UNIVERSITY OF CALCUTTA

Notification No. CSR/ 12 /18

It is notified for information of all concerned that the Syndicate in its meeting held on 28.05.2018 (vide Item No.14) approved the Syllabi of different subjects in Undergraduate Honours / General / Major courses of studies (CBCS) under this University, as laid down in the accompanying pamphlet:

List of the subjects

Sl. No.	Subject	Sl. No.	Subject
1	Anthropology (Honours / General)	29	Mathematics (Honours / General)
2	Arabic (Honours / General)	30	Microbiology (Honours / General)
3	Persian (Honours / General)	31	Mol. Biology (General)
4	Bengali (Honours / General /LCC2 /AECC1)	32	Philosophy (Honours / General)
5	Bio-Chemistry (Honours / General)	33	Physical Education (General)
6	Botany (Honours / General)	34	Physics (Honours / General)
7	Chemistry (Honours / General)	35	Physiology (Honours / General)
8	Computer Science (Honours / General)	36	Political Science (Honours / General)
9	Defence Studies (General)	37	Psychology (Honours / General)
10	Economics (Honours / General)	38	Sanskrit (Honours / General)
11	Education (Honours / General)	39	Social Science (General)
12	Electronics (Honours / General)	40	Sociology (Honours / General)
13	English ((Honours / General/ LCC1/ LCC2/AECC1)	41	Statistics (Honours / General)
14	Environmental Science (Honours / General)	42	Urdu (Honours / General /LCC2 /AECC1)
15	Environmental Studies (AECC2)	43	Women Studies (General)
16	Film Studies (General)	44	Zoology (Honours / General)
17	Food Nutrition (Honours / General)	45	Industrial Fish and Fisheries – IFFV (Major)
18	French (General)	46	Sericulture – SRTV (Major)
19	Geography (Honours / General)	47	Computer Applications – CMAV (Major)
20	Geology (Honours / General)	48	Tourism and Travel Management – TTMV (Major)
21	Hindi (Honours / General /LCC2 /AECC1)	49	Advertising Sales Promotion and Sales Management –ASPV (Major)
22	History (Honours / General)	50	Communicative English –CMEV (Major)
23	Islamic History Culture (Honours / General)	51	Clinical Nutrition and Dietetics CNDV (Major)
24	Home Science Extension Education (General)	52	Bachelor of Business Administration (BBA) (Honours)
25	House Hold Art (General)	53	Bachelor of Fashion and Apparel Design – (B.F.A.D.) (Honours)
26	Human Development (Honours / General)	54	Bachelor of Fine Art (B.F.A.) (Honours)
27	Human Rights (General)	55	B. Music (Honours / General) and Music (General)
28	Journalism and Mass Communication (Honours / General)		

The above shall be effective from the academic session 2018-2019.

SENATE HOUSE
KOLKATA-700073
The 4th June, 2018

Paul 4/6/18
(Dr. Santanu Paul)
Deputy Registrar

University of Calcutta

Under Graduate Curriculum under Choice Based Credit System (CBCS)

Syllabus forAbility Enhancement Compulsory Course-2 (AECC-2) in
Environmental Studies

Semester-2

Total Marks-100*(Credit -2)*
(50 Theory-MCQ type + 30 Project + 10 Internal Assessment + 10 Attendance)

[Marks obtained in this course will be taken to calculate SGPA & CGPA]

Theory

Unit 1	**Introduction to environmental studies**	2 lectures
	•Multidisciplinary nature of environmental studies; •Scope and importance; Concept of sustainability and sustainable development.	
Unit 2	**Ecology and Ecosystems**	6 lectures
	•Concept of ecology and ecosystem, Structure and function of ecosystem; Energy flow in an ecosystem; food chains, food webs; Basic concept of population and community ecology; ecological succession. •Characteristic features of the following: a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, wetlands, rivers, oceans, estuaries)	
Unit 3	**Natural Resources**	8 lectures
	• Concept of Renewable and Non-renewable resources • Land resources and landuse change; Land degradation, soil erosion and desertification. •Deforestation: Causes, consequences and remedial measures •Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state). •Energy resources: Environmental impacts of energy generation, use of alternative and nonconventional energy sources, growing energy needs.	
Unit 4	**Biodiversity and Conservation**	8 lectures
	•Levels of biological diversity: genetic, species and ecosystem diversity; • Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots •India as a mega-biodiversity nation; Endangered and endemic species of India •Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; •Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. •Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.	
Unit 5	**Environmental Pollution**	8 lectures
	• Environmental pollution: concepts and types, • Air, water, soil, noise and marine pollution- causes, effects and controls • Concept of hazards waste and human health risks • Solid waste management: Control measures of Municipal, biomedical and e-waste.	

Unit 6	**Environmental Policies and Practices**	7 lectures
	•Climate change, global warming, ozone layer depletion, acid rain and their impacts on human communities and agriculture •Environment Laws: Wildlife Protection Act; Forest Conservation Act. Water (Prevention and control of Pollution) Act; Air (Prevention & Control of Pollution) Act; Environment Protection Act; Biodiversity Act. •International agreements: Montreal Protocol, Kyoto protocol and climate negotiations; Convention on Biological Diversity (CBD). •Protected area network, tribal populations and rights, and human wildlife conflicts in Indian context.	
Unit 7	**Human Communities and the Environment**	6 lectures
	•Human population growth: Impacts on environment, human health and welfare. •Case studieson Resettlement and rehabilitation. • Environmental Disaster: Natural Disasters-floods, earthquake, cyclones, tsunami and landslides; Manmade Disaster- Bhopal and Chernobyl. •Environmental movements: Bishnois.Chipko, Silent valley,Big dam movements. •Environmental ethics: Role of gender and cultures in environmental conservation. •Environmental education and public awareness	
Project/ Field work		Equal to 5 lectures
	•Visit to an area to document environmental assets: Natural resources/flora/fauna, etc. •Visit to a local polluted site-Urban/Rural/Industrial/Agricultural. •Study of common plants, insects, fish, birds, mammals and basic principles of identification. •Study of ecosystems-pond, river,wetland, forest,estuary and agro ecosystem.	
	Total	50 Lectures

Suggested Reading:

Asthana, D. K. (2006).*Text Book of Environmental Studies*. S. Chand Publishing.

Basu, M., Xavier, S. (2016). Fundamentals of Environmental Studies, Cambridge University Press, India

Basu, R. N., (Ed.) (2000). *Environment*. University of Calcutta, Kolkata

Bharucha, E. (2013). *Textbook of Environmental Studies for Undergraduate Courses*. Universities Press.

De, A.K., (2006).*Environmental Chemistry*, 6th Edition, New Age International, New Delhi.

Mahapatra, R., Jeevan, S.S., Das, S. (Eds) (2017). *Environment Reader for Universities*, Centre for Science and Environment, New Delhi.

Masters, G. M., &Ela, W. P. (1991).*Introduction to environmental engineering and science*. Englewood Cliffs, NJ: Prentice Hall.

Odum, E. P., Odum, H. T., & Andrews, J. (1971).*Fundamentals of ecology*. Philadelphia: Saunders.

Sharma, P. D., & Sharma, P. D. (2005).*Ecology and environment*.Rastogi Publications.

UNIVERSITY OF CALCUTTA

SCOTTISH CHURCH COLLEGE

AIR POLLUTION

NAME : - DHIRAJ MANDAL

DEPARTMENT - SANSKRIT

C.U REGISTRATION NO : 223-1121-0480-12

COLLEGE ROLL NO – A-512

বায়ুদূষণ (AIR POLLUTION)

বায়ু পরিবেশের এমন এক উপাদান যার বিশুদ্ধতা জীবের অস্তিত্ব রক্ষায় অপরিহার্য। আমাদের পরিবেশের প্রধানতম উপাদান বায়ু যার মধ্যে থেকে শ্বাসগ্রহণ করে আমরা প্রতিমুহূর্তে বেঁচে থাকার রসদ সংগ্রহ করি। বায়ু উদ্ভিদ ও প্রাণী নির্বিশেষে সকল জীবের জীবনের উৎস। বায়বিক উপাদানের বিনিময়ের মাধ্যমে সৃষ্ট পারস্পরিক নির্ভরশীলতার দ্বারা বাস্তুতন্ত্রের কাঠামো গড়ে ওঠে। কোন স্থানের বায়ুর স্বাভাবিক উপাদানের কোন প্রকার পরিবর্তন তাই সমগ্র পৃথিবীর পক্ষেই বিপদজনক হয়ে উঠতে পারে। এই অংশে আমরা বায়ুদূষণের সংজ্ঞা, কারণ, ফলাফল ও সম্ভাব্য প্রতিকার পদ্ধতি নিয়ে আলোচনা করবো।

সংজ্ঞা : পৃথিবীর বায়ুমণ্ডলের কোন স্তরে বিভিন্ন ভৌত, রাসায়নিক ও জৈব পদার্থের অনুপ্রবেশ বা বায়ুর স্বাভাবিক উপাদানগুলির পারস্পরিক অনুপাতের পরিবর্তন যা প্রাণী বা উদ্ভিদের জীবনযাত্রায় কোনও ক্ষতিকর প্রভাব বিস্তার করে তাকে আমরা বায়ুদূষন বলে থাকি।

বায়ু জীবজগতকে ঘিরে থাকা এক মিশ্র, চলমান ও সদা পরিবর্তনশীল গ্যাসীয় পদার্থ। বায়ুদূষণ তাই সর্বদা সামগ্রিক অবক্ষয়ের সূচক যা পরিবেশের অন্যসকল উপাদানগুলিকে সর্বাধিক প্রভাবিত করে এবং দ্রুত একস্থান হতে অন্যস্থানে ছড়িয়ে পড়ে। তাই এটি এক আন্তর্জাতিক পরিবেশ সমস্যারূপে চিহ্নিত হয়েছে। বায়ুদূষনের ফলে ওজোন স্তরে ক্ষয় সৃষ্টি, গ্লোবাল ওয়ার্মিং ও গ্রীনহাউস এফেক্ট মানবজাতির অস্তিত্বের পক্ষে এক অশনিসংকেত হয়ে দেখা দিচ্ছে।

বায়ুদূষণের নানা প্রভাবের ফলে সৃষ্টি হওয়া বিভিন্ন অসুখ সংক্রমণ ও তৎজনিত মৃত্যুর হার আক্ষরিক অর্থেই উদ্বেগজনক।

বায়ুদূষণ প্রধানতঃ বায়ুমন্ডলের নীচের স্তরগুলি অর্থাৎ সমমন্ডলের (Homosphere) স্তরগুলিতে আবদ্ধ। ভূপৃষ্ঠ সংলগ্ন জীবজন্তুকে ঘিরে থাকা ক্ষুব্ধমন্ডলে (Troposhere) বায়ুদূষণ প্রভাব সর্বাত্মক এবং স্বাভাবিক ভাবে ক্ষুব্ধমন্ডল দূষণের ফল জীবকুলের অস্তিত্বের পক্ষে মারাত্মক।

বায়ুদূষণের প্রকারভেদ: দূষক পদার্থের প্রকৃতির উপর নির্ভর করে বায়ু দূষণকে চারটি শ্রেণিতে ভাগ করা সম্ভব।

(১) **গ্যাসীয় দূষণ :** বায়ুতে কোন বিষাক্ত বা ক্ষতিকর গ্যাসের মিশে যাওয়ার ফলে এই প্রকার বায়ুদূষণের ঘটে। কয়েকটি প্রধান দূষক গ্যাস হলো কার্বন মনোক্সাইড (CO), সালফার-ডাই-অক্সাইড (SO_2), নাইট্রোজেনের বিভিন্ন অক্সাইড (N_2O, NO, NO_2 ইত্যাদি) এছাড়া বিভিন্ন হাইড্রোকার্বন ইত্যাদি। ক্ষেত্রবিশেষে অন্য কিছু বিষাক্ত গ্যাস যেমন অ্যামোনিয়া (NH_3), হাইড্রোজেন সালফাইড, ক্লোরিন ইত্যাদি কোনও ভাবে বায়ুতে মিশে পরিবেশকে প্রচন্ডভাবে ক্ষতিগ্রস্ত করে। আবার কোন কারণে বায়ুর গ্যাসীয় উপাদান-গুলির স্বাভাবিক অনুপাতে পরিবর্তন ঘটার ফলে বায়ুদূষণ সৃষ্টি হয়ে থাকে। যেমন কার্বন-ডাই-অক্সাইড গ্যাসটি বায়ুর একটি গুরুত্বপূর্ণ উপাদান, কারণ এটি প্রাথমিক খাদক অর্থাৎ সবুজ উদ্ভিদের খাদ্য উৎপাদনের কাজে একটি অন্যতম প্রধান পদার্থ রূপে ব্যবহৃত হয়। বর্তমানে পৃথিবীতে প্রাণী বিশেষতঃ মানুষের সংখ্যা অত্যাধিক বেড়ে যাওয়ার ফলে উদ্ভিদ প্রাণীর সংখ্যার স্বাভাবিক অনুপাতে ব্যহত হয়েছে এবং অত্যাধিক প্রাণীর শ্বাসকার্যের ফলে নির্গত এবং কয়লাজাত পদার্থ দহনের ফলে

বাতাসে কার্বন-ডাই-অক্সাইডের পরিমাণ অত্যাধিক বেড়ে গেছে। এর ফলে পৃথিবীর বায়ুমন্ডলের গড় উত্তাপ নিয়ত বৃদ্ধি পাচ্ছে যা পৃথিবীর আবহাওয়ায় একটি মারত্মক দূষণ এবং সমস্ত পৃথিবীর বিজ্ঞানীকূল এই "গ্লোবাল ওয়ার্মিং" সমস্যায় অত্যন্ত উদ্বিগ্ন।

(২) ভাসমান কঠিন কণাজনিত দূষণ :- বায়ুতে বিভিন্ন জৈব কণা যেমন ফুলের পরাগ জীবাণু ইত্যাদি এবং কিছু সূক্ষ্ম ধূলিকণা মিশে থাকে যা প্রকৃতিজাত এবং স্বাভাবিক। এর উপরন্তু মানুষের দ্বারা বিভিন্ন ভাবে নানা ধাতব পদার্থ বা রাসায়নিক দ্রব্যের সূক্ষ্ম কণা বা কয়লার গুঁড়ো ইত্যাদি বায়ুতে মিশছে যা শ্বাসের সঙ্গে শরীরে ঢুকে মানুষ ও অন্যান্য প্রাণীর দেহে নানা অসুখের সূচনা করে।

(৩) ভাসমান তরল কণাজনিত বায়ুদূষণ :- বায়ুতে কোনও রাসায়নিক তরল-পদার্থের সূক্ষ্ম কণা ভাসমান অবস্থায় থেকেও দূষণ সৃষ্টি করতে পারে। যেমন বাতাসে উপস্থিত অধাতব অক্সাইডগুলি জলীয় বাষ্পের সাথে প্রক্রিয়া করে বিভিন্ন অ্যাসিড কণা উৎপন্ন করে। এছাড়া বিভিন্ন কারখানায় অত্যাধিক অ্যাসিড ব্যবহারের ফলে সংশ্লিষ্ট এলাকার বাতাসে অ্যাসিড ধোঁয়াশার প্রাদুর্ভাব ঘটে। বাতাসে এইসব অ্যাসিড এলাকার ঘরবাড়ী ও সৌধের উপরিস্তরকে প্রবলভাবে ক্ষতিগ্রস্ত করে। বলাবাহুল্য যে বাতাসে এই ধরনের অ্যাসিডকণার উপস্থিতি এলাকার মানুষের শরীরে দীর্ঘমেয়াদী থাকে, এমনকি ক্ষেত্রবিশেষে প্রানঘাতী রোগ সৃষ্টি করে থাকে।

(৪) তেজস্ক্রিয় পদার্থ জনিত বায়ুদূষণ :- পরিবেশে তেজস্ক্রিয় পদার্থের উপস্থিতি কিছু স্বাভাবিক উৎস আছে। যেমন উল্কাপাত ইত্যাদির মাধ্যমে বাইরে থেকে পৃথিবীর আবহমন্ডলে মেশা, পরিবেশে উপস্থিত কিছু বিশেষ ধাতু বা ধাতব যৌগ থেকে নিঃসৃত আণবিক দূষণের পরিমাণে নগণ্য। পারমাণবিক-

গবেষণাগার, কারখানা বা চিকিৎসাকেন্দ্র বা সুরক্ষা পরীক্ষায় ব্যবহৃত X-ray তেজস্ক্রিয় (স্টেডিয়াম) ডায়ালযুক্ত ঘড়ি, লেসার টর্চ প্রভৃতি থেকে আণবিক বিকিরণ এবং বিশেষতঃ পারমাণবিক অস্ত্রের পরীক্ষামূলক বিস্ফোরণের ফলে পরিবেশে তেজস্ক্রিয় দূষণের প্রাদুর্ভব ঘটে।

বায়ুদূষণের কারণঃ-

(১) প্রাকৃতিক কারণ :- বিভিন্ন প্রাকৃতিক বিপর্যয় এবং প্রাকৃতিক পরিবর্তনের ফলে বায়ুদূষণ ঘটে থাকে যদিও তার পরিমাণ এবং স্থাতিকারকতা মানুষের দ্বারা কৃত দূষণের তুলনায় নগণ্য। বায়ু দূষণের কয়েকটি প্রধান প্রাকৃতিক কারণ হল—

(ক) দাবানল, আগ্নেয়গিরি থেকে অগ্ন্যুৎপাতের ফলে সৃষ্ট সালফার - ডাই - অক্সাইড গ্যাস ও সালফার, ম্যাঙ্গানীজ ক্লোরিন, ব্রোমিন প্রভৃতি ধাতু বা অধাতব কণাজাতীয় পদার্থ।

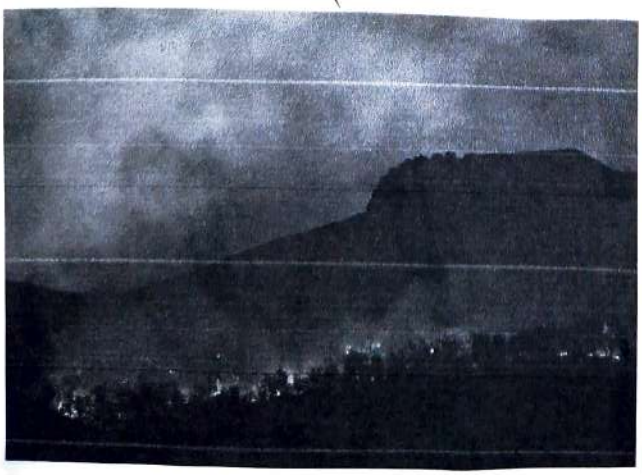
(খ) জলাভূমি, অঞ্চলে বা জীবদেহের পচনের ফলে সৃষ্ট মিথেন (CH_4) গ্যাস।

(গ) কয়লা ও পেট্রোলিয়াম খনিজাত গ্যাস, যেমন—মিথেন (CH_4), কার্বন মনোক্সাইড (CO)

(ঘ) উল্কাপাতের ফলে ধাতুকণা।

(ঙ) মহাজাগতিক ভারি ধূলিকণা,

(চ) গ্রহগুলির আবর্তন ও পারস্পারিক দূরত্বের হ্রাস বৃদ্ধির ফলে সংঘটিত নানা আলোক রাসায়নিক বিক্রিয়া জাত বায়ুদূষণ।



দাবানল

আগ্নেয়গিরি

(২) যানবাহন সৃষ্ট বায়ুদূষণ :- মানুষের ব্যবহৃত বিভিন্ন আধুনিক পরিবহন মাধ্যম থেকে নিঃসৃত ধোঁয়া পরিবেশকে দূষিত করে। স্থলপথে যাত্রীবাহী যা বা মালগাড়ি হিসাবে ব্যবহৃত বাস, ট্রেন, মোটর-গাড়ি, টেম্পো, লরি, ট্রাক ইত্যাদি জ্বালানি হিসাবে ব্যবহৃত শুদ্ধ ও অশুদ্ধ পেট্রোল, ডিজেল ইত্যাদির সম্পূর্ণ ও অসম্পূর্ণ দহনের ফলে বিভিন্ন বিষাক্ত গ্যাস যেমন – কার্বন মনোক্সাইড (CO), নাইট্রোজেনের বিভিন্ন অক্সাইড, সালফার-ডাই-অক্সাইড (SO_2) লেড অক্সাইড প্রভৃতি বাতাসে মিশে যায়।

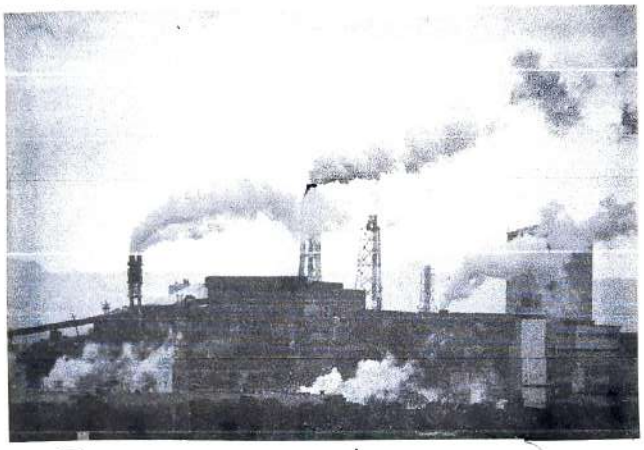
এছাড়া দহন না হওয়া কিছু হাইড্রোকার্বন জাতীয় যৌগ, পারিনিউক্লিয়ার হাইড্রোকার্বন বা কার্বন কণা ও লেড-অক্সাইড গ্যাস প্রচন্ড বিষাক্ত বা শরীরে চিরস্থায়ী ব্যাধি সৃষ্টি করে।

স্বভাবতই শহরাঞ্চলে যানবাহন এবং মালগাড়ি অত্যাধিক ব্যাবহারের ফলে এই জাতীয় বায়ুদূষণের পরিমাণ অত্যাধিক। একটি পরিসংখ্যান অনুসারে ভারতের বড় শহর গুলিতে মোট বায়ুদূষনের অর্ধেক ভাগ সৃষ্টি হয় পরিবহন সংক্রান্ত অসতর্কতা দরুণ।

এছাড়া সামুদ্রিক ও বায়ুযান থেকে নির্গত ধোঁয়া বিশেষত যুদ্ধযান বা অন্য সামরিক -যান নিঃসৃত গ্যাসগুলি পরিবেশকে প্রবলমাত্রায় দূষিত করে।

পরিবহনের জন্য রাস্তা, পুল ইত্যাদি তৈরিতে পীচ গলানোর সময় যে ধোঁয়া বেরোয় তাতে বেঞ্জোপায়ারিন যৌগ থাকে যার থেকে ক্যানসার রোগ হয়।

(৩) শিল্পজাত বায়ুদূষণ :- শিল্পাঞ্চলগুলির কারখানা থেকে নানা গ্যাস, ধোঁয়া এবং তাতে ভাসমান অতিক্ষুদ্র ধাতব বা অধাতব রাসায়নিক পদার্থের কণা বায়ুতে মিশে যায়। প্রধানতঃ গতশতাব্দীর শিল্পবিপ্লবের পরবর্তী পর্যায়ে শিল্পাঞ্চলে অত্যধিক প্রসার ও সেখানে প্রয়োজনীয় সতর্কতা ছাড়াই নানা ক্ষতিকর রাসায়নিক পদার্থের ব্যবহার এই দূষণের কারণে। প্রাথমিকভাবে এই দূষণ শুধুমাত্র সংশ্লিষ্ট এলাকাকে প্রভাবিত করলেও পরবর্তীকালে বায়ু ও জলের প্রবাহমানতার কারণে অত্যন্ত দ্রুত হারে বিস্তৃত অঞ্চলে ছড়িয়ে পড়ে। এর মধ্যে কয়েকটি প্রধান দূষক সৃষ্টিকারী শিল্প ও শিল্পজাত বায়ুদূষণ -গুলি হলো :—



শিল্পজাত বায়ুদূষণ

বিদ্যুৎ শিল্প :- তাপ বিদ্যুৎ ও অন্যশক্তি উৎপাদন কেন্দ্রগুলি থেকে নির্গত সালফার-ডাই-অক্সাইড, কার্বন মনোক্সাইড, নাইট্রোজেন-ডাই-অক্সাইড, ধাতুকণা ও ছাই।

অ্যাসীড শিল্প :- ক্লোরিন, সালফার-ডাই-অক্সাইড (SO_2), সালফার-ট্রাই-অক্সাইড (SO_3) ফ্লুওরাইড ক্লোরাইড যৌগ সার শিল্প— অ্যামোনিয়া গ্যাস।

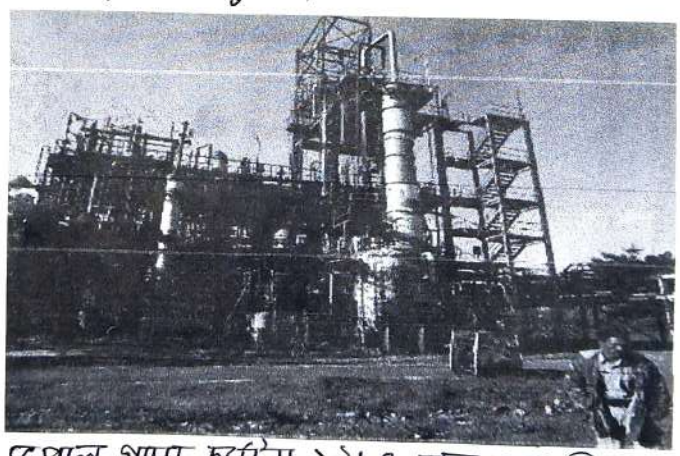
পেট্রোলিয়াম শিল্প :- পেট্রোলিয়াম শোধনাগার ও পেট্রোকেমিক্যাল কারখানা থেকে উৎপন্ন হয় বিভিন্ন হাইড্রোকার্বন যৌগ, ফরম্যালডিহাইড, লেড ও সালফার যৌগ।

রাসায়নিক শিল্প :- বিভিন্ন রাসায়নিক শিল্পজাত বর্জ্য পদার্থ, ধাতব যৌগ, বিষাক্ত রাসায়নিকের ধোঁয়া, রঙ বার্নিশ শিল্পের উৎসৃষ্ট পদার্থ, সিমেন্ট কারখানার থেকে উৎপন্ন কঠিন ধূলিকণা।

অস্ত্র কারখানা:— বিভিন্ন পারমানবিক ও অন্য শক্তিশালী বোমা তৈরিতে ব্যবহৃত বিষাক্ত গ্যাসগুলি, জীবানুবোমা এবং রকেট তৈরিতে রাসায়নিক পদার্থ বায়ুতে মিশে যায় যার ফলে দূষণ সৃষ্টি করে।

শিল্পজাত বায়ুদূষণের মারাত্মক ক্ষতিকারক প্রভাবের প্রত্যক্ষ প্রমাণ পাওয়া যায় কয়েকটি বিশে, দুর্ঘটনার বিবরণ থেকে যা এখানে সংক্ষেপে উল্লেখ করা হলো।

ভূপাল গ্যাস দুর্ঘটনা:— শিল্প কারখানায় দুর্ঘটনার ফলে সর্বাত্মক বায়ুদূষণের ঘটনাটি ঘটেছিল ভারতবর্ষের ভূপাল শহরে ১৯৮৪ সালের ৩রা ডিসেম্বর তারিখে। ঐদিন কীটনাশক, দ্রব্য প্রস্তুতকারী ইউনিয়ন কার্বাইড কারখানায় মিক প্ল্যান্ট থেকে মিক (MIC) বা মিথাইল-আইসো-সায়ানেট নামক অতি বিষাক্ত ও উদ্বায়ী গ্যাস মুক্ত পরিবেশের বায়ুতে মিশে গিয়ে ব্যাপক জীবনহানি ঘটায়। সরকারি রিপোর্ট অনুসারে ২৩০০ মানুষ এতে মারা যান। দু'লক্ষ মানুষ পঙ্গু হয়ে যায়। অসংখ্য জীবজন্তু (বিশেষতঃ গবাদি পশু) ও গাছপালা ধ্বংস হয়ে যায়।



ভূপাল গ্যাস দুর্ঘটনা ১৯৮৪ সাল ৩রা ডিসেম্বর

দুর্ঘটনার দিন মিক গ্যাস ট্যাঙ্কের সংলগ্ন ফ্রিজ খারাপ হয়ে গ্যাসের উষ্ণতা ০°C থেকে বাড়িয়ে দেয়। অতঃপর কোনো ভাবে গ্যাসটি জলের সংস্পর্শে আসে যার ফলে রাসায়নিক বিক্রিয়ায় অত্যাধিক তাপ ও চাপ তৈরি হলে ট্যাঙ্কের সেফটি ভাল্ব খুলে ঐ বিষাক্ত গ্যাস বাতাসে ছড়িয়ে যায়। নিরাপত্তা ব্যবস্থাগুলি স্বাভাবিক ভাবে চালু না থাকায় গ্যাসটি দাহ্য হলেও পুড়িয়ে দেওয়া বা অন্য ট্যাঙ্কে স্থানান্তর করা সম্ভব হয়নি। দুর্ভাগ্যজনক ভাবে কারখানার পাশে বস্তি অঞ্চলে থাকা হাজার হাজার মানুষ সতর্ক হবার সামান্যতম সুযোগটুকু ও পাননি।

চেরনোবিল দুর্ঘটনা:- ১৯৮৬ সালে সোভিয়েত ইউনিয়নের চেরনোবিল পরমানু শক্তি উৎপাদন কেন্দ্রের রিঅ্যাক্টরে দুর্ঘনার ফলে প্রচন্ড পরিমাণ তেজস্ক্রিয় পদার্থ বাতাসে, মাটি জলে ছড়িয়ে পড়ে। এর ফলে তেজস্ক্রিয়তার প্রভাবে তাৎক্ষনিক মৃত্যু ছাড়াও পরবর্তী কয়েক প্রজন্ম পর্যন্ত নানা রোগব্যাধি. বিকলাঙ্গতা, ক্যানসার প্রভৃতি আক্রমন ঘটতে থাকে। বলাবাহুল্য এই তেজস্ক্রিয়তা বায়ুমাধ্যমে সর্বাধিক দ্রুতগতিতে সমস্ত এশিয়া, ইউরোপে ছড়িয়ে পড়ে যায় ফলে বহু অজানা রোগ ভাইরাস সংক্রামন ও পঙ্গুতা মানুষ ও পশুপাখি ক্ষুবার মধ্যেই দেখা যায়। পরমাণু বোমার পরীক্ষামূলক বিস্ফোরণ বা পরমাণু কেন্দ্রের দুর্ঘনার ফলে এভাবে কয়েক প্রজন্ম ধরে সুস্থ জীবনের অস্তিত্বকে বিপন্ন করে।

1952 সালে লন্ডনের সৃষ্ট স্মালফার-ডাই-অক্সাইড ধোঁয়াশার ফলে তাৎক্ষনিকভাবে প্রায় 4 হাজার মানুষ মারা যায় এবং পরবর্তী কয়েকমাসে আরও 8 হাজার মানুষ মারা যায়। 1979 সালে সোভিয়েত রাশিয়ায় একটি জৈব অস্ত্রগবেষণাগারে অ্যানথ্রেক্স যৌগ নি:সরণের ফলে কয়েকশো মানুষ মারা যান।

চেরনোবিল দুর্ঘটনা ১৯৮৬ সাল

গৃহজাত বায়ুদূষণ:- মানুষের বাসগৃহ ও কর্মপ্রতিষ্ঠানে রন্ধন, বা উত্তাপ সৃষ্টির জন্য ব্যবহৃত জ্বালানির অসম্পূর্ণ দহনের ফলে কার্বন মনোক্সাইড বা অবিশুদ্ধ জ্বালনির দহনের ফলে অন্যান্য বাতব বা অবাতব অক্সাইড উৎপন্ন হয় যায় অধিকাংশই বিষাক্ত। অত্যাধিক মাত্রায় উৎপন্ন কার্বন-ডাই-অক্সাইড হল পরিবেশের অবক্ষয় ঘটায়। এছাড়া জমা আবর্জনার পচন, অবহন যোগ্য নর্মদা ইত্যাদি থেকে অজৈব গ্যাস জীবানু, ও ভাইরাস. ইত্যাদি সৃষ্টি হয়। জমা জঞ্জাল পুড়িয়ে ফেলতে গিয়েও কিছু ক্ষতিকর গ্যাস তৈরী হয়। যেমন— প্লাস্টিক দহন।

প্রত্যক্ষ ও পরোক্ষ বায়ুদূষক:- বিভিন্ন প্রাকৃতিক বা মানুষের দ্বারা কৃত বায়ুদূষণ যার সম্বন্ধে জানলাম সেগুলি হলো উৎস থেকে সরাসরি সৃষ্ট বায়ুদূষণ। যাকে আমরা প্রাথমিক বা প্রত্যক্ষ বায়ুদূষণ বলে থাকি। এই ধরনের কিছু দূষক পদার্থ বায়ুমন্ডলে বা পরিবেশের অন্য উপাদানের সঙ্গে স্পর্শে এসে কোন বিক্রিয়ার ফলে আরও বেশি ক্ষতিকর দূষক তৈরি করে। যাদের পরোক্ষ দূষণ বলা হয়। উদাহরণ স্বরূপ বাড়ির রান্নাঘর, যানবাহন ও কারখানা নিঃসৃত ধোঁয়া ও রাসায়নিক পদার্থ গুলি সূর্যের আলোর সংস্পর্শে আলোক রাসায়নিক বিক্রিয়ার ফলে এক বিষাক্ত ধোঁয়াশা সৃষ্টি করে। যার মধ্যে বিভিন্ন অ্যালডিহাইড ও কিটোন যৌগ, পার অক্সি অ্যাসিটাইল নাইট্রেট ইত্যাদি বায়ুদূষক মিশ্রিত থাকে। কিছু দূষক প্রত্যক্ষ এবং পরোক্ষ উভয় ভাবেই সৃষ্টি হয়ে থাকে।

বনাঞ্চল হ্রাস:- নির্বিচারে নগরায়ণ এবং শিল্পায়নের প্রয়োজনে অতি দ্রুত হারে বনাঞ্চল ধ্বংস করার ফলে প্রকৃতিতে সবুজ উদ্ভিদের অনুপাত প্রাণীর তুলনায় অত্যন্ত কমে গেছে। সবুজ উদ্ভিদ যা সালোকসংশ্লেষকে বায়ুতে কার্বন-ডাই-অক্সাইড হ্রাস করে বিশুদ্ধ অক্সিজেন উৎপন্ন করে পরিবেশকে নির্মল রাখতো তা আজ বিলুপ্ত প্রায়।

সূক্ষ্ম কঠিন কণাজাত কিছু বিশেষ প্রকার বায়ুদূষণ:- বায়ুমন্ডলে সর্বদাই নানা প্রকার সূক্ষ্ম কঠিন কণার অস্তিত্ব বর্তমান। যদি কিছু সূক্ষ্ম কণার বেশি মাত্রায় উপস্থিত পরিবেশের উপর ক্ষতিকর প্রভাব ফেলে তবে তা বায়ুদূষণ হিসাবে চিহ্নিত হয়।
যেমন → ধূলো, বাষ্প, মিস্ট, ধোঁয়া।

বায়ুদূষণের ক্ষতিকারক ফলাফল:- পূর্বে আলোচিত বিভিন্ন উৎস থেকে সৃষ্ট বায়ুদূষক পদার্থগুলি ক্রমাক্রম বায়ুমন্ডলে মিশে বায়ুর স্বাভাবিক মিশ্রনের অনুপাতকে প্রভাবিত করেছে। বায়ু দূষিত হলে সেই বায়ুতে শ্বাস নেওয়ার সময় ক্ষতিকর গ্যাসীয় পদার্থ ও কার্বন কণাগুলি মানুষ ও অন্য প্রাণীর দেহে মিশে যাচ্ছে। ক্ষেত্রবিশেষের ফলে মৃত্যু হওয়া ও সম্ভব নয়। বায়ুতে উপস্থিত বিভিন্ন সূক্ষ্ম কঠিন কণা নিঃশ্বাসের মাধ্যমে ফুসফুসে জমা হলে তার ফলে

বিভিন্ন রোগ দেখা দিতে পারে যেমন – বালিকণা জমে সিলিকোসিস কয়লার গুঁড়ো থেকে অ্যানথ্রাকোসিস, অ্যাসবেস্টস থেকে অ্যাসবেস্টোসিস ইত্যাদি। বায়ুদূষণের ফলে উদ্ভিদের ফলন ও বৃদ্ধিতেও নানা ক্ষতি ঘটে। এছাড়া বাড়ি বা সৌধের বাইরে দেওয়ালে ক্ষয়ক্ষতি ঘটে। কয়েকটি প্রধান দূষকের ক্ষতিকর প্রভাব এখানে ব্যাখ্যা করা হল। যেমন — কার্বন মনোক্সাইড (CO), সালফার-ডাই-অক্সাইড (SO_2), নাইট্রোজেন-ডাই-অক্সাইড (NO_2), হাইড্রোজেন সালফাইড (H_2S), ওজন (O_3), ক্লোরিন (Cl_2), হাইড্রোকার্বন যৌগ, লেড ও লেড অক্সাইড, অ্যামোনিয়া, মিথেন, ক্লোরোফ্লুরোকার্বন জাতীয় যৌগ।

ওজোনস্তরে ছিদ্র বা ফাটল সৃষ্টি :-

শান্তমণ্ডলীয় ওজোন স্তর :- ভূ-পৃষ্ঠ থেকে 10-35 কিলোমিটার উচ্চতায় বিস্তৃত বায়ুমণ্ডলীয় স্তরকে শান্তমণ্ডল বলা হয়। বায়ুমণ্ডলের অক্সিজেন (O_2) গ্যাসের অণু এই অংশে সূর্যের অতিবেগুনী রশ্মির প্রভাবে দুটি অক্সিজেন পরমাণুতে ভেঙে যায় এবং তিনটি অক্সিজেন পরমাণু পুনর্বিন্যস্ত হয়ে ওজোন অনু (O_3) গঠন করে।

বায়ুদূষণ নিয়ন্ত্রণ :- বায়ুদূষণ নিয়ন্ত্রণ করার জন্য বর্তমানে বহু আন্দোলন, গবেষণা, লেখালেখি, সভাসমিতি, সেমিনার ইত্যাদি করা হচ্ছে। এর প্রাথমিক উদ্দেশ্য হলো জাতি-ধর্ম-বাসস্থান নির্বিশেষে সমাজের সকলস্তরের মানুষকে বায়ুদূষণের ক্ষতিকর প্রভাবগুলি সম্পর্কে অবহিত করা। কারণ সচেতন মানুষই তার পরিবেশ রক্ষায় স্বেচ্ছায় অংশগ্রহণ করতে পারে। বায়ুদূষণ যতটাই ব্যাপক ও মারাত্মক যে শুধুমাত্র কিছু মানুষের সদিচ্ছা নয় সবার যৌথ উদ্যোগ, সরকারী পৃষ্ঠপোষকতা ও আইন প্রণয়নের মাধ্যমেই এই সমস্যাকে কিছুটা নিয়ন্ত্রণ করা সম্ভব। বায়ুদূষণ নিবারণে অবিলম্বে যে ব্যবস্থাগুলি নেওয়া প্রয়োজন তা হলো —

১। কলকারখানা শিল্প ক্ষেত্রে এবং জনজীবনে ব্যবহৃত যন্ত্রপাতি এবং যানবাহন থেকে নির্গত গ্যাসকে সরাসরি বাতাসে ছাড়ার আগে যান্ত্রিক উপায়ে পরিশুদ্ধ করা। যানবাহন ও রান্নাঘরে জ্বালানির দহনে সৃষ্ট গ্যাসে কার্বন-ডাই-অক্সাইড ছাড়া যে

পদার্থগুলি নানাভাবে সৃষ্ট হয় তার দূরীকরণে ব্যবস্থা নিতে হবে। এই পদার্থগুলি ফিল্টার সাইক্লোন সেপারেটর (ধূলোময়লা অপসারণের জন্য), ক্যাটালাইটিক কনভার্টার (যানবাহন থেকে নির্গত কার্বন মনোক্সাইড ও হাইড্রোকার্বন যৌগগুলির জারণের অপেক্ষাকৃত কম ক্ষতিকর দূষণকে রূপান্তর করার জন্য), ইলেকট্রোস্ট্যাটিক প্রেসিপিটার (অত্যন্ত সূক্ষ্ম বস্তুকণা পৃথক করার জন্য বিশেষত তামা, দস্তা শিল্পে ব্যবহৃত হয়) প্রভৃতি যন্ত্র ব্যবহার পৃথক করা হয়।

২। অত্যন্ত প্রযুক্তির সাহায্যে এমন পদ্ধতি অবলম্বন করা হবে যার ফলে দূষিত পদার্থের উৎপাদন কমে যাবে। ফলে যানবাহ, যন্ত্রপাতি, কলকারখানা থেকে গ্যাস বা কঠিন দূষণকারী কণার নিঃসারণ নিয়ন্ত্রিত হয়।

৩। দহনের জন্য ব্যবহারের পূর্বে জ্বালানীর বিশুদ্ধকরণ করতে হবে, যার ফলে পরিবেশে অতিরিক্ত লেড ও ক্ষতিকর ধাতব অক্সাইড প্রভৃতি বিষাক্ত ধাতুজাত রাসায়নিক দূষণ উৎপাদন কমবে।

৪। জীবাশ্ম জ্বালানীর ব্যবহার কম করতে হবে। ধাতুনিষ্কাশন চুল্লী নির্গত গ্যাস ও ধোঁয়াকে পরিশ্রুত করে বাতাসে ধোঁয়াশা বিশেষতঃ সালফার ডাই অক্সাইডের পরিমাণ কমাতে হবে।

৫। যথেষ্ট পরিমাণে গাছ লাগিয়ে বনসৃজন করতে হবে। যার ফলে পরিবেশে অতিরিক্ত কার্বন-ডাই-অক্সাইডের পরিমাণ হ্রাস পায়।

৬। অপ্রচলিত বা ঢিরাচরিত শক্তির উৎস সন্ধান ও তার সঠিক ব্যবহারের মাধ্যমে কয়লা, পেট্রোলিয়াম দহনের পরিমাণ কমাতে হবে।

৭। কাঠের চোরাচালান ব্যবসা বন্ধ করতে হবে এবং বিকল্প বস্তু নির্মিত আসবাবের ব্যবহার শুরু করতে হবে।

৮। জৈব আবর্জনার সঠিক রূপান্তর ঘটাতে হবে যাতে মিথেন গ্যাসের পরিমাণ বৃদ্ধি না পায়।

৯। ক্লোরোফ্লুরোকার্বনের ব্যবহার নিয়ন্ত্রিত করতে হবে।

১০। তেজস্ক্রিয় দূষণ রোধের জন্য পারমাণবিক গবেষণাগার-গুলিতে যথেষ্ট সাবধানতা অবলম্বন করতে হবে। X-ray মেশিন, রেডিওথেরাপির সাথে যুক্ত ব্যক্তিদের জন্য বিশেষ, পোশাক ও অন্যান্য তেজস্ক্রিয়তা রোধক ব্যবস্থা গ্রহণ করতে হবে।

Shiraj Mandal.
06/07/2021.


চিপকো
আন্দোলন

SCOTTISH CHURCH COLLEGE

NAME - SANDEEP DAS

DEPARTMENT - SANSKRIT

COLLEGE ROLL NO - A-511

CU REG. NO. - 223-1111-0502-17

CU ROLL No. - 2223-41-0006

।। সূচীপত্র ।।

ভূমিকা

- Eco-System বা, বাস্তুতন্ত্রের খুব বড় অংশ জুড়ে রয়েছে বৃক্ষের অবদান, আমরা প্রত্যেকেই পরিবেশ শিক্ষা গ্রহনের সময় বাস্তুচক্র বজায় রাখতে কিছু স্লোগান একাধিকবার পড়েছি, সেখানে জনপ্রিয় দুটি স্লোগান হল "একটি গাছ একটি প্রান" এবং "গাছ লাগান, প্রান বাঁচান", অর্থাৎ, গাছ যে কতটা প্রানদায়ী তা, আমরা খুব সহজেই বুঝতে পারি, তাই Environmental Protection বা, পরিবেশ সুরক্ষার জন্য আমাদের বৃক্ষরোপন এবং তার সুরক্ষার দায়িত্ব নিতে হবে।

এই প্রকৃতি আমাদের অনেক কিছু প্রদান করে বেঁচে থাকার জন্য, কিন্তু আমরা নিজেদের অর্থ পূরনের জন্য সেই প্রকৃতির বিনাশ করি, এর মধ্যে Deforestation বা বৃক্ষচ্ছেদন অন্যতম, এই বৃক্ষচ্ছেদন রোধ করার জন্য ভারতের সবথেকে গুরুত্বপূর্ণ যোগদানের উদাহরন হল "চিপকো আন্দোলন"।

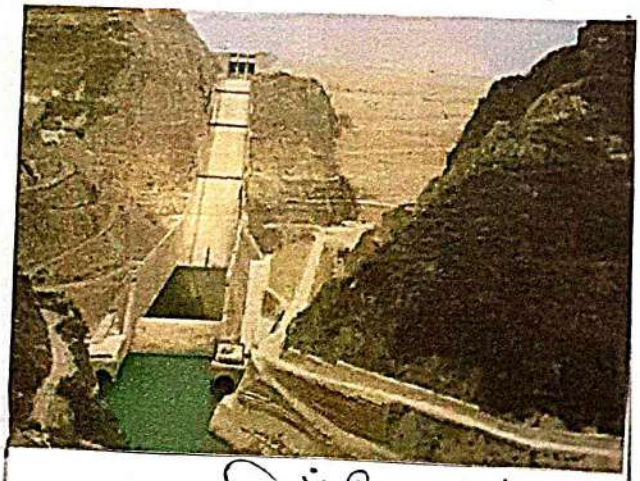
৪৫ বছর পূর্তিতে গুগল সংস্থার পক্ষ থেকে চিপকো আন্দোলনকে সম্মান জ্ঞাপন করা হয়েছিল ২০১৮ সালে,

• চিপকো আন্দোলন : ঐতিহাসিক প্রেক্ষাপট

চিপকো আন্দোলন ইতিহাস থেকে বর্তমানের সবচেয়ে বৃহৎ এবং কার্যকরী বন-সংরক্ষণ আন্দোলন হিসাবে খ্যাত, সারা বিশ্বব্যাপী বন-সংরক্ষণের জন্য এর পূর্বে আর কোনও অহিংস আন্দোলন দেখা যায়নি,

১৯৭৩ সালের এই আন্দোলন মূলত নারীবাদী আন্দোলন হিসাবে খ্যাত, গ্রামের সকল মহিলাদের যৌথ উদ্যোগে এবং সুন্দর লাল বহুগুনার নেতৃত্বে এই আন্দোলন সফল হয়,

জয় প্রকাশ নারায়ণ এবং সর্বোদয় আন্দোলনের দ্বারা অনুপ্রাণিত হয়ে ১৯৬৪ সালে 'দশোলি গ্রাম স্বরাজ্য সংঘ' প্রতিষ্ঠা করেছিলেন গান্ধী-অনুগামী সেবক চন্ডী প্রসাদ ভট্ট, তাঁর মূল লক্ষ্য ছিল বনের সম্পদ ব্যবহার করে ছোট শিল্প স্থাপন, ঠিকাদারী সংস্থার হাতে এই অঞ্চলের নিলাম করা শুরু হয়, সাধারন অনগ্রসর অঞ্চল থেকে আজও অধিক শ্রমিকেরা এই বনভূমি উদ্ভাত, পাথর উত্তোলনে অসমর্থ ছিল, তাই এই কাজে পাহাড়ী লোকদের নিয়োগ করা হয় এবং তাদের কোনও প্রকার অর্থ দেওয়া হত না, ধীরে ধীরে এই অঞ্চলে বহিরাগত দের আগমনের বৃদ্ধি ঘটে যার ফলে পরিবেশ-গত ভারসাম্য সংকীর্ন হয়ে পড়ে, নাড়োয়াল হিমালয়ের পাদদেশ এবং সংলগ্ন বনভূমির বাস্তুতন্ত্র ভারসাম্যহীন হয়ে পড়ে,



তেহেরি বাঁধ-প্রকল্প
নাড়োয়াল হিমালয়ের বুকে

• অধুনা উত্তরাখন্ড ও চিপকো আন্দোলন

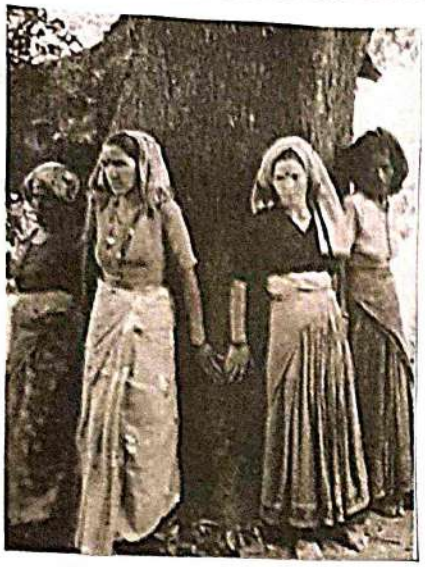
বিভিন্ন সংবাদ মাধ্যম এবং "Uttarakhand: Past, Present & future", "Ancient communities of the Himalayas" বা "Garhwal himalaya" ইত্যাদি গ্রন্থের থেকে উত্তরাখন্ডের (পূর্বের উত্তর প্রদেশ) যে ভয়ানক একটি ইতিহাস আমরা জানতে পারি তা অবাক্তবিক ভাবে চিপকো আন্দোলনের সাথে যুক্ত,

পূর্বোক্ত চিপকো আন্দোলন: ঐতিহাসিক প্রেক্ষাপট থেকে একটি বিষয় স্পষ্ট যে উত্তরা খন্ডের সাড়োয়াল হিমালয় পর্বতের বনভূমি ও পাদদেশে কিছু অঘটন ঘটছে যা পরিবেশের ক্ষতি সাধক হিসাবে গন্য,

ক্রমবর্ধমান শিল্প স্থাপনের তাড়াহুড়ো, বেপরোয়া ভাবে বনাঞ্চল সাফ করে একাধিক বাঁধ নির্মাণের কাজ বা পাথর তোলা অবাধে হয়ে গুচ্ছে প্রকৃতির রোষের কারন, যার ফলস্বরূপ ১৯৭০ সালের জুলাই মাসে অলকানন্দা নদীর বন্যায় এক বিস্তীর্ন অঞ্চলে ধ্বংসাত্মক রূপ দেখা যায়, একটি বিস্তৃত অঞ্চলের বিস্তর নদীর গতিপথ অবরোধ করে ফলে বদ্রীনাথের কাছে হনুমানচট্টি থেকে হরিদ্বার পর্যন্ত বহু গ্রাম, সেতু ও রাস্তা জলে মগ্ন হয়ে পরে, ফলে বন-সংরক্ষণের প্রয়োজন বৃদ্ধি পায়, চিপকো আন্দোলন এরই প্রথম পদক্ষেপ,

বৃক্ষচ্ছেদনের ফলে ১৯৭০ ও ২০১৩ র বন্যা ও ভূমিধস বহু গ্রাম ধ্বংস করেছে,

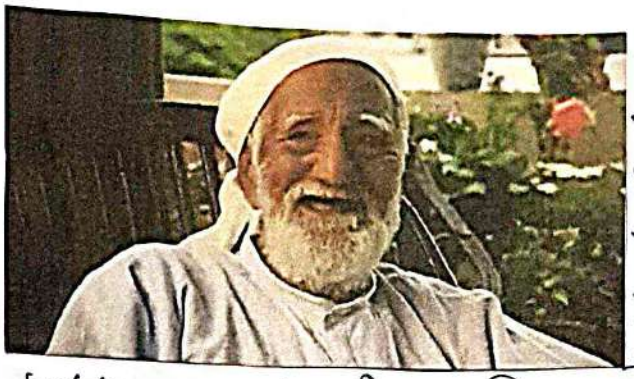
• **চিপকো আন্দোলন:** চিপকো অর্থাৎ জড়িয়ে ধরা, সুন্দর লাল বহুগুনা, গৌরা দেবী প্রমুখের অক্লান্ত নেতৃত্বে চিপকো আন্দোলন সংঘটিত হয়েছিল। এই আন্দোলন মূলতঃ একটি মহিলা আন্দোলন, নজরদারীর মুখে বনাঞ্চল ধ্বংসের কারণে বন্যা ও ভূমিধ্বসের কবলে পড়ে গ্রামের মহিলারা ঘাষবাদ, বনজ সম্পদ ব্যবহার, পশুপালন প্রভৃতি সম্পূর্ণ রূপে হারিয়েছিল। ১৯৭৩ সালের সম্পূর্ণ অহিংস আন্দোলনে গ্রামের সাধারণ নারীরা এগিয়ে এসেছিলেন গাছ বাঁচানোর তাগিদে। চামোলী গ্রামে সূচিত এই বিদ্রোহ কিছু দিনের মধ্যে উত্তর ভারতের বিভিন্ন রাজ্যে ছড়িয়ে পড়ে।



চিপকো আন্দোলনের মূল ধারা যা, কালের ইতিহাস হারিয়ে দিয়েছে তা হল রাজস্থানের ঘটনা, অষ্টাদশ শতকে যোধপুরের বিষ্ণোই সম্প্রদায়ে এই আন্দোলন হয়েছিল, যোধপুরের রাজার আদেশে গাছ কাটা আটকাতে সেই আন্দোলনের নেত্রী অমৃতা দেবী সহিত বাকিরাও জীবন উৎসর্গ করে দিয়েছিলেন। এই ঘটনার পর রাজা এক রাজকীয় নির্দেশে বিষ্ণোই গ্রামে গাছ কাটা সম্পূর্ণ রূপে নিষিদ্ধ করেন।

"Eco-logy is the permanent economy" বহুগুনা কর্তৃক এই স্লোগান আজও স্মরণীয় হয়ে আছে, দীর্ঘস্থায়ী হওয়া এই চিপকো আন্দোলনের রেশ আজও ভারতের যুব সমাজে লক্ষ্যনীয়, ৪৮ বছরের পর বহুগুনার মৃত্যু চিপকো আন্দোলনকে আবার উজ্জ্বল স্মৃতির অঙ্গ করে তুলেছে।

• **সুন্দর লাল বহুগুনা :** সুন্দরলাল বহুগুনা ভারতের একজন বিখ্যাত পরিবেশ বিদ এবং চিপকো আন্দোলনের নেতা ছিলেন, চিপকো আন্দোলনের ধারনা ছিল তাঁর স্ত্রীর, ১৯৭০ থেকে দানা বাঁধতে থাকা পরিবেশ সুরক্ষার ধারনা ১৯৭৩ সালে চিপকো আন্দোলনের রূপ ধারণ করে, তিনি আন্দোলনের সদস্য হিসাবে প্রথম হিমালয় অঞ্চলে বন এবং রক্ষণের জন্য লড়াই করে ছিলেন, সুন্দরলাল বহুগুনা



২০২১-এর শেষ জীবনের চিত্র
সংরক্ষণের কর্তা প্রেরক
সুন্দরলাল বহুগুনা

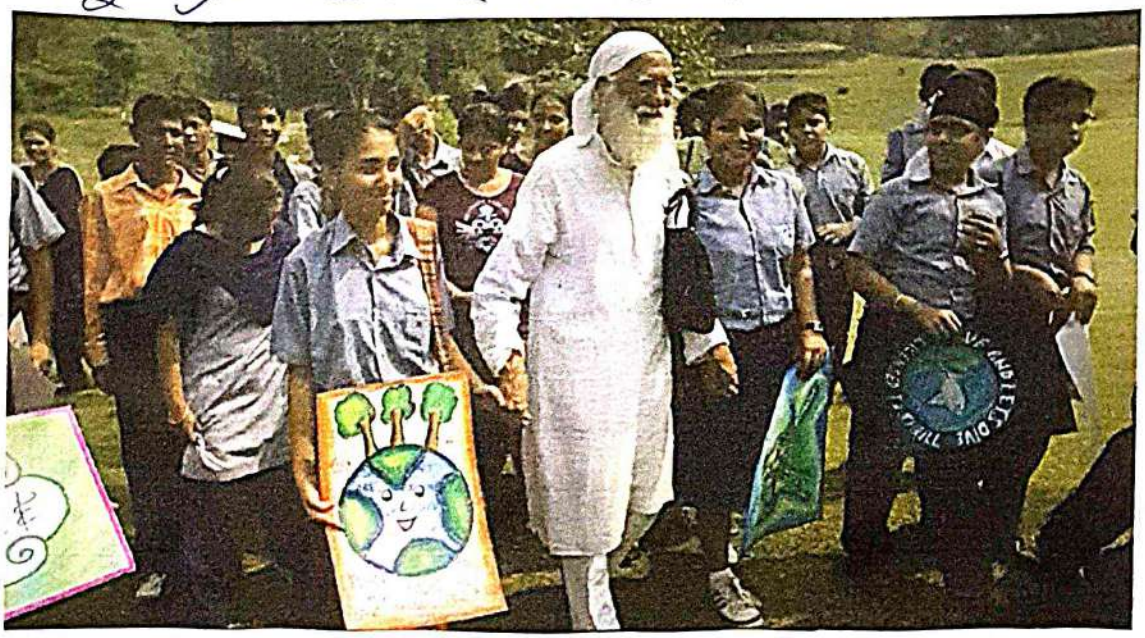
৯ জানুয়ারী ১৯২৭ সালের উত্তরপ্রদেশের (অধুনা উত্তরাখন্ড) তেহেরির নিকট মারোদা গ্রামে জন্ম গ্রহন করেন, তিনি সর্বপ্রথম অস্পৃশ্যতার বিরুদ্ধে আওয়াজ তুলেছিলেন, পরবর্তীতে ১৯৬৫-৭০এ তিনি পার্বত্য মহিলাদের নিয়ে মাদক বর্জনের অভিযান চালান, মাত্র ১৩ বছর বয়সে তিনি সামাজিক কাজে যুক্ত হয়ে ছিলেন, শ্রী দেব সুমনের তত্ত্বাবধানে, তিনি মূলতঃ গান্ধীবাদে বিশ্বাসী ছিলেন, বিমলা দেবীর সাথে বিবাহের পর তিনি সিদ্ধান্ত গ্রহন করেন যে, তাঁরা পর্বতের প্রাক্তন লোকেদের সাথে থাকবেন এবং গ্রাম্য-আশ্রম গড়ে তুলবেন, তিনি হিমালয় পার্বত্য অঞ্চল ও বনাঞ্চল পরিভ্রমন করেন এবং সেখানে গড়ে ওঠা উন্নয়নমূলক প্রকল্পের ফলে বাস্তু-তন্ত্র এবং গ্রাম্য পরিবেশের ক্ষতি সম্পর্কে জানতে পারেন, এইভাবে তিনি বিভিন্ন কাজ করেছিলেন পরিবেশ রক্ষার স্বার্থে।

➡ **প্রাপ্য পুরস্কার :**

- ১৯৮৭ : Right Livelihood Award (chipko Movement)
- ১৯৮৬ : Jamnalal Bajaj Award (Constructive work)
- ১৯৮৯ : Honorary Degree or Doctor of Social Sciences (IIT)
- ২০০৯ : Padma Vibhushan (Govt. of India)
- ১৯৮৭ : Padma Shri (১৯৮৭ সালের তেহেরি বাঁধ প্রকল্পের জন্য তিনি সরকারের বিরোধিতা করেন এবং পদ্মশ্রী প্রত্যাখ্যান করেন,)

• সুন্দর লাল বহুগুনা : চিপকো ও তেহেরি আন্দোলন

আইনজ্ঞ ও পরিবেশবিদ বহুগুনা হিমালয় অঞ্চলের বন ও মানুষের অধিকার নিয়ে এবং প্রকৃতির সম্বন্ধ রক্ষার জন্য এক অহিংস আন্দোলন করেছিলেন। ১৯৮০ থেকে ২০০৪ পর্যন্ত দীর্ঘ ব্যাপী ছিল এই আন্দোলন। পার্বত্য অঞ্চলে এপ্রকার বৃহৎ বাঁধ নির্মান স্বাভাবিক ভাবে এলাকাবাসীর মনে ভঙ্গুর বাস্তুতন্ত্রের চিন্তার সৃষ্টি করে ছিল, হিমালয়ের ভূমিকম্প-

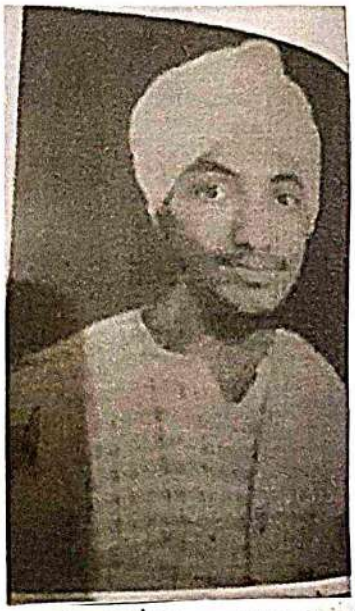


-প্রবন এলাকায় বাঁধ নির্মান অঞ্চলের মনে বিস্তীর্ন অঞ্চলে বন্যার ভয় সৃষ্টি করে, ১৯৭০ সালের মর্মান্তিক বন্যার কথা ভেবে এই বাঁধ নির্মানের বিরুদ্ধে বহুগুনা একটি স্লোগান লিখেছিলেন "बांध नहीं चाहिए, बांध पहाड का विनाश है" অর্থাৎ, আমাদের বাঁধ চাইনা, বাঁধ আমাদের ধ্বংস করে। এই আন্দোলন পূর্নতা পায়নি ১০ লক্ষের অধিক মানুষকে স্থানান্তর করা হয় এবং বাঁধ নির্মান করা হয়। ১৯৯৮ সালের ১৫ জুন তেহেরি বাঁধের ফাটল নিয়ে নিরাপত্তার প্রশ্নও উঠেছিল, তাই গাছের উপর ভরসা থাকে প্রত্যেকের যা ভূমিধস এবং বন্যার হাত থেকে বাঁচাতে পারে, তাই বৃক্ষ সংরক্ষন এবং চিপকো আন্দোলন খুব পরম্পরায় ছড়িয়ে পড়ে। এই তেহেরি বাঁধ নির্মান হওয়ায় বহুগুনা সরকার প্রদত্ত 'পদ্মশ্রী' পুরস্কার প্রত্যাখ্যান করেন এবং শেষ নিশ্বাস পর্যন্ত অকুণ্ঠায়নের বার্তা দিয়ে যান,

• সুন্দরলাল বহুগুনা ও চিপকো আন্দোলন:

ভারতের বুকে জন্ম গ্রহণ করা পরিবেশপ্রেমী বহুগুনা সমগ্র হিমালয় বেল্ট সংরক্ষণের জন্য সম্মিলিত এবং ব্যবহারিক পদ্ধতির পক্ষে ছিলেন, সমগ্র হিমালয় বেল্ট অর্থাৎ, উত্তর ভারতের কাশ্মীর থেকে পূর্ব ভারতের কোহিমা পর্যন্ত প্রায় ৪,৭০০ কিলোমিটার পথ তিনি পায়ে হেঁটে ছিলেন, তিনি কেবল একজন পরিবেশবিদ এবং খুব সাধারণ জীবনযাপনের মানুষ ছিলেন। সুন্দর লাল বহুগুনা গাছকে আলিঙ্গন করতে শিখিয়েছেন।

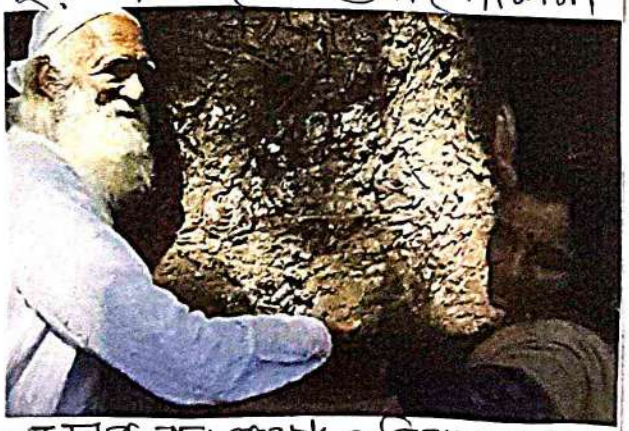
"We are doing violence towards the earth, towards nature. We have become butchers of nature." তিনি এক সাক্ষাৎকারে বলেছিলেন।



যুবক বহুগুনার দুষ্প্রাপ্য চিত্র

▪ ১৯৭০ সালে উত্তরাখণ্ডে এক বিধ্বংসী বন্যা হয়। গ্রামবাসীর সবকিছু কেড়ে নেওয়া এই দুর্যোগের মূল ছিল, বন উদ্ভাত। তারা বুঝতে পারে বনাঞ্চল ধ্বংসই ছিল ভূমিধ্বস ও বন্যার ফলে হওয়া ক্ষয় ক্ষতি, এই কারণে, সুন্দর লাল বহুগুনার নেতৃত্বে এবং গৌরা দেবীর সহায়তায় শুরু হয় চিপকো আন্দোলন,

১৯৭৩ সালে মহিলা এবং যুব সমাজ গাছকে আলিঙ্গন করে শুরু করে চিপকো আন্দোলন, ২০২১ সালের ২১ মে বহুগুনা কোরোনা আক্রান্তে মারা যান,



সুন্দর লাল বহুগুনা ও বিমলা বহুগুনা

• **গৌরা দেবী :** আলোয়াল হিমালয়ের গ্রামের মেয়ে এই গৌরা দেবী ছিলেন পরিবেশকর্মী এবং গ্রামীন মহিলা সম্প্রদায়ের নেত্রী। চিপকো আন্দোলনে বহুজনার অগ্রণী হিসাবে গৌরা দেবীর নাম আজও চিরস্মরণীয়।

১৯২৫ সালে অবিভক্ত উত্তরাখন্ড রাজ্যের, চামোলি জেলার লতা গ্রামে জন্ম গ্রহন করেছিলেন। বিবাহের পর তিনি অলকানন্দা নদীর তীরবর্তী একটি গ্রাম রেনিতে চলে এসেছিলেন, মাত্র ২২ বছর বয়সে তিনি একটি সন্তান সহ বিধবা হয়ে ছিলেন, পরবর্তীতে পরিবেশ রক্ষার জন্য তিনি ওই গ্রামের মহিলাদের নিয়ে মহিলা মঙ্গল সমিতি গড়ে তুলে ছিলেন।

তথা কথিত নিরক্ষর হওয়া সত্ত্বেও তাঁর অদম্য সাহস এবং পরিবেশের প্রতি নিঃস্বার্থ ভালোবাসা তাঁকে হিমালয় তথা বিশ্বের পরিবেশবিদ মহলে বিশেষ ভাবে বন্দিত করে তুলেছে।

১৯৮৬ সালে তিনি প্রথম পরিবেশ-বান্ধব সম্মানে ভূষিতা হয়েছিলেন, পরবর্তীতে তিনি দশোলি গ্রাম স্বরাজ্য মন্ডলের পঞ্চায়েত প্রধান এবং ৩০ টির বেশি মহিলা দলের দলনেত্রী ছিলেন।

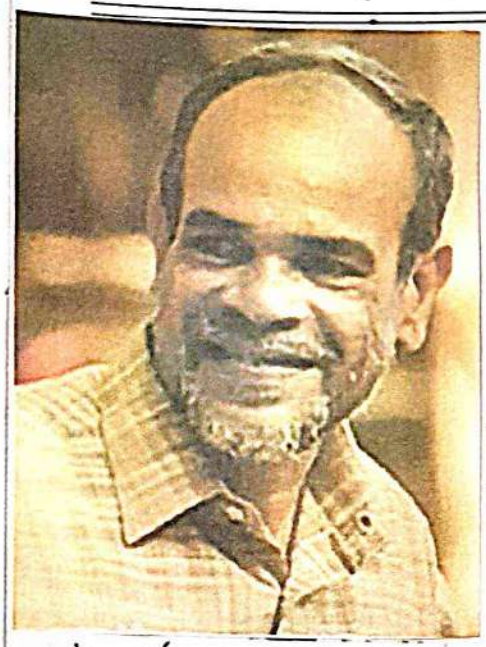
অনুপ্রেরনা শীল মহিলা, গৌরা দেবী ছিলেন চিপকো আন্দোলনের জননী।

• গৌরা দেবী : চিপকো আন্দোলনের জননী

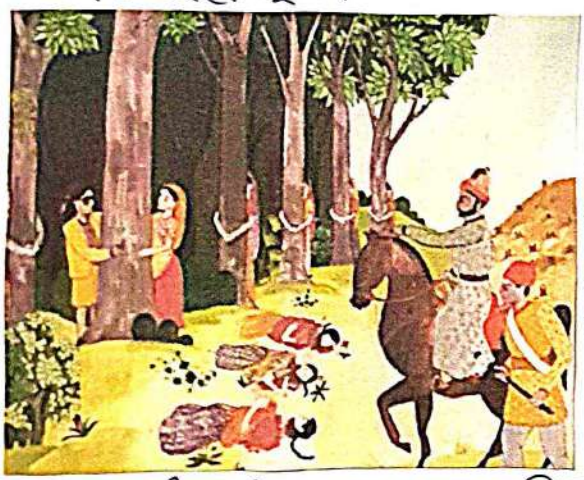
চিপকো আন্দোলন মূলতঃ মহিলা প্রধান আন্দোলন, এই আন্দোলন গৌরা দেবী গ্রামের ২৭ জন মহিলা নিয়ে শুরু করেন, ১৯৭৪ সালে ২৪৫৯ টা গাছ কাটার ঘটনা প্রকাশ পায় এবং গৌরা দেবী ২৩ মার্চ রেনি গ্রামে এক সভা (ও কালীন) এই না করে গভীর গৌরা দেবী এবং গাছকে জড়িয়ে চিৎকার করতে থাকে "আগে আমাদের আমাদের গায়ের ওপর কাটবে," সবাই গাছ আগলে রাখে এবং সরকারী কর্মী দের সাবধান করে বলে গাছ কাটতে আগে তাদেরও কাটতে হবে, গৌরা দেবীর নেতৃত্বে এই চিপকো আন্দোলন দমনের জন্য এক সরকারী কর্মী তাঁর উপর থুথু ফেলেন, কিন্তু প্রত্যেকেই এই আন্দোলন এবং গৌরা দেবীর সাহস ও বিশ্বাসকে দমন করতে পারেনি।

গৌরা দেবী চিপকো আন্দোলনের পাশাপাশি আন্দোলন তোলেন সারও অন্যান্য আন্দোলনের, তিনি গাছ কাটা এবং বহুমূল্য গাছের চোরা চালানের বিরুদ্ধে বহু আন্দোলন করে ছিলেন, হিমালয়ের ভূমি কন্যা পরিবেশ বান্ধব হিসাবে সারা বিশ্বব্যাপী নাম করলেন এবং পরিচিত হলেন চিপকো জননী নামে, ৬৬ বছর বয়সে ৪ জুলাই ১৯৯১ সালে গৌরা দেবী মারা যান এবং চিপকো আন্দোলনে নারীশক্তির অবদান রেখে যান,

• **চিপকো আন্দোলনের প্রভাব :** ১৯৭৩ সালে সূচিত চিপকো আন্দোলন কেবল মাত্র উত্তর ভারতেই থেমে ছিলনা, ঠিক দশ বছর পর সুদূর দক্ষিণ ভারতের কর্নাটকের সালকনির কাললসে অঞ্চলে স্ত্রী-পুরুষ নির্বিশেষে প্রত্যেকে আপ্পিকো আন্দোলন শুরু করেন, স্থানীয় কন্নড় ভাষায় 'আলিঙ্গন' কে "আপ্পিকো" বলা হয়, ১৯৮৩ সালের সেপ্টেম্বর মাসে হুক্কা এই আপ্পিকো আন্দোলন সমস্ত দক্ষিণ ভারতের প্রথম পরিবেশ প্রেমের পরিচয় দেয়, আপ্পিকো আন্দোলনের নেতা ছিলেন "পান্ডুরঙ্গ হেগড়ে" (১৯৫৫-), সুন্দরলাল বহুগুণার দ্বারা অনুপ্রানীত হয়ে পান্ডুরঙ্গ দক্ষিণ ভারতে এই আন্দোলনের সূচনা করেন, ১৯৮০ সালে যথেচ্ছ গাছ কাটা, বাঁধ নির্মান, নজরায়ন প্রভৃতির বিরুদ্ধে এই আন্দোলন করা হয়েছিল,



পান্ডুরঙ্গ হেগড়ে



১৭৩১সালে ঘটিত এই ঘটনা খেজরলি গণহত্যা নামে পরিচিত (রাজস্থানের খেজরি বৃক্ষ রক্ষা)

অমৃতা দেবী কর্তৃক ভারতের প্রথম চিপকো আন্দোলন

আপ্পিকো আন্দোলন

• **উপসংহার :** অমৃতা দেবী সহিত ৩৫২ জনের স্মৃত্যুর খেজরলি গণহত্যা, চিপকো আন্দোলন বা আপ্পিকো আন্দোলন এগুলোই উঃ বাদ দিয়ে যায় পরিবেশ রক্ষার জন্য গাছ বাঁচানো সবচেয়ে গুরুত্বপূর্ণ। ১৯৭৩, ১৭৩১, ১৯৮৩ থেকে বা ২০২১ সাল পর্যন্ত গাছ লাগান, প্রাণ ও পরিবেশ দুই বাঁচান॥

বর্তমানে অব্যহত চিপকো ধারা

• **ঋণ স্বীকার:** প্রকল্পের কাজ মানে অনেকের সাহায্য নিতেই হয়। আমার এই প্রকল্পে আমার শিক্ষকের অবদান অনস্বীকার্য এছাড়াও, আরও তথ্য উপস্থিত করতে আমি Internet মাধ্যম এবং website এর সাহায্য নিয়েছি।

- Page 2 & 3 : www.his00.blogspot.com (2016)
- Page 4 : www.indianexpress.com (26th Mar, 2018)
  The Power that Nourishes: The Chipko Movement in India [Renae Sullivan : April, 2014]
- Page 5 : www.india.mongabay.com (27th May, 2021)
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  www.jstor.org (Vol 44)
- Page 7 : www.downtoearth.org.in (21-27th Feb, 2009)
- Page 8 & 9: www.himalayanbuzz.com (Sanya Anya)
- Page 10 : www.culturalsurvival.org (June, 1989)

এছাড়াও, ছাদশ শ্রেণীর ইতিহাস প্রকল্প, জাতীয় TV চ্যানেল "Epic TV" -এর দুটি ধারাবাহিক থেকে ও Wikipedia থেকে কিছু তথ্য নিয়েছি।

Thank You

Sandeep Das
02.07.2021
SANDEEP DAS

Topic Name – Sound Pollution

Name – Ritisha Sarkar

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No. of Pages written – 13

Sound Pollution

Noise Pollution, also Known as environmental noise or Sound Pollution, is the Propagation of noise with ranging impacts on the activity of human or animal life, most of them harmful to a degree. The Source of outdoor noise worldwide is mainly caused by machines, transport, and Propagation systems. Poor urban Planning may give rise to noise disintegration or Pollution, side-by-side industrial and residential buildings can result in noise Pollution in the residential areas. Some of the main Sources of noise in residential areas include loud music, transportation (traffic, rail, airplanes, etc.), lawn care maintenance, construction, electrical generators, explosions, and people.

Documented Problems associated with noise in urban environments go back as far as ancient Rome. Today, the average noise level of 98 decibels (dB) exceeds the WHO value of 50 dB allowed for residential areas. Research suggests that noise pollution the united States is the highest in low-income and racial minority neighborhood, and noise Pollution associated with household electricity generators is an emerging environmental degradation in many developing nations.

High noise levels can contribute to cardiovascular effects in human and an increased incidence of coronary artery disease. In animals, noise can increase the risk of death by altering Predator or Prey detection and avoidance, interfere with reproduction and navigation, and contribute to Permanent hearing loss.

A substantial amount of the noise that humans produce occurs in the ocean. Up until recently, most research on noise impacts has been focused on marine mammals, and to a lesser degree, fish. In the past few years, scientists have shifted to conducting studies on invertebrates and their responses to anthropogenic sounds in the marine environment. This research is essential, especially considering that invertebrates make up 75% of marine species, and thus compose a large percentage of ocean food webs. Of the studies that have been conducted, a sizable variety in families of invertebrates have been represented in the research. A variation in the complexity of their sensory systems exists, which allows scientists to study a range of characteristics and develop a better

understanding of anthropogenic noise impacts on living organisms.

■ Ambient air quality standards in respect of noise for different areas/zones –

- The ambient air quality standards in respect of noise for different areas/zones shall be such as specified in the schedule annexed to these rules.
- The State Government shall categorize the areas into industrial, commercial, residential or silence areas/zones for the purpose of implementation of noise standards for different areas.
- The State Government shall take measures for abatement of noise including noise emanating from vehicular movements and ensure that the existing noise levels do not exceed the ambient air quality standards specified under these rules.

- All development authorities, local bodies and other concerned authorities while planning developmental activity or carrying out functions relating to town and country planning shall take into consideration all aspects of noise pollution as a parameter of quality of life to avoid noise menace and to achieve the objective of maintaining the ambient air quality standards in respect of noise.
- An area comprising not less than 100 metres around hospitals, educational institutions and courts may be declared as silence area/zone for the purpose of these rules.

■ Responsibility as to enforcement of noise pollution control measures —

- The noise levels in any area/zone shall not exceed the ambient air quality standards in respect of noise as specified in the schedule.

- The authority shall be responsible for the enforcement of noise pollution control measures and the due compliance of the ambient air quality standards in respect of noise.

■ Restrictions on the use of loud speakers / Public address system —

- A loud speaker or a public address system shall not be used except after obtaining written permisson from the authority.
- A loud speaker or a public address system shall not be used at night (between) 10:00 p.m. to 6:00 a.m. except in closed premises for communication within, e.g. auditoria conference rooms, community halls and banquet halls.
- Notwithstanding any thing contained in sub-rule (2), the state Government may subject to such terms and conditions

as are necessary to reduce noise pollution, permit use of loud speakers or Public Address system during night hours (between 10:00 P.m. to 12:00 midnight) on or during any cultural or religious festive occasion of a limited duration not exceeding fifteen days in all during a calendar year.

■ Consequences of any violation in Slience zone / area —

Whoever, in any place covered under the Slience zone / area commits any of the following offence, he shall be liable for Penality under the Provisions of the act:-

- whoever, Plays any music or uses any Sound amplifiers,
- whoever, beats a drum or tom-tom or blows a horn either musical or Pressure, or trumpet or beats or sounds any instrument, or

- whoever, exhibits any mimetic, musical or other performances of a nature to attract crowds.

■ Complaints to be made to the authority-

- A person may, if the noise level exceeds the ambient noise standards by 10 dB (A) or more given in the corresponding columns against any area/zone, make a complaint to the authority.
- The authority shall act on the complaint and take action against the violator in accordance with the provisions of these rules and any other law in force.

■ Power to Prohibit etc. Continuance of music sound or noise —

If the authority is satisfied from the report of an officer incharge of a police station or other information received by him that it is necessary to do so in order to prevent annoyance, discomfort or injury or risk of annoyance, disturbance, discomfort or injury to the public or to any person who dwell or occupy property on the vicinity, he may, by a written order issue such directions as the may consider necessary to any person for preventing, prohibiting, controlling or regulating :—

- The incidence or continuance in or upon any premises of -
- any vocal or instrumental music,

- sounds caused by playing, beating, clashing, blowing or use in any manner whatsoever of any instrument including loudspeakers, public address systems, appliance or apparatus or contrivance which is capable of producing or reproducing sound, or
- the carrying on in or upon, any premises of any trade, avocation or operation or process resulting in or attended with noise.

The authority empowered under sub-rule (1) may, either on its own motion, or on the application of any person aggrieved by an order made under sub-rule (1), either on its rescind, modify or alter any such order:

Provided that before any such application is disposed of, the said authority shall afford to the applicant an opportunity of appearing before it either in person or by a person representing him and showing cause against the order and shall, if it rejects any such application either wholly or in part, record its reasons for such rejection.

- Reference :- CBCP

Conclusion

It was a wonderful learning experience for me while working on this Project. This Project has developed my thinking skills related to the topics. This Project gave me real insight into the Environmental world.

I enjoyed each and every bit work I had Put into this Project.

Thank You

Ritisha Sarkar
(Ritisha Sarkar)
Date: 05/07/2021

(Debashis Ghosh)
Date: 05/07/2021

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COLLEGE ROLL :- SANA20F693
PAGES NO. :- 9

AIR POLLUTION

Introduction:-

Air pollution is the introduction into the atmosphere of chemicals particulates or biological materials that cause discomfort, desease, or death to humans damage other living organisms such as food ~~etc~~ crops or damage the natural environment or built enviroment.

A substance in the air that can be adverse to humans and the environment is known as an air pollutants can be in the form of solid particles liquid droplets, or gases. In addition, they may be natural or man-made. Pollutants can be classified as primary or secondary. Usually, primary pollutants are directly produced from a process, such as ash from a volcanic eruption, the carbon monoxide gas a motor vehicle exhaust or sulphur dioxide released from factories. Secondary pollutants are not emitted directly. Rather, they form in the air when primary pollutants react or interact. An important example of a secondary pollutant is ground level ozone - one of the many secondary pollutants that make up photochemical smog. Some pollutants may be both primary and secondary: that is, ~~that~~ they are both emitted directly and formed from other primary pollutants.

Major primary pollutants produced by human activity include :-

- Sulphur oxides (SO_x) - Especially sulphur dioxide, a chemical compound with the formula SO_2. SO_2 is produced by volcanoes and in various industrial processes. Since coal and petroleum often contain sulphur compound, their combustion generates sulfur dioxide. Further oxidation of SO_2 usually in the presence of a catalyst such as NO_2, forms H_2SO_4 and thus acid rain. This is one of the causes for concern over the environmental impact of the use of these fuels as power sources.

- Nitrogen oxides :- (NO_x) especially nitrogen dioxide are expelled from high temperature combustion, and are also produced naturally during thunderstorms by electric discharge. can be seen as the brown haze dome above or plume downwind of cities. Nitrogen dioxide is the chemical compound with the formula NO_2. It is one of the several nitrogen oxides. This reddish brown toxic gas has a characteristic sharp, biting odor. NO_2 is one of the most prominent air pollutants.

- Carbon monoxide :- (CO) is a colorless, odourless, non irritating but very poisonous gas. It is a product by incomplete combustion of fuel such as natural gas coal or wood. Vehicular exhaust is a major source of carbon monoxide.

Particulates :- Alternatively referred to as particular matter, atmospheric particulate matter, or fine particles, are tiny particles of solid or liquid suspended in a gas. In contrast, ~~or~~ aerosol refers to particles and the gas together. Sources of particulates can be manmade or natural. Some particulates occur naturally originating from volcanoes, dust ~~storm~~ storms, forest and grassland fires, living vegetation and sea spray. Human activitys such as the burning of fossil fuels in vehicles, power plants and various industrial processes also genereate ~~sign~~ significant amounts of aerosols. Averaged over the globe, anthropogenic ~~or~~ aerosole – those made by human activitys – currently account for about 10% of the total amount of aerosols in our atmosphere. Increased ~~le~~ levels of fine particales in the air are linked to ~~health~~ health hazards such as heart disease, altered lung function and lung cancer.

Persistent free radicals connected to airborne fine particles could cause cardiopulmonary disease.

Secondary pollutants include :-

- Particulates created from gaseous primary pollutants and compounds in photochemical smog. Smog is a kind of air pollution the word ~~Smog~~ "smog" is a ~~port~~ portmanteau of ~~an~~ smoke and fog. classic smog results from large amounts of coal burning in an area caused by mixture

of smoke and sulphur dioxide. Modern smog does not usually come from coal but from vehicular and industrial emissions that are acted on in the atmosphere by ultraviolet light from the sun to form secondary pollutant that also combian with the primary emissions to form photochemical smog.

- Ground level ozon (O_3) is formed from NO_x and VOCs. Ozone is a key constituent of the tropospher. It is also an important constituent of certain regions of the stratospher commonly know as the ozone layer. Photochemical and chemical reations involving it drive many of the chemical processes that occur in the atmosphere by day and by night. At abnormally high concentrations brought about by human activitys (largely the combustion of fossil fule), it is a pollutant and a constituend of smog.

Causes: Factors Responsible for air pollution

Air pollution can result from both human and natural actions. Natural events that pollute the air include forest fires, volcanic eruptions, wind erosion, pollen dispersal, evaporation of organic compounds and natural radioactivity. Sources of air pollution refer to the verious locations, activitys or factors which are responsible for the releasing of pollutants into the atmosphere.

Man-made sources:-

- "Stationary sources" include smoke stacks of power plants, manufacturing facilities and waste incinerators, as well as furnaces and other types of fule-burning heating divices. In developing and poor ~~con~~ countries traditional biomass burning is the major source of air pollutants; traditional biomass include wood, crop waste and dung.

- "Mobile sources" include motor vehicles, marine vessels, aircraft and the effect of sound etc.

- Chemicals, dust and controlled burn practices in agriculture and ~~fro~~ forestry management. Controlled or prescribed burning is a technique sometimes used in forest managment, farming prairia restoration or greenhouse gas abatement. Fire is a natural part of both ~~fro~~ forest and grassland ecology and controlled fire can be a tool for foresters. Controlled burning ~~stimu~~ stimulates the germination of some desirable forest trees, thus renewing the forest.

- Fumes ~~fr~~ from paint, hair spray, varnish, aresol sprays and other solvents.

- Waste deposition in landfills, which generate methane. Methane is highly flammable and may form explosive mixture with air.

- Milibry, such as nuclear weapons, toxic gasses gram warfear and racketry.

Natural sources

- Dust from natural sources, usually large areas of land with few or no vegetation.
- Methane, emitted by the digestion of food by animals, for example cattle.
- Radon gas from radioactive decay within the Earth's crust. Radon is a colorless, odorless, naturally occurring, radioactive noble gas that is formed from the decay of radium. It is considered to be a health hazard. Radon gas from natural sources can accumulate in buildings, especially in confined areas such as the basement and it is the second most frequent cause of lung cancer, after cigarette smoking.
- Volcanic activity, which produce sulfur, chlorine and ash particulates.

Consequences: Effects of Air pollution

Health Effects

Air pollution is a significant risk factor for multiple health conditions including respiratory infections, heard disease, and lung cancer, according to the WHO. The health effects caused by air pollution may include difficulty in

breathing, wheezing, coughing asthma and aggravation of existing respiratory and cardiac conditions. These effects can result in increased medication use, increased doctor or emergency room visits, more hospital admission and premature death. The heavier bed principally affect the ~~lungs~~ body's respiratory system and the cardiovascular system. Individual health effects of poor air quality are far reaching reactions to air ~~pollute~~ pollutants depend on the type of pollutant a person is exposed to, the degree of exposure, the individual's health status and genetics.

The most common sources of air pollution include particulates, ozone, nitrogen dioxide, and sulfur dioxide. Both indoor and outdoor air pollution have caused approximately 3.3 million death worldwide. children aged less than five years that live in developing ~~con~~ countries are the most ~~vulne~~ vulnerable population in ~~te~~ terms of ~~total~~ total ~~de~~ deaths attributable to indoor and outdoor pollution. The world Health organization states that 2.4 million people die each year from causes directly attributable to air pollution, with 1.5 million of these deaths attributable to indoor air pollution.

The ~~worst~~ worst short term civilian pollution crises, in ~~and~~ India was the 1984 Bhopal Disaster. Leaked industrial vapours from the Union Carbide factory belonging to union Carbide Inc, USA killed more then 25,000 ~~people~~ people ~~de~~

outbreaks and injured ~~and~~ anywhere from 150,000 to 600,000. The United Kingdom suffered its ~~worse~~ worst air pollution even when the December 4 Great Smog of 1952 formed over London. In six day more than 4,000 died, and 8,000 more died within the following months. An accidental ~~to~~ leak of anthrax spors from a biological warfare laboratory in the former USSR in 1979 near Sverdlovsk is believed to have been the cause of hundreds of civilian deaths.

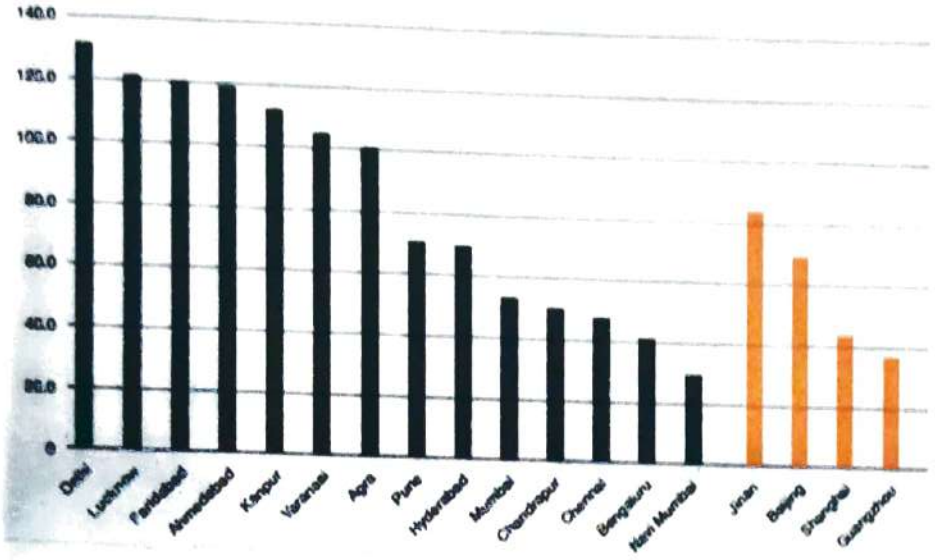
Control: Measures to reduce Air pollution

Solution effects on pollution are always a big problem. This is why prevention interventions are always a better way of controlling air pollution. These prevention methods can either come from government (laws) or by actions. In many big cities monetoring equipments ~~have~~ have been installed at many points in the city. Authorities read them regularly to check the quality of air.

Government (or community) level prevention

- Governments throughout the world have already taken action against air pollution by introducing green energy. Some governments are investing in wind energy and solar energy, as well as other renewable energy, to minimize burning of fossil fuels, which cause heavy air pollution.

Comparing July-November average $PM_{2.5}$ levels in Chinese and Indian cities



ENTIRE NATION IN POLLUTION GRIP

India's five hotspots identified in report

- Largest hotspot are the stretches in Punjab, Haryana & eastern Uttar Pradesh
- *Second hotspot covers the rural areas of Bihar, West Bengal*
- Third hotspot includes areas in Orissa and Chhattisgarh
- *Fourth hotspot covers some areas of Gujarat and Maharashtra*
- Fifth hotspot covers areas in Andhra Pradesh

Health Hazards of PM

- Particles in the PM2.5 size range are capable of reaching deep inside the respiratory tract and harming the lungs
- *Exposure to fine particles can cause irritation in eyes, nose, throat and lungs & can cause coughing, sneezing, runny nose and shortness of breath*
- It can also affect lung functioning and worsen medical conditions such as asthma and heart disease
- *Studies also suggest that long term exposure to fine PM may be associated with increased rates of chronic bronchitis and increase in deaths because of lung & heart disease*
- Scientists have linked the exposure with increased cardiovascular cases in hospital and emergency department visits & deaths

- Governments are also forcing companies to be more responsible with their manufacturing activities, so that even though they still cause pollution, they are a lot controlled.

- Companies are also building more energy efficient cars which pollute less then before.

Conclusion

Air pollution can be prevented only if individuals and businesses stop using toxic substances that cause air pollution in the first place. This would require the cessation of all fossil fuel burning processes, from industrial manufacturing to home use of air conditioners. This is an unlikely scenario at this time. However we have to make rules which set stringent regulations on industrial and power supply manufacturing and handling. The regulations core to be designed to further reduce ~~the~~ harmful emissions into the Earth's atmosphere.

References:-

1. http://en.wikipedia.org/wiki/Air_pollution
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PROJECT TITEL - WATER POLLUTION

SUBJECT - ENVS

Introducation

Water is one of the renewable resources essential for sustaining all forms of life, food Production, economic development, and for general well being. It is impossible to substitute for most of its, difficult to de pallute, expensive to transport. and it is truly a unique gift to mankind from nature. water is also one of the most manageable natural resources as it is capable of diversion, transport, storge, and recycling. All these properties impart to water its great utility for human beings. The surface water and groundwater resources of the contry play a major role in agriculture, hydropower generation, livestock Production, industrial activities, forestry, fisheries navigation recreational activities etc. The freshwater ecosystem of the warld comprise only about 0.5% of the earth's surface and have a volume of $2.84 \times 105\ km^3$. Rivers constitute an insignificant amount (0.1) of the land surface only 0.01% of the water of the earth occur in river channels. Inspite of

these low quantities running waters are of enormous significance (Wetzel, 2001). India receives annual precipitation of about 4000 km³, including snowfall. out of this, monsoon rainfall is of the order of 3000 km³. Rainfall in India is dependent on the south-west and nourth-east monsoons, on shallow cyclonic depressions and disturbances and on local storms (kumar et. al., 2005). Most of it takes place under the influence of south-west monsoon between June and September except in Tamil Nadu, where it is under the influence of Nourth-east monsoon during October and November (kumar et. al., 2005). India is gifted with river system comprising more than 20 year major rivers with several tributaries. Many of these rivers are Perennial and some of them are seasonal. Although, India occupies only 3.29 million km² geographical area, constituting 2.4% of the world's land area, it supports over 15% of the world's population. The population of India as on 1st march

2001 stood at 1,027,015,247 persons. Thus, India supports about 1/6th of world population 1/50th of world's land and 1/25th of world's water resources (Water Management Forum, 2003). In the last few decades, there has been a tremendous increase in the demand for freshwater due to rapid growth of population and the accelerated pace of industrialization (Ramakrishnaiah et al., 2009). Human health is threatened by most of the agricultural development activities particularly in relation to excessive application of fertilizers and unsanitary condition (Okeke and Igboanua 2003). Anthropogenic activities related to extensive urbanization, agricultural practices, industrialization, and population expansion have led to water quality deterioration in many parts of the world (Baig et al. 2009, Mian et al., 2010, Wang et al., 2010). In addition, deficient water resources have

restraine water pollution control and water quality improvement (Bu et al., 2010). Water pollution has been a research focus for government and scientists. Therefore, protecting water quality is extremely urgent because of serious water pollution and global scarcity of water resources

Sources of Water Pollution:

Water pollution can occur from two source. 1. Point source and 2. Non-Point Source (Table 1). Point source of pollution are those which have direct indentifiable source. Example includes pipe attached to a factory, oil spill from a tanker, effluents coming out from industries. Point source of pollution include wastewater effluent (both municipal and industrial) and storm sewer discharge and affect mostly the area near it. Whereas non-point source of pollution are those which arrive from different source of origin and number of ways by which contaminants enter into groundwater or surface water and arrive in the environment from different non identifiable

on surface water and arrive in the environment from different non indentifiable source. Examplaare runoff from agricultural fields, urban waste etc. Sometimes pollution that enters the environment in one place has an effect hundreds or even thousands of miles away. This is known as transboundary pollution one example is the radioactive west that travels through the oceans from nuclear reprocessing plants to nearby countries. Water pollutants may be i) organic and ii) Inorganic water pollutant.

i: Organic water pollutant: They comprise of insecticides and herbicides, organohalides and other forms of chemicals; bacteria from sewage and livestocks farming; food processing wastes Pathogens; volatile organic compounds, etc.

2. Inorganic water pollutant: They may arise from heavy mental from acid mine

paint source	Nonpaint source
- wastwater effluent (munipal and industrial) - Runoff and leachate from wast disposal sites - Runoff and infiltration from animal fed lots - Runoff from mines, oil fields. unsewered industrial Site - storm sewer outfalls from Cities with a population > 100,00 - overflows of combined storm and sanitrary Sewers - Runoff from construction Sites > 2 ha.	- Runoff from agriculture (including return flow from irrigated agriculture) - Runoff from pasture and range - Urban runoff unsewered and sewered areas with a population < 100,000 Septic tank leachate and runoff from feild Septic system - Runoff from construction Sites - Runoff from abandoned mine - Atmospheric deposition over a water surface - Activities on land that generate contaminants such as logging. wetland conversion construction. and development of land or water ways

Some of the important source of water pollution are discussed below: Urbanization: Urbanization generally leads to higher phosphorus concentrations in urban catchments (Paul and Meyer, 2001). Increasing imperviousness, increased runoff from urbanized surfaces, and increased municipal and industrial discharges all result in increased loadings of nutrients to urban streams This Makes urbanization second only to agriculture as the major cause of stream impairment.

Sewage and other Oxygen Demanding wastes:

Management of solid waste is not successful due to huge volumes of organic and non-biodegradable wastes generated daily. As a consequence, garbage in most part of India is unscientifically disposed and ultimately leads to increase in the pollutant load of surface and ground water courses. Sewage can be a fertilizer as it releases important nutrient to the environment such a nitrogen and phosphorus which plant and animal need for growth. Chemical fertilizer used by farmes also add nutorient to the soil

which drain into rivers and seas and dald to the fertilizing effect of the sewage. Together, sewage and fertilizers can cause a massive increase in the growth of algae or plankton that facilitate huge area of oceans. lakes. or rivers creating a condition known as algal bloom thereby reducing the dissolved oxygen content of water and killing other forms life like fish.

Industrial Wastes: Many of the industries are situated along the banks of river Such as steel and paper industries for their requirement of huge amount of water in manufacturing processes and finally their wastes containing acids, alkalies, dyes and other chemicals are dumped and poured down into river as effluents. Chemical industries concerning with manufacture of Aluminium release large amount of fluoride through their emissions to air and effluents to water bodies fertilizer industries generate huge amount of ammonia whereas steel plants generate cyanide

Chromium salt are used in industrial process for the production of sodium dichromate and other compounds containing chromium. All such discharges finally arrive at water bodies in the form of effluents affecting human health and the organism living there.

Agro-chemical wastes: In the agriculture sector, water and electricity for irrigation are subsidized for political reasons. This leads to wasteful flood irrigation rather than adoption of more optimal practies such as sprinkler and drip irrigation cropping Patterns and farming practices also do not necessarily encourage the judicious use of water. There are losses of water due to breaches and seepage resulting in water logging and salinity. Agro chemical wastes include fertilizers. Pesticides which may be herbicides and insecticides widely used in crop fields to enhans productivity. Improper disposal of Pesticides from field farms and

agricultural activities contributes a lot of pollutant to water bodies and soils. Some of the pesticides are: DDT, Aldrin, Dieldrin. Malathion, Hexachlore Benzene etc. Pesticides reach water bodies through surface runoff from agricultural fields, drifting from spraying, washing down of precipitation and direct dusting and spraying of pesticides in low lying areas polluting the water quality. Most of them are non-biodegradable and persistent in the environment for long period of time. These chemicals may reach human through food chain leding to biomagnification.

Nutrient enrichment: The source of nutrients in surface water can be divided broadly into natural and anthropogenic types. Contribution to pollution by natural source is low due to blance established by the natural system between the production and consumption of nutrients over the course of time. Anthropogenic sources of contaminant are contributed from agriculture, domestic and industrial wastes. Nutrient concentration in streams and rivers have been strongly correlated with human land use and disturbance gradients. Both N and p enrichment have links with the agricultural and urban land uses in the watershed. Fluxes of Total N in temperent-zone River surrounding the North Atlantic Ocean

highly correlated with net anthropogenic input of N in these watersheds (Howarth et al., 1996). Total N and nitrate fluxes and concentrations in rivers are also correlated with human population density (Howarth et al., 1996). Nitrogen fertilization is the main source of N in streams and river (Goolsby and Battaglin, 2001). Similarly, nutrient enrichment of aquatic system from anthropogenic sources includes point and nonpoint sources (Table 1. adapted from Carpenter et al., 1998). In contrast to point sources of nutrients that are relatively easy to monitor and regulate, nonpoint sources such as livestock, crop fertilizers, and urban runoff exhibit more spatial and temporal variability. Following strong regulation of point source inputs in response to the clean water Act, nutrients from nonpoint sources are now the major source of water pollution in the united states (Carpenter et al., 1998).

Thermal Pollution: Changes in water temperature adversely affect water quality and aquatic biota Majority of the thermal pollution in water is caused due to human activities. Some of the important sources of thermal pollution are nuclear power and electric power plant. Petroleum refineries, steel Melting factories

Coal fire power plant. boiles fooom industries which release large anount of heat to the wáter bodies leading to change in the physicdl, chenical and biological characterisfics of the receiving water bodies. High temperature declines the oxygen content of wates; disturbs the reproductive cycles respiratory and digestive rates anel other physiological changes causing difficulties for the aquatic life

Oil spillage: ail discharch into the surface of sea by way of accident or leakage from cargo tankers carrying petrol, diesel and thiis derivetives pallute sea water to a great extent Exploration of oil from offshore also lead to oil pallution in water. The rosivel oil spreads over the wates surface forming a thim layer of wates-in-oil emulsion.

The disruption of sediments: Construction of dans For hydroelectric power or water reservoirs @Can reduce the sediment flow affecting adversely the formation of beeches, increases caastal erosion and reduces the flow nutrients from river into seas (potentially redweing

coastal fish stocks). Increased sediment flow can also create a problem. During construction work. Soil, rock, and other fine powder sometimes enter nearby rivers in large quantities, causing water to become turbid (muddy or silted). The extra sediment can block the gills of fish causing them suffocation.

Acid rain pollution: Water pollution that alters a plants surrounding pH level, such as due to acid rain can harm or kill the plant. Atmospheric sulfur dioxide and nitrogen dioxide emitted from natural and human-made sources like volcanic activity and burning fossil fuels interact with atmospheric chemicals, including hydrogen and oxygen, to form sulfuric and nitric acids in the air. These acids fall down to earth through precipitation in the form of rain or snow. Once acid rain reaches the ground, it flows into waterways that carry its acidic compounds into water bodies. Acid rain that collects in aquatic environments lowers water pH levels an effects

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Bulet Mondal

B.A-HONS Sem-2

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Subject → AECC ENVS (TU)

Semester → II

Tutorial Topic → Soil Pollution

Soil Pollution

Human activities are the Primary cause of soil pollution and land degradation. By the end of this topic, you will know how different forms of human activities are responsible for the majority of different types of soil pollution.

Soil Soil Pollution & Posticides

Soil pollution has gradually become a major challenge that we need to overcome for establishing a healthy environment. Weathering of the earth's crusts by different processes leads to the formation of soil that accumulates over the centuries. The soil is the home for a large part of bacterial bio diversity and other microscopic and macroscopic living organisms.

However, let us consider our very own country India. Indian economy is largely dependent on agriculture. Thus, we Indians give very high priority to the development of agriculture, fisheries, and livestock.

Therefore, for surplus production, it is very important to protect crops from any type of damage that occurs due to insects, weeds, rodents and other crop diseases.

So, how do we protect crops? The very obvious answer is pesticides and herbicides. However, do you know these pesticides and herbicides is a leading cause of soil pollution? Therefore, it is very important to judiciously use pesticides because it contains lots of different harmful chemicals. Therefore, to improve soil and prevent soil pollution it is important to limit the use of pesticides and herbicides.

Causes of soil Erosion here.

Definition of Soil Pollution

Soil pollution refers to anything that causes contamination of soil and degrades the soil quality. It occurs when the pollutants causing the pollution reduce the quality of the soil and convert the soil inhabitable for microorganisms and macro organisms living in the soil.

Soil contamination or soil pollution can occur either because of human activities or because of natural processes. However, mostly it is due to human activities. The soil contamination can occur due to the presence of chemicals such as pesticides, herbicides, ammonia, petroleum hydrocarbons, lead, nitrate, mercury, naphthalene etc in an excess amount,

The primary cause of soil pollution is a lack of awareness in general people. Thus, due to many different human activites such as overuse of Pesicides the soil will lose its fertility. Moreover the presence of excess chemicals will increase the alkalinity or acidity of soil thus degrading the soil quality. This will in turn cause soil erosion. The soil erosion refers the soil pollution.

Cause Of Soil Pollution

Soil pollution can be natural or due to human activity. However, it mostly boils down to the activities of the human that causes the majority of soil pollution such as heavy industries, or Pesticides in agriculture.

Pesticides

Before World War II, the chemical nicotine chemical present in the tobacco plants was used as the pest controlling substance in agricultural practices.

However, DDT was found to be extremely useful for malaria control and as pest control of many insects during World War II. Therefore, it was used for controlling many diseases.

Industrial Pollution

The incorrect way of chemical waste disposal form different types of industries can cause contamination of soil. Human activities like this have led to acidfication of soil and contamination due to the disposal of industrial waste, heavy metals, toxic chemical, dumping oil and fuel, etc.

Inorganic Fertillzers

Excessive use of inoganic nitrogen fertilizers leds to acidification of soil and contaminate the agricultural soil. Also known as agrochemical pollution.

After Effect of Soil Pollution

Soil pollution is not only the problem in India but it is a global problem. It causes harmful effect on the soil and the environment at large. Contamination of soil will decrease the agricultural output of a land. Major soil pollution after effect are:

Inferior Crop Quality

It can decrease the quality of crop. Regular use of of chemical fertilizers, posticides will decrease the fertility of the soil at a rapid rate and alter the structure of the soil. This will lead to decreases in soil quality and poar quality of crops. Over the time the soil become less productive due to the accumulation of toxic chemicals in large quantity.

Harmful Effect on Human Heath

It will increase the exposure to toxic and harmful chemicals thus increasing health threats to people living nearby and on the degraded land. Living, working or playing in the contaminated soil can lead to respiratory diseases, skin diseases, and other diseases. Moreover, it can cause other heath Problems.

Water Sources Contamination

The surface run-off after raining will carry the polluted soil and enter into different water resour-ce. Thus, it can cause underground water contamination thereby causing water pollution. This water after contaimination is not fit for human as well as animal use due to the presence of toxic chemicals.

Negetive Impact on Ecosystem and Biodiversity

Soil pollution can cause an imbalance of the eco-system of the soil. The soil is an important habitat and is the hause of different type of microorganisms, animals, reptiles, mammals, birds and insects. Thus, soil pollution and negatively impact the lives of the living organisms and can result in the gradual death of many organisms. It can cause health threats to animals grazing

in the contaminated soil or microorganisms residing in the soil.

Therefore, human activities are responsible for the majority of the soil pollution. Without being aware we harm our own environment.

Therefore, it is very important to educate people around you the importance of environment if they are not aware. prevention of soil erosion will help to cease soil pollution. Thus, it is our small steps and activities that can help us to achive a healthier planet of us.

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PROJECT TITLE: GLOBAL-WARMING

Global Warming

1. Introduction.
2. What is Global Warming?
3. What causes Global Warming?
4. How is Global Warming linked to Extreme weather?
5. What are the other effects of Global warming?
6. Is the United States doing anything to prevent Global Warming?
7. Where does the United States stand in terms of global-warming contributors?
8. Solutions
9. Conclusion
10. References

Introduction

The continuous rise in temparature of the planet is really upsetting. The root cause for this is global warming. Global warming beigns when sunlight reaches the Earth. The clouds, atmospheric particles, reflective ground surfaces and surfaces of oceans then sends back about 30%. of sunlight back into the space, whilst the remaining is absorbed by oceans, air and land. Millions of pounds of methane gas are generated in landfills and agricultural decompo-sitions of biomass and animal manure. Nitrous oxide is released into the atmosphere by various nitrogen-based fertilizers including urea and diammonium phosphate and other soil management utilizations. Once released, these greenhouse gases stay in the atmosphere for decades or even longer. According to Intergovermental Panel on Climate Change (IPCC), carbon dioxide and methane levels have increased by 35% and 148% since the industrial revolution of 1750.

Q: What is global warming?

A: Since the Industrial Revolution, the global annual temperature has increased in total by a little more than 1 degree Celsius, or about 2 degrees Fahrenheit. Between 1880 — the year that accurate record keeping began — and 1980, it rose on average by 0.07 degrees Celsius (0.13 degrees Fahrenheit) every 10 years. Since 1981, however, the rate of increase has more than doubled: For that last 40 years, we've seen the global annual temperature rise by 0.18 degrees Celsius, or 0.32 degrees Fahrenheit, per decade.

The result? A planet that has never been hotter. Nine of the 10 warmest years since 1880 have occurred since 2005 — and the 5 warmest years on record have all occurred since 2015. Climate change deniers have argued that there has been a "pause" or a "slowdown" in rising global temperatures, but numerous studies, including a 2018 paper published in the journal Environmental Research Letters, have disproved this claim. The impacts of gobal warming are already harming people around the world.

Now climate scientists have concluded that we must limit global warming to 1.5 degrees Celsius by 2040 if we are to avoid a future in which everyday life around the world is marked by its worst, most devastating effects: the extreme droughts, wildfires, floods, tropical storms, and other disasters that we refer to collectively as climate change. These effects are felt by all people in one way or another but are experienced most acutely by the underprivileged, the economically marginalized, and people of color, for whom climate change is often a key driver of poverty, displacement, hunger and social unrest.

Q. What causes global warming?

A:→ Global warming occurs when carbon dioxide (CO_2) and other air pollutants collect in the atmosphere and absorb sunlight and solar radiation that have bounced off the earth's surface. Normally this radiation would escape into space, but these pollutants, which can last for years to centuries in the atmosphere, trap the heat and cause the planet to get hotter. These heat-trapping pollutants — specifically carbon dioxide, methane, nitrous oxide, water vapor and synthetic flourinated gases — are known as green house gases and their impact is called the greenhouse effect.

Though natural cycles and fluctuations have caused the earth's climate to change sveral times over the last 800,000 years, our current era of global warming is directly attributable to human activity —— specifically to our buring of fossils fuels such as coal, oil, gasoline, and natural gas, which results in the greenhouse effect. In the United States, the legest source of greenhouse gases is transportation (29 percent), followed closely by electricity production (28 percent) and industrial activity (22 percent).

Curbing dangerous climate change requires very deep cuts in emissions, as well as the use of alternatives to fossils fuels worldwide. The good news is that countries around the globe have formally committed — as part of the 2015 Paris Climate Agreement — to lower their emissions by setting new standards and crafting new policies to meet or even exceed those standards. The not-so-good news is that we're not working fast enough. For that to happen, the global community must take immediate, concrete steps: to decarbonize electricity generation by equitably transitioning from fossils fuel — based production to renewable energy sources like wind and solar; the electrify our cars and trucks; and to maximize energy efficiency in our buildings, appliances and industries.

Q. How is global warming linked to extreme weather?

A. Scientists agree that the earth's rising temperatures are feeling longer and hotter heat waves, more frequent droughts, havier rainfall, and more powerful hurricanes.

In 2015, for example, scientists concluded that a lengthy drought in California — the state's worst water shortage in 1,200 years — had been intensified by 15 to 20 percent by global warming. They also said the odds of similar droughts happening in the future had roughly doubled over the past century. And in 2016, the National Academics of Science, Engineering, and Medicine announced that we can now confidently attribute some extreme weather events, like heat waves, droughts and heavy percipitation, directly to climate change.

The earth's ocean temperatures are getting warmer, too — which means that tropical storms can pick up more energy. In other words, global warming has the ability to turn a category 3 storm into a more dangerous category 4 strom. In fact, scientists have found that the frequency of North Atlantic hurricane season has increased since the early 1980s, as has the number of storms that reach categories 4 and 5. The 2020 Atlantic hurricane season included a record breaking 30 tropical storms, 6 major hurricanes, and 13 hurricanes altogether. With increased intensity increased damage and death. The United States saw an unprecedented 22 weather and climate disaster that causes at least a billion dollars' worth of damage in 2020, but 2017 was the costliest on record and among the deadliest as well: Taken together, that year's tropical storms (including Hurricanes Harvey, Irma and Maria) caused nearly $300 billion in damage and led to more than 3,300 fatalities.

The impacts of global warming are being felt everywhere. Extreme heart waves have caused tens of thousands of deaths around the world in recent years. And in an alarming sign of events to come, Antartica has lost nearly four trillion metric tons of ice since the 1990s. The rate of loss could speed up if we keep burning fossils feul at our current pace, some experts say, next 50 to 150 years and weraking havoc on coastal communities worldwide.

Q. What are the other effects of global warming?

A. Each year scientists learn more about the consequences of global warming, and each year we also gain new evidence of its devastating impact on people and the planet. As the heat waves, droughts and floods associated with climate change become more frequent and more intense, communities suffer and death tolls rise. If we're unable to reduce our emissions, scientists believe that climate change could lead to the deaths of more than 250,000 people around the globe every year and force 100 million people into poverty by 2030.

Global warming is already taking a toll on the United States. And if we aren't able to get a handle on our emissions, here's just a smattering of what we can look forwa -rd to:

Disappearing glaciers, early snowmelt, and serve droughts will cause more dramatic water shortages and continue to increase the risk of wildfires in the American West.

Allergies, asthama and infections disease outbreaks will become more common due to increased growth of pollen - producing ragweed, higher levels of air pollution, and the spread of conditions favorable to pathogens and mosquitoes.

Through everyone is affected by climate change, not everyone is affected equally. Indigenous people, people of color, and the economically marginalized are typically hit the hardest. Inequities built into our housing, health care and labor systems make these communities more vulnerable to the worst impacts of climate change — even though these same communities have done the least to contribute to it.

Q. Is the United States doing anything to prevent global warming?

A. We've started. But in order to avoid the worsening effects of climate change, we need to do a lot more — together with other countries — to transition to clean energy sources.

Under the administration of President Donald Trump (a man who falsely referred to global warming as a "hoax"), the United States withdrew from the Paris Climate Agreement, rolled back or eliminated dozens of clean-air protections, and opened up federally managed lands, including culturally sacred national monuments, to fossil fuel development.

President Biden has made action on global warming a high priority. On his first day in office, he recommitted the United States to the Paris Climate Agreement, sending the world community a strong signal that we were determined to join other nations in cutting our carbon pollution to support the shared goal of preventing the average global temperature from rising more than 1.5 degrees Celcius above preindustrial levels. And significantly, the president has assembled a climate team of experts and advocates who have been tasked with pursuing action both abroad and at home while furthering the cause of environmental justice and investing in nature-based solutions.

9. Where does the United States stand in terms of global-warming contributors?

A. In recent years, China has taken the lead in global-warming pollution, producing about 26 percent of all CO_2 emmissions. The United States comes in second. Despite making up just 4 percent of the world's population, our nation produces a sobering 13 percent of all global CO_2 emissions — nearly as much as the European Union and India (third and fourth place) combined. And America is still number one, by far, in culative emissions over the past 150 years. As a top contributor to global warming, the United States has an obligation to help propel the world to a cleaner, safer and more equitable future. Our responsibility matters to other countries and it should matter to us, too.

Solutions

As elaborated earlier, toxic emmissions are a major cause of global warming. A likely solution to reduce harmful emissions is to cut the usage of vehicles which produce them. This has not been met with much success as many people refuse to cut down their practice of using cars. No doubt, some people have started to use bicycles and public transport, whereas some other prefer to walk but these numbers are relatively small. It should be noted that fuel economy and emmissions rates are chief factors to consider regarding the car choice. People shoud share the ride with friends or co-workers to reduce the local number of vehicles on the road. Print and social media can play an effective role in curbing the problem. It should use the philosophy of automobile advertisements to encourge drives to conserve energy and reduce pollution. Forest degradation and deforestation must be discourged at govt. level. Nuclear power is also a possible solution as this power results in fewer emissions but this method should be used with care as it can lead to severe accidents therefore, the major hurdle is to overcome the security, propagation, water disposal and high costs of Nuclear power if this method has to be made practical.

Conclusion

The scientific and enviornmental community is on the same page regarding the bitter reality of global warming and the involvement of human factor in it. The paper discussed here has only dented the surface of what is a very intricate line of scientific and engineering exploration. Global warming is a big hazard and appropriate measures must be taken to tackle this serious problem. This problem is not only causing trouble to the human beings but also to animals and plants. Melting of polar ice caps will lead to floods which can cause mayhem everywhere. Innovative solutions must be brought forward to end this hazard once and forever.

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SUBJECT- ENVS (AECC)

TOPIC- ATOMIC WASTE AND ILL EFFECTS

ATOMIC WASTES AND IT'S ILL EFFECTS

INTRODUCTION

Radioactive waste is waste product containing radio active decay materials. It is usually the product of a nuclear process such as nuclear fission. Though industries not directly connected to the nuclear power or nuclear power industries produce radioactive waste.

DEFINATION

Despite the advantage of nuclear as a clean energy, the big concer is the resulted from nuclear reaction, which is a form of pollution called Radio activity.

Radiation (Laser- rays) will from Radio Active Pollution.

CAUSES OF RADIO ACTIVE WASTE

- Nuclear Power Plants
- Nuclear Weapon
- Disposal of Nuclear Waste
- Uranium Mining

EFFECTS

- The diseases include blood in cough
- Ulcer
- Swelling
- Cancer
- Lung Cancer
- Skin Cancer
- Bone Cancer
- Eye Problems

EFFECTS ON ANIMALS

- It may include tumor, dry, itchy skin, hair loss and discoloration of the skin around the tumor site.
- In addition, these particular tumors often release a disagreeable odor as the cancerous cells die.
- More serious side effects may include some nerve damage and either the death or hardening of healthy tissues.

EFFECTS ON HUMANS

- Skin Diseases
- Damage of Reproduction Organs
- Causes of Abnormality in Bone Marrow
- Destroy Retina of Eyes
- Shortening of Life Span

TYPES OF NUCLEAR WASTE AND ITS MANAGEMENT

- LOW-LEVEL

This wastes are least dangerous radioactive materials which aren't able to radiate for a long time. The garment which is used by the people involving with these materials, tools they use and filters are low-level waste.

- INTERMEDIATE-LEVEL

This wastes includes chemical sewage ,meal coats in fuels and most of the wastes from nuclear reactors. These types can't able to radiate from a long time but the need to covered carefully.

- HIGH-LEVEL

One of the examples of this type is the waste from the nuclear reactor's fuel, maintenance of which is way harder and more expensive. They should be covered in a special coat and kept in stores at least 1.5 km under the ground and in temperatures below zero.

MANAGEMENT OF NUCLEAR WASTE

- TEMPORARY STORE KEEPING

The fuel used up in a reactor in very hot and radioactive and radiates a lot of radiances and ions. So, not only they should be cooled but also they should be stooped from radiating radioactive radiances. There are pools beside each reactor for storing used up fuel which are made up of concrete with stainless steel with8meters of depth. As the time goes by the radiation decreases to one tenth of the amount it was at time the temperature cools down too.

- REPROCESS FINAL STORAGE

After separation high-level nuclear waste are heated to change into powder. After this process which is called calcification , powder is mixed with glass to be stored in a container. This process is called glassification . Liquid glass is stored in a container made of stainless steel and kept in a stable place.

DISPOSAL OF NUCLEAR WASTE

- HIGH-LEVEL WASTE

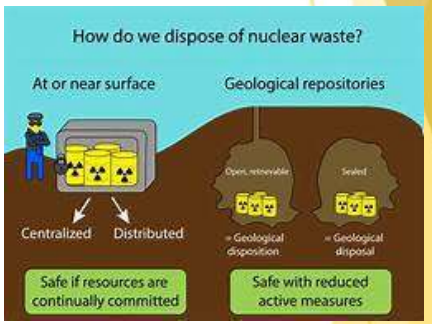
High level wastes have a very high-radioactivity per unit volume. E.g. Spent nuclear fuel. HLW's have to be cooled and are , therefore, stored for several decades by its producer before disposal. Since there wastes are too dangerous to be released anywhere in the biosphere, therefore, they must be contained either by converting them into inert solids and then buried deep into earth or are stored in deep salt mines.

- MID-LEVEL WASTE

Medium level waste are solidified and are mixed with concrete in steel drums before being buried in deep mines or below the sea bed in concrete chambers.

- LOW-LEVEL WASTE

Low level waste are disposed of in steel drums in concrete-lined trenched in designated sites.



STEPS WE CAN TAKE TO SAVE OUR PLANETS

- Avoid Constructing Nuclear Power Plant.
- Avoid using Nuclear Weapon.
- Have Power Treatment for Nuclear Waste.
- Avoid Mining for Uranium to a minimal.
- Avoid direct disposal of waste to the oceans.

CONCLUTION

Any form of energy production give rise to waste the management of which should be the subject of a constant and rigorously scientific preoccupation. Nuclear energy seems to be the focus of most of the attention paid to energy-related waste. Among the main reasons for this unbalanced situation is the inadequate information often received by the public.

Meanwhile, international co-operation in research programmes on the political level should be intensified, so that solutions leading to international consensus may become reality.

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(No. of Pages :→ 7)

জলদূষণ (সূচিপত্র)

ভূমিকা:→ পৃথিবীর ৭৫ শতাংশ জুড়ে আছে সমুদ্র, নদী হ্রদ, পুকুর ইত্যাদি বলেছেন। জীবন ধারণে জলের ভূমিকা অপরিহার্য। জলের সঙ্গে বিভিন্ন ক্ষতিকর পদার্থ নানাভাবে মিশে জলের স্বাভাবিকতাকে নষ্ট করে। যা জীবজগৎ-এর ক্ষতি সাধন করে।

জলদূষণ:→ প্রাকৃতিক ভাবে অথবা জীবকৃত কারণে জলে রাসায়নিক, তেজস্ক্রিয়, জৈবিক পদার্থের পরিমান ক্ষতিকর মাত্রায় বেড়ে গেলে, তা ব্যবহারের অযোগ্য হয়ে পড়ে। বিশুদ্ধ জলের নিজস্ব বৈশিষ্ট্যের এই অবক্ষয়কেই জলদূষণ বলা হয়।

বিশ্ব স্বাস্থ্য সংস্থার মতে, পানীয় জলে 0.05 মি.লি./লি. -এর বেশী মাত্রায় সায়নিক থাকলে সেই জল পানের অযোগ্য বা জলটি দূষিত বলে গণ্য করা হবে।

জলদূষণের বিভিন্ন দিক গুলির মধ্যে রয়েছে-

→ • প্লাস্টিক জনিত দূষন

• রাসায়নিক দূষণ

- জলে অদ্রাব্য পদার্থের কারণে ঘটিত দূষণ,
- আণুবীক্ষিক দূষণ,

জলদূষণের কারণ:→

- তৈলবাহী জাহাজ থেকে নানা কারণে সমুদ্রের জলে তেল মিশে যায়,
- বিশ্বউষ্ণায়নের ফলে কার্বনডাই অক্সাইড, সালফার ডাই অক্সাইড ও নাইট্রোজেন অক্সাইডের মতো গ্যাস জলীয় বাষ্পে মেশে। এই অম্ল গ্যাসে গুলি মিশ্রিত মেঘ থেকে বৃষ্টিপাত হলে তা পৃথিবীর জলভাগকে দূষিত করে।
- বিভিন্ন কলকারখানা থেকে সিসা, পারদ, সালফার, মেশে।
- যন্ত্রপাতি ও খনিজ তেলের মতো শিল্পজাত পদার্থ জলে
- এছাড়া, প্রত্যহ হাসপাতাল, চাষের কাজে ব্যবহৃত বহু-প্রকার পদার্থ নল-নালার মাধ্যমে পুকুর-নদী-সমুদ্রে মেশে।

• নদনদীতে মৃত জীব-জন্তু, মৃত মানুষের দেহাবশেষ বা প্রতিমা প্রভৃতির দ্বারা জল দূষণ হয়।

• প্লাস্টিক নষ্ট হয় না। অবিকৃত অবস্থায় থাকা প্লাস্টিক নানা ভাবে জলজ প্রাণীর ক্ষতিসাধন করে।

• নদী বা পুকুরের জলে কাপড় কাচা, বাসন মাজা, স্নানাদি পশু স্নান করানোর ফলেও জল দূষণ ঘটে থাকে।

জল দূষণের পরিণাম:→

• জলে হ্রাসমান প্লাস্টিক জলজ প্রাণীরা খাদ্য হিসেবে গ্রহণ করার ফলে মারা যায়।

• জল দূষণের ফলে জলজ প্রাণীর সাথে সাথে জলজ উদ্ভিদের প্রাণসংশয় দেখা দেয়।

• বিভিন্ন প্রকার রাসায়নিকের ফল – নানা প্রকার রোগ দেখা দিতে পারে মানুষের শরীরে।

• পেয়ঃ প্রণালীর দূষিত পদার্থ নদী, পুকুরের জল মিশে জলবাহিত রোগের সঞ্চারণ সৃষ্টি করে।

জলদূষণের নিয়ন্ত্রণ / প্রতিকার :-

- কলকারখানার বা পয়ঃপ্রণালী নিঃসৃত তরল ও বিষাক্ত আবর্জনা শোধন করে নদী ও সমুদ্রে ফেললে জলদূষণ নিয়ন্ত্রণ করা যায়।
- সমুদ্রতীরে পারমাণবিক আবর্জনা নিক্ষেপ বন্ধ করতে হবে।
- কৃষিকার্যে অত্যধিক রাসায়নিক ব্যবহার বন্ধ করতে হবে।
- প্লাস্টিক ব্যবহার কমানো বন্ধ করতে হবে।
- পানীয় জলে আর্সেনিক দূষণ কমানোর জন্য ভূগর্ভস্থ জলের ব্যবহার ছাড়া কৌশল নিয়ন্ত্রণ করা প্রয়োজন।

পাদটীকা :-

A. Center for Biological Diversity (https://www.biologicaldiversity.org/)

বৃত্তপঞ্জি / সূত্রসার :-

- https://www.water-Pollution.org.uk/sewage-and-wastewater/

- https://www.biologicaldiversity.org/
- jalshakti-dowr.gov.in
- https://CPCb.nic.in

Parna Dutta Roy
6/7/24

NARMAD BACHAO ANDOLAN

नर्मदा बचाओ

मानव बचाओ

SCOTTISH CHURCH COLLEGE

NEC TAMEN CONSUMEBATUR

Subject:- ENVS(AECC PAPER)

College Roll No :	SANA20F694
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Content

Pages →

1. Introduction:-

In India, all major rivers are dammed or are in the process of being so. This has, however, not been able to deliver good to the local populace in the areas of the big dams, and therefore, the questions are now being raised about the viability of large dams that have often proved to be ecological disasters. The performance of the large dams in India case study report of the World Commission on Dams (WCD) makes harash-judgement on the capacity of the large dams to deliver on promises of increased irrigation. In terms of Cost Benefits Ratio (CBR), the dams seem to have started off badly and gotten worse from there (see Singh, 1997 and Nilsen, 2005 for details). However, we have little data to review the performance of large dams in terms of their hydro power capacity. Nonetheless, it is now widely seen that the large dams have been criticized for the disasters related to them – social, economic and environmental. The negative externalities produced by the construction of large dams have, therefore, resulted in the rise of conflicts, often culminating into large scale social movements in contemporary India

Narmada Bachao Andolan

NARMADA BACHAO ANDOLAN POSTER ← Pic 3

The table below shows the important anti-dam struggles in India since 1970s, and the main issues raised by such protest movements.

Name of the Dam	Year Since the Protest Became Active	Main Issue of Protest	Details
Koel Karo, Bihar	1973	•Tribal Displacement •Loss of Forest	1256 villages affected, mostly tribal
Tehri Dam, Uttaranchal (Previously UP)	1978	• Fragility of Ecosystem • Dislocation of People	195 Villages affected Displacement of about 70,000 people
Subarnarekha, Bihar	1978	•Displacement and •Rehabilitation	Displacement of 1,20,000 People
Bedhi, Karnataka	1979	•Environment and •Displacement	About 4000 Tribal Displacement
Bhopalapatnam-Inchampalli	1983	•Displacement •Loss of Livelihood •Environment	Affecting about 75,000 Tribals
Sardar Sarovar on Narmada, Gujarat	1985	•Resettlement and •Rehabilitation	Displacement of about 400,000 People
Bochghat on Indrawati	1986	•Environment	Affecting about 10,000 People
Maheswar Dam, Narmada, Madhya Pradesh	1992	•Resettlement and •Rehabilitation	About 400,000 to be affected
Bisalpur on Banas and Dai, Rajasthan	1993	•Resettlement and •Rehabilitation	Displacement of over 70,000 people
Bargi on Narmada in Madhya Pradesh	1994	•Displacement and •Rehabilitation	Submergence of about 162 villages

Pic 1. The details of some major dams and related issues →

(source: State of India's environment: Centre for Science and Environment, New Delhi)

(See chapter 4: Taxonomy of environmental movements in India), in the form of environmental movements, which constitute a bulk of the environmental movements in the country. Silent Valley and Munnar in Kerala, Bedthi in Karnataka, Teri and Vishnuprayag in Uttaranchal, Koelkaro in Bihar, Lalpur in Gujrat, Bhopalapatanam and Inchampali in Madhya Pradesh, Maharastra and Andhra pradesh borders, and the dams across the Narmada in Madhya Pradesh, Maharastra and Gujrat are some leading examples where dam related disasters like ecological devastation and human displacement have taken place or are in the offing.

The System of water harnessing through the construction of large dams and the resultant conflicts over the issue of distribution of water resources have, therefore, contributed to the multiplication of peoples' movements on the issue. However the debate on the ecological impact of dams has generally remained confined to environmentalists alone. Hence, the study of the politics of large dams has become prominent on the agenda of Social scientists in the recent years.

The present study concerns with the "NARMADA BACHAO ANDOLON" which developed as a critical response to damming "Narmada", India's most ambi-

Narmada Valley, India. → Pic 4

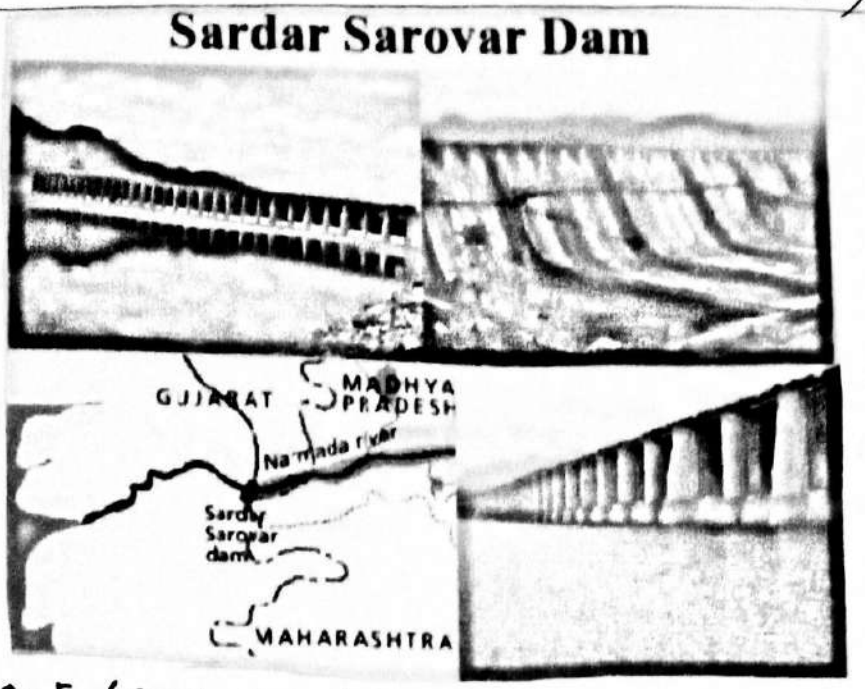
(Source:- researchgate.net, uploaded by Pablo Shiladitya Bose) Sited on 30th May, 2021

Pic-5 → Rally in Khandwa, November 2008

tious development project to date, and yet the most controversial. The Narmada water dispute and the consequent movement in the "Narmada Valley", for a political scientist, provides a classic illustration of three highly complex problems: allocating a resource and the costs and benefits of developing it in a federation where two or more states and a central government are jurisdictionally involved; shaming water in an upstream-downstream conflict; and resolving the conflict between human rights and environmental justice on the one hand, and government and pro-development interests, on the other.

2. Contexual Background :-

The Narmada Besin covers an area of approximately 94, 500 Square Kilometers between the Vindhya and the Satpura bages in central India. It is the site of the "Narmada Valley Development Project" (NVDP), an ambitious project that seeks to harness the river "NARMADA" that flows through the three states of "MADHYAPRADESH", "MAHARASTRA" and "GUJRAT", which envisages that "thirty big dams", "One hundred and thirty-five medium dams", and "three thousand small dams" will be constructed on



Pic-5, (Source:- SHIKHA GOYAL
created on OCT 5, 2019 17:23 IST
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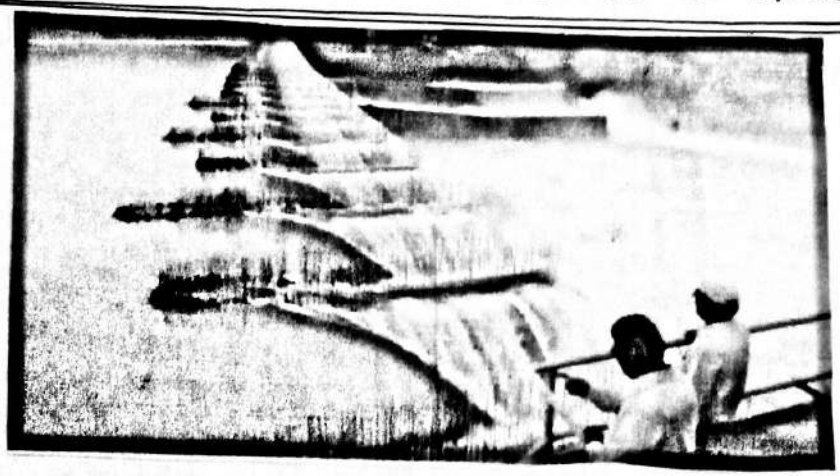


Pic-6, SARDAR SAROVAR DAM
(Source: Article: "People continued to stay in their flooded houses", Scroll staff, Sep 16, 2017 · 10:30 am,
Updated Sep 16, 2017 · 10:30 am

Use Of Narmada Water In Gujarat, 2013-2016

Year	Water Withdrawn	Water Used For Non-Agricultural Sources	Water Used For Non-Agricultural Purposes (In %)
2013-2014	8168.82	1862.44	22.80%
2014-2015	10418.9	1395.92	13.40%
2015-2016	9375	1093.58	11.70%

Pic-7, (Source: NARMADA CONTROL AUTHORITY, annual report)

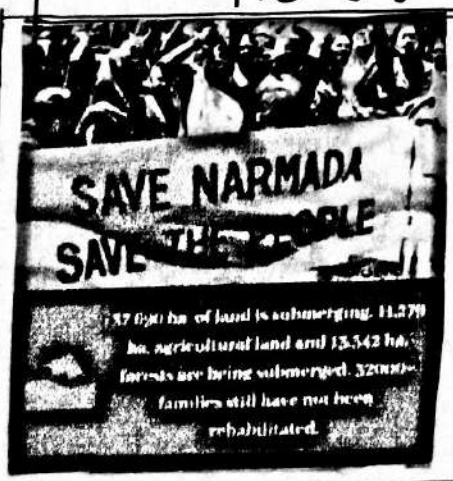
the "NARMADA RIVER" and It's "Forty-one tributaries". However, the Narmada basin has such characteristic that has led the people to oppose the project envisaged by the state. This is because between gorges flanked by densely forested basaltic hills, the "1312 kilometers" long "Narmada Valley" contains large alluvial plains in "Madhya Pradesh". To the West, the "Narmada River" meanders through "Gujrat" Widening into a "25-kilometer" long estuary as it flows into the "Gulf of Cambay". More than "22 million" people live in the vally and several tribal groups, particularly "Bhils" and "Gonds" occupy the "forested uplands". The project is estimated to affect over "2.5 lakh people". "The Sardar Sarovar Project" (SSP) and "The Narmada Sagar project" (NSP) are the two largest dams to be constructed in "the NARMADA RIVER", and "the SSP" alone will submerge "245 villages": "19 in Gujrat", "33 in Maharastra" and "193 in Madhya Pradesh". Thus, these two projects have remained controversial owing to their large scale displacement and problems of humane rehabilitation. This has resulted in the emegence of a protest movement unique of its kind called the "NARMADA BACHAO ANDOLON". However, its need to be noted and clarified here tat although

ANI
@ANI

MP: Medha Patkar & 37 others stage Jal Satyagraha in Chhota Barda demanding rehabilitation of those displaced due to Sardar Sarovar Dam

10:03 AM · Sep 16, 2017

Pic- 8



NARMADA BACHAO ANDOLAN
Pic: 9, Source :- m.facebook.com
12 August 2019 at 18:01
[Sited on : 1st July, 2021]

resistant in the "Narmada Valley" is often equated with the "NARMADA BACHAO ANDOLON's" campaign against "the SSP", just as the "NARMADA VALLEY DEVELOPMENT PROJECT" is more than "the SSP", "the NBA" is also more than the struggle against "the SSP", embracing within its fold the protests against the "MAHESWAR" and the "BARGI" Dams too.

The movement uses various tools of protest such as "SATYAGRAHA" (Political action based on truth and non-violence as coined by "Gandhi"), "JAL SAMARPAN" (sacrificial drowning in the rivers), "RASTA ROKO" (road blockade at strategic points), "GRAON BANDHI" (refusing the entry of government officials in to the villages), "demonstrations" and "rallies", "hunger strikes" and "blockade of Projects".

The "NARMADA BACHAO ANDOLON" has successfully brought to public domain the hitherto closed and protected discourse on mega development projects, thereby opening new vistas for environmental-movements. The protest also has pointed out the necessity to address the shortcomings in institutional frameworks governing big developmental projects by laying bare the ecological implications of such mega development Projects.

(Page = 5-6)

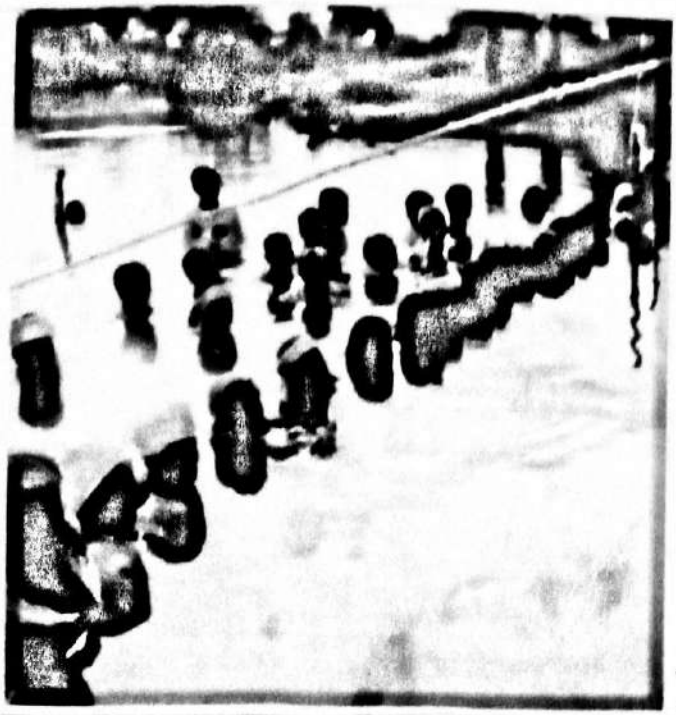
rediff NEWS

Pic-10, Sited On - 1st July, 2021

Rediff.com » News

Innovative ways to wake up the government

Updated on: November 22, 2012 11:36 IST



Tehsil	No. of Villages	Total No. of families	Total No. of families living in villages	Total No. of families living at Rehabilitation Sites
Barwani	40	8739	5712	3027
Kukshi	37	10200	8077	2123
Manavar	23	4749	3180	1569
Thikri	27	6441	3843	2598
Kasravad	15	1439	1065	374
Alirajpur	26	1986	516	1470
Maheshwar	3	29	29	0
Dharampuri	22	5614	4725	889
Total	193	39197	27147	12050

Pic-11] 27,147 NARMADA DAM AFFECTED FAMILIES YET TO BE REHABILITATED NBA ESTIMATES AHEAD OF AUG 8 APEX COURT HEARING, (Wednesday, August 02, 2017) [Sited on 1st July, 2021]

3. The Movement and its course :-

"THE NARMADA BACHAO ANDOLON" did not at once emerge as a monolithic pan-state movement as it exists today. Not being an evidently identifiable chain of events, the course of the movement began with the sporadic incidents in different corners of the three riparian states of "MADHYA PRADESH", "MAHARASTRA" and "GUJRAT". Hence, the course of the movement prevents any diachronic analysis. At best, its course of development can be comprehended as a discourse of resistance accessible through movement documents and specific symbolic practices. In the following section, an attempt has been made to precursors of the "NARMADA BACHAO MOVEMENT" until the later half of the movement (second half of the 1980s) when it appeared as a unified movement followed by discussion on the movement as a pan-state environmental movement after its institutionalization, till date.

A Major resistance movement organized against "the SSP" is the one by "the KMCS" in the Submergence Zone in "Alirajpur", in "Jhadua" district of "Madhya Pradesh" in the early and mid-1980s. Although "the KMCS" was a trade union which initially worked for defending customary use rights of the tribals to forest resources, yet it came to address the problems

Pic - 12

Indira Sagar Dam affected people standing in the reservoir water of the dam at Narmada river on the 14th day of their Jal Satyagrah' agitation for proper compensation and rehabilitation, at Khardana village in Harda district on Madhya Pradesh.
PTI Photo

(Source: Outlook Website, site on 30th May 2021)

Pic - 13, Source: NDTV

associated with dam building on the "NARMADA RIVER". Hence, in "Alirajpur", it was "the KMCS" which started a mobilization campaign against the SSP, which however, ultimately melted in to the current "NBA" in the later half of the 1980s.

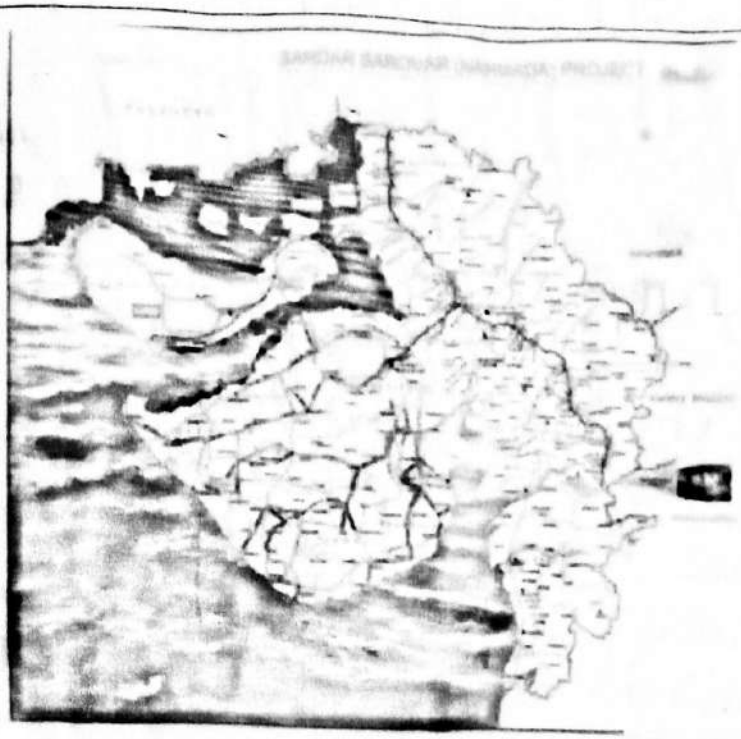
The first stirrings leading to the "NARMADA BACHAO ANDOLAN" (Save the Narmada Movement) in the western Nimad reign of "Madhya Pradesh" began in the fag end of the 1970s. The Caste Hindu farming communities of "Western Nimad Plains" initiated the resistance against "the SSP" first as "NIMAD BACHAO ANDOLAN" immediately after NARMADA WATER DISPUTES TRIBONAL" (NWDT) presented its final award on 16 August 1979. The affected "Nimad" launched the "NIMAD BACHAO SANGHARSH SAMITI" as a struggle for the reduction of the height of the proposed dam. Although the "NIMAD BACHAO CAMPAIGN" was chiefly supported by merchants and farmers in "Nimad" and worked within the established structures of party politics, the attendence in the rally is said to have been several times more than what it seems today. However, with ARJUN SINGH winning the 1979 State elections on a platform that pledged support for the movement, the situation changed for worse. ARJUN SINGH ditched the movement, leading finally to its collapse. Hence, the stirrings quickly waned due to their embeddness in the equations of the parliamentary politics. This phase representing

Sporadic stirrings in different parts of the three riparian states maybe regarded as the first phase in the evolution of the "NARMADA BACHAO ANDOLAN".

The second phase of the protest occurred sometimes in 1985, a time when some environmentalists' forums outside the valley like the "KALPABRIKSH" and "The Hindu College Nature Club" expressed their disquiet in the press. At this stage, "MEDHA PATKAR" got involved in community mobilization in "MAHARASTRA" on the issue of submergene and displacement. Initially, just resettlement and rehabilitation of people being displaced by "the SSP DAM" also became the core issues of the movement. However, when it became apparent that it was not possible for the state to resettle all the displaced persons properly, the focus shifted to total opposition to the dam, and finally, in course of time, to preserving the environmental integrity and natural ecosystems of entire valley. Thus, the issues transformed from reduction of dam height to question of resettlement and rehabilitation to the question of environmental integrity culminating in the total opposition to the project.

4. Movement Parameters and Movement Dynamism:-

In Case of the "NARMADA BACHAO ANDOLAN", originated as a response to the "NARMADA WATER DISPUTES TRIBUNAL AWARD" and is lead by the charismatic leaders. Its activities are recruited from different sections of Indian Society: the tribals of the affected area and the educated middle-class activists who have joined the movement from different urban centers in India in the course of the movement. It evoloved, grew and still continues to grow, passing through different stages with with its unique Characteristics, shaped by various social relational factors, history, culture and the activities involved in the movement, nature of the target and the nature of the domestic and international environments. Thus, the movement is dynamic and it is constantly changing in its objectives, issues, strategies, and finally in its nature and content. We shall explore the various factor that have led to the movement of the movement and its consequent transformations at different levels in different stages of the movement.



Source: Sardar Sarovar Narmada Nigam Limited

Pic!- 14, NARMADA BESIN

■ 4.1. Influence of Cultural and Historical Legacies movement Dynamics →

"The NBA" has mobilized the affected adivasis communities resorting to such factors in the adivasis cultural milieu with "NARAS" like " DOOBENGH PAR NABI HATENGH". Hence, even land-for-land compensation offer of the goverment which may be a viable option for the non-adivasi ousee, is irrelevant and unacceptable to an adivasis farmer for whom the land is more than material. This culture value system is propelling element to motivate and mobilize the adivasis masses, and, the source from which the movement derives strength and sustenance to keep itself going, the motive force being provided by the contradictions between the modern and the traditional, rational and irrational at one level and dialogical interactions between the local culture (the structure) and the leaders and activists of the movement (the agency) on the other.

Similarly, historical legacies have influenced the making of the movement mobilizations. The "NARMADA BACHAO ANDOLAN" began as a resistance against the "SARDAR SAROVAR PROJECT (SSP)". Tribal and non-tribal politics in the area affected by "the SSP" and other projects on "the NARMADA" have

a long history ripe with experiences of protests and remembered through stories and "GAYANAS". To quote a few, for instance, "the BHILS" and "SATPUDA" ranges waged three long drawn wars against British Occupancy during the mid-nineteenth century, Pursuing the aliens in the Plains of "Khandesh". A number of tribal movements in this area have reflected the issues of tribal rights, Survival and autonomy. The tribals of the "SATPUDA" region in "DHULE" district of "MARASTRA" were organized in the 1970s under the leadership of "AMBERSINGH MAHARAJ", a tribal Gandhian Socialist leader, and later under the aegis of "SHRAMIK SANGHATHANA" a radical trade union of tribal agricultural labours. Such tribal movements in "MAHARASTRA" have been fighting on contemporary issues generated by the 'feudal-capitalist-system'. In the process the devised contemporary approaches, idioms and means of struggles for social justice. One such issue that was led to struggles in the region is the issue pretaining to water resources. Hence, apart from the general history of tribal protests as have been pointed out above, a notable water related protest moment has taken place in the region in the pre-independent period, hailed as a predecessor of the " NARMADA BACHAO ANDOLAN"

■ 4.2. National Constitutional- Legal Framework and Movement Dynamics →

Let us briefly explore some of the fundamental constitutional provisions pertaining to environment under the constitution of India. The Indian Constitution provides for a wide range of provisions towards the protection of the environment, which have a bearing on the social movement organizations. First, Article 14 of the Indian Constitution envisages that the state shall not deny to any person equality before law and equal protection of laws within the territory of India. This corroborates with the principle 1 of the UN conference on Human environment (1972). Secondly, 48-A under Part IV of the constitution provides that " THE STATE SHALL ENDEAVOAR TO PROTECT AND IMPROVE THE ENVIRONMENT AND TO SAFEGUARD THE FORESTS AND WILDLIFE OF THE COUNTRY". This article is in compliance with principle 4 of the UN conference on environment. Later on, the fourty-second amendment to the constitution (1976) added Article 51-A (g), which enshrines a fundamental duty that commits the citizen to environmental protection that reads that it shall be the (fundamental) duty of every citizen of India " TO PROTECT AND IMPROVE THE NATURAL ENVIRONMENT INCLUDING FORESTS, LAKES, RIVERS AND WILDLIFE, AND TO COMPASSION FOR LINING CREATURES."

Furthermore, the 73rd constitution (Amendment) Act 1922 on the revitalization of the panchayati Raj adds Schedule XI to the constitution. The Schedule has eight entries, which are linked to environmental protection and conservation. There are also numerous other amendments that Provide for the environmental protection and conservation. There, ~~are also~~ These legal-constitutional provisions create an enabling environment for the preservation and protection of the environment. Moreover, the judiciary has taken the lead in terms of the actual immediate effects in the matters of environment. Failure of the governmental agencies to implement the laws made has, In India, Prompted "the NGOS" and Public to approach the courts as a last resort. Thus the credit for the evolution of environmental jurisprudence in India goes to the Supreme court which has contributed to this end by way of its landmark judgements in cases like — " ANDHRA PRADESH POLLUTING INDUSTRIES CASE 1996 (6 SSC 26)", " ANTOP HILL CASE 1985 (W. P. 12179/1985)", " ACQUACULTURE CASE 1988 (AIR 1988 SC 1037)", " BRICK KILN CASE 2000 (2000-6-SCALE 315)." "COASTAL CASE 1987 (AIR 1987 SC 965)", " DELHI RIDGE CASE 1996 (8 SCC 462)", " DELHI SEWAGE TREATMENT PLANT CASE 1984 (W.P. NO. 13381/1984)", " ENVIRONMENTAL AWARNESS AND EDUCATION CASE 1991 (W.P 860/1991),

" GAMMA CHAMBER CASE 1985 (W.P. 4677/1985)," "GANGA POLLUTION CASE 1987 (AIR 1987 SC 1086)", "GROND WATER DEPLETION CASE 2002 (W.P. 1996)", "KAMAL NAT CASE 2002 (W.P. 182/1996)", "TAJ TRAPEZIUM CASE 1997 (AIR 1997 SC 734)", "VEHICULAR POLLUTION CASE 1990 (W.P. 13029/1985)", among many others.

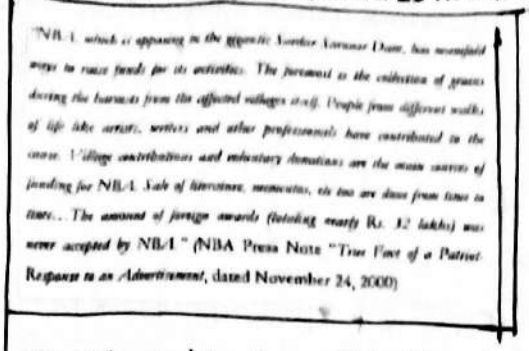
The Supreme Court first took up the cases filed by the Andolan in August and September of 1994, However, it was only in January 1995 that it first took action when, after hearing the arguments of the petitioner and the respondents, the court ordered that the "FIVE MEMBER GROUP (FMG)" should prepare another report on the "NARMADA'S HYDROLOGY", "THE HEIGHT OF THE SARDER SAROVAR PROJECT" and "THE STATUS OF RESETTLEMENT AND ENVIRONMENTAL IMPACTS". The group submitted its report in April, stating that the "SARDAR SAROVAR PROJECT" could only be completed if the studies and plans on Resettlement and environmental impacts were completed, if the local people were allowed full participation in and information about implementation of the Project, and if the dam bureaucracy was restructured so as to ensure efficiency and accountability during implementation.

■ 5.3. Funding Problems and Movement Dynamics

→

Fund is an essential component necessary for movement organizations. Sufficiency or otherwise of the fund is likely to determine the effectiveness of movement mobilizations and hence its nature and course. There has been a lot of controversy regarding the sources of funds of the "Narmada Bachao Andolan". For instance, "THE INDIAN EXPRESS" dated 'NOVEMBER 10 AND 11", 2000 carried an advertisement titled "TRUE FACE OF MS. MEDHA PATKAR AND HER NARMADA BACHAO ANDOLAN", by an AHMEDABAD BASED NATIONAL COUNCIL FOR CIVIL LIBERTIES (NCCL), which alleged that "the NBA" is not a registered body and that it meets the expenses of the movement through Hawala transactions. Furthermore, it is also said that "Jayanarayan Vyas", the the minister of "NARMADA", government of "GUJRAT" asked for a CBI enquiry into the foreign exchange violations by "the NBA". In 2001, "JAMUNA DEVI", the then deputy chief minister of "MADHYA PRADESH" alleged "NBA" of foreign funding (LOKMAT- THE MARATHI DAILY, dated 09.02.2001). "NAI DUNIYA" (dated January 18th 2001) also alleges "NBA" of working in union with foreign people, environmentalists and other social organizations, both domestic and internation like - "CORAL INDIA PROJECTS", "NTPC POWER PROJECTS", "UMARGAON PORT PROJECT"

The activists have strongly opposed that they have accepted any foreign funding. They have disregarded these as base-less alligations. For instance, as a response to the advertisement in the The Indian express (dated 10 and 11 November, 2000), The NBA



"NBA, which is opposing in the opposite Sardar Sarovar Dam, has worshiped ways to raise funds for its activities. The foremost is the cultivation of grains during the harvests from the affected villages itself. People from different walks of life like artists, writers and other professionals have contributed in the course. Village contributions and voluntary donations are the main sources of funding for NBA. Sale of literature, memorabilia, etc too are done from time to time... The amount of foreign awards (totaling nearly Rs. 32 lakhs) was never accepted by NBA." (NBA Press Note "True Face of a Patriot: Response to an Advertisement, dated November 24, 2000)

published a press note, in which it claimed.

The Indian EXPRESS

Decision-making becoming 'undemocratic' in nation: Medha

PIL-16

The drive which aims to make drugs and liquor-free society was organized by National Alliance of People's Movements and will move through from the Sabarmati Ashram to the Rajghat in Delhi.

Written by Lakshmi Ajay | Ahmedabad |
Updated: January 24, 2017 6:23:10 pm

etc which help "the NBA" with funds. It is also asserts that "the NBA" is given the logistic support by 'EARTH JUSTICE LEGAL DEPENCE FUND", especially as travel costs to "MEDHA PATKAR" and "ARUNDHATI ROY" to visit foreign countries for attending workshops and conferences on Large Dams. These apart there are several like allegations towards "the NBA" alleging it of working on foreign funds. However, the activists differ on it and so do some "INSIDER" authors like "SANGVAI" (2002) and other scholars who have worked on "NARMADA-MOVEMENT".

■ 4.4. Leaderships and Movement Dynamics →

Leaders are central to social movements, yet a negligible attention has been paid by scholars to understanding the concept of leadership or its effects on movements. Since leaders play a critical role in collective action, shaping movements in numerous ways like defining goals and advancing coalitions, they significantly influence response to external repression. Moreover, the actions of the leaders, and their rhetoric and style affect the conflict outcomes in movements.

The leadership of the movement is provided by a group of urban, educated, middle-class intellectuals from outside the "Narmada Valley". The most prominent of the movement leader are the charismatic "MEDHAPATKAR"

Omvedt built her criticism on the failing of NBA leadership from one poem entitled "STAGE" written by "WAHURU" on the non-assignment of any role to the tribal leaders like him. The poem reads: →

We did not go on to the stage,
Neither were we called
We were shown our places,
Told to sit
But they, sitting on the stage,
Went on telling us of our sorrows,
Our sorrows remained ours, they never became theirs.

followed by others like "CHITTAROOPA PALIT" in the line of hierarchy, and more recently "ARUNDHATI ROY"- a novelist turned activist, who is only second to "MEDHA PATKAR". The issues raised about the problem of leadership pertains to the personification of the movement in its leaders, absense of high ranking tribal leaders in the movement (OMVEDT: 2004), and the question of representation of the tribal interest by "the NBA" leadership (DWIVEDI: 1997 and 1999; OMVEDT:; BAVISKAR: 1995; MEHTA: nd)

■ 4.5. Party Politics and Movement Dynamics.

In this section, we would like to discuss the role of the agencies like the Political Parties in the anti-dam campaign in the 'Narmada Valley" and its consequent impact on the dynamics of and transformation in the movement (see Hypothesis 1). Political parties are the important agencies of interest articulation and aggregation. However, in the Indian Context, one experiences a glaring alienation developing between the representatives of the political parties and the people at the grassroots. This is because, with the globalization and liberalization sweeping the World, the local issues have been marginalized from the legislative forums of both the national and State governments, leading to the denial of social Justice to the people. As a response to this situation, India has experienced the emergence of a wide

range of voluntary organizations and social movements specially since the 1970s and their interventions, leading to what "RAJNI KOTHARI" calls 'Non-Party Political Process" in India. This have produced a double impact: first, led to the emergence of green Party on the one hand, which aspires to address the issues confronting the marginalized with a focus on green agenda on the hand, and second, to the necessity of rethinking the relationship between protest movements and the role of political parties.

In the recent years there has been a proliferation of 'Green' Political parties throughout the globe, and most with a good repute in electoral performances. In India too, recently the Indian National Green Party is born (it was registered with the Election Commission of India on 7th January 1999). It has an elaborate list of envisaged national policies pertaining to environment and a couple of pages discussion on water and water management. It also vows to "CANCEL ALL PLANS TO BUILD LARGE SCALE NEW DAMS" as a short-term target of the party (http://www.ecology.edu/greens). However, unlike the western experiences as in Germany and elsewhere, the Green Party has little or no room in Indian political dynamics as of now. So far, the Green Party has not even contested a single election. Hence, Green issues have been taken over by the mainstream political parties in India. Most of the

Year	Leading Party	Seats Won	% Votes	Runner-Up Party	Seats Won	% Votes
1977	BLD	37	57.9	INC	01	32.5
1980	INC	35	47.2	JP	04	31.3
1984	INC	40	57.1	BJP	-	30.0
1989	BJP	27	39.7	INC	08	37.7
1991	INC	27	45.3	BJP	12	41.9
1996	BJP	27	41.3	INC	08	30.9
1998	BJP	30	45.74	INC	10	39.4
1999	BJP	29	46.58	INC	11	43.91
2004	BJP	25	41.13	INC	04	34.07

Pic 2 → Electorical history of the state (Madhya-Pradesh Parliametary Constituencies 1977-2004)

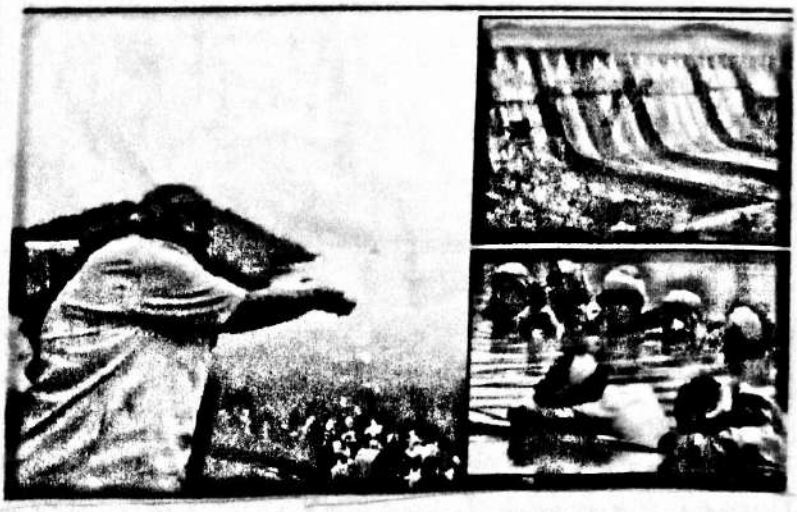
(Source :- MS. S Rana (2006), INDIAN VOTES, NEW DELHI, Sabup and Sons.)

PM Modi Inaugurates Sardar Sarovar Dam After 56 Years; Know The Timeline & The Struggle Of Those Displaced

Pooja Chaudhuri

Update: 2017-09-18 10:18 GMT

Editor : Pooja Chaudhuri



Pic - 17

political parties have come out with manifestos containing wide lists of ecopolitical issues (MAHALANABIS: 1997). Hence, it is imperative to undertake an analysis of the role played by political parties in shaping the nature and dynamics on an environment movement in general, and in case of the "NARMADA BACHAO ANDOLAN" in particular. To this end, we begin with the electoral history of the three tripatrian states in the following sections, beginning with the state of "MADHYA PRADESH". However, we have provided the details only since 1977 because it was in the post emergency period roughly coinciding with the 1977 elections that the traces of protests were emerging in "Narmada Valley".

In "Gujrat" too, "BJP" shows no sign of retreat since it established its stronghold in the 1989 general elections. Since then, it has always been the leading Party in the State. However, "the INC" also does not seem to be farther away from "BJP". it's trailing the "BJP", with steadily decreasing margin of difference in terms of the percentage of votes obtained over the last ten years. One possible reason for the "BJP" leading the list maybe that it is the only party with an impressive environmental agenda in its election manifesto, however, not suggesting that this is the absolute reason for its successes. This is because, if we see in terms of influence of the movement by political parties, it is quite

paradoxical that even in the states like "MADHYA PRADESH" and "MAHARASTRA" where the movement has been strong, it has not been able to make any difference to the party in terms of the party's ecological results, despite the movement having a sharp difference specially in "GUJRAT" with "the BJP". Hence, there is a necessity to explore the relationship between the role of parties and movement dynamics, which of course, we undertake very purposely in the sections to follow.

Although the "NARMADA BACHAO ANDOLAN" has not been influenced by any political party or its ideology, at least apparently, as it is claimed by the movement. This is evident from the result of the attitude Scaling we conducted of the people involved in the movement.

■ 4.6. Role of the NGOS and Movement Dynamism

A number of non-governmental organizations have been in alliance with the "NARMADA BACHAO ANDOLAN" in its struggle against the "SARDAR SAROVAR PROJECT", Some important organizations which been with "the NBA" are the Civil Liberties, Such as, "KISAN SANGHA SAMITI (MADHYA PRADESH)", "ADHIKAR SANGH (GUJRAT)", "MANAV KALYAN TRUST (KHEDBRAHMA)", "NAVASARJAN TRUST (SURAT)", "SAHIYAR (WOMEN'S ORGANIZATION - BARODA)", "STUDENTS CHRISTIAN MOVEMENT (KERALA)", "RASTRIYA YUVA

In his connection, Akula (1995) mightly states : →

> "According to World bank officials in charge of Narmada, the international links were crucial in forcing the Bank to stop funding for the Project"

SANGHATHAN, SMILE (DELHI)", "SAMNVAY (AHMEDABAD)" etc. All these organizations has organized and participated in various solidarity programmes in support of "the NARMADA BACHAO ANDOLAN".

The "NBA" vividly illustrates the power of building alliances with the international actors. "The NBA" has created solidarity groups globally. It has been receiving support from the "GRASSROOTS MOVEMENTS" in "EUROPE" and "LATIN AMERICA". "FIGHTING AGAINST NEO-IMPEPERILISM", "WTO" and "GLOBALIZATION". Besides, "NBA" has articulated its resistance through environmental groups such as "Internation River Network (IRN)", "Environmental Defense Fund (EDF)", "Human and Indigenous Right Organisations," etc. "NBA" has created what "KECK" and "SIKKINK (1998)" called the "TRANSNATIONAL ADVOCACY NETWORKS" (TAN) or globally linked collectives of social movements. By sending faxes to international ENGOS such as "EDF" in "WASHINGTON DC", "SURVIVAL INTERNATIONAL (SI)" in "LONDON", "FRIENDS OF THE EARTH" in "TOKYO", the "NBA" was able to solicit support from these organizations, which in turn put pressure on politicians in the respective countries to stop the Bank from further for funding for "NARMADA PROJECT".

International lobying against the "NBA" has changed the character of negotiation between state

(Page 21-22)

The Narmada, unabridged

The Narmada, unabridged

Pie- 18, Article :- ~~Rag~~
RAGHAV CHANDRA

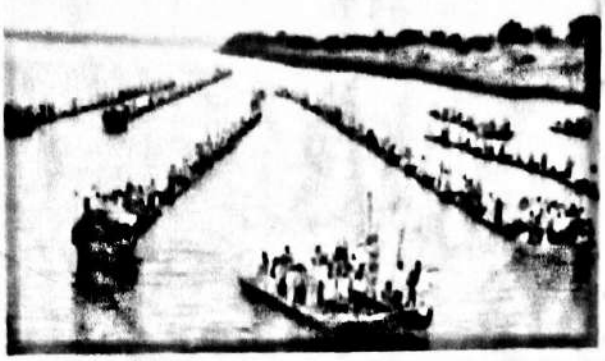
and the domestic actors in complex ways. For instance, "the NBA's" alliance with the international NGOs, significant lobbying by the international NGOs against the 'NARMADA PROJECTS', and their pressure on the donor agencies eventually led to withdrawing of support for "NBA" by the World Bank and Japanese government in the later half of the 1980s. In turn, this lack of major donor funding has repeatedly stalled government project on dam construction.

Initially, the protests concentrated on issues of just compensation for the loss of land and livelihood, air resettlement and rehabilitation policies and their implemention. Hence, the issues of the movement have transformed over time. The local mobilization and strategic action came to be focused increasingly on ending the World Bank funding for the Project. Local grievances came to be articulated increasingly in terms of an environmental discourse which would have had international legitimacy and legibility. Gradually, it led to the emergence of a no large dam agenda, for which there was large transnational support. Today, the strategic issue is opposition to large dams and espousing for alternative sustainable development strategy. Hence, the NGOs at the local as well as international level have contributed towards the movement of "NBA".

Socio-political timeline of the country

Wednesday, 5 October 2016

Narmada Bachao Andolan !!



Pic- 19

5. Transformations in the Movement :-

From the standpoint of social organization, resistance efforts often initiate a process of redefination of a variety of internal and external relationships and institutions. The need to organise for resistance will exert a new form of pressure in the internal Organization of the community. The organization of the resistance movement may sharpen both internal and external pre-existing conflicts and vice-versa. The existence of Patterns of internal differentiation based on ethnicity, caste or class in a community may constitute obstacles to formations of the necessary levels of solidarity and cooperation for effective resistance and may require efforts to alter local social structural patterns to enable the formation of an organized movement, sometimes even by isolating or banishing the dissidents, or by attempting to redefine the social, structural elements themselves. This in turn requires the shift towards new goals, with newer sets of strategies and tactics and even shifts in the scales of mobilizations, resulting in the transformations in the support base and the nature of the movement itself. Hence, in the sections that follow, an attempt has been made to map the transformations in the movement under study.

The NBA points out the multiple and yet interrelated issues thrown up by the movement as:-

> *"The issues raised by the Andolan are inter related, interwoven. They emanate from the same system and reinforce each other. All of them exist in the larger reality of Indian political culture, increasing socio-economic deprivation and inequality, depleting natural resource base, increasing centralization, capitalistic tendencies and vulgar consumerism depriving tribals and other socio-economic disadvantaged sections of population, robbing them and their right to natural resources, with increasing international debt..."*
> (NBA: 1992)

■ 5.1. Transformations of issues, objective and demands ●⟶

Although along the course of the movement we see shifts in the nature of the issues addressed by "the NBA" as has been discussed in the sections that follow, yet it is not to suggest that the movement picked up a single issue at a particular point of time. One issue might have gained significance at a given point of time due to compulsions emanating from either within or without the movement or both. Yet a host of interrelated and interconnected issues always flooded the agenda of the Movement. This fact has been pointed out by "the NBA" itself.

However, despite having a myriad of issues before it, the NBA focused on some specific issues at specific points of time during the course of the movement. These issues too have their roots touching the broad issues of deprivation, social Justice and the necessity to change the present state of affairs. The following sections how the movement experienced the change in the nature of priority issues at different phases of the movement.

■ 5.2. Transformations of the Strategies ⟶

In this section we dwell on an analysis of the different phases of the movement with a focus on the changes in the strategies and the nature of the "REPETTORIES OF CONTENTION" (TARROW: 1998), focusing on the argument that the strategie changes and movement transformation relate to the "CYCLES OF STRUGGLES" and the "CYCLES OF LEARNING" referring to feedback loops between theory and Practice. This feedback loop is animated by a pattern. For instance, the lack of a suitable strategy or tactic in a movement maybe experienced through a failure in achieving the desired goals in a particular phase of the movement. This failure leads to the ~~develop~~ development of a new strategy, and the process goes on, sometimes with the failures experienced by the movement, and sometimes with an incremental success, with a desire to achieve more comprehensive goals through more appropriate and adequately efficient strategies and movements. This dynamism is produced in a process where movements design a set of strategies to pursue preconceived objectives and demands, discover the inadequacies and inaptness

The NBA's opposition to the dam stems from a sophisticated critique of project as a whole, and therefore, its approach has required a response that is similarly complex. Acknowledging this complexity, MEDHA PATKAR, the leader of the NBA stated that,

> *"We in India feel that the people's movements who take up these issues must have a comprehensive politico-economic, social ideology, which may not come merely from Gandhi or Marx, but a combination of various analysis, tools that all of them have offered to us"* (Interview of Medha by Venu Govindu, August 7).

Narmada Bachao Andolan (NBA)

Social activist Medha Patkar along with villagers and dam oustees of Sardar Sarovar dam from Nimad region of Madhya

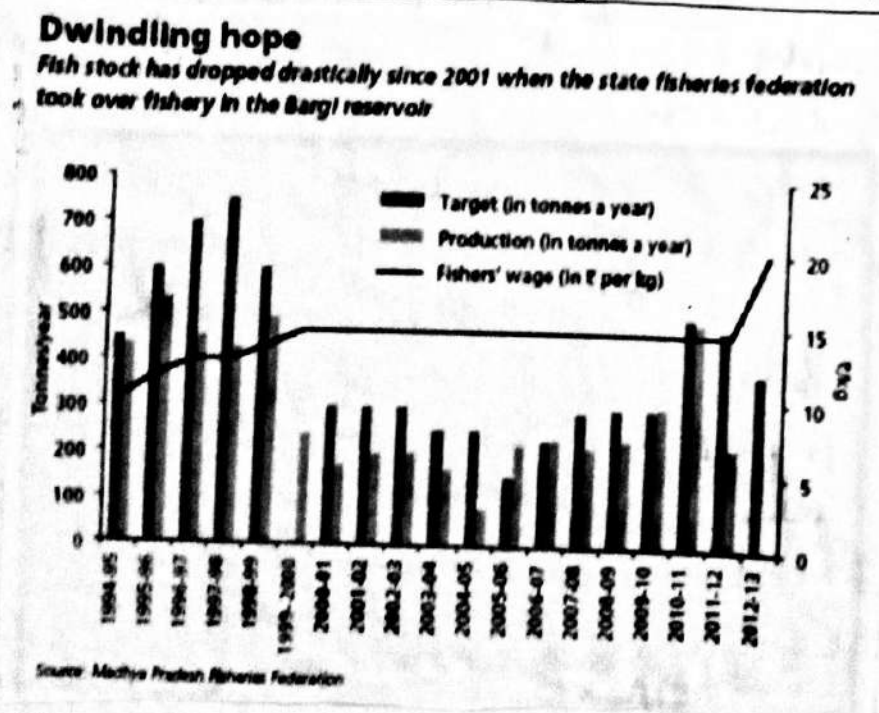
Pic- 20, Source:- Outlook website, Sitedon-1st July, 2021

of the initially employed repertories of contentions in its interactions with the opponents, leading to the understanding for the need of better strategies, and so on. In the process of such cyclic confrontations and resulant changes in strategies, the movement itself undergoes transformations, for instance, because of the changes in the nature of the support base, which in turn leading to the rethinking of experiences and further changes in strategies.

Apart from using the strategy of Gandhian non-violent direct action and its allied tactics, the movement has also devised and employed a wide range of "NARAS (Slogans)", which have acted not only as methods of resistance by succinctly articulating movement demands within demonstrations and rallies and on protest banners. "NARAS" have acted as the pulse of the movement in lifting the energy of the meetings, they have been used to punctuate the speeches of leaders, to incite moments of participation and inclusion amongst the audience, to end a person's speech or to conclude a meeting, to weave a meeting crowd together, to propagandize the goals and demands of the movement, to act as a greeting or a

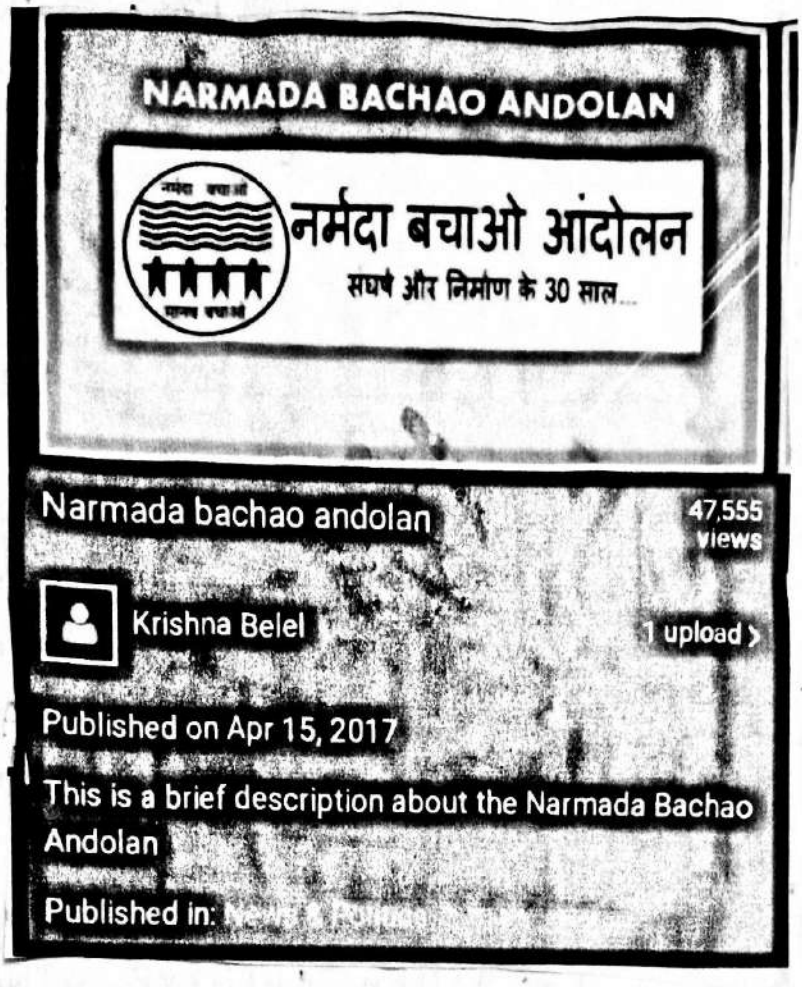
Pic- 21, NARMADA BACHAO ANDOLAN RALLY

Source:- isieWomen.Org, Sited on 1st July 2021



Pic- 22, Source:- MADHYA PRADESH FISHERS FEDARATION

farewell when an activist arrives or leaves a meating, as a call and a response meechanism unifying the speaker and the audience in a meeting, and also to add voice to particular points made by a speaker as an amplification of the voice and arguments of the speaker. The "NARAS" represent the confluence of different and yet braided counter - hegemonic discourses. For instance, "NARAS" like "KOBHI NEHI HATEGIA, BAANDH NEHI BANEGIA" (We shall Not Move, The will Not be build) "articulates the participents" political intent in the face of threatened submergenceand attempted eviction; "JANGIAL", "JAMEEN KUNI CHEE, AMRI CHEE, AMRI CHEE (To whom Does the Forest and Land Belong - It Is Ours, It Is ours) articulates the customary rights of the advasis over the forests and lands; "VIKAS CHAHIYE, VINASH NEHI" (We seek Development, Not Destruction) lay naked the failures of the developmental state to deliver common goodsjand the "NARAS" like "~~Doobenge~~ "DOOBENGIEH PAR NEHI HATENGIEH" (We will drown but we shall not move) articulates the attachment of the people to their ancestral lands and the idea of self sacrifice inherent on the practice of "SATYAGIRAHA" — the kingpin of the movement's strategy.


NARMADA BACHAO ANDOLAN
नर्मदा बचाओ आंदोलन
संघर्ष और निर्माण के 30 साल...
Narmada bachao andolan
47,555 views
Krishna Belel
1 upload
Published on Apr 15, 2017
This is a brief description about the Narmada Bachao Andolan
Published in:

Pic - 23,

5.3. Transformation in the Nature of the Movement

"The NBA", which started as a struggle of the innocent, simple tribals, has undergone a sea change in its course of over twenty years. Initially, when the movement began with its demand of the right to information about the costs and benefits of the dam and how the trauma of displacement would be compensated, the movement was a scattered one, with a series of sporadic protests by different organizations, dotting the three riparian states. This phases of the movement used lobbying and petitioning as its principal strategy.

In 1988-1989, with all organizations protesting against displacement by the "NARMADA PROJECT" and against the improper and inadequate resettlement and rehabilitation schemes coming together, the emerging collective was christened as 'the NBA'. The nomenclature of "the NBA" as an emerging collective, signified the transformation in the nature of the struggle from the sectored to a more coherent and a monolithic collective, with well defined objectives, demands and strategies. Apart from the issues of displacement, resettlement and re-habilitation, the movement also started questioning the projects in terms of its social, human and environmental costs.

Hence, in course of its evolution and development, the movement has undergone metamorphosis several times, with changes in its thematic orientations, changes in

NDTV.com

Pic- 24, another pic of MEDHA PATKAR ending "HUNGER STRIKE"

Support bases, and finally, changes in the structure of the movement, from a local movement to a national one, and finally becoming a movement of global significance.

6. Implications For Sustainable Development :-

Articulated as a discourse of oppositional populism, the social movement in the "Narmada Valley" indicts the ways in which India's development ~~strategy~~ trajectory has been moulded by the interest of the dominant groups, leading to the perpetual marginalization of the poor and the needs of social justice, participatory democracy and environmental sustainability. The movement, through its vision of alternative development and "NARA NIRMAN" activities has been attempting to bring about a change in the meaning of development and social transformation. This articulation of the vision of alternative development by the movement stems from the counter-expertise developed by the movement vis-avis the claims of the governments about environmental sustainability and the benefits of development through the project, and the movement's attempt to expose the false claims of the government. Hence, it's reconstructive and "NARA-NIRMAN" activities relate to the shifts in strategies of the movement, as a response to the State's failure to deliver public good in forms of decentralized development, social justice, equity and rights of the poor to

their legimate livelihood opperturnities. Hence. the changes and / or a combination of the charges in the parameters of the movement. its objectives & goals and strategies beat positive implecations for sustainability in the valley.

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মৃত্তিকাদূষণ —

মৃত্তিকাদূষণ বলতে বোঝায় মানুষের অনভিপ্রেত ক্রিয়াকলাপের ফলে মৃত্তিকার গুনমানের বিরূপ পরিবর্তন যা মানবজীবন এবং জীববৈচিত্রের ওপর প্রত্যক্ষ বা পরোক্ষ প্রভাব বিস্তার করে।

মৃত্তিকা মানুষের জীবনে প্রকৃতির অবচেয়ে বড়ো দান। সূর্যকিরণ, বাতাস এবং জলের সঙ্গে মৃত্তিকা উদ্ভিদ তথা প্রানীকে পুষ্টি জোগায় এবং মানুষের জীবনধারনে সাহায্য করে। মানুষের অনভিপ্রেত ক্রিয়ার ফল ফলে মৃত্তিকার চরিত্র বদলে যাচ্ছে, অতি প্রয়োজনীয় মৃত্তিকা ক্ষয়প্রাপ্ত হচ্ছে এবং বিষিয়ে উঠছে, এদের মধ্যে উল্লেখযোগ্য কয়েকটি কারন হল —

(A) কৃষিজমি, চারনভূমি এবং বনের অতিব্যবহারজনিত অবক্ষয় :

(১) যথেচ্ছ গাছ কাটার ফলে অরণ্যের বিদায় ঘটছে জমি হচ্ছে ছায়াশূন্য, অনাবৃত,

(২) যেসব উদ্ভিদ ছায়ায় জন্মায় তারা এমন তীব্র তাপ ও আলোর মুখোমুখি হয়,

(৩) বাছবিচার না করে জমিকে চারনভূমিতে পরিনত করায় জমির ওপর যে মাঝের পাতলা আবরন বা ছোটো ছোটো ঝোড়কাপ ছিল তা অপসৃত হচ্ছে।

(৪) ব্যাপক ও নিবিড় কৃষির ফলে জমির উর্বরশক্তি কমছে, তার ধারক পুষ্টি এবং প্রয়োজনীয় রাসায়নিক পদার্থের ঘাটতি দেখা যাচ্ছে।

(৬) দীর্ঘ রোদ পেয়ে মাটির উপরের স্তর প্রাণহীন হচ্ছে। বৃষ্টিতেও খুব উপরের স্তর ভিজছে। জল ধরে রাখার মতো কিছুই না থাকায় বৃষ্টির জল দ্রুত মাটির উপর দিয়ে বয়ে যাচ্ছে। জমির উপর দিয়ে জল বয়ে যাওয়ার সময় জমির প্রয়োজনীয় বিভিন্ন লবনও ধুয়ে যাচ্ছে তার সঙ্গে।

(৬) ভূমিক্ষয়ের ক্ষেত্রে বাতাসও একটা বড়ো ভূমিকা নেয়। জমির উপর কোনো আবরন না থাকায় তীব্র বাতাস জমির কিছু পদার্থকে হাওয়ায় ভাসিয়ে নিয়ে যায়। ধুলোর আকারে জমির মাটি চলে যাচ্ছে অন্যত্র। আমাদের দেশে ভূমিক্ষয় পার্বত্য এলাকায় অত্যন্ত প্রবল।

(৪) অ্যাসিড বৃষ্টির জন্য অতিরিক্ত দূষন :—

অ্যাসিডবৃষ্টির জন্য মাটির অম্লত্ব বৃষ্টির ফলে মাটিতে পটাশিয়ামের পরিমান ক্রমশ কমছে। সেই জন্যে দড়ার মতো বিষাক্ত ধাতুর পরিমান বাড়ছে। মাটিতে যেসব উপকারী অনুবিক্ষনীয় জীব থাকে তারাও ধ্বংস হচ্ছে। অম্ল পরিবেশ প্রতিকূল হওয়ার জন্য 'বৃষকের বন্ধু' বলে পরিচিত কেঁচোও ধ্বংস হচ্ছে। সব মিলিয়ে সজীব মাটি ক্রমশ অতিরিক্ত রূপান্তরিত হচ্ছে।

(৫) আবিরন রাসায়নিক পদার্থজনিত অতিরিক্ত দূষন :

(১) বিপুল পরিমানে কৃত্রিম রাসায়নিক সারের ব্যবহার মাটির বিভিন্ন উপাদানকে নষ্ট করে,

(২) কয়লাখনি এবং ধাতু গলন কেন্দ্রের যে বিপুল পরিমান বর্জ্যপদার্থ মাটির উপর জমা রাখা হয়, তা থেকে নানা বিষাক্ত পদার্থ মাটিতে মিশে তাকে বিষাক্ত করে।

(৩) পয়ঃপ্রনালী ইত্যাদি এবং শিল্পের বর্জ্যপদার্থ মাটির উপর স্তূপীকৃত করে রাখার ফলে মাটি দূষিত হয়।

(৪) কীটনাশক, আগাছানাশক (BHC, DDT) ইত্যাদি, যথেচ্ছ ব্যবহারে বিষময় হয়ে ওঠে।

(৫) পেট্রোলিয়ামজাত বিভিন্ন পদার্থ এবং তেজস্ক্রিয় মৃত্তিকাদূষণ ঘটায়। এই দূষণ জল ও জঙ্গলের সঞ্চারিত হয়ে শেষ পর্যন্ত মানুষের শরীরে ঠাঁই নিয়ে বিপত্তি ঘটায়।

(৬) যেসব তেজস্ক্রিয় মৃত্তিকাদূষণ ঘটায় তাদের মধ্যে উল্লেখযোগ্য ধাতুগুলি হল - ক্রোমিয়াম, নিকেল, দস্তা, ক্যাডমিয়াম, পারদ, সিসা ইত্যাদি। এ ছাড়া নানা শিল্প থেকে নির্গত আর্সেনিক, ফ্লুরাইড এবং সালফার ডাই অক্সাইডে গাছের পাতা বিকৃত হয়, জঙ্গল নষ্ট হয়।

(B) <u>স্যালাইনিটিজনিত মৃত্তিকাদূষণ :</u>

জলসেচ ব্যতীত আধুনিক কৃষিকাজ অচল। সামুদ্রিক উচ্ছ্বাস বা সমুদ্রের জলসেচ কাজে ব্যবহৃত হলে জমির স্যালাইনিটি বেড়ে যায়। ফলে সেই জমি ক্রমশ চাষের অনুপযুক্ত হয়ে পড়ে এবং এক সময় বন্ধ্যা জমিতে পরিনত হয়।

(E) <u>গৃহগুলি থেকে নির্গত আবর্জনা দ্বারা মৃত্তিকাদূষণ -</u>

মৃত্তিকাদূষণের অন্যতম এবং উল্লেখযোগ্য আধারন কারন হচ্ছে গৃহগুলি থেকে নির্গত বর্জ্যপদার্থ-সমূহ। এদের মধ্যে উল্লেখযোগ্য হল ভাঙা কাচের বোতল,

পলিথিনের পাউচ, প্লাস্টিকের পদার্থ, কাঠের টুকরো, প্যাকিং বাক্স ইত্যাদি যেগুলি মৃত্তিকার স্বাভাবিক গুনমানের প্রতিকূল ভাবে বিবেচিত হয়।

(F) তেজস্ক্রিয় পদার্থজনিত মৃত্তিকাদূষন:

ইউরেনিয়াম খনি বা থোরিয়াম প্রকল্পের আবর্জনা, হাসপাতাল ও বিভিন্ন পরীক্ষাগারের বর্জ্যপদার্থের মাধ্যমে এবং পারমানবিক বিস্ফোরন ও পারমানবিক চুল্লি থেকে নির্গত তেজস্ক্রিয় পদার্থের মাধ্যমে মৃত্তিকায় তেজস্ক্রিয়দূষন দেখা দেয়। এর ফল দীর্ঘস্থায়ী এবং উদ্ভিদ ও প্রানীজগতের সুদূর-প্রসারী ক্ষতির কারন হয়ে দাড়ায়। উল্লেখযোগ্য মৃত্তিকা দূষনকারী তেজস্ক্রিয় পদার্থগুলি হল — আয়োডিন - 131, বেরিয়াম - 140, ল্যানথ্যানাম - 140, সিরিয়াম - 144, সিজিয়াম - 137 ইত্যাদি।

(G) বায়োলজিক্যাল এজেন্ট দ্বারা মৃত্তিকাদূষন:

মানুষ, পক্ষী, অন্যান্য প্রানীর মল, মূত্র ইত্যাদি মাটিকে স্বাভাবিক নিয়মে দূষিত করে। মল, মূত্রের মাধ্যমে বিভিন্ন প্রকারের অনুজীবী, কৃমি নিষ্ক্রান্ত হয়। অবক্ষি বা মলের মাধ্যমে পুনরায় মানুষের শরীরে প্রবেশ করে এবং পুন: পুন আক্রমনের কারন হয়ে দাঁড়ায়।

মৃত্তিকাদূষন নিয়ন্ত্রন (Control of Soil Pollution):

(১) আবিরনভাবে বৃষ্টি ও বাতাসের দ্বারা যাতে ভূমিক্ষয় না ঘটতে পারে তার জন্য মাটিকে আবৃত করার দিকে নজর দিতে হবে। এর জন্য একদিকে যেমন ঘাসে ঢেকে দিতে হবে তেমনি গাছপালা লাগিয়ে সরাসরি বৃষ্টি যাতে মাটির ওপর পড়ে তার ক্ষয় ঘটাতে না পারে অথবা বাতাসের তীব্র ঘর্ষনে মাটি ধুলো হয়ে উড়ে যেতে না পারে তার পথেও বাধা সৃষ্টি করা দরকার। পাহাড়ি অঞ্চলে ঢালের গুণে বাধা সৃষ্টি করে জলের গতি ব্যাহত করলে ভূমিক্ষয় রোধ হয়। যথেচ্ছ চারনভূমি করতে না দেওয়া, বন কাটা বন্ধ করা, গাছ লাগানো ইত্যাদি উদ্যোগ গ্রহন করলে মৃত্তিকা ক্ষয় ও মৃত্তিকাদূষন কমানো যায়।

(২) অ্যাসিডবৃষ্টি কমানোর জন্য বিভিন্ন শিল্প থেকে আলফার তাই অক্সাইড এবং নাইট্রোজেনের বিভিন্ন অক্সাইড নির্গমনের হার নিয়ন্ত্রন করা প্রয়োজন। কারন এই গ্যাসগুলির কারনেই অ্যাসিড বৃষ্টি হয়। অন্যভাবে বলা যায়, শিল্পের মতো স্থির উৎস এবং মোটরযানের মতো চলমান উৎসগুলি যাতে বায়ুদূষন ঘটাতে না পারে তার জন্য স্থায়ী ব্যবস্থা নেওয়া দরকার।

(৩) বিভিন্ন কৃষিজ রাসায়নিক সার, কীটনাশক ও ভেষজ ইত্যাদি ব্যবহারের ক্ষেত্রে একদিকে যেমন সংযম দেখাতে হবে, অন্যদিকে গুলি যাতে মাটির অক্সো

মিশে তার ক্ষতি করতে না পারে তার দিকেও দৃষ্টি রাখা দরকার।

(৪) পৌরজঞ্জাল, নর্দমার ময়লা কিংবা শিল্পকারখানার বর্জ্যপদার্থকে মাটির উপর না ফেলে তাকে একদম উৎসেই পরিশুদ্ধ করলে ওজোন দ্বারা যে মৃত্তিকা দূষণ ঘটে তাকে নিয়ন্ত্রণ করা যায়,

(৫) মৃত্তিকাদূষণের অন্যতম উৎস হল জল। তাই জলে যাতে বিভিন্ন দূষক মিশতে না পারে তার জন্য বিভিন্ন ব্যবস্থা নেওয়া দরকার।

(৬) সমুদ্র উপকূল বর্তী অঞ্চলে বাগদা চিংড়ির চাষ নিয়ন্ত্রণ করা দরকার যাতে অধিক লবণাক্ত জলের কারণে মৃত্তিকা দূষণ না হয়,

(৭) কৃষিকার্জে কৃত্রিম সারের পরিবর্তে প্রাকৃতিক সারের ব্যবহারের উপর অধিক গুরুত্ব প্রদান করা উচিত। যেমন প্রাকৃতিক সার গোবর প্রভৃতির,

(৮) পারমানবিক বিস্ফোরণ ও পারমানবিক চুল্লি থেকে নির্গত তেজস্ক্রিয় পদার্থ যাতে মাটিতে মিশতে না পারে সেদিকে নজর দেওয়া উচিত,

মৃত্তিকাদূষণের পরিণাম (Consequences of Soil pollution) : —

(১) বিভিন্ন ধরনের রাসায়নিক পদার্থ যেমন - অ্যাসিড, ক্ষার, পেস্টিসাইড, হার্বিসাইড, ছত্রাকনাশক, ভারী ধাতু ইত্যাদি মৃত্তিকার রাসায়নিক, ভৌত ও জৈব ধর্মের পরিবর্তন ঘটিয়ে উর্বরতা শক্তি হ্রাস ঘটায়,

(২) কতিপয় দীর্ঘস্থায়ী টক্সিক, রাসায়নিক পদার্থ মৃত্তিকাস্থিত ক্লোরা ও ফনার বিনাশ ঘটিয়ে মৃত্তিকার উৎপাদন শীলতা হ্রাস ঘটায়,

(৩) নাইট্রোজেন ও গন্ধকযৌগযুক্ত সার ইউট্রিফিকেশন প্রক্রিয়াকে ত্বরান্বিত করে,

(৪) তেজস্ক্রিয় বর্জ্যপদার্থ মৃত্তিকা থেকে খাদ্যশৃঙ্খলের মাধ্যমে মানুষের শরীরে প্রবেশ করে নানাবিধ জটিল রোগের সৃষ্টি ঘটায়,

তথ্যসূত্র —

(১) দুলালচন্দ্র আঁতরা - পরিবেশ বিদ্যা গ্রন্থ
(২) ছায়া প্রকাশনী প্রকাশিত পরিবেশ বিদ্যা গ্রন্থ,

কৃতজ্ঞতা স্বীকার

'মৃত্তিকা দূষণ' শীর্ষক প্রকল্পটি রূপায়ণের ক্ষেত্রে যিনি প্রাথমিক পাঠদান থেকে শুরু করে প্রতিবেদন রচনা পর্যন্ত প্রতিটি ক্ষেত্রে সাহায্য করেছেন, তিনি হলেন কলকাতা বিশ্ববিদ্যালয়ের অন্তর্গত স্কটিশ চার্চ কলেজের অধ্যাপক ড. দেবাশিস ঘোষ মহাশয়, এ ছাড়া সাহায্য করেছেন কলেজের অন্যান্য অধ্যাপক এবং অধ্যাপিকা, এঁদের প্রত্যেকের কাছে আমি কৃতজ্ঞ, সবশেষে প্রত্যেকের কাছ থেকে আন্তরিক সাহায্য পাওয়ার জন্য তাদের অভিনন্দন ধন্যবাদ জানাই।

প্রিয়াঙ্কা মজুমদার | 06/09/2020
ছাত্রীর স্বাক্ষর ও তারিখ

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Subject for Tutorial - AECC ENVS

Semester - II

Tutorial Topic - Global Warming

• What is global warming?

⇒ Since the Industrial Revolution, the global annual temperature has increased in total by a little more than 1 degree celsius, or about 2 degrees Fahrenheit. Between 1880 - the year that accurate recordkeeping began - and 1980, it rose on average by 0.07 degrees celsius (0.13 degrees) every 10 years. Since 1981, however, the rate of increase has more than doubled. For the last 40 years, we've seen the global annual temperature rise by 0.18 degrees celsius, or 0.32 degrees Fahrenheit, per decade.

The result? A planet that has never been hotter. Nine of the 10 warmest years since 1880 have occurred since 2005 - and the 5 warmest years on record have all occurred since 2015. climate change deniers have argued that there has been a "pause" or a "slowdown" in rising global temperatures, but numerous studies, including a 2018 paper published in the Journal Environmental Research letters, have disproved this claim. The impacts of global warming are already harming people around the world.

Now climate scientists have concluded that we must limit global warming to 1.5 degrees celsius by 2040 if we are to avoid a future in which everyday life around the world is marked by its worst, most devastating effects. the extreme droughts, wildfires, floods, tropical storms, and other disasters that we refer to collectively as climate change. These effects are felt by all people in one way or another but are experienced most acutely by the underprivileged, the economically marginalized, and people of color, for whom climate change is often a key driver of poverty, displacement, hunger, and social unrest.

- What causes global warming?

Global warming occurs when carbon dioxide (CO_2) and other air pollutants collect in the atmosphere and absorb sunlight and solar radiation that have bounced off the earth's surface. Normally this radiation would escape into space, but these pollutants, which can last for years to centuries in the atmosphere, trap the heat and cause the planet to get hotter. These heat-trapping pollutants - specifically carbon dioxide, Methane, nitrous oxide, water vapor, and synthetic fluorinated gases - are known as greenhouse gases, and their impact is called the green house effect.

Though natural cycles and fluctuations have caused the earth's climate to change several times over the last 800,000 years, our current era of global warming is directly attributable to human activity - specifically to our burning of fossil fuels such as coal, oil, gasoline, and natural gas, which results in the greenhouse effect. In the united states, the largest source of greenhouse gases is transportation (29 percent), followed closely by electricity production (28 Percent) and industrial activity (22 percent).

curbing dangerous climate change requires very deep cuts in emissions, as well as the use of alternatives to fossil fuels worldwide. The good news is that countries around the globe have formally committed - as part of the 2015 Paris climate Agreement - to lower their emissions by setting new standards and crafting new policies to meet or even exceed those standards. The not-so-good news is that we're not working fast enough. To avoid the worst impacts of climate change, Scientists tell us that we need to reduce global carbon emissions by as much as 40 Percent by 2030. For that to happen, the global community must take immediate, concrete steps.

to decarbonize electricity generation by equitably transitioning from fossil fuel-based production to renewable energy sources like wind and and solar; to electrify our cars and trucks; and to maximize energy efficiency in our buildings, appliances, and industries.

• How is global warming linked to extreme weather?

Scientists agree that the earth's rising temperatures are fueling longer and hotter heat waves, more frequent droughts, heavier rainfall, and more powerful hurricanes.

In 2015, for example, scientists concluded that a lengthy drought in california - the state's worst water shortage in 1,200 years - had been intensified by 15 to 20 percent by global warming. They also said the odds of similar droughts happening in the future had roughly doubled over the past century. And in 2016, the National Academies of Science, Engineering, and medicine announced that we can now confidently attribute some extreme weather events, like heat waves, droughts, and heavy precipitation, directly to climate change.

The earth's ocean temperatures are getting warmer, too - which means that tropical storms can pick up more energy. In other words, global warming has the ability to turn a category 3 storm into a more dangerous category 4 storm. In fact, scientists have found that the frequency of North Atlantic hurricanes has increased since the early 1980, as has the number of storms that reach categories 4 and 5. The 2020 Atlantic hurricane season included a record-breaking 30 tropical storms, 6 major hurricanes, and 13 hurricanes altogether. with increased intensity come increased damage and death. The united states saw an unprecedented 22 weather and climate disasters that caused at least a billion dollar's worth of damage in 2020, but 2017 was the costliest on record and among the deadliest as well. Taken together

that year's tropical storms (including Hurricanes Harvey, Irma, and Maria) caused nearly $300 billion in damage and led to more than 3,300 fatalities.

The impacts of global warming are being felt everywhere. Extreme heat waves have caused tens of thousands of deaths around the world in recent years. And in an alarming sign of events to come, Antarctica has lost nearly four trillion metric tons of ice since the 1990s. The rate of loss could speed up if we keep burning fossil fuels at our current pace, some experts say, causing sea levels to rise several meters in the next 50 to 150 years and wreaking havoc on coastal communities worldwide.

- What are the other effects of global warming?

Each year scientists learn more about the consequences of global warming, and each year we also gain new evidence of its devastating impact on people and the planet. As the heat waves, droughts, and floods associated with climate change become more frequent and more intense, communities suffer and death tolls rise.

Global warming is already taking a toll on the United States. And if we aren't able to get a handle on our emissions, here's just a smattering of what we can look forward to:

- Disappearing glaciers, early snowmelt, and severe droughts will cause more dramatic water shortages and continue to increase the risk of wildfires in the American West.
- Rising sea levels will lead to even more coastal flooding on the Eastern seaboard, especially in Florida, and in other areas such as the Gulf of Mexico.
- Forests, farms, and cities will face troublesome new pests, heat waves, heavy downpours, and increased flooding. All of these can damage or destroy agriculture and fisheries.

Though everyone is affected by climate change, not everyone is affected equally. Indigenous people, people of color, and the economically marginalized are typically hit the hardest. Inequities built into our housing, health care, and labor systems make these communities more vulnerable to the worst impacts of climate change - even though these same communities have done the least to contribute to it.

• Where does the United States stand in terms of global-warming contributors?

In recent years, China has taken the lead in global-warming pollution, producing about 26 percent of all CO2 emissions. The United States comes in second. Despite making up just 4 percent of the world's population, our nation produces a sobering 13 percent of all global CO2 emissions - nearly as much as the European Union and India (third and fourth place) combined. And America is still number one, by far, in cumulative emissions over the past 150 years. As a top contributor to global warming, the United States has an obligation to help propel the world to a cleaner, safer, and more equitable future. Our responsibility matters to other countries, and it should matter to us, too.

• Is the United States doing anything to prevent global warming?

We've started. But in order to avoid the worsening effects of climate change, we need to do a lot more - together with other countries - to reduce our dependence on fossil fuels and transition to clean energy sources.

Under the administration of president Donald Trump (a man who falsely referred to global warming as a "hoax"), the United States withdrew from the Paris Climate Agreement, rolled back or eliminated dozens of clean-air protections, and opened up federally managed lands, including culturally sacred national monuments, to fossil fuel development. Although President Biden has pledged to get the country back on track, years of inaction during and before the Trump administration - and our increased understanding of global warming's serious impacts - mean we must accelerate our efforts to reduce greenhouse emissions.

Despite the lack of cooperation from the Trump administration, local and state governments made great strides during this period through efforts like the American cities climate challenge and ongoing collaborations like the Regional Greenhouse Gas initiative. Meanwhile, industry and business leaders have been working with the public sector, creating and adopting new clean-energy technologies and increasing energy technologies and increasing energy efficiency in buildings, appliances, and industrial processes. Today the American automotive industry is finding new ways to produce cars and trucks that are more fuel efficient and is committing itself to putting more and more zero-emission electric vehicles on the road. Developers, cities, and community advocates are coming together to make sure that new affordable housing is built with efficiency in mind, reducing energy consumption and lowering electric and heating bills for residents. And renewable energy continues to surge as the costs associated with its production and distribution keep falling. In 2020 renewable energy sources such as wind and solar provided more electricity than coal for the very first time in U.S. history.

President Biden has made action on global warming a high priority. On his first day in office, he recommitted the United States to the Paris Paris climate Agreement a strong signal that we were determined to join other nations in cutting our carbon pollution to support the shared goal of preventing the average global temperature from rising more than 1.5 degrees celsius above preindustrial levels. (Scientists say we must stay below a 2-degree increase to avoid catastrophic climate impacts). And significantly, the president has assembled a climate team of experts and advocates who have been tasked with pursuing ~~the~~ action both abroad at home while furthering the cause of environmental justice and investing in nature-based solutions.

• Is global warming too big a problem for me to help tackle?
No! While we can't win the fight without large-scale government action at the national level, we also can't do it without the help of individuals who are willing to use their voices, hold government and industry leaders to account, and make changes in their daily habits.

Wondering how you can be a part of the fight against global warming? Reduce your own carbon footprint by taking a few easy steps: Make conserving energy a part of your daily routine and your daily routine and your decisions as a consumer. When you shop for new appliances like refrigerators, washers, and dryers, look for products with the government's Energy Star label, they meet a higher standard for energy efficiency than the minimum federal requirements. When you buy a car, look for one with the highest gas mileage and lowest emissions. You can also reduce your emissions by taking public transportation or carpooling when possible.

And while new federal and state standards are a step in the right direction, much more needs to be done. Voice your support of climate-friendly and climate change preparedness policies, and tell your representatives that equitably transitioning from dirty fossil fuels to clean power should be a top priority healthy, more secure communities

You don't have to go it alone. Either movements across the country are showing how climate action can build community, be led by those on the front lines of its impacts, and create a future that's equitable and just for all.

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Access date- 01/07/2021

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SEMESTER : 2

PROJECT TITLE : GREEN HOUSE EFFECT

SUBJECT : ENVS (AECC)

PAGE NO : 13

Introduction

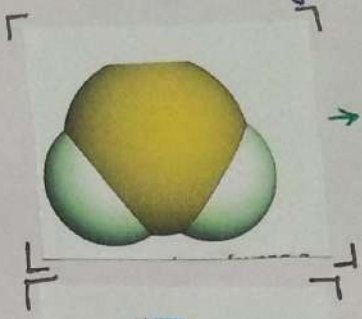
Over the last decade, Scientists have studied extensively the greenhouse effect, which holds that the accumulation of carbon dioxide (CO_2) and other greenhouse gases (GHGs) is expected to produce global warming and other significant climatic changes over the next century. Along with the Scientific research have come growing alarm and calls for drastic curbs on the emissions of greenhouse gases, as for example the reports of the Intergovernmental Panel on Climate Change (IPCC [1990]) and the Second World Climate Conference (October 1990). To date, these call to arms for forceful ~~mea~~ measurs to ~~Saw~~ slow green-house warming have been made without any Serious attempt to weigh the costs and benefits of climatic change ~~and~~ or alternative control strategies.

□ Many chemical compounds present in Earth's atmosphere behave as 'greenhouse gases' These are gases which allow direct sunlight (relative short wave energy) to reach the Earth's surface Unimpeded. As the Shortwave energy (that in the visible and ultraviolet portion of the Spectra) heats the surface, longer-wave (infrared) energy (heat) is reradiated to the atmosphere. Greenhouse gases absorb this energy, thereby allowing less heat to escape back to Space, and 'trapping' it in the lower atmosphere.

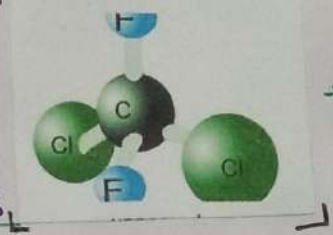
Definition

Greenhouse gases are gases in Earth's atmosphere that trap heat. They let sunlight pass through the atmosphere, but they prevent the heat that the sunlight brings from leaving the atmosphere. The main greenhouse gases are:

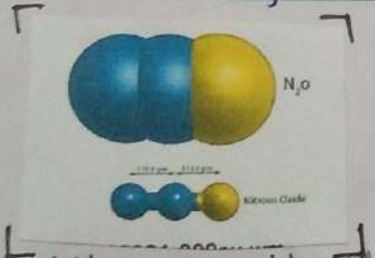
- Water vapor
- Carbon dioxide
- Methane
- Ozone
- Nitrous oxide
- Chlorofluorocarbons



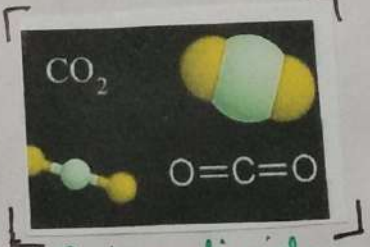
→ Water vapor



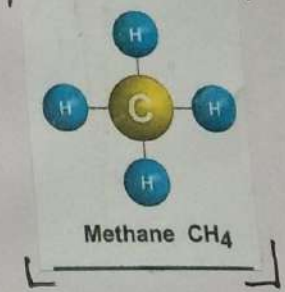
→ Chlorofluorocarbons



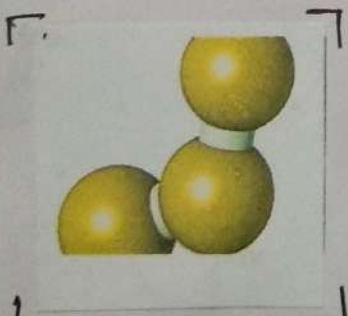
Nitrous oxide



Carbon dioxide



Methane CH_4



ozone

Greenhouse gases are gases that can trap heat. They get their name from greenhouses. A greenhouse is full of ~~green~~ windows that let in sunlight. That sunlight creates warmth. The big trick of a greenhouse is that it doesn't let that warmth escape.

☐ That's exactly how greenhouse gases act. They let sunlight Pass through the atmosphere, but they Prevent the heat that the sunlight brings from leaving the atmosphere, but they prevent the heat that the Sunlight brings from leaving the atmosphere. Overall, greenhouse gases are a good thing. Without them, our planet would be too cold, and life as we know it would not exist. But there can be too much of a good thing. Scientists are worried that human activities are adding too much of these gases to the atmosphere.

The Casues of Greenhous Gases

The casuses of the greenhouse effect are as follows:

The use of combustible minerals in ~~ind~~ industries – coal, oil, natural gas, which emits a huge amount of carbon dioxide and other harmful compounds into the atmosphere when burned; different means of transportation – cars and trucks emit exhaust fumes that also pullute the air and exchance the greenhouse effect; deforestation, which absorbs carbon ~~dio~~ dioxide and ~~rele~~ releases oxygen, and ~~which~~ with the destruction of each tree on the planet (Table 1). The increase in Population affects the growing demand for food, clothing, housing. Correspondingly, on order to ~~company~~ comply with this demand industrial production is growing, which is increasingly polluting the air with greenhouse gases; agro chemistry and fertilizers contain a different number of compounds, the evaporation of which releases nitrogen – one of the greenhouse gases; decomposition and burning of garbage at landfills contributes to the increase of greenhouse gases.

Table 1. Greenhouse gas summary

Compound	Formula	Concentration in atmosphere (ppm)	Contribution (%)
• Water vapour and clouds	H_2O	10-50,000 (A)	36-72%
• Carbon dioxide	CO_2	~400	9-26%
• Methane	CH_4	~1,8	4-9%
• Ozone	O_3	2-8 (B)	3-7%

Greenhous Effect

Many greenhouse gases occur naturally in the atmosphere, such as Carbon ~~dio~~ dioxide, ~~me~~ methane, Water vapor and nitrous oxide While others are synthetic. Those that are man-made include the ~~chl~~ chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs) and Perfluorocarbons (PFCs), as well as Sulfur hexafluoride (SF_6). Atmospheric concentrations of ~~boo~~ both the natural and man-mad gases have been rising over the last few centuries due to the ~~ind~~ industrial revolution. As the global population has increased and our reliance on fossil ~~fu~~ fuels (such as coal, oil and natural gas) has been firmly solidfied, So emissions of these gases have risen.

□ While gases such as carbon dioxide occur naturally in the atmosphere, through our interference with the carbon cycle (through burning forest lands, or mining and burning coal), we artificially move carbon from Solid Storage to its gaseous state, thereby increasing atmospheric Concentrations.

⊞ There is great uncertainty about the impact of climate of climate change upon Sea-level change. Recent Scientific views are in the range of 30 to 60 cm. over the next century. EPA (1988) ~~et~~ estimates the cost of a 50cm Sea-level rise for the United States will fail in there Categories: land loss of around 4000 Square miles, Protection costs (by leves and dikes) of high-value ~~its~~ ~~in~~

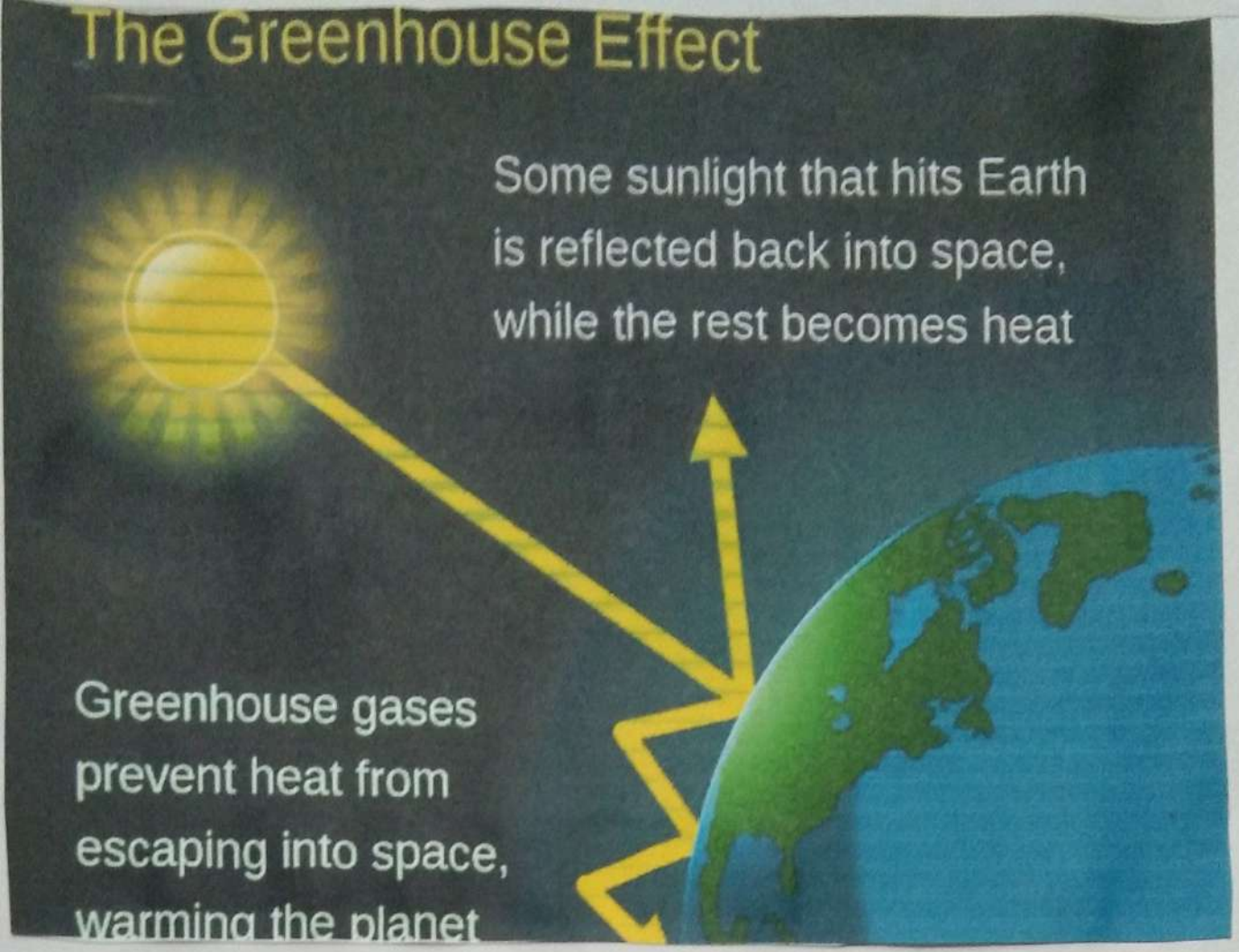
Property, and miscellaneous Protection of open coasts. The total capital value is in the order of $50 billion, which is approximately 0·05% of projected cumulative gross private domestic investment over the Period 1985 – 2050.

Many other sectors are likely to be affected, although numerical estimates of the effects are incomplete. Greenhouse warming will increase the demand for space cooling and decrease the demand for space heating, with but a small net impact on the energy sector. The forest Products industry may benefit from CO_2 fertilisation. Water Systems (Such as runoff in rivers or the length of ice-free Periods) may be significantly affected, but the costs are likely to be determined more by the rate of ~~ed~~ climate change than the new equilibrium climate. Construction in temperate climates ~~Change~~ will be favourably affected because of a longer Period of warm weather. For recreation and water transportation, the outlook is mixed depending upon the inital climate. Cold regions may gain while hot regions may lose; investments in water skiing will appreciate while those in snow skiing will depreciate. But for the bulk of the economy – manufacturing, mining, utilities, finance, trade and most service industries – it is difficult to find major direct impacts of the projected climate changes over the next 50 to 75 years.

A full assessment of the impact of greenho warming must, of course, include regions outside the United States. To date, studies for other countries

are fragmentary, and is not possible to make any firm conclusions at this time. A preliminary reading of the evidence is that other advanced industrial countries will experience modest impacts similar to those of the United states. On the other hand, small and poor countries, Particularly ones with low population mobility in narrowly restricted climatic zones, may be severly affected. Much more work on the potential impact of climate change on developing countries needs to be done.

- Green house gases trap the infrared heat that is trying to escape back into space. The atmosphere trapping, or reflection of radiant energy back toward the earth. Increase in the global averge surface temperature. Greenhouse effect, contributing to global warming.
- The human activities release large amounts of CO_2 (which is the primary greenhouse gas) in addition to those naturally occurring in the atmosphere, increasing the greenhouse effect and global warming. Human activities have signification have significantly distrubed the natural carbons cycle by extracting long-buried fossil fuels and burning them for energy thus releasing CO_2 to the atmosphere. The sun's radiation strikes the Earth's atmosphere in the form of light, Ultraviolet Radiation (UV) and Infrared Radiation (IR).
- 30 percent of the radiation striking Earth's atmosphere immediately reflected back out to space by clouds, ice, snow, sand, and other reflected surfaces. The oceans, land and atmosphere release heat in the form of IR thermal radiation which passes out of the atmosphere and into space.


The Greenhouse Effect
Some sunlight that hits Earth is reflected back into space, while the rest becomes heat
Greenhouse gases prevent heat from escaping into space, warming the planet

Steps We Can take to save our Planet

Biochar production and application from crop straw has been proposed as one effective countermeasure to mitigate climate change through increasing soil carbon storage while decreasing direct GHGs emission and improving soil fertility and crop productivity. The high porosity of biochar may also be very beneficial for improving soil structure and water holding capacity and therefore, mitigating the increasing drought stress in dryland agriculture due to climate change. Biochar amendment to cropland may have indirect effects on reducing N demand by crop production through enhanced N use efficiency which in turn may reduce the indirect emission of GHGs from N fertilizer industry.

As agricultural production has strong impacts on greenhouse gas emissions, effective and applicable countermeasures for mitigating these emissions are urgently required globally. This study provided an insight into greenhouse gas emissions and greenhouse gas intensity as affected by biochar amendments in maizeintensity systems of the Central China Plain. Biochar amendments significantly decrased the total direct N_2O emission from the maize field during the whole maize growing agronomic N use of biochar as a soil amendment could be adopted as an effective and applicable measure to achieve simultaneously high grain yield and low global warming potential intensity of maize production

in croplands of calcareous soil poor in organic carbon, which are very extensive and critical for maize production in croplands of calcareous soil poor in organic carbon, which are very extensive and critical for maize production in North China. Moreover, the application of biochar from crop residues may offer additional carbon negative benefits though avoiding burning in field and bio-resource recycling, which have been a great concern with air pollution of China's agriculture.

Today, the problem of the greenhouse effect is a global ecological issue. Experts believe that the widespread adoption of the following measures will help slove the problem: changes in the use of energy sources. Reduction in the proportion and quantity of fossil fuels (containing carbon peat, coal) and oil. The transition to natural gas will significantly reduce CO_2 emissions. An increase in the share of alternative energy sources (Sun, wind, water) will reduce emissions, because these methods allow to receive energy without troubling the environment. When using them, harmful gases are not released. Change in energy policy. An increase in efficiency at power plants. Reduction of products' facades, window openings, heating plants give a significant result, decreasing the amount of emissions. Solving the problem at the enterprisal, industrial, state levels entails a global improvement of the situation. Everyone can contribute to solving this problem. energy saving, proper disposal of garbage, warming up their own home: development of technologies aimed at obtaining

Products in new, environmentally friendly ways; use of secondary resources, which is also one of the measures to reducts waste, the number and volume of landfills; restoration of forests, fighting fires in them, increasing the area as a way to reduce the concentration of carbon dioxide in the atmosphere.

Today, the fight against greenhouse gas emissions is at the international level. World summits devoted to this problem are being held, documents are being created a device of active molecules that decompose greenhouse gases, and then turn them into useful aerosols. In those years there was not enough technically developed equipment that would allocate these molecules in a free form.

Conclusion

Moreover, climate change is ~~bele~~ believed, by some researchers, to be company's new long-term breakthrough wile maintaining competitive advantage and environmental sustainability. To enhance reputation and access to customers and wide and broad new markets, climate change is developed in corporate strategy, particularly by adopting greenhouse emissions friendly technology.

Although the carbon emessions study remains a debate among previous researchers, this issue is an interesting study in this article, where we develop and other to fill this gap of carbon emissions and climate change. This study proposes two forecasting models for greenhouse gas emissions balance forecast and greenhouse gas emissions forecast until 2030 by ~~indu~~ industry to be a solution to the aforementioned research gap. This research also develops an empirical research model to further discuss their relationship.

Acknowledgement

Reference :

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