent to or exceeds 10 million cubic metres. 13. Waste-water treatment plants with a capacity exceeding 150 000 population equivalent as defined in Article 2 point (6) of Directive 91/271/EEC. 17. Installations for the intensive rearing of poultry or pigs with more than: (a) 85 000 places for broilers, 60 000 places for hens; (b) 3000 places for production pigs (over 30 kg); or (c) 900 places for sows. 20. Construction of overhead electrical power lines with a voltage of 220 kV or more and a length of more than 15 km.

Appendix (*continued*)

Annex II (to be screened for EIA)

1. *Agriculture, Silviculture and aquaculture* (a) Projects for the restructuring of rural land holdings; (b) Projects for the use of uncultivated land or semi-natural areas for intensive agricultural purposes; (c) Water management projects for agriculture, including irrigation and land drainage projects; (d) Initial afforestation and deforestation for the purposes of conversion to another type of land use; (e) Intensive livestock installations (projects not included in Annex I); (f) Intensive fish farming; (g) Reclamation of land from the sea. *2. Extractive Industry* (a) Quarries, open-cast mining and peat extraction (projects not included in Annex I); (b) Underground mining; (c) Extraction of minerals by marine or fluvial dredging; (d) Deepdrillings, in particular: – geothermal drilling, -drilling for water supplies, with the exception of drillings for investigating the stability of the soil; *3. Energy Industry* (i) Installations for the harnessing of wind power for energy production (wind farms). *4. Production and processing of metals* (a) Installations for the production of pig iron or steel (primary or secondary fusion) including continuous casting; (b) Installations for the processing of ferrous metals: (i) hot-rolling mills; (ii) smitheries with hammers; (iii) application of protective fused metal coats; (c) Ferrous metal foundries; (d) Installations for the smelting, including the alloyage, of non-ferrous metals, excluding precious metals, including recovered products (refining, foundry casting, etc.); (e) Installations for surface treatment of metals and plastic materials using an electrolytic or chemical process; (f) Manufacture and assembly of motor vehicles and manufacture of motor-vehicle engines; (g) Shipyards; (h) Installations for the construction and repair of aircraft; (i) Manufacture of railway equipment; (j) Swaging by explosives; (k) Installations for the roasting and sintering of metallic ores. *5. Mineral Industry*
(d) Installations for the manufacture of glass including glass fibre; (e) Installations for smelting mineral substances including the production of mineral fibres; (f) Manufacture of ceramic products by burning, in particular roofing tiles, bricks, refractory bricks, tiles, stoneware or porcelain. *6. Chemical Industry (not included in Annex I)* (a) Treatment of intermediate products and production of chemicals; (b) Production of pesticides and pharmaceutical products, paint and varnishes, elastomers and peroxides; *7. Food Industry*
(a) Manufacture of vegetable and animal oils and fats; (b) Packing and canning of animal and vegetable products; (c) Manufacture of dairy products; (d) Brewing and malting; (e) Confectionery and syrup manufacture; (f) Installations for the slaughter of animals; (g) Industrial starch manufacturing installations; (h) Fish-meal and fish-oil factories; (i) Sugar factories. *8. Textile, Leather, wood and paper products* (a) Industrial plants for the production of paper and board (projects not included in Annex I); (b) Plants for the pretreatment (operations such as washing, bleaching, mercerization) or dyeing of fibres or textiles; (d) Cellulose-processing and production installations. *9. Rubber Industry* - Manufacture and treatment of elastomer-based products. *10. Infrastructure projects* (c) Construction of railways and intermodal transshipment facilities, and of intermodal terminals (projects not included in Annex I); (e) Construction of roads, harbours and port installations, including fishing harbours (projects not included in Annex I); (h) Tramways, elevated and underground railways, suspended lines or similar lines of a particular type, used exclusively or mainly for passenger transport; (k) Coastal work to combat erosion and maritime works capable of altering the coast through the construction, for example, of dykes, moles, jetties and other sea defence works, excluding the maintenance and reconstruction of such works; (l) Groundwater abstraction and artificial groundwater recharge schemes not included in Annex I; *11. Other projects* (a) Permanent racing and test tracks for motorized vehicles; (b) Installations for the disposal of waste (projects not included in Annex I); (c) Waste-water treatment plants (projects not included in Annex I); (d) Sludge-deposition sites; (e) Storage of scrap iron, including scrap vehicles; (f) Test benches for engines, turbines or reactors; (g) Installations for the manufacture of artificial mineral fibres; (h) Installations for the recovery or destruction of explosive substances; (i) Knackers' yards. *12. Tourism and leisure* (a) Ski-runs, ski-lifts and cable-cars and associated developments; (b) Marinas; (c) Holiday villages and hotel complexes outside urban areas and associated developments; (d) Permanent camp sites and caravan sites; (e) Theme parks. *13 – Any change or extension* of projects listed in Annex I or Annex II, already authorized, executed or in the process of being executed, which may have significant adverse effects on the environment; – Projects in Annex I, undertaken exclusively or mainly for the development and testing of new methods or products and not used for more than two years.

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Beyond 25 years of EIA in India: Retrospection and way forward

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ABSTRACT

Environmental Impact Assessment (EIA) experience in India dates back since the 70s when it was practiced only as an administrative decision. However, it was not made mandatory until 1994 with the introduction of the EIA Notification under the Environmental Protection Act of 1986. Hence, it's been just over 25 years since EIA was formally introduced in the country and in celebrating this landmark occasion, the paper provides a review of EIA performance in India since its inception. In doing so, it provides a systematic analysis against criteria set by one of the first EIA reviews conducted in the country way back in 1994. The four broad categories of this review include completeness, open and public character, objectivity and verifiability. In conducting the review, the paper consolidates publications on this subject area. This is further complemented with data collected via online survey and interviews with experts in the field. The findings reveal that since its inception days, EIA in India has made significant progress with regards to open and public character. However, this is still in need of further improvements. With regards to the other two criteria of completeness and objectivity, progress is rather limited. However, there has been hardly any improvements made with regards to verifiability of EIA. The new EIA notifications being drafted in the country do not seem to be engaging with the lessons learned over the years. Hence, based on the findings of the review, the paper provides some initial recommendations. In doing so the work further draws comparisons and inspirations from international experiences.

1. Introduction

Environmental Impact Assessment (EIA) i.e. Environmental Assessment (EA) applied at the project level has been formally introduced and made mandatory in the Indian legislation via the EIA Notification of 1994, which was enacted under the Environmental Protection Act (EPA) of 1986 (Paliwal, 2006). However, the foundation of EIA in India was first laid in 1976–77 when the Planning Commission directed Department of Science and Technology (DST) to examine major projects from an environmental angle for supporting administrative decisions. These were mainly river valley projects followed by major public sector projects. In 1986, the need for incorporating environmental considerations within the Indian planning process was first reflected through the umbrella EPA legislation which required environmental appraisal to be undertaken for certain projects (Valappil et al., 1994). Hence with nearly three decades of EIA experience and with more than 25 years of mandatory requirement of EIA in India, the EIA system within the country continues to suffer from various weaknesses (Rathi, 2017). This paper offers a systematic review of EIA in India since its inception and accordingly presents a comprehensive overview of the academic literature, which has been published on the subject over the last three decades. Secondly, in doing so this review not only identifies the strength and weaknesses of EIA in India, but it does so retrospectively, allowing us to trace how things have changed or not changed over the years. Third, though the EIA system in India has been reviewed by various authors, they have adopted different approaches in carrying them out. Therefore, the discussions have not allowed for a systematic comparison to be drawn. This work will allow such comparisons to be drawn by adhering to the methodology adopted in the earliest review paper (See methodology section). It should be further noted that this initial review criterion allows the paper to conduct a holistic review, which looks at both procedural changes along with substantive changes such as the influence that EIA has had in decision-making. Furthermore, the survey and interviews have engaged with stakeholders representing practice, consultancy and academia enabling a well-rounded view to be established. Finally, based on the findings of the review, some initial recommendations have been drawn.

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1.1. Setting the context: EIA in India

During the last three decades, EIA has come a long way but so has India. The EIA Notification of 1994 was amended 11 times in 12 years and eventually was replaced by the EIA Notification of 2006. The 2006 Notification too has been undergoing a series of changes with 40 interventions in the last 14 years (Jha-Thakur and Rajvanshi, 2020). At present, the country faces tremendous growth pressures and tricky environmental challenges relevant both to the developed and the developing world. An increasing population and rapid urbanisation compounded with global environmental problems such as climate change is bringing about additional environmental challenges and vulnerabilities. Furthermore, failure of the developmental planning process in adequately protecting the environment and the new changes to the organization of the planning system in India under the present political environment, emphasises the need to evaluate the role that EIA and more broadly EA needs to play in India (Turaga et al., 2019).Therefore, the aim of the paper is to review EIA performance in India since its inception and accordingly provide recommendations in order for it to play an effective role in the future of the country. The description of the EIA system in terms of institutional set-up and procedures adopted are beyond the scope of the paper though it refers to several published articles that do this effectively. The rest of the paper is broadly divided into four sections. In the following section, the methodology adopted is presented. In the third section, EIA in India is evaluated retrospectively since its inception against the approach used by Valappil et al. (1994). In the following section, EIAs future role is explored while providing recommendations and finally overall conclusions are drawn.

2. Conceptual framework and methodology

It is worth noting that there have been four major reviews undertaken for the EIA process in India, which includes Valappil et al. (1994), Banham and Brew (1996), Paliwal (2006) and Rathi (2017). The earliest review was done by Valappil et al. (1994), and this review was based on the EIA system and practices that existed before EIA was mandatory through the EIA Notification in 1994. Furthermore, the review framework used in this study is holistic in nature enabling both procedures to be reviewed along with the influence that EIA has had on decision-making in India. The other reviews conducted for EIA in India have focused either on a SWOT type of analysis (Paliwal, 2006; Rathi, 2017) or have focused on quality review of procedural strengths and weaknesses (Banham and Brew, 1996). However, the timing of Valappil et al. (1994) paper along with the breadth and scope of the criterion provides itself as an ideal benchmark against which, the EIA system of the country can be evaluated through its evolution over the last quarter of a century. Hence, this paper adheres to the methodological approach adopted by Valappil et al., 1994.

Valappil et al. (1994) used Devuyst's review package (Devuyst, 1994), which was based on Lee and Colley, 1990 and consisted of seven criteria. This included determination of activities subject to EIA, scoping, preparation of EIA report, independent control, public participation, decision-making and post-project analysis. Valappil et al. (1994) categorised these seven sub-criteria into categories of a) Completeness, b) Open and public character and c) Objectivity and Verifiability. The last category dealt with objectivity and verifiability together in their analysis. However, with the evolution of the EIA system around the world and in India, verifiability, which relates to effectiveness has developed as a strong component on its own right (Jha-Thakur and Fischer, 2016) and has been investigated as a separate category in this paper (See Table 1). Furthermore, the first review of the EIA system was published in 1994, which is the same year when the EIA Notification was passed in India. Therefore, following this approach allows us to trace the evolution of EIA in the country systematically since its inception.

Valappil et al. (1994) used two reviewers to conduct the review process. However, in this paper, the review is being done on the basis of the information available from three essential sources, which include a) systematic literature review; b) online survey amongst EIA stakeholders in India and finally c) interviews with five EIA experts from India. These data collection methods are also spread through the years and the findings from these sources is further complimented by a wider literature review of published articles and books, as well as grey literature and material available on the internet.

Table 1
Explanation of Criterion used in the study.

Criteria	Explanation	Sub Criteria
Completeness	This is usually associated with the EIS report and addresses concerns related to discussion of relevant environmental effects; consideration and discussion of alternatives and mitigating measures; availability of guidelines especially with regards to techniques and methodologies; types of projects included within the list for EIA and whether possibility of transboundary EIA and EIA for policies, plans and programs (in other words known as Strategic Environmental Assessment-SEA) are considered.	Do you perceive the list of projects requiring EIA to be robust (Screening)? Does EIS report always considers the key issues of the project and discusses them in adequate depth (Scoping)? Are alternatives usually considered within EIA in India? Are mitigation measures adequately covered in EIA? Are there adequate guidelines available for techniques and methodologies to be used in EIA? Are EAs carried out above the project level? Does EIA consider transboundary issues?
Open and public character	Considerations in this category includes the role of EIA in discouraging the possibility for authorities to take arbitrary political decisions, enhancement of democratisation of decision-making; incorporation of values, needs and knowledge of local population and availability and transparency of EIA related documents, reports and decisions to public.	Is public participation adequately conducted through EIA? Does EIA include local knowledge, values and needs? Does EIA enhance the democratisation of decision-making and discourage arbitrary political decisions? Has the Indian EIA process achieved transparency?
Objectivity	This deals with expertise of the people who are involved in the preparation and review of the EIA reports; independence with which they can conduct their role without conflict of interest; overall credibility and neutrality of the EIA process.	People involved in the EIA report preparation have achieved the required expertise? People involved in the EIA process have independence with which they can work without any conflicting interest? Overall do you think the EIA process in India is credible and neutral?
Verifiability	This relates to the requirement of external inspection and control for every step of the EIA procedure; possibility to check whether the proponent adheres to the procedure and if the contents of the EISs are of quality; the extent to which the results of the EIA influences the decision-making process; possibility to check the accuracy of the predictions made and finally the effectiveness of the mitigation measures carried out.	Are there efficient compliance monitoring to ensure proponents adhere to procedures? Does EIA influence decision-making? Do you think EIS is of good quality? Are the accuracy of predictions verified? Are the mitigation measures effectively carried out in practice?

(Based on Devuyst, 1994; Valappil et al., 1994).

2.1. Systematic literature review

The study sets out to evaluate EIA practice in India by systematically reviewing the related literature published in international journals till date, which is over the span of last 32 years (1986–2020). This time span further makes sense as the umbrella act of EPA under which EIA was introduced was enacted in 1986 and this helps in setting the context for the mandatory uptake of EIA in the country. Following on from the approach adopted by Jha-Thakur and Fischer (2016), this work focusses on four leading international journals on EA, namely Environmental Impact Assessment Review (EIA Review), Impact Assessment and Project Appraisal (IAPA), Journal of Environmental Assessment Policy and Management (JEAPM) and Journal of Environmental Planning and Management (JEPM). Fig. 1 provides a summary of the 28 articles published in these journals, which relate to EA in India. This includes articles, which are dedicated on EA in India or within which, India has featured as a comparative case study or constitutes part of a wider survey.

As far as the focus of these papers are concerned, they can be discussed under the categories of sectors and EA procedures. Hydro Power sector seems to be the most popular sector with six papers being dedicated on the subject (for e.g. see Diduck et al., 2007; Erlewein, 2013), followed by biodiversity related projects and programmes, each of which have been discussed in three papers (e.g. Khera and Kumar, 2010). Apart from these, coal mining, nuclear power, urban planning/land use and highway projects have also been specifically discussed. Certain papers have looked at multiple sectors including transport, cement, oil and gas exploration, bulk drug and drug intermediates and industrial estates (e.g. Sainath and Rajan, 2015). With regards to EA procedures, six papers have looked into public participation and community development making it the most popular stage of EA to be discussed (e.g. Rajvanshi, 2003). Other procedural stages which have received special attention include, scoping and follow-up (Jha-Thakur et al., 2009a, 2009b; Rajaram and Das, 2008).

2.2. Online survey

Secondly, the study draws results of an online survey to complement the findings where ever appropriate. The survey was conducted in India (June 2013) in unfolding the perception towards effectiveness of EIA in the country. The three parts of the survey helped in establishing—a) the respondent's background in terms of educational, experience and role within EIA; b) the respondents' perceptions on EIA's influence in decision-making in India, and c) part three focused primarily on what an ideal EIA system in India may look like and what opportunities were available for doing this. A total of 176 responses were available. It should be noted that the online survey was based in 2013, hence perceptions may have evolved since then.

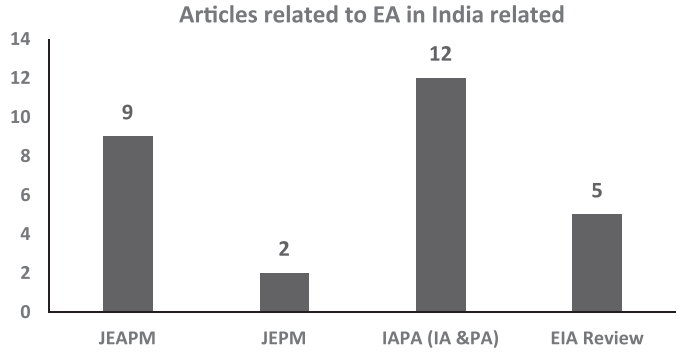

Fig. 1. Publications focussing on India in four EA related international journals (1986–2018).

2.3. Expert opinion

The analysis of the evolution of EIA in India is based primarily on the two sources of data collection mentioned above. However, the findings were further substantiated with the views of five EIA experts in India, which were collected in 2019 via interviews. To ensure a balanced representation the choice of the experts was intentionally varied to include views from consultancy, research institute, involvement within the ministry and academia. Furthermore, it was ensured that they had a sound reputation within the EIA system in India and were chosen with referral from known contacts in the Indian EIA community.

3. Evaluating the evolution of EIA in India

3.1. Completeness

3.1.1. Screening

Completeness refers to the 'breadth of activities that are subject to EIA' (Valappil et al., p. 81). One of the first questions to be explored in this category is the type of activities that require EIA to be undertaken or in other words how screening is done in EIA. The key framework legislation introduced in 1986 was the Environmental Protection Act under which 11 categories of projects required EIA to be carried out (Banham and Brew, 1996). The 1994 Notification made it mandatory for all projects listed in its schedule I, which included a total of 29 categories, to seek permission for development on the basis of an EIA. This process is known as Environmental Clearance (EC) in India (Jha-Thakur et al., 2009a). The number of categories was eventually increased to 32 with subsequent amendments and these projects were grouped under nine broad categories by sector. However, the threshold determining the requirement for EC was still based on the 'capital cost of the project' (Paliwal and Srivastava, 2012; Banham and Brew, 1996, p.198). As a result, EIA was not required for smaller industries with investments less than INR 1billion. Eventually with the introduction of EIA notification of 2006, screening criteria of investment size was replaced by the capacity of the project. Furthermore, it also divided the projects under category A and B on the basis of capacity. Category A projects were required to be considered by the Central Ministry of Environment and Forest (MoEF) and category B is considered by the State Environmental Impact Assessment Agency (SEIAA). The latter is further classified as B1 and B2. B1 projects require EIA while B2 projects submit information based on Form-1 which in a questionnaire format requires information on raw materials, waste generation, environmental details of location along with emissions and effluents (MoEF, 2006). The number of projects enlisted keeps getting adjusted through amendments. However, it has been argued that the screening process does exclude many projects having significant environmental impacts due to them falling below a certain size. Hence, Rajaram and Das (2011) advocates that ecological carrying capacity should be the determining factor for screening. As far as expert opinion is concerned, three out of our five experts view that screening is achieved well in India, while one expert viewed it to be very well performed in India. According to one of the experts '*New sectors/categories of projects needs to be included for mandatory EIA' as it 'seems to be less effective particularly in case of sectors like real-estate/township development, roads and highways etc. in India'*. Also, railways seem to be escaping the need of EIA requirements (MoR, 2020).

3.1.2. Scoping

Based on the EPA of 1986, Valappil et al. (1994) criticised the scoping stage for the lack of public consultation, lack of project specific approach and the reliance on subjective interpretation. Interestingly, scoping continues to face the same issues over the past 25 years. Based on the 1994 Notification, scoping was facilitated in EIA via a set of guidelines and review checklists (MoEF, 2001). The MoEF provided general questionnaires for all the sectors (Paliwal, 2006). Furthermore, the onus of identifying the key issue lies with the proponent and based

on the experiences, proponents are not diligent enough to take interest in identifying diverse impacts of their projects. Paliwal (2006) provides such an example of a project in an industrial estate of Haldia, which is located in the banks of the Hoogly river. The proponents in this case didn't estimate the impacts of their effluents on the ground water and nearby flowing river streams and the EIA reports got away with it 'saying that impact of their loadings would be negligible when compared with the quantum of flow in the river Hoogly' (p.15). (). Based on the 2006 Notification, scoping is carried out for category-A and category-B1 projects through three stages, which include, (a) Application is filed by the proponent in Form-I along with pre-feasibility report and draft Terms of References (ToR) (b) MoEF/SEAC decides ToR for EIA (c) Intimation of final ToR to project proponent and display in website. This updated scoping process continues to suffer limitations as the proponents provide information in the prescribed forms, which acts as the basis for the ToR provided by the expert appraisal committees at the state and central level (Rathi, 2017). Our experts interviewed have divided views on scoping. While none of them rated scoping to be very well performed in India, three out of our five experts thought it is achieved to some extent with inaccuracies and gaps, one expert felt it is poorly performed while one thought this is not achieved at all. Public consultation still does not take place during scoping and in the words of one of the experts, '*key issues are generally not brought out*' and the issues covered are '*generic*'. This is evident in the EIAs of Nuclear power sector where the EIA reports make '*bland assurances*' and have serious gaps with respect to including impacts (See Ramana and Rao, 2010, p.269). Furthermore, there is lack of ecological and socioeconomic indicators based on the comments of the experts.

3.1.3. Consideration of alternatives

Consideration of alternatives has been identified as a weakness within the EIA system throughout its existence in India (Paliwal, 2006; Khera and Kumar, 2010; Rathi, 2017). Most of the time its application is restricted to 'with project' and 'without project' scenarios (World Bank, 1999). The role of EIA in influencing the site selection and other activities associated with the planning stage, is usually limited (Ramanathan and Geetha, 1998). According to Paliwal (2006), one of the reasons for inadequate consideration of alternatives is owing to the fact that site clearance is conducted much before the environmental clearance process. The 2006 Notification has not really improved this situation as Rathi (2017) reports that alternatives are 'rarely' included in EIA reports and is merely used in justifying the project. The responses of the experts are not in agreement with regards to alternatives with two experts commenting, this is not really happening, one has chosen not to comment on this aspect, while one opines that this is happening with some omissions. However, one expert has also commented that '*alternatives are very well considered since review of three alternatives before finalising a project site is inherent in amended EIA legislation in 2006*'. Overall, based on the comments received and the literature reviewed it can be concluded that in practice alternatives are considered merely as a tick box exercise without any serious considerations.

3.1.4. Mitigation measures

In the 1994 review, mitigation was pointed out as a weakness as they were suggested on the basis of compilation of data without considering interrelationships with other factors (Vizayakumar and Mohapatra, 1991). This weakness continues to exist in the 2006 Notification which only requires direct impacts of individual projects (MoEF, 2006). As Erlewein (2013) notes, this is especially problematic for hydropower projects as this form of power creation is becoming a leading source of energy in states like Uttarakhand and Himachal Pradesh (also see Rajvanshi et al., 2012), resulting in a series of cascading individual projects, which get away from the need of conducting EIAs. In addition to this, impact significance is not well understood or utilised within EIAs in India (Rathi, 2017). The feedback from our experts were quite consistent with regards to mitigation measures for which three of them opined that this was poorly performed with gaps and inaccuracies and two experts felt that it was performed to some extent with inaccuracies. One expert commented that only '*generic mitigation measures are covered*'. Similar view was shared by another interviewee with regards to the 'generic' nature of these measures which are usually incorporated as a requirement under the Environmental Management Plan (EMP) in the chapter on Anticipated Environmental Impacts and Mitigation. Hence, based on the interviews it could be concluded that the mitigation measures discussed in EIAs lack depth and are '*seldom comprehensive and all encompassing*'. Also, mitigation measures on socioeconomic and cultural assessments are often neglected in Indian EIAs (Paliwal and Srivastava, 2012).

3.1.5. Availability of guidelines

Valappil et al. (1994) pointed out that lack of EIA guidelines is one of the main causes leading to poor quality of EIA reports. The MoEF plays the leading role in the preparation of guidelines while its Impact Assessment division is responsible for setting guidelines for the preparation of the EIA reports (Paliwal, 2006). The view on guidelines though seem to have changed for better. There are quite comprehensive guidelines available in India for preparing EIA reports (MoEF, 2001; Paliwal, 2006). Completeness of guidelines has been further investigated in the survey where more than 70% of the participants were of the opinion that Indian system has provided enough EIA guidelines which are of sound quality (see Fig. 2). The interviews with the experts further revealed a consistent opinion on this with four experts viewing this to be achieved with some gaps and one expert viewing that this is very well achieved. One expert claimed that: "*Plenty of guidelines are available, however, someone has to use these and someone has to ensure that these are being used and that too properly*".

3.1.6. EA's above project level and transboundary issues

The lack of EA above the project level was seen as a weakness within the EA system in India prior to the enactment of the EIA Notification of 1994 (Valappil et al., 1994). This weakness has been highlighted in subsequent reviews of EIA system in India post 1994 and 2006 EIA Notification (see Paliwal, 2006; Jha-Thakur et al., 2009a; Rathi, 2017). Strategic Environmental Assessment (SEA) has been recommended at policy and planning levels to facilitate better coordination amongst various government authorities (Paliwal, 2006; Lodhi et al., 2016). SEA has also been advocated to enhance the EA system in India and fill in current gaps by enabling the right options to be addressed at strategic levels (See Jha-Thakur et al., 2009a; Sainath and Rajan, 2015). In certain sectors, such as land use planning at a regional level, SEA's potential role in guiding lower level plans such as the master plan or zonal plans has been emphasised (Mukherjee and Rajvanshi, 2016). Furthermore, SEA has also been recommended to deal with non-environmental

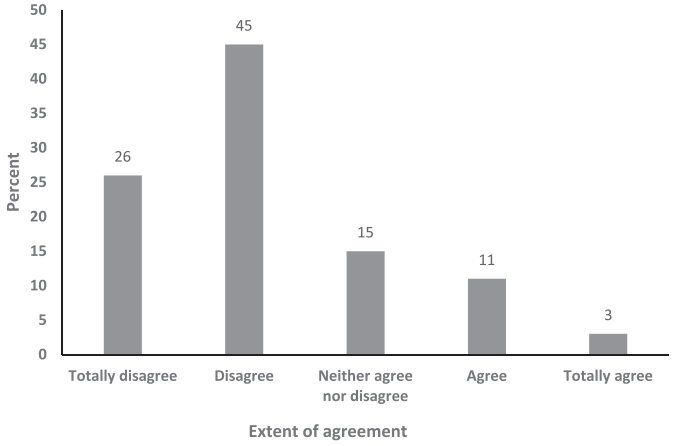

Fig. 2. The EIA guidelines require improvement.

issues such as employment and compensation which need to be considered at macro level (Paliwal, 2006). Currently EIA Notification of 2020 has been drafted and even this is silent with regards to SEA (Jha-Thakur and Rajvanshi, 2020). As far as transboundary issues are concerned, this is something which has not been discussed at all within the EIA system in India.

3.2. Open and public character

3.2.1. Public participation

During Valappil's et al., review (Valappil et al., 1994), public participation was not required to be conducted as part of EIA in India. Mandating public hearing by the enactment of Public Hearing Notification in April 1997 as an amendment to EIA Notification of 1994 was one of the major amendments (Rajvanshi, 2003; Paliwal, 2006) and was a turning point for public participation in the EIA system in India. In 2006, transparency of the process was further enhanced for e.g. the requirement to video record the proceedings was introduced. (Diduck et al., 2013). However, inadequacy in public participation has continued to be one of the commonly stated shortcomings of EIA in the country (Sinclair and Diduck, 2010; Agrawal et al., 2010; Rathi, 2017). For e.g. it is not carried out during the scoping stage but comes rather late and conducted on the draft EIA report arguably making it ineffective (Paliwal, 2006; Erlewein, 2013). One interviewee in this context claimed that: "*Public participation is being held once the draft report is ready. As it is, this is too late a stage in the EIA process to serve the intended objective of EIA. Moreover, the issues generally raised in public hearings revolve around local employment and social infrastructure*". Furthermore, it has been argued that project affected people do not get the chance to participate meaningfully in the public hearing process (Rajaram and Das, 2008). This view was emphasised by another interviewee who added that: *The public hearing, which is mandatory according to the EIA Notification is generally highly contentious and usually the civil society organizations and communities accuse the regulatory agencies of colluding with the project proponents to undermine the voice of the communities affected by the projects.*

3.2.2. Incorporation of local knowledge, values and needs

During Valappil's review, this was an underexplored aspect as public participation was not required and its base was embryonic. However, based on the 2006 Notification the public hearing process requires the views of all stakeholders to be ascertained for environmental impacts (MoEF, 2006). However, in case of India, public hearing concerns are dominated by socio-economic and development concerns with environmental issues being side lined (Sainath and Rajan, 2015). For certain projects at national level such as small hydropower projects of capacity <25 MW local knowledge and values are yet to be incorporated effectively at the state level approval process (Diduck and Sinclair, 2016). Out of our five experts, one couldn't comment on this, three opined that local knowledge, values and needs are being incorporated in public hearings to some extent with minor inaccuracies while one felt this was poorly achieved with too many inaccuracies.

3.2.3. Democratisation of decision-making

In the benchmark paper, EIA was not seen as an open democratic process as it lacked a mandatory requirement for public hearing (Valappil et al., 1994). Public participation is the most important way of introducing procedural democracy to the decision-making process (Aschemann, 2007; Khosravi et al., 2019a). However, even after mandating the requirement of public participation it was noted that this worked as a 'one-way flow of information from public to panel members with contribution made largely by vocal groups' (Rajvanshi, 2003, p.309). Furthermore, Rajvanshi (2003) noted that mechanisms of public participation were strategically designed to limit the influence, which people could have on decision-making. Public awareness has however considerably increased since the initial days of EIA in the country. For e.g. grass root level opposition against nuclear projects has been expressed strongly through public consultation mechanisms within EIA (Ramana and Rao, 2010). However, there are also reports of complaints of non-compliance of the mandated proceedings for public hearing required of the EIA Notification 2006. These include, public not receiving copies of EIA reports or where the authorities have not read out the minutes of proceedings and sought consent from the public participating in the hearings (Ramana and Rao, 2010; (Dilay et al., 2019). Other procedural problems exist such as public in remote villages having to pay for their own expense to attend the meetings imply significant burden for villagers (Sinclair and Diduck, 2010).

3.2.4. Transparency of the EIA process

Valappil et al. (1994) discussed EIA reports accessibility as another criterion in this category and stated EIA documents were treated as secret documents. Regarding the EIA process transparency, EIA notification of 1994 made provision for access to the executive summary of the project at the offices (Rajvanshi, 2003; Paliwal, 2006). Erlewein (2013) argues this has improved and the EIA process follows a clear process in India. One interview confirmed this by commenting on a web based, role-oriented workflow application called *PARIVESH,* which has been developed for online submission and monitoring of the proposals submitted by the proponents for seeking Environment, Forest, Wildlife and CRZ Clearances from Central, State and district level authorities. However, another interviewee added: "*Although the regulation mandates access to EIA summary, it is difficult to obtain for ordinary public. The final decisions of the expert committees are publicly available but the nature of deliberations that led to approval or disapproval are not available making the transparency of the process questionable*. ".

3.3. Objectivity

3.3.1. Expertise of people involved

Valappil et al. (1994) highlighted that the 'findings of the EI reports are mainly based on technical and scientific information' (p.83). This may be owing to the fact that EA related higher education in Asia and especially within India is mainly taught with the disciplines of engineering and natural science (Jha-Thakur, 2016). The survey result shows 34% of the EIA experts had technical and engineering background, and 62% with natural environment educational background. However, this educational background has shifted over time. For example, whilst respondents with over 10 years' EIA experience mainly had a Technical/engineering or natural environment background, those with less than five years' experience mostly possessed a Natural/Environmental studies background (Fig. 3). This shift can suggest that EIA is

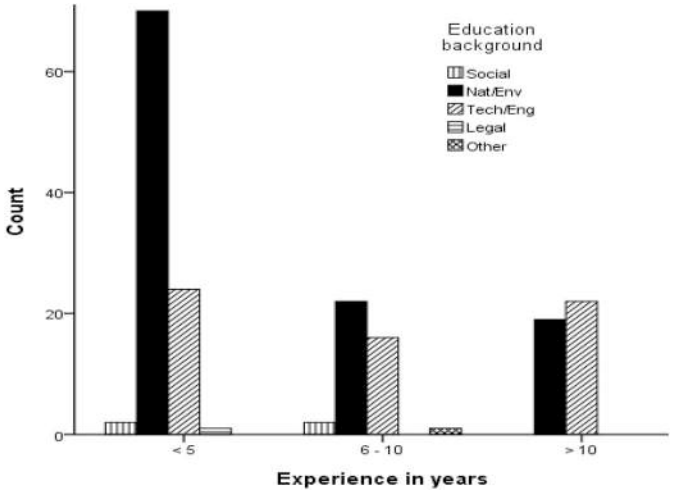

Fig. 3. Results from Cross-tabulating respondents' EIA experience in years and educational background.

increasingly engaging with multidisciplinary team, which is expected to enhance its effectiveness (Jha-Thakur et al., 2009b).

Paliwal (2006) stated that lack of expertise and limited human resources affect the quality of EIA reports and decision-making. A major step taken towards this has been the introduction of the scheme for accreditation of EIA Consultant organizations in 2015 by the Quality Council of India and its constituent board the National Accreditation Board for Education and training (NABET-QCI, 2020). This mandatory accreditation scheme has emphasised the need of multi-disciplinary EIA teams which has been supported with the prescription of educational qualifications that are required. None the less, when interviewees were asked about EIA human resources and their capabilities, one of them stated: *"The Accreditation process for EIA consultants is in place…however, the expertise is variable and as the number of accredited EIA consulting firms is small, workload often dilutes the rigour and quality of inputs"*. It was further commented that the professional expertise amongst people involved in EIA report proportion is still relatively small.

3.3.2. Independence with which people can work

Before the enactment of the 1994 EIA Notification, there was no independent expertise involved in preparation of the EIA report and political pressures influenced the EIA process and its overall quality control (Valappil et al., 1994; Banham and Brew, 1996). However, lack of independence continues to be cited as an issue in recent times. Within the nuclear sector, Ramana and Rao (2010), provided explicit examples where the appraisal committee reviewing the clearance process of the nuclear projects had members from institutes and organization that were involved in preparing the EIA reports themselves or were associated with the nuclear establishment. Within a similar context, Rathi (2017), mentions that EIA proponents who pay for conducting EIA report downplay some of the impacts in the draft EIA report. This was endorsed by the interviewees. One interviewee claimed that *"The project authorities hire the EIA consultants. The team of EIA consultants are therefore not completely independent and are likely to be influenced by the project proponents"*. Another interviewee added that: *"My perception is that most of the people follow the path of least resistance, which is a typical tendency of the majority in almost every walk of life"*.

3.3.3. Credibility and Neutrality of the process

The points mentioned in the above paragraphs further affects the credibility and neutrality of the EIA process, which seems to be a persistent issue over the quarter of a century in India (Valappil et al., 1994; Paliwal, 2006). In the energy sector which hold a vital place in fuelling the economy of the country, concessions and exceptions prevail blanketing the sectors, which dilute the creditability and neutrality of the EIA process. For e.g. in 2005, the environmental appraisal committee for mining accorded EC to 20 mining projects in the same review meeting while in the nuclear sector the environmental appraisal committee suggested the proponents to carry out environmental impact studies and yet sanctioned the EC process without waiting for these studies to be conducted (See Jha-Thakur et al., 2009a; Ramana and Rao, 2010).

3.4. Verifiability

3.4.1. Efficiency of compliance monitoring

EIA follow-up and external inspection are often absent from the EIA process (Glasson et al., 2012; Khosravi et al., 2018), and this has been an issue within the EIA system in India (Valappil et al., 1994; Paliwal, 2006; Rathi, 2017). In reviewing the 1994 Notification, Paliwal (2006) stated despite of a legal requirement and detailed guidelines on the monitoring procedure, there is a larger inadequacy in implementation of environmental management plans, mitigation measures and compliance monitoring in Indian system. Monitoring only takes place in response to complaints. The inefficiency of compliance monitoring was further confirmed) within the mining sector (Jha-Thakur et al., 2009a). Rathi's review of the 2006 Notification (Rathi, 2017), stated similar findings and he stated that monitoring especially of ecological and social environment is rarely done in India.

3.4.2. EIA's influence on decision-making

The low influence of EIA on decision-making has been claimed frequently in the EIA system of India (Agrawal et al., 2010; Choudhury, 2013; Diduck et al., 2007, 2013; Nandimath, 2009; Paliwal, 2006; Erlewein, 2013). Valappil et al., (Valappil et al., 1994, p, 83) believed that "EIA reports do not have much influence on decision-making and decisions continue to be largely politically based". However, based on our survey results the perception of influence of EIA on decision-making has changed compared to Valappil's review in 1994. When survey participants were asked to provide their opinion on the influence of EIA on decision-making, 36% of the respondents stated that EIA has led to the most environmentally friendly alternative. This is in contradiction to what we have found in section 3.1 when 'consideration of alternatives' was explored. The interviewees commented that this rather 'positive' outcome may be owing to the fact that at times, EIA reports provide alternatives, which are drastically negative when compared to the preferred alternative which is already pre-determined by the proponents. Hence, this '*preferred alternative*' is made to look good by purposely providing environmentally unfriendly options. However, 30% of them thought EIA considers environmental values but does not lead to change, 26% were of the opinion that it had led to limited changes and 7% suggested that EIA had no influence on a project. Only 1% thought EIA has extensive influence change on decision-making. (See Fig. 4).

Interviewees found it difficult when we asked them about the influence of EIA on decision-making. One interviewee stated: *"Question marks on EIA's influence on decision-making because adverse aspects invariably do not get reflected in EIAs"*. However, one interviewee was quite confident that EIA is influencing decision-making.

3.4.3. Quality of EIS report

Most of the reports tend to be a compilation of data and this holds true from the initial review way back in 1994 to what has been suggested more recently as well (Valappil et al., 1994; TERI, 2002; Paliwal, 2006). Reviewing EIA reports is the leading responsibility of Impact Assessment division in MoEF (Paliwal, 2006). Rathi (2017) considers EIA review mechanism as one of the weaknesses of India's EIA system and believes it is not robust enough to motivate consultants to prepare good quality reports. Out of five of our interviewees, four of them see it as a weakness while one perceives the quality to be achieved with some weaknesses. Based on the findings of our online survey 37% of participants viewed that the quality of EIA reports in India is good (Fig. 5). Nevertheless, Rathi (2017) having reviewed more than 90 EIA reports concluded that reports are not effective and lack realistic impact assessment. The main

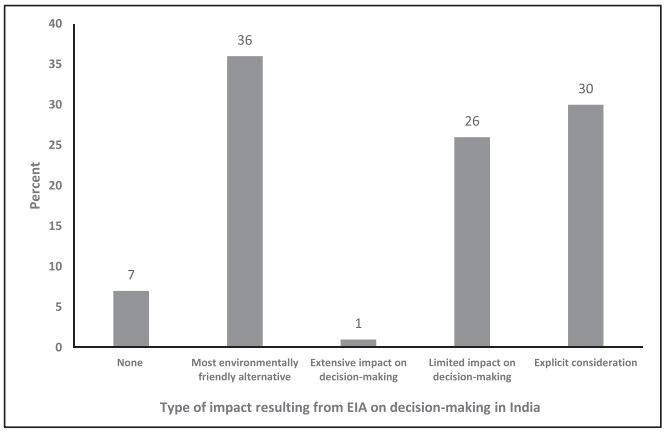

Fig. 4. Respondents' opinion on EIA's influence on decision-making ($N = 176$).

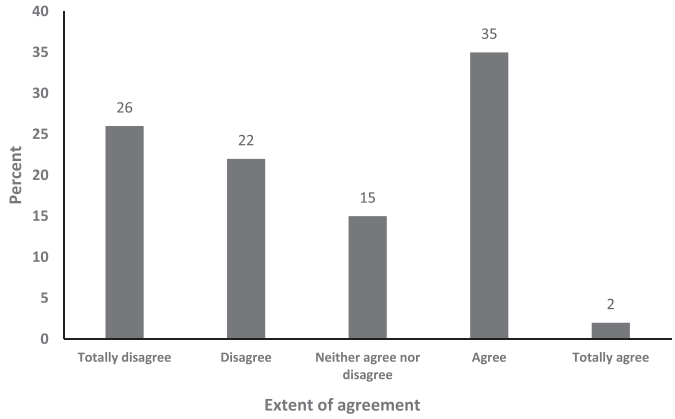

Fig. 5. Responses to the question of whether the quality of EIA reports is good.

reason for such inefficiency has been thought to be related to the role of the consultants who hold their allegiance to the proponents as they are hired by them.

3.4.4. Accuracy of predictions

Due to EIA being in its earlier days, the initial review of EIA system conducted by Valappil et al. (1994) identified that this was lacking within the EIA system. However, this continues to be a weakness in more recent times within the EIA system in India. For e.g. within the nuclear sector Ramana and Rao (2010) have reported how the EIA reports don't even consider significant impacts that are associated with nuclear projects such as impacts on health. Within the coal sector, consultants as well MoEF&CC have even committed the mistake of copy pasting impact predictions of underground mining in open cast coal mining EIA reports and conditional letters (Jha-Thakur et al., 2009a; Jha-Thakur and Fischer, 2008; Jha-Thakur, 2011). To some extent, accuracy of predictions is even impacted due to the lack of consideration of cumulative impacts which makes predictions in a piecemeal fashion (Erlewein, 2013). The interviewees are consistent with their perception regarding accuracy of predictions within EIA reports as they all consider this to be a weakness within the Indian system.

3.4.5. Effective implementation of mitigation measures

Valappil et al. (1994) commented that the implementation of mitigating measures was not taking place. Furthermore, later it has been identified that the effectiveness with which mitigation measures are implemented can differ regionally based on the pressure of development within the states of India. The capacity of the regulating agencies to check compliance is severely limited and hence they are compelled to set targets of how many industries can be reviewed by them annually (See Jha-Thakur, 2011). In addition to this, certain sectors such as the energy sector are critical for the economic development of the country and hence are powerful, which makes the regulating agencies not very effective in implementing strict measures (Jha-Thakur and Fischer, 2008). As such, even if there are reports of violation the State Pollution Control Boards and the MoEF&CC do not shut these violating units as they 'do not appear to have the power to enforce their regulation' (Ramana and Rao, 2010, p. 271).

4. Overview of strengths and weaknesses

Based on the performance of EIA in India over more than the last quarter of a century, it is evident that it has come a long way. Overall, EIA has made the most progress in the category of 'open and public character' though there is scope of further improvement. With regards to both categories of 'completeness' and 'objectivity' though some components have improved, overall these categories have severe gaps. However, with regards to verifiability, improvement is the least significant and as such, this is where the EIA system is really deficient within the country. Performance within sub-criteria like screening, transparency and expertise of the people involved, has certainly improved. The dominant weaknesses within sub-criteria, which have repeatedly been highlighted since its inception include scoping, consideration of alternatives, application of EA above the project level that is the introduction of SEA and efficiency and accuracy of mitigation measures.

Shortcomings discussed above are common within other EIA systems, especially from developing countries (Khosravi et al., 2019b). Furthermore, issues such as weak alternative consideration in EIA process is a common weakness in both developed and developing countries (Jha-Thakur and Fischer, 2016; Kamijo and Huang, 2016). (Nadeem and Hameed, 2008) revealed similar deficiencies within the EIA process in Pakistan which included inadequate resource capacities, deficiencies in screening, scoping, ineffective public participation and absence of EIA follow-up. These are also inter-related issues and strengthening one can help in improving the other area of weakness. For e.g. as one of the experts commented '*no provisions are in place to cover landscape and visual impacts in the Indian EIA regulations. This is largely because the existing EIA process applies to individual projects and not to a series of projects in a landscape or an ecosystem*'.

In India, there has been a constant effort in revising the provisions of EIA framework and hence there has been several attempts of introducing a new Notification to this effect (MoEF&CC, 2009; MoEF&CC, 2019). With the economic meltdown in India, the emphasis of the MoEF&CC has been on 'faster clearances and stringent compliances' (Pradhan, 2020). However, the recent Draft 2020 Notification (MoEF&CC, 2020) that is being considered reflects serious shortfalls that aim in speeding up the EIA Clearance process without adequately strengthening its foundation. For e.g. it dilutes the screening and scoping process and though it claims it wants to enhance transparency in reality it has been argued that it actually dilutes it (Bindra and Rawat, 2020; Pradhan, 2020). Additionally, it requires the proponents to submit fewer monitoring reports without strengthening capacity building for compliance checking (See Pradhan, 2020; MoEF&CC, 2020). However, the development of EIA legislation in a country depends on the contextual factors such as the political system and economic situation as well as key actors' capacities (e.g. parliaments and the sector ministries) (Kolhoff et al., 2013). Therefore, further research on identifying contextual factors affecting EIA system is a precondition for providing a comprehensive prospect of EIA in India (Khosravi et al., 2019a). Nevertheless, considering learning lessons from the experiences of the last quarter of a century and taking inspiration from best practices to tailor down to the Indian context is essential.

5. 1 way forward for EIA in India: Recommendations

One of the most important aspect that needs to be highlighted on the basis of this study is the perceived added value of EIA in India. Fig. 4 reflects how EIA is having an influence on decision-making in India and this finding seems to be in alignment with similar studies conducted in other countries such as The Netherlands and The United Kingdom (See Jha-Thakur and Fischer, 2016; Arts et al., 2012). Hence, it is evident that EIA has been influencing decision-making to some extent and incorporating environmental considerations within it. However, suggestions have been put forward by various experts that EIA's role can be broadened to include a wider range of projects such as railways, which seems to be currently beyond its remit (Ministry of Railways, 2011). Furthermore, it should be broadened to be applied at a strategic level, for e.g. in national level urban reform initiatives such as the 'Smart Cities Mission (Turaga et al., 2019). However, it is also observed that the expectation from EIA can grow too much to the extent that it can lead to a "mid-life crisis" (Jha-Thakur and Fischer, 2016, p.25). Hence, importance of the context within which it is being practiced needs to be considered in tailoring EIA.

If EIA is to be strengthened in India, we have four recommendations based on this study. First, step would be to enhance its scoping process and rather than adopting a standard approach, more effort should be taken to tailor made the EIA to cater to the significant impacts associated with it. As suggested by Canter and Ross (2014), the scoping process must involve all relevant stakeholders including the affected public and its content should include "an introductory section, background information on the potential project, logistics of the scoping process, press releases and announcements, and the process summary" (p. 21). Unfortunately, though, the EIA Draft Notification of 2020 dilutes the scoping process by raising uncertainty over the role of the appraisal committee in providing specific tailor-made terms of reference for the scope of the EIA projects and instead takes a generic and standard approach to it (Bindra and Rawat, 2020; Pradhan, 2020). An efficient scoping process focused on the likely significant impacts, and not on the potential ones, joined with early public consultation would help to scope insignificant issues out, and is the key to achieving more proportional and effective EIAs (Hansen and Wood, 2016).

Secondly, the compliance mechanism and associated capacity building needs to be strengthened. Follow-up is usually the weakest link in EIA and India is not an exception to this (Sadler, 1996; Jha-Thakur, 2011; Rathi, 2017). Focus on the design stage of EIA follow-up can give more teeth to follow-up practices which would certainly add value to how EIA follow-up is currently undertaken in India (Jha-Thakur et al., 2009a). Furthermore, capacity -building amongst compliance officers in the regional offices of the MoEF&CC along with training and broadening of the review committees will strengthen the foundations. Once again, the 2020 Draft Notification requires the proponents to submit fewer monitoring reports without strengthening capacity building for compliance checking (Bindra and Rawat, 2020). Third, with regards to credibility and neutrality and, with regards to the independency of EIA review, The Netherlands is one of the few countries that have established an independent expert commission, the independent Netherlands' Commission for Environmental Assessment, who are in charge with quality review (Arts et al., 2012). Developing a neutral committee such as this, which does not appraise the environmental process neither writes the EIA report can add a certain level of objectivity to the EIA process in India and provide support to the stakeholders in enhancing the quality and know-how related to their work.

Finally, India's EA system is said to be 'myopic' due to its short sightedness and lack of incorporating a regional and cumulative approach in strategic decision-making (Modak, 2019). The need to introduce SEA has been emphasised in several articles over the years (see Erlewein, 2013; (Bhatt et al., 2017). Since 1994 (Valappil et al.), the lack of EA above project level has been cited as a weakness and yet more than 25 years later, the 2020 Draft Notification still fails to address this issue. With the lack of a mandatory SEA requirement, it is up to the critical sectors such as water and energy to adopt SEA to suit their needs (Jha-Thakur and Rajvanshi, 2020; Lodhi et al., 2016). Hence there is a need for the uptake of SEA and develop capacity building and know-how regarding conducting EA above the project level. It should be noted that making SEA a mandatory requirement does not guarantee its effective implementation. Therefore, in order to strengthen the current EA system and introduce and increase the uptake of SEA, training and capacity building within sub-capacities, such as institutional capacity, resource capacity, organisational capacity, human capacity and technical capacity (See Khosravi et al., 2019a) is important. This should help in ensuring a steady and incremental shift towards enhancing environmental awareness and strengthening capacity development, which will allow the EA system to improve over time and eventually create a stronger foundation for SEA legislation to be introduced in the country (Jha-Thakur and Rajvanshi, 2020).

6. Conclusion

Based on the performance of EIA in India over the last quarter of a century, it is evident that it has come a long way. Overall, EIA has made the most progress in the category of 'open and public character' though there is scope of further improvement. With regards to both categories of 'completeness' and 'objectivity' though some components have improved, overall these categories have severe gaps. However, with regards to verifiability, nothing has improved as such and this is where the EIA system is really deficient within the country. Performance within sub-criteria like screening, transparency and expertise of the people involved, has certainly improved. The dominant weaknesses within sub-criteria, which have repeatedly been highlighted since its inception include scoping, consideration of alternatives, application of EA above the project level that is the introduction of SEA and efficiency of mitigation measures. These are also inter-related issues and strengthening one can help in improving the other area of weakness. There has been a constant effort in revising the provisions of EIA in India and hence there has been several attempts of introducing a new Notification to this effect (MoEF, 2009; MoEF&CC, 2019). However, the recent Draft 2020 Notification (MoEF&CC, 2020) that is being considered reflects serious shortfalls that aim in speeding up the EIA Clearance process without adequately strengthening its foundation (See Pradhan, 2020). In light of this, it becomes even more critical to learn lessons from the last quarter of a century and take inspiration from best practices to tailor down to the Indian context.

Declaration of Competing Interest

None.

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INDUSTRIES AND ENVIRONMENTAL IMPACT ASSESSMENT: ANALYSIS OF THE SCREENING PROCESS IN ARGENTINA

Industrias y evaluación de impacto ambiental: análisis del proceso de revisión inicial en Argentina

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ABSTRACT

The approach of "pollute first, then clean up", has been understood to be hard both technologically and economically. Therefore, the necessity of adopting another strategy, which is anticipate-and-prevent, has risen and consequently the environmental impact assessment (EIA) has emerged as a tool. Screening is one of the earliest steps of every EIA process and it is characterized as the determination of whether or not an environmental assessment must be prepared for a particular project. The aim of this paper is to identify, analyse and compare the methodological models regulating the screening process of industrial activity in Argentina, a federal country without a national directive concerning this particular matter and where each of the 24 districts are autonomous in this matter. This research was followed through employing a comparative method, which was implemented based on secondary data analysis. Three guiding questions and three criteria were used to compare the 24 districts. Six different screening process models were described (both qualitative and quantitative). The six chosen models were integrated into three great groups. The group of districts that present "Preliminary study" + "Case by case" approaches prevail, while in second place comes the "Threshold" + "Case by case" approaches. Finally, the more complete screening model, with specific legislation for EIA in industries and a quantitative environmental complexity index, turned out to be the least applied in Argentina.

Palabras clave: legislación ambiental, método comparativo, actividad industrial, gestión ambiental

RESUMEN

El enfoque de "contaminar, luego limpiar", se considerada desde hace años inapropiado tanto en términos tecnológicos y económicos; así, la necesidad de adoptar otra estrategia, como "anticipar y prevenir" ha tomado mayor importancia y para ello surge como herramienta la evaluación de impacto ambiental (EIA). El screening es uno de los pasos iniciales de la EIA y es un proceso para determinar si un proyecto en particular debe presentar un estudio ambiental. El objetivo de este artículo es identificar, analizar y comparar los modelos metodológicos que regulan el proceso de revisión inicial para la actividad industrial en Argentina, un país federal sin una directiva nacional al respecto y donde cada uno de los 24 distritos son autónomos en este sentido. Se utilizó el método

comparativo, implementado con base en datos secundarios. Se utilizaron tres preguntas guía y tres criterios para comparar los 24 distritos. Se distinguieron seis modelos de screening (tanto cualitativos como cuantitativos), los cuales se integraron finalmente en tres grandes grupos. El grupo que comprende "Estudio preliminar" + "Análisis caso por caso" es el que prevalece, siguiéndole el de "Umbrales" + "Análisis caso por caso". Finalmente, el modelo de screening más completo, con legislación específica para industrias y un índice cuantitativo de complejidad ambiental, resulta ser el menos aplicado en Argentina.

INTRODUCTION

Business and industry, including transnational corporations, play a crucial role within the social and economic development of a country (UN 1992). Even though industrial growth has favoured economic and spatial expansion in cities for over two centuries, industrial activities may be the culprit of some of the causes of environmental pollution today (Sosa et al. 2013).

In contrast to developed economies, industrial wastewater discharges in third world and transitional economies, where pollution control policies have not been implemented as vigorously, if not at all, do remain a concern (Earnhart 2013). In order to mitigate the negative impact caused by human activities, instruments obliging countries to adjust their policies and legislations are brought to table in different ways (international meetings, EU directives, UN directives, etc.). The approach of "pollute first, then clean up", is understood to be hard both technologically and economically (Rezaei-Moghaddam and Karami 2008). Therefore, the necessity of adopting another strategy, which is anticipate-and-prevent, has risen (Elvan 2018). In 1970 the United States of America adopted the National Environmental Policy Act (NEPA), which in Section 102 in Title I of the Act requires federal agencies to incorporate environmental consideration into their planning and decision-making by employing a systematic interdisciplinary approach (USEPA 1969).

Environmental Impact Assessment (EIA) study has become inevitable for projects and activities where natural resources will be used and negative effects on the environment are to be expected. It is the single and most decisive document that aims to achieving sustainable healthy environmental conditions through the "anticipate-and-prevent" strategy (Elvan 2018). EIA is a systematic process used to make decisions that takes into account the environmental impact assessment of human activities on the environment. The process helps to include environmental factors into the project proposal. EIA involves an assessment of the potential impacts of the project on the ecosystem (Reddy Maredy 2017).

Comparative analysis of countries' statutes and regulations offer immediate recourses for policy makers (Suwanteep et al. 2016). Comparative case studies of national EIA systems are widespread in literature (e.g. Glasson and Salvador 2000, Ahmad and Wood 2002, Kolhoff et al. 2013, Al-Azri et al. 2014, Gałaś et al. 2015). National case studies are also quite common for both developed and developing countries (e.g. Fowler and Dias De Aguiar 1993, Nadeem and Hameed 2008, Haydar and Pediaditi 2010); in this second group most of the publications are related to Southeast Asia, Eastern Europe and, to a lesser extent, Latin America (Ahmad and Wood 2002). These authors review and compare the performance of environmental impact assessment using the following criteria: legislative and administrative procedures for EIA; aspects of EIA such as screening, scoping, EIA report review, mitigation, etc.; and the decided measures undertaken to improve the effectiveness of EIA systems. However, more studies are needed to compare developing and developed countries, particularly subnational EIA systems, since they are eligible for the majority of implementations. There are very few studies that include a subnational focus, which is ironic considering that most EIAs are implemented by sub-national authorities (Loomis and Dziedzic 2018). This is the case in federal countries like Argentina.

EIA consists of different steps and stages. Screening is one of the first steps in every EIA process, and it is characterized by the determination as to whether or not an environmental assessment must be prepared for a particular project (Christensen and Kørnøv 2011). The screening decision must be recorded and made available to the public (EC 2001). The competent authority (CA) makes a decision on whether EIA is required. This may occur when the CA receives notification of the intention to present a development consent application, or the developer

may make an application for a screening opinion. Should the CA screening opinion be positive, and EIA be a requirement, there would be implications for the project timeline that would include the necessary time required for technical studies, environmental statement (ES) preparation, and other requirements. There might possible be cost implications, with EIA commonly needing a greater, vaster reporting effort in the ES than for a non-EIA planning application (Melvill 2017).

The screening process can be based on two broad approaches: an inclusion/exclusion list of projects (with or without threshold limits) and case-by-case screening (Christensen and Kørnøv 2011). Pinho et al. (2010), based on the European Directive 97/11/EC differentiated four types of screening approaches: a. Preliminary study or initial environmental evaluation: The need for an EIA is taken into consideration by way of an early assessment process covering all types of projects in all circumstances. b. Case-by-case: The need for EIA is individually considered; it usually appears together with and as a complement to another screening method. c. List of projects: The need for EIA is based on lists of projects organized within different categories and types of projects. Positive lists specify the projects which require EIA, whereas negative lists present the exemptions. d. Thresholds: The need for EIA is based on specific measures and limits in accordance with a predefined criterion.

Even though the above definition conveys the objectiveness of the screening process in a simple and straight forward manner, the process of determining the same can become rather complicated in a developing country (Rajaram and Das 2011).

Argentina is a developing country in Latin America with a federal organization, which consists of 23 provinces and a Federal District (the autonomous city of Buenos Aires, CABA), located in the southern cone of South America, with an area of 2780 400 km^2 (**Fig. 1**). It is the second biggest country within South America. The distance from north to south is 3779 km, and from east to west, is about 1384 km. There are more than 2100 local councils and 43.85 million inhabitants.

Throughout history, Argentina has always been recognized as a country with important growth, regarding agricultural and livestock activities. In the 50s a process of industrialization began in the country and as a result, industrial activities at this time became the main engine of economic development (CEPAL 1993).

Argentina's economy is basically divided into three main productive sectors: agricultural, industrial and mining (Zappino 2014). According to the World Bank, in 2017 the manufacturing industry accounted for 22 % of the country's Gross Domestic Product (GDP).

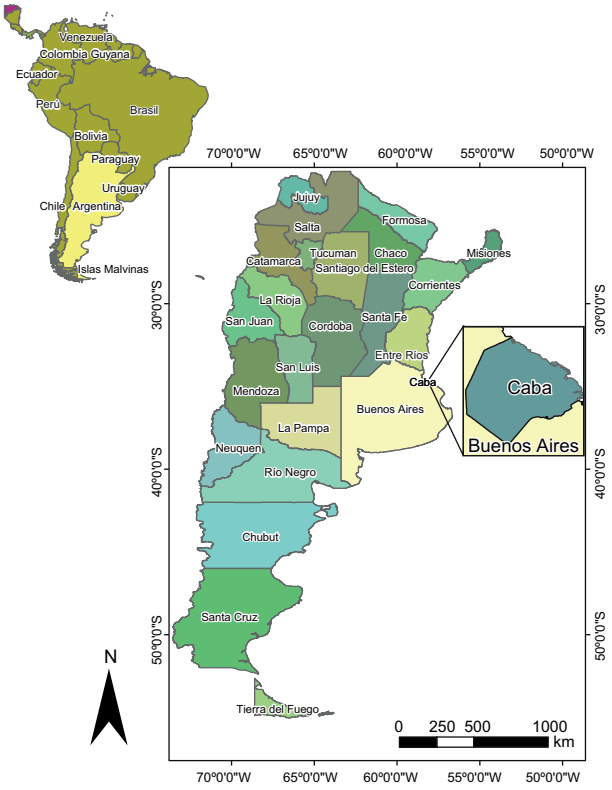

Fig. 1. Study area

Aim and research questions

The three guiding questions for this research are:

1. Which type of environmental impact assessment legislation do the Federal District and every province have?
2. Is it possible to identify similarities and differences in the industrial EIA screening process in the Federal District and the 23 provinces?
   An integrated subnational research about this subject does not actually exist in Argentina, unlike, for example, as it would in the European Union, where the EIA Directive outlines a common screening approach that is adopted by member states. It could be useful to systematize the screening process so as to facilitate its optimization and the analysis of the scoping process at a subnational level.
3. Are the criteria used in determining impact significance in the screening process objective (predetermined) or subjective (judgmental)?

Some authors argue that there are always some objective measurable elements associated to the concept of significance in EIA, while others emphasize the intrinsic subjective nature of all environmental components and therefore reject any attempt to define objective measures. These differences give forth to difficulties in determining coherent forms of decision-making in screening (Pinho et al. 2010).

In accordance with these questions, the aim of this article is to compare and analyse at a subnational scale the industrial EIA screening process in Argentina.

At this present time, there is no existent normative systematisation in the country (in public access websites or whereabouts) that integrates the laws which regulate the EIA process for a new industry to establish itself in whichever province. Access to information in this regard, is very complex to analyse at a national dimension, due to the fact that in some provinces access is very simple and in others quite difficult.

The Argentinian environmental legal framework

Environmental governance in Argentina is multilayered and works within federal, provincial and municipal levels (WBG 2016).

It was not until the Rio Summit in 1992 that environmental legislation began to gain strength. A direct consequence of the Rio Summit in Argentina was the inclusion of environmental topics in the National Constitution, which was then amended in 1994.

- Article 41 establishes the right to 'a healthy, balanced environment suitable for human development and where productive activities meet present needs without compromising those of future generations'. This article recognizes the federal nature of the environmental legislation. 'The Nation shall regulate the minimum protection standards and the provinces where it be necessary to reinforce them, without altering their local jurisdictions'. It states that it is the duty of the national state to dictate the 'minimum budget laws' of environmental protection and the duty of the provinces to comply with them.
- Despite the fact that this article does not explicitly mention EIA as a management instrument, it offers three fundamental principles for an effective environmental protection. The principles are: access to environmental education, access to environmental information and access to justice.

In 2002 the Argentinian National State sanctioned the Environmental General Law (LGA) which established the minimum budgets needed to achieve a sustainable management of environment, preservation and protection of biological diversity and implementation of sustainable development (Article Nº 1). The Argentina National State, in the Environmental General Law Nº 25675 (LGA), dictates only general guidelines about how the EIA process should be carried out. EIAs in Argentina have widely been applied as procedural permissive tools that allow major projects to move forward quickly, rather than tools to guide project design through a careful impact assessment and stakeholder buy-in (WBG 2016).

The articles that specifically deal with the topics analyzed in this paper regarding the screening process of environmental impact assessment in this law are:

- Article 8. –recognizing the environmental impact assessment as one of the most important instruments of environmental management and policy.
- Article 11.–indicating that any project or activity which, within the national territory, is likely to degrade the environment, any of its components, or affect life quality in a significant manner, shall be subject to an environmental impact assessment procedure, prior to their development or establishment.

This law does not specify the EIA administrative procedure in general or the screening procedure specifically.

MATERIALS AND METHODS

This research was carried out using a comparative method, which was implemented using secondary data analysis. This method consists of a systematic case-based comparison drawn up for empirical generalization and hypothesis verification purposes or through guiding questions (as is the case of this paper). This approach has been used in a vast number of papers and it is recommended when necessary to identify similarities and differences in various analysis units (AU) (Makón 2004, Pérez Liñán 2008, Van Hoecke 2015).

In this paper, the comparative method was implemented in four steps:

1. Identification of the territorial units to be compared.
2. Data source identification.
3. Identification and selection of comparison criteria.

4. Application of selected criteria to each AU, systematization of the results and identification of common models (screening process).

For the first step, due to Argentina being a federal country, 24 AU were chosen, specifically the Federal District (City of Buenos Aires, CABA) and the 23 Argentinian provinces.

Step 2 was very relevant to this article. The absence of a centralized and systematized information flow led us to carry out an almost "archaeological reconstruction" of the screening procedure in each AU. The screening procedure in question consists of a process that took almost 30 years to consolidate. The 24 AU governments websites were consulted to identify the CA (e.g. Secretariat/Ministry of Environment), as well as those responsible for the specific administration of the industrial sector (e.g. Ministry of Production). Once both CAs was identified, information on the EIA screening procedure for new industries was collected on all the agencies' websites responsible for environmental management and those responsible for administering the industrial sector. In order to fill some gaps, both the Scientific and Technological Promotion Ministry website and the Justice and Human Rights Ministry legal database were consulted.

After going over the information and literature found on EIA, it was decided to base Step 3 on Ahmad and Wood (2002) and the Council Directive 97/11/EC 1997 (Pinho et al. 2010). Three screening evaluation criteria were selected for the analysis and comparison: 1) "Legal provisions for EIA". 2) "Specified Screening Categories". 3) "Systematic Screening Approach".

Finally, in step 4 the results were systematized and synthesized in an "Overall Screening Pattern" and also on a flow chart, which gathers criteria results analyzed in each AU and allows for a clear understanding of the screening process in each one of them. This last pattern could be useful for a screening process comparison of Argentina with other countries.

RESULTS

Criterion 1 "Legal provisions for EIA"

This criterion explains which type of legislation covers the environmental impact assessment; it allows for the identification of two different models (**Fig. 2a**):

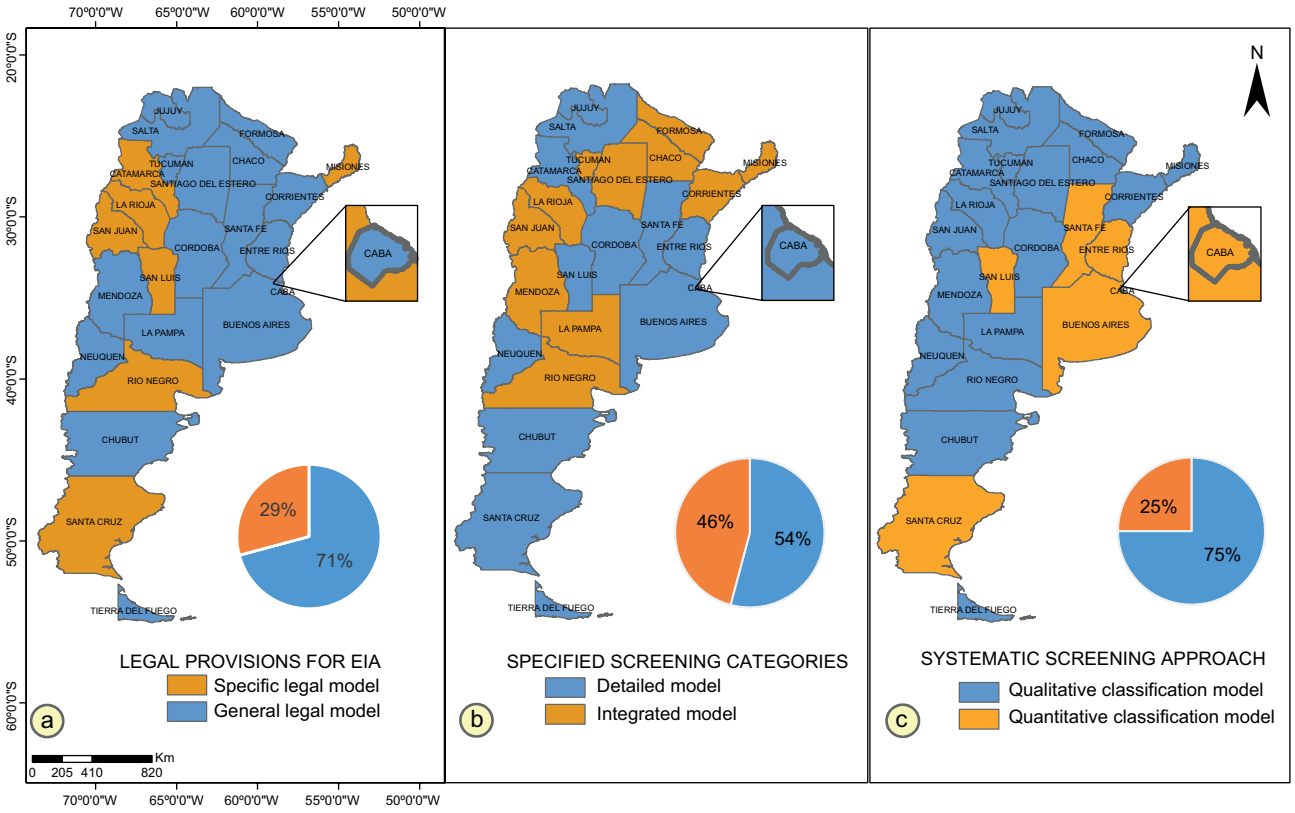

Fig. 2. Screening process models

1. Specific legal model: it includes all the AU where a specific law that governs the EIA requirements and procedures exist. For example, in the San Juan province, Law N° 6571 of Environmental Impact Assessment describes in detail the EIA screening process, including the general guidelines for the preparation of the notice of project.
2. General legal model: it corresponds to all AU where general laws regarding environment already include the EIA process. For example, in the La Pampa province, Law N° 1914 establishes the provincial environmental policy and the environmental management tools, among which it mentions the EIA but without going into detail about the screening process.

Most of the studied AU (71 %) presents a general legal model.

Criterion 2. "Specified Screening Categories"

From this second criterion two models were identified.

1. Detailed model: it has been named "detailed model" because the legislation lists specifically which industrial fields must present an EIA ("positive list of projects"). For example, the Chubut province in Decree N° 185 establishes six industrial fields (chemical, oil, paper, iron foundries, non-ferrous metals production and industrial processes that contain asbestos).
2. Integrated model: this model is applied in those AU in which a "positive list" of industrial fields does not exist; only the general term 'industries' is included in a list with other activities that are conditionally subject to the presentation of an EIA.

For example, the Chaco province in its Decree N° 1726 only mentions generically the establishment of "industries and industrial parks" among other activities.

The detailed model has been adopted by 54 % of the AU, including those which are more industrialized (**Fig. 2b**)

Criterion 3. "Systematic Screening Approach"

This criterion is of the most relevant importance because it is the one that defines the magnitude and significance of the more likely related environmental impact. Industries must submit the initial documentation or notice of intention to the CA that must include the basic information to be evaluated by way of one of the two models that have been identified (**Fig. 2c**):

1) Quantitative model: The AU legislation establishes an index called "environmental complexity level" (NCA, **Table I**), taking into consideration the information included in the notice of intention. The NCA defines three industrial categories (first, second and third category), and for each one there are different EIA requirements (also defining the environmental study requirements, if a public audience is mandatory, etc.). This model corresponds to "Threshold" + "Case by Case" approaches (Council Directive 97/11/EC).

The NCA is calculated by a linear equation that sums up five different variables:

- Activity classification: it is the industrial field (it can be classified according to the field international classification, in some cases).
- Effluents and waste quality: it includes the liquid effluents and gases released by the industry as well as solid and semi-solid waste.
- Risks: potential risks that an activity can present, such as fire, explosion, chemical, acoustic and by pressure devices which may affect the population or the surrounding environment.
- Dimensions: Project dimension, taking into consideration the number of employees, power installation and the surfaces covered.
- Location: Company location, taking into account the zone and the amenities infrastructure that it possesses.

For example, in the case of Buenos Aires province the range of values for each variable is:

- Activity classification (Ru): between 1 and 10
- Effluents and waste quality (ER): between 0 and 6
- Risks (Ri): between 1 and 5
- Dimensions (Di): between 0 and 4
- Location (Lo): between 0 and 4

Regarding industries that are classified as first category the CA grants the Environmental Aptitude Certificate (which allows the industry to operate) with just the information presented in the initial documentation or notice of intention; in the case of second and third categories the industries must present an EIA in accordance with the requirements established by each AU legislation; third category industries must also present a monitoring plan and may be subject to a public participation process.

Three AU use an "adjustment factor" that increments or diminishes the NCA obtained. The adjustment factor that diminishes the NCA is the implemen-

TABLE I. ANALYSIS UNITS (AU) WITH A CLASSIFICATION PROCESS IN ITS LEGISLATION

AU	Equation	Categories/ Points		
Buenos Aires	NCA=Ru + ER + Ri + Di + Lo	1º	2º	3º
		≤ 14	15 – 25	≥25
Entre Ríos	NCA = Ru + ER + Ri + Di + Lo	1º	2º	3º
		≤ 14	15 – 25	≥25
Santa Fe	NCA = Ru + ER + Ri + Di + Lo	1º	2º	3º
		≤ 11	12 – 25	≥25
Santa Cruz	NCAi = Ru + ER+ Di + Lo	1º	2º	3º
		≤ 11	12 – 25	≥25
San Luis	NCAi = Ru + ER + Ri + Di + Lo NCAf= NCAi + AjSP–AjSGA	1º	2º	3º
		≤ 14	15 – 25	≥26
CABA	NO	Without relevant effect	Subject to classification	With relevant effect
	YES (Subject to classification) NCA=∑A+∑B	Without relevant effect	With relevant effect	
		<8.5	≥8.5	

In order to clarify this table the original acronyms given in the legislation were modified. Ru = activity classification, ER = effluents and waste quality, Ri = risks, Di = dimensions, Lo = location, NCA = environmental complexity level, NCAi = initial environmental complexity level, NCAf = final environmental complexity level, AjSGA = adjustment factor for certified environmental management system, AjSP = adjustment factor for hazardous substances, AU = analysis units, CABA = autonomous city of Buenos Aires.

tation of an "Environmental Management and Safety System or an Integrated Management System". This particular system can be designed in accordance to ISO 9001 or ISO 14001, for example; the adjustment factor that increments the NCA refers to the handling of rather risky substances in specific quantities.

2) Qualitative model: General guidelines and requirements, that all activities must comply with, are put forward for the EIA presentation; the specific details of the environmental study are defined by the CA for each particular case. This model corresponds to "Case by Case" (Council Directive 97/11/EC) + "Preliminary study or initial environmental evaluation" approaches (Council Directive 97/11/EC, Pinho et al. 2010).

The vast majority of AU (75 %) has chosen the qualitative model (**Fig. 2c**).

Overall screening model

Lastly, using the information obtained from the previous model definitions, three management models of the EIA process in industry were identified (**Table II**).

1. Complete model: this model is characterized by specific EIA legislation, a detailed model of specified screening categories and a quantitative systematic screening approach.
2. Intermediate model: this model is characterized by any combinations that do not meet with the complete model nor the simplified model.
3. Simplified model: this model is characterized by a general legal EIA provision, an integrated model of specified screening categories and a qualitative systematic screening approach.

The least represented in this model are the complete (13 %) and the simplified models (17 %). Most AU (70 %) present an intermediate model (**Fig. 3**). The first AU to adopt a complete model was CABA, before the LGA sanctions and after the national constitutional amendment. The other three AU that have adopted this model did so after 2002 (after LGA).

In **figure 4** a flow chart of the administrative procedure of the screening process in Argentina is shown. This figure was elaborated with the

TABLE II. CRITERIA AND MODELS

AU	Legal provisions EIA			Specified screening categories	Systematic screening approach	Overall screening model
	Specific	General	Year			
CABA	Law 123		1998	DM	Quantitative.	CM
Buenos Aires		Law 11723	1995	DM	Quantitative	InM
Catamarca	Legal Provision SA 74		2010	DM	Qualitative	InM
Chaco		Law 3964	1994	IM	Qualitative	SM
Chubut		Law 5439	2005	DM	Qualitative	InM
Córdoba		Law 7343	1985	DM	Qualitative	InM
Corrientes		Law 5067	1996	IM	Qualitative	SM
Entre Ríos		Decree 4977	2009	DM	Quantitative	InM
Formosa		Law 1060	1993	IM	Qualitative	SM
Jujuy		Law 5063	1998	DM	Qualitative	InM
La Pampa		Law 1914	2000	IM	Qualitative	SM
La Rioja		Law 7371	2002	IM	Qualitative	SM
Mendoza		Law 5961	2002	IM	Qualitative	SM
Misiones	Law 3079		1993	IM	Qualitative	InM
Neuquén		Law 1875	1990	DM	Qualitative	InM
Río Negro	Law 3266		1998	IM	Qualitative	InM
Salta		Law 7070	2000	DM	Qualitative	InM
San Juan	Law 6571		1995	IM	Qualitative	InM
San Luis	Law XI-876		2013	DM	Quantitative.	CM
Santa Cruz	Law 2658		2003	DM	Quantitative.	CM
Santa Fe		Law 11717	1999	DM	Quantitative.	InM
Santiago del Estero		Law 6321	1996	IM	Qualitative	SM
Tierra del Fuego		Law 55	1992	DM	Qualitative	InM
Tucumán		Law 6253	1991	IM	Qualitative	SM

AU = analysis units, EIA = environmental impact assessment, CABA = autonomous city of Buenos Aires, SA = environmental undersecretary, DM = detailed model, IM = integrated model, CM = complete model, InM = intermediate model, SM = simplified model.

comparative analysis of the 24 political-administrative districts in Argentina.

DISCUSSION

Amongst the concerns raised in this paper, it comes to light that a unique management model of industrial EIA screening does not exist in Argentina, having already identified three models in the EIA screening process. It is important to highlight the shoddy, uncoordinated manner in which the legislation is handled in the different AU. This could be attributed to basically two factors: the first one is that Argentina is a federal country and there is no specific national EIA law that indicates general guidelines for the screening process. In second place, because of the lack of a national directive to guide provinces in the generation of their own legislation; the process has gone on for 28 years (1985 to 2013) so the social, economic and political situation was very different for every province at the moment of regulating the EIA process. This circumstance might have a certain influence on the scoping process, but that analysis is beyond the realm of this paper. It is also of interest to mention, as a hypothesis, the importance the constitutional amendment (1994) has had on the AU, since 50 % of them sanctioned their environmental legislation between 1995 and 2002. It is also worth pointing out that three AU (12 %) enacted their EIA legislation before the Rio Conference (but with a general model). This shows how important it would have been for a country like Argentina, to count on a national directive that would have allowed unifying the criteria applied in the screening process. The screening process reconstruction made in this paper has allowed to verify that the process, in general, does not differ too much from what happens in the rest of the world (project preparation, notice of Project, CA intervention, screening methodology selection). The complexity that results in the main difference found is that this reconstruction does not exist as an integrated model in a national regulation. As happens in other countries, in some Argentinian provinces overlapping between the screening and scoping processes does occur.

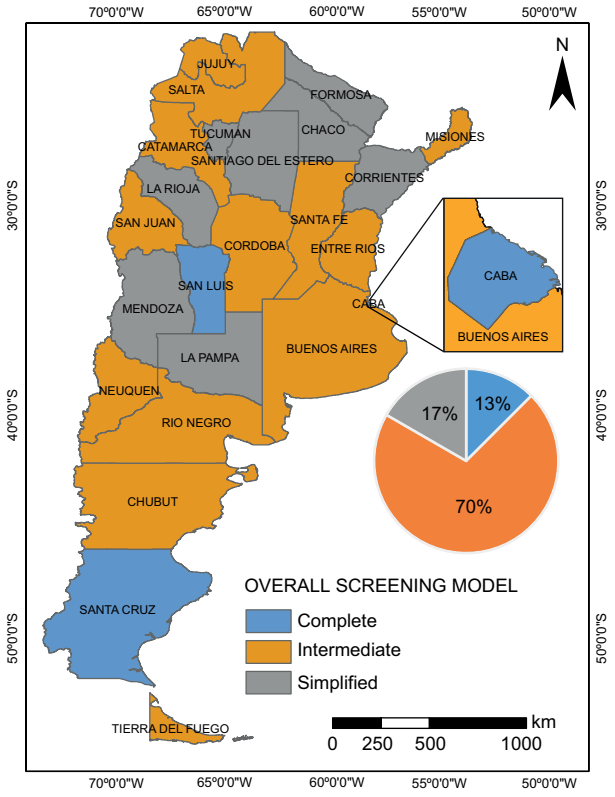

Fig. 3. Overall screening model

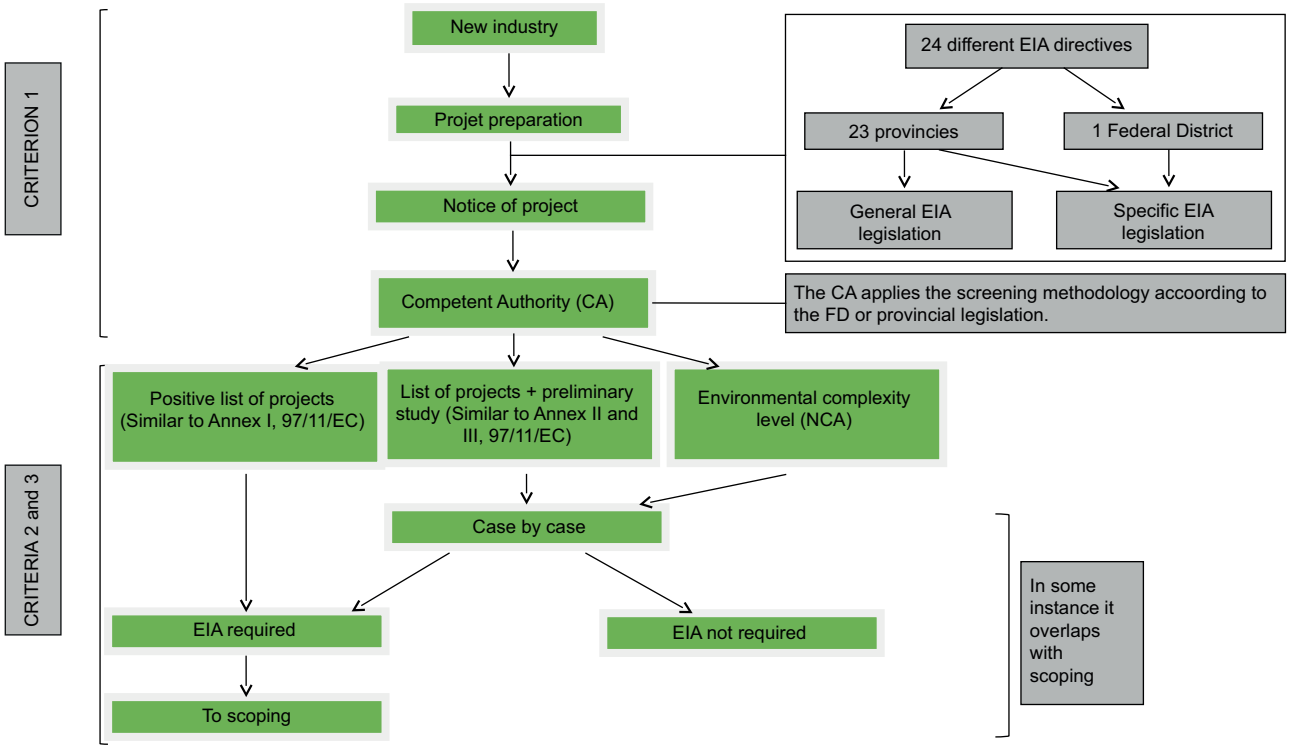

Fig. 4. Screening procedure and methodological synthesis
EIA = environmental impact assessment, NCA = environmental complexity level, FD = federal district

Considering the "Overall Screening Model", one of the positive aspects of the complete model is the importance of having an exact environmental classification of industries in accordance with their complexity (objective criterion); accomplished by the calculation index (NCA) which is considered a relevant contribution in six of the 24 AU. This proffers a better adjustment to the requested requirements in the EIA process in accordance with their complexity. Taking into account the variables used in the systematic screening approach, all the AU recognize three principle groups of criteria: the first relating to the industrial field, location and dimensions. A positive aspect is that the location of the industry is taken into consideration in the determination of the NCA, and that whenever this location changes, a new categorization procedure must be initiated. This is a positive point since, obviously, the characteristics of the surroundings change as well as hazardous focal points that could be caused. The second one is related to effluents; and the third to possible health risks to neighbours and workers.

Although it is considered that these three groups are suffice to represent the environmental complexity of an industry properly, it is important to mention that liquid effluents, gaseous emissions and solid waste, are contemplated in the same term when calculating the NCA. This could lead to a lack of specification in these particular issues. Taking into consideration the adjustment factors in the calculation of the environmental complexity level can be seen as a particularly positive aspect. This is due to the fact that it is possible to separately identify hazardous waste from innocuous types; and it also positively values the adherence of industry to international certification of environmental management systems.

CONCLUSIONS

The comparative method has proven to be efficient enough to carry out the reconstruction of the information referred to, in the screening process execution in Argentina, allowing the identification of three screening models that synthesize the way in which each AU carry forward this process; the greatest difficulty encountered in the application of this method has been information access. On the other hand, Ahmad and Wood (2002) selected criteria, was appropriate to be applied in a federal country such as Argentina, despite the elapsed time. Regarding, the "Systematic Screening Categories" and the "Systematic Screening Approach" it has been verified that there is a good correlation between the identified models in the AU with the 97/11/EC Annex I, II and III. In Argentina the "Preliminary study or initial environmental evaluation approach" + "Case by Case" approaches prevail in such a way as to be noticed, while in second place comes the "Threshold" + "Case by Case" approaches.

From the analyzed results it comes up that the "complete screening model" should be taken as a national guide, since it includes a discrimination of the different industrial activities and a quantitative (objective) model to determine the scope of the information to be presented. Despite being the model that provides more detail, it is the lesser applied since only a mere 13 % of the provinces present it.

Finally, a recommendation that arises from this paper is to develop technical EIA guidelines to cover legislation, thereby creating a more uniform standard EIA screening process among the AU. These guidelines could be designed by the National Government, with the collaboration of the provincial authorities, particularly in the analysis and evaluation of the lessons already learnt. It is important to mention that at this moment a propitious interjurisdictional area integrated by the 24 AU (COFEMA, Environmental Federal Council) already exists, so this task could be brought about.

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Environmental and Health Impacts from Slaughter Houses Located on the City Outskirts: A Case Study

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Abstract

This paper explores the location of slaughter houses in the city outskirts, describes its functioning and explores its impact on the environment and health of residents living in its vicinity. A medium sized city of North India, Aligarh, was selected for the case study. The study is mainly based on primary sources of data collected through survey of city ouskirts, slaughter houses, villages and households located in its vicinity. For in-depth investigation, 2 slaughter houses located in the outskirts, 460 households living in the vicinity of these slaughter houses (0 to 3 km) were randomly selected for sampling. Data were collected with the help of questionnaire. Field surveys revealed that there were innumerable authorized and unauthorized slaughter houses inside the city, Makdoomnagar was the oldest one (1995), individual households in many parts of the city were slaughtering animals in one room, the city outskirts had 6 big slaughter houses and meat processing units and innumerable open illegal ones. Investigations revealed that all the slaughter houses suffer from very low hygienic standards posing both environment and health hazards due to discrete disposal of waste, highly polluted effluent discharge, burning and boiling of bones, hooves, fat, meat, etc. The results show that for the residents living in the immediate vicinity of the slaughter house, both the environmental conditions and their health conditions were worst.

Keywords

Pollution, Environment, Illegal, Waste

1. Introduction

With the growing annual per capita meat consumption and high meat export, the estimated number of animals

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slaughtered has increased from 2.5 million during 2009-2010 to 3.5 million during 2011-2012. The number of cattle slaughtered in India between April 2009 and March 2013 was nearly 8 million [1]. There has also been an increase in the number of slaughter houses in India.

A slaughter house is a facility, where animals are butchered/killed for consumption as food products. In India there are approximately 3600 legal (authorized) and over 32,000 illegal (unauthorized) slaughter houses located both inside and in the city outskirts. All the major Indian cities have central slaughter houses mostly dating back to the British period (>70 years old). Most of them are creating enormous hygienic and environmental problems because they are without adequate basic amenities like water supply, proper flooring, ventilation, lairage, transport, etc. In addition to these, slaughter houses also suffer from very low hygienic standards posing major public health and environmental hazards due to discrete disposal of waste and highly polluted effluent discharge. Unauthorized and illicit slaughtering has also increased manifolds and thus, the related problems, like disposal of waste in hazardous manner, pollution of land, air and water, horrible smell/stench etc., make lives of those living in immediate vicinity and also those living farther away, miserable. Efforts to close the illegal open slaughter houses have, so far, been largely unsuccessful.

The rapidly growing city provides markets for food grains, milk, vegetables, meat etc. So, the city outskirts are day by day becoming a hub of activities. There is a rapid growth of residential areas and other landuses like industrial, commercial, educational institutions, health centers etc. The medium sized cities are also facing similar problems as those faced by mega cities like crowding, congestion, expansion, environmental degradation etc. These problems have become so massive and vital that they have attracted the attention of researchers, planners and local/municipal authorities. Ways have to be found to map out broad strategies to provide livable environment to the dwellers.

Keeping these aspects in mind, in this paper, an attempt has been made to explore the slaughter houses located in the outskirts of Aligarh city and to examine the health and environmental impacts from these slaughter houses. More concern is being expressed over danger to health of residents who live in the vicinity of slaughter houses especially in developing countries where level of awareness is low. People are expressing dissatisfaction with the location of slaughter houses and the way they are being managed. The author has tried to suggest ways for its management.

1.1. Database and Methodology

The study is mainly based on primary sources of data which were collected through survey of the city and its outskirts, neighbouring villages and households living in the vicinity of the slaughter houses. Field surveys were conducted during the years 2011-2012 to collect information from the selected slaughter houses, surrounding villages and households living in these villages. The following methodology has been used:

1) Extensive surveys of the city and its outskirts were conducted to locate and map the slaughter houses lying in the outskirts and to collect general information regarding its functioning.
2) For indepth investigation slaughter houses located (i) along Anupshahar road and (ii) along Mathura bypass road were selected (**Figure 1** and **Figure 2**).
3) Information regarding the environmental and health impacts was collected from sampled households living in the villages in the vicinity of the slaughter houses. Villages were selected randomly on the basis of distance from the slaughter houses *i.e.* 0 to 1.5 km and 1.5 to 3 km. About 30 households from each selected village lying within 0 to 1.5 km distance and 10 households from each selected village lying within 1.5 to 3 km distance from the slaughter house were randomly selected for sampling (**Table 1**). The total sample size consisted of 460 households living in the 26 villages in the vicinity of the slaughter houses (0 to 3 km).
4) Information was collected from the 460 households with the help of two sets of structured questionnaire interviews. One set was designed to obtain information regarding the slaughter house *i.e.* ownership, year of establishment, number of animals slaughtered, place from where the raw material came, available facilities for waste disposal and other management issues. The other set was designed for the sampled residents, *i.e.* characteristics of the respondents, effect of slaughter house on their environmental conditions—land, water, and air quality, effect on their health, symptoms associated with abattoir, frequency of diseases etc.

1.2. Discussion and Results

Aligarh (27˚53'N latitudes and 78˚4'E longitudes) a medium sized city located in the fertile Ganga-Yamuna in-

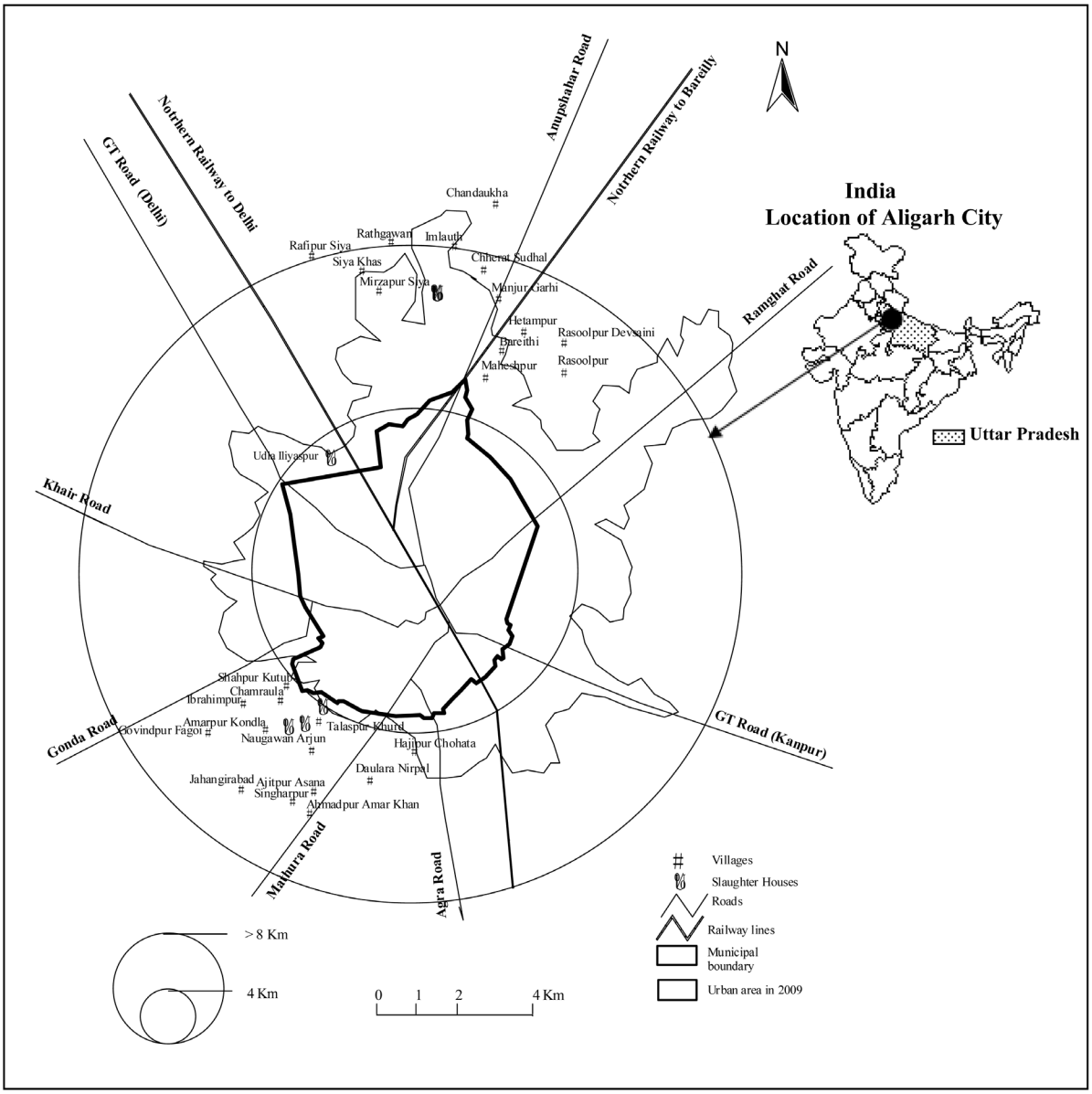

Figure 1. Location of slaughter houses in the outskirts of aligarh city. Source: (i) Singh. A.L. 2011, Urban Sprawl; causes, consequences and policies, B.R. Publishers, New Delhi; (ii) Based on field survey 2011-12.

ter-riverine plain of North India, about 135 kms away from country's capital New Delhi was selected for the case study. Aligarh, an agricultural and industrial town located in western part of the state of Uttar Pradesh, spreads over an area of about 40 square kilometers and has a population of more than 0.8 million (2011). It has been estimated that by 2021 the city's population will be more than 1.5 millions [2]-[4]. This will lead to an increase in demand for food items, vegetables, milk, meat etc. Although the city is famous for its lock industries, brasswares and educational institutions but today it has made its name in the country for meat processing and production units (**Table 2**).

1.3. Location of Slaughter Houses

Field surveys were conducted to locate the *Kattighars* (slaughter house) both inside Aligarh city and its outskirts during 2011 and 2012. Information regarding the functioning of these *kattighars* was also collected.

- **Oldest** kattighar **at Makdoomnagar**

Table 1. Selection of respondents/households for sampling from villages living in the vicinity of the slaughter houses in the outskirts of Aligarh city.

Distance from the slaughter houses	(i) Slaughter houses located along Anupshahar road		(ii) Slaughter houses located along Mathura bypass road	
	No. of villages living in vicinity	No. of sampled households	No. of villages living in vicinity	No. of sampled households
0 - 1.5 km	1. Chherat Sudhal	30	1. Talaspur Khurd	30
	2. Imlouth	30	2. Naugawan Arjun	30
	3. Manjur Garhi	30	3. Saharpur Kutub	30
	4. Mirzapur	30	4. Chamraula	30
			5. Amarpur Kondla	30
			6. Ibrahimpur	30
Total 0 - 1.5 km	4 villages	120 households	6 villages	180 households
>1.5 - 3 km	1. Hetampur	10		
	2. Rasoolpur	10	1. Daurla Nirpal	10
	3. Bareithi	10	2. Hajipur Chohatta	10
	4. Maheshpur	10	3. Ajitpur Asana	10
	5. Rasoolpur dev saini	10	4. Jahangirabad	10
	6. Chandaukha	10	5. Ahmadpur Amar Khan	10
	7. Rafipur	10	6. Govindpur Fagor	10
	8. Siya Khas	10	7. Singharpur	10
	9. Rathgawan	10		
Total > 1.5 - 3 km	9 villages	90 households	7 villages	70 households
Grand total 0 - 3 km	13 villages	210 households	13 villages	250 households

Source: Based on field Survey 2011-12.

Table 2. Aligarh city's contribution to meat production (2013).

Country/state/city	No. of meat factories and processing units		percentages
1. India	Total number of meat factories	37	
	Total number of meat processing units	40	
2. Uttar Pradesh	Total number of meat factories	21	
	Total number of meat processing units	25	
3. Aligarh City	Total number of meat factories and processing units	09	60
4. Contribution of Uttar Pradesh to India's total meat production of which Aligarh contributes			20 - 24

Source: 1. Based on information collected from field Survey 2011-2012, 2. Amar Ujala, Hindi Daily Newspaper, 16th Sept. 2013.

The *Kattighar* at Makdoomnagar was once located outside the city municipal boundary in the city outskirts along Mathura bypass road. Presently due to growth of city population, the city has expanded and this *Kattighar* is now surrounded by a dense population. People are forced to settle near and around the *Kattighar* having unhealthy conditions. The *Kattighar* at Makdoomnagar is run by the Aligarh Municipality since 1955, the Municipality contracted out the slaughter house to a private contractor who further sub-contracted to 3 butchers who slaughter animals in a private godowns which have no arrangement of drinking water, ventilation and disposal facility. One butcher slaughters about 70 buffaloes per day. At least 2500 buffaloes are slaughtered in these godowns daily and the meat is supplied to the city and various other cities (Khurja, Mathura, Delhi etc.) All the animals to be slaughtered have to undergo health checkup (Uttar Pradesh Nagar Nigam Act., 1955) but no rules are followed here. Now this slaughter house has become old and dilapidated without any basic amenities like water connections, boundary wall, wrotten gate, *kutcha* (uncemented) floor, no solid and liquid waste disposal facility etc. The waste of slaughtered animals is thrown and dumped in the landfill site, some of the waste such as hides and solid waste are sold to private parties while waste water and blood is washed away and discharged

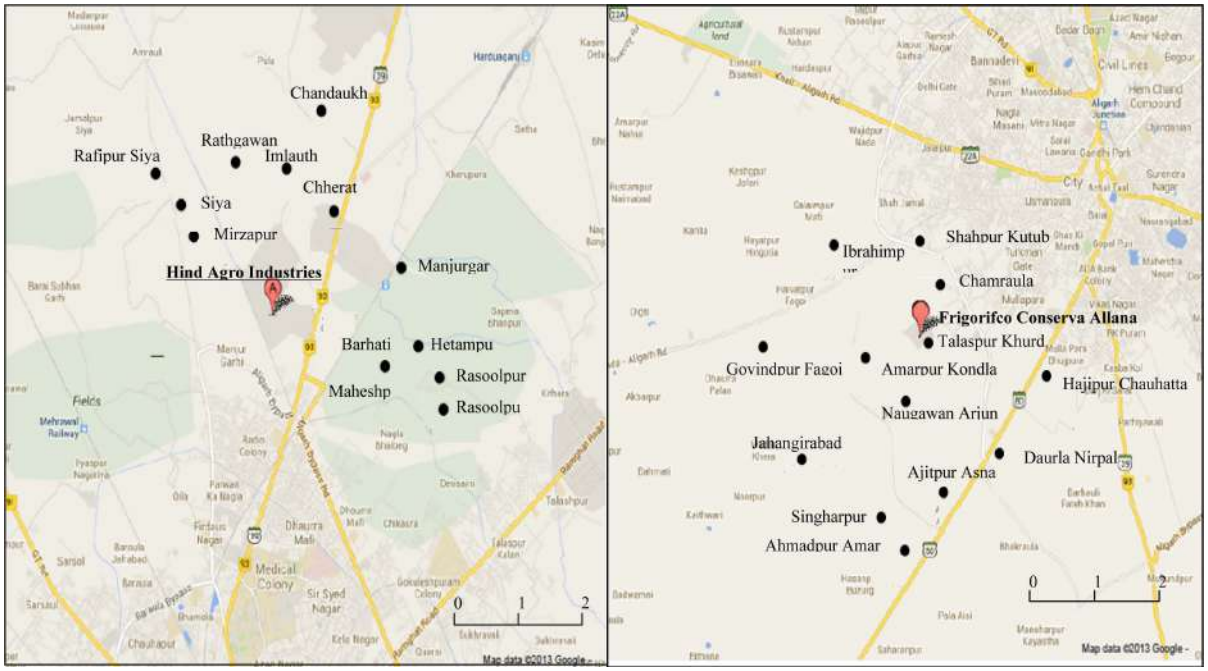

Figure 2. Location of sampled villages in the vicinity of (i) Hind agro industries Ltd (anupshahar Road); (ii) Frigorifco conserva allana (Mathura Road).

in *kutcha nalas* (uncemented drains) around the *Kattighar*. The whole area is *kutcha* and the condition of the place worsens during the rainy season. The area is totally polluted with animal parts strewn all over, having foul-smell and filth all around. Since April, 2012 this *Kattighar* has closed down [5] [6].

- **Illegal** slaughtering **inside individual households**

Numerous illegal abattoirs are often housed in Aligarh's individual households. Field surveys have revealed that in colonies, such as Sarai Rahman, Shah Jamal, Sarai Sultani, Jamalpur, Tantanpara, Quazi Sarai, Quazipara, Khawaja Chowk, Turkaman gate, Bani Islayn, Khaidora, Bhujpura etc. more than 80 percent of the households slaughter buffaloes. These are two room tenements with a shop in front, where at five in the morning, a buffalo is slaughtered in one of the rooms. All the waste is just washed off into the drain, clogging the sewer lines. Illegal slaughtering in Aligarh cannot be banned [6]. An alternative for this problem was to penalize the *kattighars* which do not improve the conditions of slaughtering and disposal of waste and to give the *kattighars* in the hand of private parties for its proper development.

- **Slaughter houses in the city outskirts**

Privatization of slaughter houses was thought to be a sure panacea for various ills of *kattighars*. Indepth investigation revealed that these slaughter houses were also creating the same problems. The first slaughter house was established in 1992 and gradually 6 meat factories were established in the city outskirts within 7 km from the city centre (**Figure 1** and **Figure 2**, **Table 3**), 1 along Anupshahar road, 4 along Mathura bypass road and 1 along G.T road (towards New Delhi). These factories have a capacity to slaughter >1000 animal per day. But as per the local reports these factories are slaughtering nearly 25,000 animals daily. Open/illegal slaughtering was rampant and such practices are also creating environmental havoc. Animals parts are seen strewn all over the fields and open places, dogs and vultures could be seen preying over these wretched remains; dirt festering all around; animal blood, water and debris is directly disposed into the drains; there is horrible stench/filth which makes your inwards wrench with revulsion. For indepth investigation two slaughter houses the Hind Agro Industries (located along Anupshahar road at Chherat village, nearly 7 km away from the city centre) and Frigorifico Conservation Allana Sons Ltd. (located along Mathura by pass road, at Talaspur Khurd, nearly 5 km away from the city centre) were selected (**Table 3**, **Figure 1** and **Figure 2**).

The Hind Agro, established in 1992 was slaughtering > 12,000 buffaloes daily which were brought from nearly districts (Khurja, Mathura, Meerut, Mujaffarnagar and from Bihar state). Sometimes truck load of animals are illegally brought for slaughtering. Information gathered from nearby villages revealed that waste in

Table 3. Location of slaughter houses in the aligarh city outskirts.

Name of slaughter house	Location		Distance (Km) from the City centre	Year of establishment	Products permitted	No. of animals slaughtered per day	Products transported from/to	
	Road	Village					From	To
							Raw Material	Finished Product
Hind Agro Industries Ltd.	Anupshahar	Chherat	7	1992	Buffalo/sheep and goat Meat	1000 - 12,000	Khurja, Meerut, Muzaffarnagar, Mathura, Agra, Bihar etc.	Egypt, Iran, Saudi Arabia, Malaysia, Finland, South Africa, Sudan, Middle East Countries
Allana Sons Ltd. Allana Centre	Mathura bypass	Talaspur khurd	5	1999	Buffalo Meat	1500	do	do
H.M.A Agro Industries Ltd.	Mathura bypass	Talaspur khurd	5	2010	Buffalo Meat	10000	do	do
Al Tabarak Food as Frozen	Mathura bypass	Talaspur khurd	5	2010	Buffalo Meat	10000	do	do
Al-Dua Food Processing (P) Ltd.	Mathura by pass	Amarpur kondla	5	2011	Buffalo Meat	2000	do	do
Al-Hamd Agro Food Products Pvt.	G.T road (Delhi)	Udla Illyaspur	4	2000	Buffalo Meat	1000	do	do

Note: Many small units of privately owned open slaughter houses are located around Mathura road bypass. Source: Based on information collected from Field survey 2011-2012.

cluding carcass, bones, rumen contents etc. is thrown in open areas/fields or in drains while the animal blood, water is disposed into the Chherat drain which is dirty and clogged and blood is seen flowing in it. When it overflows during the monsoon season, the dirty water spreads into the fields polluting both land and water even killing animals who drink this water. Living and sustaining in the nearby villages has become very difficult for the residents due to stench and filth.

Frigorifico Conservation Allana Sons Ltd. was established in 1999. Two other factories established along Mathura bypass road at Talaspur Khurd village were H.M Agro Industries Ltd (in 2010) and Al Tabrak Food and Frozen (in 2011). In Amarpur Kondla village another factory was established along Mathura bypass road (Al Dua Food Processing Pvt. Ltd (in 2011)). Thus, there were 4 meat factories and processing units and innumerable illegal/open slaughtering butchering over 25,000 animals daily disposing the waste in open fields and blood in open drains *i.e.* in Mathura bypass *nala* (drain).

2. Impact of Slaughter House on the Environment and Health of Residents Living in Its Vicinity

Field investigations have revealed that all the slaughter houses suffer from very low hygienic standards posing both environmental and health hazards due to discrete disposal of waste, highly polluted effluent discharge and burning of bones and hooves etc. Since unauthorized and illicit slaughtering has increased, these problems have also increased manifolds.

Waste generated in the slaughter houses includes both solid (carcass, bones, hooves, rumen, intestine contents, dung etc.) and liquid waste (blood, urine, internal fluids including water used for washing). According to a rough estimate a buffalo weighs about 2 quintals and almost 25 percent of the total body weight becomes waste. It generates 10 litres of waste blood. Surveys of the slaughter houses have revealed that there were no special waste disposal system or treatment plants. The solid waste is either simply thrown and dumped in the open fields or burnt or sold off to private parties. While the liquid waste is washed away and discharged in *nalas* (Chherat drain and Mathura bypass drain) around the slaughtering area. Finally all the water containing blood and debris goes inside the Aligarh drain without treatment. This has led to land degradation, air and water pollution.

The results of survey on characteristics of the respondents (**Table 4(i)**) shows that, 60 percent were males, 50

Table 4. Characteristics and perception/awareness of the respondents living in the vicinity of sampled slaughter houses in the outskirts of Aligarh City.

i. Characteristics					
Characteristics	Percent-ages	Characteristics	Percent-ages	Characteristics	Percent-ages
1. Sex		2. Age		3. Marital status	
Male	60	Up to 19	5	Married	55
Female	40	20 - 39	50	Unmarried	45
		40 - 60	35		
		>60	10		
4. Household Size		5. Educational Status		6. Employment Status	
1 - 2	4	Educated	40	Employed	80
3 - 4	27	Uneducated	60	Unemployed	20
5 - 12	53				
>12	16				
7. Status at home		8. Length of Stay in the area			
Landlord	37	<5 years	15		
Tenants	62	5 - 10	40		
Visitors	01	11 - 15	35		
		15 - 20	5		
		>20	5		
ii. Perception and Awareness					
1. Awareness of closeness of slaughter house to residence		2. Contamination of water/ food items by Incidence of flies/ mosquitoes/insects/ in high number spreading infection		3. Horrible stench/odour of slaughter house	
Yes	95	Yes	74	Yes	98
No	05	No	26	No	02
4. Boiling of fat/bones Etc by private parties also spreading bad odour		5. Pungent odour affects breathing and causes respiratory ailments		6. Chocking blocked drains with waste water containing blood and debris spreading infection	
Yes	79	Yes	43	Yes	78
No	05	No	14	No	22
Not sure	16	Not sure	43		
7. Contamination of Surface/ground water		8. Slaughter house is a nuisance			
Yes	58	Yes	74		
No	08	No	26		
Not sure	34				

Source: Based on information collected from Field survey 2011-2012.

percent were between the age of 20 to 39 years, 55 percent were married, 40 percent were educated, 80 percent were employed and the size of household of 53 percent was between 5 to 12. Nearly 37 percent were landlords and nearly 40 percent reported staying in this area for 5 to 10 years. Regarding respondents perception and awareness (**Table 4(ii)**) of slaughter house and its effect on environment and health, 95 percent were fully aware of closeness of slaughter house to their residence. Nearly 74 percent reported of incidence of flies/insects and mosquitoes in high number spreading infection; 98 percent reported of horrible odour from slaughter house; 78 percent reported of choking drains containing water with blood and debris; 58 percent reported of drinking water contamination; 79 percent reported of pungent odour from burning of fats and bones. **Table 5(i)** is showing the

Table 5. Environmental and health impacts reported by respondents (in percentages) living in the selected villages in the vicinity of sampled slaughter houses in the outskirts of Aligarh city (2013).

i. Environmental Impacts								
Distance from the slaughter houses	Name of sampled villages	(i) Slaughter houses located along Anupshahar road			Name of sampled villages	(ii) Slaughter houses located along Mathura bypass road		
		Land degradation	Water Pollution	Air Pollution		Land Degradation	Water Pollution	Air Pollution
					1. Talaspur Khurd	93.33	95.45	98.89
	1. Chherat Sudhal	74.67	78.77	83.13	2. Naugawan Arjun	90.11	94.23	96.01
	2. Imlouth	65.00	70.67	73.34	3. Saharpur Kutub	86.67	91.33	95.12
0 - 1.5 km	3. Manjur Garhi	71.33	74.89	78.32	4. Chamraula	78.78	84.89	93.98
	4. Siya khas	72.67	73.22	75.45	5. Amarpur Kondla	76.65	83.45	92.21
					6. Ibrahimpur	78.90	85.34	94.32
Total	120 households	70.92	74.39	77.56	180 households	84.07	89.12	95.09
	1. Hetampur	40.00	52.23	56.45		69.90	74.85	
	2. Rasoolpur	45.56	58.88	63.32	1. Daurla Nirpal	67.87	72.65	85.75
	3. Bareithi	43.45	55.56	59.78	2. Hajipur Chohatta	68.79	73.59	81.25
	4. Maheshpur	42.87	55.21	59.65	3. Ajitpur Asana	65.02	66.82	83.34
>1.5 - 3 km	5. Rasoolpur dev saini	39.65	49.67	55.34	4. Jahangirabad	64.89	68.73	75.90
					5. Ahmadpur Amar			79.45
	6. Chandaukha	38.89	48.89	53.87	Khan	62.22	65.75	
	7. Mirjapur Siya	37.87	50.90	58.11	6. Govindpur Fagor	60.60	63.21	76.91
	8. Siya Khas	40.02	54.61	58.43	7. Singharpur			74.25
	9. Rathgawan	42.21	57.78	62.54				
Total	90 households	41.17	53.75	58.61	70 households	65.61	69.37	79.55
ii. Health Impacts								
		Water borne diseases	Air borne diseases	others		Water borne diseases	Air borne diseases	others
			34.00		1. Talaspur Khurd	74.78	54.34	80.00
	1. Chherat Sudhal	55.95	34.67	78.75	2. Naugawan Arjun	70.49	65.52	83.33
	2. Imlouth	54.62	34.00	65.00	3. Saharpur Kutub	67.81	55.89	90.00
0 - 1.5 km	3. Manjur Garhi	54.26	37.00	68.33	4. Chamraula	74.53	54.12	93.33
	4. Siya khas	52.32		69.45	5. Amarpur Kondla	73.03	57.67	90.00
					6. Ibrahimpur	72.26	54.89	90.00
Total	120 households	54.29	34.95	70.38	180 households	72.15	57.07	87.78
	1. Hetampur	31.67	16.67	30				
	2. Rasoolpur	23.33	13.33	30	1. Daurla Nirpal	55.00	43.33	80
	3. Bareithi	23.33	20.00	30	2. Hajipur Chohatta	55.00	53.33	60
	4. Maheshpur	40.00	16.67	50	3. Ajitpur Asana	55.00	23.33	70
>1.5 - 3 km	5. Rasoolpur dev saini	28.33	16.67	50	4. Jahangirabad	55.00	46.67	50
					5. Ahmadpur Amar			
	6. Chandaukha	21.67	13.33	20	Khan	50.00	26.67	80
	7. Mirjapur Siya	40.00	16.67	50	6. Govindpur Fagoi	55.00	23.33	60
	8. Siya Khas	28.33	13.33	50	7. Singharpur	50.00	46.67	80
	9. Rathgawan	30.00	18.33	50				
Total	90 households	28.33	16.11	40.00	70 households	53.57	37.62	68.57

Source: Based on information collected from Field survey 2011-2012.

environmental impacts as observed and reported by 300 respondents living in the selected villages in its immediate vicinity *i.e.* 0 - 1.5 km and 160 respondents living in the selected villages little farther away *i.e.* 1.51 to 3 km. The results show that land degradation, water and air pollution was higher in close vicinity of the slaughter house and as one goes farther away it decreases.

On the whole, nearly three fourth of the respondents reported that the slaughter house was a nuisance for them because it helped in spreading various infections. The presence of flies, insects in the dumped waste, mosquitoes in chocked drains, organisms in the drinking water source, the presence of dirt and pungent smell in the air etc. all these are significant source of health risk. In this study residents living in the vicinity of the slaughter house *i.e.* 0 to 3 km reported of headache, general body ache and weakness, excessive coughing, shortness of breath and other respiratory symptoms, fever, typhoid fever, jaundice, cholera, diarrhoea/dysentery and malaria. Results indicated in **Table 5(ii)** shows that the disease have been grouped under three categories, the water borne, air borne and other diseases. Solid waste and waste water is not a direct threat to health but when accumulates in the neighbourhood it becomes a source of health hazards, when it decomposes it favours breeding of flies, it attracts rodents and vermins; the pathogens present in the waste may be conveyed back to man's food by flies and dust, it is a source of nuisance from smell and unsightly appearance, and drainage from waste dumps pollutes the surface and ground water. The resultant diseases are typhoid and paratyphoid, fever, diarrhoea/dysentery, cholera, hookworm, other intestinal infections etc. Mosquitos population also increases due to open blocked drains causing malaria [7]. A large number of disease vectors live, breed or feed in the neighbourhood of the slaughter houses. Microbial tests carried out on water samples collected from the resident's source of drinking water *i.e.* tube wells indicated presence of organism which are a significant health risk [8]. Not only is the odour/stench from the slaughter house helping in lowering the air quality but the boiling of fat, bones, meat has also helped in spreading the bad odour. Residents from the city and villages reported that with the wind comes pungent odour. The residents reported that they could not spend time outside their home due to odour. They experienced severe headache, body ache, loss of appetite, loss of breath, excessive coughs etc. Data collected with the help of field surveys and presented in **Table 5** shows that: (**Table 5**, **Figure 3**)

1) The respondents living in closer vicinity *i.e.* 0 to 1.5 km from the slaughter house were suffering move

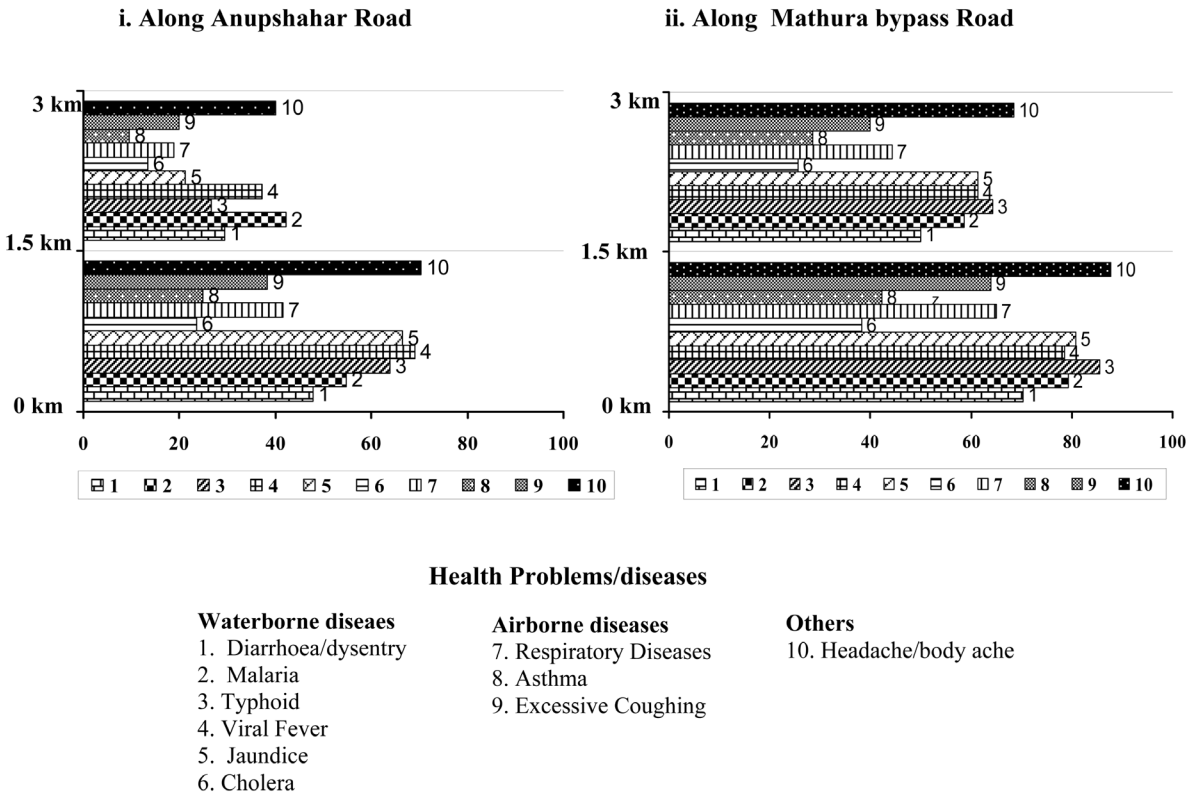

Figure 3. Health Problems and occurrence of diseases reported by respondents (in percentages) living in the vicinity of slaughter houses. (i) Along Anupshahar Road; (ii) Along Mathura bypass Road. Source: Based on field survey 2011-2012.

from both environmental hazards and health problems than those living farther away *i.e*. between 1.5 to 3 km

2) The conditions were worst for residents living in the vicinity of slaughter houses located along Mathura bypass road as compared to residents living in the vicinity of slaughter houses located along Anupshahar road.

3. Conclusions

The foregoing analysis reveals that:

1) Slaughter houses were located in the midst of residential areas whether they were inside the city or in the outskirts. The local authorities and municipality should properly chalk out plans for its proper place *i.e.* outside the residential areas so they do not degrade the environment and harm the health of the residents.
2) The slaughter house activities and management practices have direct and indirect impact on the land, water and air quality more in its vicinity. The disposal of waste in open fields and drains, the effluent discharge of water with blood and waste in open drains, the disposal of blood borings and burning of solid waste destroy the environmental quality.
3) Even today slaughter houses suffer from enormous hygienic and environmental hazards which affect the health of residents living in its vicinity. They reported the occurrence of headache, bodyache, breathiness, nausea/vomiting, coughing and other waterborne and air borne diseases.
4) Conditions were worst for:

- Residents living in the immediate vicinity of the slaughter house and
- For those living in the vicinity of slaughter houses along Mathura bypass road.

So, special attention should be paid by planners, government bodies and local municipal authorities to improve the conditions of these areas.

5) Control and management of slaughter house requires special legislative laws and rules.

- Site location-slaughter houses should be located outside populated areas downwind from the city far away from water body. Landuse policies should be framed accordingly.
- Land contamination—proper storage of waste inside the premises of the slaughter house in an aerated area to minimize biodegradation and pungent/foul smell
- Water contamination—presence of a liquid waste collection system to avoid any water discharges outside the premises
- Air emissions—planting trees around the slaughter houses development of proper aerated storage area to minimize unpleasant smell.

For health, hygiene and safety regular check up of meat handlers, head cover, gloves etc. for them should be carried out. Storing meat in hygienic conditions and provision of all necessary facilities and infrastructure in the slaughter houses should be checked. Above all, the animals brought for slaughtering should be checked by the veterinary surgeon.

The government should enforce the existing laws strictly related to slaughter houses. There should be a proper licensing system for slaughter houses. Public awareness and enlightment on possible impact of pollution from slaughter house wastes should be embarked upon by government and non-government organizations and public participation is necessary for the development of policies for slaughter house management.

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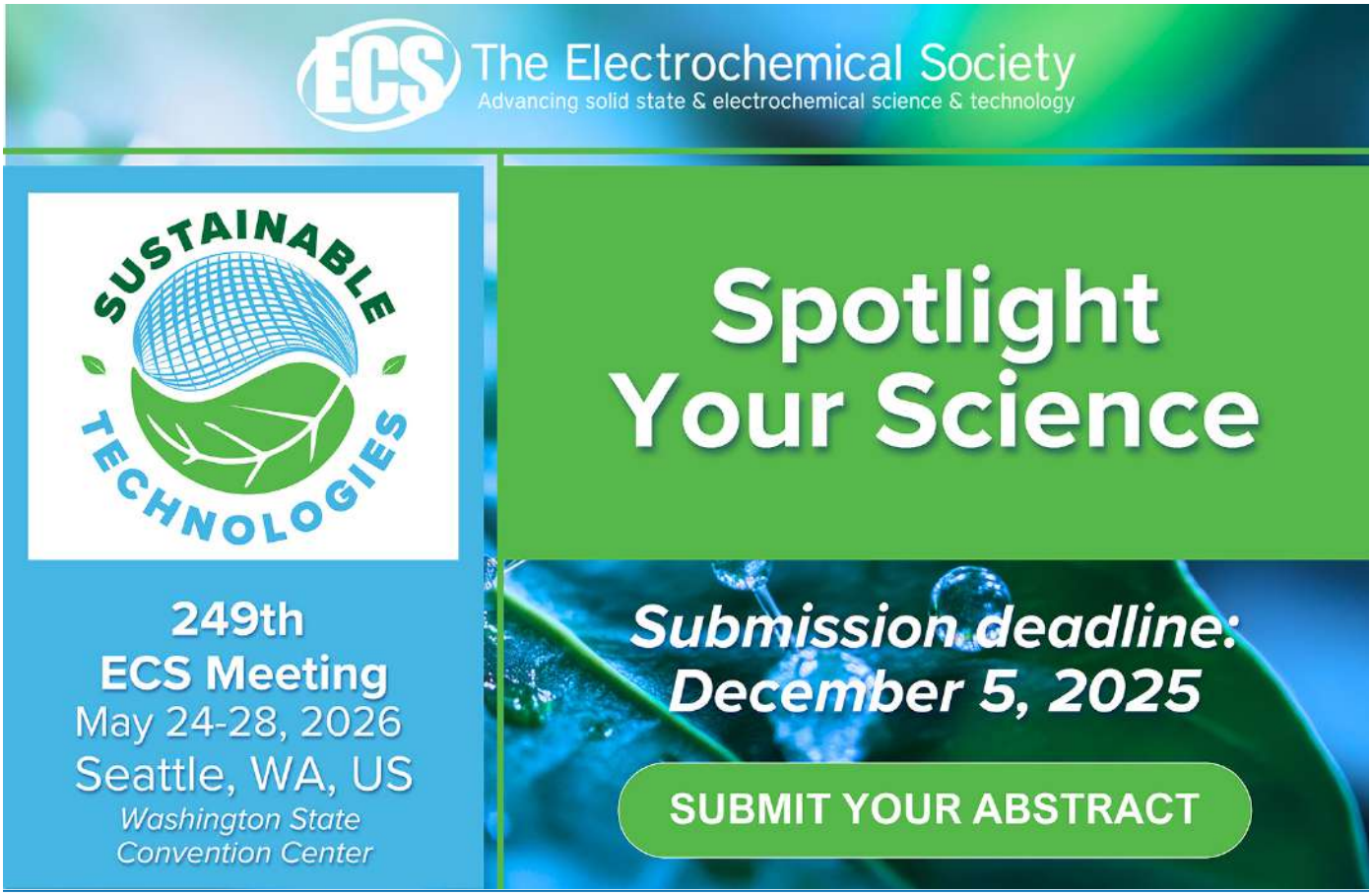

Impact of slaughterhouse waste on adjoining water quality

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Abstract. This article examines the condition of water in rural regions surrounding slaughterhouse industries on the Mathura bypass road in Aligarh, Uttar Pradesh, India. A total of seven villages were chosen for sample collection, with two samples from each village - one from a hand pump and the other from a submersible pump. A total of 14 samples per month were collected for analysis for their physical, chemical, and biological attributes. The study was conducted covering the dry and wet seasons so as to give the trend of water quality parameters and thereby represent a comparative analysis. Based on these findings, it can be inferred that the groundwater quality parameters have been severely impacted by effluent from slaughterhouse industries. Water samples from hand pumps showed higher concentrations of all parameters compared to those from submersible pumps, indicating better water quality from submersible pumps. Water samples from hand pumps and submersible pumps in all villages had nitrate, pH, and turbidity levels within permissible limits. Nitrates and pH were found to be within permissible limits. Some remaining parameters were found to be above and below rejection limit. As a whole it is observed that almost all water quality parameters increased during the dry season and lowered in wet seasons. However after observing the current trend of water quality parameters, it can be seen that water quality may deteriorate further due to an increase in industrialisation.

Keywords. Hand pump, submersible pump, groundwater, and slaughterhouse

1. Introduction

Water, the most remarkable and plentiful compound in nature, is the foundation of all life, serving as an ecological resource for flora and fauna. It is an essential requirement for all living beings. Without a reliable water supply, it's hard to envision productive human activities, whether it's agriculture, forestry, livestock, farming, fisheries, trade, or industry.

Studies have shown that the characteristics of slaughterhouse waste and effluents can vary daily, depending on the number of animals processed [1]. This waste is typically divided into solid, liquid, and fat components. The solid waste, rich in organic matter, includes condensed meat, undigested feed, bones, horns, hair, and aborted fetuses. The liquid waste consists of dissolved solids, blood, gut content, urine, and water, while the fatty waste is characterized by high levels of fat, oil, and grease [2]. Animal waste is susceptible to microbiological contamination by microorganisms that are either naturally present or introduced during processing operations [3,4,5].
The practice of slaughtering animals for community consumption is ancient, leading to the pollution of underground water sources [6]. The impact on human health can manifest in various ways:

1. Waterborne Diseases: Bacterial Contamination: Poor treatment and disposal of slaughterhouse wastewater can result in the presence of pathogenic bacteria (such as Salmonella, Escherichia coli) in water sources.

Consuming or coming into contact with contaminated water can lead to waterborne diseases, causing symptoms like diarrhea, stomach cramps, and fever. Viral and Parasitic Infections: Viruses (e.g., Hepatitis E) and parasites (e.g., Cryptosporidium, Giardia) may also be present in untreated wastewater. These can cause gastrointestinal infections and pose significant health risks. Groundwater contamination due to stormwater infiltration has been reported by [7,8,9].

2. Chemical Contamination: Heavy Metals: Slaughterhouse wastewater often contains heavy metals (e.g., lead, chromium) originating from animal feed, medications, or processing activities. Long-term exposure to these metals can lead to chronic health problems, including neurological damage, kidney issues, and carcinogenic effects. Organic Pollutants: It has been reported that among 12 main groundwater aquifers in Slovenia, the amount of nitrate exceeds the allowable level (45 mg/1) for drinking water. [10] studied the effect of chemical fertilizers on groundwater quality in the Nile Valley aquifer, Egypt and found the major ion concentration of Nitrate (20 to 340 mg/1), Sulphate (96 to 630 mg/1), Phosphate (7 to 34 mg/l) and Potassium (7 to 28 mg/1) [11,12].

3. Residual Antibiotics: The use of antibiotics in animal farming can result in the presence of antibiotic residues in slaughterhouse wastewater. Over time, this can contribute to the development of antibiotic-resistant bacteria, posing a threat to human health by reducing the effectiveness of antibiotic treatments.

4. Vector-Borne Diseases: Breeding Grounds for Vectors: Poorly managed wastewater can create stagnant pools, serving as breeding grounds for disease vectors such as mosquitoes. This increases the risk of vector-borne diseases like malaria and dengue fever. Quality of well water near the Mae-Hia waste disposal site has been evaluated by [13]. It has been reported that well water in the study area was not suitable for drinking due to high contamination of Total and Fecal coliforms and moderate contamination by nitrate and manganese [14,15].

5. Groundwater Contamination: Aquifer Pollution: If untreated slaughterhouse wastewater seeps into the ground, it can contaminate aquifers and underground water sources. This contamination poses a long-term risk to communities relying on groundwater. Nitrate pollution of groundwater in 14 cities of Northern China due to nitrogen fertilizer has been reported by [16]. When rainfall or ground surface water percolates through open dumps containing all sorts of municipal, toxic wastes as well as heavy metals like Cd, Cr, Cu, Fe, Ni,Pb, Fe, Zn etc forms leachate and highly effects groundwater [17,18,19].
The potential impacts of mine wastes on ground and surface water have been studied by [20].

In this research the target is basically to check the important water quality parameters from various sites in close vicinity of the slaughterhouses so as to get a report of the possible groundwater contamination from submersible pumps and hand pumps in dry as well as wet seasons.

2. Study Area

The study area is rural area in Aligarh district of northern India. The seven villages were chosen around four slaughterhouse industries at Mathura by pass road Aligarh U.P.
Field investigations have revealed that all the slaughter houses suffer from very low hygienic standards posing both environmental and health hazards due to discrete disposal of waste, highly polluted effluent discharge and burning of bones and hooves etc. Since unauthorized and illicit slaughtering has increased, these problems have also increased manifolds. Waste generated in the slaughter houses includes both solid (carcass, bones, hooves, rumen, intestine contents, dung etc.) and liquid waste (blood, urine, internal fluids including water used for washing). The solid waste is either simply thrown and dumped in the open fields or burnt or sold off to private parties. While the liquid waste is washed away and discharged in nalas (Chherat drain and Mathura bypass drain) around the slaughtering area. The general characteristics of slaughter house waste water contains 546 mg/l of total organic compound, BOD is 1200 mg/l, COD is 4221 mg/l, Total nitrogen is 427 mg/l, potassium contains 90 mg/l and Chloride is 450 mg/l.

3. Methodology

This study has been carried out in District Aligarh. Water samples have been collected from rural areas situated around slaughterhouse industries at Mathura by pass road in Aligarh city. Seven villages have been selected up to 3 km radius from slaughterhouse industries which located at Mathura by pass road. Two points have been selected in each village, one is Indian mark (IM)-II hand pump and second is submersible pump. The hand-pumps and submersible pumps were continuously pumped prior to the sampling to ensure that ground water to be sampled was representative of groundwater aquifer. The samples were analyzed in the Indo-European Water Technology Lab. Department of Civil Engineering. AMU for their physical, chemical & biological properties.

- The project work of collecting the groundwater sample from 14 locations of rural areas of Aligarh district (2 samples from each village).7 samples from hand pump and 7 samples from submersible pump.
- Samples were taken from hand pumps and submersible pumps.
- The samples were collected from the chosen villages in the months of May, June, July and August 2023. The purpose of selecting these months is to give an analysis of different water parameters in dry and wet season.
- The hand pumps were continuously pumped prior to the sampling, to ensure that ground water to be sampled was representative of ground water aquifer.
- The sample were collected in 1L. Polylab bottle.
- The samples were transported to the Environmental laboratory of the Department of civil engineering where they were stored to at 4° C and analyzed for various physio- chemical & biological parameters.

4. Results and discussion

The analysis contains Total hardness, pH, DO, Chlorides, turbidity, TDS, Nitrates and iron. The data given in Tabel 1 and showed in Figures (1-8) are made accordingly.

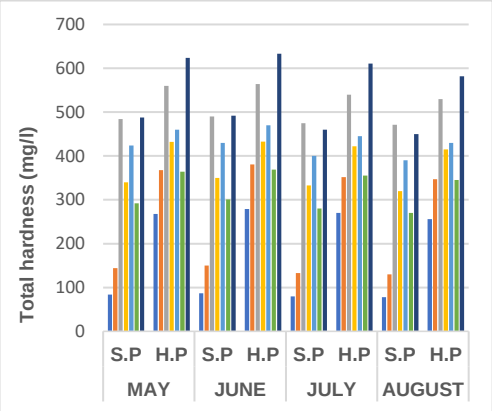

Figure 1: Variation of total hardness with time

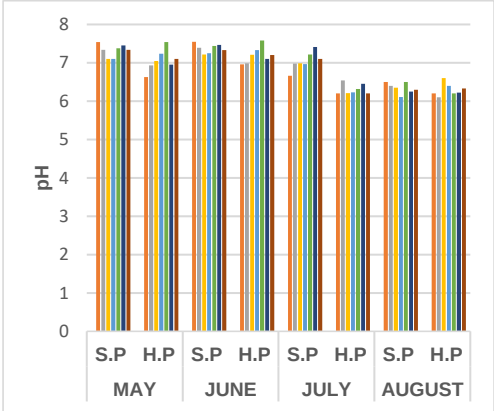

Figure 2: Variation of pH with time

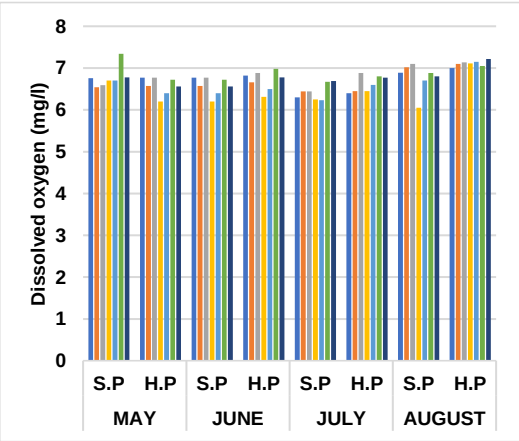

Figure 3: Variation of Dissolved oxygen with time

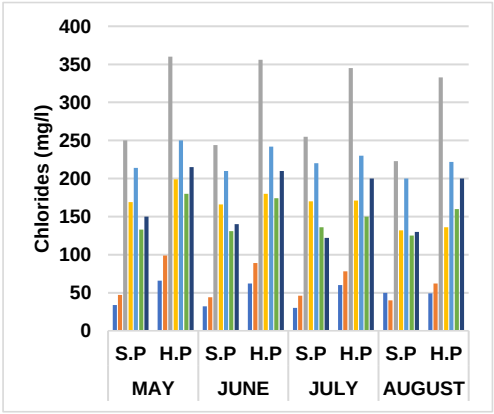

Figure 4: Variation of Chlorides with time

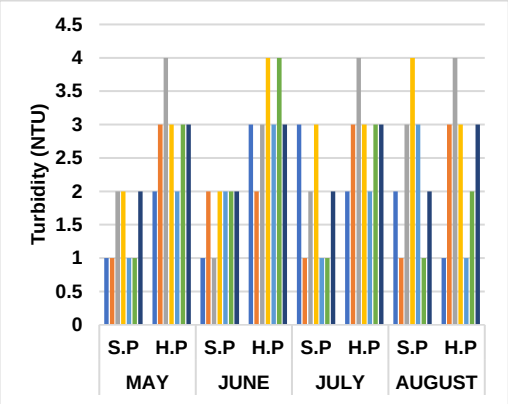

Figure 5: Variation of Turbidity with time

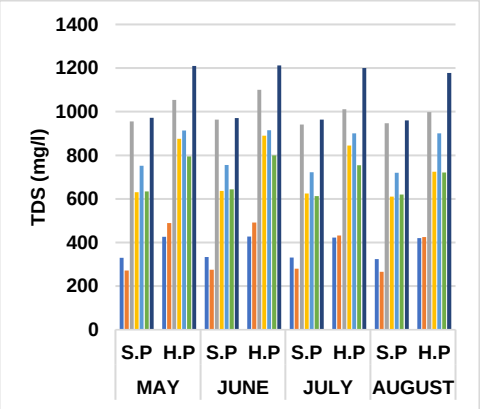

Figure 6: Variation of TDS with time

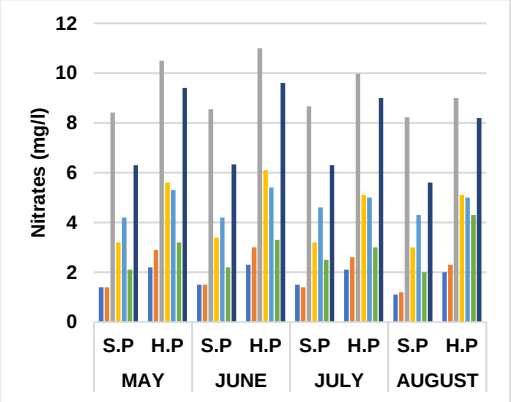

Figure 7: Variation of Nitrates with time

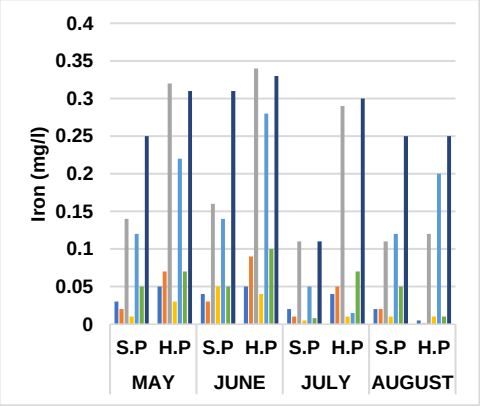

Figure 8: Variation of Iron with time

As shown in Figure 1, the total hardness samples of Talashpur khurd (submersible pump, 84mg/l) and Shahpur kutub (submersible pump, 144 mg/l) were found to be within permissible limit and other remaining samples exceeded the permissible limits. Amarpur kondla (handpump sample having total hardness of 624 mg/l) also exceeded the rejection limit.The pH samples of all villages either from submersible pump or hand pump are found in the range which is recommended by central pollution control board (CPCB) India. Alteration of pH in ground water is due to chemical pollution generated from slaughterhouse industries in the locality can cause a water body to become acidic. These chemicals can enter the water through illegal discharge or inadequate waste water treatment [21]. The results of the pH test was shown in Figure 2.

The CPCB has recommended the permissible limit of dissolved oxygen (D.O.) in drinking water is 6 mg/l or more. Samples of all villages from both submersible pump and hand pump were obtained above permissible limit. Water samples of all villages from both submersible pump and hand pump were obtained under permissible limits for chlorides except for Naugawan Arjun (hand pump, 356 mg/l) which were obtained above permissible limit but all samples readings were under rejection limit as presented in Figure 3. The samples tested for chlorides from both submersible pump and hand pump of all villages were obtained above permissible limit and below rejection limit as presented in Figure 4. According to the Figure 5, the turbidity values within the permissible limit for all samples. TDS samples of both submersible pump and hand pump of all villages exceeded permissible limit except village Naugawa Arjun and Amarpur Kondla handpump samples had high TDS of 1054 and 1210 mg/l respectively. Talashpur khurd (both submersible pump and hand pump) and Shahpur kutub (submersible pump) and obtained below permissible limit. The results of TDS test was shown in Figure 6. Excess discharge of waste water, poorly maintained septic system, natural organic matter, waste disposal landfill [21, 22] .Samples of both submersible pump and hand pump of all villages were obtained below rejection limit. It is interesting to note in Figure 7 that none of the nitrate samples exceeded the permissible limit.

Figure 8 presented the Iron samples taken from both submersible pump and hand pump were obtained under permissible limit of all villages except naugawan arjun (hand pump, 0.32 mg/l) and amarpur kondla (hand pump, 0.31 mg/l)
exceeded the permissible limit which is expected from samples nearby slaughterhouses [23,24]. It is seen that vast majority of the parameters for both handpump and submersible pumps are found to be within permissible limits with submersible pump values being on the lower end indicating better water quality.
The physico-chemical characteristics of the samples under study are shown in Table 1.

Table 1: Physio- chemical & biological parameters for water samples

S. No	Parameters		Teleshpur Khurd	Shahpur Kutub	Naugawan Arjun	Ajeetpur Asna	Singharpur	Ahmedpur Amar	Amarpur Kondla
1	Total Hardness (mg/l)	S.P.	84	144	484	340	424	292	488
		H.P.	268	368	560	432	460	364	624
2	pH	S.P.	7.54	7.34	7.1	7.1	7.38	7.45	7.34
		H.P.	6.63	6.93	7.05	7.24	7.54	6.95	7.1
3	Dissolved oxygen (mg/l)	S.P.	6.76	6.54	6.59	6.7	6.7	7.34	6.78
		H.P.	6.77	6.57	6.77	6.2	6.4	6.72	6.56
4	Chlorides (mg/l)	S.P.	32	44	244	166	210	131	140
		H.P.	62	89	356	180	242	174	210
5	Turbidity (N.T.U.)	S.P.	1	1	2	2	1	1	2
		H.P.	2	3	4	3	2	3	3
6	Total dissolved solids (mg/l)	S.P.	330	271	955	630	752	634	972
		H.P.	426	489	1054	875	914	795	1210
7	Nitrates (mg/l)	S.P.	1.4	1.4	8.41	3.2	4.2	2.1	6.3
		H.P.	2.2	2.9	10.5	5.6	5.3	3.2	9.4
8	Iron (mg/l)	S.P.	0.03	0.02	0.14	0.01	0.12	0.05	0.25
		H.P.	0.05	0.07	0.32	0.03	0.22	0.07	0.31
S.P.- Submersible pump **H.P. – Hand pump**									

5. Conclusions

Based on the research conducted the following conclusions were drawn:

1. The pH of all samples were found to be in permissible limits.
2. None of the nitrate samples exceeded permissible limits.
3. Turbidity for all samples also found to be within permissible limits.
4. Iron samples from two sites exceeded rejection limits (Naugawan Arjun-0.32 mg/l and Amarpur Kondla-0.31 mg/l).
5. Total hardness sample from one site exceeded rejection limit (Amarpur Kondla site- 624 mg/l).
6. Water samples from hand pumps had higher concentrations of all parameters compared to those from submersible pumps, indicating better water quality from submersible pumps.

6. Recommendations:

There is a need to analyze more water quality parameters like sulphates, fluorides, chemical oxygen demand (COD) etc. There is an urgent need to enforce regulations for slaughterhouse sanitation in the study area. Regular checks should be conducted to monitor groundwater quality in the study area to minimize health and environmental risks. Residents in the study area should use chlorine to treat water before use to reduce health risks. Slaughterhouse control and management require specific legislative laws and rules. Slaughterhouses should be located outside populated areas, downwind from the city, and far from water bodies. To prevent water contamination, a liquid waste collection system should be in place to avoid any water discharges outside

the premises. Public participation is crucial for developing slaughterhouse management policies. Further research should be conducted on the effects of abattoir effluents on surface water quality and crop quality within the study area. More studies can be done on a larger scale for more time period covering all seasons so as to get a complete picture of water contamination and arrive at a solution.

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Research Article Open Access

Emergence of Zoonotic Diseases in India: A Systematic Review

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Abstract

Introduction: Zoonotic diseases are the diseases originating from animals wherein humans acquire infectious diseases from zoonotic reservoirs, either naturally or through zoonotic vectors. The newly emerged or existing zoonotic diseases like Kyasanur Forest Disease, Scrub typhus and Japanese Encephalitis are frequently expanding to non-endemic areas. Nipah Virus was first encountered in West Bengal (India) in 2001 and recently has been reported from Kerala in May 2018.

Method: Multiple databases like PubMed, Google Scholar, Research Gate, Embase and Web of Science were searched to collect scientific research articles on emerging and reemerging 'Zoonoses' in India using various key-words like Emerging Zoonoses, Reemerging Zoonoses, High-priority Zoonoses, Neglected Zoonoses, natural Zoonoses and occupational Zoonoses in India. Articles were identified through a comprehensive search of the literature and by reviewing references from 127 review articles identified through the search process.

Result: On the basis of this review, the 'knocking' property of high-priority Zoonoses and neglected Zoonoses in India is compared through a line graph. Emphasis is given on the increasing annual burden of Zoonoses on public health in India.

Conclusion: The impacts of various factors such as Animal farming, Urbanization, Poverty, Climate change and Adaptation of pathogens on emergence of Zoonoses are discussed in this paper. Public health sectors of India need to be pro-active by emphasizing on effective periodic surveillance, pre-assessment or forecasting of zoonotic diseases and capacity building of stakeholders.

Keywords: Emerging Zoonoses; Reemerging Zoonoses; High-priority Zoonoses; Neglected Zoonoses; Annual disease burden; Public health

Abbreviations

A&N: Andaman and Nicobar; AP: Andhra Pradesh; AR: Arunachal Pradesh; AS: Assam; DL: Delhi; GJ: Gujarat; GO: Goa; HY: Haryana; J&K: Jammu and Kashmir; KA: Karnataka; KE: Kerala; MH: Maharashtra; ML: Meghalaya; MN: Manipur; NL: Nagaland; OR: Orissa; PC: Pondicherry; PJ: Punjab; RJ: Rajasthan; SK: Sikkim; TN: Tamil Nadu; UK: Uttarakhand; UP: Uttar Pradesh; WB: West Bengal

Introduction

Zoonotic Diseases (ZD) are defined as the diseases originating from animals wherein humans acquire infectious diseases from Zoonotic Reservoirs (ZR) either naturally or through zoonotic vectors. The emerging ZD can be newly evolved diseases most particularly in the developing nations, or may have been occurred in the past and are now expanding rapidly to new geographic, host or vector ranges [1] due to their changing ecology [2], such as Scrub typhus, Cutaneous Leishmaniasis and Japanese Encephalitis. ZD are major public health issue in several countries of the world and India is among the top geographical hotspots for such diseases [3]. Poor personal hygienic practices, improper farming practices, lack of awareness, poor diagnostic facilities, under reporting system, poverty and lack of medical facilities, all this causes high burden of morbidity and mortality, particularly in infants and children [4] living in rural parts of developing countries. In India, incidence and prevalence of ZD like Plague, Rabies and Anthrax have affected human health throughout times. In recent past, India has seen emergence and reemergence of high priority and neglected Zoonoses. As a case of point a highly infectious disease called Nipah Virus was first emerged in West Bengal (India) in 2001 and recently it has been reported from Kerala in May 2018.

Emergence of new zoonotic pathogens have caused heavy toll of life in the areas where locals doesn't have natural or artificial (from vaccination) immune response for them [5]. High priority ZD like Brucellosis have been emerged from Haryana to Goa; Japanese Encephalitis from Tamil Nadu to Uttar Pradesh (Gorakhpur); Leptospirosis from Maharashtra to Punjab; Listeriosis from Maharashtra to Delhi, Jammu and Kashmir, and Tamil Nadu, whereas neglected ZD like Cutaneous Leishmaniasis had been emerged from Delhi to Rajasthan to Jammu and Kashmir; Kyasanur Forest Disease from Karnataka to Kerala, Tamil Nadu and Goa; NipahVirus from West Bengal to Kerala; Scrub typhus from Himachal Pradesh to Tamil Nadu. Extension of these ZD to non-endemic areas has increased the complexity of their forecast. According to World Health Organization

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(WHO) [6], "there is a coexistence of humans in a complex, interdependent relationship with the companion, production, and wild animals we depend on for our food, livelihoods, and well-being, as well as with the environments we live and work in together". The increasing annual burden of Zoonoses on public health in India can be prevented only by effective periodic surveillance, pre-assessment or forecasting of zoonotic diseases and capacity building.

This paper provides a systematic review of the emergence of ZD in India, their 'knocking' trend for 68 years (1951-2018), negative impact on public health and the way forward.

Methodology

During June 2018, a systematic search was conducted to collect scientific research articles on Emerging and Reemerging Zoonoses in India through Pub Med, Google Scholar, Research Gate, Global Health, Embase and Web of Science using key-words like Emerging Zoonoses, Reemerging Zoonoses, High-priority Zoonoses, neglected Zoonoses, natural Zoonoses and occupational Zoonoses in India. Epidemiological profile and geographical risk map for emergence and reemergence of four high-priority Zoonoses and four neglected Zoonoses from 1951 to 2018 (68 years) was done in context of India. To further understand the 'knocking' trend of these diseases, graphs were generated. We also summarized the location of studies, to examine whether some areas were over- or under-represented in the literature.

Literature search

The review was carried out according to a proposal and analytical plan. A systematic search of all the published literatures was initiated by using key word like, high-priority Zoonoses, neglected Zoonoses, emerging Zoonoses and reemerging Zoonoses in context of India. Abstract of all the relevant records were studied carefully, to identify and collect the most suitable research works to be reviewed.

Study inclusion and exclusion criteria

Research reports were assessed for inclusion and exclusion criteria, to choose correct and most relevant studies. Only English-language articles were included. Case reports were excluded. Meta-analyses and reviews were included if they provided a novel analysis of the data from the studies. Reports with information regarding emergence, reemergence and prevalence of ZD in India were included, whereas reports related to animal to animal infection, pathological and serological studies were excluded. Figure 1 is a flowchart representing the study inclusion and exclusion for this review paper.

Data extraction and analysis

Data extracted from various research articles regarding the year, geographical hotspot, emergence and prevalence of selected high-priority Zoonoses and neglected Zoonoses in India was used to create their epidemiological profile. On the basis of these profiles, a geographical risk map was designed for the emerging Zoonoses and reemerging Zoonoses during the period of 68 years. Graphs were designed in Microsoft Word to analyze the trend for reemergence of selected high-priority Zoonoses and neglected Zoonoses in India.

Risk of bias and study quality assessment

There is no risk of bias in this review paper as all the possible key words were used to search the relevant research articles. All the articles were found in English language. The articles selected were full text and contained information suitable for this review.

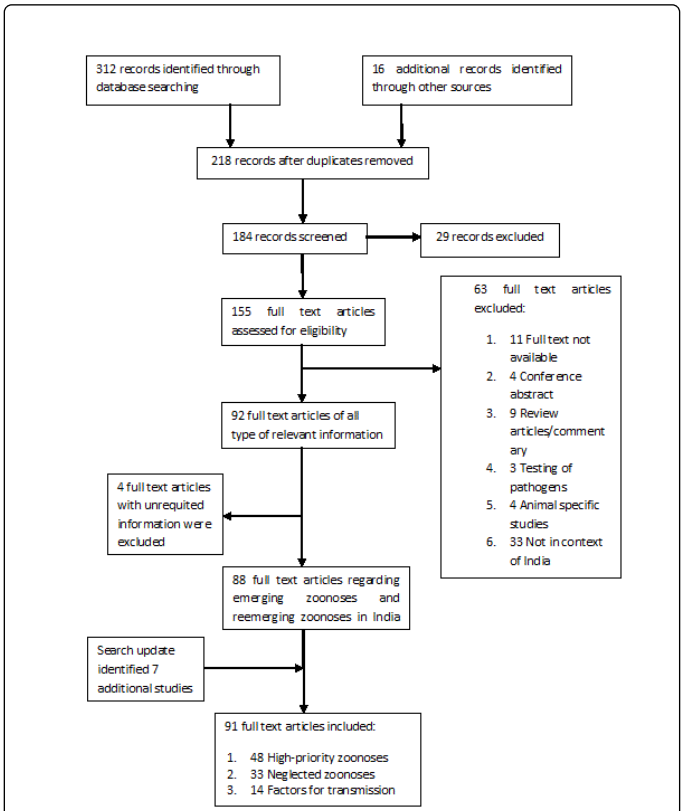

Figure 1: Flowchart of study inclusion and exclusion (adapted from [7]).

Results and Discussion

The highest peak of 'knocking' of high-priority Zoonoses was for 5 years in case of Japanese Encephalitis and Leptospirosis during 1981-1990, again for Leptospirosis during 1991-2000, and that of neglected Zoonoses was for 8 years in case of ST during 2001-2010. For the same years it was also found that there was extremely high prevalence of high-priority Zoonoses and neglected Zoonoses in non-endemic areas of India. Figure 2 represents the geographical risk map for emergence and reemergence of high-priority Zoonoses and neglected Zoonoses in India, since 1951 (68 years*), Figures 3 and 4 are graphical representation of trend of 'knocking' of high-priority and neglected Zoonoses in India respectively.

High Priority Zoonoses in India - Diseases in this category are considered significant as they can cause high disease burden and mortality among Indian population. Table 1 represents four HPZ in India as reported in literature [3], which ranked them through composite index (CI).

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Zoonotic Diseases	Major factors for emergence/reemergence	1951-1960	1961-1970	1971-1980	1981-1990	1991-2000	2001-2010	2011-2018
Brucellosis (BR)	Dairy products [8] Animal trading [9] Common laboratory-acquired infection [10]	Studies/Cases not found	1968 HY [11]	1971 (Vellore) TN [12]	1986 GJ [13], 1988 KA [14]	Studies/Cases not found	2007 (Bikaner) RJ [15]	2014 GO [16]
Japanese Encephalitis (JE)	Bird migration, certain irrigation projects, animal smuggling, and global warming increases its prevalence [17]	1952 (Nagpur) MH and (Chingleput) TN, 1955 (Vellore) TN and PC [18]	1966 TN [19]	1973 (Bankura), WB [18,19], 1978 (Gorakhpur) UP [20]	1982 GO [19], 1985 [17], 1988 [21] (Gorakhpur and Deoria) 1989 (Siddharth nagar), 1990 (Maharajganj) UP [22]	1997 AP and (Kushinagar) UP [23]	2005 (Gorakhpur) UP [24]	2011 DE [25], 2016 (Gorakhpur) UP [26]
Leptospirosis (LE)	Areas with poor hygiene, rodents and stagnant dirty water as well as drier parts of country [27]	1960 (Mumbai) MH [28]	1966 (Kalra) PJ [29], 1967 (Mumbai) MH [30]	Studies/ Cases not found	1983 [31], 1984, 1985 [32], 1988 [33], 1990 (Madras) TN [34]	1991 [34], 1998 [35] (Chennai) TN [36], 1993 (North Andaman) A&N [37] 1994 (Madurai) TN [38], 1995 PC [39]	2004 DE [40] UP [41] and (Chennai) TN [42], 2005 (Chandigarh) [43], 2006 [42], 2008 (Ludhiana) PJ [44]	Studies/Cases not found
Leptospirosis (LE)	Domestically acquired food borne illness which results in death [45]	Studies/Cases not found	1966 (Mumbai) MH [46]	1973 [47] and 1975 DL [48]	1981 (Mumbai) MH [49]	1997 [50] and 1998 DL [51]	2003 (Chandigarh) PJ [52], 2010 HP [53], (Kashmir) J&K [54]	2011TN [55]

Table 1: Epidemiological profile of high-priority Zoonoses in India since, 1951.

Neglected Zoonoses in India-Such diseases are relatively rare in occurrence and thus were not considered significant for making policies or specific strategies to control them. Table 2 represents the Epidemiological profile of four common neglected Zoonoses occurring in India.

Zoonotic Diseases	Major factors for emergence/reemergence	1951-1960	1961-1970	1971-1980	1981-1990	1991-2000	2001-2010	2011-2018
Cutaneous Leishmaniasis (CL)	Occupational disease of rural residents [56] Endemic to dry North-western parts of India [57] Reported during cooler months in Southern Parts [58]	1951 DE [59]	1961, (Bikaner) RJ [60,61]	1971[62], 1973 [63] (Bikaner) RJ	1982 [64] 1990 [65] (Bikaner) RJ, 1988 KE [66]	1992 KE [67], 1993 [68] 1995 [69], 1998 [70], 1999, 2000 [71] (Bikaner) RJ	2001 (Bikaner) RJ [71], 2002 [72], 2003 [73], 2007 [74] UP	2012-13 (Jammu) J&K [75]
Kyasanur Forest Disease (KFD)	Destruction of local forest areas [76]. Circulation among rodents, ground birds and ticks in enzootic areas [77]	1957 [78], 1959, (Shimoga)KA [79]	Studies/Cases not found	Studies/Cases not found	Studies/Cases not found	Studies/Cases not found	Studies/Cases not found	2012 KA and (nilgiri) TN, 2013 (Bandipur) KA and (Wayanad) KE, 2014 (Shimoga) KA and (Wayanad, Malappuram and Palakkad) KE, 2015 (Nilambur, Malappuram and Wayanad) KE,

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								(Shimoga) KA and GO [80]
Nipah Virus (NiV)	Change in ecological conditions [81]	Studies/Cases not found	Studies/Cases not found	Studies/Cases not found	Studies/Cases not found	Studies/Cases not found	2001 (Siliguri) [82] and 2007 [83] (Nadia) WB	2018 KE [84]
Scrub typhus (ST)	Bushy and unhygienic areas [85]	Studies/Cases not found	Studies/Cases not found	Studies/Cases not found	Studies/Cases not found	Studies/Cases not found	2003, 2004, 2007 SK, HP and (Darjeeling) WB [86], 2005 HP, NL, 2006 HP, MN 2008 UK, 2009 ML, 2010 PC, AS [87]	2011 HP, KA, NL, UK, 2012 AR, HP,TN, RJ, UK, WB, 2013 DE, (Vellore) TN,AP and OD 2014 (foot hills) HP, UK, (Vellore) TN [87]

Table 2: Epidemiological profile of neglected Zoonoses in India since, 1951.

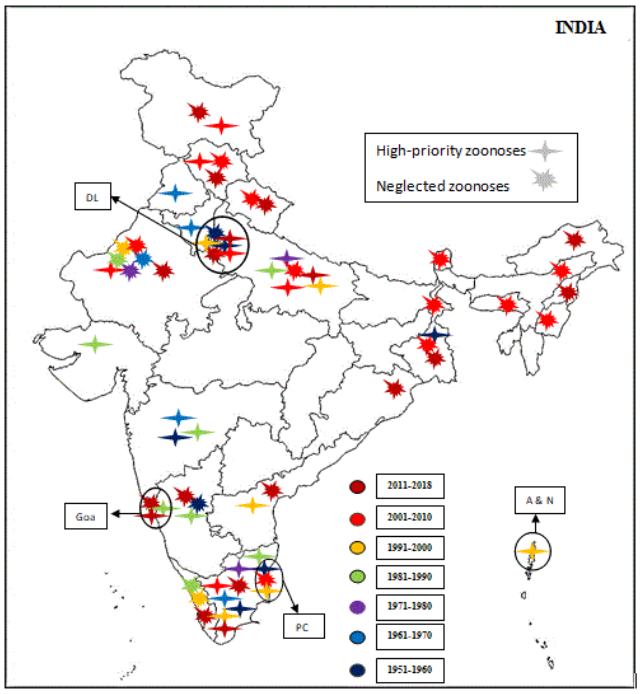

Figure 2: Geographical risk map for emergence and reemergence of HPZ and NZ in India, since 1951 (68 years*).

Existing diseases coupled with newer emergence have increased the task of researchers, scientists, pathologists and field veterinarians to make India pro-active regarding sudden outbreaks. Continuous or sudden emergence and re-emergence of major public health ZD like Japanese Encephalitis, Leptospirosis, and Kyasanur Forest Disease were found to be highly life threatening due to their lesser known epidemiological features. According to the geographical risk map it was found that the high priority ZD were endemic in UP, DL, MH, GO, TN and PC, whereas they were epidemic to J&K, HP, HR, PJ, RJ, GJ, KA, A&N, AP and WB. Also, the NZ were found endemic to RJ, DL, KA and KE, whereas they were epidemic to J&K, HP, UK, UP, GO, AP, TN, PC, WB, OR, SK, AP, AS, NG, MN and ML. Cases for Zoonoses in central states (Madhya Pradesh and Chhattisgarh) and eastern states (Bihar and Jharkhand) of India were either underreported or less prevalent.

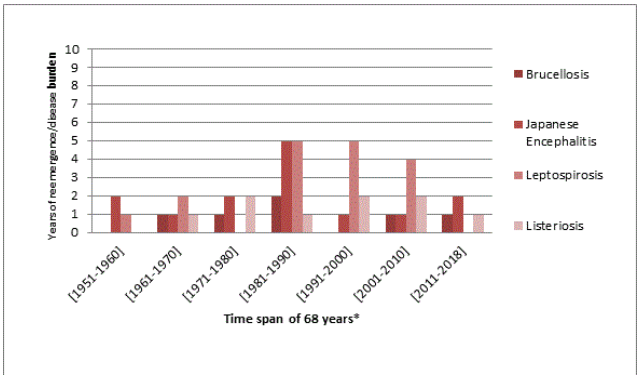

Figure 3: Graphical representation of trend of 'knocking' of HPZ in India.

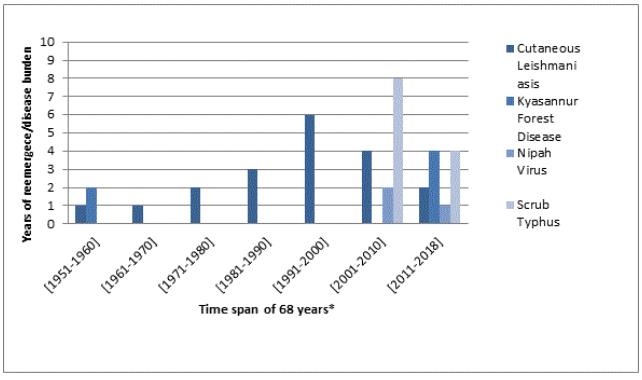

Figure 4: Graphical representation of trend of 'knocking' of NZ in India.

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Increased emergence/reemergence of zoonotic agents

India is under the burden of emergence of new pathogens and overstretched health infrastructure [88]. To increase the immunity of the people against the unknown dangers of future due to reemergence or 'knocking' of zoonotic diseases in the country, there is a need to increase the efficiency of health sectors during outbreaks. There are various factors which are responsible for prevalence of ZD in the different parts of the country as mentioned below.

Occupational risk

Agricultural practices and livestock farming: Being the second most populous country in the world, there is a high demand for food and water in India. The expansion of agriculture or livestock farming is disturbing the natural ecosystem of wild-animals and thus increases the burden of ZD [89] in the population.

Import or export of live animals: A close contact with phylogenetically distant animals may result in evolution of animal pathogens as human pathogens [90]. The perseverance is higher among the livestock which are farmed together [91]. People engaged in such occupation are major sufferers of ZD such as Kyasanur Forest Disease, Brucellosis and Leptospirosis to name a few.

Infection during veterinary treatment/animal based research: The treatment of animals which contains zoonotic virus or bacteria without proper utilization of preventive measures can infect the Vets directly and can cause serious illness or death. Thus, pre-exposure immunization is recommended to people involved in certain high-risk occupations such as laboratory workers dealing with live virus or veterinarians [92].

Working in slaughter houses, tanneries or wool factories: India is endemic for many ZD, especially the southern states due to unprotected livestock population [93]. Risk of zoonotic infections such as anthrax, is higher for the workers in the slaughter houses and during the cleaning or processing of contaminated animal materials at carpet weaving mills, wool mills, dairies and tanneries [94].

Natural migration of animals

Change in ecological conditions due to the destruction of forests alters the epidemiology of disease [2] by the migration of wild-animals towards the human settlements. The human societies in the vicinity of forest or tribes are at higher risk of getting the new pathogens through the ingestion of contaminated food and water by the urine or feces of infected animal.

Deforestation and urban expansion

The socio-economic development of the country by the expansion of road networks, agricultural fields and, intensification of wildlife trade has caused emergence of new pathogens. Nipah Virus is the current example [95], where the fruit bats came out of their natural habitat and started feeding on agricultural produce, causing food borne Zoonoses in Kerala.

Travel and tourism

The containment of disease is difficult nowadays due to availability of better facilities to travel worldwide. ZD like Japanese Encephalitis, Nipah Virus, etc., can infect the non-immunized travelers on their visit to endemic countries. According to the Yellow Book of CDC [81], "India has no risk of yellow fever but Indian government needs a proof of immunization for people arrived from a country with risk of yellow fever".

Climate change and disaster

The increasing temperature in northern India or excessive rainfall in north-eastern part of India due to climate change leads to higher growth of vectors such as mosquitoes [96,97], ticks [98] and Sandflies. Increase in crop and food production after rainfall increases the population of rodents and birds (small ZR near residential areas) and thus increases the chances of water and food borne Zoonoses [96].

Poverty and political conflicts

Shortage of resources in rural and malnourished states like Uttar Pradesh, Rajasthan, Maharashtra, Tamil Nadu, Himachal Pradesh, Uttarakhand and West Bengal, often generates civil conflicts, war and political instability. It weakens the healthcare infrastructures and upsurges the infectious diseases and thus they are considered as hotspots for 'knocking' of Zoonoses. Increase in vulnerability of people living in poverty affected areas due to limited access to quality health, safe and nutritious food and adequate housing is very well discussed by Seimenis A [99].

Pathogen adaptation

The increasing mortality and morbidity due to zoonosis and anthroponosis represents that the host-species barrier have already been crossed by the pathogens. Thus, expansions of Zoonoses to various non-endemic areas have made surveillance, mapping and forecasting of ZD a major challenge. Phylogenetically related hosts (anthroponosis) have more frequent adaptation and transmissions of pathogens in them [100,101].

Conclusion

On the basis of this review regarding emerging ZD in India since 1951, it is concluded that new ZD like Cutaneous Leishmaniasis, Japanese Encephalitis, Leptospirosis and Scrub typhus are spreading to a much wider areas at an alarming rate, which have caused greater annual disease burden on large population of India. Reemergence of neglected Zoonoses is found to be rarer than high-priority Zoonoses during these 68 years, but the sudden outbreak of these diseases of less preference after a long gap (e.g., Kyasanur Forest Disease) can be fatal due to unavailability of strategies and policies to fight against them. Knowledge and practice of preventive measures is essential for locals, patients and the health workers during the outbreaks to reduce the prevalence of these diseases. Immunization before travelling to other countries can prevent spread of ZD to non-endemic area. To avoid the worst situations like pandemic, the Health ministry and public health stakeholders in India should strengthen the public health surveillance systems and providence of quick medical facilities to control the rate of mortality and morbidity during outbreaks.

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Author Contribution

RCD, planned, created the framework and reviewed the paper: RCD; AT, analyzed the available data and wrote the paper.

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13. Shri Balachandra H.C., IFS
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    Karnataka State Pollution Control Board
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14. Dr. Sheela A M,
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    Kerala State Pollution Control Board,
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15. Madhya Pradesh
    Member Secretary,
    Madhya Pradesh Pollution Control Board
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17. Shri T Mangi Singh,
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18. Dr. G.H.Chyrmang, MFS
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    Meghalaya State Pollution Control Board
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19. Shri C. Lalduhawna, Environmental Engineer,
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    Nagaland Pollution Control Board
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21. Dr. K. Murugesan, IFS
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    State Pollution Control Board, Odisha
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22. Shri. G.S.Majithia,
    Member Secretary,
    Punjab Pollution Control Board
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23. Shri Vijai N.,
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    Rajasthan Pollution Control Board
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24. Dr. Gopal Pradhan

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Tamil Nadu Pollution Control Board
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26. Sri Ravi Gugulothu, IAS
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Telangana Pollution Control Board,
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27. Dr. Parag Madhukar Dhakate, IFS
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28. Shri Sanjeev Kumar Singh, IFS
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29. Shri. Rajesh Kumar, IPS
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30. Dr. K.S. Jayachandran,
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31. Shri Arun Ranjan, IFS
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Chandigarh Pollution Control Committee
E-mail: cpcc-chd@nic.in

32. Dr. N. Ramesh,

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33. The Member Secretary,
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Email: dstandamans@gmail.com

34. The Member Secretary,
Ladakh Pollution Control Committee
Email: membersecretarylpcc@gmail.com

35. The Member Secretary,
Lakshwadeep Pollution Control Committee
Email: lk-dst@nic.in

Subject: Legal Notice on behalf of my Client, Ms. Gauri Maulekhi, regarding the Hon'ble National Green Tribunal's direction passed vide Order dated 03.05.2023 in Original Application No. 879/2022 titled '*Gauri Maulekhi v. Union of India & Ors.*' mandating prior Environment Impact Assessment for establishment or expansion of large slaughterhouses.

Under instructions from and on behalf of my Client, Ms. Gauri Maulekhi, aged about 47 years, having her office at Plot No. 26, D.D.A, Opposite Gate No. 3, Gulmohar Enclave, New Delhi- 110049, I do hereby serve you with the following Legal Notice:-

1. The present Legal Notice is to bring to your attention that an Original Application [O.A. No. 879/2022 titled *Gauri Maulekhi v. Union of India & Ors.*] had been filed in the Hon'ble National Green Tribunal [Hon'ble Tribunal] seeking inclusion of 'Slaughter Houses' within the framework of Environment Impact Assessment [EIA].

2. That vide Order dated 03.05.2023 passed in O. A. No. 879/2022, the Hon'ble Tribunal considered the pollution caused by slaughterhouses and their adverse effect on the surrounding areas and categorically **directed that no large slaughterhouse can be established or expanded without EIA as per procedure applicable to B category project in terms of the EIA Notification dated 14.09.2006. For the sake of convenience, the relevant paragraph of Order dated 03.05.2023 is reproduced as under:**

ESHA DUTTA & SHAALINI AGRAWAL
ADVOCATES
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> *"15. We further direct that if no decision is taken by MoEF&CC within two months as directed above,* ***the requirement for EC will apply to all large slaughter houses as per classification in the 'Revised Comprehensive Industry Document on Slaughter Houses' i.e. "Large: More than 200 large animal i.e. bovines per day, or more than 1000 small animal i.e. goat and sheep per day (any day in a week)" with effect from 01.08.2023. Thereafter, no 'Large' slaughter house can be established or expanded without EIA as per procedure applicable to B category project in terms of EIA Notification dated 14.9.2006. This direction is being issued under Section 15 of the NGT Act.*** *The Tribunal may consider such directions in respect of medium slaughter houses on the next date."* **[Emphasis Supplied]**

True copy of the Order dated 03.05.2023 passed by the Hon'ble Tribunal in O. A. No. 879 of 2022 titled *Gauri Maulekhi v. Union of India & Ors.* is annexed herewith as **ANNEXURE NO. 1.**

3. That subsequently, on the request of the Learned Counsel for the Ministry of Environment, Forest & Climate Change [MOEFCC]/Respondent No. 1, the said Order dated 03.05.2023 was put in abeyance for a limited period of time vide subsequent Orders passed in the matter, dated 01.08.2023 and 09.08.2023. The relevant portion of the Orders dated 01.08.2023, 09.08.2023, 20.10.2023 are reproduced below:-

Order dated 01.08.2023-

> *"6. The interim application be listed for hearing before three Member bench headed by Hon'ble Chairperson on 09.08.2023.*
> *7. In the meanwhile, in view of the facts and circumstances and the urgent nature of relief involved, the operative part of order dated 03.05.2023 as to applicability of the requirement of EC to all large slaughter houses as mentioned therein shall remain inoperative."*

Order dated 09.08.2023-

> *"10. The grievance of the applicant is Para 15 of the order passed by this Tribunal on 03.05.2023 where the term of two months' time was granted to the MoEF&CC to take further action. The prayer in the IA is to extend further time. Accordingly, in view of the fact that the Respondent No. 1 has already constituted a Committee and the Committee is considering the implementation, thus, it would be appropriate to provide further time of 60 days to take a decision in accordance with law and to submit the report.*
> *11. List the matter on 20.10.2023 (previous date is modified accordingly)."*

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Handheld: 9818448799, 9984940990 Reg. No.: D/2467/2013; UP 10022/2021

Order dated 20.10.2023-

> *"2. The Learned Counsel for Respondent No.1 has sought further four weeks time by submitting that the working group is in the process of giving a hearing to the stakeholders. In terms of the order dated 07.08.2023 issued by the MoEF &CC constituting the working group, recommendation was to be submitted within three months from the date of constitution which is not yet over. He submits that further four weeks time be granted to implement the order of the Tribunal dated 03.05.2023 and submit the report in terms thereof.*
> *3. Though, prayer has been opposed by the Counsel for the Applicant but considering the circumstances of the case, we allow further four weeks time on the same terms as contained in the order dated 09.08.2023.*
> *4. List the matter on 29.01.2024."*

True copy of the Orders dated 01.08.2023, 09.08.2023 and 20.10.2023 passed by the Hon'ble Tribunal in O. A. No. 879 of 2022 titled *Gauri Maulekhi v. Union of India & Ors.* is annexed herewith as **ANNEXURE NO. 2 [COLLY].**

4. That consequently, the direction contained in the Order dated 03.05.2023 came into effect from 29.01.2024 as no further stay on the direction was granted by the Hon'ble Tribunal. Order dated 29.01.2024 is reproduced as under:-

> *"1. Learned counsel appearing for the MoEF & CC submits that the technical working group constituted to study the issue has made recommendations which are pending for approval before the competent authority. In this background he has prayed for four weeks adjournment."*

True copy of the Order dated 29.01.2024 passed by the Hon'ble Tribunal in O. A. No. 879 of 2022 titled *Gauri Maulekhi v. Union of India & Ors.* is annexed herewith as **ANNEXURE NO. 3.**

5. That the Order dated 03.05.2023 hence is applicable to establishment or expansion of large slaughterhouses (slaughtering more than 200 large animals or more than 1000 small animals per day) **with effect from 29.01.2024**.

6. In light of the above, you are requested to ensure that no Consent to Establish [CTE] or/and Consent to Operate [CTO] are granted to large slaughterhouses **without** prior EIA having been conducted and prior Environment Clearance granted. If any CTE/CTO is granted without prior

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Handheld: 9818448799, 9984940990 Reg. No.: D/2467/2013; UP 10022/2021

EIA, it would amount to Contempt of Court and my Client would be constrained to initiate necessary proceedings under law.

Regards,

Esha Dutta,
Advocate

Shaalini Agrawal
Advocate

Gauri Maulekhi
(Client)

DATE: 12.11.2024
REF. NO: 4411/2024

The Public Information Officer,
Andhra Pradesh Pollution Control Board.
Dr. Y.S.R Paryavaran Bhavan,
APPIC Colony Road, Gurunanak Colony,
Autonagar, Vijaywada-520007

Subject: Request for information under the Right to Information Act 2005.

Sir,
Please make it convenient to provide certified copies of the following documents, orders, note sheets, records etc. with respect to the following information:

1. List of large slaughterhouses (slaughtering more than 200 large animals or more than 1000 small animals per day) to which Consent to Establish (CTE) has been granted within the jurisdiction of the state of Andhra Pradesh from 29.01.2024 till date, specifying the date of CTE granted to the slaughterhouses along with the location of the slaughterhouses.

2. List of large slaughterhouses (slaughtering more than 200 large animals or more than 1000 small animals per day) to which Consent to Operate (CTO) has been granted within the jurisdiction of the state of Andhra Pradesh from 29.01.2024 till date, specifying the date of CTO granted to the slaughterhouses along with the location of the slaughterhouses.

Please accept the payment of Rs. ___/- as fee vide IPO No. _____.
Please use the reference number of this letter in the response that you can send.
Regards,

Gauri Maulekhi,
Plot No. 26, D.D.A.,
[illegible] nclave, Oppos Gate No. 3
[illegible] 10049

अधपत्रा COUNTERFOIL

इसे फाड़कर प्रेषक अपने पास रख ले।
To be detached and kept by the Sender.

पोस्टल आर्डर
₹ 10
POSTAL ORDER

किसे अदा करना
To whom payable_____

किस डाकघर में
At what Office_____

क्या इसे क्रास किया है
Whether crossed_____

भेजने की तारीख
Date sent_____

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<Dial 18002668868> <Wear Masks, Stay Safe>

ED727447581IN IVR:6968727447581
SP GAUTAM NAGAR SO <110049>
Counter No:1,14/11/2024,15:06
To:THE P. I. O ,A. P. P. C. B
PIN:520007, Autonagar S.O
From:GAURI MAULE,PLOT NO 26 DDA
Wt:20gms
Amt:41.30,Tax:6.30,Amt.Paid:41.00(Cash)
<Track on www.indiapost.gov.in>

A.P. POLLUTION CONTROL BOARD
REGIONAL OFFICE, ELURU
D.No.22B-3-2,
Kaanukolanivaari Street,
Power pet Railway Station Road,
Power pet, Eluru-534002
Phone: 08812 - 249668
E-mail: roelr-ee1@appcb.gov.in

//RPAD//

Lr.No.102/APPCB/RO-ELR/2005 -437 **Dt.09.12.2024**

To
Sri Gauri Maulekhi,
Plot No.26, D.D.A.,
Gulmohar Enclave,
Oppos Gate No.03,
New Delhi - 110049.

Sir,

Sub: APPCB – RO - Eluru – Information under RTI Act, 2005 – RTI Application filed by Sri Gauri Maulekhi, Plot No.26, D.D.A., Gulmohar Enclave, Oppos Gate No.03, New Delhi – 110049 - Information - Furnished - Reg.,

Ref: RTI Application of the applicant dt.12.11.2024 was received from EE, Water Division, Head Office, Vijayawada through mail on 03.12.2024.

****

With reference to RTI application dated 12.11.2024 of Sri Gauri Maulekhi, Plot No.26, D.D.A., Gulmohar Enclave, Oppos Gate No.03, New Delhi was received from EE, Water Division, Head Office, Vijayawada through mail on 03.12.2024 has requested to furnish certain information about list of large slaughter houses (slaughtering more than 200 large anaimals or more than 1000 small animals per day) operating in the jurisdiction of the State of Andhra Pradesh from 29.01.2024 till date under RTI Act.

In this regard, the following information pertaining to APPCB, RO, Eluru is furnished below as per available office records:

S.No.	Information required	Reply
1.	List of large slaughter houses (slaughtering more than 200 large anaimals or more than 1000 small animals per day) to which Consent to Establish (CTE) has been granted from 29.01.2024 till date, specifying the date of CTE granted to the slaughterhouses along with the location of the slaughter houses	There is one unit i.e., M/s. AL Sami Food Exports Private Limited., (Formerly M/s. Asvini Agro Exports), Sy.No.129, Ananthasagaram (V), Agiripalli (M), Eluru District has obtained CTE (Expansion) from the APPCB on 28.02.2024 in the jurisdiction of APPCB, RO, Eluru. The copy of the CTE (Expansion) order is enclosed.
2.	List of large slaughter houses (slaughtering more than 200 large anaimals or more than 1000 small animals per day) to which Consent to Operation (CTO) has been granted from 29.01.2024 till date, specifying the date of CTO granted to the slaughterhouses along with the location of the slaughter houses	No unit has obtained CTO from the APPCB from 29.01.2024 to till date in the jurisdiction of APPCB, RO, Eluru.

This is for information.

Yours faithfully,

S. Ramesh

Public Information Officer,
APPCB, Eluru.

Public Information Officer
A.P. Pollution Control Board
Regional Office, Eluru

Copy submitted to the EE, Water Division, Head Office, Vijayawada for information.

ANDHRA PRADESH POLLUTION CONTROL BOARD
ZONAL OFFICE :: VISAKHAPATNAM
39-33-20/4/1,Madhavadhara Vuda Colony,
Visakhapatnam - 530018.

LiFE Lifestyle for Environment

RED CATEGORY

CONSENT TO ESTABLISH (*CTE*) ORDER FOR EXPANSION

Order No. 4188/APPCB/ZO-VSP/ELR/CTE/2024 **Date: 28/02/2024**

Sub: APPCB – ZO – VSP – CONSENT TO ESTABLISH (*CTE*) ORDER for EXPANSION – **M/s. AL Sami Food Exports Private Limited., (Formerly M/s. Asvini Agro Exports), Sy.No.129, Ananthasagaram (V), Agiripalli (M), Eluru District** – Consent to Establish of the Board under Section 25 of Water (Prevention and Control of Pollution) Act, 1974 and under Section 21 of Air (Prevention and Control of Pollution) Act, 1981 – Issued – Reg.

Ref:
1. CTO & HWA Order No.Kr.488/PCB/ZO-VJA/CTO/W&A/2013-1928 Dt.31.12.2014 expired on 30.11.2017.
2. Auto Renewal Order No. Kr-488/PCB/ZO-VJA/CTO/W&A/2016-, Dated 25.10.2017 expired on 30.11.2022.
3. Auto Renewal Order No. Kr-488/APPCB/ZO-VJA/CTO/W&A/2022, Date: 04.07.2022 valid up to 30.11.2025.
4. CTO Amendment Order No: Kr-488/APPCB/ZO-VJA/CTO/2021-, Dt.04.08.2021 for name change.
5. Industry's CTE (Expansion) application received at Regional Office, Eluru on 30.01.2024.
6. RO's inspection report received at ZO, Visakhapatnam on 07.01.2024.
7. CTE Committee meeting held on 20.02.2022 at APPCB, Zonal Office, Visakhapatnam.

* * *

1. The Board vide ref. 1st cited issued CTO order to **M/s. AL Sami Food Exports Private Limited., (Formerly M/s. Asvini Agro Exports), Sy.No.129, Ananthasagaram (V), Agiripalli (M), Eluru District** to produce the following products.

S. No.	Name of the Raw materials and chemicals	Quantity	Sl. No	Name of the Products and By-products	Quantity
1.	Buffaloes	420 Nos / Day	1.	**Slaughter House:** Buffalo Meat	63 Tons/day (420 Nos TWLK/Day)
				By- Products:	

			1.	Bones and Stomach waste	18 Tons/day
			2.	Skin	3 Tons/day
			3.	Horns	1 Tons/day
			4.	Blood Powder	0.4 Tons/day

2. **M/s. AL Sami Food Exports Private Limited., (Formerly M/s. Asvini Agro Exports),** vide reference 5th cited submitted an application to the Board seeking Consent for Establishment (CTE) for expansion to carry out the following activity with production capacities as mentioned below, with an additional proposed project cost of Rs. 33.50 Cores (Rupees Thirty Three Crores Fifty lakhs only).

S. No.	Name of the Raw materials and chemicals	Quantity after expansion	Sl. No	Name of the Products	Existing Quantity as per CTO order dated 31.12.2014	Proposed Expansion	Total Quantity after Expansion
1	Buffaloes	800 Nos / Day	**1.**	**Slaughter House:** Buffalo Meat	63 Tons/day (420 Nos TWLK/Day)	67 Tons/day (480 Nos TWLK/Day)	130 Tons/day (900 Nos TWLK/Day)
				By- Products:			
			1.	Bones and Stomach waste	18 Tons/day	19.20 Tons/day	37.20 Tons/day
			2.	Skin	3 Tons/day	3.20 Tons/day	6.20 Tons/day
			3.	Horns	1 Tons/day	1 Tons/day	2 Tons/day
			4.	Blood Powder	0.4 Tons/day	0.4 Tons/day	0.8 Tons/day

3. As per the application, the above activity is to be located **Sy.No.129, Ananthasagaram (V), Agiripalli (M), Eluru District** in an area of **14.56 acres.**
4. The above site was inspected by the Environmental Engineer, A.P Pollution Control Board, Regional Office, Eluru on 02.02.2024 and found that the industry is surrounded by **East:** Horticultural gardens; **West:** Horticultural gardens; **North:** Village Road & **South:** Horticultural gardens. Ananthasagaram village is at a distance of about 1.80 Km from the industry towards western direction.
5. The Board, after careful scrutiny of the application, verification report of Regional Office, Eluru and recommendation by the CTE Committee hereby issue CONSENT TO ESTABLISH for (EXPANSION) to the industry, under Section 25 of Water

(Prevention and Control of Pollution) Act, 1974 and under Section 21 of Air (Prevention and Control of Pollution) Act, 1981 and the rules made there under. This Order is issued to manufacture the products mentioned at para (2) only.

6. This Consent Order issued is subject to the conditions mentioned in Schedule 'A' and Schedule 'B'.
7. This order is issued from pollution control point of view only. Zoning and other regulations are not considered.
8. **This order is valid for a period of 7 years from the date of issue.**

DR P.PRASADA RAO, JCEE(PRR)-ZO-VSP, O/o JOINT CHIEF ENVIRONMENTAL ENGINEER7 -APPCB

Encl: Schedules "A & B".

To
M/s. AL Sami Food Exports Private Limited.,
(Formerly M/s. Asvini Agro Exports),
Sy.No.129, Ananthasagaram (V), Agiripalli (M),
Eluru District.

- Copy to the Environmental Engineer, Regional Office, Eluru for information and necessary action

SCHEDULE – A

1. Progress on implementation of the project shall be reported to the concerned Regional Office, A.P. Pollution Control Board once in six months.
2. Separate energy meters shall be provided for Effluent Treatment Plant (ETP) and Air Pollution Control equipments to record energy consumed.
3. The proponent shall obtain Consents for Operation from APPCB, as required under sec. 25/26 of the Water (P&C of P) Act, 1974 and under sec.21/22 of the Air (P&C of P) Act, 1981 and Authorization under Hazardous and Other Wastes (Management, Handling & Transboundary Movement) Rules, 2016 before commencement of the activity, including trial production.
4. Notwithstanding anything contained in this conditional letter or consent, the Board hereby reserves its right and power under Sec.27 (2) of Water (Prevention & Control of Pollution) Act, 1974 and under Sec.21 (4) of Air (Prevention & Control of Pollution) Act, 1981 to review any or all the conditions imposed herein and to make such alternation as deemed fit and stipulate any additional conditions by the Board.
5. The Consent of the Board shall be exhibited in the factory premises at a conspicuous place for the information of the inspection officers of different departments.
6. Compensation is to be paid for any environmental damage caused by it, as fixed by the Collector and District Magistrate as civil liability.
7. The Rules and Regulations notified by Ministry of Law and Justice, Government of India, regarding the Public Liability Insurance At, 1991 shall be followed.
8. If the proponent is aggrieved by this order made by A.P. Pollution Control Board under Sec. 25 of Water (Prevention & Control of Pollution) Act' 1974 and Sec. 21 of Air (Prevention & Control of Pollution) Act' 1981 he may within 30 days from the date on receipt of the order prefer an appeal before concerned Authority.

SCHEDULE – B

SPECIAL CONDITIONS:

1. The industry shall install & commission the 600 KLD ETP for treatment and disposal of wastewater and shall start production of expansion quantities only after commissioning of the new ETP.
2. The industry shall provide suitable capacity STP to treat the domestic effluents.
3. The industry shall acquire additional land of 30 acres for disposal of the treated effluents as committed vide letter dt 06.02.2024.

WATER:

4. The source of water is bore well and the maximum permitted water consumption for expansion activity shall not exceed the following quantities:

S. No.	Purpose	Existing Quantity as per CTO Order dated 07.01.2014	Proposed Expansion	Total after Expansion
1.	Process & Washings	168.0 Kilo Liters/Day	282 Kilo Liters/Day	450 Kilo Liters/Day

2.	Domestic	20.0 Kilo Liter/Day	10 Kilo Liter/Day	30 Kilo Liter/Day
	Total	**188.0 Kilo Liters/Day**	**292 Kilo Liters/Day**	**480 Kilo Liters/Day**

5. Separate meters with necessary pipe-line shall be provided for assessing the quantity of water used for each of the purposes mentioned below.
   a. Industrial cooling, spraying in mine pits.
   b. Domestic purposes.
   c. Processing, whereby water gets polluted and pollutants are easily bio-degradable.
   d. Processing, whereby water gets polluted and the pollutants are not easily bio-degradable.
6. The maximum waste water generation (*KLD*) shall not exceed the following after expansion:

S. No.	Purpose	Existing Quantity as per CTO Order dated 07.01.2014	Proposed Expansion	Total after Expansion
1.	Process & Washings	168 Kilo Liters/Day	282 Kilo Liters/Day	450 Kilo Liters/Day
2.	Domestic	10 Kilo Liters/Day	5 Kilo Liters/Day	15 Kilo Liters/Day
	Total	**178 Kilo Liters/Day**	**287 Kilo Liters/Day**	**465 Kilo Liters/Day**

***Treatment & Disposal*: (After Expansion) : The industry shall comply with the standards for discharge of effluents from slaughterhouses, meat processing units as per MoEF Notification dated 28.10.2016.**

Effluent source	Treatment	Mode of final disposal	Standards
Process & Wash and Domestic	Existing: The industry is having ETP of capacity 250 KLD consisting of Bar Screen Chamber, Collection Cum Equalization Tank, Oil and Grease Tarp, Flash Mixer, Tube Settler, Aeration Tank, Bio Tower, Secondary Clarifier, Sludge Drying Beds, Filter Feed Tank, Sand & Carbon Filters and treated Water Storage Tank. The industry proposed new ETP of capacity 600 KLD. The units of the new ETP are furnished below: 1. Bar Screen Chamber, Collection Tank (42.9X36.3X11), Coagulation (4.95 x 4.95 x 6.6), Flocculation, Flash Mixer, Primary Clarifier (21.4 X 8.58), Buffer Tank (23.1 x	After treatment in ETP, the treated wastewater is to be proposed for back to recycle for process & washings and the remaining shall be utilized for greenbelt development.	pH – 6.5 – 8.5; TSS – 50 mg/l, BOD(3 days at 27^0C) – 30.0 mg/l; COD – 250.0 mg/l & Oil & Grease – 10 mg/l.

	19.8), UASBR (23.1 X 23.1), Tube Settling Tank (29.7x29.7x8), Aeration Tank (46.2x39.6x11), Secondary Clarifier (21.4x8.5), Intermediate Tank (26.4x16.5x8.2), Sand Filter, Carbon Filter, Treated Water Tank and Sludge Dying Beds.		

7. The industry shall complete the construction and operation of ETP to treat the wastewater generated from the industry in order to meet the Board standards before submitting application for CTO of the Board. All the units of ETP shall be impervious and above ground level.
8. The industry shall follow the CPCB "Guidelines for utilization of treated effluents in irrigation" for use of treated effluent in irrigation. The guidelines can be downloaded from CPCB website at the web link – https://www.cpcb.nic.in/NGT/Guidelines-UTE-Irrigation.pdf.
9. The effluent shall be treated to on land for irrigation standards, stipulated under Environment (Protection) Rules, 1986, notified and published by Ministry of Environment and Forests, Government of India as specified in schedule VI vide G.S.R.422 (E), dt.19.05.1993 and its amendments thereof, and additional standards / conditions stipulated by APPCB.
10. The industry shall provide lined treated effluent holding tank of minimum 2 days before disposal to onland for greenbelt duly providing water meters at the inlet and outlet.
11. The industry shall provide separate energy meter for the Effluent Treatment Plant (ETP) and maintain log registers to record the energy meter readings pertaining to the operation of the ETP.
12. The industry shall provide digital flow meters with totalizer facility for measuring the actual quantity of water consumption and for the ETP at inlet and outlet to measure quantity of effluent routed through the ETP and shall maintain log registers for the same.
13. The industry shall not discharge any treated/untreated wastewater outside the industry premises, under any circumstances.

AIR:

14. The industry shall comply with the following for controlling air pollution:

S. No	Details of Stack	Stack 1 (Existing)	Vent 1 (Existing)	Stack 3 (Expansion)	Vent 1 (Expansion)
a)	Attached to:	Boiler	DG Set	Boiler	DG Set
b)	Capacity	5 TPH	500 KVA	3 TPH	500 KVA
c)	Name of the Fuel :	Husk	Diesel	Husk	Diesel
d)	Stack height above ground (m.)	30m	5m	30m	5m
e)	Air Pollution Control Equipment:	Multi Cyclone Dust Collectors	Acoustic enclosures	Multi Cyclone Dust Collectors	Acoustic enclosures

f)	Emission standard	115 mg/Nm^3

15.The industry shall install suitable air pollution control equipment to the boiler to meet the standards.

16.The industry shall provide separate energy meter for the Air pollution control equipment (APC) and maintain log registers to record the energy meter readings pertaining to the operation of the APC.

17.The industry shall change Bio filter media for every six months and submit records to RO, Kakinada.

18.The generator shall be installed in a closed area with a silencer and suitable noise absorption systems. The ambient noise level shall not exceed 75 dB(A) during day time and 70 dB(A) during night time.

19.A sampling port with removable dummy of not less than 15 cm diameter shall be provided in the stack at a distance of 8 times the diameter of the stack from the nearest constraint such as bends etc. A platform with suitable ladder shall be provided below 1 meter of sampling port to accommodate three persons with instruments. A 15 AMP 250 V plug point shall be provided on the platform.

20.The industry should comply with the National ambient air quality standards as per MoEF, GoI notification dated. 18.11.2009 along the premises of the factory as prescribed below.

S. No.	Parameters	Standards in µg/m^3
1	Particulate Matter (PM_{10})	100
2	Particulate Matter ($PM_{2.5}$)	60
3	SO_2	80
4	NOx	80

Noise Levels: Day time (6 AM to 10 PM) - 75 dB (A)

Night time (10 PM to 6 AM) - 70 dB (A)

21.The industry shall ensure that there is no odour nuisance emanating from the process.

22.The industry shall take all necessary measures to control the odour nuisance to the surroundings.

23.The industry shall take measures to comply with the provisions laid down under Noise pollution (Regulation and Control) Amendment Rules, 2010 dated 11.01.2010 issued by MoE&F, GoI to control the noise to the prescribed levels.

SOLID WASTE:

24.The solid wastes generated shall not exceed the following breakup quantities after expansion:

S. No	Solid Waste generation	Hazardous / as defined under HWM Rules, 2016	Existing Quantity as per CTO Order dated 07.01.2014	Proposed for Expansion	Total after expansion	Method of Disposal
1.	Used Oil	5.1 of Schedule – I	100 Liters/annum	100 Liters/annum	200 Liters/annum	Shall be used as lubricant within the premises (or) Shall be

						routed through M/s. Andhra Pradesh Environment Corporation Limited (APEMCL) so as to sent to authorized Re-processors / Recyclers.
2.	ETP Sludge	Non-Hazardous	0.2 Tons/day	0.1 Tons/day	0.3 Tons/day	Shall be disposed as manure
3.	Dung	Non-Hazardous	0.3 Tons/day	1.7 Tons/day	2.0 Tons/day	Compost plant
4.	Boiler Ash	Non-Hazardous	1.5 Tons/day	1 Tons/day	2.5 Tons/day	Shall be disposed brick manufacturing units.

25. The industry shall not dispose any solid waste outside the industry premises, under any circumstances.

OTHER CONDITIONS:

26. The industry shall take necessary control measures for controlling the odour nuisance. The industry shall store the raw meat, offals, stomach contents in closed containers, in order to avoid odour nuisance.
27. The industry shall develop thick green belt in all the vacant places covering at least 33% of total area.
28. The industry shall maintain good housekeeping and sanitation in the industry premises.
29. The industry shall comply with Plastic Waste Management Rules, 2016.
30. The industry shall comply with all the Rules and Regulations specified in Water (P&C of P) Act, 1974, Air (P&C of P) Act, 1981 and Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2016 and their amendments issued thereof.
31. The industry shall not manufacture any extra products or extra capacities without obtaining CTE/CTO of the Board.
32. Concealing the factual data or submission of false information / fabricated data and failure to comply with any of the conditions mentioned in this order may result in withdrawal of this order and attract action under the provisions of relevant pollution control Acts.
33. The Board reserves its right to modify above conditions or stipulate any further conditions and to take action including revoke of this order in the interest of environment protection.

DR P.PRASADA RAO, JCEE(PRR)-ZO-VSP, O/o JOINT CHIEF ENVIRONMENTAL ENGINEER7 -APPCB

To
M/s. AL Sami Food Exports Private Limited.,
(Formerly M/s. Asvini Agro Exports),
Sy.No.129, Ananthasagaram (V), Agiripalli (M),
Eluru District.

Digitally Signed by Dr P.prasada Rao
Date: 28-02-2024 18:06:34
Reason: Approved

DATE: 13.01.2025
REF. NO: 2301/2025LT

The Public Information Officer,
Haryana State Pollution Control Board,
C-11, Sector-6, Panchkula
Haryana-134109

Subject: Request for information under the Right to Information Act 2005.

Sir,
Please make it convenient to provide certified copies of the following documents, orders, note sheets, records etc. with respect to the following information:

1. List of large slaughterhouses (slaughtering more than 200 large animals or more than 1000 small animals per day) to which Consent to Establish (CTE) has been granted within the jurisdiction of the state of Haryana from 29.01.2024 till date, specifying the date of CTE granted to the slaughterhouses along with the location of the slaughterhouses.

2. List of large slaughterhouses (slaughtering more than 200 large animals or more than 1000 small animals per day) to which Consent to Operate (CTO) has been granted within the jurisdiction of the state of Haryana from 29.01.2024 till date, specifying the date of CTO granted to the slaughterhouses along with the location of the slaughterhouses.

Please accept the payment of Rs. ___/- as fee vide IPO No. _____.
Please use the reference number of this letter in the response that you can send.
Regards,

Gauri Maulekhi,
Plot No. 26, D.D.A.,
Gulmohar Enclave, Oppos Gate No. 3
New Delhi-110049

अधिपत्र COUNTERFOIL
इसे फाड़कर प्रेषक अपने पास रख ले
To be detached and kept by the Sender.

पोस्टल आर्डर
रुपए 20.00 Rs.
POSTAL ORDER

किसे अदा करना
To whom payable .....

किस डाकघर में
At what Office .....

क्या इसे क्रास किया है
Whether crossed .....

भेजने की तारीख
Date sent .....

18G 397768

Regional Office
Haryana State Pollution Control Board,

SCO- 23-24, Ground Floor, LIC Branch Office, District Shopping Centre,
Urban Estate, Sector-10, Jind

Email- hspcbrojnd@gmail.com

No. HSPCB/JND/2025/ 1744 Dated: 07/02/2025

To

Ms. Gauri Maulekhi,
Plot No. 26, DDA, Gulmohar Enclave,
Oppos Gate No. 03, New Delhi – 110049.

Subject: **Information under section 5(4) & 5(5) filed by Ms. Gauri Maulekhi, Plot No. 26, DDA, Gulmohar Enclave, Oppos Gate No. 03, New Delhi – 110049.**

Ref: - Head Office letter dated 04.02.2025 with Application No. 21, received in this office on dated 04.02.2025 through Email

Kindly refer to the subject noted above, it is intimated that desired information of your RTI application under RTI Act, 2005 pertaining to Jind Region as per office record is as under:-

Sr. No.	Information Sought	Reply		
1.	List of large slaughterhouses (slaughtering more than 200 large animals or more than 1000 small animals per day) to which Consent to Establish) CTE has been granted within the jurisdiction of the state of Haryana from 29.01.2024 till date, specifying the date of CTE granted to the slaughterhouses along with the location of the slaughterhouses.	Sr. No.	Name & Address	CTE Granted date
		1.	Chahal Foods VPO Bagru Kalan, Tehsil Safidon, Jind	05/04/2024
		2.	Karma Protein Pvt. Ltd., Plot No 16, HSIIDC Jind	15/10/2024
2.	Large slaughterhouses (slaughtering more than 200 large animals or more than 1000 small animals per day) to which Consent to Operate) CTO has been granted within the jurisdiction of the state of Haryana from 29.01.2024 till date, specifying the date of CTO granted to the slaughterhouses along with the location of the slaughterhouses.	No CTO has been granted to any slaughter house in the jurisdiction of Jind Region from 29.01.2024 to till date.		

Further, if any clarification is required from this office, you may personally visit this office within 07 days of the receipt of this letter.

Public Information Office - cum-Regional Officer
Jind Region

Endst: No. HSPCB/JND/2025/ **Dated:**

A copy of above is forwarded to The SPIO-cum-EE, Haryana State Pollution Control Board, Panchkula, in reference of your good office letter dated 04.02.2025 with Application No. 21, received in this office on dated 04.02.2025 for information, please.

Public Information Office - cum-Regional Officer
Jind Region

DATE: 13.01.2025
REF. NO: 0601/2025LT

The Public Information Officer,
Maharashtra Pollution Control Board
Kalpatru Point, 3rd and 4th Floor,
Opposite PVR Cinemas, Sion Circle
Mumbai, Maharashtra- 400022

Subject: Request for information under the Right to Information Act 2005.

Sir,
Please make it convenient to provide certified copies of the following documents, orders, note sheets, records etc. with respect to the following information:

1. List of large slaughterhouses (slaughtering more than 200 large animals or more than 1000 small animals per day) to which Consent to Establish (CTE) has been granted within the jurisdiction of the state of Maharashtra from 29.01.2024 till date, specifying the date of CTE granted to the slaughterhouses along with the location of the slaughterhouses.

2. List of large slaughterhouses (slaughtering more than 200 large animals or more than 1000 small animals per day) to which Consent to Operate (CTO) has been granted within the jurisdiction of the state of Maharashtra from 29.01.2024 till date, specifying the date of CTO granted to the slaughterhouses along with the location of the slaughterhouses.

Please accept the payment of Rs. ___/- as fee vide IPO No. _____.
Please use the reference number of this letter in the response that you can send.
Regards,

Gauri Maulekhi,
Plot No. 26, D.D.A.,
Gulmohar Enclave, Oppos Gate No. 3
New Delhi-110049

अधपत्रा COUNTERFOIL
इसे फाड़कर प्रेषक अपने पास रख ले।
To be detached and kept by the Sender.
पोस्टल आर्डर
रुपए 20.00 Rs.
POSTAL ORDER
किसे अदा करना
To whom payable .....
.....
किस डाकघर में
At what Office .....
क्या इसे जमा किया है
Whether crossed .....
भेजने की तारीख
Date sent .....
18G 397748

MAHARASHTRA POLLUTION CONTROL BOARD

Tel: 24010437/24020781/24014701
Fax: 24044532 / 24023516
Website: http://mpcb.gov.in

Kalpataru Point, 2nd - 4th Floor
Opp. Cine Planet Cinema,
Near Sion Circle, Sion (E)
Mumbai - 400 022.

No. MPCB/JD(WPC)/AVP/RTI- 2502 12- FTS- 0170 Date: 12/02/2025

To
Public Information officer, By E mail
All Regional Office and stand alone SRO office,
Maharashtra Pollution Control Board.
Mumbai/ Kalyan/ Thane/ Navi Mumbai/ Raigad/ Pune/ Kolhapur/ Nashik/ Aurangabad/ Amravati/ Nagpur/ Chandrapur.

Sub: RTI Application **(Slaughter House – Consent list)**

Ref: RTI Application received from **Smt Gauri Maulekhi** dated 13.01.2025 (MPCB HQ Inward No. 250121-FTS-0305).

Sir,

Available information at MPCB HQ is in below said tabular Chart. Remaining information , if any , which may be available with your office then you are requested to provide the information directly to the applicant on her postal address.

Note : **1.** Please give list of slaughter houses for CTE & CTO granted from only 29.01.2024 till date.
2. Applicant want only list with address. Applicant doesn't want copies of consent.
3. Please give only specific Information. Slaughtering of more than 200 large animals per day. Slaughtering of more than 1000 small animals per day.

D.A:- RTI Application.

Public Information Officer (Technical-II)
and Sub-Regional Officer- JD WPC section

Copy submitted for information to: -
Appellate Officer -JD (WPC), MPCB, Sion, Mumbai.
Reply to RTI Applicant:
Shri Gauri Maulekhi, Plot No.26, D.D.A., Gulmohar Enclave, Oppos Gate No.3, New Delhi-110049.: Available information at MPCB HQ is as further.

sr	Name of slaughter house with location- Address.	Date of grant of CTE (point no 1 in your RTI),CTO (point no 2 inyour RTI)
1	M/s AL-Raiyan Exports, Gut No. 231/2, At.Daregon, Tal.Malegaon, Dist.Nashik.	CTO grant on 15.10.2024.
2	M/s Reliable Agro Foods, Gut no.160-161, At.Kanadkhed, Tal.Purna, Dist.Parbhani.	CTE for expansion granted on 02.05.2024
3	M/s Maharashtra Foods Processing And Cold Storage, Gut No.21/2B, 22/4, Ganesh Nagar, Baramati Road, Algudewadi, Phaltan, Tal.Phaltan, Dist.Satara.	CTO granted on 04.10.2024

PIO
PIO Tech-II MPCB

DATE: 13.01.2025
REF. NO: 2701/2025LT

The Public Information Officer,
Karnataka State Pollution Control Board,
Parisara Bhavana, No #49, Church Street,
Bengaluru-560001

Subject: Request for information under the Right to Information Act 2005.

Sir,
Please make it convenient to provide certified copies of the following documents, orders, note sheets, records etc. with respect to the following information:

1. List of large slaughterhouses (slaughtering more than 200 large animals or more than 1000 small animals per day) to which Consent to Establish (CTE) has been granted within the jurisdiction of the state of Karnataka from 29.01.2024 till date, specifying the date of CTE granted to the slaughterhouses along with the location of the slaughterhouses.

2. List of large slaughterhouses (slaughtering more than 200 large animals or more than 1000 small animals per day) to which Consent to Operate (CTO) has been granted within the jurisdiction of the state of Karnataka from 29.01.2024 till date, specifying the date of CTO granted to the slaughterhouses along with the location of the slaughterhouses.

Please accept the payment of Rs. ___/- as fee vide IPO No. _____.
Please use the reference number of this letter in the response that you can send.
Regards,

Gauri Maulekhi,
Plot No. 26, D.D.A.,
Gulmohar Enclave, Oppos Gate No. 3
New Delhi-110049

अधपत्रा COUNTERFOIL

इसे फाड़कर प्रेषक अपने पास रख ले।
To be detached and kept by the Sender.

पोस्टल आर्डर
₹ 10
POSTAL ORDER

किसे अदा करना
To whom payable _____

किस डाकघर में
At what Office _____

क्या इसे क्रास किया है
Whether crossed _____

भेजने की तारीख
Date sent _____

52F 036983

Karnataka State Pollution Control Board

Parisara Bhavana,No.49, Church Street,Bengaluru-560001

Tele : 080-25589112/3, 25581383/388 Fax:080-25586321 Email id: ho@kspcb.gov.in

Consent For Establishment (CFE) - (CfE-Fresh)

As per the provisions of

The Water (Prevention & Control of Pollution) Act, 1974

&

The Air (Prevention & Control of Pollution) Act, 1981

To

Pratha Meat Works Private Limited , Sy.No.14, Cheelanahalli Village, Sira Taluk,

for the Facility located at,

Pratha Meat Works Private Limited ,Sy.No.14 ,Sy.No.14, Cheelanahalli Village, Sira Taluk,

Tumkur

Consent Order No	PCBID	INW ID	Industry Colour/Scale	Date of Issue
CTE-346409	246815	282446	RED/LARGE	12/12/2024

This Consent is granted for the Products/ Activity/Service name indicated in the annexure along with the terms & conditions attached to this order

Validity : 01/12/2029

ISO 9001:2015 & 14001:2015 Certified

(This document contains 9 pages including annexure & excluding additional conditions)

Combined Consent Order No: CTE-346409 **PCB ID:** 246815 **GSC No :** PB0XG0000272446 **Date:** 12/12/2024

To,

The Applicant

Pratha Meat Works Private Limited

Sy.No.14, Cheelanahalli Village, Sira Taluk, Tumakuru District-

Sir,

Sub: Consent to Establish under the Water (Prevention & Control of Pollution) Act, 1974 & the Air (Prevention & Control of Pollution) Act, 1981-reg.,

Ref: 1. CFE application submitted by the industry/organization on 06/10/2024 at Regional Office

2. Inspection of the project site by Regional Officer Tumakuru on 09/10/2024

3.Proceedings of the ECM dated 02/12/2024 ,held on 28/11/2024

With reference to the above, Karnataka State Pollution Control Board hereby accords **Consent for Establishment** for new Activity under the Water (Prevention & Control of Pollution) Act, 1974 & the Air (Prevention & Control of Pollution) Act, 1981 at the location indicated below subject to the following terms & conditions.

Location:

Name of the Applicant: Pratha Meat Works Private Limited

Address: Sy.No.14, Sy.No.14, Cheelanahalli Village, Sira Taluk,

Industrial Area: Not in I.A, Cheelanahalli Village,

Taluk: Sira, District: Tumkur

Conditions:

1. This consent for establishment is valid up to 01/12/2029 from the date of issue.
2. The applicant shall not undertake expansion/diversification without the prior consent of the Board.
3. The applicant shall obtain necessary license/clearance from other relevant statutory agencies as required under the law.
4. This consent is granted considering the following activities:

Sr	Product Name	Applied Qty	Unit
1	animals slaughtering house (only sheeps & goats)	72000.0000	Number/month
2	meat processing	720.0000	Metric Tonnes/month

18

1861

Gmail

Shaalini Agrawal <shaaliniagrawal04@gmail.com>

Service of additional affidavit being filed by the Original Applicant in OA No. 879/2022

Esha Dutta <eshadutta7@gmail.com> 13 October 2025 at 19:44
To: secy-moef@nic.in, sanjay goswami <lawquery89@hotmail.com>, mscb.cpcb@nic.in, animalwelfareboard@gmail.com, abhinav@chambersofabhinavmishra.in, admin@chambersofabhinavmishra.in, info@aimlea.com, Pratyaksh Gupta Adv For MOEFCC NGT <lawquery89_1@hotmail.com>, suhasini@rschambers.net
Cc: Gauri Maulekhi <gaurimaulekhi@gmail.com>, Shaalini Agrawal <shaaliniagrawal04@gmail.com>, Siddharth Pandey <siddharth.pandey17@gmail.com>, nanditamishra.1631@gmail.com

Dear Sir,

Please find attached an additional affidavit on behalf of Original Applicant in OA No. 879/2022 being filed before the Hon'ble National Green Tribunal.

This is for your kind information, necessary action and record and constitutes service.

Thanking you,
Yours faithfully,
Esha Dutta
Advocate

Additional Affidavit on behalf of the Petitioner 13.10.25_compressed.pdf
7483K