

To whom it may concern

**Subject: Completion of ENVS Project by BNGA, HINA and HISA students
of Semester II in 2022**

The undersigned hereby certifies that the students mentioned in the table given below have completed their AECC 2 - ENVS projects for the University of Calcutta B.A/B.Sc. Semester-II Examination, 2022. These students are mentioned in the modified template of Metric 1.3.2 (as DVV compliance) as ENVS-BNGA_HINA_HISA with pdf link of their projects stated alongside.

SL. NO.	REGISTRATION NO.	COLLEGE ROLL	NAME	SUBJECT
1	013-1211-0028-21	21/BAH/0110	MIHIKA SHOME	BNGA
2	013-1211-0046-21	21/BAH/0142	UPASANA DAS	BNGA
3	013-1211-0049-21	21/BAH/0148	ANAMIKA SHAW	BNGA
4	013-1212-0002-21	21/BAH/0005	SUMANA SARKAR	BNGA
5	013-1211-0005-21	21/BAH/0024	PRERANA MISHRA	HINA
6	013-1211-0026-21	21/BAH/0097	RANI MALLICK	HINA
7	013-1211-0055-21	21/BAH/0156	CHANDNI SHAW	HINA
8	013-1211-0039-21	21/BAH/0132	ADRITA BHATTACHARJEE	HISA
9	013-1211-0042-21	21/BAH/0136	SOUMYAJITA MITRA	HISA
10	013-1211-0065-21	21/BAH/0172	ATYUSHA PAL	HISA
11	013-1211-0070-21	21/BAH/0180	PRITHA DAS	HISA
12	013-1211-0073-21	21/BAH/0185	LOVLEEN SINGH	HISA
13	013-1211-0077-21	21/BAH/0192	DISHA SHAW	HISA
14	013-1211-0084-21	21/BAH/0203	SUKANYA GHOSH	HISA
15	013-1211-0085-21	21/BAH/0204	LABONY PAUL	HISA
16	013-1211-0086-21	21/BAH/0205	NEHA MITRA	HISA
17	013-1211-0108-21	21/BAH/0237	SAHELI DAS	HISA
18	013-1211-0111-21	21/BAH/0242	MEHAR SALIM	HISA
19	013-1212-0003-21	21/BAH/0010	POORNIMA KUMARI DAS	HISA



Arpita
Principal
Gokhale Memorial Girls' College

গোখেল মেমোরিয়াল গার্লস কলেজ



নাম - মিহিকা সোম

শ্রেণী - দ্বিতীয় সেমেস্টার

বিষয় - পরিবেশ বিদ্যা

বিভাগ - বাংলা (অনার্স)

বর্ষ - ২০২১-২০২২

কলেজ ক্রমিক সংখ্যা - ২১ / BAH / ০১১০

ইউনিভার্সিটি ক্রমিক সংখ্যা - ২১২০১৩-১১-
০০১৩

ইউনিভার্সিটি রেজিস্ট্রেশন সংখ্যা - ০১৩-১২১১-
০০২৮-২১

প্রকল্পের বিষয় :

পুকুরের বাস্তুতন্ত্র
পর্যবেক্ষণ :

ਸ੍ਰੁਤਿ ਪਾਤ୍ର

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২. অসম্পূর্ণ -	১
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• ডুগ্মিবগ :

[illegible]

■ અક્ષર :

[illegible]

৩। ব্যুৎ :

- આવન આવડા → ભાગ્ય, સુખસુખ ।
- કામલ આવડા → 'દુષ્ટિ'નાં નિષ્ક્રમ ।
- આમી → 'દુષ્ટિ'નાં આમ, ભાગ્ય મેળવે મળ્યા ।
- કૌરવ આમી આમી આમી આમી → વિશ્વ, આકાશ ।

81 अंतर :

- [illegible]

Q. 2. 200

૯. શ્રાવણ
 • શ્રાવણ તાલના → મુખમુખા ।
 • શ્રાવણ તાલના → રંગાણાનાં લિલિલિમ્મ ।
 • શ્રાવણ → રંગાણાનાં મધ્ય ત્રિલિમ્મ રંગાણા, આશ્રુકા ।
 • શ્રાવણ તાલનાં પ્રાચીન નામ → રિમ્મ ।

■ शिक्षा :

[illegible]

■ বাঙালির সীমাবদ্ধতা :

[illegible]

■ ତଥ୍ୟସ୍ତ୍ର :

21. 'प्रगतिश्रद्धा' विद्या - यद्वा अविश्रद्धा विद्या अग्राह्य ।

২। ত্রাশ ৭ : প্রতিবেশ বিদ্যা ।

৩। স্বাভাবিক : পরিষ্কার বিদ্যা।

▪ ବୃତ୍ତାନ୍ତ ସ୍ୱୀକାର :

ଆହୁରି ବିଶାଳ ସହାୟତା ଶ୍ରୀ ଆନନ୍ଦୁ ଆମକୁ - ୧ ବାଡ଼େ
ବିଶିଷ୍ଟତାରେ ହୃଦୟ ପ୍ରସନ୍ନ କରିବା ପାଇଁ ଆମକୁ ବିଶେଷ ନିର୍ଦ୍ଦେଶ ଦେବା
ଦେଖାଯାଉଛି । ଯଦ୍ୟାପି ପ୍ରସଙ୍ଗରେ ପ୍ରାୟତଃ ଆହୁରି ବାଡ଼େ
ଦେଖା ଓ ଶ୍ରୀ ବିଶେଷ ଶ୍ରଦ୍ଧା ଓ ନିର୍ଦ୍ଦେଶ ଦେବା ଆମର ଶ୍ରଦ୍ଧା
ବାଡ଼େ ହୃଦୟ । ସିନ୍ଧୁବାଦୀ ଦ୍ଵାରା ଆମକୁ ଆମର ମନ
ପ୍ରଭୃତିରୁ ହରାଇବା ଚେଷ୍ଟା ହେଉଛି ।

famanta

निर्दिष्टात्मक प्राश्न

তারিখ - 25/05/2022

গোখেল মেমোরিয়াল গার্লস কলেজ



নাম - উপাসনা দাস

শ্রেণী - দ্বিতীয় সেমেস্টার

বিষয় - পরিবেশ বিদ্যা

বিভাগ - বাংলা (অনার্স)

বর্ষ -

কলেজ ক্রমিক সংখ্যা - ২১ / BAH / ০১৪২

ইউনিভার্সিটি ক্রমিক সংখ্যা - ২২২০২৩-২২-০০৩০

ইউনিভার্সিটি রেজিস্ট্রেশন সংখ্যা - ০২৩-২২২২-০০৪৬
-২২

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চিত্র: পরিবেশ দূষণ

পরিবেশ দূষণ

দূষণ হল প্রাকৃতিক পরিবেশে দূষিত পদার্থের প্রবর্তন যা অতিদ্রুত পরিবর্তন ঘটায়, দূষণ রাসায়নিক পদার্থ বা ক্ষতিকর রূপ নিতে পারে, যেমন- শব্দ, তাপ বা আলো, দূষককারী, দূষণের উপাদান হয় বিশেষ পদার্থ/ক্ষতিকর বা প্রাকৃতিকভাবে ঘটে যাওয়া দূষক হতে পারে,

পরিবেশ দূষণ আজ আমাদের গ্রহে মানবতা এবং অন্যান্য জীবন গঠনের ঝুঁকি সৃষ্টি করেছে, গুরুতর অবস্থাগুলির মধ্যে একটি, পরিবেশগত দূষণকে পৃথিবী বা বস্তুগত জৈব ও জৈবিক উপাদানের এমন মাধ্যম দূষিত করা যে স্বাভাবিক পরিবেশগত প্রক্রিয়াগুলি বিরূপভাবে প্রভাবিত হয়, দূষককারীগুলি প্রাকৃতিকভাবে ঘটিতে পারে এমন পদার্থ বা ক্ষতিকর হতে পারে, কিন্তু প্রাকৃতিক মাধ্যম বেশি হলে জৈবগত দূষক হিসাবে বিবেচনা করা হয়, প্রাকৃতিক অবস্থার যে কোনও ব্যবহার প্রকৃতি নিজেকে পুনরুদ্ধার করার ক্ষমতার চেয়ে বেশি হারে বায়ু, জল এবং জমির দূষণের কারণ হতে পারে,

পরিবেশগত বায়ু, পানি, মাটি, শব্দ এবং আলো- পূর্ণ দূষণ বিভিন্ন স্তরের, এগুলো জীবন বৃদ্ধির গতি করে, বর্তমানে দূষণ অনস্বীকার্য, পরিবেশগত, স্বাস্থ্য এবং পরিবেশ এর সাথে মিথস্ক্রিয়া করে নানান পরিবর্তনের মূল্য দিয়ে গেছে,

পরিবেশ দূষণের প্রকারভেদ





চিত্র:- বায়ুদূষণ

বায়ুদূষণ

বাতাসে বিস্মাক্ত বাসায়নিক দ্রব্য বা ঘেঁড়ের উপস্থিতি যদি এমন পরিমাণে থাকে যে তা মানব স্বাস্থ্যের জন্য কুঁকিযুক্ত হয়ে ওঠে, তবে তাকে বায়ুদূষণ বলা হয়,

⊗ বায়ু দূষণের কারণ:-

- গাছপালা ও প্রাণী- ভাঙ্গনা পোতালের জন্য,
- কলকারখানা ও যানবাহন থেকে নির্গত ধোঁয়ার জন্য,
- বিভিন্ন ক্ষতিকারক গ্যাস ও ইলিকট্রনিক বায়ুতে ক্ষেপার জন্য,
- মেঝানে-মেঝানে মলমূত্র ত্যাগের ফলে দুর্গন্ধ বায়ুতে মিশে বায়ুকে দূষিত করে,

⊗ বায়ু দূষণের পার্শ্বপ্রতিক্রিয়া:-

- | | |
|---------------------|------------------|
| • গ্রিনহাউস প্রভাব | • অ্যাসিড বৃষ্টি |
| • ওজোন স্তরের বিনাশ | • বিশ্ব উষ্ণায়ন |

⊗ বায়ু দূষণের সমাধান:-

- | | |
|---------------------------|---------------------------------|
| • বনজুড়ন | • অসংলগ্ন শক্তির ব্যবহার |
| • বিস্কৃত প্রাণীর ব্যবহার | • বায়ু পরিষ্কারক যন্ত্র স্থাপন |



চিত্র: জলসঞ্চয়ন

জলসঞ্চয়ন

জলের অভাবে কোনো বস্তু পদার্থ বিশেষ যাওয়ার ফলে যদি জল কোথা হুম এক জলের ক্ষেত্র, বায়বনিক ও ভৌম বৈশিষ্ট্যের পরিবর্তন ঘটে এবং তার ফলস্বরূপ জলই উদ্ভিদ, প্রাণী ও মানুষের জীবিত অঙ্গাঙ্গী থাকে, তাহলে তাকে জলসঞ্চয়ন বলে,

❖ জল সঞ্চয়ের কারণ:-

- শিল্প ও কলকারখানার বস্তু পদার্থ জলকে বেশি দ্রুতিতে ক্ষুণ্ণ,
- কৃষকের ভাণ্ডার, বাগানের জলসঞ্চয়ন জল নষ্ট হয়ে ও জলাশয়কে দূষিত করে,
- বৃষ্টিজলে নানাবিধ আর, কীটনাশক মিশ্রণ থাকে, যেটি প্রক্রিয়ায় প্রকৃতি মাটির নিচে গিয়ে ভূগর্ভস্থ জলকে দূষিত করে,
- রোগজীবাণু, ব্যাকটেরিয়া, প্লাস্টিকোমা ইত্যাদি মিশ্রিত এই জল জল পয়ঃপ্রণালী দিয়ে নদীতে পড়ে দূষণ ঘটায়,

❖ জল সঞ্চয়ের অঙ্গাঙ্গী:-

- জলের ভাণ্ডার রোধ
- উষ্ণ জল শীতলীকরণ
- কীটনাশক ও বায়বনিক আরের ব্যবহার হ্রাস
- মনুষ্য জল পরিবহনে অতর্কতা অবলম্বন



চিত্র:- স্মৃতিদূষণ

স্মৃতিদূষণ

স্মৃতি দূষণ বলতে রাসায়নিক বস্তুর নিষ্ক্ষেপ কিংবা ড্র-এজেন্ট
যাগুলির কারণে নিঃসৃত বিষাক্ত রাসায়নিক পদার্থের মিশ্রণের
কারণে জমির উর্বরতা ক্ষতি নষ্ট হওয়াকে বোঝানো হয়ে থাকে।

❊ স্মৃতি দূষণের কারণ:—

- বৃষ্টিচৌহান
- অতিরিক্ত পশুচারণ
- ধানিজ উত্তোলন
- অগ্নিকাণ্ড
- অতিরিক্ত জলসেচ
- অরিসেচনিক অপব্যর্থন

❊ স্মৃতি দূষণের ফলাফল:—

- রাসায়নিক সার ও কীটনাশকের ব্যবহারে উর্বরতা হ্রাসকারী
বস্তুবিষয়, ফেচো ইত্যাদি দ্বারা যায়,
- অস্বাভাবিক পদার্থ নানাভাবে মানুষের শরীরে প্রবেশ করে
জলের এতদূরত পরিবেশে ছড়ায় এবং ক্যান্সার অসুখ
হ্রাসোপ্য ক্যাচির সৃষ্টি করে।

❊ স্মৃতি দূষণের সুরক্ষা:—

- আবজলা ও বস্তু পদার্থগুলি ফেল না দিয়ে তা থেকে দূরে
গ্যাস ও অস্ব উপাদান করা যায়।



চিত্র:- শব্দদূষণ

শব্দদূষণ

যদি প্রাকৃতিক ও উচ্চতা গ্রহণ বিধিগত অহন জীবন উদ্বে সুর
বজিত করত শব্দ দ্বারা পরিবেশের এবং মানব দেহের ক্ষতির
ও ভয়াঙ্কনীয় পরিবর্তনকে শব্দদূষণ বলে,

❊ শব্দদূষণের কারণ:-

শব্দদূষণের একটি অন্যতম প্রধান কারণ হল
যানবাহন, জনসমাগম্য স্থানের অধিক অধিক যানবাহনের পরিমাণ বৃদ্ধি
পাড়ে ফলে যানবাহন থেকে শব্দদূষণ দিনের পর দিন বেড়ে
চলেছে, বাস, লরি, রেল চলাচলের সময় যে শব্দ সৃষ্টি হয়
তা শব্দদূষণ সৃষ্টি করে,

❊ শব্দদূষণের ফলাফল:-

শব্দদূষণ মানব স্বাস্থ্যের উপর বা মানব জীবনের
উপর প্রভাবপূর্ণ প্রভাব বিস্তার করে, অত্যধিক শব্দের ফলে
মানুষের মনের মধ্যে বিরক্তির উদ্ভব হয়, অনেক সময় শব্দ-
দূষণের ফলে মানবদেহে স্থায়ী বা অস্থায়ী জারীবিহীন বা
চান্দমিরক বোগ সৃষ্টি হয়,

❊ শব্দদূষণের অস্বাভাবিকতা:-

- যখন যখন অস্বাভাবিক শব্দ বাজাবেন না,
- লার্জিক্সবগের ব্যবহার করতে নিষেধ করুন,
- জিডি এবং মিডিয়াম সিফটের অলুচন আশ্রয় হিন,



চিত্র: - তেজস্ক্রিয় দূষণ

তেজস্ক্রিয় দূষণ

পারমাণবিক চুল্লি থেকে নির্গত তেজস্ক্রিয় বর্জ্য পদার্থ, চিকিৎসা ক্ষেত্রে এবং বিভিন্ন বৈজ্ঞানিক পরীক্ষা নিরীক্ষায় ব্যবহৃত তেজস্ক্রিয় অর্ধজীবোপগামী থেকে নির্গত তেজস্ক্রিয় পারচলনবিকর কণা এবং পারমাণবিক বিস্ফোরণের পর এর উৎসগুলি পরিবেশে ছড়িয়ে যে দূষণ ঘটায়, তাকেই তেজস্ক্রিয় দূষণ বলা হয়।

১) তেজস্ক্রিয় দূষণের কারণ:—

পারমাণবিক শক্তি কেন্দ্রগুলিতে যেসকল তেজস্ক্রিয় উপাদান ব্যবহার করা হয় তার বর্জ্য শক্তি কেন্দ্র-গুলিতে শক্তি উপাদানের পরে স্থানান্তরের বর্জ্যপদার্থগুলি সব তেজস্ক্রিয়, অর্ধজীব পদার্থগুলি নদীর জলের সাথে মিশে বায়ুচলনুলে তেজস্ক্রিয় দূষণ ঘটায়।

২) তেজস্ক্রিয় দূষণের ফলাফল:—

- তেজস্ক্রিয় বিকিরণের বিক্রেত গাছা বৃদ্ধি বেশি হয়।
- তেজস্ক্রিয় বিকিরণের ফলে জলজীব, সুসমুদ্র প্রভৃতি মারা যায়।

৩) তেজস্ক্রিয় দূষণের সন্মিতি:—

- তেজস্ক্রিয় পদার্থগুলিকে পুরু সিসার আঁঠারে রাখতে হবে।
- তেজস্ক্রিয় শিল্পকারখানার কর্মীদের সিসার জামা পরে রাখতে হবে।

Samantha
25/05/2022

Year - 2022

সরিষের বীজ অকুণ্ঠ সরিষের বিস্তার দুটি অংশে বিভক্ত
হয়।

ਸ਼ਰਿਯੋਗ ਵਿਦਵਾਨ ਸਤੁਕੂਤੀ ਸ਼੍ਰੀਭਾ

[illegible]

• जीवित्वलक्षण प्रश्न ००

কোনো একটি নির্দিষ্ট জ্ঞানের ইচ্ছাশক্তি এবং প্রাকৃতিক স্রষ্টা
উজ্জ্বলনের অর্থ মানুষের কার্যকলাপ সৃষ্টি করে যে সামগ্রিক জগৎ
উজ্জ্বল হয় তার যত্ন হয় সবিস্তার।

• जयप्रकाश इनामान :

সরিষের সঞ্চার অকুলী সরিষের বিষয়ক দুটি অংশ চিহ্নিত
হয়।

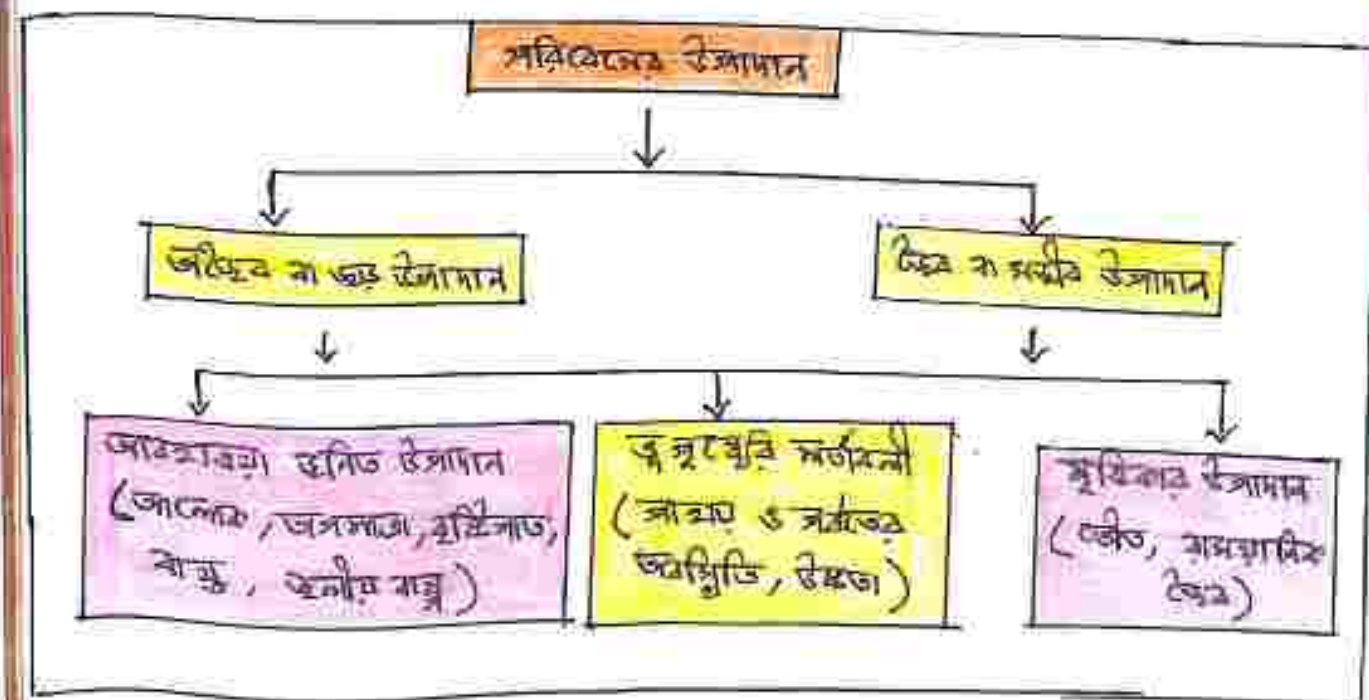
(ii) স্বাভাবিক সম্মিলন :

સાહિત્ય ગ્રામીણ જીવન & વિશ્વસુ નિર્ધારિત સ્તરો પરથી બનેલ છે
સાહિત્ય.

(10) ଆକାଞ୍ଚିକ ଗବିଷୟ :

ଖୋଦ୍ଦେଶର ଜାତୀୟ - ଜାତୀୟ, ମଂ କୃତି, ପ୍ରତିଷ୍ଠା, ସମାଜସେବୀ, ବିଜ୍ଞାନ, ମିତ୍ର, ଜାତୀୟ ଶିକ୍ଷା ନିଧି ପ୍ରତିଷ୍ଠା ସାହାଯ୍ୟ କରିବେ।

ଅଧିକାରୀଙ୍କର ଉତ୍ତମାଦାନକେ ପ୍ରଶଂସିତ ହୁଏ ଛାତ୍ର ଛାତ୍ରୀଙ୍କର ଅଭ୍ୟାସ, ଅଭ୍ୟାସ ବା ପଢ଼ା ଉତ୍ତମାଦାନ ଏବଂ ଶିକ୍ଷକ ବା ଅଧ୍ୟାପକ ଉତ୍ତମାଦାନ,



ଉତ୍ପାଦନ କିମ୍ବା ଉତ୍ପାଦନ :

୧. ଆବଶ୍ୟକୀୟ ଉତ୍ପାଦନ :

(i) ଆଲୋକ :

ସୃଷ୍ଟିଗତେ ସୂର୍ଯ୍ୟ ଏକମତ ଉତ୍ସରୁ ଆସିଥାଏ । ସୂର୍ଯ୍ୟ ଲୋକେ ଆମର ଆଲୋକରାଶି ଯେତେବେଳେ ଆମ ପୃଷ୍ଠରେ ପହଞ୍ଚେ ତେବେ ସେହି ସମୟରେ ଆମର ଆଲୋକରାଶି ଅନୁଭବ ହୁଏ । ସୂର୍ଯ୍ୟର ଶକ୍ତିରାଶିର ଅନୁଭବ ହୁଏ ଓ ଏହା ଆମର ଆଲୋକରାଶିର ଉତ୍ପାଦନ କରେ ।

ଉତ୍ପାଦନ କରେ ଆଲୋକରାଶିର ଉତ୍ପାଦନ ହୁଏ । ସୂର୍ଯ୍ୟର ଶକ୍ତିରାଶିର ଅନୁଭବ ହୁଏ ଓ ଏହା ଆମର ଆଲୋକରାଶିର ଉତ୍ପାଦନ କରେ ।

(ii) ତାପମାତ୍ରା :

ଉତ୍ପାଦନ ଆଲୋକରାଶିର ଉତ୍ପାଦନ ହୁଏ । ସୂର୍ଯ୍ୟର ଶକ୍ତିରାଶିର ଅନୁଭବ ହୁଏ ଓ ଏହା ଆମର ଆଲୋକରାଶିର ଉତ୍ପାଦନ କରେ ।

(iii) ବାୟୁ :

ବାୟୁର ଉତ୍ପାଦନ ହୁଏ । ସୂର୍ଯ୍ୟର ଶକ୍ତିରାଶିର ଅନୁଭବ ହୁଏ ଓ ଏହା ଆମର ଆଲୋକରାଶିର ଉତ୍ପାଦନ କରେ ।

(iv) ପ୍ରାଣ :

ପ୍ରାଣର ଉତ୍ପାଦନ ହୁଏ । ସୂର୍ଯ୍ୟର ଶକ୍ତିରାଶିର ଅନୁଭବ ହୁଏ ଓ ଏହା ଆମର ଆଲୋକରାଶିର ଉତ୍ପାଦନ କରେ ।

୨. ଉତ୍ପାଦନ କିମ୍ବା ଉତ୍ପାଦନ :

(i) ଆଲୋକରାଶିର ଉତ୍ପାଦନ : ଉତ୍ପାଦନ କରେ ଆଲୋକରାଶିର ଉତ୍ପାଦନ ହୁଏ । ସୂର୍ଯ୍ୟର ଶକ୍ତିରାଶିର ଅନୁଭବ ହୁଏ ଓ ଏହା ଆମର ଆଲୋକରାଶିର ଉତ୍ପାଦନ କରେ ।

(ii) ତାପମାତ୍ରାର ଉତ୍ପାଦନ :

ତାପମାତ୍ରାର ଉତ୍ପାଦନ ହୁଏ । ସୂର୍ଯ୍ୟର ଶକ୍ତିରାଶିର ଅନୁଭବ ହୁଏ ଓ ଏହା ଆମର ଆଲୋକରାଶିର ଉତ୍ପାଦନ କରେ ।

୩. ଉତ୍ପାଦନ କିମ୍ବା ଉତ୍ପାଦନ :

ଉତ୍ପାଦନ କରେ ଆଲୋକରାଶିର ଉତ୍ପାଦନ ହୁଏ । ସୂର୍ଯ୍ୟର ଶକ୍ତିରାଶିର ଅନୁଭବ ହୁଏ ଓ ଏହା ଆମର ଆଲୋକରାଶିର ଉତ୍ପାଦନ କରେ ।

୪. ଉତ୍ପାଦନ କିମ୍ବା ଉତ୍ପାଦନ :

ଉତ୍ପାଦନ କରେ ଆଲୋକରାଶିର ଉତ୍ପାଦନ ହୁଏ । ସୂର୍ଯ୍ୟର ଶକ୍ତିରାଶିର ଅନୁଭବ ହୁଏ ଓ ଏହା ଆମର ଆଲୋକରାଶିର ଉତ୍ପାଦନ କରେ ।

(i) ଉତ୍ପାଦନ (ii) ଉତ୍ପାଦନ

Name: Sumana Sankar

Semester: 2nd Sem

Subject: Environmental Science

Title of Project: Environmental Science & Climate change

Roll No: 21/BAH/0005

CU Roll No: 212013-11-0099

CU Registration No: 013-1212-0002-21

Environmental Science & Climate change

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Environmental Science and Climate Change

Environmental Change, specifically climate change, has emerged as a major concern in the 21st century. Demand for energy, water and food for raising the standard of life are driving the environmental changes.

Deforestation and CO₂ emissions from fossil fuels such as coal and petroleum are the main causes for climate change. The major environmental problems for India in the coming decades include air and water pollution, heat waves and changes to monsoon rainfall and glaciers retreat due to climate change. Impacts of climate change on our food, water and forestry resources, biodiversity loss, sea level rise and the consequent impacts on our coastal communities. Ocean acidification, often referred to as the evil twin of global warming, is also likely to cause disturbances to marine life including corals and fisheries in the Indian Ocean. India has already taken major initiatives to improve our scientific understanding of environmental change and to adapt to and mitigate these changes. Some of the urgent scientific and engineering challenges in the area of environment change are discussed here.

Climate Science:

Locally generated knowledge on climate science is strategically crucial for providing sound guidance on the impacts of climate change on various sectors in India. In the last three decades, several countries have developed mathematical models to project future climate change but India lags behind in model development. Since climate model development is essentially a scientific and engineering exercise and since there is plenty of expertise in science and engineering in India, India should identify the development of one or more earth system models as a key national priority. Creation of a long term climate observation network and objective assessments of extreme events and climate change impacts on agriculture, forestry, water resources, glaciers, health, coastal zones, corals and fisheries should be also considered as national priorities. Resources for creating as national skilled manpower in this domain should be provided by the government of India.

Monsoon Prediction:

Simulation and prediction of the Indian summer monsoon on seasonal and intraseasonal scales is one of the major challenges in weather and climate science. Skill of numerical and empirical models in predicting monsoon has improved in recent years

but there is still considerable scope of improvement. Forecasting skill can be improved by better representation of physical processes in climate models. Dedicated research into numerical methods is also required if India were to develop its own model of weather and climate. With increasing amounts of data available from satellites and other sources, studying monsoons is also a 'Big Data' challenge. Newer machine learning techniques can be used to mine this data and obtain new insight. Improved utilization of this data also requires extensive research into data assimilation to provide better initial conditions for interdisciplinary research combining skills of various IITs and IISc in weather, climate, turbulence studies, applied mathematics and computational sciences.

Ocean Studies:

Oceans play an important role in modulating monsoons. Understanding the interplay between the atmosphere and oceans requires in-situ data collection and modelling. Hence, more oceanic expeditions and high resolution ocean modelling capability would be needed to understand the complex thermodynamic structure and circulation in the Indian Ocean. The acidified waters could be detrimental to marine organisms as calcification rates in marine calcifying organisms could be reduced. Hence, there is an urgent need to study

the chemistry and biology of Indian Ocean waters using extensive observations and complex earth system models that simulate the ocean biogeochemistry.

Air Pollution:

Air Pollution continues to remain a public health concern despite various actions taken to control air pollution. The problem becomes more complex due to multiplicity and complexity of air polluting source mix - generators sets, domestic fuel burning, road side dusts, construction activities etc. The urgent needs in this theme are extensive data compilation, management and interpretation of the monitored air quality, development of grid based emission inventory of the specified pollutants, meteorological and air quality modeling of these pollutants with prediction capabilities.

Aerosols and Climate:

Aerosols are suspended particulates in the atmosphere and they are believed to be mitigating global warming by increasing the planetary albedo, although the sign and magnitude of aerosol effects on climate are uncertain. Resolving the role of aerosol on Indian summer monsoon rainfall and winter fog and mitigation of the undesired effects of aerosol should be priority areas for research.

Forests & Climate Change:

Forestry is one of the most important sectors in the context of climate change, both from the point of ~~improving~~ mitigation as well as adaptation. It lies at the centre-stage of global mitigation and adaptation efforts. Yet it is one of the least understood sectors, especially at the regional level - many of its fundamental metrics such as its mitigation potential, its vulnerability and the likely impacts of climate change on forests and carbon stock are not well understood. There is synergy between mitigation and adaptation when considering forest sectors; while forests are projected to be adversely impacted under climate change forests also provide opportunities to mitigate climate change. Thus, there is a need for research & field demonstration of synergy between mitigation and adaptation that the cost of addressing climate change impacts can be reduced and co-benefits increased.

Glaciers Retreat:

The Himalayas are home to one of the largest glaciers-stored waters outside the Polar Regions. Melt water from these glaciers and seasonal snow form an important source of run off into the north Indian rivers during critical summer months.

However, lack of trained manpower and rugged terrain pose major challenges to collection of data on snow and glaciers. A rigorous scientific program on satellite remote-sensing, field observations and modelling is urgently needed to provide guidance on the impacts of potential glacier retreat in the coming decades.

Global Leadership & Conclusion:

Research in environmental science and climate change in India has been so far mostly limited to the Indian geography. Assessments of climate change adaptation and mitigation have been also limited to India. For India to take global leadership position in the 21st century, this barrier has to be crossed. Merely receiving inputs on global environment and climate change from reports from global agencies would not be sufficient. India should start generating its own knowledge on global energy scenario and global environmental and climate change. Hence, as a long term strategy, Indian government should start promoting observational and modeling research into energy and environmental issues that concerns the entire planet.

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Acknowledgement:

I would like to express my thanks to my teachers Mrs. Santanu Samanta for giving me this great opportunity to excel in my learning through this project.

I have achieved a good amount of knowledge through the research & the help that I got from my teachers.

Samanta
25/05/2022

GOKHLE MEMOGIAL GIRL'S COLLEGE



CLASS-2nd SEMESTER
SUB-ENVIRONMENTAL SCIENCE
DEPARTMENT-HINDI
PAPER-AECC-2

YEAR-

::Submitted By::

NAME - PRERANA MISHRA

COLLEGE ROLL-BAH/21/0024

UNIVERSITY ROLL- 212013-11-0001

UNIVERSITY REG.NO- 013-1211-0005-21





WATER POLLUTION

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 uses, difficult to be pollute, 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, storage, and recycling. All these properties impart to water its great utility for human being. The surface water and groundwater resources of the country play a major role in agriculture, hydropower generation, livestock production, industrial activities, forestry, fisheries, navigation, recreational activities etc. The freshwater ecosystem of the world comprise only about 0.5% of the earth's surface and have a volume of $2.84 \times 10^5 \text{ km}^3$. Rivers constitute an insignificant amount (0.1%) of the land surface. Only 0.01% of the water of the earth occur in river channels. In spite of these low quantities, running waters are of enormous significance. India receives annual precipitation of about 4000 km^3 , including snowfall. Out of this, monsoon rainfall is of the order of 3000 km^3 . Rainfall in India is dependent on the south-west and north-east monsoons, on shallow

Cyclonic depressions and disturbances and on local storms. Most of it take place under the influence of south-west between June and September except in Tamil Nadu, where it is under the influence of north-east monsoon during October and November. India is gifted with river system comprising more than 20 major rivers with several tributaries. Many of these rivers are perennial and some of them are seasonal. Although India occupies only 3.29 million km^2 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 population, 1/5th of world's land and 1/25th of world's water resources.

SOURCES OF WATER POLLUTION

There are various classification of water pollution, which are discussed as follows:-

1) Groundwater Pollution:-

Groundwater is one of our least visible but most critical natural resources. With rainfall, it becomes groundwater as it seeps deep into the earth, filling up cracks, crevices, and porous spaces of an aquifer, which is an underground storehouse of water. Groundwater is then pumped to the earth's surface for drinking water.

Groundwater gets polluted when contaminants such as fertilizers, pesticides, and waste leaching from landfills and septic system, making their way into an aquifer.

Once polluted, an aquifer becomes unsafe for humans and remains unusable for decades, or even thousands of years. Besides groundwater can also spread contamination far from the original polluting source when it seeps into streams, lakes, and oceans. Making groundwater free of contaminants can be difficult to impossible, as well as costly.

2) Surface Water

Surface water covers about 70% of the earth, filling our ocean, lakes, rivers and including all blue bits on the world map. Surface water from freshwater sources other than the sea accounts for more than 60% of water delivered to our homes.

As per the Environmental Protection Agency of U.S., nearly 50% of our rivers and streams and over one-third of our lakes are polluted and unfit for swimming, fishing, and drinking.

Nutrient Pollution that includes nitrates and phosphates, which plants and animals need to grow, causes major pollution on in the freshwater sources due to farm waste and fertilizer run off.

Municipal and industrial waste discharges and also individuals dumping directly into waterways contribute their fair share of toxins.

2. Ocean Water

Eighty percent of Ocean pollution or marine pollution originates on land along the coast or far inland. Streams and rivers carry contaminants such as chemical, nutrients, and heavy metals that are carried from farms, factories, and cities into our bays and estuaries, and from there, they reach the ocean.

Marine debris, particularly plastic, is blown away by the wind or washed away in storm via drains and sewers. Our seas sometimes get polluted by big and small oil spills and leaks and are also soaking up carbon pollution from the air. The ocean absorbs a quarter of human-made carbon emissions.

4. Point source

When contamination occurs from a single source, it's called point source pollution. Though this pollution originates from a specific place, it can affect miles of waterways and ocean.

VARIOUS CAUSES OF WATER POLLUTION

1) Industrial Waste:-

Industries produce a tremendous amount of waste, which contains toxic chemicals and pollutants, causing air pollution and damage to our environment and us. They contain harmful chemicals, including lead, mercury, sulfur, nitrates, asbestos, and many others.

Many industries, not having a proper waste management system, drain the waste in the freshwater, which goes into canals, rivers and later into the sea.

The toxic chemicals may change the color of water, increase the number of minerals called eutrophication, change the temperature of the water, and pose a severe hazard to water organisms.

2) Sewage and Wastewater:-

The sewage and wastewater that is produced in each household are treated chemically and released into the sea along with freshwater. The sewage water carries pathogens, a typical water pollutant, other harmful bacteria and chemicals that can cause serious health problems and thereby diseases.

Microorganisms in water are known to cause some of the very deadly diseases and become the breeding grounds for creatures that act as carriers. These carriers inflict these diseases onto an individual via various forms of contact. A typical example would be Malaria.

3) Mining Activities :-

Mining is the process of crushing the rock and extracting coal and other minerals from the underground. These elements, when extracted in the raw form, contain harmful chemicals and can increase the number of toxic elements when mixed up with water, which may result in health problems. Mining activities emit a large amount of metal waste and sulphides from rocks, which is harmful to the water.

4) The Burning of Fossil Fuels :-

Fossil fuels like coal and oil, when burnt, produce a substantial amount of ash in the atmosphere. The particles which contain toxic chemicals when mixed with water vapour result in acid rain. Also, carbon dioxide is released from the burning of fossil fuels, which results in global warming.

5) Chemical Fertilizers and Pesticides :-

Chemical Fertilizers and Pesticides are used by farmers to protect crops from insects and bacteria. They are useful for the plant's growth. However, when these chemicals are mixed up with water, they produce harmful pollutants for plants and animals. Also, when it rains the chemical mix up with rainwater and flow down into rivers and canals, which pose serious damage for aquatic animals.

6) Global Warming :-

An increase in the earth's temperature results in global warming due to the greenhouse effect. It increases the water temperature and results in the death of aquatic animals and marine species, which later results in water pollution.

sources from which water is also drawn for irrigation and domestic purpose. The enforcement of regulation regarding discharge of industrial waste water and limit to extraction of groundwater needs to be considerably strengthened, while more incentives are required for promoting wastewater reuse and recycling.

4) There should be ban on washing of clothes and laundry alongside the river bank.

5) Industries should install Effluent Treatment Plant (ETP) to control the pollution at sources.

6) All towns and cities must have sewage treatment plants (STPs) that clean up the sewage effluent.

7) Rainwater harvesting should be practiced to prevent the depletion of water table.

8) Improper use of fertilizers, herbicides and pesticides in farming should be stopped and organic methods of farming should be adopted. Cutting practices in riparian zone should be banned to protect the riparian vegetation growing there.

a) Religious practices that pollute river water by dumping colourful paints of idols containing harmful synthetic chemical should be stopped.

10) Making people aware of the problem is the first step to prevent water pollution. Hence, importance of water and pollution prevention measures should be a part of awareness and education programme.

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EFFECTS OF WATER POLLUTION

Water Pollution damage human health makes our living conditions precarious and threatens life on the planet.

1) Effects on aquatic ecosystem:

- Polluted water reduces dissolved oxygen (DO) content, thereby, eliminates sensitive organisms like plankton, molluscs and fish etc.
- Hot water discharges from industries, when added to water bodies, lower DO content.

2) Effects on human health:

- The polluted water usually contain pathogens like virus, bacteria, parasitic protozoa and worms; therefore, it is a source of water borne diseases like jaundice, cholera, typhoid, amoebiasis etc.
- Water contaminated with cadmium can cause itai disease also called ach-ouch diseases (a painful diseases of bones and joints) and cancer of lungs and liver.
- The compounds of lead cause anaemia, headache, loss of muscle power and bluish line around the gum.

3) Biological Magnification

4) Eutrophication

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3) Biological Magnification

4) Eutrophication

CONCLUSION.....

Water is the most precious resources on our planet and the most vital means for survival. Thus all living things cannot live without most especially human beings. However, water pollution is caused by human activities.

Therefore, Water Pollution is indeed a very serious concern because it not only has an impact on health and but also can have negative effects on various industries and agriculture. It is therefore highly important to devise methods to reduce the level of water pollution that we are currently facing.

Jamanta
21/06/2022

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ACKNOWLEDGEMENT

I would like to express my special thanks of gratitude to my professor Mr. Sandaru Samanta, who gave me the golden opportunity to do this wonderful project Environmental pollution (water pollution).

Chandni also helped me completing my project. I am come to know about so many new things i am really thankful them.

Secondly i would also like to thanks my parents and friends who helped me a lot in finalizing this project within the limited time frame.



Roni Mallick

WATER POLLUTION

DEFINATION



Water pollution is the contamination of water bodies usually as a result of human activities so that it negatively affects its uses. Water bodies include lakes, rivers, oceans, aquifers, reservoirs and groundwater. Water pollution results when contaminants are introduced into these water bodies. Water pollution can be attributed to one of four sources, sewage discharges, industrial activities, agriculture activities and urban runoff including stormwater. It can be grouped into surface water pollution or ground water pollution. For example, releasing inadequately treated waste water into natural waters can be lead to degradation of these aquatic ecosystems. Water pollution can also lead to water-borne diseases for people using polluted water drinking, bathing, washing or irrigation. Water pollution reduces the ability of the body water to provide the ecosystem services that it would otherwise provide. Non point sources are more diffuse such as agriculture run-off. Pollution is the

result of the water cumulative effect over time pollution may have the form of toxic substances oil, metal, plastics, pesticides, persistent organic pollutants industrial waste products stressful conditions e.g. changes of pH, hypoxia or anoxia, increased temperatures, excessive turbidity, unpleasant taste or odor and changes of salinity or pathogenic organisms contaminants may include organic substances. Heat can also be a pollutant and this is called thermal pollution. A common cause of thermal pollution is the use of water as a coolant by power plants and industrial manufacturing.

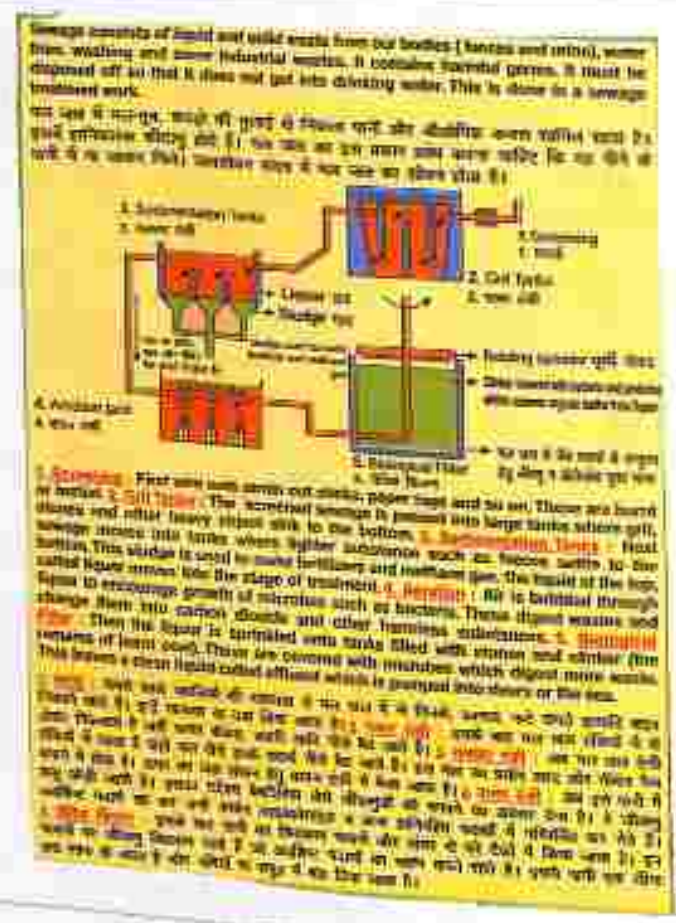
control of water pollution requires appropriate infrastructure and management plans as well as legislation. Technology solutions can include improving sanitation, sewage treatment. Industrial waste water treatment agriculture wastewater treatment erosion control sediment control and control of urban runoff (including stormwater management). Effective control of urban runoff includes reducing speed and quantity of flow.

CONTAMINANTS

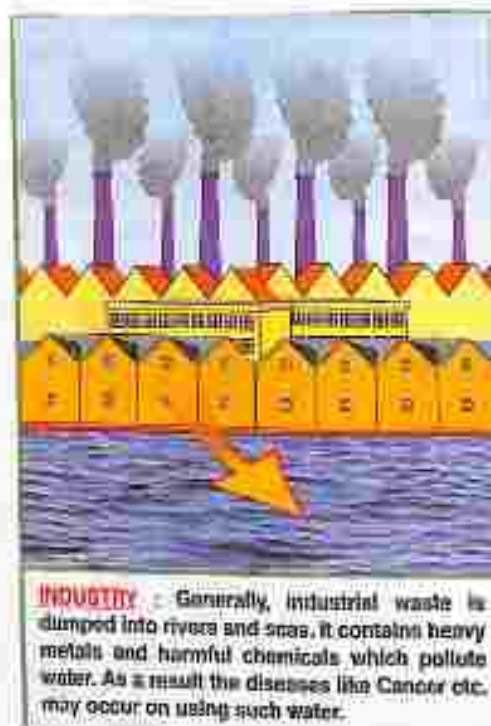
The following compounds can all reach water bodies via raw sewage or even treated sewage discharges.

- Various chemical compounds found in personal hygiene and cosmetic products.
- Disinfection by-products found in chemically disinfected drinking water (which chemicals can be a pollutant in the water distribution network they are poorly volatile and therefore not usually found in environmental waters).
- Hormones from animal husbandry and residue from human hormonal contraception methods and synthetic materials such as phthalates that mimic hormones in their action. These can have adverse impacts even at very low concentration on the natural biota and potentially on humans if the water is treated and utilized for drinking water.
- Insecticides and herbicides often from agriculture run-off.

If the water pollution stems from sewage municipal wastewater the main pollutants are suspended solids biodegradable organic matter, nutrients and pathogenic disease organisms. pollutants and their effects sources of these pollutants are municipal and industrial waste water.



GROUNDWATER POLLUTION



INDUSTRY : Generally, industrial waste is dumped into rivers and seas. It contains heavy metals and harmful chemicals which pollute water. As a result the diseases like Cancer etc. may occur on using such water.

Groundwater pollution also called groundwater contamination occurs when pollutants are released to the ground and make their way into ground water. This type of water pollution can also occur naturally due to the presence of a mineral and unwanted constituent, contaminant or impurity in the groundwater in which case it is more likely referred to as contamination rather than pollution. Groundwater pollution can occur from on site sanitation systems landfill leachate, effluent from wastewater treatment plants, leaking sewers, petrol filling stations, hydraulic fracturing or from over application of fertilizers in agriculture. Pollution can also occur from naturally occurring contaminants such as arsenic or fluoride. Using polluted ground water causes hazards to public health through poisoning or the of disease.

IMPACTS

Water pollution is a major global environmental problem because it can result in the degradation of aquatic ecosystems. The specific contaminants leading to pollution in water include a wide spectrum of chemical, pathogens and physical changes such as elevated temperature. While many of the chemicals and substances that are regulated may be naturally occurring calcium, sodium, iron, manganese etc. The concentration usually determines what is a natural component of water and what is a contaminant. High concentration can have negative impacts on aquatic flora and fauna. Oxygen-depleting substances may be natural materials such as plant matter (e.g. leaves and grass) as well as man made chemicals. Other natural anthropogenic substances may cause turbidity (cloudiness) which blocks light and disrupts plants growth and clogs the gills of some fish species.



OIL REFINERIES: Generally oil refineries are situated on coastal areas. Seepage of oil from refineries and other reasons contribute to ocean pollution. The pollution causes harm to coastal environment and habitats.

POLLUTION FROM NONPOINT SOURCES

Nonpoint source (NPS) pollution refers to diffuse contamination from a single discrete source. This type of pollution is often the cumulative effects of all small amounts of contaminants gathered from a large area. It is in contrast to point source pollution which results from a single source. Nonpoint source pollution generally results from land runoff, precipitation, atmospheric deposition, drainage, seepage or hydrological modification where tracing pollution back to a single source is difficult. Nonpoint source water pollution affects a water body from sources such as polluted runoff from agricultural areas draining into a river or wind borne debris blowing out to sea. Nonpoint source air pollution, air quality from sources such as smokestacks or car tailpipes. Although these pollutants have originated from a point source the long-range transport ability and multiple sources of the pollutant make it a nonpoint source of pollution if the discharges were to occur to a body of water or atmosphere.

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Samantha
2/10/2022

DATE
20/5/22

PAGE NO.
NA

EXPT. NO.

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CLASS - 2nd SEM

SUBJECT - Environmental Science

PAPER -

DEPARTMENT - HINDI (HINA)

YEAR - 1st YEAR

COLLEGE ROLL No. - 21/BAH/0156

UNIVERSITY ROLL No. - 212013-11-0038

UNIVERSITY REGISTRATION No. - 018-1211-0055-21

DATE - 26.05.2022

TIME - 2:00 Pm

WATER POLLUTION -

Water is essential for life. Without water there would be no life. We usually take water as granted for its purity, but we must ensure the quality of water. Pollution of water originates from human activities. Through different paths, pollution of reaches surface or ground water. Easily identified sources or place of pollution is called as point source. e.g. municipal and industrial discharge pipes where pollutants enter the water - source. Non point source of pollution cannot be easily identified. e.g. agriculture run off (from farm, animals and crop-lands), acid rain, storm-water drainage (from streets, parking lots and lawns) etc.

Causes of Water Pollution

(i) Pathogens: The most serious water pollutants are the disease causing agents called pathogens. Pathogens include bacteria and other organism that enter water from domestic sewage and animal excreta. Human excreta contain bacteria such as *Escherichia coli* and *Streptococcus faecalis* which cause gastrointestinal diseases.

(ii) Organic waste: The other major water pollutant is organic waste matter such as leaves, grass, brush etc. They pollute water as a consequence of run off. Excessive phytoplankton growth within water is also a cause of water pollution. These waste are biodegradable.

The large population of bacteria decomposes organic matter present in water. They consume oxygen dissolved in water. The amount of oxygen that water can hold in the solution is limited. In cold water, dissolved oxygen (DO) can reach a concentration up to 10 ppm (parts per million). Whereas oxygen in air is about 200,000 ppm. That is why even a moderate amount of organic matter when decomposed in water can deplete the water of its dissolved oxygen. The concentration of dissolved oxygen in water is very important for aquatic life. If the concentration of dissolved oxygen of water is below 6 ppm, the growth of fish gets inhibited. Oxygen reaches water either through atmosphere or from the process of photosynthesis carried

out by many aquatic green plants during day light. However, during night, photosynthesis stops but the plants continue to respire, resulting in reduction of dissolved oxygen. The dissolved oxygen is also used by microorganism to oxidise organic matter.

If too much of organic matter is added to water, all the available oxygen is used up. This causes oxygen dependent aquatic life to die. Thus, anaerobic bacteria (which do not require oxygen) begin to break down the organic waste and produce chemicals that have a foul smell and are harmful to human health. Aerobic (oxygen requiring) bacteria degrade these organic wastes and keep the water depleted in dissolved oxygen.

Thus, the amount of oxygen required by bacteria to break down the organic matter present in a called **Biochemical Oxygen Demand (BOD)**. The amount of organic material in the water, in terms of how much oxygen will be required to break it down biologically. Clean water have BOD value of less than 5 ppm whereas highly polluted water could have a BOD value less than 17 ppm or more.

(iii) **Chemical pollutants:** As we know that water is an excellent solvent, water soluble inorganic chemicals that include heavy metals such as cadmium, mercury, nickel etc constitute an important class of pollutants. All these metals are dangerous to humans because our body cannot excrete them. Over the time, it crosses the tolerance limit. These metals then can damage kidneys, central nervous system

liver etc. Acids (like sulphuric acid) from mine drainage and salts from many different sources including road salt used to melt snow and ice in the colder climates. Sodium and calcium chloride are water soluble chemical pollutants. The organic chemicals are another group of substances that are found in polluted water. Petroleum products pollute many sources of water e.g. major oil spills in oceans. Other organic substances with serious impacts are the pesticides that drift down from sprays or runoff from lands. Various industrial chemicals like polychlorinated biphenyls (PCBs) which are used as cleansing solvent detergents and fertilizers add to the list of water pollutants. PCBs are suspected to be carcinogenic. Nowadays most of the detergents are available are biodegradable. However, their use can create other problems. The bacteria responsible for degrading biodegradable detergent feed on it and grow rapidly. While growing they may use up all the oxygen dissolved in water. The lack of oxygen kills all other forms of aquatic life such as fish and plants. Fertilizers contain phosphates in water enhances algae growth. Such profuse growth of algae covers the water surface and reduces the oxygen concentration in water. This leads to anaerobic conditions commonly with accumulation of noxious decay and animal death. Thus bloom infested water inhibits the growth of other water bodies support a dense plant population which kills animal life by depriving it of oxygen and results in subsequent loss of biodiversity is known as **Eutrophication**.

ACKNOWLEDGEMENT

I would like to express my special thanks of gratitude to my Environmental Science teacher "Mr. Santanu Samanta" for their able guidance and support in completing my project.

I would also like to extend my gratitude to the principal Mam "Dr. Adashi Karpha" — for providing me with all the facility that was required.

DATE:

26/05/2022

Chandni Shaw

2nd Sem/HINA)

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BIOGEOGRAPHICAL ZONES OF INDIA



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ACKNOWLEDGEMENT

I would like to thank our Environmental Science Professor Mr Santanu Samanta for providing us with guidance and giving us the opportunity to work on this project topic. Lastly I would like to extend my gratitude towards my fellow classmates who helped me with the completion of this project.

Santanu Samanta
25/05/2022

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2. The Biogeographical Zones of the World
3. The Biogeographical Zones of India
4. North Eastern India as a Biogeographical Zone
5. Vegetation of the Area
6. Wildlife or Fauna of the Area
7. Conclusion
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INTRODUCTION

What is a Biogeographical Zone:-

Biogeography, the study of animal and plant distributions, was a subject that began to receive much attention in the 19th century. It is a matter of general experience that the plants and animals of the land and inland waters differ to a greater or lesser degree from one part of the world to another.

One of the first modern delimitations of biogeographic regions was created in 1858 by the English ornithologist Philip L. Sclater, who based his division of the terrestrial world on the distributions of birds. In the 1870s the biologist Adolf Engler devised a schema based on plant distributions.



The Biogeographical zones of the world are as follows:-

1. Palearctic
2. Nearctic
3. Afrotropical
4. Indomalayan
5. Australasian
6. Neotropical
7. Oceanian
8. Antarctic

Biogeographical Zones of India:-

Biogeographic classification of India is the division of India according to biogeographic characteristics. Biogeography is the study of the distribution of species (biology), organisms, and ecosystems in geographic space and through geological time. India has a rich heritage of natural diversity. India ranks fourth in Asia and tenth in the world amongst the top 17 megadiverse countries in the world. India harbours nearly 11% of the world's floral diversity comprising over 17500 documented flowering plants, 6200 endemic species, 7500 medicinal plants and 246 globally threatened species in only 2.4% of world's land area. India is also home to four biodiversity hotspots, that is, Andaman & Nicobar Islands, Eastern Himalaya, Indo-Burma region, and the Western

The north eastern region has been in focus for its high biodiversity and this region has been a priority for leading conservation agencies of the world. The richness of the region's avifauna largely reflects the diversity of habitats associated with a wide altitudinal range. North East India supports some of the highest bird diversities in the orient with about 850 bird species. The region's lowland and montane moist to wet tropical evergreen forests are considered to be the northernmost limit of true tropical rainforests in the world.



The following figures highlight the biodiversity significance of the region :

1. 51 Forest types are found in the region broadly classified into six major forest types which are the tropical moist deciduous forests, tropical semi evergreen forests, tropical wet evergreen forests, subtropical forests, temperate forests and alpine forests.
2. Out of the 9 important vegetation types of India, 6 are found in the North Eastern region.
3. These forests harbour 80,000 out of 15,000 species of flowering plants. These include 500 out of 1012 species of Pteridophytes, 825 out of 1145 species of orchids, 80 out of 90 species of rhododendrons, 60 out

of 110 species of bamboo, 25 out of 56 species of canes.

BIODIVERSITY HOTSPOTS IN INDIA

1. Himalaya: Includes the entire Indian Himalayan region (and that falling in Pakistan, Tibet, Nepal, Bhutan, China and Myanmar)
2. Indo-Burma: Includes entire North-eastern India, except Assam and Andaman group of Islands (and Myanmar, Thailand, Vietnam, Laos, Cambodia and southern China)
3. Sundaland: Includes Nicobar group of Islands (and Indonesia, Malaysia, Singapore, Brunei, Philippines)
4. Western Ghats and Sri Lanka: Includes entire Western Ghats (and Sri Lanka)



2. Cymbidium Orchid



3. Ferns



4. Types of Deciduous trees found in the North Eastern part of India

WILDLIFE OR FAUNA OF THE AREA:-

The seven sister states are one of the least explored regions of India so called as Paradise Unexplored. The forest covered area of this region is home to some of the rare and unique animals in the world such as the distinct Clouded Leopard, greater one-horned rhino and Red Panda. Some of the most beautiful state animals of the Seven Sister States and one Himalayan state of Sikkim are the

Red Panda, One Horned Rhino, Clouded Leopard, Hoolock Gibbon, Indian Gray Hornbill and the Macaque.



1. One Horned Rhino



3. Clouded Leopard



4. Hoolock Gibbon

Biogeography is important as a branch of geography which sheds light on the natural habitats around the world. It is also essential in understanding why species are in their present location and are developing, by protecting the world's natural habitats. Thus conservation of such biodiversity areas or hotspots should be initiated and practiced all over the world for a sustainable environment.

Samanfa
29/05/2022

TOPIC NAME: MAN MADE
DISASTERS (BHOPAL AND
CHERNOBYL)

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NO: 013-1211-0042-21

MAN MADE DISASTERS (BHOPAL & CHERNOBYL)

ACKNOWLEDGMENT

I would like to express my special thanks to My AECC-2 (ENVS) Professor Shantanu Samanta who gave me this golden opportunity to make this wonderful project .Through this project I came to know about so many new things . I am really grateful .

Secondly, I would like to thank my parents and friends who helped me a lot in finalizing this project within the short amount of time.

INTRODUCTION



WHAT ARE MAN MADE DISASTERS?

A disaster is a hazard resulting in an event of substantial extent causing significant physical damage or destruction, loss of life, or drastic change to the environment. Disasters fall into two major categories. These include man made and natural disasters. Man-made disasters are disasters due to the result of human intent, negligence or involving a failure of a man-made system that leads to human suffering and environmental damage. Man-made disasters are the consequence of technological or human hazards. Fires, transport accidents, industrial accidents, oil spills and nuclear explosions/ radiation are some examples resulting the human hazards. Man has cut forests recklessly to clear the land for cultivation and along with this environmental degradation has taken place, which also affects human life.

Man-made hazards or disasters are sometimes referred to as anthropogenic. Man-made disasters can be divided into different categories. As with natural hazards, man-made hazards are events that have not happened, for instance terrorism. Man-made disasters are examples of specific cases where man-made hazards have become reality in an event. The rising population has resulted in high fuel consumption and reduction of natural resources. Over population also affects our social environment. Another type of disaster that falls in this category is nuclear bomb. Other types of man made disasters which are just as catastrophic include chemical spill, oil spill, arson and terrorism.

World's two of the most infamous and gruesome man made disasters which shook the World during this 21st Century Era The Bhopal Tragedy and the Chernobyl which are going to be mentioned below in the case studies .

BHOPAL GAS TRAGEDY

On the night of December 2, 1984, chemical, methyl isocyanate (MIC) spilt out from Union Carbide India Ltd's (UCIL's) pesticide factory turned the city of Bhopal into a colossal gas chamber. It was India's first major industrial disaster. At least 30 tonnes of methyl isocyanate gas killed more than 15,000 people and affected over 600,000 workers. The Bhopal gas tragedy is known as the world's worst industrial disaster.



Fig.1 Images of the Bhopal Gas Tragedy

Warning bell before the tragedy

In 1969, the UCIL factory was made to produce Sevin (a pesticide) using methyl isocyanate as an intermediate. In 1976, trade unions in Bhopal complained of pollution within the plant. A few years later, a worker accidentally inhaled a large amount of toxic phosgene gas, leading to his death a couple of

What is Methyl Isocyanate (MIC)?

Methyl Isocyanate is a colourless liquid used for making pesticides. MIC is safe when maintained properly. The chemical is highly reactive to heat. When exposed to water, the compounds in MIC react with each other causing a heat reaction.

Methyl Isocyanate is no longer in production, although it is still used in pesticides. The Bayer CropScience plant in Institute, West Virginia is currently the only storage location of MIC left across the globe.

How methyl isocyanate leaked happened

Union Carbide India's Bhopal facility housed three 68,000-litre liquid MIC storage tanks: E610, E611, and E619. Months before the tragedy, MIC production was in progress and was being filled in the tanks. No tank was allowed to be filled more than 50% of its capacity and the tank was pressurized with inert nitrogen gas. The pressurization allowed liquid MIC to be pumped out of each tank. However, one of the tanks (E610) lost the ability to contain nitrogen gas pressure, hence liquid MIC could not be pumped out of it. As per the rules, each of the tanks could not be filled with more than 30 tonnes of liquid MIC. But this tank had 42 tonnes. This failure forced UCIL to

halt methyl isocyanate production in Bhopal and the plant was partly shut for maintenance.



Fig.5 images of the gas leak in Bhopal

An attempt was made to make the defective tank functional again on December 1, however the attempt failed. By then, most of the plant's methyl isocyanate related safety systems were malfunctioning. According to reports, by December 2 eve, water had entered the malfunctioning tank, which resulted in runaway chemical reaction. The pressure in the tank increased five times by night. By midnight, the workers in the MIC area started feeling the effects of MIC gas. The decision to address the leak was to be made a couple of minutes later. However, by then the chemical reaction in the tank had reached a critical state. About 30 tonnes of MIC escaped from the tank into the atmosphere within an hour. Most Bhopal residents were made aware of the gas leak by exposure to the gas itself.

Impact of methyl isocyanate leak

Doctors were not aware of proper treatment methods for the incident. Methyl isocyanate gas leak killed more than 15,000 people and affected over 600,000 workers. The stillbirth rate and the neonatal mortality rate increased by up to 300% and 200% respectively. The gas leak impacted trees and animals too. Within a couple of days, trees in the nearby area became barren. Bloated animal carcasses had to be disposed of. People ran on the streets, vomiting and dying. The city ran out of cremation grounds.



Fig.6 victims of the hazard



Fig.7 people getting sick inhaling the gases

Methyl Isocyanate chemical reaction's impact on health

Immediate health effects include ulcers, photophobia, respiratory issues, anorexia, persistent abdominal pain, genetic issue, neuroses, impaired audio and visual memory, impaired reasoning ability, and a lot more.

Long-term health effects include chronic conjunctivitis, decreased lung function, increased pregnancy loss, increased infant mortality, increased chromosomal abnormalities, impaired associate learning and more.



Fig.8 the inhaling of the toxic gases affecting the child's health

CHERNOBYL NUCLEAR DISASTER

The accident destroyed the Chernobyl 4 reactor, killing 30 operators and firemen within three months and several further deaths later. One person was killed immediately and a second died in hospital soon after as a result of injuries received. Another person is reported to have died at the time from a coronary thrombosis. Acute radiation syndrome (ARS) was originally diagnosed in 237 people onsite and involved with the clean-up and it was later confirmed in 134 cases. Of these, 28 people died as a result of ARS within a few weeks of the accident. Nineteen more workers subsequently died between 1987 and 2004, but their deaths cannot necessarily be attributed to radiation exposure. Nobody offsite suffered from acute radiation effects although a significant, but uncertain, fraction of the thyroid cancers diagnosed since the accident in patients who were children at the time are likely to be due to intake of radioactive iodine fallout. Furthermore, large areas of Belarus, Ukraine, Russia, and beyond were contaminated to varying degrees.



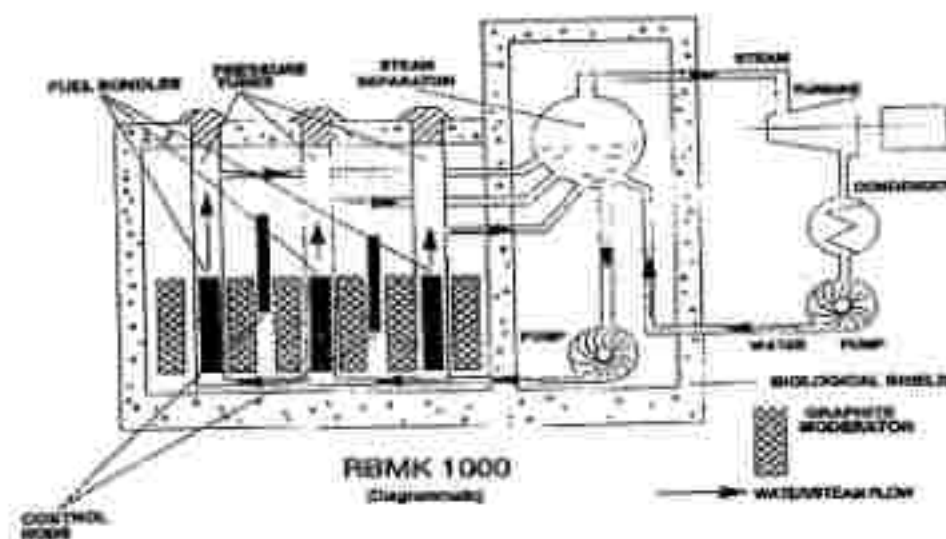
Fig. 11 map of the location of Chernobyl

The Chernobyl disaster was a unique event and the only accident in the history of commercial nuclear power where radiation-related fatalities occurred. The design of the reactor is unique and in that respect the accident is thus of little relevance to the rest of the nuclear industry outside the then Eastern Bloc. However, it led to major changes in safety culture and in industry cooperation, particularly between East and West before the end of the Soviet Union. Former President Gorbachev said that the Chernobyl accident was a more important factor in the fall of the Soviet Union than *Perestroika* – his program of liberal reform.

The Chernobyl site and plant

The Chernobyl Power Complex, lying about 130 km north of Kiev, Ukraine, and about 20 km south of the border with Belarus, consisted of four nuclear reactors of the RBMK-1000 design. Units 1 and 2 were constructed between 1970 and 1977, while units 3 and 4 of the same design were completed in 1983. Two more RBMK reactors were under construction at the site at the time of the accident. To the southeast of the plant, an artificial lake of some 22 square kilometres, situated beside the river Pripyat, a tributary of the Dnieper, was constructed to provide cooling water for the reactors.

This area of Ukraine is described as Belarussian-type woodland with a low population density. About 3 km away from the reactor, in the new city, Pripyat, there were 49,000 inhabitants. The old town of Chernobyl, which had a population of 12,500, is about 15 km to the southeast of the complex. Within a 30 km radius of the power plant, the total population was between 115,000 and 135,000 at the time of the accident.



The RBMK-1000 is a Soviet-designed and built graphite moderated pressure tube type reactor, using slightly enriched (2% U-235) uranium dioxide fuel. It is a boiling light water reactor, with two loops feeding steam directly to the turbines, without an intervening heat exchanger. Water pumped to the bottom of the fuel channels boils as it progresses up the pressure tubes, producing steam which feeds two 500 MWe turbines. The water acts as a coolant and also provides the steam used to drive the turbines. The vertical pressure tubes contain the zirconium alloy clad uranium dioxide fuel around which the cooling water flows. The extensions of the fuel channels penetrate the lower plate and the cover plate of the core and are welded to each. A specially designed

refuelling machine allows fuel bundles to be changed without shutting down the reactor.

The moderator, the function of which is to slow down neutrons to make them more efficient in producing fission in the fuel, is graphite, surrounding the pressure tubes. A mixture of nitrogen and helium is circulated between the graphite blocks to prevent oxidation of the graphite and to improve the transmission of the heat produced by neutron interactions in the graphite to the fuel channel. The core itself is about 7 m high and about 12 m in diameter. In each of the two loops, there are four main coolant circulating pumps, one of which is always on standby. The reactivity or power of the reactor is controlled by raising or lowering 211 control rods, which, when lowered into the moderator, absorb neutrons and reduce the fission rate. The power output of this reactor is 3200 MW thermal, or 1000 MWe. Various safety systems, such as an emergency core cooling system, were incorporated into the reactor design.

One of the most important characteristics of the RBMK reactor is that it can possess a 'positive void coefficient', where an increase in steam bubbles ('voids') is accompanied by an increase in core reactivity. As steam production in the fuel channels increases, the neutrons

that would have been absorbed by the denser water now produce increased fission in the fuel. There are other components that contribute to the overall power coefficient of reactivity, but the void coefficient is the dominant one in RBMK reactors. The void coefficient depends on the composition of the core - a new RBMK core will have a negative void coefficient. However, at the time of the accident at Chernobyl 4, the reactor's fuel burn-up, control rod configuration, and power level led to a positive void coefficient large enough to overwhelm all other influences on the power coefficient.



The 1986 Chernobyl accident

On 25 April, prior to a routine shutdown, the reactor crew at Chernobyl 4 began preparing for a test to determine how long turbines would spin and supply power to the main circulating pumps following a loss of main electrical power supply. This test had been carried out at Chernobyl the previous year, but the power from the turbine ran down too rapidly, so new voltage regulator designs were to be tested.

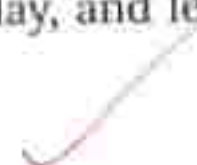
A series of operator actions, including the disabling of automatic shutdown mechanisms, preceded the attempted test early on 26 April. By the time that the operator moved to shut down the reactor, the reactor was in an extremely unstable condition. A peculiarity of the design of the control rods caused a dramatic power surge as they were inserted into the reactor.

The interaction of very hot fuel with the cooling water led to fuel fragmentation along with rapid steam production and an increase in pressure. The design characteristics of the reactor were such that substantial damage to even three or four fuel assemblies would - and did - result in the destruction of the reactor. The overpressure caused the 1000 t cover plate of the reactor to become partially detached, rupturing the fuel channels and jamming all the

control rods, which by that time were only halfway down. Intense steam generation then spread throughout the whole core (fed by water dumped into the core due to the rupture of the emergency cooling circuit) causing a steam explosion and releasing fission products to the atmosphere. About two to three seconds later, a second explosion threw out fragments from the fuel channels and hot graphite. There is some dispute among experts about the character of this second explosion, but it is likely to have been caused by the production of hydrogen from zirconium-steam reactions.

Two workers died as a result of these explosions. The graphite (about a quarter of the 1200 tonnes of it was estimated to have been ejected) and fuel became incandescent and started a number of fires, causing the main release of radioactivity into the environment. A total of about 14 EBq (14×10^{18} Bq) of radioactivity was released, over half of it being from biologically-inert noble gases.

About 200-300 tonnes of water per hour was injected into the intact half of the reactor using the auxiliary feedwater pumps but this was stopped after half a day owing to the danger of it flowing into and flooding units 1 and 2. From the second to tenth day after the accident, some 5000 tonnes of boron, dolomite, sand, clay, and lead were dropped onto the



Long-term health effects of the Chernobyl accident

Several organizations have reported on the impacts of the Chernobyl accident, but all have had problems assessing the significance of their observations because of the lack of reliable public health information before 1986.

In 1989, the World Health Organization (WHO) first raised concerns that local medical scientists had incorrectly attributed various biological and health effects to radiation exposure. Following this, the Government of the USSR requested the International Atomic Energy Agency (IAEA) to coordinate an international experts' assessment of the accident's radiological, environmental and health consequences in selected towns of the most heavily contaminated areas in Belarus, Russia, and Ukraine. Between March 1990 and June 1991, a total of 50 field missions were conducted by 200 experts from 25 countries (including the USSR), seven organizations, and 11 laboratories. In the absence of pre-1986 data, it compared a control population with those exposed to radiation. Significant health disorders were evident in both control and exposed groups, but, at that stage, none was radiation related.

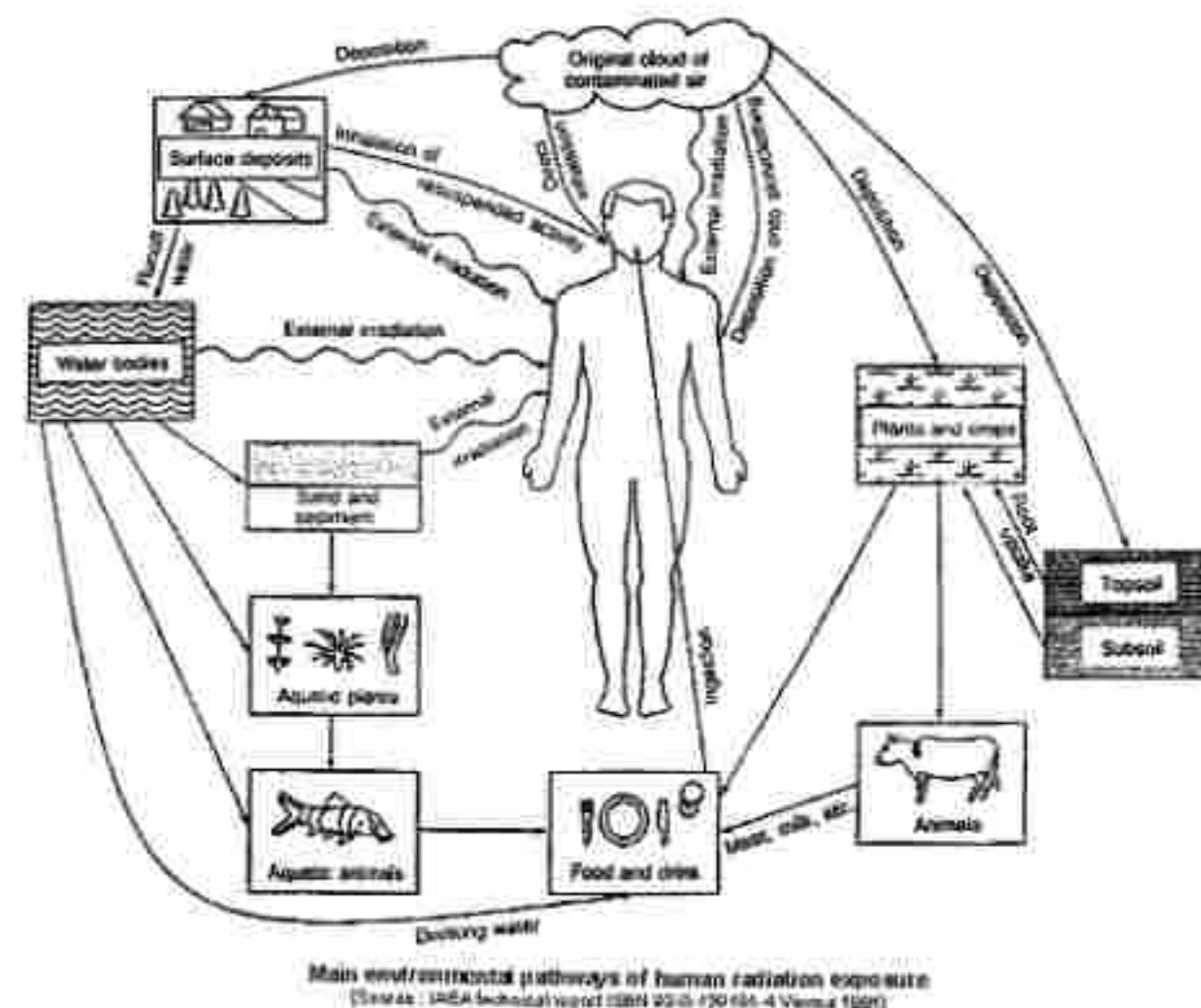


Fig.15 paths of the radiation exposure

In February 2003, the IAEA established the Chernobyl Forum, in cooperation with seven other UN organizations as well as the competent authorities of Belarus, the Russian Federation, and Ukraine. In April 2005, the reports prepared by two expert groups – "Environment",

coordinated by the IAEA, and "Health", coordinated by WHO – were intensively discussed by the Forum and eventually approved by consensus. The conclusions of this 2005 Chernobyl Forum study (revised version published 2006³) are in line with earlier expert studies, notably the UNSCEAR 2000 report which said that "apart from this [thyroid cancer] increase, there is no evidence of a major public health impact attributable to radiation exposure 14 years after the accident. There is no scientific evidence of increases in overall cancer incidence or mortality or in non-malignant disorders that could be related to radiation exposure." There is little evidence of any increase in leukemia, even among clean-up workers where it might be most expected. Radiation-induced leukemia has a latency period of 5-7 years, so any potential leukemia cases due to the accident would already have developed. A low number of the clean-up workers, who received the highest doses, may have a slightly increased risk of developing solid cancers in the long term. To date, however, there is no evidence of any such cancers having developed. Apart from these, the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) said: "The great majority of the population is not likely to experience serious health consequences as a result of radiation from

the Chernobyl accident. Many other health problems have been noted in the populations that are not related to radiation exposure."

The Chernobyl Forum report says that people in the area have suffered a paralysing fatalism due to myths and misperceptions about the threat of radiation, which has contributed to a culture of chronic dependency. Some "took on the role of invalids." Mental health coupled with smoking and alcohol abuse is a much greater problem than radiation, but worst of all at the time was the underlying level of health and nutrition. Apart from the initial 116,000, relocations of people were very traumatic and did little to reduce radiation exposure, which was low anyway. Psycho-social effects among those affected by the accident are similar to those arising from other major disasters such as earthquakes, floods, and fires.

Aftermath of the disaster

The impact of the disaster on the surrounding forest and wildlife also remains an area of active research. In the immediate aftermath of the accident, an area of about four square miles became known as the "Red Forest" because so

many trees turned reddish-brown and died after absorbing high levels of radiation.

Today, the exclusion zone is eerily quiet, yet full of life. Though many trees have regrown, scientists have found evidence of elevated levels of cataracts and albinism, and lower rates of beneficial bacteria, among some wildlife species in the area in recent years. Yet, due to the exclusion of human activity around the shuttered power plant, the numbers of some wildlife, from lynxes to elk, have increased. In 2015, scientists estimated there were seven times more wolves in the exclusion zone than in nearby comparable reserves, thanks to humans' absence.

The Chernobyl disaster had other fallout: The economic and political toll hastened the end of the USSR and fueled a global anti-nuclear movement. The disaster has been estimated to cost some \$25 billion in damages. Belarus, which saw 23 percent of its territory contaminated by the accident, lost about a fifth of its agricultural land. At the height of disaster response efforts, in 1991, Belarus spent 22 percent of its total damage dealing with Chernobyl.

Today, Chernobyl beckons to tourists who are intrigued by its history and its danger. But though Chernobyl symbolises the potential devastation of nuclear power,

Russia never quite moved beyond its legacy—or its technology. As of 2019, there are still 11 operational RBMK reactors in Russia.



Fig.16 The city of Pripyat was built to house workers of the nuclear power plant in the 1970s. It has been an abandoned ghost town since the accident, and is now used as a laboratory to study fallout patterns.

Russia never quite moved beyond its legacy—or its technology. As of 2019, there are still 11 operational RBMK reactors in Russia.



Fig.16 The city of Prip'yat was built to house workers of the nuclear power plant in the 1970s. It has been an abandoned ghost town since the accident, and is now used as a laboratory to study fallout patterns.

Many other international programmes were initiated following Chernobyl. The International Atomic Energy Agency (IAEA) safety review projects for each particular type of Soviet reactor are noteworthy, bringing together operators and Western engineers to focus on safety improvements. These initiatives are backed by funding arrangements. The Nuclear Safety Assistance Coordination Centre database lists Western aid totalling almost US\$1 billion for more than 700 safety-related projects in former Eastern Bloc countries. The Convention on Nuclear Safety adopted in Vienna in June 1994 is another outcome.

The Chernobyl Forum report said that some seven million people are now receiving or eligible for benefits as 'Chernobyl victims', which means that resources are not targeting those most in need. Remedying this presents daunting political problems however.

Samanta
24/05/2022

ନାମ - ଅନୁଷ୍ଠାନ ନାମ

ସମ୍ପର୍କ ନଂ - 21/BAH/6172

ସିସମ୍ - ଆସିଷ୍ଟେନ୍ସ (AECC)

ସ୍ଥଳ - ଗୋବିନ୍ଦ ଗୋବିନ୍ଦ
ସାହନା ସାହନା

ଡିଜିଟାଲାଇଜେସନ ନଂ - 013-1211-0065-21

ଆହାର ଶୃଙ୍ଖଳା (Food chain)

ଏହା ପ୍ରକୃତିରେ ଥିବା ଏକ ଶୃଙ୍ଖଳା ଯାହା ଉତ୍ପାଦକ ଓ ଉପଭୋକ୍ତାଙ୍କ ମଧ୍ୟରେ ଥାଏ। ଏହା ଉତ୍ପାଦକ ଓ ଉପଭୋକ୍ତାଙ୍କ ମଧ୍ୟରେ ଥିବା ଶୃଙ୍ଖଳା ଯାହା ଉତ୍ପାଦକ ଓ ଉପଭୋକ୍ତାଙ୍କ ମଧ୍ୟରେ ଥାଏ। ଏହା ଉତ୍ପାଦକ ଓ ଉପଭୋକ୍ତାଙ୍କ ମଧ୍ୟରେ ଥାଏ। ଏହା ଉତ୍ପାଦକ ଓ ଉପଭୋକ୍ତାଙ୍କ ମଧ୍ୟରେ ଥାଏ।

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ਗੁਣੀ	—	ਭਗਤ ਪ੍ਰਿਥਵੀ ਆਸਾ
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ਭਗਤ ਪ੍ਰਿਥਵੀ ਆਸਾ

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अभिहित वाक्य → अर्थानुसार, शक्ति → उच्च, निम्न

ਅੰਤਰ

$\text{ଅମ୍ଳିକ} \rightarrow \text{ଅମ୍ଳିକ} \rightarrow \text{ଅମ୍ଳିକ} \rightarrow \text{ଅମ୍ଳିକ}$

• દોષિષ્ટ આમૃતચૂન (Detoxious food chain) :-
 વિષાસક રુચિ ભાગ આજ યાજ આમૃત ચેતુસનિષ્ઠ આયુ ૩ દુષ્ટિ
 અવાચક દોષિષ્ટ આમૃતચૂન આમૃતચૂન વાન,
 કાચક

ৱাৰাণসী → বঁকা → চৌধাৰী → চৌধাৰী → চৌধাৰী

- ଅମ୍ଳଜାନର ଗୁଣ —

୧. ଜୀବମଣ୍ଡଳର ଶାନ୍ତିକ୍ରମ (Predator food chain) :- ଏହାର ଆରମ୍ଭ ଜୀବ-ଶାନ୍ତିକ୍ରମରୁ ହୋଇଥାଏ । ଏହା ଶାନ୍ତିକ୍ରମର ବିପରୀତ।

अधुना ज्ञेयम् → भाष्यम् → कुतश्चि → ज्ञानम् → ह्यर्थः वाक्यमर्थः

2. प्राणीकी खाद्यशृंखला - (Parasitic food chain) :- इस शृंखला में प्राणी ही प्राणी की खाद्य शृंखला के रूप में कार्य करते हैं।

স্বাধীনতা আন্দোলনের বৈশিষ্ট্য :-

2. প্ৰসূতি - স্বাম্যুজাৰে স্নানোত্তৰে নিৰ্দিষ্ট জীৱৰ স্নানোত্তৰে নিৰ্দিষ্টকালীন অৱস্থাত প্ৰসূতি হয়, যিখন অৱস্থাত স্বাম্যুজাৰে অৱস্থাত প্ৰসূতি হয়।

8. ଆଦିତ୍ୟ - ଆଦିତ୍ୟ ଏବଂ ପୁରୁଷୋତ୍ତମ ଏବଂ ଆଦିତ୍ୟ ପୁରୁଷ
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ଆଦିତ୍ୟ

3. जीव विज्ञान :- आधुनिक विज्ञान युग में जीव विज्ञान अत्यंत महत्वपूर्ण है। इसका अध्ययन हमें हमारे जीवन में उपयोगी जानकारी देता है।

9. അഭിമാനം - മനസ്സിലുള്ള അഭിമാനം വളരെ ഉയർന്നു പോകുന്നു.

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—: ସୁଦୃଢ଼ତା ଧରିବାକୁ :-
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 ଆମେ ମାନବ କଳାକାର ନୁହେଁ, ଆମେ ମାନବ କଳାକାର ନୁହେଁ —
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— ଭବିଷ୍ୟତ —

- wikipedia.org
- myfuturepoint.blogspot.com
- ଭବିଷ୍ୟତ — ଡ. ବିନୟ କୁମାର

Jamanta
 24/05/2022

SOLID WASTE MANAGEMENT:
Control Measures by
Municipal, Biomedical and e-
waste.

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ACKNOWLEDGEMENT

I would like to express my special thanks of gratitude to our professor Mr.Santanu Samanta who gave me the golden opportunity to work on this topic "solid waste management-biomedical and e-waste" and helped to complete the project in a given time frame. And our respective principal Dr.Atashi Karpah for the support that made us more aware and efficient regarding the environment.

Thank you.

Samanta
25/05/2022

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- 2. EFFECT OF POOR SOLID MANAGEMENT**
- 3. BIOMEDICAL WASTE**
- 4. E-WASTE**
- 5. METHODS OF SOLID WASTE
MANAGEMENT**
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Solid waste is a real threat to the global environment and economy.



INTRODUCTION

What is Solid Waste Management ?

Solid Waste Management is a term that is used to refer to the process of collecting and treating solid wastes. It also offers solutions for recycling items that do not belong to garbage or trash. As long as people have been living in settlements and residential areas, garbage or solid waste has been an issue. Waste management is all about how solid waste can be changed and used as a valuable resource.

Solid waste management should be embraced by each and every household, including the business owners across the world. The industrialisation has brought a lot of good things and bad things as well. One of the adverse effects of industrialisation is the creation of solid waste.

EFFECTS OF POOR SOLID MANAGEMENT

1. Litter Surroundings

Due to improper waste disposal systems, particularly by municipal waste management teams, wastes heap up and become a menace. While people clean their homes and places of work, they litter their surroundings which affect the environment and the community.

2. Impact on Human Health

Improper waste disposal can affect the health of the population living nearby the polluted area or landfills. The health of waste disposal workers and other employees involved with these landfill facilities are also at a greater risk. Exposure to wastes that handled improperly can cause skin irritations, respiratory problems, blood infections, growth problems, and even reproductive issues.

3. Disease-causing Pests

This type of dumping of waste materials forces biodegradable materials to rot and decompose under improper, unhygienic and uncontrolled conditions. After a few days of decomposition, a foul smell is produced, and it becomes a breeding ground for different types of disease-causing insects as well as infectious organisms. On top of that, it also spoils the aesthetic value of the area.

4. Environmental Problems

Solid wastes from industries are a source of toxic metals, hazardous wastes, and chemicals. When released to the environment, the solid wastes can cause biological and physicochemical problems to the environment that may affect or alter the productivity of the soils in that particular area.

5. Soil and Groundwater Pollution

Toxic materials and chemicals may seep into the soil and pollute the groundwater. During the process of collecting solid waste, hazardous wastes usually mix with ordinary garbage and other flammable wastes making the disposal process even harder and risky.

6. Emission of Toxic Gases

When hazardous wastes like pesticides, batteries containing lead, mercury or zinc, cleaning solvents, radioactive materials, e-waste and plastics mixed up with paper and other non-toxic scraps are

burned they produce dioxins, furans, polychlorinated biphenyls, and other gases. These toxic gases have the potential of causing various diseases, including cancer.

7. Impact on Land and Aquatic Animals

Our carelessness with our waste and garbage also affects animals, and they suffer the effects of pollution caused by improperly disposed of wastes and rubbish. Consuming styrofoam and cigarette butts have been known to cause deaths in marine animals. Animals are also at risk of poisoning while consuming grasses near contaminated areas or landfills as the toxins seep into the soil.

Biomedical and e-waste are the main two concerns of the project.

What is Biomedical?

This refers to hospitals and biomedical equipment and chemical manufacturing firms. In hospitals, there are different types of solid wastes produced.

Some of these solid wastes include syringes, bandages, used gloves, drugs, paper, plastics, food wastes and chemicals. All these require proper disposal or else they will cause a huge problem for the environment and the people in these facilities.



What is e-waste?

Electronic waste or e-waste describes discarded electrical or electronic devices. Used electronics which are destined for refurbishment, reuse, resale, salvage recycling through material recovery, or disposal are also considered e-waste. Informal processing of e-waste in developing countries can lead to adverse human health effects and environmental pollution.

Electronic scrap components, such as CPUs, contain potentially harmful materials such as lead, cadmium, beryllium, or brominated flame retardants. Recycling and disposal of e-waste may involve significant risk to health of workers and their communities.



METHODS OF SOLID WASTE MANAGEMENT

There are different methods of solid waste management. The following are some of the recognized methods:

1. Sanitary Landfill

This is the most popular solid waste disposal method used today. Garbage is basically spread out in thin layers, compressed and covered with soil or plastic foam.

Modern landfills are designed in such a way that the bottom of the landfill is covered with an impervious liner, which is usually made of several layers of thick plastic and sand. This liner

protects the groundwater from being contaminated because of leaching or percolation.

When the landfill is full, it is covered with layers of sand, clay, topsoil and gravel to prevent seepage of water.

Advantage: If landfills are managed efficiently, it is an ensured sanitary waste disposal method.

Constraint: It requires a reasonably large area.

2. Incineration

This method involves the burning of solid wastes at high temperatures until the wastes are turned into ashes. Incinerators are made in such a way that they do not give off extreme amounts of heat when burning solid wastes.

Incinerators that recycle heat energy through furnace and boiler are called waste-to-energy plants. These waste-to-energy systems are more expensive to set up and operate compared to plain incinerators because they require special equipment and controls, highly skilled technical personnel, and auxiliary fuel systems. This method of solid waste management can be done by individuals, municipalities and even institutions. The good thing about this method is the fact that it reduces the volume of waste up to 20 or 30% of the original volume.

Advantage: The volume of combustible waste is reduced considerably by burning waste. In the case of off-site pits, it is an appropriate method to minimize scavenging.

Constraint: It can cause smoke or fire hazard and also emits gaseous pollutants.

3. Recovery and Recycling

Recycling or recovery of resources is the process of taking useful but discarded items for the next use. Plastic bags, tins, glass and containers are often recycled automatically since, in many situations, they are likely to be scarce commodities.

Traditionally, these items are processed and cleaned before they are recycled. The process aims at reducing energy loss, consumption of new material and reduction of landfills. The most developed countries follow a strong tradition of recycling to lower volumes of waste.

Advantage: Recycling is environmentally friendly.

Constraint: It is expensive to set up, and in most emergencies, there is limited potential.

4. Composting

Due to a lack of adequate space for landfills, biodegradable yard waste is allowed to decompose in a medium designed for the

Constraint: The systems that destroy chlorinated organic molecules by heat may create incomplete combustion products, including dioxins and furans. These compounds are highly toxic in the parts per trillion ranges. The residue it generates may be hazardous wastes, requiring proper treatment, storage, and disposal.

To summarize, proper solid waste management is an integral part of environmental conservation that should be observed by both individuals and companies globally.



CONCLUSION

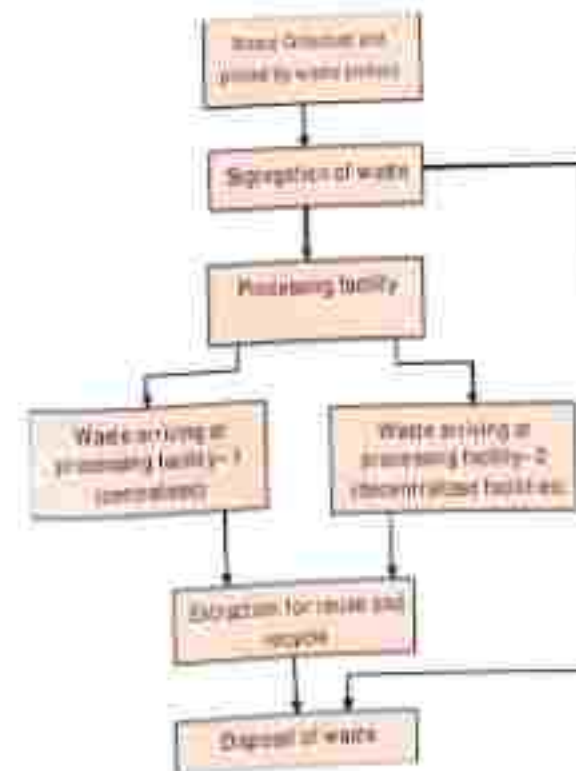
A technological approach to solid-waste management began to develop in the latter part of the 19th century. Watertight garbage cans were first introduced in the United States, and sturdier vehicles were used to collect and transport wastes. A significant development in solid-waste treatment and disposal practices was marked by the construction of the first refuse incinerator in England in 1874. By the beginning of the 20th century, 15 percent of major American cities were incinerating solid waste. Even ~~then~~, however, most of the largest cities were still using primitive disposal methods such as open dumping on land or in water.

Technological advances continued during the first half of the 20th century, including the development of garbage grinders, compaction trucks, and pneumatic collection systems. By mid-century, however, it had become evident that open dumping and improper incineration of solid waste were causing problems of pollution and jeopardizing public health. As a result, sanitary landfills were developed to replace the practice of open dumping and to reduce the reliance on waste incineration. In many countries waste was divided into two categories, hazardous and non-hazardous, and separate regulations were developed for their disposal. Landfills were designed and operated in a manner that minimized risks to public health and the environment. New refuse incinerators were designed to recover heat energy from the waste and were provided with extensive air pollution control devices to satisfy stringent standards of air quality. Modern solid-waste management plants in most developed countries now emphasize the practice of recycling and waste reduction at the source rather than incineration and land disposal.



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Solid waste management is extremely important in a community mainly because **it will prevent the household from experiencing the hazardous outcomes of solid waste material**. By getting rid of most of these waste matter properly, one can actually protect one's loved ones along with the environment.



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24/05/2022

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ACKNOWLEDGEMENT

I would like to express my special thanks of gratitude to my professor ~~Dr~~ Santanu Samanta who gave me the golden opportunities to this project who also helped me in completing my project. I came to know about many things.

Secondly, I would also like to thank my parents, and my friends who helped a lot in finalizing this project within the limited time frame.

INTRODUCTION

The continuous rise in temperature of the planet is really upsetting. The root cause for this is global warming. Global warming begins when sunlight reaches the Earth. The clouds, atmospheric particles, reflective ground surfaces and surface of oceans then sends back about 30 % of sunlight back into the space, whilst the remaining is absorbed by oceans, air and land. This consequently heats up the surface of the planet and atmosphere, making life feasible. As the Earth warms up, this solar energy is radiated by thermal radiation and infrared rays, propagating directly out to space thereby cooling the Earth. However, some of the outgoing radiation is re-absorbed by carbon dioxide, water vapours, ozone, methane and other gases in the atmosphere and is radiated back to the surface of Earth.

These gases are commonly known as greenhouse gases due to their heat-trapping capacity. It must be noted that this re-absorption process is actually good as the Earth's average surface temperature would be very cold if there was no existence of greenhouse gases. The dilemma began when the concentration of greenhouse gases in the atmosphere was artificially increased by humankind at an alarming rate since the past two centuries. As of 2004, over 8 billion tons of carbon dioxide was pumped thermal radiation is further hindered by increased levels of greenhouse gases resulting in a phenomenon known as human enhanced global warming effect.



Greenhouse Effect

While other planets in the solar system of the Earth are either roasting hot or bitterly cold, Earth's surface has relatively mild, steady temperatures. Earth enjoys these temperatures because of its atmosphere, which is the thin layer of gases that cover and protect the planet. However, 97 % of climate scientists and researchers agree that humans have changed the Earth's atmosphere in dramatic ways over the past two centuries, resulting in global warming.

To understand global warming, it is first necessary to become familiar with the greenhouse effect. The natural greenhouse effect normally traps some portion of heat in such a way that our planet is safe from reaching freezing temperatures while human enhanced greenhouse effect leads to global warming. This is due to burning of fossil fuels which increase the amount of greenhouse gases (carbon dioxide, methane and oxides of nitrogen) present in the atmosphere

The greenhouse effect, combined with increasing levels of greenhouse gases and the resulting global warming, is expected to have philosophical implications. If global warming continues unrestrained and nothing effective is done to limit this evil, it will cause significant climate change, a rise in sea levels, extreme weather events and other ruthless natural, environmental and social impacts.



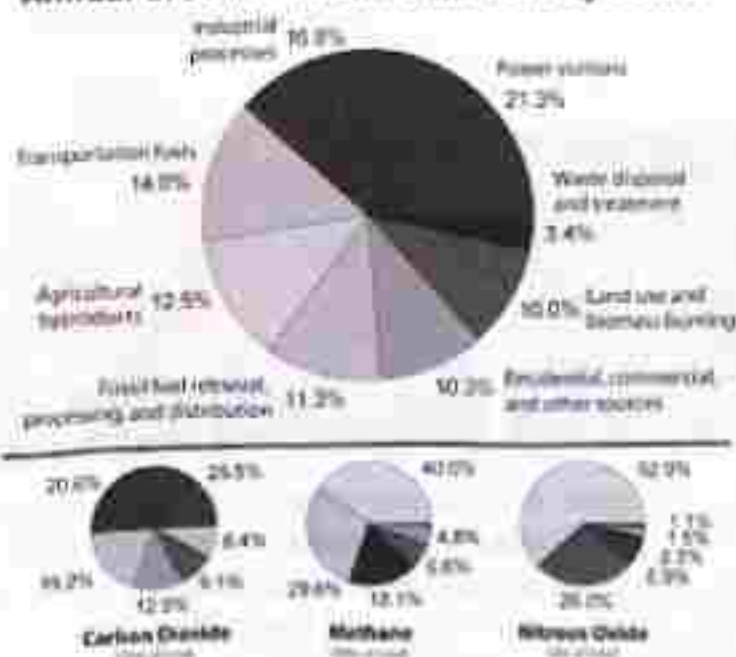
Greenhouse Gases

There are many greenhouse gases which are mainly emitted by human activity. The first and foremost in the list is carbon dioxide. Excessive burning of fossil fuels like coal and oil is the major factor for producing this gas. Moreover, deforestation i.e., removal of trees for acquiring lands also causes large amount of carbon dioxide in the atmosphere.

Cement manufacture also contributes carbon dioxide to atmosphere when calcium carbonate is heated generating lime and carbon dioxide. The second culprit gas is methane, commonly known as natural gas. It is produced as a result of agricultural activities such as livestock digestion, paddy rice farming and use of manure. Methane is also produced due to improper management of waste. Nitrous oxides are generated mainly by fertilizers.

Moreover, fluorinated gases such as chlorofluorocarbons (CFCs) are chiefly a result of various industrial processes and refrigeration shows pictorially the distribution of greenhouse gases. These gases are playing their negative part in increasing the havoc of global warming. They are continuously causing an increase in the earth's temperature.

Annual Greenhouse Gas Emissions by Sector



Causes of Global warming

The major cause of global warming is the greenhouse gases. They include carbon dioxide, methane, nitrous oxides and in some cases chlorine and bromine containing compounds. The build-up of these gases in the atmosphere changes the radiative equilibrium in the atmosphere. Their overall effect is to warm the Earth's surface and the lower atmosphere because greenhouse gases absorb some of the outgoing radiation of Earth and re-radiate it back towards the surface.

When ultraviolet light is present, these gases dissociate releasing chlorine atoms which then catalyses ozone destruction. Aerosols present in the atmosphere are also causing global warming by changing the climate in two different ways. Firstly, they scatter and absorb solar and infrared radiation and secondly, they may alter the microphysical and chemical properties of clouds and perhaps affect their lifetime and extent. The scattering of solar radiation acts to cool the planet, while absorption of solar radiation by aerosols warms the air directly instead of permitting sunlight to be absorbed by the surface of the Earth. The human contribution to the number of aerosols in the atmosphere is of various forms. For instance, dust is a by-product of agriculture. Biomass burning generates a mixture of organic droplets and soot particles.



Many industrial processes produce a wide diversity of aerosols depending on what is being burned or generated in the manufacturing process. Moreover, exhaust emissions from various sorts of transport produce a rich mixture of pollutants that are either aerosols from the outset or are transformed by chemical reactions in the atmosphere to form aerosols.

EFFECTS OF GLOBAL WARMING

Global warming is one of the most difficult tasks faced by the climate researchers. This is due to the fact that natural processes that cause rain, snowfall, hailstorms, rise in sea levels is reliant on many diverse factors. Moreover, it is very hard to predict the size of emissions of greenhouse gases in the future years as this is determined majorly through technological advancements and political decisions. Global warming produces many negative effects some of which are described here.

Firstly, extra water vapour which is present in the atmosphere falls again as rain which leads to floods in various regions of the world. When the weather turns warmer, evaporation process from both land and sea rises. This leads to drought in the regions where increased evaporation process is not compensated by increased precipitation. In some areas of the world, this will result in crop failure and famine particularly in areas where the temperatures are already high. The extra water vapour content in the atmosphere will fall again as extra rain hence causing flood. Towns and villages which are dependent on the melting water from snowy mountains may suffer drought and scarcity of water supply. It is because the glaciers all over the world are shrinking at a very rapid rate and melting of ice appears to be faster than previously projected.

According to Intergovernmental Panel on Climate Change (IPCC), about one-sixth of the total population of the world lives in the regions which shall be affected by a decrease in melting water. The warmer climate will likely cause more heat waves, more violent rainfall and also amplification in the severity of hailstorms and thunderstorms. Rising of sea levels is the deadliest effect of global warming, the rise in temperature is causing the ice and glaciers to melt rapidly. This will lead to rise of water levels in oceans, rivers and lakes that can pilot devastation in the form of floods.

Conclusion

The scientific and environmental 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. Rise of sea levels will devastate agricultural and fishing activities. To embark upon these problems, some remedial steps must be timely taken which include but are not limited to the use of renewable sources of energy and stopping deforestation. Innovative solutions must be brought forward to end this hazard once and forever.

Jamanta
26/05/2022

TITLE PAGE

PROJECT REPORT

(SUBMITTED FOR THE DEGREE OF B.A. HONOURS IN HISTORY UNDER
THE UNIVERSITY OF CALCUTTA)

ON

Project title

ENVIRONMENTAL POLLUTION

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MONTH AND YEAR OF SUBMISSION: JUNE 2022

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ACKNOWLEDGEMENT

I take this opportunity to express my profound gratitude and deep regards to our professor, in charge for his support and guidance in making this project.

I would also like to thank my supervisor Prof.: **SANTANU SAMANTA** for his exemplary guidance, monitoring and constant encouragement throughout the project.

I would also like to thank the librarian of our college who helped in getting the books required for the completion of this project.

Lastly, I thank the Almighty, my family and friends for their constant encouragement without which this assignment would not be possible.

DISHA SHAW

INTRODUCTION

Pollution is the introduction of harmful materials into the environment. These harmful materials are called pollutants. Pollutants can be natural, such as volcanic ash. They can also be created by human activity, such as trash or runoff produced by factories. Pollutants damage the quality of air, water, and land.

Many things that are useful to people produce pollution. Cars spew pollutants from their exhaust pipes. Burning coal to create electricity pollutes the air. Industries and homes generate garbage and sewage that can pollute the land and water. Pesticides—chemical poisons used to kill weeds and insects—seep into waterways and harm wildlife.

All living things—from one-celled microbes to blue whales—depend on Earth's supply of air and water. When these resources are polluted, all forms of life are threatened.

Pollution is a global problem. Although urban areas are usually more polluted than the countryside, pollution can spread to remote places where no people live. For example, pesticides and other chemicals have been found in the Antarctic ice sheet. In the middle of the northern Pacific Ocean, a huge collection of microscopic plastic particles forms what is known as the Great Pacific Garbage Patch.

TYPES OF POLLUTION

- Air pollution
- Noise pollution
- Water pollution
- Soil pollution
- Thermal pollution
- Radiation pollution

In this project, we will talk about air, water, soil, and noise pollution.

AIR POLLUTION

Air pollution is the contamination of the indoor or outdoor environment by any chemical, physical or biological agent that modifies the natural characteristics of the atmosphere. Household combustion devices, motor vehicles, industrial facilities and forest fires are common sources of air pollution.

CAUSE

Certain gases in the atmosphere can cause air pollution. For example, in cities, a gas called **ozone** is a major cause of air pollution. Ozone is also a greenhouse gas that can be both good and bad for our environment. It all depends on where it is in Earth's **atmosphere**.

Following are the important causes of air pollution:

Burning of Fossil Fuels

The combustion of **fossil fuels** emits a large amount of sulphur dioxide. Carbon monoxide released by incomplete combustion of fossil fuels also results in air pollution.

Automobiles

The gases emitted from vehicles such as jeeps, trucks, cars, buses, etc. pollute the environment. These are the major sources of greenhouse gases and also result in diseases among individuals.

Agricultural Activities

Ammonia is one of the most hazardous gases emitted during agricultural activities. The insecticides, pesticides and fertilisers emit harmful chemicals in the atmosphere and contaminate it.

Factories and Industries

Factories and industries are the main source of carbon monoxide, organic compounds, hydrocarbons and chemicals. These are released into the air, degrading its quality.

Mining Activities

In the mining process, the minerals below the earth are extracted using large pieces of equipment. The dust and chemicals released during the process not only pollute the air, but also deteriorate the health of the workers and people living in the nearby areas.

Domestic Sources

The household cleaning products and paints contain toxic chemicals that are released in the air. The smell from the newly painted walls is the smell of the chemicals present in the paints. It not only pollutes the air but also affects breathing.

EFFECTS

The hazardous effects of air pollution on the environment include:

1.1.1 Diseases

Air pollution has resulted in several respiratory disorders and heart diseases among humans. The cases of lung cancer have increased in the last few decades. Children living near polluted areas are more prone to pneumonia and asthma. Many people die every year due to the direct or indirect effects of air pollution.

1.1.2 Global Warming

Due to the emission of greenhouse gases, there is an imbalance in the gaseous composition of the air. This has led to an increase in the temperature of the earth. This increase in the earth's temperature is known as global warming. This has resulted in the melting of glaciers and an increase in sea levels. Many areas are submerged underwater.

1.1.3 Acid Rain

The burning of fossil fuels releases harmful gases such as nitrogen oxides and sulphur oxides in the air. The water droplets combine with these pollutants, become acidic and fall as acid rain which damages human, animal and plant life.

1.1.4 Ozone Layer Depletion

The release of chlorofluorocarbons, halons, and hydrochlorofluorocarbons in the atmosphere is the major cause of the depletion of the ozone layer. The depleting ozone layer does not prevent the harmful ultraviolet rays coming from the sun and causes skin diseases and eye problems among individuals.

Also Read: Ozone Layer Depletion

1.1.5 Effect on Animals

The air pollutants suspended in the water bodies affect aquatic life. Pollution also compels the animals to leave their habitat and shift to a new place. This renders them stray and has also led to the extinction of a large number of animal species.

CONTROL

Following are the measures one should adopt, to control air pollution:

1.1.6 Avoid Using Vehicles

People should avoid using vehicles for shorter distances. Rather, they should prefer public modes of transport to travel from one place to another. This not only prevents pollution but also conserves energy.

1.1.7 Energy Conservation

A large number of fossil fuels are burnt to generate electricity. Therefore, do not forget to switch off the electrical appliances when not in use. Thus, you can save the environment at the individual level. The use of energy-efficient devices such as CFLs also controls pollution to a greater level.

1.1.8 Use of Clean Energy Resources

The use of solar, wind and geothermal energies reduces air pollution at a larger level. Various countries, including India, have implemented the use of these resources as a step towards a cleaner environment.

WATER POLLUTION

Water pollution can be defined as the contamination of water bodies. Water pollution is caused when water bodies such as rivers, lakes, oceans, groundwater and aquifers get contaminated with industrial and agricultural effluents.

When water gets polluted, it adversely affects all lifeforms that directly or indirectly depend on this source. The effects of water contamination can be felt for years to come.

CAUSE

Water pollution has damaging effects on the environment, humans, plants and animals. Pollution can occur if your business discharges substances into surface waters or groundwater without prior treatment or by accident, eg after a spill.

Key causes of pollution include:

- spills or leaks from oil and chemical containers
- trade effluent going into surface water drains instead of foul water drains, or straight into watercourses
- removing too much water from surface waters and groundwater
- run-off containing fertilisers and pesticides from farming into surface waters
- run-off containing salt during winter months
- silt and soil from construction sites and bank erosion on farms
- wash waters and waste products
- fuel spills
- releases of hot water
- spills of food products, eg dairy products and fruit juice.

If you pollute the water environment, you may be committing an offence.

Surface waters and groundwater are protected by a number of licensing regimes that prevent and control pollution from businesses. See the page in this guide on regulation that protects surface water and groundwater.

EFFECTS

The effect of water pollution depends upon the type of pollutants and its concentration. Also, the location of water bodies is an important factor to determine the levels of pollution.

- Water bodies in the vicinity of urban areas are extremely polluted. This is the result of dumping garbage and toxic chemicals by industrial and commercial establishments.
- Water pollution drastically affects aquatic life. It affects their metabolism, and behaviour, and causes illness and eventual death. Dioxin is a chemical that causes a lot of problems from reproduction to uncontrolled cell growth or cancer. This chemical is bioaccumulated in fish, chicken and meat. Chemicals such as this travel up the food chain before entering the human body.
- The effect of water pollution can have a huge impact on the food chain. It disrupts the food chain. Cadmium and lead are some toxic substances, these pollutants upon entering the food chain through animals (fish when consumed by animals, humans) can continue to disrupt at higher levels.
- Humans are affected by pollution and can contract diseases such as hepatitis through faecal matter in water sources. Poor drinking water treatment and unfit water can always cause an outbreak of infectious diseases such as cholera, etc.
- The ecosystem can be critically affected, modified and destructured because of water pollution.

CONTROL

Water pollution, to a larger extent, can be controlled by a variety of methods. Rather than releasing sewage waste into water bodies, it is better to treat them before discharge. Practising this can reduce the initial toxicity and the remaining substances can be degraded and rendered harmless by the water body itself. If the secondary treatment of water has been carried out, then this can be reused in sanitary systems and agricultural fields.

A very special plant, the Water Hyacinth can absorb dissolved toxic chemicals such as cadmium and other such elements. Establishing these in regions prone to such kinds of pollutants will reduce the adverse effects to a large extent.

Some chemical methods that help in the control of water pollution are precipitation, the ion exchange process, reverse osmosis, and coagulation. As an individual, reusing, reducing, and recycling wherever possible will advance a long way in overcoming the effects of water pollution.

SOIL POLLUTION

Soil pollution refers to the contamination of soil with anomalous concentrations of toxic substances.

It is a serious environmental concern since it harbours many health hazards. For example, exposure to soil containing high concentrations of benzene increases the risk of contracting leukaemia. An image detailing the discolouration of soil due to soil pollution is provided below.

CAUSE

Soil pollution can be broadly classified into two categories –

- Naturally caused soil pollution
- Anthropogenic soil pollution (caused by human activity)

Natural Pollution of Soil

In some extremely rare processes, some pollutants are naturally accumulated in soils. This can occur due to the differential deposition of soil by the atmosphere. Another manner in which this type of soil pollution can occur is via the transportation of soil pollutants with precipitation water.

An example of natural soil pollution is the accumulation of compounds containing the perchlorate anion (ClO_4^-) in some dry, arid ecosystems. It is important to note that some contaminants can be naturally produced in the soil under the effect of certain environmental conditions. For example, perchlorates can be formed in soils containing chlorine and certain metals during a thunderstorm.

Almost all cases of soil pollution are anthropogenic in nature.

A variety of human activities can lead to the contamination of soil. Some such processes are listed below.

- The demolition of old buildings can involve the contamination of nearby soil with asbestos.
- Usage of lead-based paint during construction activities can also pollute the soil with hazardous concentrations of lead.
- Spillage of petrol and diesel during transportation can contaminate soils with the hydrocarbons found in petroleum.
- Activities associated with metal casting factories (foundries) often cause the dispersion of metallic contaminants into the nearby soils.
- Underground mining activities can cause the contamination of land with heavy metals.

- Improper disposal of highly toxic industrial/chemical waste can severely pollute the soil. For example, the storage of toxic wastes in landfills can result in the seepage of the waste into the soil. This waste can go on to pollute groundwater as well.
- Chemical pesticides contain several hazardous substances. Excessive and inefficient use of chemical pesticides can result in severe soil pollution.
- Sewage produced in urbanized areas can also contaminate soil (if not disposed of correctly). These wastes may also contain several carcinogenic substances.

Other forms of waste that can pollute soil include nuclear waste, e-waste, and coal ash.

EFFECTS

Effects on Human Beings

Soil contaminants can exist in all three phases (solid, liquid, and gaseous). Therefore, these contaminants can find their way into the human body via several channels such as direct contact with the skin or through the inhalation of contaminated soil dust.

The short term effects of human exposure to polluted soil include:

- Headaches, nausea, and vomiting.
- Coughing, pain in the chest, and wheezing.
- Irritation of the skin and the eyes.
- Fatigue and weakness.

A variety of long-term ailments have been linked to soil pollution. Some such diseases are listed below.

- Exposure to high levels of lead can result in permanent damage to the nervous system. Children are particularly vulnerable to lead.
- Depression of the CNS (Central Nervous System).
- Damage to vital organs such as the kidney and the liver.
- Higher risk of developing cancer.

It can be noted that many soil pollutants such as petroleum hydrocarbons and industrial solvents have been linked to congenital disorders in humans. Thus, soil pollution can have several negative effects on human health.

Effects on Plants and Animals

Since soil pollution is often accompanied by a decrease in the availability of nutrients, plant life ceases to thrive in such soils. Soils contaminated with inorganic aluminium can prove toxic to plants. Also, this type of pollution often increases the salinity of the soil, making it inhospitable for the growth of plant life.

Plants that are grown in polluted soil may accumulate high concentrations of soil pollutants through a process known as bioaccumulation. When these plants are consumed by herbivores, all the accumulated pollutants are passed up the food chain. This can result in the loss/extinction

of many desirable animal species. Also, these pollutants can eventually make their way to the top of the food chain and manifest as diseases in human beings.

Effects on the Ecosystem

- Since the volatile contaminants in the soil can be carried away into the atmosphere by winds or can seep into underground water reserves, soil pollution can be a direct contributor to air and water pollution.
- It can also contribute towards acid rain (by releasing huge quantities of ammonia into the atmosphere).
- Acidic soils are inhospitable to several microorganisms that improve soil texture and help in the decomposition of organic matter. Thus, the negative effects of soil pollution also impact soil quality and texture.
- Crop yield is greatly affected by this form of pollution. In China, over 12 million tons of grain (worth approximately 2.6 billion USD) is found to be unfit for human consumption due to contamination with heavy metals (as per studies conducted by the China Dialogue).

CONTROL

Several technologies have been developed to tackle soil remediation. Some important strategies followed for the decontamination of polluted soil are listed below.

- Excavation and subsequent transportation of polluted soils to remote, uninhabited locations.
- Extraction of pollutants via thermal remediation – the temperature is raised in order to force the contaminants into the vapour phase, after which they can be collected through vapour extraction.
- Bioremediation or phytoremediation involves the use of microorganisms and plants for the decontamination of soil.
- Mycoremediation involves the use of fungi for the accumulation of heavy metal contaminants.

NOISE POLLUTION

The word noise is derived from the Latin word 'Nausea', which means sickness in which one feels the need to vomit. Noise is an unpleasant and undesirable sound which leads to discomfort in human beings. **The intensity of sound is measured in decibels (dB).** The faintest sound that the human ear can hear is 1 Db. Due to increasing noise around the civilizations, noise pollution has become a matter of concern. Some of its major causes are vehicles, aircraft, industrial machines, loudspeakers, crackers, etc. When used at high volume, some other appliances also contribute to noise pollution, like television, transistor, radio, etc.

CAUSE

Following are the causes and sources of noise pollution:

- **Industrialisation:** Industrialisation has led to an increase in noise pollution as the use of heavy machinery such as generators, mills, and huge exhaust fans are used, resulting in the production of unwanted noise.
- **Vehicles:** Increased number of vehicles on the roads are the second reason for noise pollution.
- **Events:** Weddings and public gatherings involve loudspeakers to play music resulting in the production of unwanted noise in the neighbourhood.
- **Construction sites:** Mining, construction of buildings, etc add to the noise pollution.

1.2 Noise Pollution Examples

Following are the examples of noise pollution:

- Unnecessary usage of horns
- Using loudspeakers either for religious functions or for political purposes
- Unnecessary usage of fireworks
- Industrial noise
- Construction noise
- Noise from transportation such as railway and aircraft

EFFECTS

Noise pollution can be hazardous to human health in the following ways:

- **Hypertension:** It is a direct result of noise pollution which is caused due to elevated blood levels for a longer duration.

- **Hearing loss:** Constant exposure of human ears to loud noise that are beyond the range of sound that human ears can withstand damages the eardrums, resulting in loss of hearing.
- **Sleeping disorders:** Lack of sleep might result in fatigue and low energy level throughout the day affecting everyday activities. Noise pollution hampers the sleep cycles leading to irritation and an uncomfortable state of mind.
- **Cardiovascular issues:** Heart-related problems such as blood pressure level, stress and cardiovascular diseases might come up in a normal person and a person suffering from any of these diseases might feel a sudden shoot up in the level.

CONTROL

Some noise pollution preventive measures are provided in the points below:

- Honking in public places like teaching institutes, hospitals, etc. should be banned.
- In the commercial, hospital, and industrial buildings, adequate soundproof systems should be installed.
- Musical instruments' sound should be controlled to desirable limits.
- Dense tree cover is useful in noise pollution prevention.
- Explosives should not be used in forest, mountainous and mining areas.

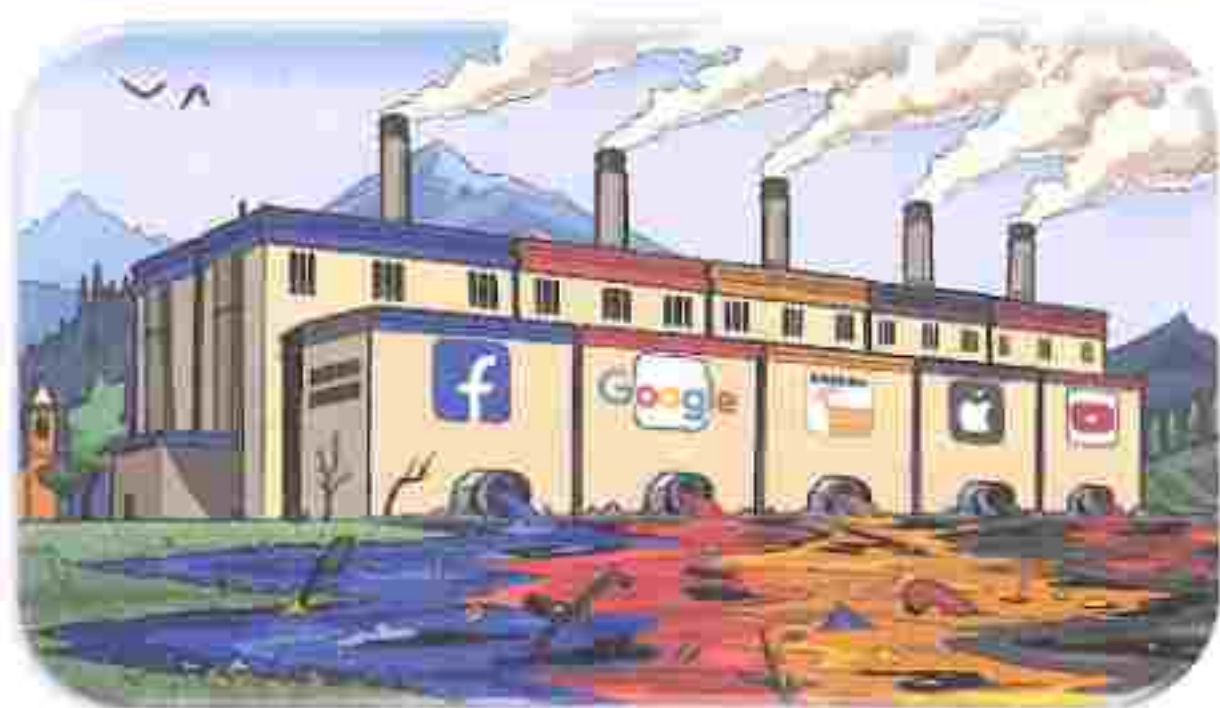
CONCLUSION

-It can be concluded that reducing vehicular pollution in India and improving air quality in Metropolitan Area seeks to encourage the use of integrated and sustainable transport, in addition to awareness campaigns.

- Also, it could be concluded that is important to raise population awareness about the importance of contributing to the preservation of the environment and thus to a better quality of life for all because there may be many projects seeking this objective but the change must start with each person. - Finally, it was very helpful for us to investigate how the dynamics of vehicular pollution are presented in India and better yet, to offer and think about possible solutions to this problem through engineering, such as helping with the systematization of transport and thus decreasing the ecological impact on nature.

Samantha
24/05/2022

GOKHALE MEMORIAL GIRLS' COLLEGE



Pollution And Its Types

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Topic

POLLUTION

AND

ITS TYPES



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Acknowledgement

I am very much thankful to my respected Professor Mr Santanu Samanta for giving me the golden opportunity to do this wonderful project on 'Pollution and Its Types' and also helping me in completing the project. I would also like to thank God for helping me by providing me with the necessary things so that I can finish the project on time. And lastly but not least I would like to thank my family and friends for helping me finish my project on time. While doing the project, I also learned many new things about 'Pollution and Its Types', so I am again very thankful to God, my respected professor, family, and friends.

Introduction

Pollution is a necessary evil of all development. The lack of development of a culture of pollution control has resulted in a heavy backlog of gaseous, liquid and solid pollution in the environment. It has to be cleaned. Pollution control is a recent environmental concern. Pollution is a man-made problem, mainly in affluent countries.

The developed countries have been exploiting natural resources to convert them into goods for their comfort and export them to the needy developing world. In doing so, the industrialized countries dump a lot of materials in their environment which becomes polluted. In one way pollution has been "exported" to developing countries and around the world.

Pollution

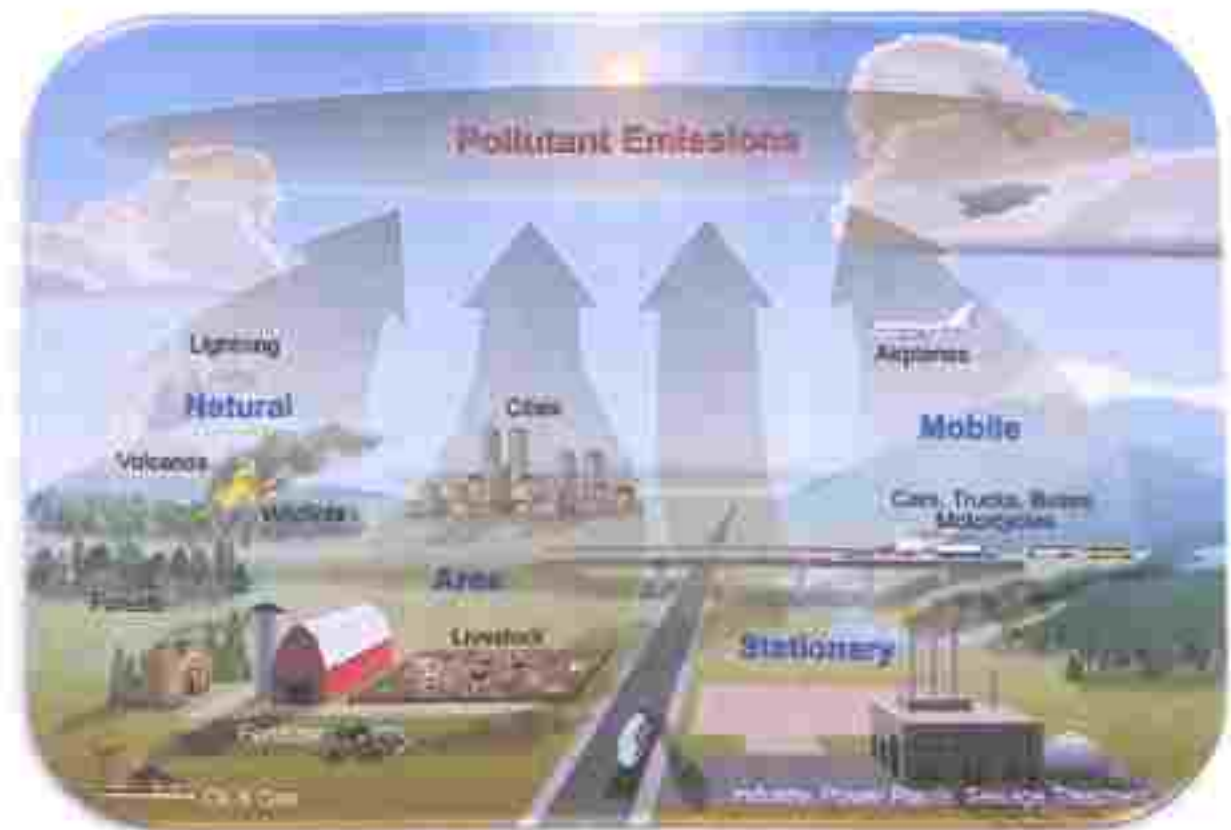


Pollutants

A pollutant or novel entity is a substance or energy introduced into the environment that has undesired effects, or adversely affects the usefulness of a resource. These can be both naturally forming (that is, minerals or extracted compounds like oil) or anthropogenic in origin (that is, manufactured materials or by-products from biodegradation). Pollutants result in environmental pollution or become public health concerns when they reach a concentration high enough to have significant negative impacts.

A pollutant may cause long- or short-term damage by changing the growth rate of plant or animal species, or by interfering with human amenities, comfort, health, or property values. Some pollutants are biodegradable and therefore will not persist in the environment in the long term. However, the degradation products of some pollutants are themselves polluting such as the products DDE and DDD produced from the degradation of DDT.

Pollution has widespread negative impacts on the environment. When analysed from a planetary boundaries perspective, human society has released novel entities that well exceed safe levels.



Sources And Causes Of Pollution

Natural pollution

One of the most significant natural sources of pollution is volcanoes, which during eruptions release large quantities of harmful gases into the atmosphere. Volcanic gases include carbon dioxide, which can be fatal in large concentrations and contributes to climate change, hydrogen halides which can cause acid rain, and sulphur dioxides, which are harmful to animals and damage the ozone layer. Volcanic emissions also include fine and ultrafine particles which may contain

toxic chemicals and substances such as arsenic, lead, and mercury.

Wildfires, which can be caused naturally by lightning strikes, are also a significant source of air pollution. Wildfire smoke contains significant quantities of both carbon dioxide and carbon monoxide, which can cause suffocation. Large quantities of fine particulates are found within wildfire smoke as well, which poses a health risk to animals.

Human-generated pollution

Motor vehicle emissions are one of the leading causes of air pollution. Principal stationary pollution sources include chemical plants, coal-fired power plants, oil refineries, petrochemical plants, nuclear waste disposal activity, incinerators, large livestock farms (dairy cows, pigs, poultry, etc.), and PVC factories, metals production factories, plastics factories, and other heavy industry. Agricultural air pollution comes from contemporary practices which include clear felling and burning of natural vegetation as well as spraying of pesticides and herbicides. About 400 million metric tons of waste are generated each year.

Some of the more common soil contaminants are chlorinated hydrocarbons (CHH), heavy metals (such as chromium, cadmium – found in rechargeable batteries, and lead – found in lead paint, aviation fuel and still in some countries, gasoline), MTBE, zinc, arsenic and benzene.

In 2001 a series of press reports culminating in a book called Fateful Harvest unveiled a widespread practice of

recycling industrial byproducts into fertilizer, resulting in the contamination of the soil with various metals.

Ordinary municipal landfills are the source of many chemical substances entering the soil environment (and often groundwater), emanating from the wide variety of refuse accepted, especially substances illegally discarded there.

Pollution can also be the consequence of a natural disaster. For example, hurricanes often involve water contamination from sewage and petrochemical spills from ruptured boats or automobiles. Larger scale and environmental damage are not uncommon when coastal oil rigs or refineries are involved. Some sources of pollution, such as nuclear power plants or oil tankers, can produce widespread and potentially hazardous releases when accidents occur.

In the case of noise pollution, the dominant source class is the motor vehicle, producing about ninety per cent of all unwanted noise worldwide.

Greenhouse gases emissions

Carbon dioxide, while vital for photosynthesis, is sometimes referred to as pollution, because raised levels of the gas in the atmosphere are affecting the Earth's climate. Disruption of the environment can also highlight the connection between areas of pollution that would normally be classified separately, such as those of water and air. Recent studies have investigated the potential for long-term rising levels of atmospheric carbon dioxide to cause slight but

critical increases in the acidity of ocean waters, and the possible effects of this on marine ecosystems.

Most polluting industries

The Pure Earth, an international non-for-profit organization dedicated to eliminating life-threatening pollution in the developing world, issues an annual list of some of the world's most polluting industries. Below is the list for 2016:

- *Lead-Acid Battery Recycling*
- *Industrial Mining and Ore Processing*
- *Lead Smelting*
- *Tannery Operations*
- *Artisanal Small-Scale Gold Mining*
- *Industrial/Municipal Dumpsites*
- *Industrial Estates*
- *Chemical Manufacturing*
- *Product Manufacturing*
- *Dye Industry*

A 2018 report by the Institute for Agriculture and Trade Policy and GRAIN says that the meat and dairy industries are poised to surpass the oil industry as the world's worst polluters.



History

Before the 19th century

Air pollution has always accompanied civilizations. Pollution started in prehistoric times when man created the first fires. According to a 1983 article in the journal Science, "soot" found on ceilings of prehistoric caves provides ample evidence of the high levels of pollution that were associated with inadequate ventilation of open fires."

Metal forging appears to be a key turning point in the creation of significant air pollution levels outside the home. Core samples of glaciers in Greenland indicate increases in pollution associated with Greek, Roman, and Chinese metal production.

19th century

It was the Industrial Revolution that gave birth to environmental pollution as we know it today. London also recorded one of the earlier extreme cases of water quality problems with the Great Stink on the Thames of 1858, which led to the construction of the London sewerage system soon afterwards. Pollution issues escalated as population growth far exceeded the viability of neighbourhoods to handle their waste problem. Reformers began to demand sewer systems and clean water.



Wastewater from the houses collected in the gutters running alongside the curbs and emitted a truly fearsome smell. There were no public toilets in the streets or squares. Visitors, especially women, often became desperate when nature called. In the public buildings, the sanitary facilities were unbelievably primitive.

20th and 21st century

The emergence of great factories and consumption of immense quantities of coal gave rise to unprecedented air pollution and the large volume of industrial chemical discharges added to the growing load of untreated human waste. Chicago and Cincinnati were the first two American cities to enact laws ensuring cleaner air in 1881.

The development of nuclear science introduced radioactive contamination, which can remain lethally radioactive for hundreds of thousands of years.

Nuclear weapons continued to be tested in the Cold War, especially in the earlier stages of their development. The toll on the worst-affected populations and the growth since then in understanding the critical threat to human health posed by

radioactivity has also been a prohibitive complication associated with nuclear power.



International catastrophes such as the wreck of the Amoco Cadiz oil tanker off the coast of Brittany in 1978 and the Bhopal disaster in 1984 have demonstrated the universality of such events and the scale on which efforts to address them needed to engage. The borderless nature of the atmosphere and oceans inevitably resulted in the implication of pollution on a planetary level with the issue of global warming.

A much more recently discovered problem is the Great Pacific Garbage Patch, a huge concentration of plastics, chemical sludge and other debris which has been collected into a large area of the Pacific Ocean by the North Pacific Gyre. This is a less well-known pollution problem than the others described above but has multiple and serious consequences such as increasing wildlife mortality, the spread of invasive species and human ingestion of toxic chemicals.

Pollution introduced by light at night is becoming a global problem, more severe in urban centres, but contaminating also large territories, far away from towns.

Growing evidence of local and global pollution and an increasingly informed public over time have given rise to environmentalism and the environmental movement, which generally seek to limit human impact on the environment.





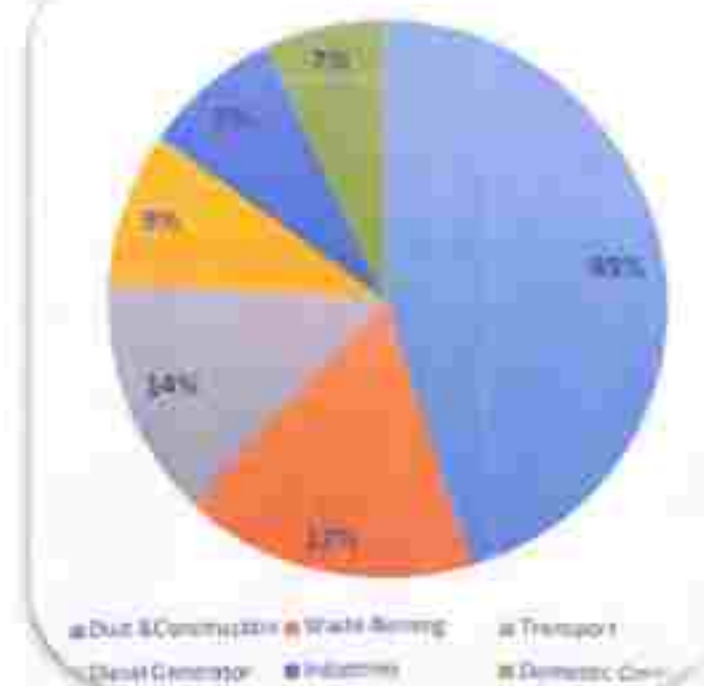
Air pollution in the US, 1973

Types Of "Pollution"

The major forms of pollution are listed below along with the particular contaminants relevant to each of them:

- Air pollution: the release of chemicals and particulates into the atmosphere. Common gaseous pollutants include carbon monoxide, sulphur dioxide, chlorofluorocarbons (CFCs) and nitrogen oxides produced by industry and motor vehicles. Photochemical ozone and smog are created as nitrogen oxides and hydrocarbons react to sunlight. Particulate matter or fine dust is characterized by their micrometre size PM_{10} to $PM_{2.5}$.

Sources of Air Pollution



- Electromagnetic pollution: the overabundance of electromagnetic radiation in their non-ionizing form, such as radio and television transmissions, Wi-fi etc. Although there is no demonstrable effect on humans there can be interference with radio-astronomy and effects on safety systems of aircraft and cars.



- Light pollution: includes light trespass, over-illumination and astronomical interference. A light pollution is a form of waste energy that can cause adverse effects and degrade environmental quality. Light is generated by electricity, which is usually generated by the combustion of fossil fuels, so there is a connection between light pollution and air pollution.



- Littering: the criminal throwing of inappropriate man-made objects, unremoved, onto public and private properties without consent. Litter can exist in the environment for long periods before decomposition and be transported over large distances into the world's oceans. Litter can affect the quality of life.





- Noise pollution: which encompasses roadway noise, aircraft noise, industrial noise as well as high-intensity sonar. 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. 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, lawn care maintenance, construction, electrical generators, wind turbines, explosions, and people.

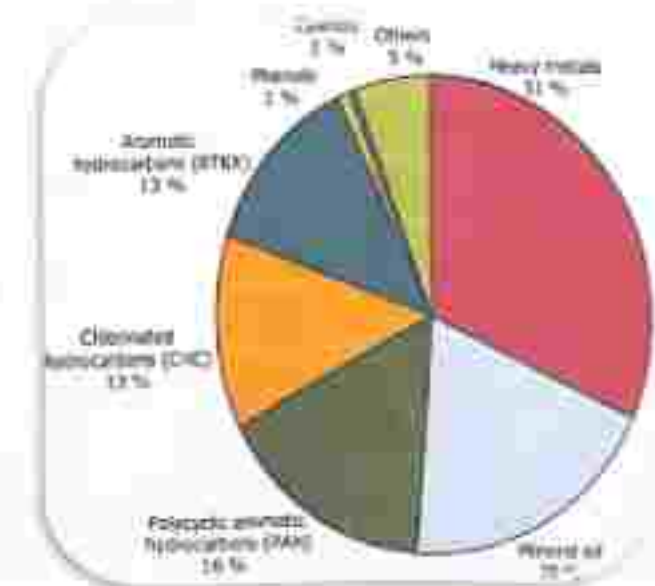




- *Plastic pollution: involves the accumulation of plastic products and microplastics in the environment that adversely affects wildlife, wildlife habitat, or humans. Whether being mistaken for food by animals, flooding low-lying areas by clogging drainage systems, or simply causing significant aesthetic blight, plastics have attracted increasing attention as a large-scale pollutant.*



- Soil contamination: occurs when chemicals are released by spills or underground leakage. The most significant soil contaminants are hydrocarbons, heavy metals, MTBE, herbicides, pesticides, chlorinated hydrocarbons and chemical fertilizers.



- Radioactive contamination: resulting from 20th-century activities in atomic physics, such as nuclear power generation and nuclear weapons research, manufacture and deployment.



- Thermal pollution: is a temperature change in natural water bodies caused by human influence, such as the use of water as coolant in a power plant.



- Visual pollution: can refer to the presence of overhead power lines, motorway billboards, scarred landforms (as from strip mining), open storage of trash, municipal solid waste or space debris.





- Water pollution: by the discharge of industrial wastewater from commercial and industrial waste (intentionally or through spills) into the surface waters; discharges of untreated sewage, and chemical contaminants, such as chlorine, from treated sewage; release of waste and contaminants into surface runoff flowing to surface waters (including urban runoff and agricultural runoff, which may contain chemical fertilizers and pesticides; also including faeces from open defecation – still a major problem in many developing countries); groundwater pollution from waste disposal and leaching into the ground, including from pit latrines and septic tanks; eutrophication and littering.



WATER POLLUTION



Cost Of Pollution

Pollution has a cost. Manufacturing activities that cause air pollution impose health and clean-up costs on the whole of society. A manufacturing activity that causes air pollution is an example of a negative externality in production. A negative externality in production occurs "when a firm's production reduces the well-being of others who are not compensated by the firm." For example, if a laundry firm exists near a polluting steel manufacturing firm, there will be increased costs for the laundry firm because of the dirt and smoke produced by the steel manufacturing firm. If external costs exist, such as those created by pollution, the manufacturer will choose to produce more of the product than would be produced if the manufacturer were required to pay all associated environmental costs. Because responsibility or consequence for self-directed action lies partly outside

the self, an element of externalization is involved. If there are external benefits, such as in public safety, less of the good may be produced than would be the case if the producer were to receive payment for the external benefits to others. However, goods and services that involve negative externalities in production, such as those that produce pollution, tend to be over-produced and underpriced since the externality is not being priced into the market.

Pollution can also create costs for the firms producing the pollution. Sometimes firms choose or are forced by regulation, to reduce the amount of pollution that they are producing. The associated costs of doing this are called abatement costs, or marginal abatement costs if measured by each additional unit.



Effects Of Pollution

Human health

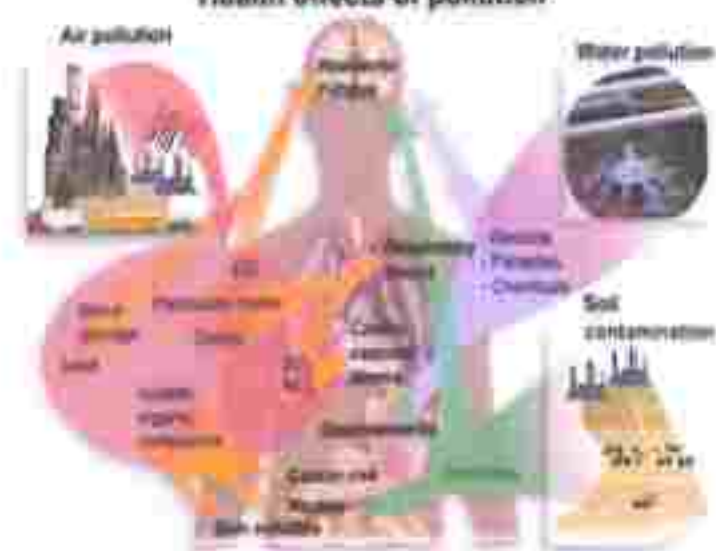
Adverse air quality can kill many organisms, including humans. Ozone pollution can cause respiratory disease, cardiovascular disease, throat inflammation, chest pain, and congestion. Water pollution causes approximately 14,000 deaths per day, mostly due to contamination of drinking water by untreated sewage in developing countries. Water pollution can also lead to water-borne diseases such as gastrointestinal diseases and parasitic infections for people using polluted water for drinking, bathing, washing or irrigation.

Oil spills can cause skin irritations and rashes. Noise pollution induces hearing loss, high blood pressure, stress, and sleep disturbance. Mercury has been linked to developmental deficits in children and neurologic symptoms.

Older people are majorly exposed to diseases induced by air pollution. Those with heart or lung disorders are at additional risk. Children and infants are also at serious risk. Lead and other heavy metals have been shown to cause neurological problems. Chemical and radioactive substances can cause cancer as well as birth defects.



Health effects of pollution



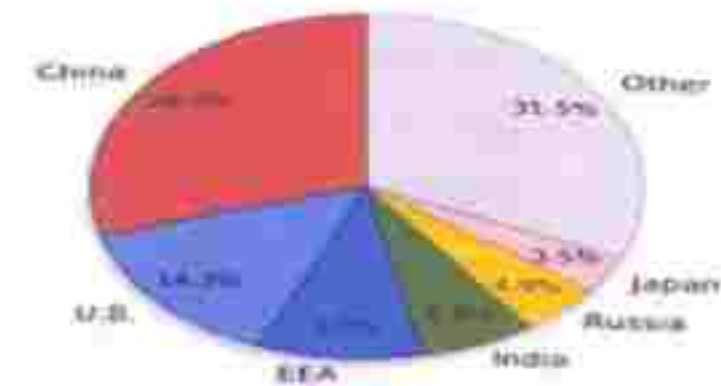
Environment



The great Pacific garbage patch

Pollution is present widely in the environment. There are several effects of this:

- Biomagnification describes situations where toxins (such as heavy metals) may pass through trophic levels, becoming exponentially more concentrated in the process.



Global carbon dioxide emissions by jurisdiction (as of 2015)

- Carbon dioxide emissions cause ocean acidification, the ongoing decrease in the pH of the Earth's oceans as CO_2 becomes dissolved.
- The emission of greenhouse gases leads to global warming which affects ecosystems in many ways.
- Invasive species can outcompete native species and reduce biodiversity. Invasive plants can contribute debris and biomolecules (allelopathy) that can alter soil and chemical compositions of an environment, often reducing native species' competitiveness.

- Nitrogen oxides are removed from the air by rain and fertilise land which can change the species composition of ecosystems.
- Smog and haze can reduce the amount of sunlight received by plants to carry out photosynthesis and leads to the production of tropospheric ozone which damages plants.
- Soil can become infertile and unsuitable for plants. This will affect other organisms in the food web.
- Sulphur dioxide and nitrogen oxides can cause acid rain which lowers the pH value of soil.
- Organic pollution of watercourses can deplete oxygen levels and reduce species diversity.

Pollution Control And Regulation And Monitoring

Regulation and monitoring

To protect the environment from the adverse effects of pollution, many nations worldwide have enacted legislation to regulate various types of pollution as well as to mitigate the adverse effects of pollution.

Pollution control

Pollution control is a term used in environmental management. It means the control of emissions and effluents into air, water or soil. Without pollution control, the waste products from overconsumption, heating, agriculture, mining, manufacturing, transportation and other human activities, whether they accumulate or disperse, will degrade the environment. In the hierarchy of controls, pollution prevention and waste minimization are more desirable than pollution control. In the field of land development, low impact development is a similar technique for the prevention of urban runoff.

- *Practices*
- *Recycling*
- *Reusing*
- *Waste minimisation*
- *Mitigating*

- *Pollution prevention*
- *Compost*

Pollution control devices

- *Air pollution control*
- *Thermal oxidizer*
- *Dust collection systems*
- *Baghouses*
- *Cyclones*
- *Electrostatic precipitators*
- *Scrubbers*
- *Baffle spray scrubber*
- *Cyclonic spray scrubber*
- *Ejector venturi scrubber*
- *Mechanically aided scrubber*
- *Spray tower*
- *Wet scrubber*
- *Sewage treatment*
- *Sedimentation (Primary treatment)*
- *Activated sludge bio treaters (Secondary treatment; also used for industrial wastewater)*
- *Aerated lagoons*
- *Constructed wetlands (also used for urban runoff)*
- *Industrial wastewater treatment*
- *API oil-water separators*
- *Biofilters*
- *Dissolved air flotation (DAF)*

- Powdered activated carbon treatment
- Ultrafiltration
- Vapor recovery systems.

Conclusion

The earliest precursor of pollution generated by life forms would have been a natural function of their existence. The attendant consequences on viability and population levels fell within the sphere of natural selection. These would have included the demise of a population locally or ultimately, species extinction. Untenable processes would have resulted in a new balance brought about by changes and adaptations. At the extremes, for any form of life, consideration of pollution is superseded by that of survival.

For humankind, the factor of technology is a distinguishing and critical consideration, both as an enabler and an additional source of byproducts. Short of survival, human concerns include the range from quality of life to health hazards. Since science holds experimental demonstration to be definitive, modern treatment of toxicity or environmental harm involves defining a level at which an effect is observable. Common examples of fields where practical measurements are crucial include automobile emissions control, industrial exposure (e.g., Occupational Safety and Health Administration (OSHA) PELs), toxicology (e.g., LD50), and medicine (e.g., medication and radiation doses).

"The solution to pollution is dilution", is a dictum which summarizes a traditional approach to pollution management whereby sufficiently diluted pollution is not harmful. It is well-suited to some other modern, locally scoped applications such as laboratory safety procedures and hazardous material release emergency management. But it assumes that the diluent is in virtually unlimited supply for the application or that those resulting dilutions are acceptable in all cases.

Such simple treatment for environmental pollution on a wider scale might have had greater merit in earlier centuries when physical survival was often the highest imperative, human population and densities were lower, technologies were simpler and their byproducts more benign. But these are often no longer the case. Furthermore, advances have enabled the measurement of concentrations not possible before. The use of statistical methods in evaluating outcomes has given currency to the principle of probable harm in cases where assessment is warranted but resorting to deterministic models is impractical or infeasible. In addition, consideration of the environment beyond its direct impact on human beings has gained prominence.

Yet in the absence of a superseding principle, this older approach predominates practices throughout the world. It is the basis by which to gauge concentrations of effluent for legal release, exceeding which penalties are assessed or

restrictions applied. One such superseding principle is contained in modern hazardous waste laws in developed countries, as the process of diluting hazardous waste to make it non-hazardous is usually a regulated treatment process. Migration from pollution dilution to elimination in many

cases can be confronted by challenging economical and technological barriers.

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To complete this project, I took help from the following websites:-

- <https://en.wikipedia.org/wiki/Pollution>
- <https://www.nationalgeographic.org/encyclopedia/pollution/>
- <https://www.britannica.com/science/pollution-environment>

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স্বাক্ষরিতা স্বীকৃতি →

আমি আমার প্রকল্পের জাতীয় সাক্ষর-২ প্রতি নিম্নলিখিত স্বাক্ষরিতা
প্রকাশ করতে চাই, যিনি আমাকে এই চাকরিতে প্রকল্পটি করার সুবর্ণ
সময় দিয়েছেন। এছাড়া প্রকল্পটি করার সময় 'পরিবেশ' নামক বইটির
সাধ্যমে এই প্রকল্পটি সমাপ্ত করেছি।

সূচিপত্র

পৃষ্ঠা সংখ্যা

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জলদূষণ

পৃ-1

□ জলদূষণ → জলের স্বাভাবিক কোয়ালিটি বদলায় যাতে মানুষের স্বাস্থ্যের ক্ষতি হয়। জলের স্বাদ, রাসায়নিক ও জৈব বৈশিষ্ট্যের পরিবর্তন হয় এবং তার ফলে জলজ উদ্ভিদ, প্রাণী ও মানুষের ক্ষতি হয়। জলদূষণের কারণে, জল জলের স্রোত প্রাচীরে জমাট জলদূষণ বা ওয়াটার পলিউশন বলে।

অন্যান্য ক্ষেত্রে 'Environmental Pollution' বলা হয় যে জলের বৈশিষ্ট্য এবং সুবাসিত জলের সুগন্ধাদায়ী পরিবর্তনকে জলদূষণ বলে। এর ফলে জলের উৎসাদিতা নষ্ট হয়।

আইএইসইএ 'Ecology And the Quality of our Environment' বলা হয় জলদূষণের সংজ্ঞা বলে যে 'সুস্থ মানুষের কর্মকাণ্ড ও প্রাকৃতিক কারণে জলের প্রাকৃতিক, রাসায়নিক এবং জৈব উৎসাদনগুলির ক্ষতি নষ্ট হওয়ায় জলদূষণ বলে।



□ জলদূষণের কারণ →

i) জৈব ও রাসায়নিক → জৈব-রাসায়নিক জৈব, মিশ্রিত ও রাসায়নিক জৈব, জৈব জৈব, রাসায়নিক জৈব মিশ্রিত জৈব

Name - Neha Mishra

Class - 2nd Sem (1st year)

Roll - 21/BAH/0205

Subject - AECC 2 [E.N.V.S.]

Registration No - 013-1211-0086-21

विषय - जैव अम्ल

संदर्भग्रन्थ -

<u>विषय</u>	<u>पृष्ठ</u>
जैव अम्ल	1
जैव अम्ल विभिन्न संसाधन	1-2
जैव अम्ल (अमीनो अम्ल)	2-4
जैव अम्ल आरोग्य	4-5
जैव अम्ल निष्पत्ति	5-7
मानव शरीर में जैव अम्ल का स्थान	7-9
जैव अम्ल का उपयोग	9-10
संदर्भग्रन्थ	10

NAME: SAHELI DAS

DEPARTMENT: HISTORY

SEMESTER: 2

SUBJECT: ENVIRONMENTAL SCIENCE (AECC-2)

TOPIC: Concept of renewable and non-renewable

resources

RENEWABLE RESOURCES

DEFINITION

Renewable resources are generally living resources (trees, goats, coffee etc). which can renew themselves after they are harvested if used sustainably.

Flow renewable resources are very much like nonrenewable resources, only they do not need regeneration, unlike nonrenewable resources.

SOURCES OF RENEWABLE RESOURCES

The sources could sustain for a longer period of time and can easily be renewed after. Sustainable sources are biomass, nuclear power, geothermal, wind energy, solar energy, tidal energy, hydroelectricity.

The sources of renewable resources are known to be less polluting and therefore the whole world is looking forward to new carbon emission norms, where carbon will play a major role in developing new factories and industries.

TYPES OF RENEWABLE RESOURCES

There are various types of renewable resources are :-

1. Solar Energy- Solar Energy is the energy derived directly from the sun and it is an extremely clean and renewable form of energy. The sun is the most abundant source of energy on Earth. The main uses of solar energy are: water heating, production of electricity, heating buildings.
2. Wind Energy- Wind Energy is the conversion of wind into more useful forms. Most modern wind power is generated in the form of electricity by converting the rotation of turbine blades into electric current by means of an electrical generator. Wind power is used in large scale wind farms for national electrical grids as well as in small individual turbines for providing electricity to rural residences or isolated locations.
3. Hydropower- Hydropower is power derived from the energy of falling water, running water or ocean energy which may be harnessed for useful purposes. It is a very common resource which can be used to generate electricity or to do useful work.

Hydroelectric power plants capture the energy of falling water to generate electricity. A dam usually raises the water level of the river to create falling water and it also makes it possible to control the flow of water. The force of falling water pushing against the turbine's blades causes the turbine to spin. The turbine converts the kinetic energy of falling water into mechanical energy. A generator is connected to the turbine, so when the turbine spins it causes the generator to spin also. It converts the mechanical energy from the turbine into electrical energy.

4. Geothermal Energy - Geothermal Energy is the energy extracted from heat stored in the Earth. This geothermal energy originates from the original formation of the planet, from radioactive decay of minerals, and from solar energy absorbed at the surface. Geothermal energy is cost effective, reliable, sustainable, and environmentally friendly. Geothermal electric plants were traditionally built exclusively on the edges of tectonic plates where high temperatures geothermal resources are available near the surface. The thermal efficiency of geothermal electric plants is low, around 10-23%, because geothermal fluids do not reach the high temperatures of steam. Geothermal energy requires no fuel, therefore immune to fuel cost fluctuations, but capital costs are significant.

Nuclear power plants work when nuclear reactions and their equipment contain and control the chain reactions, most commonly fuelled by Uranium-235, to produce heat through fission. The heat warms the reactor's cooling agent, typically water, to produce steam. The steam is then channelled to spin turbines, activating an electric generator to create low-carbon electricity.

8. Tidal Energy - Tidal Energy is a form of hydropower

that converts energy obtained from tides into useful forms of power, such as electricity. Tides are created by the gravitational effect of the moon and the sun on the earth causing cyclical movement of the seas. Although tidal energy is renewable energy, it has traditionally suffered from fairly high cost and limited availability of use spots with sufficiently high tidal ranges or flow rapidity, therefore constraining its total availability.

CHARACTERISTICS

Some characteristics of renewable resources are as follows:

- i) These resources are capable of regeneration.
- ii) These are renewed along with exploitation and hence, always available for use.
- iii) The regeneration of these sources involves some ecological processes on a time scale.
- iv) The renewable sources become non-renewable if used at a greater rate than the environment's capacity to replenish them.
- v) These resources comprise materials like food, timber, raw materials for clothing, leather etc. These also include oxygen, fresh water, solar energy and biomass.

DISADVANTAGES

There are also some disadvantages of renewable resources and they are:-

1. Renewable Energy is not available round the clock

Renewable Energy sources are natural forces that are strongly dependent on the weather condition. Therefore, when you have bad weather condition, renewable energy technologies such as solar cells are of less use.

2. The Efficiency of renewable technologies is low

The efficiency of energy conversion devices is of great importance when it comes to prioritising energy sources. Unfortunately, the efficiency of renewable technologies is not that high compared with traditional energy conversion devices.

3. The initial cost of Renewable Energy is High

The amount of energy we can get from renewable technologies, their initial cost is high and sometimes unaffordable.

NON-RENEWABLE RESOURCES

DEFINITION

Non-renewable resources are natural resources that exist in a fixed amount that cannot be re-made, re-grown or regenerated as fast as it is consumed and used up.

SOURCES OF NON RENEWABLE RESOURCES

There are certain types of non-renewable resources: oil, natural gas, coal, nuclear energy. Oil, natural gas, coal are collectively called fossil-fuels. Fossil fuels were formed within the Earth from dead plants and animals over millions of years - hence the name "fossil fuels".

TYPES OF NON RENEWABLE RESOURCES

There are various types of non-renewable resources they are:

1. Coal - Coal is combustible black or brown rock, used primarily as a fuel; it was also the chief

CHARACTERISTICS

Some characteristics of non-renewable resources are:-

- i) Non-renewable energy sources are not easily replenished.
- ii) Non-renewable energy sources deplete over time.
- iii) Non-renewable energy sources are not environment friendly.
- iv) Comparatively lower cost in the short-term for installation.
- v) Do not need large area for production unlike wind or solar farms.
- vi) Not always available locally and requires regular supply of unrefined material.

ADVANTAGES

There are some advantages of non-renewable resources and they are:-

1. They are abundant and affordable. For example, oil and diesel are still good choices for powering vehicles.
2. They are high in energy. Resources such as coal and oil tend to provide us with more energy compared to renewable energies such as solar or wind energy.
3. These resources are easy to use whether at home or anywhere else.
4. They are cost effective and easier to produce and use.
5. Most of the non-renewable sources are also very easy to store.
6. There are huge profits to be made from mining coal, selling oil or building natural gas pipelines.

CONCLUSION

Our results confirm that the use of non-renewable energy sources for production in developing countries leads to degradation of the environment, while renewable energy sources are the safeguard of environment-quality. Financial development in the sample countries has also been found a weak determinant to enhance environmental quality which needs attention. The countries should strengthen financial institutions to fund renewable energy projects.

Samartha

26/05/2021

'DEFORESTATION'

NAME : MEHAR SALIM

SUBJECT: ENVS

SEMESTER : SEM 2

ROLL NUMBER : 21\BAH\0242

**COLLEGE NAME : GOKHALE
MEMORIAL GIRLS COLLEGE**

REGISTRATION NO :- 013-1211-0111-21.

I. INTRODUCTION

Deforestation is considered to be one of the contributing factors to global climate change. According to Michael Daley, associate professor of environmental science at Lasell College in Newton, Massachusetts, the No. 1 problem caused by deforestation is the impact on the global carbon cycle. Gas molecules that absorb thermal infrared radiation are called greenhouse gases. If greenhouse gases are in large enough quantity, they can force climate change, according to Daley. While oxygen (O₂) is the second most abundant gas in our atmosphere, it does not absorb thermal infrared radiation, as greenhouse gases do. Carbon dioxide (CO₂) is the most prevalent greenhouse gas. In 2012, CO₂ accounted for about 82 percent of all U.S. greenhouse gas, according to the Environmental Protection Agency (EPA). Trees can help, though. 300 billion tons of carbon, 40 times the annual greenhouse gas emissions from fossil fuels, is stored in trees, according to Greenpeace. The deforestation of trees not only lessens the amount of carbon stored, it also releases carbon dioxide into the air. This is because when trees die, they release the stored carbon. According to the 2010 Global Forest Resources Assessment, deforestation releases nearly a billion tons of carbon into the atmosphere per year, though the numbers are not as high as the ones recorded in the previous decade. Deforestation is the second largest anthropogenic (human-caused) source of carbon dioxide to the atmosphere, ranging between 6 percent and 17 percent.

Carbon isn't the only greenhouse gas that is affected by deforestation. Water vapor is also considered a greenhouse gas. "The impact of deforestation on the exchange of water vapor and carbon dioxide between the atmosphere and the terrestrial land surface is the biggest concern with regard to the



climate system," said Daley. Changes in their atmospheric concentration will have a direct effect on climate.

II.DEFORESTATION AND ITS IMPACT ON ENVIRONMENT

This is when a large number of trees are cleared from areas of land for various reasons. The impact on the environment is extremely adverse, and there will be terrible consequences for future generations due to us cutting down, burning, or otherwise damaging the forests. In my essay, I am going to investigate the reasons as to why deforestation occurs and its impact on the environment. I will also look at any measures taken to minimise deforestation to prevent global destruction of rainforests, and ensure resources are available for future generations. There are many reasons accounting for deforestation despite its harmful effect on the environment. People need timber and wood from the trees to make paper, houses, and buildings due to urbanisation in some areas. It is used for commercial as well as industrial use. Trees may also have aesthetic, recreational, economical, historical, cultural and religious values to humans. Timber and other products of the forest are important economically both locally and as exports. Deforestation also provides employment to the people who harvest the wood. There are also many other products of the forest apart from wood as a result of deforestation which Herbalists, rubber tappers, hunters and collectors of fungi nuts, bamboo and berries can utilise. Other non-wood forest products come in the form of medicinal compounds, dyes and fabrics. There are many people who are dependent on forestlands for their livelihoods. One-third of the world's people depend on wood for fuel as a significant energy source. A

competitive global economy forces the need for money in poorer tropical countries. At the national level, the governments sell logging concessions to raise money for projects, to pay international debt, or to develop industry. Brazil had an international debt of \$159 billion in 1995, on which it must make payments each year. The logging companies seek to harvest the forest and make profit from the sales of valuable hardwoods (such as mahogany) and pulp. Peasant farmers often deforest to raise crops for self-subsistence, and are driven by the basic human need for food. Most tropical countries are very poor and farming is a basic way of life for a large part of the population. Farmers in these countries do not have the money to buy necessities and must raise crops for food and to sell. One main cause of deforestation in the Amazon is the spread of highways. Recent development of regions in the Amazon resulted in a need for new roads and highways. The opening of highways over the last 20 years promoted new and easy access to forested areas. This expansion combined with government incentives for development of the region, made it possible for activities which causes rapid deforestation, such as land speculation, cattle ranching, timber extraction, clearing for cash crops like rubber, cocoa and sugar cane and exploration for oil and minerals. Unsuccessful farmers tend to be unstable, selling out and moving on to new frontiers where they will deforest again, which is very evident in satellite images of the Amazon. The issue is no longer how to prevent migration to the Amazon from the rest of the country but how to ensure that the farmers already in the Amazon remain on the deforested land. This would in turn reduce migration and further deforestation inland. The poor farmers in the Amazon depend on the resources from the forest for their very survival. Land is needed for crops; trees are burned and used for fuel, and fodder for their animals. The Amazonians do not have very much experience with agriculture and they do not have very much technology. They simply use slash and burn farming, with the belief that setting fire on the forest will rejuvenate the land

The climate becomes more extreme due to deforestation. The occurrence and strength of floods and droughts increases. Forests store large amounts of carbon which are released once the trees are cut down or burnt. Deforestation and burning of biomass will be responsible for 15% of the greenhouse effect between 1990 and 2025. The stress of such environmental change may cause some species to be more susceptible to the effects of insects, pollution, disease and fire. Rising sea levels brought on by global warming have the potential to threaten the locations of many major cities, much fertile agricultural land, the purity of freshwater supplies and the survival of some nations. The clearing of forestland results in increased erosion and landslides. Soil from areas of reduced forest cover can fill reservoirs created by dams. Thus a dam's ability and future capacity to generate hydroelectricity and provide irrigation would be significantly reduced. Forests play a crucial role in the management of fisheries. Logging has directly and indirectly damaged spawning grounds, blocked river channels, raised water temperatures and caused water levels in streams to fluctuate dangerously. The loss of fuel wood means depriving soil of nutrition which leads to a receding forest. This causes an increase in rainfall and risk of flooding and soil erosion. A loss of trees also emits a higher concentration of CO₂ and other greenhouse gases that in effect increase the temperature. and violent confrontation and fuelled bitter rivalries between area residents, the forest sector and environmentalists. Deforestation also leads to a drier atmosphere that increases the risk of forest fires. As trees continue to get cut down, the watershed protection of the forest diminishes, leading to excess flooding and billions of dollars worth of damage. Deforestation affects the earth tremendously; leaving us with pollution due to an excessive amount of carbon dioxide in the air, soil erosion, stream erosion, loss of fisheries and water supply, as well as the loss of recreation. Trees protect the soil from the rain and wind. When they are cut down, the rain leaches out the nutrients

from the soil and the wind blows the soil away. Even if the trees are replanted, they may not be able to grow in the impoverished soil. IN rainforests, half of the rainfall is evaporated from the surfaces of soils and leaves or transpired by plants. The other half runs into streams and rivers and eventually reaching the ocean. When trees have been cut down, the recycling of water becomes inefficient leading to lower rainfall in the region

Reasons for Deforestation :

It is hard to think that there was a time when 90% of the earth was covered by trees, but this was once the case. If so, one asks, naturally, what happened to all these trees? Why do people cut down trees?

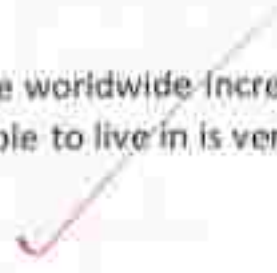
The following reasons are as follows :

a) Demand for land for cultivation. This has been seen both in Kenya and other parts of the world especially countries that have Agriculture as the backbone of their economy. Trees have been cut down to obtain land for cultivation of both subsistence and cash crops, both by governments and individuals.

b) Need for firewood People, especially those who live in rural areas where electricity and gas are unavailable, resort to use of firewood as a source of heat. Here, wood is cut down and burnt.

c) Need for land to build industries Industries require a lot of land and while industrialization is important for every country, it is the bane of large tracts of forest. People need jobs in order to provide for their daily needs.

d) Need for land to build houses With the worldwide increase in population, land to build houses for people to live in is very much required.



have just lost their lives. Hurricanes like Katrina are still fresh in our memories .

•Greenhouse effect and global warming: Nature balances the flow of energy and nutrients. Forests play a very vital role in these cycles e.g. the carbon cycle where deforestation causes carbon dioxide to remain in the atmosphere. Accumulation of carbon dioxide in the atmosphere acts as a blanket that traps long wave radiation of heat and prevents it from escaping the surface of the earth back into the atmosphere. This phenomenon is known as the greenhouse effect. The trapped radiation is converted into heat. This heat causes global warming. Destruction of forests also causes modification of climate of an area mostly leading to desertification and aridity

IV.SOLUTIONS TO CONTROL THE DEFORESTATION

a) For every tree that is cut, three, not two should be planted in its case. We have reached such a critical point that to prevent the desertification of the world that many more trees need to be planted.

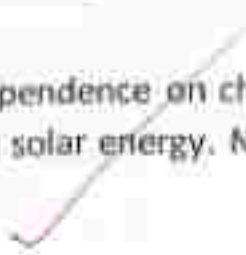
b) Unless it is necessary, water catchments areas should strictly be left alone.

c) Quick growing varieties of soft wood trees should be grown for commercial uses e.g. making of furniture, pencils and paper.

d) We should carry out consistent mass education on a worldwide scale, on the importance of reforestation and the dangers of deforestation.

e) We need to enact and enforce strict laws against deforestation, worldwide.

f) It is high time that we reduced our dependence on charcoal as a source of fuel and make use of wind and solar energy. Nature works



as a whole cycle. This is seen not only in animals where predator and prey work together but also in the different energy and nutrient cycles. As already explained earlier, forests play a crucial role in this equation. The knowledge of how to conserve

V.CONCLUSION

Deforestation can have a negative impact on the environment. The most dramatic impact is a loss of habitat for millions of species. Eighty percent of Earth's land animals and plants live in forests, and many cannot survive the deforestation that destroys their homes. Deforestation also drives climate change. Thus, deforestation is an important issue to be discussed. It has adverse effects on each living beings' life. Deforestation has become a huge concern in today's life as there has been a rise in the decline of forests. Trees are cut down in order to manufacture paper products as well as for livestock farming and so on. In order to feed the ever increasing population of the Earth, trees and forests are converted to farm lands. This has become a threat to the world and it has been seen that rates of decline in the forests are increasing at a rapid rate. This has led the planet to warm up and leading to high temperatures. This cycle would continue for the following years to come unless necessary steps are taken to prevent deforestation. Deforestation has caused fewer trees to grow. It has also gone a long way in eliminating valuable ecosystems in the planet. If major steps towards afforestation are not taken, then even the great adaptability of human beings may not be enough to cope up with the harsh climate of the future. Deforestation does have solutions. It's just that the people must step forward. The safe keeping of our precious planet lies with each and every member of its human population. We are

ACKNOWLEDGEMENT

I Mehar Salim , a student of Gokhale Memorial Girls College , would like to thank my Prof . Mr. Shantanu Samanta for helping me do my projects and also my parents for helping me with my project work .

Thank you .

Samanta
26/05/2022

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GOKHALE MEMORIAL GIRLS

Department → History

COLLEGE

SEMESTER - 2

SUBJECT - ENVS

Acknowledgement

I would like to express my special thanks of gratitude to my professor Dr. Santanu Samanta who gave me the golden opportunities to this project who also helped me in completing my project. I came to know about many things.

Secondly, I would also like to thank my parents, and my friends who helped a lot in finalizing this project within the limited time frame.



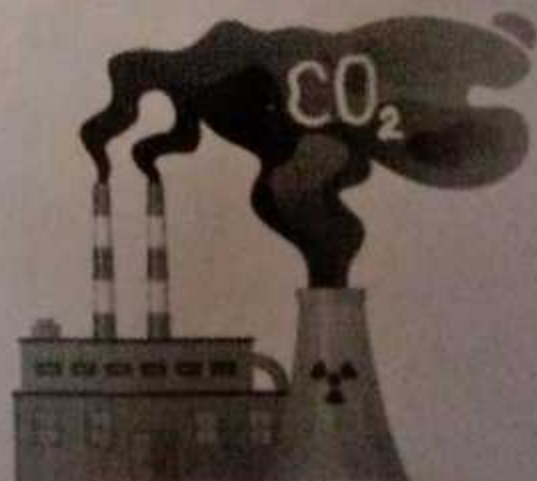
WASTE DISPOSAL



ACID RAINS



WATER POLLUTION



AIR POLLUTION

• What is Pollution?

Pollution is the introduction of contaminants into the natural environment that cause adverse change. Pollution can be in any form (solid, liquid, gas). Pollutants, the components of pollution, can be either foreign substance or natural occurring. Although environmental pollution can be caused by natural event the word pollution generally implies that the contaminants have an anthropogenic source.

• Types of Pollution

- Air
- Light
- Litter
- Noise
- Plastic
- Soil
- Radioactive
- Thermal
- Visual
- Water
- Electromagnetic
- Marine



• Natural pollution

Main sources of natural pollution are volcanoes, which during eruption release large quantities of harmful gases into the atmosphere.

Volcanic gases include carbon dioxide, which can be fatal in large concentrations and contributes to climate change.

Wildfires, which can be caused naturally by lightning strikes, are also a significant source.

• Human generated pollution

Motor vehicle emissions are one of the sources of air pollution. China, USA, Russia, India are the world leaders in air pollution emissions.

Principal stationary pollution sources include chemical plants, coal fired power plants, oil refineries, petrochemical plants, nuclear waste disposal activity. Agricultural air pollution comes from contemporary practices which include clear felling and burning of natural vegetation as well as spraying of pesticides and herbicides.

AIR POLLUTION



Air Pollution

Air pollution is release into the atmosphere of gases, finely divided solids, or liquid aerosols at rates that exceed the natural capacity of the environment to dissipate and dilute or absorb them.

• Pollutants - Carbon monoxide, Nitrogen oxide, Sulphur dioxide, ozone, lead, particulate matter.

• Effects of Air pollution on Health - Asthma, damage immune system, respiratory inflammation, heart problems, adverse effect on flora and fauna.

• Causes - burning of fossil fuel, firewood, smoke released from factories, volcanic eruptions, forest fires, bombardment, asteroids, CFCs are some sources of air pollution.

• Preventive Measures - Carpooling, promotion of public transport, no smoking zone creation, Restricted use of fossil fuels, Saving energy, Encouraging organic farming are some preventive measures to control air pollution.



Water pollution

Water pollution, the release of substances into subsurface groundwater or into lakes, streams, rivers etc. In addition to release of substances such as chemicals, trash or microorganisms, water pollution may also include the release of energy, in the form of radioactivity into bodies of water.

Pollutants - Sewage, domestic waste, solid waste, Toxic waste, Sediments, petroleum oil pollution

Effects - destruction of biodiversity, lack of portable water, contamination of food chain, infant mortality, Disease,

Causes - Global warming, deforestation, industry, agricultural farming, rubbish dumping, fuel spillages, Maritime traffic.

Prevention Measures - Reduce CO_2 emission to prevent global warming, reduce use of pesticides, treat waste water, Restrict use of plastic, Encourage sustainable fishing.

Soil Pollution

Soil pollution is defined as persistent of toxic compounds, chemicals, salts, radioactive material or disease causing agents, which have adverse effects on plant growth & animal health.

Causes:- use of fertilizer, pesticides, insecticides, Dumping of solid wastes, waste of municipalities, Deforestation, seepage of landfill.

Effects:- On human beings it will cause headaches, nausea, coughing, sneezing, skin irritation, Biomagnification, Acid rain,

Prevention measure:- use of pesticide should be minimum

- Cropping techniques should be improved.
- Special pits should be selected for dumping wastes.
- Controlled grazing & forest management.
- Wind breaks and wind shield in areas exposed to wind erosion
- Planting of soil binding grasses along banks & slopes prone to rapid erosion.

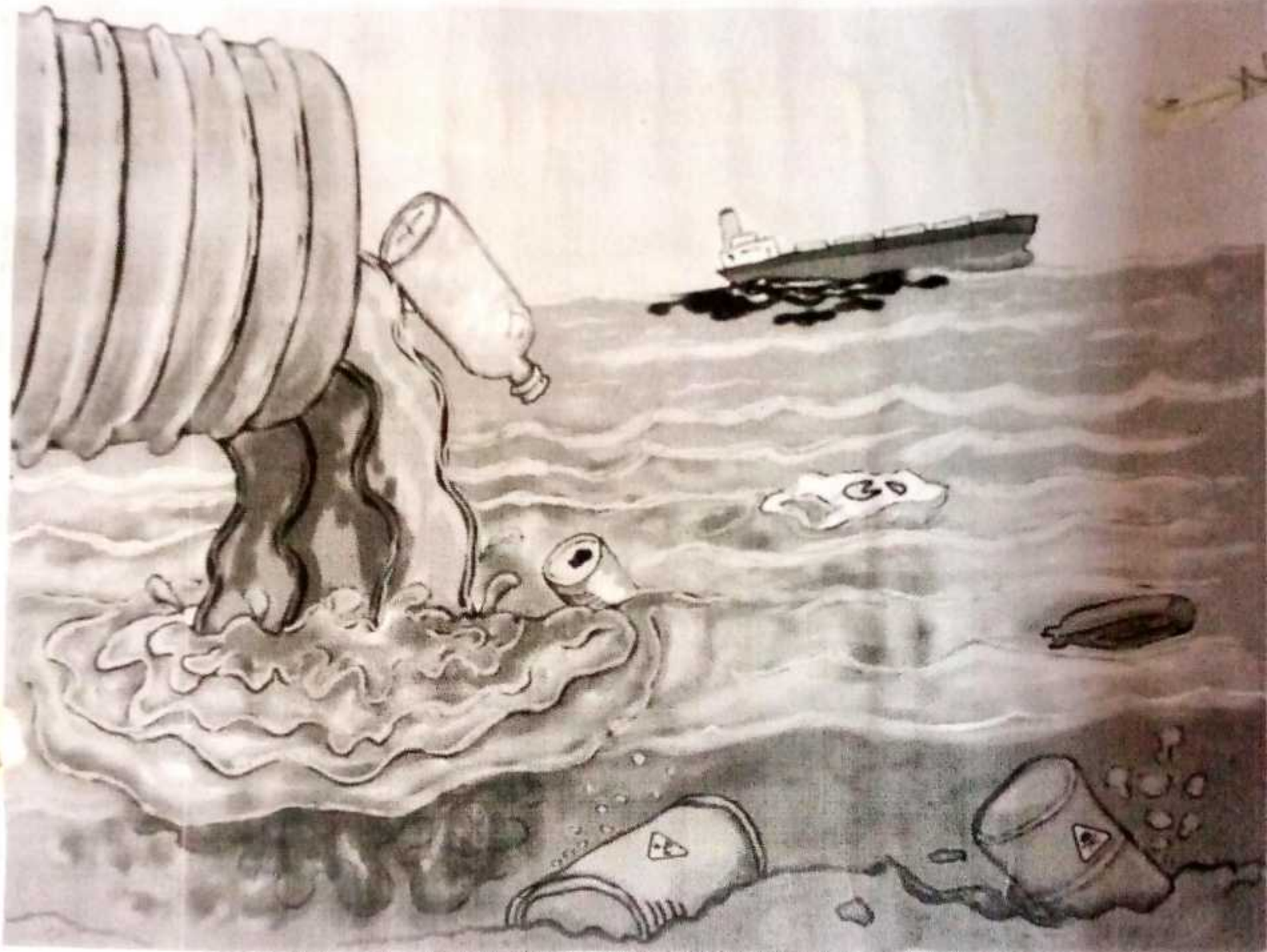
Noise pollution

Noise pollution, are unwanted or excessive sound that can have deleterious effects on human health, wildlife, and environmental quality. It is commonly generated inside many industrial facilities and some other workplace, but it also comes from highway, traffic etc

Causes - Traffic noise, Air traffic noise, construction sites, catering and night life, Animals,

Effects - It will cause respiratory agitation, racing pulse, high blood pressure, heart attacks, stress, effect concentration.

Solution - Govt. can protect certain areas of natural interest, turning off appliances when not in use, use of earplugs, lowering the volume, planting more trees, regular maintenance of vehicle, machines.



Marine Pollution

It is defined as the introduction of substances to the marine environment directly or indirectly by man resulting in adverse effects such as hazardous to human health, obstruction of marine activities and lowering the quality of sea water.

Sources - Municipal waste and sewage from residence and hotels in coastal towns are directly discharged into sea, pesticides and fertilizers too, petroleum and oil wash, Tanker accidents.

Effects

It will lead to development of 'Red tides', Eutrophication, Addition of ammonia, Methane which are toxic to organisms.

Measures - Introduction of sewage treatment before discharging into sea, cleaning oil from surface water, skimming off the oil surface with a suction device, Spreading high density powder over the oil spill, so that oil can be sunk to the bottom.

Other Pollution

(a) Thermal pollution -

It is a degradation of water quality by any process that changes ambient water temperature of a natural body of water caused by human influence.

(b) Electromagnetic - The overabundance of electromagnetic radiation in their non-ionizing form, such as radio and television transmissions, wifi etc. Although there is no demonstrable effect on humans there can be interference with radio-astronomy and effects on safety systems of aircraft & cars.

(c) Light pollution - It includes light trespass, over illumination and astronomical interference.

(d) Littering - the criminal throwing of inappropriate man-made objects, unremoved, onto public and private properties.

(E) Plastic pollution -

Involves the accumulation of plastic products and microplastics in the environment that adversely affects wildlife or humans.

(F) Radioactive pollution -

It is resulting from 20th century activities in Atomic physics, such as nuclear power generation and research, manufacture & deployment.

(G) Visual pollution -

It refers to the presence of overhead power lines, motorway billboards, scarred landscapes, open storage of trash, municipal solid waste waste.

POLLUTION CONTROL

It means the control of emissions and effluents into air, water, soil. without pollution control the waste from overconsumption, breeding, mining, will degrade the environment. Hence, it is need for an hour.

Some devices for pollution control

- Thermal oxidizer
- Dust collection systems - Baghouses
- Scrubbers - wet, spray, cyclonic
- Sewage treatment - sedimentation
- Industrial waste treatment - Biofilters,
Dissolved air flotation, ultrafiltration
- Vapor recovery system
- Phytoremediation.

CONCLUSION

Several attempts are being made world wide on a personal, industrial and governmental level to curb the intensity at which Air pollution is rising and regain a gases are concerned. This is a direct attempt at blocking Global warming. We are seeing a series of innovations and experiments aimed at alternate and unconventional options to reduce pollutants. Air pollution is one of the larger mirrors of man's follies and a challenge we need to overcome to see a tomorrow.